Bangladesh J. Agril. Res. ■ Ten Years Abstract Collection ■ 2007 – 2016

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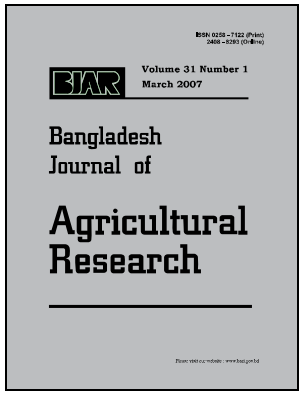

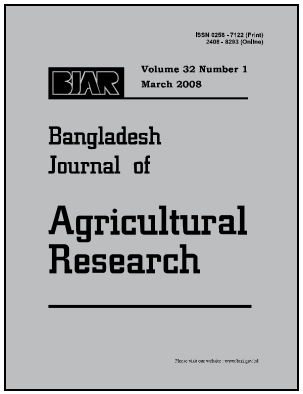

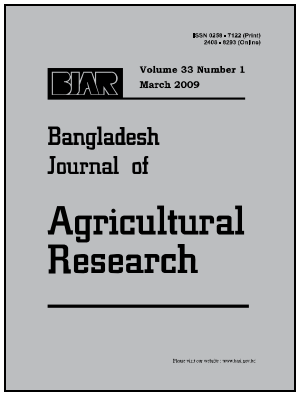

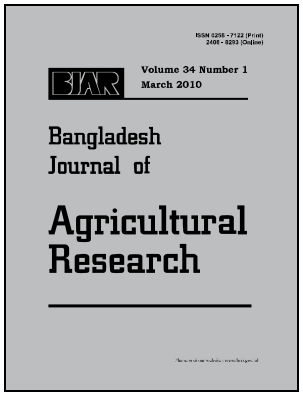

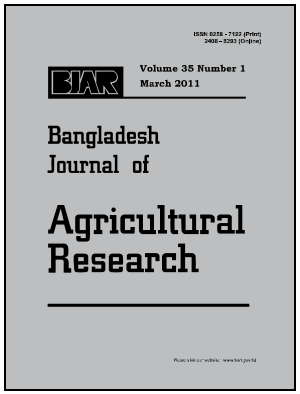

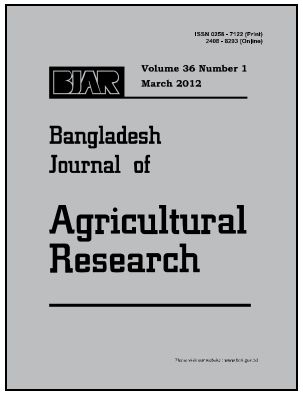

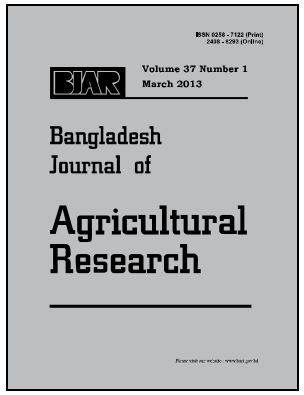

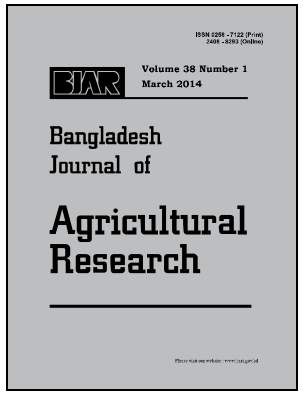

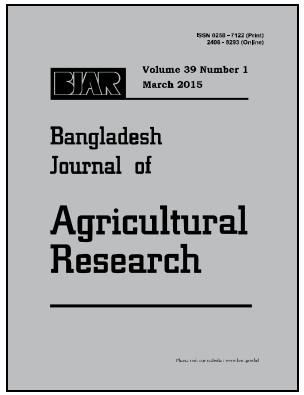

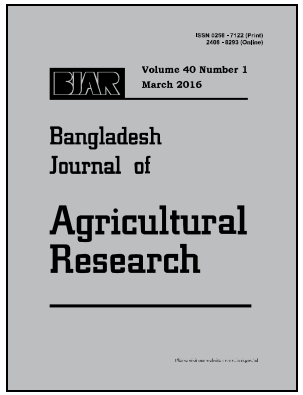

CONTENT

Bangladesh J. Agril. Res. 32(1) : 1-9, March 2007

PERFORMANCE OF NEW POTATO HYBRIDS FOR LATE BLIGHT RESISTANCE, YIELD AND TUBER CHARACTERS IN SHIMLA HILLS

K. C. THAKUR, P. MANIVEL, Y. K. SHARMA
P. H. SINGH, S. K. PANDEY AND P. S. NAIK

Abstract

Evaluation of thirty-eight early to medium maturing hybrids introduced in the All India Coordinated Research Project on Potato (AICRP-Potato) along with the popular potato variety Kufri Jyoti as control during summer in the Indian high hills (Shimla) revealed 100% incidence of late blight in the control Kufri Jyoti. Among the hybrids, J/94-90, J/95-242, MP/97-644, and MP/97-921 had high degree of field resistance to late blight (5% incidence), 21 hybrids were resistant, 10 moderately resistant, and 2 were found susceptible (50% infection on foliage). Three hybrids yielded at par with the control, and 14 hybrids and control produced >20% tuber dry matter.

Keywords : Potato hybrids, late blight resistance, yield, Shimla hills.

Bangladesh J. Agril. Res. 32(1) : 11-16, March 2007

PROFITABILITY OF GROWING RICE SEEDLINGS THROUGH SOIL SOLARIZATION

M. ELAHI BAKSH, CRAIG A. MEISNER, JOHN M. DUXBURY AND JULIE G. LAUREN

Abstract

Soil-borne pathogens and nematodes cause significant rice yield losses every year in Bangladesh. Soil solarization can control soil-borne diseases and nematodes resulting in higher rice yields. A survey was conducted in Dinajpur District of Bangladesh to find out the effect of soil solarization on rice yields and profitability and to document farmers' reactions to this technology. Results showed that transplanted monsoon rice yields were increased on average by about 36% by using solarization on nursery seedbeds prior to raising seedlings compared to non-solarized nursery seedbeds. Farmers produced additional gross return of about Tk. 10,276/ha by investing only Tk. 941/ha additional cost for solarization. Farmers opinion about this rechnology was very high. They claimed it was very easy to do, have low cost and helped increase their livelihood.

Keywords : Profitability, rice seedlings, soil solarization.

Bangladesh J. Agril. Res. 32(1) : 17-28, March 2007

INTEGRATED NUTRIENT MANAGEMENT FOR RADISH-TOMATO-RED AMARANTH-INDIAN SPINACH CROPPING PATTERN IN A HOMESTEAD AREA

S. NOOR, N. C. SHIL AND A. T. M. FARID

Abstract

An experiment was conducted with Radish-Tomato-Red amaranth-Indian spinach cropping pattern in a homestead area of Joydebpur (AEZ-28) during 2000-2001 and 2001-2002. The objective was to find out the optimum dose of chemical fertilizers and organic manure for obtaining higher yield of the crops. The first two crops were fertilized with 3 levels (0, 5 and 10 t/ha) each of poultry manure (PM) and cowdung (CD) in combination with different percentages of the recommended dose of fertilizers (RDF). The second two crops were fertilized with 3 reduced doses (0, 2.5 and 5t/ha) each of PM and CD along with varied percentages of the RDF of nitrogen fertilizer (urea). There were 10 treatment combinations having three replications, whcih were arranged in the randomized complete block design. The result indicated that an amount of 75% RDF along with 5 t/ha of PM (T_5) appeared to be the best combination providing a mean yield of 62.3 and 90.2 t/ha for radish and tomato, respectively, which was statistically at par with T_6 (75% RDF + 10 t PM/ha), but significantly higher over rest of the treatments. Again, an amount

of 75% RD of N along with 2.5 t/ha of PM showed overall best results providing the mean yield of 16.1 and 47.7 t/ha for red amaranth and Indian spinach, respectively, which was statistically identical with the yield obtained from PM @ 5 t/ha in combination with same dose of N fertilizer, but significantly higher over rest of the combinations. Performance of poultry manure was better than that of cowdung. Sole application of either organic manure or chemical fertilizers yielded inferior results over their integrated use. The same treatment T_5 (75% RDF + 5 t/ha PM/ha; 75% RDF of N + 2.5 t PM/ha) was also economically profetable as it gave higher marginal rate of return (5000%).

Keywords : Nutrient management, homestead, cropping pattern.

Bangladesh J. Agril. Res. 32(1) : 29-36, March 2007

MULTIVARIATE ANALYSIS OF DIVERGENCE IN ADVANCED LINES AND LOCAL RICE ACCESSIONS

S. H. HABIB, KHALEDA AKTER, M. K. BASHER AND M. KHALEQUZZAMAN

Abstract

Multivariate analysis was carried out with 30 advanced deep water lines of BRRI and 10 local rice germplasms collected from south-west of Bangladesh. The experiment was conducted in a randomized complete block design (RCBD) with three replications under transplanted condition during T. Aman (rainfed ecosystem) 2004 season at BRRI, Gazipur. The genotypes were grouped into six clusters. Cluster II and V contained the highest number of genotypes (8) and cluster III contained the lowest (4). The inter cluster distances were larger than the intra cluster distances in all of the cases. The highest intra cluster distance was observed in cluster II and the lowest in cluster III. The highest inter cluster distance was observed between cluster III and II followed by cluster VI and III, cluster III and I, Cluster VI and V and lowest between cluster IV and I. Filled grains per panicle, grain length, and harvest index were the most positive contributors based on the latent vectors. But the highest cluster means for yield, harvest index, and filled grains per panicle were obtained from cluster III. Eight highest and two lowest yield contributing characters were found in cluster VI. Lowest yield but early maturing varieties were found in cluster II. Therefore, more emphasis should be given on cluste VI for selecting genotypes as parents for crossing with the genotypes for cluster II and III which may produce new recombinants with desired traits.

Keywords : Genetic divergence, D^2 analysis, cluster analysis, rice *(Oryza saliva* L.).

Bangladesh J. Agril. Res. 32(1) : 37-43, March 2007

STUDY ON THE INTERCROPPING GROUNDNUT WITH CHILLI AT DIFFERENT PLANT POPULATIONS

M. A. RAZZAQUE, S. RAFIQUZZAMAN, M. M. BAZZAZ M. A. ALI AND M. M. R. TALUKDAR

Abstract

A field experiment was conducted at the FSRD site Lebukhali, Patuakhali during the year 2002-2003 to study the feasibility of growing intercropping chili with groundnut and to find out suitable row arrangement for higher yield and economic return. Monoculture of individual crops produced the highest yield. Intercropping reduced yield of chilli to the extent of 12.66 to 18.76%. However, in intercropping systems, chilli equivalent yield increased by 21.12%, land equivalent ratio (LER) by 37%, and net return 23% over monoculture. The highest chilli equivalent yield (2263 kg/ha) was obtained from 100% chilli + 66% groundnut which gave the highest net return (Tk. 53810/ha) and highest benefit cost ratio (4.82).

Keywords : Intercropping groundnut with chilli, plant population, Patuakhali.

Bangladesh J. Agril. Res. 32(1) : 45-52, March 2007

DEVELOPMENT OF CYPERMETHRIN APPLICATION SCHEDULE FOR THE CONTROL OF POD BORER IN CHICKPEA

MD. ALTAF HOSSAIN AND JANNATUL FERDOUS

Abstract

The experiments were conducted to develop application schedule of Cypermethrin for the effective and economic control of pod borer, *Helicoverpa armigera* (Hubner) attacking chikpea at

Ishurdi, Pabna, Bangladesh during the *rabi* seasons of 2002-03 and 2003-04. Single spraying of Cypermethrin @ 1 ml/litre of water in pod initiation to 100% podding stage and double spraying in 50% podding to pod maturing stage effectively suppressed pod borer infestation in chickpea. In single sprayed treatments, the highest reduction of pod borer infestation compared untreated crop was observed in the single spraying at 50% podding stage and in double sprayed treatments at 50% + 100% podding stage. Significantly the lowest grain yield loss and consequently the highest yield was obtained from double spraying at 50% + 100% podding stage. Single spray at 50% podding stage offered the highest benefit cost ratio followed by double sprayed at 50% + 100% podding stage in both the years. Single and double spraying of Cypermethrin under the two treatments, spraying at 50% podding stage appeared to be the most profitable productive schedule for pod borer control in chickpea field.

Keywords : Cypermethrin, application schedule, pod borer.

Bangladesh J. Agril. Res. 32(1) : 53-60, March 2007

EVALUATION OF EXOTIC BANANA GERMPLASM

MD. ABDUL HOQUE AND MD. MAHBUBAR RAHMAN SALIM

Abstract

The study was conducted with 11 exotic banana varieties/hybrids along with local cultivar Sabri to evaluate their performance during April 2002 to February 2004 at RARS, Ishurdi. The germplasm ITC 1123, ITC 1418, ITC 1283, and ITC 1264 required more than 600 days to complete their life cycle. The rest of the varietes including Sabri took 311 to 383 days. The germplasm ITC 1418 produced the heaviest bunch (30.84 kg). The varieties ITC 1441, ITC 611, ITC 712, ITC 1264, ITC 1123, and local Sabri produced sweet fruits with light yellow to deep yellow peel colour. But all these germplasm were low yielding except ITC 1441 and Sabri. Hence, considering crop duration in the field, yield, and fruit characteristics, such as peel colour, firmness, sweetness, TSS, and aroma, the germplasm ITC 1441 was superior to others.

Keywords : Evaluation, exotic, banana germplasm.

Bangladesh J. Agril. Res. 32(1) : 61-70, March 2007

EFFECT OF STORAGE CONDITION AND STORAGE DURATION OF SCION ON THE SUCCESS OF VENEER GRAFTING IN MANGO

M. M. RAHMAN, M. A. J. BHUYAN, M. S. ISLAM AND K. KOBRA

Abstract

An experiment was conducted to study the effect of storage condition and storage duration of scions on the success of veneer grafting in mango during June 1997 to September 1998 at the Mango Research Station, Chapai Nawabgonj. There were 24 treatment combinations comprising 6 levels of storage conditions and 4 levels of storage durations of scions. The highest survival percentage (81.67%) after 60 days of grafting was obtained from the scions stored in sealed polythene bags wrapped with moist cloth. The lowest survival (66.44%) was recorded in case of perforated polythene bags. Regarding storage duration, fresh scions (control treatment) performed better (86.30%) than the stored scions. Scions could be stored upto 9 days with varying degrees (64.44 to 77.41%) of grafting success.

Keywords : Storage condition, duration, scion, veneer grafting in mango.

Bangladesh J. Agril. Res. 32(1) : 71-80, March 2007

PERFORMANCE EVALUATION OF POWER OPERATED BEATING AND DECORTICATING MACHINE FOR PRODUCTION OF COCONUT COIR

M. N. AMIN, M. A. HAQUE, M. A. WOHAB
K. C. ROY AND M. A. MATINS

Abstract

Coir is an important product that is obtained by decorticating coconut husk. Quality of coir depends on processing method and quality of coconut husks. Manual and mechanical methods are traditionally used for coir processing. In most of the areas, coir is separated from husk manually, which is a time consuming process. Imported decorticator and beating machines are costly and not

available in Bangladesh. Two sets of decorticator and two sets of beating machines were fabricated in a local workshop as per Vietnam decorticator and beating machines. The machines were made of M. S. sheet, M. S. angle, self-centre bearing, M. S. shaft, etc. The prototypes were installed in Khulna and Barisal to evaluate their performances. In Khulna, the machines were operated by a 18 kW diesel engine and in Barisal those were operated by a 15kW electric motor alternately changing by belt of the pulley. The average capacity of both electric motor and diesel engine operated beating machines was 2500 husks per hour. The average capacities of electric motor and diesel engine operated decorticating machines were 58 kg and 60 kg coir per hour, respectively. The quality of crushed husk and coir were better than traditional practices. The coir quality of green coconut husk was better than brown coconut husk, which was finer than traditional practices. The operating cost of coir production was lower than those of traditional practices. The maximum net benefit Tk. 413,155/yr was obtained from diesel engine operated decorticator followed by motor driven decorticator Tk. 355,933/yr, traditional machine Tk. 212,505/yr, and manual Tk. 1,224/yr. The benefit cost ratio (BCR) of BARI prototypes was found to be higher (1.95) than those of traditional (1.57) and manual method (1.08). The break-even point was 650' kg coir per year for engine and motor operated BARI decorticator. Price of BARI decorticator and beating machine with engine and motor were Tk. 100,000 and Tk. 110,000, respectively.

Keywords : Beating and decorticating machine, power operated, coconut coir.

Bangladesh J. Agril. Res. 32(1) : 81-90, March 2007

EFFECT OF PLANTING TIME ON INCIDENCE AND DEVELOPMENTS OF LATE BLIGHT DISEASE IN FOUR VARIETIES OF POTATO

M. M. RAHMAN, M. A. ALI, T. K. DEY
K. M. KHALEQUZZAMAN AND M. R. A. MOLLAH

Abstract

The experiment was conducted at Tubers Crop Research Sub-centre (TCRC), BARI, Bogra to investigate the effect of different planting dates on the development of late blight disease in four potato varieties. Results indicated that the varieties Chamak and Heera were highly susceptible to late blight disease and Cardinal and Dheera showed less early infection, but become susceptible to late growth stage. Among the three planting times, all the varieties exhibited increased late blight symptoms in the 15 November planting and comparatively less symptoms in the early and late planting during early observations, but in the late observation, all varieties showed susceptible reaction to the disease irrespective of planting times.

Keywords : Incidence, developments, late blight, potato.

Bangladesh J. Agril. Res. 32(1) : 91-100, March 2007

PRODUCTION AND MARKETING OF BANANA IN BANDARBAN AREA OF BANGLADESH

M. JAMAL UDDIN, M. KAMRUL HASAN AND M. AKTAR HOSSAIN

Abstract

The study was conducted at Bandarban Sadar Upazila under Bandarban Hill District to examine the profitability of banana production, to indentify the existing marketing channels and to find out the constraints in production and marketing of banana. Data were collected from different categories of banana growers and marketing functionaries. A total of 80 samples were selected purposively for primary data collection. Of them, 45 was banana producing farmers, 10 *faria/bepari*, 13 wholesalers, and 12 retailers. The average yield of banana was calculated at 15.33 t/ha. It is revealed that small farmers received highest yield (18.32 t/ha) as well as highest net return (Tk. 136385/ha), followed by medium and large farmers. Total marketing cost was found highest for wholesalers (Tk. 1942/100 bunches) and lowest for *faria/bepari* (Tk. 933/100 bunches). The benefit cost ratio was found to vary significantly (6.8-8.0) among farm size categories. Black spot on banana, bunchy top virus diseases and lack of technical knowledge of improved banana production were the main problems to banana growers. High marketing tolls and lack of government facilities were the major marketing constraints.

Keywords : Banana *(Mussa* spp.), production and marketing, Bandarban.

Bangladesh J. Agril. Res. 32(1) : 101-116, March 2007

SOCIO-ECONOMIC EVALUATION OF HYBRID RICE CULTIVATION AT FARM LEVEL IN BANGLADESH

B. A. A. MUSTAFA, M. A. SAMAD AZAD
AND A. H. M. A. RAHMAN

Abstract

This study aimed at evaluating the relative profitability of hybrid rice over inbred *rice* cultivation, contribution of private seed companies to spread hybrid cultivation and to realize farmers' perception efficiency and constraints of hybrid technology at the farm level of Bangladesh. Primary data from interviewing hybrid growers of different regions and secondary data from different relevant organizations and seed companies were collected by structured questionnaire to conduct the study and to justify the preset hypothesis. Frontier production function model specifications were used to measure technical efficiency. The study revealed that the cultivation of hybrid rice increased substantially according to the sale volume of different companies. The adoption rate of hybrid *rice* had increased from 26 to 58% in 2005. Farmers of the study areas obtained 24% higher yield of hybrid rice compared to inbred rice varieties. Similarly they earned almost 29-47% higher net profit from hybrid rice cultivation compared to inbreed. Technical efficiency measurement demonstrated that hybrid rice growers are more efficient to use production resources than that of inbred rice growers. However, younger farmers were more efficient than the older ones. This study identified higher price of seed, poor cooking quality, less market demand, higher prevalence of pest and diseases as the major constraints of hybrid adoption at the farm level and needs due attention for solving those weaknesses.

Keywords : Hybrid rice, socio-economic evaluation, farm level.

Bangladesh J. Agril. Res. 32(1) : 117-134, March 2007

CHARACTERIZATION AND EVALUATION OF POINTED GOURD GERMPLASM

A. S. M. M. R. KHAN, M. G. RABBANI
M.A. SIDDIQUE AND M. A. ISLAM

Abstract

Characterization of 64 accessions of pointed gourd was conducted at the Regional Agricultural Research Station, Ishurdi, Pabna during the growing season 2001-2002. The objective of the experiment was to characterize and evaluate the pointed gourd accessions. Wide variations among the accessions in respect of plant, leaf, flower, fruit, and seed characters were recorded. The accessions varied significantly for number of nodes at 1st harvest, vine length at 1st harvest, number of shoots at 1st harvest, inter node length, leaf length, leaf breadth, leaf area, chlorophyll content, days required to first flower, number of nodes at which first flower appeared, female flower length, days required for opening of female flower, days required from pollination to edible fruit maturity, rate of fruit set (%), fruit length, fruit width, average fruit weight, fruit dry matter (%), pulp weight per fruit, number of fruits per plant, weight of fruits per plant, yield (t/ha), seed number per fruit, seed wight per fruit, 100-dry seed weight, and pulp seed ratio,

Keywords : Characterization, evaluation, pointed gourd.

Bangladesh J. Agril. Res. 32(1) : 135-143, March 2007

VARIATION IN ISOLATES OF *BOTRYTIS CINEREA* CAUSING BOTRYTIS GRAY MOLD IN CHICKPEA

A. U. AHMED, S. PANDE, A. K BASANDRAI
G. K. KISHORE, J. N. RAO

Abstract

Physiological, morphological and, pathogenic variations among the four isolates of *Botrytis cinerea,* the causal agent of Botrytis Gray Mold (BGM) in chickpea were studied. Colony morphology, growth patterns, sporulation, and spore size varied among the Isolates. Colonies were grayish, light gray or dirty white in colour

with regular or wavy margin and fluffy, matted or velvet texture. Length and width of conidium varied from 2.0 to 8.5 itm and 1.5 to 4.5 gm , respectively. The maximum colony diameter on potato dextrose agar (PDA) for all isolates was observed at 20-25°C with pH 5.5. Only one isolate LDH was able to produce spores on PDA at 20 and 25°C having pH 5.5 and 6.0. Among the 131 chickpea genotypes inoculated with the 4 isolates, 47 showed differential reaction categorized into eight different groups.

Keywords : Variation in isolates, *Botrytis cinerea,* Botrytis Gray Mold (BGM).

Bangladesh J. Agril. Res. 32(1) : 145-149, March 2007

EFFECT OF UREA GRANULE AND PRILLED UREA ON THE PERFORMANCE OF BANANA

M. I. NAZRUL, M. A. RAHMAN
M. D. A. CHAUDHURY AND M. A. QUAYYUM

Abstract

The experiment was conducted at Multi Location Testing site, Madhupur, Tangail for consecutive two years (2003-04 and 2004-05) in medium high land under Agro-ecological Zone-28 to observe the efficiency of urea super granule (USG) application in comparison to application of prilled urea on banana production. Five nitrogen managements viz., recommended dose of nitrogen through prilled urea (T_1), recommended dose of nitrogen through USG (T_2), 10% less than 12 (T_3), 20% less than T_2 (T_4) and farmer's practice (T_5) were used on banana (cv. Amrit Sagar). Nitrogen management exerted significant influence on banana yield and its attributes. Fruit yield was statistically similar to treatment T_2 and T_3, but significantly higher than priled urea and farmer's practice. Cost-benefit analysis showed that the highest gross margin and BCR were obtained from T_3 where 10% less than recommended dose of nitrogen through USG were applied. So, application of USG was found more profitable than prilled urea for the banana cultivation in Tangail region.

Keywords : USG, prilled urea, banana.

Bangladesh J. Agril. Res. 32(1) : 151-162, March 2007

GROWTH AND YIELD RESPONSE OF BANGLADHONIA TO LIGHT INTENSITY AND NITROGEN LEVELS

M. MONIRUZZAMAN, M. S. ISLAM, M. M. HOSSAIN
T. HOSSAIN AND M G. MIAH

Abstract

A field experiment was conducted under four light levels (100%, 75%, 50%, and 25% PAR, photosynthetically active radiation) and five nitrogen (0, 115, 138, 161, and 184 kg N/ha) levels to find out the optimum light level and nitrogen fertilizer for yield maximization of Bangladhonia at the Bangabandhu Sheikh Mujibur Rahman Agricultural University research farm during December 2002 to May 2003. Light levels were reduced by using nylon net of different mesh sizes and colours. Partial shade (50% PAR) produced significantly higher fresh yield (57.59 t/ha) which was 91% higher than the fresh yield (30.00 t/ha) obtained from full sunlight (100% PAR). The second highest fresh yield of Bangladhonia (55.04 t/ha) was obtained from 75% PAR level, which was statistically similar to the yield obtained from 50% PAR level. The maximum fresh yield of Bangladhonia was produced from the application of 161 kg N/ha (55.96 t/ha) closely followed by 184 kg N/ha (50.65 t/ha). Application of 161 kg N/ha coupled with either 50 or 75% PAR gave the highest yield of Bangladhonia. The quadratic regression equation stated that optimum level of light was 62% PAR and that of N was 175 kg/ha, respectively. Therefore, Bangladhonia can be successfully grown with the application of 161-175 kg N/ha in the places where, 50-75% incident light (PAR) would be available.

Keywords : *Eryngium foetidum*, growth, yield response, light intensity, nitrogen levels.

Bangladesh J. Agril. Res. 32(2) 2007: 171-182

DEVELOPING CROP PRODUCTION FUNCTIONS OF WHEAT USING EXPERIMENTALLY DETERMINED YIELD RESPONSE FACTORS

M.S. ISLAM, M.A HOSSAIN, M. ABDULLAH, ME HOSSAIN

Abstract

Yield response factors at vegetative and yield formation stages of wheat (var. Protiva) were determined in clay loam soil of Rajshahi

and in silty clay loam soil of Joydebpur. The value of the factor at vegetative stage was the same (0.18) in both the locations. But those at yield formation stage were 0.46 in Rajshahi and 0.45 in Joydebpur. Using these values in conjunction with the potential yield and stage wise evapotranspiration of wheat, the crop production functions were obtained as: Yv = 3.36+0.009 ETav; 50 mm ≤ ETav ≤ 83 mm and Yyf = 2.22 + 0.0214 ETayf; 53 mm ≤ ETayf ≤ 88 mm in Rajshahi and Yv = 2.76 +0.0075 ETav; 48 ≤ ETav ≤ 80 and Yyf = 1.82 + 0.02 ETyf; 47 ≤ ETayf ≤ 78 in Joydebpur Where, Yv is the expected yield (t/ha) of wheat for water deficit in vegetative stage, Yyf is the expected yield (t/ha) for water deficit in yield formation stage, ETav and ETayf are the crop evapotranspirations (mm) at vegetative and yield formation stages, respectively. All other stages except that received deficit irrigation were irrigated a per stage requirement.

Keywords: Wheat, yeild response factors, crop production functions.

Bangladesh J. Agril. Res. 32(2) 2007: 183-189, June 2007

COMBINING ABILITY FOR SOME SALINITY TOLERANCE TRAITS IN RICE

PRANAH KUMAR SAHA RAY, M. AMIRUL ISLAM

Abstract

Eight parents and 28 F_1s excluding reciprocals were tested for three salinity tolerance traits viz., Na+ concentration, Na/K ratio and visual score at EC 9.0-9.5 dS/m to know the genetic information and the nature of combining ability of the parents and their performances in F_1 hybrids. Mean values of F_1s for shoot Na+, Na/K ratio, and visual score were lower compared to parents indicated dominance of tolerance. Significant GCA and SCA effects in all the traits suggest the importance of both additive and non-additive gene actions. Much higher GCA effects than SCA effects indicated preponderance of additive gene action for salinity tolerance. Pokkali, Nonabokra, and Binnatoa were the good general combiners. Most of the best crosses were obtained from susceptible parents crossed with tolerant parents. Transfer of salinity tolerant traits from these varieties to modern varieties may offer potential for increasing the level of salinity tolerance in rice.

Keywords: Rice; salinity tolerance, combining ability.

Bangladesh J. Agril. Res. 32(2) 2007: 191-203, June 2007

STUDIES ON COMPETITION BETWEEN WHEAT AND CHENOPODIUM ALBUM L.

M. R. H. MONDOL, M. M. KHAN, R. ISLAM
M. I. ISLAM, M. H. HOSSAIN

Abstract

A field experiment was conducted at the Agronomy Field of Bangladesh Agricultural University (BAU), Mymensingh during the period from November 2001 to March 2002 to investigate the effect of Chenopodium album competition on growth and yield of wheat and to determine the critical period of weed (C. album) competition in wheat. The experiment consisted of 7 treatments viz., weed free for whole crop life, weed competition (WC) for 20, 40, 60, and 80 days after emergence (DAE), WC for 110 DAE (no weed control) and weed monoculture. The highest grain yield (3.95 t/ha) was obtained from weed free and that of the lowest from weedy (2.65 t/ha) condition. Grain yield decreased gradually with the increase in weed competition duration. Wheat yield reductions due to C. album competition for 20, 40, 60, 80, and 110 DAE were 12.65, 28.10, 29.11, 31.64, and 32.9 %, respectively. The highest rate of yield decrease was in between 20 and 40 DAE. The highest reduction of wheat yields under weedy check treatment (32.91% grain and 33.75% straw) were the results of 31.0 % reduction of total tillers/plant, 43.34% reduction of effective tillers/plant, 14.57% reduction of grains/spike, 34.5% reduction of total dry weight of wheat. The plant height of C. album was reduced due to wheat competition by 32.3% and that of total dry matter by 34.2 %. The critical period of weed competition lies between 20 and 40 DAE.

Keywords: *Chenopodium album*, wheat, weed, competition.

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RESPONSE OF KANGKONG TO VARIOUS LEVELS AND METHODS OF NITROGEN APPLICATION

M. MONIRUZZAMAN, M. R. ISLAM, S. N. MOZUMDER

Abstract

A field experiment was carried out at the Agricultural Research Station, Raikhali, Rangamati Hill District during the summer seasons of 2004 and 2005 to determine the best dose of N and method of its application for kangkong production. The treatments consisted of five N levels i. e., 0, 50, 100, 150, and 200 kg/ha and five methods of N application i. e., entire dose applied as basal, one-third of the dose applied as basal and the rest after first cut, one-third of the dose applied as basal and the rest after each cut in equal splits, one-third of the dose applied as basal and the rest after alternate cut in equal splits and full dose after each cut in equal splits. Application of 200 kg N/ha and the method of one-third N applied as basal and the two-thirds after alternate cut in equal splits independently gave maximum vegetative growth and foliage yield, while 150 kg N/ha and one-third N applied as basal and two-thirds after alternate cut in equal splits in combination produced maximum values for growth parameters and foliage yield. The same combination also gave maximum gross return of Tk. 344.25 thousand/ha with the highest benefit-cost ratio of 49.31.

Keywords: Kangkong; nitrogen application.

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BIOLOGY OF RED-BANDED MANGO CATERPILLAR, ITS INFESTATION TO DIFFERENT MANGO CULTIVARS AND CONTROL

D. SARKER, M. M. RAHMAN, J. C. BARMAN
S. N. ALAM, M. NASIRUDDIN

Abstract

Three intensive mango growing areas of Chapai Nawabgonj District, namely Sadar, Shibgonj, and Gomostapur were selected to determine the pest status of red-banded mango caterpillar (Noorda albizonalis, Hampson). Results indicated the highest levels of 9.92, 9.59, and 7.64% fruit infestation to Aswina, Gopalbhog, and Gooti varieties, respectively, at Gomostapur followed by 6.19, 5.81, and 5.03% fruit infestations in Gooti, Aswina, and Gopalbhog, respectively at Shibgonj. Mango varieties at Chapai Nawabgonj Sadar showed low levels of fruit infestation ranging from 0.96 to 3.26% Considering all those locations together, Aswina and Gopalbhog variety showed higher levels of fruit infestation of 8.50 and 6.21%, respectively, whereas Amrapali, Mohananda, Langra, and Fazli showed lower levels of fruit infestations ranging from 1.51 to 3.77%. Full-grown caterpillars are 17.6-0.38 mm long, red-banded in colour, and slightly hairy, and they pupate inside the infested fruits. The pupal length is 12.8-0.28 mm. The larval, pupal, and the adult longevity periods are 19.5-0.56, 11.25-0.54, and 6.0-0.35 days, respectively. The adult moths measured 13.25 0.54 mm in length when the wings are expanded. Moths are fawn coloured with scaly wings and a prominent white band present dorsally at the joint of the thorax and the abdomen. Female moths lay their eggs on he peduncle of the mango fruits and after 7 to 8 days hatch into larvae. Considering the pest status of the RBMC, 16 treatments with insecticides were applied twice as a full cover spray on mango trees. Based on the percent reduction (more than 80%) of fruit infestation over untreated control, Emithion, Sumithion, Lebaycid, Shobicron, Mipcin, and Sevin were the best among the tested insecticides for the effective control of RBMC. The spraying with other insecticides including botanical neembicidin produced 61-75% reduction of fruit infestation and might be the next choice for the control of red-banded mango caterpillar.

Keywords: Red-banded mango caterpillar, biology, infestation, mango cultivars and control.

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EFFECT OF MULCHING AND PRUNING ON YIELD AND QUALITY OF PEAR

M. MONIRUZZAMAN, S. N. MOZUMDER, M. R. ISLAM

Abstract

A field experiment was conducted to study the effects of mulching and pruning in pear (cv. BARI Naspati-1) with two levels of

mulching (mulched and non-mulched) and four levels of pruning (0, 25, 50, and 75 percent) at the Agricultural Research Station, Raikhali, Rangamati Hill District during 1999 to 2001. Mulching, pruning levels and their interaction showed significant effect on yield and some yield components of pear. Mulching in combination with 50% pruning gave the highest number of fruits (151) per plant and the highest fruit yield (20.87 t/ha). Percentage of total soluble solid (TSS %) increased with the increasing of pruning intensity with mulching. 75% pruning intensity with mulch gave the highest TSS (13.73%) followed by 50% pruning with mulch (13.51%). The combination of 50% pruning and mulching treatment gave the highest gross return (Tk. 758,000/ha) as well as gross margin (687, 000/ha) with maximum benefit-cost ratio (10.60).

Keywords: Pear; mulching; pruning, quality and yield.

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ASSESSMENT OF SELF-INCOMPATIBILITY IN SOME IMPROVED AND TRADITIONAL CULTIVARS OF OLEIFEROUS (BRASSICA RAPA L.)

M. A. ZILANI CHOWDHURY, M. A. KHALEQUE MIAN
M. ALI AKBAR

Abstract

Based on the seed set ratio, levels of self-incompatibility in the genotypes varied from 8.9 to 90.1 percent. The genotypes Tori-7, M-27, Din-2, Din-7, Com-5, OTBC-0293, and Bhawani showed high levels of self-incompatibility. Ten genotypes including variety TS-72 showed intermediate level of self-incompatibility. Based on the number of pollen tubes in the style, the cultivars Dhali and Sampad were grouped as self-compatible, while the genotypes PT-303, PT-30, OTBC-20, OTBC-58, OTBC-0394, NK-1, FRD-1, and Com-5 were intermediate. The other genotypes were classed as self-incompatible. Considering seed set analysis and pollen tube growth behaviour study, six genotypes, namely Tori-7, M-27, Din-2, Din-7, Bhawani, and OTBC-0293 demonstrated high level of self-incompatibility. There was also success on bud pollination for producing SI seeds in those lines.

Keywords: *Brassica rapa*, oleiferous and self-incompatibility.

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GROWTH AND YIELD OF POINTED GOURD AS INFLUENCED BY DIFFERENT PLANTING MATERIALS AND MANAGEMENT PRACTICES

A.S.M.M.R. KHAN, M.G. RABBANI, M.A. SIDDIQUE, M.A. ISLAM

Abstract

The experiments was carried out at the Regional Agricultural Research Station, Ishurdi, Pabna during the growing season 2000-2001 and 2001-2002 to find out suitable planting materials and better management practices for higher yield of pointed gourd. The experiment involved four planting materials viz., straight vine, ring vine, partial tuberous root and mother plant root, and two management practices viz., bamboo pandal and mulch with rice straw. The highest yield of 18.62 t/ha was obtained from mother plant root. The treatment bamboo pandal gave 56% higher yield than the treatment mulch with rice straw. Significantly the highest yield was recorded from mother plant root with bamboo pandal and the lowest was observed in plants grown from partial tuberous root with rice straw mulch. The highest gross return (Tk. 1,58,440 per hectare and net return (Tk. 86,143 per hectare) was obtained from the treatment combination of mother plan root and bamboo pandal. This treatment also showed higher cost of production and BCR (2.19).

Keywords: Pointed gourd, growth, planting materials management and yield.

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EFFECT OF PH, TEMPERATURE, LIGHT DURATION AND INCUBATION PERIOD FOR GROWTH AND SPORULATION OF STEMPHYLIUM BOTRYOSUM WALLR

M. IHSANUL HUQ, A.Z.M. NOWSHER ALI KHAN

Abstract

A study was undertaken to find out the effect of seven pH levels, six temperature regimes, five light durations and five incubation periods on radial colony growth and spore production of Stemphylium botryosum in petridishes (90 mm diameter)

containing carrot dextrose agar (CDA) medium. Higher colony growth and spore production were reccorded within the pH range of 6-8, temperature regime of 20-25°C and incubation period of 5-25 days as compared to other levels of each growth factors. The maximum mycelial growth and sporulation was observed at pH 6, 25°C, incubated for 15 days under a 24 hr light-darkness cycle.

Keywords: *Stemphylium botryosum*, growth, sporulation, pH, temperature, light.

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CORRELATION AND PATH COEFFICIENT ANALYSIS IN POINTED GOURD

M.A. MALEK, M.A. BARI MIAH, M.O. ISLAM

Abstract

Correlation studies in 25 genotypes of pointed gourd revealed that fruit yield had a positive correlation with vines per plant and fruits per plant. In general, genotypic correlation coefficients were higher than the corresponding phenotypic correlation coefficients suggesting that the environmental influence reduces the relationship between yield and yield contributing characters of pointed gourd. Path coefficient analysis showed that fruits per plant had direct positive effects on fruit yield. This indicates that this character was the major contributor to fruit yield. Therefore, maximum weightage should be given to this character for improvement of yield in pointed gourd.

Keywords: Pointed gourd, correlation, path analysis.

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EFFECTS OF INOCULATION WITH BRADYRHIZOBIUM ON NODULATION PATTERN, NODULE SENESCENCE AND SIZE DISTRIBUTION IN MUNGBEAN

M.A.H. BHUIYAN, M.H. MIAN, M.S. ISLAM, M.R. ISLAM

Abstract

An experiment was carried out with five mungbean varieties with or without *Bradyrhizobium* at Bangladesh Agricultural University Farm during kharif-1 2001 and kharif-1 2002 seasons to find out the time of nodule initiation, nodulation pattern and their size distribution. Five mungbean varieties viz., BARI Mung-2, BARI Mung-4, BARI Mung-5, BINA Mung-2 and Barisal local, and rhizobial inoculum (*Bradyrhizobium* strain BAUR-604) were used in this experiment. The experiment was designed in RCBD having four replications in each treatment. Each variety was tested with/without inoculation. For recording nodule size, nodules were collected from roots and were grouped on the basis of their size in diameters. The results suggested that nodule initiation in the roots of mungbean varieties started at 9 days of sowing seeds (DAS), reached the peak at 42 DAS and thereafter started reducing in numbers until 70 DAS due to spontaneous degeneration. BARI Mung-2 always produced larger size nodules at all sampling dates in both the years. Smaller size (<2.0 mm) nodules increased upto 42 DAS, whereas medium (2.1-4.0 mm) size nodules increased upto 42-49 DAS and then decreased. At 42 DAS, Bradyrhizobium inoculation produced 8.8 (<2.0 mm), 8.5-8.6 (2.1-4.0 mm) and 0.2-0.4 (>4 mm) nodules/plant, while uninoculated plant produced 5.7 (<2.0 mm), 5.6 (2.1-4.0 mm), and 0.1-0.2 (>4 mm) nodules/plant. Inoculated BARI Mung-2 always produced greater number and size of nodules at different sampling dates over uninoculated plant.

Keywords: *Bradyrhizobium*, mungbean, inoculation, nodulation.

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INFLUENCE OF NITROGEN AND PHOSPHORUS FERTILIZERS ON THE PRODUCTIVITY OF GROUNDNUT

M. ALTAB HOSSAIN, A. HAMID, M.M. HOQUE, S. NASREEN

Abstract

Field experiments were conducted at the Bangabandhu Shiekh Mujibur Rahman Agricultural University (BSMRAU), Gazipur in 2000-2001 and 2001-2002 to study the effects of nitrogen and phosphorus fertilization on the number of pods per plant, 100-seed weight, pod yield per ha, shelling percentage, seed oil content, N and P use efficiency of groundnut. Four levels of nitrogen (0, 20, 40, and 60 kg N/ha), four levels of phosphorus (0, 13, 26, and 39 kg

P/ha) and three varieties of groundnut (Dhaka-1, Zhingabadam, and Basantibadam) were the experimental materials. Application of nitrogen and phosphorus fertilizers exerted significant effects on all the parameters under study. The highest pod yield in Basantibadam was obtained with 60 kg N and 39 kg P/ha while 60 kg N and 26 kg P/ha gave the highest yield in Dhaka-1 and Zhingabadam. Dhaka-1 and Zhingabadam had more shelling percentage and oil content compared to Basantibadam. A decreasing trend in oil content was observed at higher doses of N and P application across the varieties. The N use efficiency increased upto 40 kg N/ha for both Zhingabadam and Basantibadam for Dhaka-1, while 20 kg N/ha for Dhaka-1 groundnut. The P use efficiency was found to be higher at 26 kg P/ha for Basantibadam and 13 kg P/ha for Dhaka-1 and Zhingabadam.

Keywords: Groundnuts, nitrogen, phosphorus, productivity.

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EVALUATION OF DIFFERENT NUTRIENT MANAGEMENT PRACTICES FOR THE BORO-T. AMAN RICE CROPPING PATTERN IN OLD MEGHNA ESTUARINE FLOOD PLAIN

M. AMIN, M.K. HASAN, M.A. QUAYYUM
D.A. CHOUDHURY, M.Z. HOSSAIN

Abstract

Three field experiments were conducted during 2002 to 2004 at Multi Location Testing site, Feni to evaluate different nutrient management packages for the Boro-T. aman rice cropping pattern. Four nutrient management packages along with existing farmers' practice and no fertiiler were tested. Four fertilizer management packages were soil test based (STB) fertilizer dose for moderate and high yield goals (MYG and HYG), IPNS with cowding for HYG and AEZ basis fertilizer dose (FRG'97). Three years' average result showed that IPNS and STB (MYG) treatments gave significantly higher yield in both Boro and T.aman rice. For both rice crops, the yield contributing characters were correlated with the yield of rice The average gross margin was highest (Tk. 79964/ha) in IPNS, but the highest MBCR (6.48) over control was obtained with FRG'97

due to less fertilizer cost. Nutrient uptake and nutrient balance showed that the crops removed considerable amounts of N, P, and K every year. The N and K balances were negative in all cases.

Keywords: Boro-T. aman rice, cropping pattern, IPNS.

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EFFECT OF DIFFERENT TIMES AND DEPTHS OF USG APPLICATION ON THE GROWTH AND YIELD OF CABBAGE

M.I. NAZRUL, M.A. RAHMAN, D.A. CHAUDHURY, M.A. QUAYYUM

Abstract

An experiment was conducted for two consecutive years in the farmers' field of Palima, Tangail to evaluate the effect of time and depth of placement of urea super granule (USG) on the yield and yield attributes of cabbage during 2003-04 and 2004-05, respectively. USG @ 330 kg per hectare was applied at 0, 10, 15, and 20 days after planting each at 4, 8, and 12 cm depth. The result showed that application of USG at 10 days after transplanting at a depth of 8 cm gave the highest yield of 74.92 and 117.60 t/ha in 2003-04 and 2004-05, respectively. The yield variation was observed due to change of variety (i. e., Atlas 70 in 2003-04 and Autumn Queen in 2004-05). Placement of USG either at 4 cm or 12 cm depth slightly reduced yield than obtained with point placement at 8 cm. USG application later than 10 days of transplanting decreased cabbage yield in both the varieties.

Keywords: Cabbage, urea super granule, yield.

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PRODUCTION PRACTICES AND LABOUR UTILIZATION PATTERN OF SUGARCANE PRODUCTION AS MONOCULTURE AND INTERCROP

M. KAMRUZZAMAN, M. HASANUZZAMAN

Abstract

The present study was undertaken to find out the production practices and labour utilization pattern of producing sugarcane

both as monoculture and as intercrop. Data were collected from 70 sugarcane producers of Kushtia District. The farmers produce sugarcane as monoculture and as intercrop with lentil, maize, potato, wheat, sunflower, and onion. Large farmers were more interested to produce sugarcane as intercrop than the medium and small farmers. High land and loamy soil was mostly used for producing sugarcane both as monoculture and as intercrop. ISD 16 was the most popular variety of sugarcane. Row to row distance was higher for intercropping than the sole sugarcane cultivation. The labour utilization was higher for producing sugarcane as intercrop than as monoculture. In Bangladesh, family labour was highly underused and some disguised unemployment is also present. In this situation, if intercropping with sugarcane is popularized then the unemployment situation may be improved as well as optimum utilization of family labour may be ensured.

Keywords: Sugarcane, monoculture, intercrop, production practices, labour utilization.

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IMPACTS OF PARTICIPATORY VARIETY SELECTION IN WHEAT ON AGRO-ECONOMIC CHANGES OF WHEAT FARMERS IN BANGLADESH

D.B. PANDIT, M. E. BAKSH, M. A. SUFIAN, M. HARUN-UR-RASHID AND M. M. ISLAM

Abstract

Impacts of participatory variety selection in wheat on agro-economic changes like adoption of new wheat varieties and production technologies, income and attitude change of the wheat farmers, etc. are presented in the paper. Participatory variety selection was conducted at 12 villages of four districts in Bangladesh. Base line information from the villages was collected through participatory rural appraisal and household survey in 2002. Data on agro-economic changes were collected through household survey in 2005. Impacts were assessed from the difference of the data of two surveys. The area of the check variety Kanchan came down from 97.8% (covered in 2002) to 57% in the working villages in 2005. Varietal diversity was increased

remarkably and seven varieties were found to cultivate in 2004-05. The new varieties occupied 43% of the wheat areas. Seed preservation by farmers was increased remarkably and 208 tons seeds of new vrieties were preserved by them in 2004-05. When 60% seeds of their total requirements were collected from Bangladesh Agricultural Development Coporation in 2002, then, 100% seeds were used from farmers' own source in 2004-05. There were remarkable changes in production technology adoption, sources of agricultural knowledge, attitude and income changes. Farmers' income was increased to Tk. 11148/ha due to cultivation of new varieties and use of recommended production technologies. Participatory variety selection approach in wheat was found very useful to increase wheat production in the working villages. Widespread use of this approach may be useful throughout the county in other crops also.

Keywords: Wheat, participatory variety selection (PVS), impact, income change, attitude change, varietal diversity.

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PRODUCTIVITY AND PROFITABILITY OF BILATIDHONIA INTERCROPPED WITH CUCURBIT VEGETABLES

M. MONIRUZZAMAN, M. R. ISLAM, S.N. MOZUMDER, S.M. M. RAHMAN AND N. C. BASAK

Abstract

The experiment was conducted to find out a suitable intercrop combination of Bilatidhonia and winter pumpkin relayed with different summer cucurbits (Bilatidhonia + winter pumpkin)/ summer cucurbits) in the hill valley of the Agricultural Research Station (ARS), Raikhali, Rangamati during 2003-04 and 2004-05. The results revealed that all the intercrop combinations gave the highest fresh yield of Bilatidhonia than that of the sole Bilatidhonia with an exception of Bilatidhonia + winter pumpkin followed by ash gourd and summer pumpkin combination. Maximum fresh yield of Bilatidhonia (50.13 t/ha) was recorded from Bilatidhonia + winter pumpkin closely followed by ribbed gourd and bitter gourd (50.00 t/ha) combination which showed 15-15.5% higher than that

of sole Bilatidhona. Summer cucurbits relayed with Bilatidhonia after harvesting of winter pumpkin gave reasonable good yield where ribbed gourd produced the highest yield (15.29 t/ha). Winter pumpkin intercropped with Bilatidhonia also produced reasonable good yield ranging from 31.88 to 32.68 t/ha compared to the sole winter pumpkin. The highest Bilatidhonia equivalent (69.02 t/ha) and gross return (Tk. 10,35,35,440/ha) were obtained from (Bilatidhonia + winter pumpkin)/ bitter gourd or ribbed gourd combination. But intercropped Bilatidhonia with winter pumpkin relayed by ribbed gourd gave the highest gross margin (Tk. 859, 566/ha) with maximum benefit-cost ratio (4.90) at hilly area of Raikhali, Rangamati.

Keywords: Productivity, profitability, Bilatidhonia, cucurbits.

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ISSUES AND OPTIONS IN THE PRODUCTION OF HIGH VALUE CROPS IN COASTAL REGION OF PAKISTAN

ALI MUHAMMAD KHUSHK AND MUHAMMAD IBRAHIM LASHARI

Abstract

Primary data from various stakeholders were collected to examine the issues and options in the production of high value crops in coastal region of Pakistan. During 2002, a list of betel leaf and muskmelon growers of Thatta District were developed and out of sampling frame, 160 growers were randomly selected. In the coastal area, growers are engaged in agriculture, fishing, and livestock activities. They keep camel, buffalo, and cattle mainly for milk, which is domestically consumed or sold at village level. The socio-economic conditions of growers living in coastal villages are very poor. Most of the male are unemployed or employed on daily wages. Women are engaged in fish processing industries as unskilled worker and earn a meager income. The analysis of betel leaf and muskmelon was carried out to examine the economic viability of these crops in the coastal region. Analysis shows that these crops have tremendous potential and have no competition in the existing crops in the region. The growers received high net return from betel leaf cultivation and reasonable income from muskmelon cultivation in the coastal region. The major issues for the development of high value crops in the region as identified were high initial cost, poor management operations, low input use, control of insectpests and diseases and lack of knowledge.

Keywords: Issues and options, high value crops, coastal region of Pakistan.

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INFLUENCE OF N AND P FERTILIZER APPLICATION ON ROOT GROWTH, LEAF PHOTOSYNTHESIS AND YIELD PERFORMANCE OF GROUNDNUT

M. ALTAB HOSSAIN AND A. HAMID

Abstract

Field experiments were carried out at the Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur during 2000-2002 to evaluate the effect of N and P applicaiton on the root growth, leaf photosynthesis and yield of groundnut (var. Basantibadam). Four levels of N (0, 20, 40 and 60 kg N/ha) and four levels of P (0, 13, 26 and 39 kg P/ha) were the treatment variables. The trial was set up in a randomized complete block design under factorial arrangement with three replications. Application of N and P fertilizer exerted significant effects on root development, photosynthesis, yield contributing characters and pod yield of the crop. Plant receiving 60 kg N and 39 kg P/ha had larger root system, greater photosynthetic rate and better yield contributing characters that resulted in the maximum pod yield which, however, was not significantly different from $N_{60}P_{26}$ treatment. Hence, it is recommended that higher yield of Basantibadam can be obtained from $N_{60}P_{26}$ kg/ha in salna silty clay loam soil of Madhupur tract (AEZ 28) of Bangladesh.

Keywords: N and P application, root growth, leaf photosynthesis, groundnut.

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AN ECONOMIC STUDY OF PLANT NURSERY BUSINESS IN GAZIPUR AND JESSORE DISTRICTS OF BANGLADESH

M. A. HAQUE, M. A. MONAYEM MIAH AND M. A. RASHID

Abstract

The present study was conducted in Jessore and Gazipur districts during 2002-2003 to assess the socio-economic status of plant nursery business in Bangladesh. A total of 40 private plant nurseries, four government nurseries (BADC) and six NGO nurseries (BRAC) were selected for the study. The study revealed that 60% of the private nursery owners had secondary level of education and 50% owners performed their business on leased land. More than 55% owners had 6-10 years of experience in nursery business. This business has vast potentials of generating employment and income of the owners. The yearly net returns per ha for private, government, and NGO nursery were Tk. 215766, Tk. 120149, and Tk. 535961, respectively. The rates of returns over full-cost were found to be 1.43 for private, 1.37 for government, and 1.50 for NGO nurseries. Non-availability of improved seeds/seedlings was the main constraint for private and NGO nurseries, whereas lack of adequate fund was the crucial problem for government nurseries.

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MINERAL NUTRITION AND YIELD OF SESAME IN THE GANGES TIDAL FLOODPLAIN SOIL

A. B. M. B. U. PATHAN, M A MAZID MIAH, FARZANA ISLAM, A.B.M ZAHID HOSSAIN AND M. R ISLAM

Abstract

A field trial was conducted in the saline region of Satkhira District (AEZ-13) to investigate the mineral nutrition and yield of four varieties of sesame in *kharif-1* season of 2002. The varieties were BARI Til-2, BARI Til-3, T-6 and local (red). The soil and irrigation water salinity at sowing were 2.63 and 2.01 dS m^{-1}, respectively. Among the varieties, the T-6 produced the highest seed yield (1.66 t/ha) and BARI Til-3 (0.71 t/ha) did the lowest. The maximum 1000-seed weight (2.66 g) was recorded in T-6 variety and the minimum was (2.27 g) in local (red) variety. The N, P, K, Zn, and S concentrations of seeds or stovers of different varieties were statistically identical. The uptake of these elements also did not vary with varieties.

Keywords: Mineral nutrition, sesame, soil salinity.

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RESPONSE OF OKRA SEED CROP TO SOWING TIME AND PLANT SPACING IN SOUTH EASTERN HILLY REGION OF BANGLADESH

M. MONIRUZZAMAN, M. Z. UDDIN AND A. K. CHOUDHURY

Abstract

A field experiment on okra cv. BARI Dherosh–1 comprising four sowing times starting from February to May (15th day of each month) at monthly interval and four spacings (60 × 30, 60 × 40, 60 × 50, and 60 × 60 cm) was conducted at the Agricultural Research Station (ARS), Raikhali, Rangamati Hill District to find out the most suitable sowing time and optimum plant spacing for the two consecutive years of 1997 and 1998. The highest seed yield (2.97 t/ha) was recorded from 15 April sowing closely followed by 15 March sowing (2.77 t/ha) whereas the best quality seed was obtained from 16 February (88.7% germination and 29.75 seed vigour index) and 15 March (83.7% germination and 28.80 seed vigour index) sowing. Plant spacing of 60 × 40 cm produced the highest seed yield of okra (2.86 t/ha) followed by 60 × 30 cm spacing (2.80 t/ha). The germination percentage and seed vigour index were unaffected due to different plant spacings. 15 April sowing accompanied with 60 × 30 cm spacing gave the highest seed yield (3.13 t/ha) closely followed by 60 × 30 cm spacing with the same sowing time (3.06 t/ha). The seed yield did not decline in 15 March sowing having similar spacings.

Keywords: Okra (*Abelmoschus esculentus* (L.) Moench), sowing time, plant spacing, hilly regions.

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ESTIMATION OF OPTIMUM SAMPLE SIZE AND NUMBER OF REPLICATIONS IN SPLIT-SPLIT PLOT DESIGN

MD. SAIFUL ISLAM

Abstract

In field experiments, it is necessary to determine the optimum sample size as well as optimum number of replications if researchers have to use sampling techniques for collecting data from such experiments. Estimates of such optimum sample size and number of replications has been determined for split-split plot design minimizing the variance for a given cost of the experiment per treatment.

Keywords: Estimation, sample size, replications, split-split plot design.

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NUTRIENT UPTAKE AND YIELD OF ONION AS INFLUENCED BY NITROGEN AND SULPHUR FERTILIZATION

S. NASREEN, M. M. HAQUE, M. A. HOSSAIN AND A. T. M. FARID

Abstract

The effect of nitrogen (0, 80, 120, and 160 kg/ha from urea) and sulphur (0, 20, 40, and 60 kg/ha from gypsum) fertilization on N and S uptake and yield performance of onion (var. BARI Piaz-1) was studied in the research field of Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur during *rabi* seasons of 2002-2003 and 2003-2004. The experiment was laid out in a randomized complete block design under factorial arrangement with three replications. Addition of nitrogen and sulphur fertilizers exerted significant influence on the number of leaves/plant, plant height, diameter of bulb, single bulb weight, and yield of onion. The uptake of N and S by bulb also significantly responded to the application of nitrogen and sulphur.

The highest yield of onion and the maximum uptake of N and S were recorded by the combined application of 120 kg N and 40 kg S/ha with a blanket dose of 90 kg P_2O_5, 90 kg K_2O, and 5 kg Zn/ha plus 5 tons of cowdung/ha. The antagonistic effect of nitrogen and sulphur on the uptake of N and S by bulb, yield components, and yield of onion was observed only when they were applied together at higher rates of nitrogen (160 kg/ha) and sulphur (40 kg/ha).

Keywords: Nutrient uptake, yield of onion, influenced and sulphur.

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HETEROSIS AND GENE ACTION IN OKRA

NANDAN MEHTA, B. S. ASATI AND S.R. MAMIDWAR

Abstract

Forty two hybrids generated by crossing three testers with fourteen lines were studied along with parents for studying heterosis and gene action for days to first flowering, days to 50 percent flowering, fruit weight, fruit length, plant height, number of seeds per fruit, 100-seed weight and fruit yield per plant during rainy season and summer season of 2002-03 at Department of Horticulture, Indira Gandhi Agricultural University, Raipur, Chhattisgarh, India. The most heterotic combinations were VRO-6 x Parbhani Kranti, VRO-4 x Parbhani Kranti, Daftari-1 x Arka Abhaya and Kaveri Selection x Ankur Abhaya for fruit yield per ptant. The *sca* variances for days to fruit flower, days to 50 percent flowering, fruit weight, fruit length, plant height, number of seeds per fruit and 100-seed weight were higher than so gca variance so there is a preponderance of non-additive gene action. The *gca* variances was greater than *sca* variances for fruit yield per plant indicating preponderance of additive gene action for this trait. Overall, the results discussed above are quite indicative of the fact that hybrid okra has great potentialities of maximizing fruit yield in Chhattisgarh plains.

Keywords: Okra, heterosis, gene action.

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FACTORS AFFECTING PROFITABILITY OF SUGARCANE PRODUCTION AS MONOCULTURE AND AS INTERCROP IN SELECTED AREAS OF BANGLADESH

M. KAMRUZZAMAN AND M. HASANUZZAMAN[2]

Abstract

The study was undertaken to know the profitability of sugarcane production as monoculture and as intercrop. Data were collected from 70 sugarcane growers of Daulatpur Upazilla under Kushtia District. Data were collected during the period from February to July 2003. The study reveals that the sugarcane plus potato combination produced the highest net return followed by sugarcane plus maize, sugarcane plus lentil and sole sugarcane production. Family labour cost, cost of urea, number of fertilizing, sowning/planting time of intercrop, cost of sett were the important factors which influence the profitability of sugarcane production both as intercrop and as nonoculture. High prices of inputs, lack of scientific knowledge, and dishonesty of officials are the major problems in sugarcane production. In order to promote intercropping in a large scale with sugarcane, government and other related organizations must encourage farmers to produce sugarcane as intercrop in order to earn higher net return.

Keywords**:** Profitability of sugarcane, monoculture, intercrop.

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STUDY OF CROSSABILITY AND F_1 OF INTERSPECIFIC HYBRIDIZATION BETWEEN *BRASSICA RAPA (B. CAMPESTRIS)* AND *B. NIGRA*

M. A. MALEK

Abstract

Interspecific hybridization between yellow seeded variety, Binasarisha-6 of B. *rapa* var. Yellow Sarson ($2n^{=}20$; AA) and Nigra-1 of *B. nigra* ($2n^{=}16$; BB) were made. The crosses with Binasarisha-6 of *B. rapa* var. Yellow Sarson as a female parent were only successful. Chromosome number in root tip cells of the F_1 hybrids was 18, which was half of the sum total of the somatic chromosome number of the parents and indicated hybrid nature. Hybrids exhibited intermediate morphology between the parents. All the hybrids showed complete pollen sterility with shrivelled, pointed tip, and pale colour anthers and reduced filaments and failed to set siliquae and seeds.

Keywords: Interspecific hybridization, *Brassica rapa, B. nigra*, interspecific hybrid.

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STUDIES ON THE DEVELOPMENT AND STORAGE STABILITY OF LEGUME AND VEGETABLE BASED SOUP POWDER

FAHIMA ROKHSANA, REZWANA YEASMIN AND AKHTER NAHAR

Abstract

Legumes are important constituents of Bangladeshi diet and provide a considerable portion of dietary proteins, minerals, and vitamins. The ready to eat soup powder prepared from legume and vegetables in the laboratory can provide an improved nutritional status. Incorporating processed rice, corn, and processed wheat flour as the starch source, three different samples of soup powder were prepared. Protein source was derived from legumes and vegetable paste was used as a mineral source. All these three developed formulations have a protein value ranging from 19.00 to 19.40% and calorie content 347 to 353 Kcal/100g. Sensory evaluation of the products revealed a reasonable acceptance of the sample prepared from wheat flour. The selected soup powder contains 19.40 percent protein and 350 Kcal of energy per 100g. Commercially available soup powder was compared with all samples in the light of its nutritional values. Protein and energy content of the selected sample is comparable with the commercial one, which contain only 7.77 percent protein and 297 Kcal energy per 100 g. Prepared soup powder is also a good source of carbohydrate and minerals, mainly iron, calcium & phosphorus. Storage study was conducted to determine the shelf life of the developed food product. Statistical analysis shows that there is no significant difference during the storage of the selected soup powder for six months.

Keywords: Storage, legume, soup powder.

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IN VITRO REGENERATION IN POINTED GOURD

M. A. MALEK, M. A. BARI MIAH, M. AL-AMIN
D. KHANAM AND M. KHATUN

Abstract

An efficient protocol was developed for plant regeneration, multiplication and rooting under *in vitro* condition in pointed gourd. Highest percent of shoot regeneration was 93.86 when nodal explants were cultured on MS+2.0 mg/1 BAP. The maximum number of shoots (4.00) per explant was observed in MS + 2.0 mg/1 BAP + 0.3 mg/1 NAA from nodal segment. Among the two explants, nodal segment was found better for shoot regeneration. Female genotypes responded better than the male genotypes for shoot induction and proliferation. Lower nodal segment performed the best shoot regeneration. The best response towards root induction was achieved on half MS medium supplemented with 0.5 mg/1 NAA. The regenerated plantlets were successfully established in prepared earthen soil pot.

Keywords: *In vitro regeneration,* pointed gourd.

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PARTICIPATORY VARIETY SELECTION IN WHEAT AND ITS IMPACT ON SCALING-UP SEED DISSEMINATION AND VARIETAL DIVERSITY

D. B. PANDIT, M.M. ISLAM, M. HARUN-UR-RASHID AND M.A. SUFIAN

Abstract

Participatory selection was conducted at the Wheat Research Centre, Bangladesh Agricultural Research Institute (BARI), Dinajpur to facilitate farmers in selecting and disseminating their preferable variety and replace widely cultivated disease susceptible Kanchan to increase wheat yield and production. Farmers' need for wheat variety was identified through participatory rural appraisal in 2002 and impacts were assessed by house hold level survey in 2005. Researches were conducted as mother and baby trials. Scaling-up seed dissemination was carried out through seed supply. BAW1008, Shatabdi, and BAW 1006 produced higher yield in both mother and baby trials and got higher scores for farmers' overall preference. The farmers emphasized on yield together with bold and white grains, more grains/spike, strong stem and other characters during scoring. They identified BAW 966, BAW 1006, BAW 1008, and Shatabdi for good Chapati quality. They expected to cultivate BAW1008, Shatabdi, and BAW 1006 in the following years. Farmer to farmer seed dissemination was highly satisfactory and seeds of Shatabdi reached 47% wheat farmers of the villages in 2004-05. Varietal diversity was increased remarkably and seven varieties were grown in the study villages. The area of Kanchan came down from 100% (in 2002-03) to 24% (in 2005-06). The participating personnel were hopeful to the new concept of plant breeding and expecting its widespread use in the country.

Keywords: Wheat, participatory variety selection (PVS), mother trial (MT), baby trial (BT), seed dissemination, varietal diversity.

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INTERNAL NUTRIENT SUPPLY CAPACITY OF VERTISOLS FOR RICE IN CHHATTISGARH AGRO-CLIMATIC CONDITIONS OF INDIA

T. CHOWDHURY, G.P. AYAM, S.B. GUPTA
G.K. DAS AND M.K. PRADHAN

Abstract

Nutrient supplies from internal sources of soil can be estimated by measuring plant nutrient uptake in nutrient omission plots. On farm experiments were conducted in rice (*Oryza sativa* L.) domains of Chhattisgarh state of India to develop guidelines for the use of omission plots in site specific nutrient management. In these experiments, significant site variations were observed in respect of soil test values, grain yields in nutrient omitted and applied plots, nutrient uptake and its efficiency of utilization. However, grain yields correlated significantly with nutrients (N, P, and K) uptake in nutrient omitted and applied plots, but it showed positive correlation only with soil test N in nutrient omitted plots.

Similarly, relationship of nutrients uptake with soil test values gave significantly high R2 values for nitrogen and phosphorus in nutrient omission plots indicating lower internal N & P supply (INS &IPS) and significantly higher K supply capacity (IKS) of soils (Vertisols). INS, IPS, and IKS varied from 21.24 to 37.39, 7.50 to 12.22, and 93.99 to 115.86 kg/ha, respectively. Farmers' fertilizer practice gave significantly lower yield than with recommended fertilizer practices at majority of sites with yield difference of more than 10 q/ha.

Keywords: Vertisols, nutrient supply, rice.

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DEVELOPMENT OF *LLOPLASMIC BRASSICA* SPECIES: VARIATION IN DNA CONTENTS AND ITS RELATIONSHOP WITH MORPHLOGICAL TRAITS IN C_2 GENERATION

M.R. MOLLA, L. RAHMAN AND S. SULTANA

Abstract

Five C_2 populations and their parents were studied for subsequent development of alloplasmic species using appropriate methods. The study was aimed at finding out the variation in morphological traits, DNA content and their relationship at C_2 generation with respect to their parents. DNA contents of the cross products of BINA-4 × Agrani, BINA-4 × Safal, BINA-4 × Daulat and BINA-5 × Daulat were 480, 620, 610, and 720 ng/Âµl, respectively. In all the cases of B. napocampestris and B. napojuncea materials, the DNA contents were much higher than their parental values. The DNA content of BINA-4 × Agrani (*B.napus* x *B.rapa*) and BINA-4 × Daulat (*B.npus* x *B.juncea*) were significantly correlated in case of pollen fertility and leaf area, while the correlated response of the crosses BINA-5 × Sampad (*B.napus* × *B.rapa*) and BINA-5 × Daulat (*B.napus* × *B.juncea*) were significant in case of leaf area only. The cross BINA-5 × Daulat showed strong correlation with DNA content in case of plant height, BINA-4 × Daulat and BINA-4 × Safal in case of beak length, while BINA-4 × Safal in case of seeds per siliqua only. The results indicate that the changes of DNA content also cause changes in morphological traits of the cross products of two different species having different genomic combinations.

Keywords: *Lloplasmic brassica*, variation, DNA, C_2 generation.

Bangladesh J. Agril. Res. 32(4) : 519-532, December 2007

SEASONAL EFFECT ON IN VIVO POLLEN GERMINATION AND TUBE GROWTH OF LABLAB BEAN GENOTYPES

M.Z UDDIN, A.R. CHOWDHURY, M.M. HOSSAIN AND M. ZAKARIA

Abstract

The study was conducted to evaluate the seasonal influence on in vivo pollen ermination, pollen viability, and pollen tube growth of lablab bean genotypes associated with poor pod setting beyond winter season. Four genotypes, namely IPSA Sheem-1, IPSA Sheem-2, BU Sheem-3, and JER were evaluated during September 2000 to December 2001 covering one main season (winter) and two off seasons (early) summer and late summer). Compared to off-seasons, all the genotypes performed better for all the parameters during winter. Every delay in planting was associated with appreciable reduction in pollinated stigma, in vivo pollen germination, pollen tube growth into style or ovary due to adverse effect of environmental factors. Stigma harvested at 8 to 12 hours after anthesis produced better results for most of the embryological parameters in winter. But for reaching the maximum level of pollination and fertilization beyond winter season, a period of 24 hours after anthesis was the safe limit.

Keywords: lablab bean, genotypes, pollen germination, tube growth, seasonal effect.

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REDUCTION OF PARASITIC NEMATODE BY SOIL SOLARIZATION IN TRANSPLANTED AMAN RICE-WHEAT SYSTEM

M. HOSSAIN, M.M. KAMAL, M.A. MAZID AND M.M. RASHID

Abstract

Experiments were conducted to study the effect of soil solarization on soil nematode, weed, yield contributing characters, and grain

yield of transplanted aman rice and also to observe the residual effect of the treatments on the following wheat crop. The treatments were, untreated control (T_1), Furadan 5G (Carbofuran) @ 18 kg/ha (T_2), soil solarization using transparent plastic (25Âµm) for 4 weeks and spaded after solarization to disturb the soil (T_3), soil solarization using transparent plastic (25Âµm) for 4 weeks and not spaded after solarization (undisturbed) (T_4), and plastic mulch (land covered by transparent plastic (25Âµm) throughout the aman rice season) (T_5). The application of plastic mulch (T_5) significantly increased plant height, number of tiller per m2, and number of panicles per m^2 reduced weed, galling incidence, and parasitic nematode population in soil. The highest increase of grain yield (26.77%) was observed in T_5 over control. Residual effect of those treatments of aman crop was also effective in reducing nematode in soil and root gall in wheat crop. Those residual effect of treatments also significantly increased yield of wheat. Seven parasitic nematode species, Tylenchorynchus sp., Hirschmaniella sp., Heterodera sp., Pratylenchus sp., Tylenchus sp., Xiphinema sp. and Meloidogyne sp. were found both in rice and wheat field. Different parasitic nematode species decreased due to the treatments over control in aman and wheat fields.

Keywords: Parasitic nematode, soil solarization, aman rice, wheat.

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PERFORMANCE OF COMMERCIAL AND PROMISING MANGO VARIETIES UNDER JOYDEBPUR CONDITION

MAJ BHUYAN AND K KOBRA

Abstract

Twelve well known mango varieties of Bangladesh (Surjapuri, Ashwina, Kalia, Deori, Fazli, Langra, Lota Bombai, BARI Aam-1, Gopalbhog, Bombai, Khirsapat, and Rani Passand) planted in the research farm of the Horticulture Research Centre of BARI at Joydebpur were evaluated in respect of tree growth, flowering and harvesting time, yield per tree, and quantitative and qualitative characteristics of leaf, inflorescence and fruit. Susceptibility of the varieties to insects and diseases was also observed. Full bloom in all the varieties took place between 26 February to 02 March. Fruits of the varieties were harvested between 24 May and 10 July.

The variety Deori was the earliest and Ashwina was the latest in respect of harvesting time. The maximum number of fruits/tree (300) and yield/tree (37.40kg) were produced by Kalia and Ashwina, respectively. The highest fruit weight (315.00g) was obtained from Fazli followed by Ashwina (220.00g), Bombai (207.00g) and Langra (200.00g). The highest percentage of edible portion was recorded in Ashwina (76.00%) followed by Langra (73.00%), Fazli (72.00%, Kalia (71.00%, Bombai (70.50%), Khirsapat (68.50%), Gopalbhog (68.50), and BARI Aam-1 (68.00%). TSS was found to be the highest in Khirsapat (22.00%) whcih was followed by Bombai (19.50%). Langra (18.50%), Gopalbhog and BARI Aam-1 (18.00%). All of the varieties were affected by different insects and diseases in different degrees. In overall performance, the varieties Khirsapat, Gopalbhog, Langra, and BARI Aam-1 were better than the others.

Keywords: Mango, varietal performance, commercial varieties.

Bangladesh J. Agril. Res. 32(4) : 553-558, December 2007

ANALYSIS OF GENETIC DIVERGENCE FOR QUALITY IMPROVEMENT OF RAPESEED AND MUSTARD

M.S. ISLAM, L. RAHMAN, M.S. ALAM AND M.M. ROHMAN

Abstract

Twenty two genotypes of Brassica (*B. rapa, B. iuncea,* and B. napus) were studied for genetic divergence using principal component analysis and nonhierarchical Euclidean cluster analysis on the basis of major fatty acid compositions. The genotypes were grouped into four clusters irrespective of the geographical divergence. Cluster I, III, and IV consisted of six genotypes each followed by cluster II and it was 4. Cluster I had the highest mean value for stearic acid and erucic, while the lowest value was for palmitic acid, linoleic, and linolenic acid. Cluster II had only the lowest mean value for stearic acid. Cluster III showed the highest mean value for palmitic acid, oleie, acid and eicosenoic acid, and the lowest mean value for erucic acid. The highest mean value for linoleic acid and linolenic acid and the lowest mean value for oleic acid and eicosenoic acid were observed in cluster IV. Those genotypes may be used in hybridization programmes for the

improvement of quality traits of rapeseed and mustard. The cluster I had the highest intra-cluster D_2 value (0.65). So, the genotypes belong to this cluster would be more stable in different environments. Being the highest inter-cluster D_2 value (10.24) between the clusters I and III, the genotypes of I would produce desirable recombinants crossing with those of the cluster III. The principal component analysis revealed that oleic acid and erucic acid contributed maximum to the total divergence in the present materials.

Keywords: Rapeseed, mustard, genetic diversity, D^2 values.

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STABILITY FOR GRAIN YIELD AND YIELD COMPONENTS IN RICE

UMAKANTA SARKER, P.S. BISWAS AND B. PRASAD

Abstract

Stability analysis was carried out for grain yield and its components in six HYV boro rice varieties across five different planting dates. Highly significant genotypes, environment and G × E interaction were observed for all the traits. Non-linear component (pooled deviation) was found highly significant for grain yield and its components, while linear components (variety × planting time) were only significant for plant height. BRRI dhan27, BRRI dhan29, and BRRI dhan36 were found suitable for favourable environments. Among the varieties, BRRI dhan29 was the top yielder followed by BRRI dhan27 and BRRI dhan36. 30 December and 15 January were suitable planting time for these varieties in northern area, especially in Rangpur. For better production, transplanting must be completed within December to mid January.

Keywords: Rice, stability, HYV, grain yield.

Bangladesh J. Agril. Res. 32(4) : 565-571, December 2007

EFFECT OF ADDITIONAL FERTILIZER AND PRUNING ON GROWTH OF POINTED GOURD

A.S.M.M.R. KHAN, M.G. RABBANI, M.A. SIDDIQUE AND M.A. ISLAM

Abstract

The experiment was conducted at the Regional Agricultural Research Station, Ishurdi, Pabna during the growing season of 2001-2002 and 2002-2003 to investigate the different levels of pruning and application of additional fertilizer on the growth and yield of pointed gourd. The highest yield (28.17 t/ha) was recorded by additional fertilizer treatment. Pruning intensities differed significantly in respect of different yield contributing characters and yield. The highest yield (34.54 t/ha) was recorded in medium pruned plants, while the lowest yield (19.06 t/ha) was recorded in heavy pruned plant. The highest yield was recorded in crops receiving additional fertilizer and medium pruning and the lowest yield was observed in crop receiving no additional fertilizer with heavy pruning. The highest benefit cost ratio (3.66) was obtained from additional fertilizer with medium pruning treatment.

Keywords: Pointed gourd, fertilizer, pruning, growth, yield.

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STUDY ON THE PREPARATION OF SHELF STABLE READY TO SERVE (RTS) BEVERAGES BASED ON BAEL PULP

M.M. MOLLA, M. ALAMGIR HOSSAIN
T.A.A. NASRIN, M.N. ISLAM AND S. SHEEL

Abstract

The experiment was conducted to find out suitable formulation for preparation of bael beverage. The beal pulp was analyzed for its composition and different formulations of beverages were prepared using varying proportions of bael pulp and different concentrations of thickening agents, such as sodium alginate, xanthane gum, and CMC. The prepared bael beverages were

packed in glass bottle with lug cap. The bael pulp showed 61.9% moisture, 32% TSS, Vitamin C content 8.89mg/100mg, and acidity 0.35%, reducing sugar 5.08%, non-reducing sugar 12.05%, total sugar 17.13%, mucilage 4.92%, and pH 4.3 (with titrable acidity 0.5%). The glass packed beverages were stored at room temperature for a period of 150 days and evaluated for their keeping quality at an intervals of 30 days. It was revealed that the sedimentation was minimized by using CMC and found to be more effective for reducing the sedimentation than xanthae and sodium alginate. A five-member taste panel opined that formulation T1 (16% bael pulp = 0.2% CMC + 0.28% citric acid + 11.07% sugar + 0.06% KMS) had the highest overall acceptability among other treatments.

Keywords: Bael, beverages, pulp.

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EFFECT OF SOWING AND HARVESTING TIME ON THE GROWTH AND QUALITY OF LETTICE

Z.A. FIROZ, M.A. ROUF, S.N. MOZUMDER AND M.M. ZAMAN

Abstract

An experiment was conducted at the Hill Agricultural Research Station, Khagrachari from November 2002 to March 2003 to find out the effect of sowing time (10. 20, 30 November and 10, 20, and 20 December) and harvesting time (40, 50, 60, and 70 DAS) on the growth, yield, and quality of lettuce. Maximum yields were obtained from 10 November to 10 December sowing when harvested at 70 days after sowing (DAS) followed by 60 and 50 DAS. The lower yield was recorded from 20 and 30 December sowing when harvesting was done at 40 DAS. Though yield was maximum at 70 DAS, but quality of lettuce was not good, but harvesting at 50 DAS is suitable for quality lettuce production when sown between 10 November and 1 December.

Keywords: Sowing dates, harvesting time, lettuce yield, lettuce quality.

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YIELD REDUCTION ASSESSMENT OF LENTIL DUE TO OMISSION OF DIFFERENT MANAGEMENT PRACTICES

M. ALTAB HOSSAIN, M.S.A. KHAN, M. NURUL ISLAM
M.S. ALOM AND J.A. CHOWDHURY

Abstract

Field experiments were conducted at Joydebpur, Jessore, and Ishurdi of Bangladesh Agricultural Research Institute (BARI) during rabi seasons of 2002- 03 and 2003-04 to analyze the production factors limiting performance of yield and yield attributes of lentil. The treatments were, T_1 = complete package of production factors (CPP), T_2 = CPP with 30-day delay sowing, T_3 = CPP excluding chemical fertilizer, T_4 = CPP in addition to cowdung only as fertilizers, T_5 = CPP excluding N, T_6 = CPP also with broadcast seeding, T_7 = CPP excluding plant protection measures, and T_8 = CPP excluding seed treatment. Averaged over locations, CPP resulted in significantly higher seed yield (1915 kg/ha) and gross margin (Tk. 31043/ha) compared to any other treatment exercised in the study. Response of organic manure contribution was positive to increasing seed yield (16%). Use of inoculum (instead of N) under CPP gave statistically identical yield in all three locations. Seed yield decreased significantly (11-42% at Joydebpur, 10-37% at Jessore, and 9-41% at Ishurdi) when any of the production factors was withdrawn from CPP irrespective of locations. The maximum reduction in mean seed yield was recorded due to delayed sowing (40%) followed by withdrawing of chemical fertilizers (22%), using organic manure only (20%) and broadcast seeding (15%), without plant protection measures (15%), and using non-treated seeds (14%), respectively. Gross return also reduced significantly (15-44%) when any of the management practices was withdrawn from CPP. The results revealed that delay in sowing, no use of plant protection measures, chemical fertilizers and seed treatments were the production factors limiting yield of lentil.

Keywords: Lentil, management practices, yield reduction.

Bangladesh J. Agril. Res. 32(4) : 603-620, December 2007

DETERMINISTIC MODEL FOR GROWTH ANALYSIS AND FORECASTING FO RICE PRODUCTION IN BANGLADESH

M.A. AWAL, M.E. HAQUE AND M.F. IMAM

Abstract

The present study was undertaken to find out appropriate model using seven contemporary model selection criteria that could best describe the growth pattern of rice production in Bangladesh and its three type seasons (aus, aman and boro during the time period 1969-70 to 2005-2006). It appeared from the study that the best fitting model for aus and boro rice production was cubic model and quadratic model. It means that the assumption of constant annual rate of growth in percent that lies behind the use of exponential/compound model, which was very common to use in describing growth pattern, was not true for the growth pattern of rice production in aus and boro. In aman rice production, exponential/compound model seemed to be appropriate. Five years forecasting results showed that the aus, aman, and boro rice production in the year of 2005/06 were 1.83, 11.30, and 14.23 million metric tons with a 95 percent confidence interval, respectively. If the present growth rates continue then the total aus, aman, and boro rice production in Bangladesh will be 2.28, 12.13, and 17.29 million metric tons in the year of 2009/10, respectively.

Keywords: Rice production, model, selection.

Bangladesh J. Agril. Res. 32(4) : 621-628, December 2007

STANDARDIZATION OF SHELF-STABLE AONLA, CARAMBOLA, PAPAYA, PINEAPPLE, AND WATERMELON RIND CANDIES

T.A.A. NASRIN, M. ALAMGIR HOSSAIN AND M.M. MOLLA

Abstract

This study was conducted to standardize procedures for preparing candies from aonla, carambola, papaya, pineapple, and watermelon rind. Fruit's slices were treated with preservative and firming agents, pricked, blanched, and then processed. Initially the range of moisture content of candies was 15.6 to 16.15%, total sugar 79.78 to 81.63%, reducing sugar 55,56 to 58.71%, and acidity 0.54 to 0.88%. The candies were tasted by a taste-testing panel for different sensory attributes using 9 point Hedonic scale. During four months of storage, the results showed that aonla and carambola candy packed in high density foil pack (HDFP) secured the highest sensory score, while papaya, pineapple, and water melon rind candy packed in normal polyethylene pack (NPP) showed the lowes sensory acceptability.

Keywords: Rind candies, standardization, fruit.

Bangladesh J. Agril. Res. 32(4) : 629-635, December 2007

EFFECT OF DIFFERENT PLANT GROWTH REGULATORS ON PLANTLET REGENERATION IN DENDROBIUM HYBRID ORCHID

HASINA KHATUN, M.M. KHATUN, D. KHANAM
M.A. MALEK AND M. AL-AMIN

Abstract

The experiment was conducted to investigate the combined effect of different plant growth regulators on growth and development of plantlets regeneration from Protocorm Like Bodies (PLBs) of hybrid orchid. The combination of BAP + NAA, BAP + IAA, BAP + IBA, and IAA + IBA at different concentrations were studied. It revealed that highest weight of PLBs (13.35g) was obtained from the combination of IAA + IBA having concentration of 1.0mg/1 each. The highest shoot height (4.530 cm) and maximum number of leaves (5.510) was obtained from 1.0 mg/1 each of BAP + NAA combination. The highest leaf length (2.573 cm) was noticed in the combination of IAA + IBA at a concentration of 1.0 mg/1 each. While the highest leaf width was obtained from 0.5 mg/1 BAP + 1.0 mg/1 IBA combination. However, for fresh weight of single shoot was maximum by the concentration 0.5 mg/1 each of BAP + IAA. The maximum number of regenerated plantlets (22.00) was obtained from 1.0 mg/each of BAP + IAA and BAP + IBA.

Keywords: Dendrobium hybrid orchid, growth regulators, plantlet regeneration.

Bangladesh J. Agril. Res. 32(4) : 637-648, December 2007

DESIGN AND DEVELOPMENT OF HOT-WATER TREATMENT PLANT FOR MANGO

M.N. AMIN, K.C. ROY, M.A. MATIN, M.A. WOHAB AND M.M. MOLLAH

Abstract

Postharvest loss of mangoes in Bangladesh ranges from 20 to 30 percent, mainly for lack of proper postharvest practices. As a result, quantitative as well as qualitative loss occurs. To reduce postharvest loss, a hot-water treatment plant for mango has been designed and developed at the Farm Machinery and Postharvest Process Engineering Division, Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur. Overall dimension of the plant is 3030 x 1000 x 814 mm and made of M S sheet, M S angle, bearing, chain, sprocket, electric heaters, cork sheet, pulley, etc. It has five main functional parts: i) rectangular tanks, ii) roller type conveyer assembly, iii) water heating system, iv) power transmission system, and v) agitator assembly. Conveyor roller is rotated by an electric motor and water is heated by six 3 kW immersion electric heaters. The digital temperature controller is set to control the temperature of water. The plant was tested for treating mango in Joydebpur and Chapai Nawabganj. Mangoes were treated at 55Â±1Â°C for 5 minutes. The average capacity of the plant was 1,088 kg per hour. The cost of hot water treatment wasonly Tk. 0.17 per kg. No anthracnose or stem-end rot disease was observed. Most of the mangoes had attractive colour and the shelf-life was increased upto10 days. The postharvest loss was only 0.13 percent. The farmers, traders, and exporters will be benefited using this plant. The break-even-point of the plant was only 5.5 tons of mangoes per year. Price of the plant was Tk. 75,000.

Keywords**:** Mango, design, development, hot-water, treatment plant.

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INFLUENCE OF TILLAGE AND MULCHING ON THE GROWTH AND YIELD OF RAINFED WHEAT

N.A. MONDAL, S.M.A. HOSSAIN, S.U. BHUIYA AND M. JAHIRUDDIN

Abstract

Field experiments were conducted at the Regional Agricultural Research Station of the Bangladesh Agricultural Research Institute (BARI), Jessore during the rabi seasons of 1999-2000 and 2000-2001 to evaluate the effect of different tillage and mulch practices on the conservation of residual soil moisture, yield attributes, and yield of wheat (cv. Shatabdi). The experiment consisting of three levels of tillage viz., minimum, reduced, and conventional tillage and four levels of mulch viz., rice straw, water hyacinth, black polythene, and no mulch. The experiment was laid out in a split-plot design distributing the tillage treatments to the main plots and mulches to the sub-plots. Yield and yield components of wheat were significantly influenced by tillage practice. Reduced tillage gave consistently the highest grain yield and the lowest grain was obtained from minimum tillage in both the years. Black polythene mulch significantly increased grain yield by 29% over no mulch and also conserved more moisture in the soil. Variation in yield was also noticed between years, higher yield being in 2000-2001 than in 1999-2000 which can be explained by higher soil moisture for rainfall (189 mm) occurring in 2000-2001. Two years' results indicated that polythene mulch or rice straw mulch accompanied by reduced tillage might be an efficient practice in order to conserve soil moisture for higher yield of wheat under rainfed condition.

Keywords: Wheat, rainfed, tillage, mulching.

Bangladesh J. Agril. Res. 33(1) : 1-8, March 2008

MORPHOLOGY AND YIELD OF ONION AS AFFECTED BY DIFFERENT PLANT GROWTH RETARDANTS

MD. MOSLEH-UD-DEEN

Abstract

An experiment was conducted with different concentrations of plant growth retardants used through different methods to evaluate their effects on morphology and yield of onion *(Allium cepa* L.). Higher concentrations of uniconazole used as spray + soil drench method was found to be most effective for increasing bulb diameter, bulb volume, individual bulb weight. days to scape formation and days to first flowering. In general, all these were found to increase with increasing concentrations of different growth retardants, whereas leaf number per plant, plant height, pseudostem length, leaf length, length of scape, and dry weight of scape were found to decrease.

Keywords: Plant growth retardants, morphology and yield, onion.

Bangladesh J. Agril. Res. 33(1) : 9-17, March 2008

INTERACTION OF ARBUSCULAR MYCORRHIZAL FUNGI AND TERRACOTTEM® ON THE GROWTH OF *Vigna mungo* (L.) HEPPER

S. DEWAN, M. A. U. MRIDHA, M. K. BHUIYAN
M. S. R. MAZUMDER, M. G. KIBRIA

Abstract

Mycorrhiza stimulates the growth of plants by providing phosphorus, water and other slow releasing nutrients; overcomes the drought and saline stresses of the plants; confers disease resistance, etc. TerraCottem® (TC), a soil conditioner also stimulates the growth of plants by providing water and fertilizer requirements of plants. The treatments were only degraded soil; soil amended with 5 g TC/kg; soil amended with AM fungi (15 g AM soil inoculum/kg); soil amended with TC and AM fungi (5 g TC and 15 g AM/kg). The highest shoot height, root length, leaf number, nodule number, fresh and dry weight of root and shoot were recorded in TC+AM treated plants in comparison with other treatments and the lowest was found in the control. Arbuscular mycorrhiza treated plants showed better growth over control, but lower than TC and TC+AM treated plants. It may be concluded from the present results that AM fungi can be introduced in crop production system in Bangladesh. TerraCottem may be used in collaboration with AMF but the product is a bit expensive for general scale use.

Keywords: Arbuscular mycorrhiza, TerraCottem, growth and *Vigna mungo.*

Bangladesh J. Agril. Res. 33(1) :19 29, March 2008

EFFECTS OF DATE OF PLANTING USING DRUM SEEDER ON GROWTH AND YIELD OF BORO RICE

M. F. ISLAM, M. A. R. SARKAR, M. Z. ABEDIN
M. A. RAZZAQUE AND S. PARVEEN

Abstract

The experiment was conducted at the research field of the Bangladesh Rice Research Institute (BRRI), Gazipur during the *boro* season of 2005 to determine the appropriate seeding date of direct wet-seeded rice (DWSR) using drum seeder compared to traditional transplanted rice (TPR). DWSR produced 10% higher grain yield than transplanted rice and 31 December seeded DWSR produccd the highest grain yield (6.18 t/ha), which was about 24% higher than TPR. Growth duration was reduced, on an average, by 8 days in DWSR compared to that of TPR. The highest number of panfcles per m^2 (606) was found at I December planted direct wet-seeded rice, which was 128% higher than TPR. DWSR which was planted in January significantly reduced the number of panicles per m^2 but 1 Deeember planted rice significantly reduced the grains per panicle and no signifficant difference in 1000-grain

weight was observed between the planting methods irrespective of planting dates. Leaf area index (LAI) was higher in DWSR than TPR during the month of December. The month of December appeared to be suitable for direct wet-seeding using drum seeder for *boro* season.

Keywords: Direct wet-seeded, transplanted, date of seeding, drum seeder.

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EFFECT OF BORO RICE STRAW ON THE PERFORMANCE OF T. AMAN RICE IN BORO-T. AMAN RICE CROPPING SYSTEM

S. M. ZAMAN, M. R. AMIN, R. U. CHOUDHURY
M. R. SHAHEB, S. AKTAR

Abstract

An on-farm experiment was initiated at Kalaroa Multi Location Trial (MLT) site, Satkhira during 2001-2004 to find out the effect of Boro rice straw incorporation on the yield of T. Aman in Boro-T. Aman rice cropping system. Boro rice was grown with recommended doses of fertilizers and was harvested at different heights retaining I/3rd and ^{2}/3rd straws in the experimental plots. Boro rice straw was incorporated to the soil along with inorganic fertilizer for Moderate Yield Goal (MYG). Inorganic fertilizer of recommended dose for MYG and High Yield Goal (HYG) and farmer's practice was also included. A positive effect of rice straw incorporation was observed on the yield of T. Aman rice. Incorporation of ^{2}/3rd rice straw (3.75 t/ha) along with recommended fertilizer dose (70-6-20-4 kg NPKS/ha) for MYG gave similar yield with recommended fertilizer dose (90-8-30-5 kg NPKS/ha) for HYG. Regarding economic performance, higher benefit was obtained from rice straw incorporation (I/3rd rice straw harvested) treatment compared to only inorganic fertilizer packages and farmers' practice. Soil nutrient status for P, K, and S was increased in the rice straw incorporated treatments. Similarly, K mining was less and about 20 kg K/ha/year was added additionally over only inorganic fertilizer packages.

Keywords: Rice straw, cropping system, boro-t.aman.

Bangladesh J. Agril. Res. 33(1) : 43-49, March 2008

ON-FARM STUDY ON INTERCROPPING OF GROUNDNUT WITH SHORT DURATION VEGETABLES

M. A. H. KHAN AND M. A. QUAYYUM

Abstract

The experiment was conducted at MLT site Katiadi, Kishoregonj during *rabi* season of 2004-05 and 2005-06 to study the feasibility of intercropping groundnut with different short duration vegetables and economic returns. Four intercrop combinations of groundnut along with sole groundnut were arranged in randomized complete block design replicated four times. There were five treatments viz., T_1 = Monoculture of groundmit, T_2 = Two rows of red amaranth (20 cm apart) in between two (40 cm apart) rows of groundnut, T_3 = Two rows of spinach (20 cm apart) in between two (40 cm apart) rows of groundnut, T_4 = Two rows of amaranth (20 cm apart) in between two (40 cm. apart) rows of groundnut, and T_5 = Two rows of bush bean (20 cm apart) in between two (40 cm apart) rows of groundnut. Results showed that different intercropping combinations significantly influenced pods per plant, kernels per pod, 1000-kernel weight and pod yield of groundnut. Though the highest pod yield was obtained from sole groundnut (2.47t/ha), but the highest groundnut equivalent yield (3.47 t/ha), gross return of Tk. 69280/ha and benefit-cost ratio (BCR) of 2.14 were obtained from groundnut+ spinach intercropping combination. Two rows of spinach in between two rows of groundnut was the most feasible and profitable for different short duration vegetables intercropped with groundnut.

Keywords : Intercropping, groundnut, vegetables, sed amaranth, spinach, bush bean.

Bangladesh J. Agril. Res. 33(1) : 51-58, March 2008

EFFECT OF GROWTH HORMONE ON THE MYCELIAL GROWTH AND SPAWN PRODUCTION IN OYSTER MUSHROOM

MANIRUZZAMAN, A. U. HAQUE AND K. M. NASIRUDDIN

Abstract

A number of experiments were conducted to investigate the effect of IAA and NAA on mycelial colony proliferation of Oyster mushroom. Oyster mushroom was cultured on MEA media supplemented with different concentrations and combinations of IAA (1.0, 5.0, and 10.0 ppm) and NAA (0. 1, 1.0, and 5.0 ppm). MEA media supplemented with 5 ppm IAA + 0 ppm NAA was found to be the best (11.3 cm) for rapid mycelial colony proliferation. Spawn production of Oyster in different substrates viz., wheat, rice, maize, and sawdust were observed. Substrate rice was the best for spawn production of Oyster mushroom.

Keywords: Growth hormone, mycelial growth, spawn production, oyster mushroom.

Bangladesh J. Agril. Res. 33(1) : 59-66, March 2008

ON-FARM PERFORMANCE OF BARI SELF-PROPELLED REAPER FOR HARVESTING PADDY AND WHEAT

M. A. MATIN, K. C. ROY, M. N. AMIN
M. S. ALAM AND M. A. WOHAB

Abstract

BARI self-propelled reaper was tested in Jessore, Jamalpur, and Kishoreganj in three AEZs in 2005-2006. Farmers had mixed reactions on the performance. Most of the farmers of Jessore were satisfied with the performance of the reaper. But, many of them did not like to collect and tie in bundles. Farmers of Kishoreganj and Jamalpur liked the machine very much. They used mechanical threshers for threshing and did not have problem of collecting and tying bundles after harvesting by reaper. About 6 ha of paddy and wheat were harvested. The average field capacities of the reaper were 0.17 ha/h for paddy and 0.19 ha/h for wheat. The reaper, on an average, saved 90.2 percent labour and 69.4 percent cost for paddy and 91.2 percent labour and 72.7 percent cost for wheat harvesting. During the *boro* season, paddy fields with 100 mm of standing water could be harvested by the reaper in Kishoreganj. Harvesting losses were 3.67 percent and 2.33 percent for wheat and paddy, respectively. Repair cost of the reaper for one year was only 2 percent of the price of the reaper. It is recommended to demonstrate the reaper in areas where mechanical threshers, particularly closed drum threshers are in use.

Keywords : Performance, BARI self-propelled reaper, paddy and wheat.

Bangladesh J. Agril. Res. 33(1) : 67-81, March 2008

TOMATO MARKETING SYSTEM IN BANGLADESH

M. A. MATIN, M. R. KARIM, M. I. HOSSAIN AND M. A. HOSSAIN

Abstract

This study was carried out to identify the most efficient and suitable marketing channels of tomato in some selected areas of Bangladesh by using primary data collected randomly from 120 farmers and 99 traders. Based on the volume of tomato handled and longevity or participation of the intermediaries in the channel, four major channels were identified as dominant in the study areas. The channel Farmer-Bepari-Aratdar (Dhaka)-Retailer (Dhaka)-Consumer ranked first. The results showed that channel III Farmer-Aratdar (Local)-Bepari-Aratdar (Dhaka)-Retailer (Dhaka) -Consumer possesses the highest marketing efficiency followed by the channel IV. The performance indicators revealed that the channel I and channel 11 were not relatively efficient in the tomato producing regions. Unstable price of tomato was the first ranked problem in the study area. The study suggests that establishment of tomato processing plant in the intensive growing areas may solve the problem which will ensure fair prices for the farmer by improving marketing efficiency.

Keywords: Tomato marketing, marketing channel, Bangladesh.

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PATHOGENIC VARIABILITY IN FLAG SMUT PATHOGEN OF WHEAT

S. S. KARWASRA, M. S. BENIWAL AND M. L. CHHABRA

Abstract

The pathogenic variability of nine collections/isolates of flag smut pathogen *Urocystis agropyri* collected from different places i.e., Ambala, Bhiwani, Hisar (Haryana); Durgapura, Sri Ganganagar, Sikar (Rajasthan); IARI (New Delhi); Ludhiana (Punjab) and Palampur (Himachal Pradesh) was studied on a set of 12 varieties/genotypes of *T. aestivum, T. durum, T dicoccum.* and Triticale. The Ambala (FSC-1) and Ludhiana (FSC-8) collections/isolates behaved differently and formed two different pathotypes *i.e.,* pathotype-1, and pathotype-2, respectively, Hisar (FSC-3), Durgapura (FSC-4), and Palampur (FSC-9) collections/ isolates formed third group i.e., pathotype-3 whereas, Bhiwani (FSC-2), Sri Ganganagar (FSC-5), Sikar (FSC-6), and Delhi (FSC-7) collections/isolates formed fourth group i.e., pathotype-4. These.four pathotypes could be differentiated from each other with their pathogenic reactions on varieties i.e., WH 283 (pathotype- I), WH 291 (pathotype-2), HD 2329 (pathotype-3), while pathotype-4 was avirulent on WH 283, WH 291, HD 2329 and virulent only on C 306, WH 147, and Hindi-62. Thus the studies indicated the existence of four different pathotypes in flag smut pathogen in India.

Keywords: Pathogenic variability, flag smut, wheat.

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ROLE OF SUCROSE ON MICRO TUBERIZATION IN POTATO

M. ZAKARIA, M. M. HOSSAIN, M. A. KIIALEQUE MIAN
T. HOSSAIN AND M. Z. UDDIN

Abstract

Eight levels of sucrose (0, 3, 6, 8, 9, 10, 12, and 15%) were used for induction and development of microtuber in three recommended potato cultivars, namely Cardinal, Diamant, and Heera under complete dark condition. Tuberization did not occur when sucrose was not used in culture media. The number of microtubers per flask significantly increased with increasing sucrose concentration upto 10%. The heaviest microtuber was produced at 9% sucrose (271.2 mg) closely followed by 10, 8 and 12% sucrose. All the cultivars performed well in microtuberization, but Diamant was the best. Average weight of microtuber increased at sucrose concentration upto 9% in both Cardinal and Diamant, while it increased with sucrose concentration upto 10% in the variety Heera. The percentage of >300 mg size microtuber increased with increasing sucrose concentration upto 9% and decreased onwards.

Keywords: Sucrose, micro tuberization, potato.

Bangladesh J. Agril. Res. 33(1) : 99-111, March 2008

RESEARCH BENEFIT OF DURA VARIETY POTATO IN BANGLADESH

MD. ABDUL BASET, MD. REZAUL KARIM
AND QUAZI MESBAHUL ALAM

Abstract

An ex-ante study was undertaken to quantify the future benefit from Dura variety potato, which is recently approved by the National Seed Board (NSB) of Bangladesh and released by the Tuber Crops Research Centre (TCRC) of the Bangladesh Agricultural Research Institute (BARI). The model used for this study is the one developed by Akino & Hayami (1975) based on the economic surplus approach. The Internal Rate of Return (IRR) to Dura variety potato research by the Tuber Crops Research Centre (TCRC) was calculated to be 44%. The result indicated that each taka invested returns Tk.0.44 per year from Dura variety potato research and was highly profitable.

Keywords: Research benifit, Dura variety potato, ex-ante study.

Bangladesh J. Agril. Res. 33(1) : 113-120, March 2008

EFFECT OF IRRIGATION ON THE YIELD OF JACKFRUIT

M. A. RAZZAQUE AKANDA, MD. ANOWER HOSSAIN, M. SYDUR RAHMAN, M. A. SATTER AND A. KALAM AZAD

Abstract

This study was conducted during 2002-2006 at the farmers' field of village Vangnahati under Sreepur Upazila of Gazipur District to determine the effect of irrigation as well as to identify the critical stages of jackfruit for irrigation. The yield contributing characters like number of fruits per tree, length of fruit, fruit diameter, unit fruit weight varied significantly among the irrigation treatments. The yield trends for all the years were similar. The highest annual return per tree (Tk. 2016.00-2595.00) was obtained from the tree irrigated at 15 days interval and the lowest (Tk. 150.00-750.00) was obtained from no irrigation (control) during the study years. From the four years' study, it was observed that about 3-4 times higher yield could be obtained from irrigated trees than non-irrigated trees. The number of fruits and unit fruit weight were higher in irrigated trees than those of the non-irrigated ones. This might be due to presence of sufficient moisture at the root zone during flowering and fruit setting stages of the trees irrigated at 15 days interval. The critical stage for irrigation to jackfruit was found from bloom through fruit development.

Keywords: Effect, irrigation, yield, jackfruit.

Bangladesh J. Agril. Res. 33(1) : 121-128, March 2008

ORGANIC MANAGEMENT OF ROOT- KNOT NEMATODE OF TOMATO

M. L. RAHMAN AND M. I. FARUK

Abstract

Efficacy of 16 extracts obtained from leaf and/or other plant parts of Akanda *(Calotropis gigantea),* Bishkatali (Polygonum hydropiper), Dhatura *(Datura stramonium),* Dholkalmi *(Ipomoea fistulosa),* Eucalyptus *(Eucalyptus globulus),* Garlic *(Allium sativum),* Ginger *(Zingiber officinalis),* Katamehedi *(Duranta plumeri),* Marigold *(Tagetes patula),* Neem *(Azadiracta indica),* Nishinda *(Vitex negundo),* Onion *(Allium cepa),* and Turmeric *(Curcuma doinestica)* including Furadan 5G were evaluated during three successive years for controlling root-knot nematode *(Meloidogyne incognita)* of tomato under pot house condition. Shoot and root growth of tomato was significantly ($p = 0.05$) enhanced by the application of all plant extracts. The effect of Furadan 5G was statistically either similar or inferior to plant extracts in reducing the severity of root-knot (gall index) in tomato. Leaf extract of Marigold, Dhatura and bulb extract of Garlic were superior to other extracts, which reduced the gall index of root-knot nematode in tomato by 75.06, 70.94, and 67.29%, respectively, under pot house condition.

Keywords: Organic management, root-knot nematode of tomato.

Bangladesh J. Agril. Res. 33(1) : 129-134, March 2008

GENETIC DIVERSITY IN BITTER GOURD

A.K.M. QUAMRUZZAMAN, M. A. RASHID, M.M. AL1 A.K.M. M. ALAM AND M. MASHIUR RAHMAN

Abstract

Genetically diverged thirty-three genotypes of bitter gourd *(Momordica charantia* L.) were estimated using D^2 and principal component analysis. The genotypes were grouped into five clusters. The clustering pattern of the genotypes showed high degree of genetic diversity. The intra cluster distance was maximum in cluster I and minimum in IV. Cluster III comprises the maximum number of genotypes followed by the cluster 11. Inter cluster distance between I and V was maximum. The cluster mean of days to first harvest in cluster II was maximum And lowest in cluster V. The genotypes of these clusters can be exploited for developing early variety. The role of fruit yield per plant and fruit number per plant in both the vectors was found to be more prominent towards genetic divergence.

Key word: Genetic diversity, bitter gourd, cluster.

Bangladesh J. Agril. Res. 33(1) : 135-143, March 2008

INTEGRATED NUTRIENT MANAGEMENT IN THE MUSTARD - BORO RICE -T. AMAN RICE CROPPING SYSTEM

N. C. BASAK, M. A. QUAYYUM, S. M. ASADUZZAMAN, N. SULTANA AND M. A. H. KHANS

Abstract

A field experiment was conducted at farmers' fields of Phulpur multilocation testing site under Mymensingh District during 2003 to 2005 to evaluate different nutrient management packages for the Mustard-Boro rice- T. Aman rice cropping system. Four different nutrient management packages along with farmers' practice and no fertilizer (control) were tested. Two treatments were soil test based fertilizer management for moderate and high yield goal levels for the crops. An integrated nutrient management package (IPNS) where cowdung @ 10 t/ha was applied along with chemical fertilizers for high yield goal level and the cropping pattern based fertilizer recommendation for AEZ basis (FRG'97) included. The results showed that the IPNS treatment gave better yield performance of mustard, while both Boro and T. Aman rice yields were better in soil test based fertilizer dose for high yield goal. The IPNS treatment also gave the highest gross return (Tk. 106730/ha) and gross margin Jk. 90424/ha), while the highest MBCR (3.68) was obtained with FRG'97. Considering apparent nutrient balance, the ED2 and IPNS treatments were found better compared to FRG'97 and farmers' practice.

Keywords: Integrated, nutrient, management, cropping system.

Bangladesh J. Agril. Res. 33(1) : 145-156, March 2008

PRODUCTIVITY OF WHEAT-JUTE -T.AMAN CROPPING PATTERN AS AFFECTED BY SOIL TEST BASED FERTILIZER MANAGEMENT AT FARMERS' FIELDS

M. ROBIUL ALAM, M. AKKAS ALI, M.S. H. MOLLA F. ISLAM AND M.A. MANNAN

Abstract

The experiment was carried out at Farming Systems Research and Development (FSRD) site, Goyeshpur, Pabna during the three consecutive years 1999-2002 to find out a cropping pattern based economic fertilizer recommendation. Three different soil tests based (STB) nutrient management along with BARC recommendation 1997 and farmer's traditional nutrient management were evaluated on Wheat-Jute-T. Aman cropping pattern. The highest yield performance of the pattern was achieved with integrated plant nutrient system (1PNS), where inorganic fertilizer coupled with cowdung was applied. Application of organic matter in the first crop of the pattern showed considerable residual effect and remarkable response on yield of the succeeding crops. A remarkable increase (13.96%) in total production of the pattern due to soil test based fertilizer management was noted in IPNS treatment followed by high yield goal (9.23%) management over farmers' nutrient management. Moreover, an additional advantage of productivity with STB nutrient management was increased by 13.7% in IPNS followed by high yield goal (8.97%) over recommended management. Regarding economic return, the highest gross return, gross margin and marginal benefit cost ratio (MBCR) was obtained from 1PNS management followed by high yield goal and recommended nutrient management. The partial balance of N, K and S was negative in all fertilizer managements. Application of fertilizer input and significant removal by crop and mining from the soil enhanced the apparent balance. Positive balance of P indicated that the input was larger in quantity than out put. Average over the years, result showed that IPNS treatment have positive impact on crop productivity as well as economic return on Wheat-Jute-T.Aman cropping pattern for Goyeshpur, Pabna area.

Keywords: Productivity, cropping pattern, fertilizer management.

Bangladesh J. Agril. Res. 33(1) : 157-166, March 2008

PERFORMANCE OF RAINFED CHICKPEA AS INFLUENCED BY TILLAGE AND MULCHING

N. A. MONDAL, S. M. A. HOSSAIN, S. U. BHUIYA AND M. JAHLRUDDIN

Abstract

Field experiments were conducted at the Regional Agricultural Research Station (RARS) of the Bangladesh Agricultural Research

Institute (BARI), Jessore during *robi* seasons of 1999-2000 and 2000-2001 to evaluate the effect of different tillage and mulch praclices on the conservation of residual soil moisture, yield attributes, and yield of chickpea (cv. BARI Chola-5). Three tillage practices viz., minimum, reduced, and convenlional tillage and four mulch practices viz., rice straw, water hyacinth, black polythene and no mulch were assigned as treatment variables. Dry matter production increased progressively over time attaining the highest at maturity stage irrespective of tillage and mulch levels. Reduced and conventional tillage produced more dry matter per plant. Mulching with black polythene and rice straw produced significanty higher dry matter. Yield did not very significantly due to tillage in 1999-2000. During 2000-2001, the highest yield of chickpea was recorded with reduced tillage followed by conventional tillage. Black polythene mulch was found effective and registered the highest yield. Overall results indicate that black polythene or rice straw mulch accompanied with reduced tillage came out as an efficient practice in order to conserve soil moisture for higher yield of chickpea.

Keywords: Performance, rainfed chickpea, tillage and mulching.

Bangladesh J. Agril. Res. 33(2) : 175-184, June 2008

STUDIES ON HETEROSIS AND INBREEDING DEPRESSION IN SIX-ROWED BARLEY OVER ENVIRONMENTS

YOGENDRA SHARMA AND S. N. SHARMA

Abstract

Magnitude of heterosis over mid-parent, better-parent, and inbreeding depression were calculated in a 10 × 10 diallel set of six-rowed barley *(Hordeum vulgare* L.) for ten quantitative traits under three sowing conditions. Marked heterobeltiosis for grain yield and its important components were observed. For grain yield, 33 crosses showed significant positive heterobeltiosis in all the three environments. High estimates of heterobeltiosis (more than 48%) were recorded for nine crosses in early, ten crosses in normal, and six crosses in late planting. Maximum heterobeltiosis for grain yield (83.22 %) was in RD 2052 × BL 2,91.33% in RD 2503 × RD 2585,

and 90.55% in RD 2052xBL 2 under early, normal, and late sown environment, respectively. The crosses RD 2052 × RD 2552, RD 2052 × BL 2, RD 2503 × RD 2585 and RD 2508 × RD 2552 showed consistent heterobeltiosis over three environments. However, the cross BE 2xISBYT 17 showed heterobeltiosis for grain yield under early and normal sown environments. Similarly, the crosses RD 2035xRD 2052 and RD 2035xBL 2 showed stable heterobeltiosis for grain yield under early and late plantings. Significant inbreeding depression was recorded frequently for grain yield and its contributing traits. However, significant negative inbreeding depression were also recorded in a few crosses indicated that F2 was superior to F_1 The study reveals good scope for commercial exploitation of heterosis as well as isolation of pure lines among the progenies of heterotic F_1 for improvement of yield levels in six-rowcd barley.

Keywords: Six-rowed barley, heterosis, heterobeltiosis, gene effects, yield traits.

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EFFECT OF SOIL MOISTURE LEVELS ON PHYSIO-MORPHOLOGICAL FEATURES, YIELD COMPONENTS AND YIELD OF TWO CHILLI ACCESSIONS

M. A. I. KHAN, A. M. FAROOQUE, M. A. HOQUE AND M.A. RAHIM

Abstract

An experiment was set on November 1998 in pots with two chilli accessions viz., C- 0277 and C-0272, moisture stress tolerant and susceptible, respectively, to study their physio-morphological features and stomatal conditions under different moisture levels. Watering was imposed as W_I= watering once daily, W_2= watering twice daily, W_3= watering at 4-day intervals, W_4 = watering at 8-day intervals, W_5 = watering at I 6-day intervals and W_0 = no watering (control). Water treatments W_1, W_2, W_5, and W_0 showed their stress and produced lower values of different physio-morphological and yield characters of chilli accessions, on the other hand, W_3 and W_4 produced higher values. The number of stomata was found higher on the dorsal surface than that of the ventral surface. It

was observed that the percentage of closed stomata was more with water stress (deficit and excess) like W_1, W_2, W_5, and W_0. On the other hand, percentage of open stomata was found higher with water treatments of W_3 and W_4, Combined effect of water and accessions were found to differ significantly for the number of open and closed stomata in all treatments.

Keywords: Moisture level, stomata, *Capsicum annuum*, physio-morphological features

Bangladesh J. Agril. Res. 33(2) : 197-208, June 2008

EVALUATING EX-ANTE BENEFIT FROM NEW PROVENTO VARIETY OF POTATO IN BANGLADESH

MD. ABDUL BASET

Abstract

Economic benefits from the Provento variety potato research was conducted using the economic surplus model. The Internal Rate of Return (IRR) was estimated of the newly developing patato variety Provento of TCRC, BARI. The IRR to the total investment in Provento variety potato research was calculated at 34%. Sensitivity analysis reveals that the estimated Rate of Return (IRR) of Provento variety potato range from 73% to 87%. When the supply elasticity increased by 25%, the IRR was 75% and when the supply elasticity decreased by 25%, the IRR become 87%. The analysis indicated that the expenditure on the Provento variety potato is a good investment.

Keywords: Ex-ante benefit, Provento variety of potato .

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EFFECT OF PLANT SPACING AND CORM SIZE ON THE GROWTH AND YIELD OF PANCHAMUKHI KACHU IN CHITTAGONG HILL TRACTS

M. R. ISLAM, M. MONIRUZZAMAN AND M. R. AMIN

Abstract

An experiment was conducted in two consecutive years at the Agricultural Research Station (ARS), Raikhali, Rangamati Hill District from April 2004 to January 2006 to find out the effect

of spacing and corm size on the growth and yield of Panchamukhi Kachu *(Colocasia esculenta var. esculenta* Schott.) in the hilly region. Twelve treatment combinations consisting of four plant spacings viz. *25*, 30, 35, and 40cm and three corm sizes viz., 50, 100, and 150g were used. Different spacings and sizes of corm significantly increased yields and yield attributes of Panchamukhi Kachu. The spacing of 60 cm x 35 cm (42.13 t/ha) and 150g-corm size (38.17 t/ha) independently gave the highest yield of Panchamukhi Kachu. The 60 cm x 35 cm spacing coupled with 150g corms produced the highest average corm weight (926.79g/plant), whole rhizome weight (1019.0g/plant). But the spacing of 60x25cm and 150g-corm size in combination gave maximum yield (46.19 t/ha), which was at par with that of 60x 35 cm spacing with the same size of corm (45.41 t/ha). Results showed that 60x 25 cm spacing with corm size 50g was the most suitable combination with considering variable costs which offered a gross return and, gross margin of Tk. 3.597 lalch/ha and Tk. 2.963 lakh/ha, respectively, with maximum BCR (5.68) and the marginal rate of return as high as 1092.20%.

Keywords: Plant spacing, corm size, growth and yield, Panchamukhi Kachu.

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FIELD PERFORMANCE OF THREE PHOTO-INSENSITIVE CULTIVARS OF LABLAB BEAN INFLUENCED BY DATE OF SOWING

K. M. KABIR ALAM, M. K. R. BHUIYAN, G. M. A. HALIM M. ZAKARIA AND M. J. HOSSAIN

Abstract

Field performance of three photo-insensitive bean cultivars (IPSA Seem-2, BU Seem-3, and IPSA Seem-5) was assessed in relation to date of planting (15 May, 15 July, and 15 September) at BSMRAU, Salna, Gazipur during 2002. Inflorescence appeared first in IPSA Seem-5 after 43.67 days of sowing to produce flowers also earlier (50.78 days). The same cultivar also produced the maximum pod length (10.47 cm), the number of pods per plant (136.00), seeds per pod (4.17), pod

yield (18.21 g) and seed yield (2.85 t/ha). The cv. BU Seem-3 produced the maximum buds per inflorescence (25.15), pod breadth (2.95 cm), fresh weight per pod (8.35 g) and shrinkage of pod (78.07%) while IPSA Seem-2 had the maximum pod per inflorescence (5.51) and also the minimum shrinkage of seed (53.00%). Appearance of inflorescence was late in Sept. planting crop (49.67 days), but produced flower earlier (50.78 days) and the maximum buds per inflorescence (26.92), pod length (9.56 cm), and breadth (2.66 cm), fresh weight per pod (8.97 g), seeds per pod (4.75), and pod yield (18.81 t/ha). The crop of July planting also produced the maximum pods per inflorescence (5.21), pods per plant (142.7), minimum seed shrinkage (48.20%), 100-seed wt (33.99 g), and seed yield (3.49 t/ha) whereas, all the cultivars performed poorly when planted in May. IPSA Seem-2 planted in July produced significantly the highest number of pods per inflorescence (6.41), while BU Seem-3 planted in the same month produced the maximum buds per inflorescence (29.56) whereas, IPSA Seem-5 produced the maximum pod length (10.56 cm), pods per plant (167.20), 100-seed wt (35.39 g), pod yield (20.54 t/ha), and seed yield (4.48 t/ha). BU Seem-3 planted in September showed comparable growth and yield performance to IPSA Seem-5 planted in the same time. Irrespective of planting time, IPSA Seem-2 had poor performance compared to BU Seem-3, and IPSA Seem-5 was better than BU Seem-3.

Keywords: Lablab bean, photo-insensitive, sowing time, seed production.

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EFFECTS OF DIFFERENT POST-HARVEST TREATMENTS ON CHEMICAL CHANGES IN BANANA

M.M.A.PATWARY, M.A. RAHIM, M.A. SALAM
M.H. RAHMAN AND M. MOSHIUR RAHMAN

Abstract

An experiment as conducted at the Department of Horticulture, Bangladesh Agricultural University (BAU), Myrnensingh during the period from January to April 2001 in order to study the effect of different post-harsest treatments on the chemical characteristics of two banana cultivars viz., Amritsagar and Sabri. The quantitative charactcrs viz., titratable acidity, pH, TSS, total sugar, and reducing sugar were increased, while fruit weight, acidity, and non-reducing sugar content were increased during storage period. Variety Sabri showed longer shelf life (19.17 days), while Amritasagar contained more TSS value (25.93%), pH (4.82), total sugar (18.04%), and reducing sugar (11.08%) than Sabri at stage 5. Among the post-harvest treatments, ethrel treated fruits showed the shortest shelf life (10.28% days), TSS value (27.28%), total sugar content (19.34%), reducing sugar (10.20%), pH (5.09), and the lowest tritratable acidity (0.49%) at stage 5. Amritsagar and ethrel treatment combinations significantly improved the fruit quality in respect of total sugar and reducing sugar.

Keywords: Post-harvest treatments, chemical changes, banana.

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STUDY ON POLLINATION AND FRUIT SET IN POINTED GOURD

A. S. M. M. R. KHAN, M.G. RABBANI, M.A. SIDDIQUE AND M.A. ISLAM

Abstract

The experiment was conducted at Regional Agricultural Research Station (RARS), Ishurdi, Pabna during the growing season of 2001-2002 and 20022003, respectively, to find out the effect of pollination methods on fruit set in pointed gourd. The experiment involved four pollination methods viz, natural pollination, hand pollination, natural + hand pollination, and farmers practices and two pollen parents of pointed gourd M-1 (PG072) and M-2 (PG073). The yield contributing characters and (36.37 t/ha) was produced by natural artificial pollination. The interaction effect of pollen parent and pollination methods did not significantly influence on fruit set (%), yield contributing characters, and yield in pointed gourd. The natural + hand pollination produced the highest yield (36.37 t/ha) as well as gave the maximum gross return (Tk. 2,47,316/ha), net return (Tk. I ,44,009/ha), and BCR (2.39).

Keywords: Pollination, fruit set, pointed gourd.

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SOIL SOLUTION ELECTRICAL CONDUCTIVITY AND BASIC CATIONS COMPOSITION IN THE RHIZOSPHERE OF LOWLAND RICE IN COASTAL SOILS

M.A. HAQUE, D.E. JHARNA, M.F. HOQUE, M. N. UDDIN AND M. A. SALEQUE

Abstract

The onfarm study was conducted at coastal region of Bangladesh to monitor electrical conductivity (EC) and concentrations of sodium, potassium, calcium, and magnesium in solution of the rhizosphere of rice. Soil samples were collected from the rhizosphere of *T.aman* rice grown in farmers' fields of Patharghata upazilla, Borguna from salt affected fields at the active growing stage of crop. The pH of the air-dried field soils varied from 5.7 to 7.8 and electrical conductivity of the saturation extract ranges from I to 13 dS. The concentration of Na, K, Ca, and Mg in the saturation extract ranges from 98 to 1453, 6 to 31. 20 to 840, and 13 to 121 ppm, respectively. Electrical conductivity of the salt affected fields ranged from 4.64 to 13.47 dS m^{-1}. Most of the fields were not salt affected, where EC was I to 2.58 dS m^{-1}. There was significant positive linear relationship of EC of soils with soil solution sodium concentration (R^2 = 0.994). The EC of soil increased exponentially with the increase in Mg concentration (R^2 = 0.983). The linear relationship of EC with soil solution K and Ca was also significant.

Keywords: Electrical conductivity, salinity, rice.

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CORRELATION AND PATH ANALYSIS IN BUCKWHEAT

N. R. DEBNATH, M. G. RASUI, A. K. M. A. ISLAM
M. A. K. MIAN AND T. HOSSAIN

Abstract

A field experiment was conducted with 21 local genotypes of buckwheat to study the variability and their interrelationship and direct and indirect effects of different characters on yield. Correlation coefficient between seed yield (kg/rn^2) with number of inflorescence per plant and grain setting raceme per plant were significant and positive. Negative correlation was observed between yield and 100-seed weight. Highly significant and positive correlation was observed between grain setting raceme per plant vs. inflorescence per plant. Highly positive and significant correlation was also found between raceme length vs. grains per raceme. Path coefficient analysis revealed that grains per raceme had the highest positive direct effect on yield followed by inflorescence per plant and seed yield per plant. Such result indicated that direct selection based on these characters would be effective for yield improvement. The direct effect of inflorescence per plant was almost equal to the correlation coefficient implies that there is a true relationship between inflorescence per plant and yield and a direct selection through this trait would be effective. For the trait branches per plant, correlation coefficient was positive but the direct effect was negative. Path coefficients indicated that maximum direct contribution towards seed yield (kg/rn^2) was obtained through grains per raceme which indicated that this trait should he considered as primary components of yield.

Keywords: Buckwheat *(Fagopyrum esculentum),* genetic variability, gcv, pcv, genetic advance, genetic correlation, path analysis, seed yield.

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RELEASE PATTERN OF NH_4^+-N FROM PRILLED UREA AND UREA SUPER GRANULES UNDER LOWLAND RICE CULTIVATION

P. K. SAHA, M. A. MAZID MIAH, M. S. RAHMAN AND A. ISLAM

Abstract

A field experiment was carried out at the Bangladesh Rice Research Institute (BRRI) Farm, Gazipur to study the release pattern of $NH4^+$-N from the two sources of N viz., prilled urea (PU) and urea super granules (USG) at different levels of N under lowland situation, It appeared from the findings that at NO (with no N- fertilizer) plots. $NH4^+$-N concentration increased from 9.03 (initial) to 16.58 mg/kg at 15 days after transplanting (DAT) and then gradually decreased throughout the growing period. At 90 DAT it dropped below the initial soil level. At 15 DAT the plots,

in whic,h PIT at different doses (N100 -N150) were added, showed a significant positive increase of $NH4^+$-N by 5.315.88 mg/kg over NO plots. However, no significant difference in $NH4^+$-N concentration was observed among N added plots. At *45* DA I. it as observed that the magnitude of release pattern of $NH4^+$-N from USG was slightly higher than that of PU. A tendency of releasing more $NH4^+$-N was observed with the highest doses of PU and USG compared to lower doses at 45 DAT. The amount of released $NH4^+$-N gradually decreased with time depending on the magnitude of the applied N level. Results indicated that a basal dose of N fertilizer may not be required for the rice crop growing in the Grey —Terrace Soil of Madhupur Tract. Instead. N fertilizer may be used after 15 DAT, when the rice plants are established.

Keywords: Release pattern, NH_4+-N, urea super granules, lowland rice.

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RESOURCE PRODUCTIVITY IN THE IRRIGATED AND NON-IRRIGATED VILLAGES IN BARIND AREA OF RAJSHAHI DISTRICT

Q.M. ALAM

Abstract

This study is conducted in Rajshahi Barind area of Bangladesh to study the resource use efficiency of the irrigated and non-irrigated farms. Cobb- Douglas production was used to obtain the production elasticity of each factor. The production elasticity of each factor was then compared with its relative factor share derived from enterprise costing method. This gave an idea whether the factors used in the production process were guided by the market forces. The results revealed that land was overpaid and the labour was underpaid, and the current inputs and draft power which had higher scarcity value were also overpaid and did not comply with the marginal theorem even with the irrigation technology.

Keywords: Relative share, production elasticity, resource use efficiency.

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COMPARATIVE TECHNICAL EFFICIENCY OF VEGETABLE CULTIVATION IN SOME SELECTED SITES OF NETROKONA DISTRICT OF BANGLADESH

SAIFUL HAQ AND M. KAMRUZZAMAN

Abstract

A study was done to examine the comparative technical efficiency of potato, tomato, and cauliflower production in Netrokona District. Farmers preferred medium high land and sandy loam soil for vegetable cultivation. Potato growers choose Cardinal variety because of its high yielding and longer shelf-life quality. Tomato growers choose Roma variety and cauliflower growers choose Snow Queen variety for their high yield potential, good colour, and size. All vegetable growers applied fertilizer and irrigation for three times. Weeding was also done for three times in the cultivation period. Potato growers achieved around 96% of the maximum achievable production, while tomato and cauliflower growers achieved 92% of the maximum achievable production. Therefore, potato growers were technically more efficient than the tomato and cauliflower growers. On an average, 6.5% inefficiency occurs for all types of vegetables growers.

Keywords: Technical efficiency, vegetable cultivation.

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OPTIMUM CROP PRODUCTION PLAN AT VARIOUS LEVELS OF TECHNOLOGY IN AGRO-CLIMATIC ZONE II-A OF RAJASTHAN, INDIA

B. L. SHARMA AND R.C. SHARMA

Abstract

Optimum cropping plan has been developed using from a sample of 180 farms selected in agro-climatic zone II-A. The results revealed that a considerable divergence prevail between the existing and optimal crop plans under unrestricted capital with different size of farm and at various levels of technology. Cowpea and green gram were replaced by improved green gram at I level of

technology and pearimillet was replaced by improved sorghum at II level of technology on small farms. On medium farms, clusterbean and sesamum were replaced by improved cowpea and improved green gram at I and II levels of technology. Mothbean was replaced by improved green gram at III level of technology on large farms. In *rabi* season, barley was replaced by improved wheat at all levels of technology and mustard was replaced by improved chickpea at Ill level of technology on all farms. There is tremendous scope to increase the net return which was one and half to three times higher than the existing net return depending upon area and location of the farms and adoption of new technology. The return per farm increased with increase in the level of technology on all farm sizes. There are urgent need for economising resources and calls for preparation of optimum plan considering regional needs and resource availability with the farmers.

Keywords: Optimum cropping plan, technology, agro-climatic zone II-A of Rajasthan.

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YIELD AND YIELD ATTRIBUTES OF PEAR AS INFLUENCED BY IRRIGATION AND MULCH AND THEIR ECONOMICS FOR THE HILLY REGION

Z. A. FIROZ, M. S. ALAM, M. Z. ISLAM AND M. S. UDDIN

Abstract

An experiment was conducted to study the effect of five levels of irrigation and two levels of mulch on the yield of pear *(Pyrus communis* L) at the Hill Agricultural Research Station, Khagrachari during 2001-02 and 2002-03. Results showed significant influence of irrigation and mulch on individual fruit weight, number of fruits per plant and yield. Maximum fruit weight (139.6 g) was recorded from the plants received 401iter water followed by the plants received 301iter water (137.1 g)). The highest number of fruits (85.1/plant) was also obtained from the plants receiving 401iter water and it was significantly different from those of other treatments. The highest yield was found from

irrigation at 40 liter/plant followed by that at 30 liter /plant, fortnightly. Mulch showed the better performance on the yield and yield attributes in both the year. In case of interaction effect, the most satisfactory result (12.7 kg/plant, 8.0 t/ha) was observed in treatment having mulch and receiving 401iter water that was identical to 301iter irrigation with mulch (11.4 kg/plant, 7.2 t/ha). The lowest yield (7.2 kg/plant, 4.5 t/ha) was recorded from the control treatment. Number of fruits per plant also showed similar trend. The highest benefit cost ratio (9.5) was obtained from the plants receiving 401iter water and provided with mulch.

Bangladesh J. Agril. Res. 33(2) : 319-325, June 2008

IN VITRO CULTURE OF ORCHID

M. MAHMUDA KHATUN, H. KHATUN, D. KHANAM
M.A. MALEK AND M. AL-AMIN

Abstract

The experiment was conducted to investigate the effect of different plant growth regulators on growth and development of plantlets from protocorm like bodies (PLBs) of orchid. Different concentrations of BAP, NAA, and IRA (0, 0.5, 1.0 & 2.0 mg/I) were applied. Significant effect of different concentrations of BAP, NAA, and IAA were observed for different parameters studied. Among the three growth regulators, 1.0 mg/1 IAA showed the maximum weight of PLBs (12.150g), maximum width of leaf (0.733 cm), and maximum number of rooted plantlets (9.330). Maximum height of shoot was obtained from 0.5 mg/I BAP. Highest number of leaves (5.263) were obtained in 1.0 mg/1 BAP, while 2.0 mg/I BAP produced highest leaf length (2.100 cm). However, for root number, 2.0 mg/I IAA was bound for better root formation (8.417) whereas, highest root length (2.500 cm), highest fresh weight of single shoot (0.253 g), and maximum number of regenerated plantlets were obtained from 0.5 mg/I IAA.

Keywords: Orchid, *Dendrobium*, hybrid, *In vitro* culture.

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PERFORMANCE OF MICROSPORE DERIVED DH GENOTYPES FROM BARI SARISHA-7 OF *BRASSICA NAPUS* L.

M. M. ALI, M. A. KHALEQUE MIAN, M. A. AKBAR AND J.B.M. CUSTERS

Abstract

The experiment was conducted in the net house of Oilseed Research Centre. Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur to study the performance of microspore derived DH from BARI Sarisha-7 of *Brassica napus* L. Seven double haploid (DH) genotypes BNDH 01, BNDH 03, BNDH 04, BNDH 06, BNDH 09, BNDH 10, and BNDH 11 along with parent, BARI Sarisha-7 were used for evaluation. Significant variation was observed for the different yield contributing characters among the DH genotypes along with their parent. The genotype BNDH 04 required the least duration to flower as well as for maturity. The DH genotype BNDH 01 was almost determinate type. The DH genotypes showed a wide range of self- incompatible reaction, while the parent showed self-compatible reaction. Negative correlation for pod angle with 1000-seed weight was observed. The genotypes BNDH 01 and BNDH 11 produced higher seed yield per plant than their parent. Oil content of the DH genotypes was significantly different from the parent. In the fatty acid composition, the oleic acid content of BNDH 04 and BNDHO 9 were higher compared to the remaining genotypes along with the parent.

Keywords: Performance, microspore, double haploid, BARI Sarisha-7.

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FACTORS AFFECTING THE PROFITABILITY LEVEL OF WHEAT CULTIVATION IN SOME SELECTED SITES OF DINAJPUR DISTRICT OF BANGLADESH

M. KAMRUZZAMAN AND MOHAMMAD HEDAYETUL ISLAM

Abstract

The present study was undertaken to find out the factors affecting profitability of wheat production in Dinajpur District. Sixty farmers were selected randomly from the population using random number. Data were collected from 1st July to 30 September 2004. Ninety two percent of the farmers sown seed and harvest in optimum date. Farmers used fertilizer in two stages and applied irrigation in three stages. Sixty percent farmers of all farm categories collect seed from the market whereas, 38 percent farmers used seed from their own sources. Multiple linear regression analysis showed that the coefficient of total hired labour cost, cost of TSP, farming experience were significant at 5% level. Whereas, coefficient of total family labour cost, small farm dummy, medium farm dummy, education level in years are significant at 1% level. However, coefficient of cost of MP, animal power cost, interest on operating capital are significant at 10% level.

Keywords : Profitability, wheat cultivation, factors affecting.

Bangladesh J. Agril. Res. 33(3) : 347-351

CULTURAL VARIABILITY AMONG NINE ISOLATES OF *UROCYSTIS AGROPYRI* ON WHEAT

S. S. KARWASRA, M. S. BENIWAL AND M. L. CHHABRA

Abstract

Four temperatures and five different media were tested for cultural variability of nine geographical isolates of *Urocystis agropyri* (Preuss.) Schroet causing flag smut of wheat. *Urocystis agropyri* is extremely slow growing pathogen and each isolate responded differently at different temperatures. All the isolates/ collections grew well at 20°C after 45, 60, and 70 days after incubation. Ambala isolate was fast growing. PDA medium was found to be most suitable for the growth of all the nine isolates/collections. The average mycelial growth was also maximum on Potato Dextrose Agar Medium followed by Corn Meal Dextrose Agar, Oat Meal Dextrose Agar, Grain Meal Dextrose Agar and minimum on Wheat Meal Dextrose Agar.

Keywords: Variability, media, isolates, wheat.

Bangladesh J. Agril. Res. 33(3) : 353-362, September 2008

EFFECTS OF WATER STRESS AT VARIOUS GROWTH STAGES ON THE PHYSIO-MORPHOLOGICAL CHARACTERS AND YIELD IN CHILLI

M. A. I. KHAN, A. M. FAROOQUE, M. A. HAQUE
M. A. RAHIM AND M. A. HOQUE

Abstract

An experiment was carried *out* during October 1999 to January 2000 in the field of Horticulture Department of Bangladesh Agricultural University, Mymensingh with two chilli accessions viz, C-0277 and C-0272 of moisture stress tolerant and susceptible type. The chilli accessions were put into trial under field condition to observe the effects of different water treatments imposed at their vegetative, flowering, and fruiting stages of growth and development. Results of the experiment revealed that accession C-0277 was water stress tolerant compared to accession C-0272. Watering at 4-day interval significantly gave the highest yield and dry matter. While, watering imposed in fruiting stage produced the maximum yield and dry matter in chilli.

Keywords: Chilli accessions, field condition, water stress, yield.

Bangladesh J. Agril. Res. 33(3) : 363-373, September 2008

TECHNICAL EFFICIENCY OF WHEAT GROWERS IN SOME SELECTED SITES OF DINAJPUR DISTRICT OF BANGLADESH

M. KAMRUZZAMAN AND MOHAMMAD HEDAYETUL ISLAM

Abstract

The present study was undertaken to find out the technical efficiency and factors affecting inefficiency of wheat production in Dinajpur District of Bangladesh. The data were collected from 01 July to 30 September 2004. The range of technical efficiency varies from 40% to 99% and the average was 70.33%. Farmers with optimum sowing and optimum harvest were technically more efficient than the farmers with late sowing. In all farms technical efficiency was much higher for the farmers who use sandy loam soil for wheat production than the farmers who did not use sandy loam soil. There was a positive relationship between the educational level and technical efficiency of wheat practicing farmers. The farmers who contacted frequently with extension workers were technically more efficient than who contacted less with extension workers. Therefore, maintaining of optimum sowing and harvesting time, use of sandy loam soil, high level of farming experience and education are important factors for obtaining maximum achievable yield.

Kew Words: Technical efficiency, wheat growers, optimum sowing and harvest.

Bangladesh J. Agril. Res. 33(3) : 375-379, September 2008

HETEROSIS AND COMBINING ABILITY FOR GRAIN YIELD AND ITS CONTRIBUTING CHARACTERS IN MAIZE

A.K.M.M. ALAM, S. AHMED, M. BEGUM AND M.K. SULTAN

Abstract

Combining ability analysis for grain yield and its contributing characters in maize were carried out in 5×5 diallel cross. The highest percentage of heterosis for grain per ear over mid parent and better parent were observed by the cross $P_2 \times P_2$. Crosses $P_1 \times P_3$ and $P_1 \times P_5$ showed significant negative heterosis for days to maturity. Significant general and specific combining ability variances were observed for all the characters except ear height. Almost equal role of additive and non-additive gene actions was observed for days to maturity. Additive genetic variance was preponderant for grains per ear and 1000-grain weight and non-additive gene action was involved in plant height, ear height, days to silking, and days to maturity. The inbred lines P_2 and P_5 were found to be best general combiner for 1000-grain weight.

Keywords: Heterosis, combining ability, grain yield, maize.

Bangladesh J. Agril. Res. 33(3) : 381-389, September 2008

SEED QUALITY ASSESSMENT OF THREE PHOTO-INSENSITIVE CULTIVARS OF LABLAB BEAN INFLUENCED BY DATE OF SOWING

K.M. KABIR ALAM, M.K.R. BHUIYAN, G.M.A. HALIM, M. ZAKARIA AND M.J. HOSSAIN

Abstract

Quality of seeds of three cultivars (IPSA Seem-2, BU Seem-3 and IPSA Seem-5) of lablab bean *(Lablab purpureus* L. Sweet) collected from crops planted in three different dates (15 May, 15 July, and 15 September 2003) was assessed in respect of different parameters. The maximum percentage of seeds of cv. IPSA Seem-2 was germinated (95.67) whereas, BU Seem-3 had the maximum electrical conductivity (EC) (316.06 µs/cm) followed by IPSA Seem-5 (261.53 µs/cm). The cv. IPSA Seem-2 also had the highest vigour index (VI) (65.04) and coefficient of germination (CG) (58.90). The maximum length of root and shoot was 13.73 cm and 12.98 cm in IPSA Seem-5 and IPSA Seem-2, respectively. The percentage of dry matter of root and shoot was the highest for BU Seem-3 (23.68 and 12.15, respectively), whereas, the composite sample of root and shoot of IPSA Seem-2 had the highest value of dry matter (14.54%). Seeds of September planted crops had better germination percentage (95.67), VI (50.07), CG (47.65), length of root (13.63 cm), dry matter of root (24.79%), shoot (13.34%) and composite sample (15.14%). Whereas, seeds of May planted crops had the maximum EC (388.23 µs/cm) and length of shoot (15.29 cm). Seeds of cv. IPSA Seem-2 collected from September planted crops had the maximum germination percentage (97.75), VI (70.96), CG (64.13), length of shoot (11.41 cm) and dry matter percentage of composite sample of root and shoot (16.58). BU Seem-3 of May planted crops had the maximum EC (469.78 µs/cm). But BU Seem-3 of September planting had the highest dry matter of root of seedling (25.19%). Seedlings of cv. IPSA Seem-5 planted in September had the highest length of roots (14.63 cm) and dry matter of shoot (13.79%).

Keywords: Seed quality, photo-insensitive, dates of planting and lablab bean.

Bangladesh J. Agril. Res. 33(3) : 391-397, September 2008

STUDIES ON FRUITING, BEARING HABIT AND FRUIT GROWTH OF JACKFRUIT GERMPLASM

M. A. ULLAH AND M.A. HAQUE

Abstract

Studies on fruiting, bearing habit and fruit growth of jackfruit was carried out at orchard of Jackfruit Research Project, Department of Horticulture, Bangladesh Agricultural University (BAU), Mymensingh during the period from November 2000 to October 2001. Ten jackfruit germplasm of 13 years of age were selected for this study. Fruit bearing habit of jackfruit was cauliflorous i.e., fruits are borne on trunk and branches. The germplasm under study bore fruits on trunk, primary, secondary, tertiary, fourth, fifth and sixth branches of jackfruit trees. On an average, the maximum fruits were borne on primary branches (33.0%) followed by those on trunk (31.5%), secondary (12.3%), and fourth branch (8.4%), while it was the lowest on sixth branch (2.0%). The growth pattern of fruit of jackfruit is characterized by single sigmoid curve. This is true when all aspects of measurements viz, length, diameter, circumference, weight, and volume of fruits; length, breadth, weight of bulb as well as seed were plotted against time from fruit set to haiwesting maturity.

Keywords: Bearing habit, fruit growth, jackfruit germplasm.

Bangladesh J. Agril. Res. 33(3) : 399-408, September 2008

EFFECT OF WATER MANAGEMENT AND WEED CONTROL TREATMENTS ON THE PERFORMANCE OF TRANSPLANTED AMAN RICE

M. H. KABIR, M. N. BARI, M. MOYNUL HAQUE, G. J. U. AHMED AND A. J. M. S. ISLAM

Abstract

A study was conducted from June to December 2003 to assess weed dynamics and yield performance of transplanted *aman* rice (cv. BRRI Dhan39) in different weed control treatments e.g. two hand weedings at 15 and 40 DAT; Weeding by BRRI Weeder at

20 and 40 DAT; Rifit 500EC @ 1L/ha at 7 DAT; Rifit 500EC @ 1 L/ha at 7 DAT and one hand weeding at 40 DAT; Butachlor 5G @ 2 kg/ha at 7 DAT; Butachlor 5G @ 2 kg/ha at 7 DAT and one hand weeding at 40 DAT along with weed free and unweeded check under both good and poor water management practices. Weed density, weed biomass and weed control efficiency were significantly influenced by different weed control treatments under both water management practices. Other than weed free treatment, Butachlor 5G @ 2 kg/ha applied at 7 DAT along with one hand weeding at 40 DAT showed the best performance under good water management with minimum weed density (16 g/m^2) as well as weed biomass (9.27 g/m^2) and the highest weed control efficiency (82.57%). Yield and yield components were also significantly influenced by different weed control treatments and water management. The highest grain yield (5.22 t/ha) was obtained under good water management in weed free treatment followed by Butachlor 5G @ 2 kg/ ha and one hand weeding (4.96 t/ha) under same water management. Results revealed that integration of approaches, particularly Butachlor application along with one manual weeding accompanied by proper water management might be the best option to combat weed problems as well as to obtain satisfactory grain yield in transplanted *aman* rice.

Keywords: Transplanted *aman* rice, water management, weed control treatment and yield.

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CHANGE AND INSTABILITY IN AREA AND PRODUCTION OF WHEAT AND MAIZE IN BANGLADESH

M. N. HASAN, M. A. MONAYEM MIAH, M. S. ISLAM
Q. M. ALAM AND M. I. HOSSAIN

Abstract

The study measured the change and instability in area, production, and yield of two major cereal crops wheat and maize in Bangladesh based on secondary data during 1980/81-2003/04 using different statistical techniques. Area and production of wheat increased satisfactorily. But yield was not increased to meet the demand of the country. In the case of maize, significant increment happened in yield during the study period. Area and production of maize also increased to fulfill the increasing demand of population. Presently production of maize increased more rapidly than its area. The growth in area, production, and yield of wheat slightly improved in period-II, whereas the growth rate in area, production, and yield of maize improved rapidly. Though both of wheat and maize are unstable crops, maize showed very instability in its area and production because of its increasing tendency in the recent years.

Keywords: Change and instability, production, wheat, maize.

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IN VITRO TUBERIZATION OF POTATO INFLUENCED BY BENZYL ADENINE AND CHLORO CHOLINE CHLORIDE

M. ZAKARIA, M. M. HOSSAIN, M. A. KHALEQUE MIAN
T. HOSSAIN AND M. Z. UDDIN

Abstract

In an experiment, six levels of benzyl adenine (0,2.5,5.0,7.5,10.0,12.5 and 15.0 mg/I) in combination with three levels of (CCC) chloro choline chloride (0,125,250 and 500 mg/I) were evaluated against control treatment (0) in each case to find out their optimum levels for microtuberization in potato variety Diarnant. Microtuberization was the earliest by I 3 days at 10 mg/I BA. The number and average weight of microtuber per flask vas increased with increasing rate of BA and reached maximum of 12.9 and 252.1 mg respectively at 10 mg/I BA and decreased onwards with further increase of BA concentration. The increase rate of CCC increased the number of microtuber but decreased average weight. The maximum number and average weight of microtuber were recorded at 500 mg/I CCC and in absence of CCC respectively.

Keywords: BA, CCC, potato, microtuber.

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MANGO MARKETING SYSTEM IN SELECTED AREAS OF BANGLADESH

M.A.MATIN, M.A. BASET, Q.M ALAM
M.R. KARIM AND M.R. HASAN

Abstract

This study was carried out to identify the most efficient and suitable marketing channels of mango in some selected areas of Bangladesh by using primary data collected randomly from 90 farmers and 55 traders. Out of 55 traders, 15 were Bairals, 15 were Beparis. 9 Aratdar (local), 6 Aratdar (urban), 10 Retailers (both local and urban). According to the volume of mango handled and longevity or participation of the intermediaries in the channel, five major channels were identified as dominant in the study areas. The channel Farmer Bairal- Bepari-Aratdar (Dhaka)-Retailer (Dhaka)-Consumer ranked first. The results showed that channel V, Farmer-Retailer Consumer, possesses the highest marketing efficiency followed by channel IV, III, and II. The performance indicators revealed that the channel I and channel II were not relatively efficient in the mango producing regions. Unstable price of mango was the first rank problem in the study area. Establishment of mango processing plant in the intensive growing areas may be the remedy of the problem, which will ensure fair prices for the farmer.

Keywords: Mango marketing, channels, problem.

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YIELD AND N USE EFFICIENCY OF WHEAT AS INFLUENCED BY BED PLANTING AND N APPLICATION

M. A. KHALEQUE, N. K. PAUL AND CRAIG A. MEISNER

Abstract

Wheat *(Triticum aestivum* L.) was planted as winter crop using raised bed and conventional planting system with four N levels at Regional Wheat Research Station, Rajshahi (latitude 28°75′ N and longitude 92°58′ E), during November to March in 2002 and 2003 to study N content in grain and straw, uptake of total nitrogen, N use efficiency, fertilizer recovery percentage and grain yield. The highest N content in grain and straw were obtained from bed planting system with Shatabdi at 150% N treatment. Maximum total N uptake by the plants was found in bed elevation as compared to conventional planting system. The highest N use efficiency was observed at N zero treatment as compared to applied N levels. Shatabdi noticed highest N use efficiency among the crop varieties. The maximum fertilizer recovery percentage was noted in Shatabdi under bed planting system. The highest grain yield (2,555 kg/ha) was produced from bed planting system. Significantly the highest grain yield (2,929 kg/ha) was found in Shatabdi. The highest grain yield (3,746 kg/ha) was found when 150% N was applied. In bed planting system, the highest grain yield (3,323 kg/ha) was produced when 150% N was applied. The lowest grain yield (1,177 kg/ha) was obtained in zero N treatment. Among the varieties, Shatabdi was the best performer in bed planting system due to maximum nitrogen and protein content in grain and straw, maximum N use efficiency and fertilizer recovery percentage.

Keywords: Bed planting, N content, N use efficiency and fertilizer recovery percentage.

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STUDIES ON THE EFFECTS OF *BRADYRHIZOBIUM INOCULATION* ON YIELD AND YIELD ATTRIBUTES OF MUNGBEAN

M.A.H. BHUIYAN, M.H. MIAN AND M.S. ISLAM

Abstract

Field studies with and without *Bradyrhizobium* was carried out with five mungbean varieties to observe the yield and yield attributes of mungbean. Five mungbean varieties viz. BARI Mung-2, BARI Mung-4, BARI Mung-5, BINA mung-2 and Barisal local, and the rhizobial inoculum *(Bradyrhizobium* strain BAUR-604) were used. The seeds and stover were dried and weighed adjusting at 14% moisture content and yields were converted to t/ha. The yield attributing data were recorded from 10 randomly selected plants. BARI Mung-2 produced the highest seed yield (1.03 t/ha in 2001 and 0.78 t/ha in 2002) and stover yield (2.24 t/ha in 2001 and 2.01 t/ha in 2002). Higher number of pods/plant was also recorded in BARI Mung-2, while BARI Mung-5 produced the highest 1000-seed weight. Application of

Bradyrhizobium inoculant produced significant effect on seed and stover yields in both trials conducted in two consecutive years. Seed inoculation significantly increased seed (0.98 t/ha in 2001, 27% increase over control and 0.75 t/ha in 2002, 29% increase over control) and stover (2.31 t/ha in 2001 and 2.04 t/ha in 2002) yields of mungbean. *Bradyrhizobium* inoculation also significantly increased pods/plant, seeds/pod and 1000-seed weight. Inoculated BARI Mung-2 produced the highest seed and stover yields as well as yield attributes, such as pods/plant and seeds/pod.

Keywords: Bradyrhizobium, inoculation, yield, yield attributes, mungbean.

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RETURNS TO INVESTMENT ON RESEARCH AND DEVELOPMENT OF SOIL BORNE DISEASE MANAGEMENT STRATEGY FOR BRINJAL IN BANGLADESH

MAHMUDA AKTER, M. A. MONAYEM MIAH AND M. I. HOSSAIN

Abstract

The study estimated the economic returns to the past investment on the development of two 1PM practices for controlling soil borne diseases in brinjal cultivation in Bangladesh. Economic surplus model with ex-post analysis was used to estimate returns to investment. The study showed that about 20.10% more brinjal production was made available due to adoption of IPM practices (i.e. use of poultry refuse and mustard oilcake) during 2002-2003. The yields of brinjal under IPM practices were 33% and 34% higher, respectively, over the non-IPM practices. Internal rate of return (IRR), net present value (NPV) and benefit cost ratio (BCR) of the past investments were estimated at 26%, Tk. 436.21 million and 3.0, respectively. Under various assumptions on cost and return, the IRR ranged from 20 to 32% and BCR ranged from 2 to 5. The investment in research and development of 1PM practices for managing soil born diseases in brinjal cultivation was found to be very efficient.

Keywords: Brinjal, soil borne disease, producer surplus, consumer surplus, ex-post analysis, returns to investment, internal rate of return, net present value

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EFFECT OF STORAGE CONTAINERS AND TIME ON SEED QUALITY OF WHEAT

P.K. MALAKER, I.H. MIAN, K.A. BHUIYAN A.M. AKANDA AND M.M.A. REZA

Abstract

A study was undertaken to determine the prevalence of black point and percentages of germination, moisture content and different fungi associated with wheat seeds during storage in different types of container. Seeds of a widely cultivated variety Kanchan were stored in five types of containers viz., 'dole'(bamboo made), earthen pitcher, tin container, polyethylene bag and refrigerator (10^0C) for ten months at room temperature. Samples were taken at monthly interval beginning from the month of April (prior to storage). The seed moisture content and black point severity were found highest in dole resulting in the lowest percentage of seed germination. The highest germination percentage was observed under storage in refrigerator followed by polyethylene bag, tin container and earthen pitcher. The moisture content and black point infection increased and seed germination decreased with the increase of storage period. Prior to storage in April, the seed germination was 95%, which decreased to about *75%* at the end often months of storage (in January). Various fungal flora associated with wheat seeds differed in their prevalence depending on the length of storage period and types of container used for storage. The population of field fungi viz., *Alternaria alternata, Aiternaria triticina, Bipolaris sorokiniana, Cladosporium cladosporioides, Curvularia lunata, Epicoccum purpurascens* and *Fusarium* spp. decreased while that of storage fungi viz., *Aspergillus, Chaetomium, Nigrospora, Penicillium* and *Rhizopus* increased with the progress of storage period.

Keywords: Storage, seed quality, wheat.

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AGRO-MORPHOLOGICAL AND QUALITY CHARACTERIZATION OF BADSHAH BHOG GROUP FROM AROMATIC RICE GERMPLASM OF CHHATTISGARH

RITA BISNE AND A.K. SARAWGI

Abstract

India sub continent is a home for aromatic rice diversity. Land races and wild species possess immense potential of most valuable genes which can he effectively utilized in the present day breeding programmes to evolve miracle varieties in rice that possess not high yield potential and quality but also resistant to biotic and abiotic stresses. The present studies were carried out to characterize thirty two aromatic rice accessions of Badshah bhog group from IGKV, Raipur, Chhattisgarh germplasm. These germplasm accessions were evaluated for twenty-two morphological, six agronomical and eight quality characters. The specific genotypes B: 1340, B: 2039, B: 2495, B: 2816, B: 16930 B: 2354, B:1639, B:2094 were identified for quality and agronomical characteristics. These may be used in hybridization programme to achieve desired segregants for good grain quality with higher yield.

Keywords: Morphological characters. quality characters, characterization in aromatic rice.

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ENDOGENOUS HORMONAL CONTENT DURING GRAIN DEVELOPMENT IN HEXAPLOID AND TETRAPLOID WHEAT

SRIDHAR GUTAM, VIRENDRA NATH AND G.C. SRIVASTAVA

Abstract

A pot experiment was conducted in the *rabi* (post rainy) seasons of 2001 and 2002 to study the genotypic differences in grain growth rate and endogenous hormonal content in the developing grains of *hexaploid* and *tetraploid* wheat. The endogenous hormonal contents of grains in both the ploidy levels had changed in sequence. At 5 days after anthesis (DAA), gibberellic acid (GA_3); at 15 DAA (rapid growth phase), indole-acetic acid (IAA); at 25 DAA (dough stage), abscisic acid (ABA) were maximum. At 35 DAA, all the endogenous hormonal level decreased and among the hormones, ABA was highest followed by IAA and GA_3. *Hexaploids* recorded higher concentrations of endogenous hormones (13.38% IAA, 17.89% GA_3, and 14.7% ABA) on fresh weight basis and resulted in higher seed weight (56.99 mg/grain) and grain growth rate (0.009 g/g/day) compared to *tetraploids* (49.08 mg/grain; 0.008 g/g/day) on dry weight basis by better mobilization of photosynthates during grain filling.

Keywords: Grain growth rate, hormones, indole-acetic acid, gibberellic acid, abscisic acid.

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DETERMINATION OF RESIDUE OF DIAZINON AND CARBOSULFAN IN BRINJAL AND QUINALPHOS IN YARD LONG BEAN UNDER SUPERVISED FIELD TRIAL

K.H. KABIR, M.A. RAHMAN, M.S. AHMED
M.D.H. PRODHAN AND M.W. AKON

Abstract

The present study was undertaken to detect and quantify the left over residue of Diazinon and Carbosulfan in brinjal and Quinalphos in yard long bean and comparison between the detected residue level with maximum residue level (MRL) set by FAO (1970). Three supervised field trials (two for brinjal and one for yard long bean) were carried out sprayed with the field dose (1.5 ml/L of water) of Diazinon, Carbosulfan, and Quinaiphos. Samples were collected daily after spraying till residue were found. In case of Diazinon, left over residue was found upto 6 days after spray (DAS), and upto 3 DAS, the level of residue was above the MRL. Carbosulfan residue was detected till 7 DAS and the detected quantity of residue was above MRL upto 3 DAS. Left over residue of Quinalphos in yard long bean sample was detected upto 6 DAS and upto 4 DAS the level of residue was above the MRL.

Keywords: Residue, Diazinon, Carbosulfan, Quinalphos. brinjal, yard long bean.

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GENETIC ANALYSIS OF SALINITY TOLERANCE IN RICE

P. K. SAHA RAY AND M. AMIRUL ISLAM

Abstract

The genetics of' salinity tolerance in rice was studied by visual scoring in parents F_1 F_2 and backcross generations of six crosses. Segregation analysis indicated partial dominance for salinity tolerance. Estimation of genetic parameters under epistatic model indicated the importance of additive effects in the inheritance of salinity tolerance. Highly significant additive type of gene action in Pokkali/BR29 and both additive and dominance type of gene action in Nonabokra/BR29 without interaction were observed suggesting absence of epistasis and validity of additive dominance model. Significant dominance effect of genes in Nonabokra/BR29 suggests the use of hybrid rice where production of hybrid rice seed is feasible. The non-interactions with duplicate type of epistasis were observed in the crosses with moderately tolerant and susceptible parents. As heritability of the trait was low to moderate, the breeding population must he large and selection for tolerance must be exercised in later generations under controlled conditions.

Keywords: Genetic analysis, salinity, rice.

Bangladesh J. Agril. Res. 33(4) : 531-537, December 2008

EFFECT OF MOTHER BULB SIZE AND PLANTiNG TIME ON GROWTH, BULB AND SEED YIELD OF ONION

MD. MOSLEH UD-DEEN

Abstract

Onion bulbs of different sizes (20g, 15g and l0 g) were planted at different dates viz., 30 October and 15 and 30 November to observe their effects on growth, bulb and seed yield of onion. The mother bulb size and planting dates showed significant influence on growth, bulb and seed yield of onion. The large mother bulb and early planting were favourable for getting higher bulb and seed yields. The treatment combinations of large mother bulb (20 g) and 30 October planting time gave the highest bulb (17.52 t1ha) and seed (402.80 kg1ha) yield.

Keywords: Onion, mother bulb size, planting time, growth, yield.

Bangladesh J. Agril. Res. 33(4) : 539-548, December 2008

IMPACTS OF SULPHUR LEVELS ON YIELD, STORABILITY AND ECONOMIC RETURN OF ONION

M.H. ULLAH, S.M.I. HUQ, M.D.U. ALAM AND M.A. RAHMAN

Abstract

The experiments were carried out at the Regional Agricultural Research Station, Rahmatpur, Barisal during the *rabi* seasons of 2001-2002 and 2002-2003 to study the impact of different sulphur levels on bulb yield, storability and economic return of onion. Sulphur application had significant effect on yield components and bulb yield of onion. The highest bulb yields (19.75 and 19.88 t/ha) were obtained from sulphur levels between 60 and 75 kg/ha in two consecutive years. Both the cumulative weight and rotten loss were significantly influenced by sulphur fertilization. The maximum weight loss (40.78%) was recorded after 180 days of storage in S_{60} kg/ha and the minimum (31.40%) was found in S45 kg/ha. The bulbs stored in bamboo platform were found in acceptable condition after 6 months of storage showing 31.40% of weight loss. The maximum rotten bulbs (63.75%) were observed in control treatment (without S) and the minimum rotten bulbs (37.04%) were observed in S45 kg/ha after 180 days of storage because application of sulphur enhanced the storability of onion bulbs. The highest (9146 %) marginal rate of return (MRR) with gross margin of Tk. 181844/ha was obtained from the sulphur level S_{60} kg/ha.

Keywords: Sulphur, yield, storability, economic return, onion.

Bangladesh J. Agril. Res. 33(4) : 549-554, December 2008

EFFECT OF *RHIZOBIUM* INOCULATION ON NODULATION AND YIELD OF CHICKPEA IN CALCAREOUS SOIL

M.A.H. BHUIYAN, D. KHANAM, M.F. HOSSAIN AND M.S. AHMED

Abstract

Two field experiments were carried out during two consecutive *rabi* seasons of 2002-03 and 2003-2004 at Farming System Research Site, Chabbish Nagar, Rajshahi (AEZ 11) with a view to assessing the effect of *Rhizobium* inoculation on four varieties of chickpea viz., BARI Chola-3, BARI Chola-4, BARI Chola-5 and BART Chola-6. Each variety was tested with and without *Rhizobium* inoculation. Each plot received basal application of 22 kg P/ha as TSP, 42 kg K/ha as MOP, 20 kg S/ha as gypsum and 5 kg Zn/ha as zinc oxide. Peat based rhizohial inoculurn *(Rhizohium* strain RCa-220) @ 1.5 kg/ha was used for seed inoculation. Inoculated plants gave significantly higher nodule number, nodule weight, stover yield and seed yield compared to uninoculated plants. Among four varieties, BARI Chola-3 produced the highest nodule number, nodule weight and stover yield, while the highest yield was obtained from BARI Chola-4.

Keywords: Chickpea, *Rhizobium,* nodulation, yield.

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DETERMINATION OF ECONOMIC INJURY LEVELS OF *Helicoverpa armigera* (Hubner) IN CHICKPEA

M.A. ZAHID, M.M. ISlAM, M.H. REZA, M.H.Z. PRODHAN AND M. RUMANA BEGUM

Abstract

Chickpea pod borer *Helicoverpa armigera* (Hubner) *is* considered to be one of the major pests of chickpea. The damage potential and economic threshold level for *Helicoverpa* armigera larvae on chickpea crop were worked out. On an average, single larva per m row reduced the yield to the extent of 155 kg/ha and 157 kg/ha in 2004-05 and 2005-06 cropping season, respectively. The ratio of the value of yield saved to the cost of insecticide application at one larva per m row was 1.06 and 1.12 in 2004-05 and 2005-06, respectively. EILs for *Helicoverpa armigera* were determined as 12 and 0.95 per m row and ETLs was at 09 and 0 73 larvae per m row in 2004-05 and 2005 - 06, respectively.

Keywords: Economic injury, chickpea, pod borer

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CONTRIBUTION OF BARI CEREAL CROPS TO THE NATIONAL GDP OF BANGLADESH

M. R. KARIM, MA. BASET, Q. M. ALAM, S. HOSSAIN

Abstract

The study was conducted to estimate the contribution made by BARI cereal crops to GDP in the national economy of Bangladesh during the financial year 2005-2006. For the purpose of GDP calculation of BARI cereal crops, both primary and secondary data were collected from the concerned scientists of BARI, BBS, and DAM. Bangladesh has produced total goods and services those valuation at constant market price of Tk. 3150370.14 million in the financial year 2005-2006, where the contribution of agriculture and forestry was found Tk. 467436.18 million. Primarily producers sell their crops to the different users at farm-gate price and then the final output flour, bread, biscuit, poultry feed and its by-product straw, cattle feed, fuel and fodder for further value added when it is marketed to the consumer via a number of intermediaries. The value added price of the goods and services of BARI cereal crops were found at constant market price of Tk. 31434.75 million that comes as GDP valuation to the national economy. Finally, the contribution of BARI cereal crops to the agricultural and forestry GDP as worked out at 6.72 percent. On the other hand, contribution to GDP of BARI cereal crop technologies was found to be 4.40 percent.

Keywords: Contribution, BARI cereal, national GDP.

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MICROSPORE CULTURE AND THE PERFORMANCE OF MICROSPORE DERIVED DOUBLED HAPLOID IN *Brassica juncea* (L.)

M. M. ALI, M.A. KHALEQUE MIAN, J.B.M. CUSTERS AND M.M.H. KHURRAM

Abstract

The experiment was conducted at the Tissue Culture Laboratory as well as in the net house of Oilseed Research Centre, Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur on microspore culture and the performance of microspore derived doubled haploid (DH) in *Brassica juncea* (L.). The variety BARI Sarisha II of *B. junccea* was used for microspore culture and 8 DH genotypes viz., BJDH 01, BJDH *05*, BJDH ii, BJDH 12, BJDH 14, BJDH 17, BJDH 18, and BJDH 20 along with their parent Rajat collected from the Plant Research International, the Netherlands were used for performance evaluation. Four-day cold treatment at 6 °C along with bud size 3.0-3.1 mm of BARI Sarisha II showed better response in the embryonic development. Significant variation was observed for the different yield contributing characters among the DH genotypes along with their parent Rajat. All the DH genotypes were late both for days to flower and days to maturity compared to the parent. Most of the DH genotypes produced higher seed yield than the parent. The genotypes BJDII 14 (7 g) and BJDH 01(7 g) were bold seeded and almost double or more in 1000-seed weight compared to the parent. Total oil content of the DH genotypes (40.64-42.28) were significantly different from the parent (3 g). Oil content of BJDH 01 was almost 3% higher than the parent could be selected to incorporate in the future breeding program.

Keywords: Microspore culture, doubled haploid, *Brassica juncea*.

Bangladesh J. Agril. Res. 33(4) : 579-585, December 2008

EFFECT OF POSTHARVEST TREATMENTS ON SHELF LIFE AND QUALITY OF TOMATO

T.A.A. NASRIN, M.M. MOLLA, M. ALAMGIR HOSSAEN M. S. ALAM AND L. YASMIN

Abstract

An experiment was conducted to study the effect of chlorine, packaging and storage conditions on quality and shelf life of tomato. Tomato treated with chlorine packed in perforated (0.25%) polyethylene bag and kept at ambient (Temperature 20-25°C & relative humidity 70-90%) condition resulted in substantial reduction in losses caused by decay and weight loss. This treatment combination also considerably delayed compositional changes in TSS, total sugar, reducing sugar, vitamin-C, B-carotene, etc. Under this condition, shelf life of tomato had extended upto 17 days as compared to non-treated and kept in ambient condition without packaging or packed in gunny bag for 7 days only.

Keywords: Postharvest treatments, shelf-life, quality of tomato.

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PROFITABILITY LEVEL OF MUNGBEAN CULTIVATION IN SOME SELECTED SITES OF BANGLADESH

Q. M. SHAFIQUL ISLAM, M.A. MONAYEM MIAH, Q. M. ALAM AND. S. HOSSAIN

Abstract

The study was conducted at Barisal and Jhalokati districts during 2007 to estimate the profitability and resource use efficiency of rnungbean production. The study was confined to randomly selected 100 mungbean farmers. It revealed that mungbean production is profitable to the farmers. The productivity of munghean at farm level was 928 kg/ha, which vas higher than national average of 680 kg/ha. Mungbean farmers received Tk. 24236 as gross margin per hectare. The net benefit received per kilogram of mungbean was Tk. 26.45. Benefit cost ratios were estimated at 2.53 and 3.56 on variable and cash cost basis.

Functional analysis showed that human labour, urea and insecticides had positive significant contribution to mungbean cultivation. Mungbean farmers encountered various problems like untimely rainfall, lack of quality seed and disease and insect infestation, and needs immediate attention to reduce these problems.

Keywords: Profitability, mungbean, resource use efficiency.

Bangladesh J. Agril. Res. 33(4) : 597-606, December 2008

PRODUCTIVITY OF RAINFED MUSTARD IN RELATION TO TILLAGE AND MULCHING

N. A. MONDAL, S.M.A. HOSSAIN, S.U. BHUIYA AND M. JAHIRUDDIN

Abstract

Field experiments were conducted at the Regional Agricultural Research Station of Bangladesh Agricultural Research Institute, Jessore during *rabi* (winter) seasons of 1999-2001 to study the tillage and mulching effects on conservation of residual soil moisture, yield attributes and yield of mustard (cv. Daulat.). Three different tillage methods, namely minimum, reduced and conventional tillage were used in the main plots and three different mulch materials, namely rice straw, water hyacinth, black polythene including no mulch were used in the sup-plots. It was observed that reduced tillage and polythene mulch or rice straw mulch conserve more moisture than other tillage methods and mulch application. Tillage practice significantly influenced the dry matter, yield and yield components of mustard. Reduced tillage gave consistently the highest seed yield (969 kg/ha), while minimum tillage gave the lowest seed yield (92 kg/ha). Mulching also resulted in better crop growth and increased yield. Significantly higher seed yield (1164 kg/ha) was recorded from black polythene mulch followed by rice straw mulch (1089 kg/ha). The yield of mustard was obtained due to the interaction effects on reduced tillage and polythene mulch followed by conventional tillage and polythene mulch, which was found superior to all other treatments. Results revealed that polythene mulch or rice straw mulch accompanied by reduced tillage was economically profitable for mustard cultivation/production under rainfed condition.

Keywords: Rainfed mustard, tillage, mulching.

Bangladesh J. Agril. Res. 33(4) : 607-616, December 2008

STUDY ON GENETIC DIVERSITY OF POINTED GOURD USING MORPHOLOGICAL CHARACTERS

A. S. M. R. KHAN, M. G. RABBANI, M. A. SIDDIQUE AND M. I. HOSSAIN

Abstract

The genetic diversity among 64 pointed gourd *genotypes* were assessed through multivariate analysis from an experiment conducted in Regional Agricultural Research Station, lshurdi, Pabna during the growing season 2002-2003. The genotypes were grouped into twelve clusters. The cluster V consisted of highest number of genotypes and it was nine, the cluster VI and cluster VIII contained the lowest number of genotypes and it was two in each. The clustering pattern of the genotypes under this study revealed that the genotypes collected from the same location were grouped into different clusters. The genotypes of Jessore were distributed in different clusters. The highest inter genotype distance as 366.3 observed between the genotypes P0022 and P0007 and the lowest 2.6 as observed between the genotypes P0043 and P0044. Cluster V had the highest cluster mean value for internode length, fruit weight per plant and yield the highest inter-cluster distance was noticed between cluster III and II (45.71) and the lowest between cluster VII and VI (3.33). 'The highest intra cluster distance was computed for cluster III and that was lowest for the cluster II. The first five axes accounted for 77.65% of the total variation among the 13 characters describing 64 pointed gourd genotypes. Fruit weight, seeds per fruit and fruit weight per plant contributed maximum to the total divergence. The results obtained by D^2 analysis were confirmed by canonical analysis.

Keywords: Diversity pointed gourd, morphological characters.

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EFFICACY OF *RHIZOBIUM* STRAINS AND BIOFERTILIZERS FOR CONTROLLING FOOT AND ROOT ROT AND INCREASING GREEN POD YIELD OF BUSH BEAN

K. M. KHALEQUZZAMAN AND I. HOSSAIN

Abstract

The experiment was conducted during 2002—03 in the infested plot of the BINA sub-station at Ishurdi, Pabna to evaluate the effectiveness of *Rhizobium* strains and biofertilizers in controlling the foot and root rot disease, and to increase green pod yield of Bush bean under field condition. The highest germination (91.6%) was recorded with BINAR P36, which was statistically similar to BAUR 107, BARIR 7029, BARIR 1000, BINAR P6 and BINA biofertilizer. The lowest germination (77.9%) was found in untreated control. The highest foot and root rot (24.5%) was observed in untreated control and the lowest (10.00%) was in BINAR P36. Biofertilizers and Rhizobial strains decreased foot and root rot upto 59.2% over untreated control. The highest green pod yield (20.8 tlha) was obtained for using BINAR P36, which was followed by BARIR 7029, BARIR 892, BARIR 1000, BINAR P6 and BINA biofertilizer. The lowest green pod yield (13.6 tlha) was found in untreated control. *Rhizobium* strain BINAR P36 may be used as seed treatment for controlling foot and root rot and increasing green pod yield of Bush bean.

Keywords: Rhyzobium, biofertilizers, foot and root rot, bush bean.

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EFFECT OF DURATION OF WEED COMPETITION AND WEED CONTROL ON THE YIELD OF INDIAN SPINACH

M.S.A. KHAN, M. A. HOSSAIN, M. NURUL ISLAM
S.N. MAHFUZA AND M.K UDDIN

Abstract

Field experiments were conducted at the research farm of Bangladesh Agricultural Research Institute, Joydebpur during *kharif*-1 (March to July) seasons of 2005 and 2006 to identify the critical period of crop-weed competition for Indian spinach. Major weed species were *Paspalurn commersoni, Echinochlaa crusgalli. Lie nv/nc india. Cyanotis axillaris* and *Cyperus rotundus.* The lowest weed dry matter was 76.3 g m^{-2} in 2005 and l01.60 g m^{-2} in 2006 from the plots weeded up to 40 days after transplanting (DAT). The highest yields were obtained (74.82 t ha in 2005 and 48.48 t ha in 2006) from the weed free plots. The fresh yield of Indian spinach did not vary among no weeding upto 20, 30 and 40 DAT in 2006. But weeded plot upto 30 and 40 DAT produced identical yield in 2005. Maximum BCR (4.52) was obtained from weeded plots upto 30 DAT in 2005 but BCR (2.60) was same from weeded upto 30 and 40 DA F in 2006. On an average, highest BCR (3.55) was recorded from weeding upto 30 DAT. Results revealed that the critical period of crop weed competition lies between 20 and 30 DAT and two times hand weeding would be necessary within 30 DAT for maximum benefit.

Keywords: Crop-weed competitions, critical period, weed management and Indian spinach.

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GENETIC ANALYSIS FOR PANICLE CHARACTERS IN DIALLEL CROSS OF RICE

K. M. IFTEKHARUDDAULA, M. A. NEWAZ, M. A. SALAM AND KHALEDA AKTER

Abstract

An experiment was carried out to study the genetic components for eight panicle characters in rice using an 8-parent half diallel cross excluding reciprocals during Transplant Aman season, 2003. The parental genotypes used in the study were BRRI dhan29, BR4828-54-4-l-4-9, BRR1 dhan28, 1R8, Amol3, 1R65610-38-2-4-2-6-3, Minikit and ZhongYu7, which were chosen for their diversity in panicle characters. Hayman's analysis of variance (ANOVA) indicated importance of both additive and non-additive genetic components for all the panicle characters except dominance component for filled

grains/secondary branches. The ANOVA showed unidirectional dominance for the characters viz, primary branch length, secondary branch length, primary branches/panicle, secondary branches/panicle and filled grains/primary branch, asymmetrical gene distribution for all the panicle traits except filled grains/secondary branch and residual dominance effects for all the panicle characters studied. Two out of eight panicle characters viz., primary branches/panicle and unfilled grains/ secondary branch followed the simple additive-dominance genetic model. The rest of the panicle characters showed nonallelic gene interaction or epistasis. According to Vr-Wr graph, partial dominance was involved in the action of genes governing the inheritance of primary branches/panicle, while complete dominance was involved in the inheritance of unfilled grains/secondary branch. Most of the dominant genes for primary branches/panicle belonged to other hand, 1R8 possessed most of the dominant genes, while 1R65610-38-2-4-2-6-3 possessed most of the recessive genes for unfilled grains/secondary branch. The estimates of components of variance demonstrated involvement of both additive and dominant components in the inheritance of primary branches/panicle and unfilled grains/secondary branch. The distribution of dominant and recessive genes was unequal in the parents for these two characters also. There was drastic influence of environment on these two panicle characters following simple additive-dominance genetic model. Heritability in narrow sense (h^2 ns) was very high for primary branches/panicle and unfilled grains/secondary branch.

Keywords: Genetic analysis, diallel cross, panicle characters, rice.

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EFFICACY OF MAJOR NUTRIENTS IN RICE PRODUCTION

A.L. SHAH, M.R. ISLAM, M M HAQUE, M. ISHAQUE AND M.A.M. MIAH

Abstract

Nutrients efficacy means increased rice yield upon soil fertilization. Purposefully a particular nutrient stress was created in soil through missing element technique from complete treatment (NPKSZn) and its reserve management (addition of omitted nutrient) effect in increasing yield was considered as a measuring stick of nutrients efficacy. The omission of all NPKSZn fertilizers from complete treatment (NPKSZn) drastically decreased yield than continuously fertilized complete treatment. Similar extent of' yield increase was observed when all NPKSZn fertilizer was applied in absolute control plot indicating that every soil needs complete addition of NPKSZn fertilizers irrespective of seasons whether the plot was continuously fertilized or not. The amount of yield increase obtained upon a missing element fertilization nearly equivalent amount of yield loss as aloofness of that particular nutrient as compared to complete fertilization. It means lhc efficacy of each essential nutrient might increase yield in a similar manner depending on their magnitude of deficiency level in the soil. Continuous application of N @ 120 kg/ha in *boro* and 80 kg/ha in T.a*man* with PKSZn @ 25-33-20-05 kg/ha per season improve total soil N, S and Zn. But exchangeable K decreased compared to initial soil status. In case of P fertilization, this rate maintained the initial soil P level. However, available Zn was found well above critical level even after 45^{th} crop as because of high initial soil available Zn level.

Keywords: Nutrient efficacy, rice yield, soil fertilization.

Bangladesh J. Agril. Res. 33(4) : 647-654, December 2008

INTEGRATED WEED MANAGEMENT IN POTATO AT MUNSHIGONJ

A.S.A. KHAN, M.A. HOSSAIN, A.A. MAHMUD
M.I.A. HOWLADER AND M.A. RAHMAN

Abstract

A field experiment was carried out at the research farm of Tuber Crops Research Sub-station, Munshigonj of Bangladesh Agricultural Research Institute (BARI) during *rabi* seasons of 2005-06 and 2006-07 to find out the effective and economical integrated weed control method in potato. *Chenopodium album* and *Amaranthus viridis* were the major weed species in potato field. Mulch (water hyacinth) along with herbicide application (Ronstar 25 EC @ 1 ml/L water) at 7 days after planting (DAP) was found most effective in controlling weed population (94 to 95%) upto 30 days of planting than that employed by only mulch (45 to 53%). The weeds were found to reduce tuber yield to the extent of 43 percent. Mulching plus herbicide spraying at 7 DAP followed by one time uprooting of weeds by hand at 25 DAP produced the highest tuber yield of 23.39 t/ha in 2005-06 and 29.58 t/ha in 2006-07 and it was most effective in controlling weeds as compared to unweeded and mulched plots. The highest net returns (Tk. 116141/ha in 2005-06 and Tk. 205646/ha in 2006-07) and maximum benefit cost ratio of 2.64 and 3.28 were noted with mulching by water hyacinth + herbicide application at 7 DAP + one time weed uprooting by hand at 25 DAP.

Keywords: Weed management, mulching, herbicide, potato tuber yield.

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EFFECT OF SOWING DATE ON THE INCIDENCE OF LOOSE SMUT, FLAG SMUT AND SEED GALL OF WHEAT

RAJENDER SINGH, M.S. BENIWAL, S.S. KARWASRA
AND HAWA SINGH SAHARAN

Abstract

An experiment was conducted to find out the effect of delay sowing on the incidence of loose smut *(Ustilago tritici),* flag smut *(Urocystis agropyri)* and seed gall *(Anguina tritici)* of wheat. Varieties WH 896 and Raj 1555 were free from loose smut at all dates of sowing. At normal date of snwing (25 November) disease incidence varied from 28.18% (HD 2285) to 43.18 % (Sonalika). Due to delay in sowing by 20 days (15 December), the disease incidence was reduced to 21.33-38.18% and delay by *3*5 days (30 December) it was reduced to 18.62% -32.5 % on all susceptible varieties. At all dates of sowing, varieties WH 283, WI-I 291, WH 896 and Raj 1555 were not infected with flag smut. Other varieties were infected with the disease showing 1.3-14.57, 1.11-11.83 and 0.83-9.14% incidence at the sowing dates of 25 November (normal), 15 December (delay) and 30 December (delay), respectively. All of the varieties tested in this study were infected with seed gall nematode and disease incidence increased with delay in date of sowing. The ranges of the disease incidence were 8.16-20.14, 12.33-28.91 and 14.16-36.66% at first, second and third date of sowing, respectively.

Keywords: Loose smut, flag smut, seed gall nematode, wheat, sowing date.

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EFFICIENCY OF IPNS-BASED CHEMICAL FERTILIZER APPLICATION IN WET LAND RICE

P.K. SAHA AND M. A. M. MIAH

Abstract

A field trial was conducted to validate some fertilizer application approaches for Boro-Green manure (GM) -T. Aman cropping system at the Bangladesh Rice Research Institute (BRRI) Farm, Gazipur (AEZ-28: high land) during the period from Boro 1999-2000 to T. Arnan 2000. Five different application approaches of inorganic and organic fertilizers along with their residual values were evaluated. A positive effect of GM on the yield of T. Aman rice was observed. Application of cowdung (CD) @ 6 t/ha (at 15% moisture) along with integrated plant nutrient system (IPNS) based chemical fertilizer in Boro season followed by green manuring with dhaincha (in *Kharif*-l season) and then growing T. Aman rice (in Kharif-ll season) with reduced doses of chemical fertilizer (60% N, 50% P, 50% K, and 50% S) substantially increased grain yield and narrowed down the N, P, and K balance in soil. This fertilizer application approach may be practiced for sustainable crop production. No appreciable yield loss in T. Arnan rice (2^{nd} crop) occurred due to the application of reduced doses of P, K, S, and Zn indicating the beneficial residual effect of fertilizer applied to the first crop (Boro rice) of the cropping pattern. The N uptake was in excess of the N added as fertilizer. An improved balance of P, S, and Zn was observed. But the K balance was negative. However, application of cowdung and incorporation of dhaincha slightly improved the K balance of the soil. The highest gross return of Tk. 86,270 was obtained with the above practice.

Keywords: Chemical fertilizer, green manure, IPNS, wet land rice.

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AGRO-ECONOMIC ANALYSIS OF MAIZE PRODUCTION IN BANGLADESH: A FARM LEVEL STUDY

MONIRUZZAMAN, M. S. RAHMAN, M. K. KARIM AND Q. M. ALAM

Abstract

The study was carried out in four major maize growing areas, namely Chuadanga, Dinajpur, Bogra and Lalmonirhat during 2006-2007 to know the profitability level of maize production in Bangladesh. A total of 200 randomly selected maize growers taking 50 from each location were interviewed using pre-designed interview schedule. The average yield was found to be 8.00 t/ha. The average costs of maize production were Tk 44197, Tk 33195 and Tk 24441 per hectare on total cost, variable cost and cash cost basis, respectively and gross return was Tk 69773 per hectare. The gross margin was Tk 36578/ha on total variable cost (TVC) and Tk 45332/ha on cash cost basis. The net return was observed to be Tk 25575 per hectare. Benefit cost ratios (BCR) were calculated as 1.58, 2.10 and 2.85 on total cost, variable cost and cash cost basis, respectively. As a result, maize cultivation was more profitable. Lack of capital and high price of TSP were the main constraints to its higher production.

Keywords: Maize production, agro-economic analysis, BCR.

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PHENOTYPIC DIVERSITY OF COCONUT GERMPLASM CONSERVED AT DIFFERENT STATIONS OF BARI

MD. NAZIRUL ISLAM, MD. AMJAD HOSSAIN AND MD. SHARAF UDDIN

Abstract

Diversity of coconut germplasm being conserved at different Regional and Sub-stations of the Bangladesh Agricultural Research Institute (BARI) was estimated during 2001-2002. Diversity indices (D^2) ranged from 1068.96 to 171.93. Maximum

diversity was observed between BARI Narikel-2 and Rahmatpur Yellow Dwarf. Genotypes of Regional Agricultural Research Station, Jessore and BARI Narikel-2 were found morphologically similar. Population under conservation at Jamalpur and lshwardi stations were found close to BARI Narikel-l. Similar relationships among the genotypes were reflected when they were grouped into several clusters. Out of six clusters, the members of cluster II were homogenous, while that of cluster IV showed heterogenicity.

Keywords: Phenotypic diversity, coconut germplasm, D^2 values.

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VARIETAL PERFORMANCE OF TRANSPLANT AMAN RICE UNDER DIFFERNT HILL DENSITIES

M.A.T. SOHEL, M.A.B. SIDDIQUE, M. ASADUZZAMAN
M.N. ALAM AND M. M. KARIM

Abstract

An experiment was conducted at the Agronomy Field Laboratory, Bangladesh Agricultural University, Mymensingh from July to December 2004 to evaluate the effect of hill spacing on the performance of BRRI dhan40 and BRRI dhan41 as Transplant aman crop. The experiment consisted of five hill spacings viz., 5cm, 10cm, 15 cm, and 25 cm where row to row spacing of 25 cm was kept constant for all treatments. The experiment was laid out in randomized complete block design with four replications. The 25 cm x 5 cm hill spacing produced the tallest plant, highest total number of tillers/hill, bearing tillers/hill, lowest number of non-hearing tillers/hill, grain yield and harvest index, while 25 cm x 5 cm hill spacing produced the highest number of sterile spikelets/panicle, straw yield and biological yield. BRRI dhan41 produced higher grain yield (4.7 t/ha) which was the contribution of higher number of grains/panicle and heavier grain weight. Lower yield (4.51 t/ha) was recorded in BRRI dhan40.

Keywords: Varietal performance, *T. aman* rice, hill density.

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DVELOPMENT OF FERTILIZER RECOMMENDATION FOR THE CROPPING PATTERN POTATO-BORO-T.AMAN IN IRRIGATED MEDIUM HIGHLAND CONDITION UNDER AEZ -9

M.R ALI, D. J. COSTA, M.A. SAYED
M.A.H. KHAN AND J.A.ABEDIN

Abstract

The experiment was carried out in the Old Brahmaputra Floodplain soil at the farmer's field of Farming System Research and Development (FSRD) site, Kushumhati, Sherpur under Sherpur district in the medium high land under AEZ-9 for the three consecutive years 2003-06 to determine economic combined dose of organic and inorganic fertilizers for Potato-Boro-T.*aman* cropping pattern. Six treatment management packages including one farmer's practices, and one fertilizer control were tested. The other four treatments were soil test based (STB) fertilizer dose for moderate and high yield goals (MYG and HYG), STB based fertilizer dose for HYG plus 5 t/ha cowdung (IPNS) and fertilizer dose for Fertilizer Recommendation Guide'97 (FRG '97). Average of three years' results showed that recommended fertilizer dose based on the FRG '97 was more economic than all other fertilizer doses for the whole pattern. But the treatment Integrated Plant Nutrition Systems based on fertilizer management with cowdung for high yield goal produced the maximum grain and straw yields in the first crop. Application of cowdung had no significant effect on the yield of succeeding crops. The variable cost was higher for the treatment consisting of cowdung due to additional cost of cowdung. The highest marginal rate of return 1626% was obtained from recommended fertilizer based on the FRG '97.

Keywords: Balanced fertilization, cropping pattern, yield, economics.

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INTERCROPPING OF HYBRID MAIZE WITH SHORT DURATION VEGETABLES AT HILL VALLEYS OF BANDARBAN

M. JAMAL UDDIN, M.A. QUAYYUM AND K.M. SALAHUDDIN

Abstract

The experiment was conducted at farmer's field in Bandarban sadar areas daring *rabi* season 2004-05 and 2005-06 to find out the feasibility and profitability of growing short duration vegetables i.e., Potato (var. Heera,), lalsak (var. Red king,), spinach (var. local), and French bean (var. BARI Jharseem-2) with hybrid maize (var. Pacfic-11). The grain yield of sole maize was 9.65 t/ha whereas yield reduction was found in intercrop situation The maize equivalent yield showed that maize + spinach produced significantly higher yield (15.62 t/ha) followed by maize + lalsak (14.48 t/ha) and maize + potato (13.93 t/ha). Maize + spinach recorded the highest gross margin (Tk. 86,257/ha), but higher benefit cost ratio and marginal rate of return was accounted from maize + lalsak combination. The lowest gross margin was obtained from sole maize. It revealed that the combination of maize with lalsak or spinach were more compatible and profitable intercropping system in hill valleys of Bandarban areas.

Keywords: Intercropping, hybrid maize, short duration vegetables, profitable, hill valleys.

Bangladesh J. Agril. Res. 34(1) : 59-65, March 2009

COLLECTION, IDENTIFICATION AND BIOCHEMICAL ANALYSES OF DIFFERENT SEA WEEDS FROM SAINT MARTIN'S ISLAND

K.M. FORMUZUL HAQUE, SHAMIMA YESMIN CHY, SHAHINA AKTER, MD. ABDUL WAHAB, K.K. NATH

Abstract

Five species of marine a1gae were collected from Saint Martin's island, identified and biochemical analyses were carried out in BCSIR Laboratories, Chittagong. Biochemical composition were analysed to evaluate its food value and also to find out variation in composition during the period of investigation. The protein content of *Sargassum coriifolium* was 16.07%, whereas in *Padina ltenuis* that was estimated at 8.32%. The percentage of fat in *Sargassuni coriitolium* along with the other sea weeds was 0.5%. It was found that major of the biochemical parameters of these sea weeds were higher except the protein contents than that of *Spirulina.* The carbohydrate content in *Dictyota dichotoma* (38.94%) was lower among these sea weeds, but more than that of *Spirulina.* Carbohydrate contents were higher (56.29%) in *Hypnea musciformis.* Mineral contents as well as other parameters, especially carbohydrate contents were higher in these algae than that of *Spirulina.*

Keywords: Collection, identification, biochemical analyses, sea weeds.

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EVALUATION OF GROWTH AND YIELD OF SELECTED HYBRID AND INBRED RICE VARIETIES GROWN IN NET-HOUSE DURING TRANSPLANTED AMAN SEASON

M. S.H ISLAM, M.S.U. BHUIYA, A.R. GOMOSTA, A.R. SARKAR AND M.M. HUSSAIN

Abstract

Pot experiments were conducted during T. *Aman* 2001 and 2002 (wet season) at Bangladesh Rice Research Institute (BRRI) in net house. Hybrid variety Sonarbangla-1 and inbred modern variety BRRI dhan-31 were used in both the seasons and BRRI hybrid dhan-l was used in 2002. The main objective of the experiments was to compare the growth and yield behaviour of hybrid and inbred rice varieties under controlled condition. In 2001, BRRI dhan-3l had about 10-15% higher plant height, very similar tillers/plant, 15-25% higher leaf area at all days after transplanting (DAT) compared to Sonarbangla-1. Sonarbangla- 1 had about 40% higher dry matter production at 25 DAT but had very similar dry matter production at 50 and 75 DAT, 4-11% higher rooting depth at all DATs, about 22% higher root dry weight at 25 DAT, but 5-10% lower root dry weight at 50 and 75 DAT compared to BRRI dhan-31. The photosynthetic rate was higher (20 μ mol m^{-2}/sec^{-1}) in BRRI dhan-3l at 35 DAT (maximum tillering stage) but at 65 DAT,

Sonarbangla-l had higher photosynthetic rate of 19.5 μ mol m^{-2} sec^{-1}. BRRI dhan-3l had higher panicles/plant than Sonarbangla-1, but Sonarbangla-1 had higher number of grains/panicle, 1000-grain weight and grain yield than BRRI dhan-31. In 2002, BRRI dhan-31 had the highest plant height at 25 DAT, but at 75 DAT, BRRI hybrid dhan-l had the highest plant height. Sonarbangla-1 had the largest leaf area at 25 and 50 DAT followed by BRRI dhan-31, but at 75 DAT, BRRI dhan-31 had the largest leaf area. The highest shoot dry matter was observed in BRRI dhan-31 followed by Sonarbangla-1 at all DATs. Sonarbangla-1 had the highest rooting depth and root dry weight at all DATs. BRRI dhan-31 gave the highest number of panicles/plant followed by Sonarbangla-I, BRRI hybrid dhan-l had the highest grains/panicle followed by BRRI dhan-31 and Sonarbangla-I had the highest 1000-grain weight followed by BRRI dhan-31. The highest amount of grains/plant (34.6 g) was obtained from BRRI dhan-31.

Keywords: Shoot dry matter, root dry weight, leaf area, photosynthesis, grain yield.

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INFLUENCE OF METHOD AND DATE OF PLANTING ON THE PRODUCTION OF LETTUCE

P. C. D. SHARMA, M. M. RAHMAN, M. A. H. MOLLAH AND M. S. ISLAM

Abstract

The effect of two planting methods (direct seed sowing and transplanting of seedlings) and seven dates of planting (8 Oct., 2 Nov., 27 Nov., 22 Dec., 16 Jan., 10 Feb. and 5 March) on the production of lettuce was compared. 'Green Wave' a loose leaf Japanese variety was used. The average yield of the direct seeded crops (17.16 t/ha) was found to be almost double than that of the transplanted crops (9.08). The yields (t/ha) from different dates of planting were 13.7 (8 Oct.), 15.04 (2 Nov.), 8.94 (27 Nov.), 14.54 (22 Dec.), 21.45 (16 Jan.) 10.16 (10 Feb.), and 8.02 (5 March). The highest yield of 24.0 t/ha was obtained from direct seedling on 16 January.

Keywords: Method, date, planting, production of lettuce.

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EFFECT OF INTEGRATED USE OF ORGANIC MANURES WITH CHEMICAL FERTILIZERS IN THE RICE-RICE CROPPING SYSTEM AND ITS IMPACT ON SOIL HEALTH

M.E. ALI, M.R. ISLAM AND M. JAHIRUDDIN

Abstract

A field experiment was conducted during 2003-2004 at Bangladesh Agricultural University farm, Mymensingh to evaluate the suitability of different sources of organic materials for integrated use with chemical fertilizers for the Boro-Fallow-T. Aman rice cropping pattern. The experiment was set up in a randomized complete block design (RCBD) with three replications. Eight-treatments, formulated from organic manure and chemical fertilizers have been imposed. The treatment combinations are T_1: control, T_2: 70% NPKS, T_3: 100% NPKS, T_4: 70% NPKS + rice straw (RS) @ 5 t/ha, T_5: 70% NPKS + dhaincha (DH) @ 15 t/ha, T_6: 70% NPKS + mungbean residue (MBR) @ 10 t/ha, T_7: 70% NPKS + cowdung (CD) @ 5 t/ha and T_8: 70% NPKS + poultry manure (PM) @ 3 t/ha. Organic manure or crop residue was applied to T. Aman rice and their residual effects were observed in the following Boro rice. Application of 70% NPKS + PM produced the highest grain yield of T. Aman rice, which was identical to that obtained with 100% NPKS with no manure. In *Boro* season, application of 100% NPKS produced the highest grain yield of 6.87 t/ha, which was identical with the application of 70% NPKS + PM (6.57 t/ha). The total grain yield in the cropping pattern ranged from 5.14 t/ha in T_1 (control) treatment to 12.29 t/ha in the 100% NPKS. The application of 3 t/ha PM with 70% NPKS (T_8) produced the total yield of 12.09 t/ha followed by 11.59 t/ha in the treatment containing 10 t/ha MBR plus 70% NPKS (T_6). It appears that the application of 3 t/ha PM once in a year with 70% NPKS can reduce the use of 30% NPKS as fertilizers. There were negative balances for N and K with the highest mining of K, while the balances for P and S were positive. The economic analysis reveals that most of the treatments produced BCR (benefit-cost ratio) of more than 3.0 showing that they all are economically viable. The integrated use of fertilizers and manure resulted in considerable improvement in soil health by increasing organic matter, available P, and S contents of soils. The

overall findings of the study indicate that the integrated use of chemical fertilizer and manure is important for sustainable crop yield in a rice-rice cropping pattern.

Keywords: Organic manures, chemical fertilizer, soil health.

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GENETIC VARIATION AND TRAIT RELATIONSHIP IN THE EXOTIC AND LOCAL EGGPLANT GERMPLASM

M. S. ISLAM AND M. S. UDDIN

Abstract

Sixteen genotypes of local and exotic germplasms were studied to estimate variability, hcritability, genetic advance, and correlation coefficients. High genotypic and phenotypic coefficients of variation were obtained for number of fruits/plant, individual fruit weight, and yield per plant. Heritability and genetic advance were also high for these traits indicating the possibility of selection to improve these characters. Yield of fruits showed highly significant and positive association with number of fruits per plant and individual fruit weight, which indicate the importance of these characters during selection for high yielding genotypes in eggplant. Among the genotypes, Islampuri produced the highest fruit yield (58.8 t/ha) followed by Tall begun (52.8 t/ha) and EG 120 (49.6 t/ha). Incidence of borer infestation ranged from 3.0 to 20.6 %. The lowest borer infestation was found in EG 120 (3.0%), while it was the highest in EG 192 (20.6%)

Keywords: Genetic variation, trait relationship, exotic and local germplasm, eggplant.

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EVALUATION OF DIFFERENT LEVELS OF POTASSIUM ON THE YIELD AND PROTEIN CONTENT OF WHEAT IN THE HIGH GANGES RIVER FLOODPLAIN SOIL

M. ROBIUL ALAM, M. AKKAS ALI, M.S.H. MOLLA
M. A. MOMIN AND M. A. MANNAN

Abstract

Balanced fertilization with optimum potassium management may lead to maximize wheat yield. The experiment was carried out at the Farming Systems Research and Development (FSRD site, Pushpapara, Pabna during the *rabi* seasons of 2003-04 and 2004-05 to ascertain the effect of potassium application on wheat. Five different levels of potassium (K) were tested on wheat crop. Yield contributing characters and yield exerted significant variation due to application of different levels of K and the best performance of the crop parameters was recorded when 36 kg K/ha was applied. Remarkable increase in grain, straw and total biomass yield was recorded in the same treatment. Regarding the grain quality of wheat, the highest protein content was recorded from 36 kg K/ha, which was 6.86% and 4.98% higher over omission of K (control) and recommended dose (100% estimated K). The highest net benefit was obtained from 36 kg K/ha, which was 40.52% higher over omission of K (control).

Keywords: Potassium, yield, protein content, wheat.

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PERFORMANCES OF FRENCH BEAN AS INFLUENCED BY PLANT DENSITY AND NITROGEN APPLICATION

M. MONIRUZZAMAN, G. M. A. HALIM AND Z. A. FIROZ

Abstract

Field experiments with French bean comprising two varieties (BARI bush bean-1 and BARI bush bean-2), three plant densities (500×10^3, 333×10^3, and 250×10^3 plants/ha as maintained by 20 x 10, 30 x 10, and 40 x 10 cm spacings, respectively) and three levels of N (0, 60, and 120 kg/ha) were conducted at the Agricultural Research Station, Raikhali in the district of Rangamati during the winter (*rabi*) seasons of 2004-05 and 2005-06. BARI bush bean-1 outyielded BARI bush bean-2. The lowest plant density (250 x 10 plants/ha) recorded significantly higher values of growth and yield attributes, except plant height which was the maximum with the highest plant density of 500×10^3 plants/ha. The highest plant density of (500×10^3 plants/ha) resulted in the highest pod yield in comparison with the lower and medium plant densities. Application of 120 kg N/ha coupled with the highest plant density ($500 \times l0^3$ plants/ha) gave the maximum pod yield of 34.3 t/ha and 30.2 t/ha in BARI bush bean-I and BARI bush bean-2, respectively.

Keywords: French bean, plant density, nitrogen, pod yield.

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EFFECT OF COMBINATIONS OF CHEMICAL FERTILIZERS AND POULTRY MANURE ON THE PRODUCTIVITY OF CROPS IN THE CAULIFLOWER-STEM AMARANTH–JUTE PATTERN

M. AKKAS ALI, M.S.H. MOLLA, M. ROBIUL ALAM, M. A. MOMIN AND M. A. MANNAN

Abstract

Different combinations of chemical fertilizers and organic manure were applied for sustainable crop productivity in the cauliflower-stem amaranth -jute cropping pattern. The experiment was conducted at farmer's field in Multilocation Testing (MLT) site of Pakshi, Pahna over three years. There were five combinations of chemical fertilizers (CF) and poultry manure (PM) along with absolute control arranged in a randomized complete block design. The results revealed that all three crops showed significant yield for fertilizer and poultry manure use. Higher yields were obtained with 50% CF + 50% PM followed by 75% CF + 25% PM treatments where cauliflower equivalent yield was increased by 85% and 78%, respectively, over control. This indicates a positive residual effect of poultry manure on the subsequent crops. From the economic points of view, the highest marginal benefit cost ratio (MBCR) was attained in 100% chemical fertilizer due to its lower variable cost followed by 75% CF + 25% PM treated plots. However, gross margin was higher in *50%* CF + 50% PM combination for its higher total yield.

Keywords: Chemical fertilizer, poultry manure, productivity.

Bangladesh J. Agril. Res. 34(1) : 123-141, March 2009

STUDIES ON THE GENETIC DIVERSITY OF POINTED GOURD USING BIOCHEMICAL METHODS (ISOZYME ANALYSIS)

A.S.M.M.R. KHAN, M.G. RABBANI, M.A. SIDDIQUE AND M.A. ISI AM

Abstract

Biochemical characterizations of 64 pointed gourds were done using three isozyme viz., acid phosphatase, peroxidase and glutamate oxaloacetate transaminase. A wide range of diversity among the gremplasm based on their acid phosphatase, peroxidase and glutamate oxaloacetate transaminase isoenzyme banding patterns were observed. In respect of isoenzyme activity; 8 acid phosphatase, 7 peroxidase and 9 glutamate oxaloacetate transminase electrophoretic zymotypes were formed by 19, 11, and 19 bands at different Rf values varying from 0.19 to 0.82, 0.38 to 0.69 and 0.15 to 0.95, respectively. The wide range of similarity co-efficient of 0.0-80.0, 0.0-66.0, and 0.0-80.0 as found among the electrophoretic patterns in acid phosphatase, peroxidase, and glutamate oxaloacetate transminase, respectively, indicating wide genetic diversity among the accessions. Based on the polymorphic activity of these three enzymes, 27 combinations of electrophoretic zymotypes were identified, each of which can he equated to genotypes. Each of the groups consisted of one to eight genotypes. Sixty four accessions of pointed gourds were grouped into 12 clusters. The genotypes collected from the same location were grouped into different clusters.

Keywords: Genetic diversity, pointed gourd, biochemical methods.

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EFFECT OF IRRIGATION LEVELS AT DIFFERENT GROWTH STAGES ON GROWTH PARAMETERS AND YIELD OF FOUR SELECTED CHILLI ACCESSIONS

M. A. I. KHAN, A. M. FAROOQUE, M. A. HOQUE, M.A. RAHIM AND M. A. HAQUE

Abstract

An experiment was conducted at Bangladesh Agricultural University. Mymensingh in poly bags under glasshouse condition during October 1997 to March 1998 to know the effects of different water levels at different growth stages of four selected chilli accessions viz., C-027l, C-0272, C-0275, and C- 0277. Six water treatments viz., watering once everyday (W_1), watering twice everyday (W_2). watering at 4 days interval (W_3), watering at

8 days interval (W_4), watering at 16 days interval (W_5), and no watering (W_0) were tested at three growth stages viz., Vegetable stage (S_1), Flowering stage (S_2), and Fruiting stage (S_3). The accessions of chilli were selected from the results of a previous experiment where ten accessions of chilli collected from Spices Research Centre (SRC) of Bangladesh Agricultural Research Institute, Joydebpur, Gazipur were used. The primary selection was made on the basis of their tolerance and susceptibility to water stages. The results revealed that all the studied parameters viz., plant height, canopy diameter, root length, root volume, no. of fruits per plant, fruit length, fruit diameter, individual fruit weight, no. of leaves per plant, leaf area per plant, fruit yield per plant, leaf dry weight, stem dry weight, root dry weight, fruit dry weight per plant, varied significantly among the accessions under different water treatments at different stages of growth. Out of four accessions, C-0271 and C-0277 were found as water stress tolerant and susceptible, respectively.

Keywords: Water level, growth stage, chilli accessions.

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EFFECT OF INTEGRATED USE OF ORGANIC MANURES AND CHEMICAL FERTILIZERS ON YIELD, NUTRIENT UPTAKE AND NUTRIENT BALANCE IN THE BUSH BEAN - T.AUS - T. AMAN CROPPING PATTERN

F. RAHMAN, A. T. M. SAKHAWAT HOSSAIN, P. K. SAHA AND M. A. MAZID MIAH

Abstract

A study was made on integrated nutrient management in the Bush bean −T. Aus −T. Arnan cropping pattern over three years at BRRI Farm, Gazipur (AEZ-28) during 2000-02. Different packages of chemical fertilizers in combination with organic materials (cowdung and rice straw/bush bean stover) were evaluated to find out a suitable combination for obtaining higher yield of crops. There was a positive effect of crop residue recycling and residual effect of cowdung on the yield of the next crops. Both the soil test based fertilizer and the cowdung with IPNS basis fertilizer treatments gave higher pod yield of bush bean. For T. Aus rice, the highest yield was obtained with the treatment where bush bean stover was used along with IPNS based chemical fertilizer. Again the highest yield of T. Aman rice was observed in the residual effect of cowdung with reduced amount of fertilizer. An excess N uptake was recorded where N was added as fertilizer only. The apparent balance (nutrient added through manures and fertilizers minus nutrient removed by crops) for both N and K was negative while that for P & K was mostly positive.

Keywords: IPNS, cowdung, rice straw, bush bean, rice, nutrient balance.

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STUDY OF HERITABILITY, GENETIC ADVANCE AND VARIABILITY FOR YIELD CONTRIBUTING CHARACTERS IN RICE

RITA BISNE, A. K. SARAWGI AND S. B. VERULKAR

Abstract

The knowledge of genetic variability in a given crop species for characters under improvement is important in any plant breeding programme. Heritability with genetic advance are more helpful in predicting the gain under effective selection. Genetic parameters for yield and its correspondent characters in rice were estimated from a trial with four CMS lines, eight testers and thirty-two hybrids evaluated for thirteen characters related to yield. Low, moderate, and high genotypic and phenotypic coefficient of variations were observed. High genotypic and phenotypic coefficient of variations were expressed by harvest index, total number of filled spikelets per panicle, 100-grain weight and spikelet fertility percentage. High heritability coupled with high genetic advance was exhibited by harvest index, total number of chaffy spikelets per panicle, grain yield per plant, total number of filled spikelets per panicle and spikelet fertility percentage and selection may be effective for these characters.

Keywords: Heritability, variability, genetic advance in rice.

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EFFECT OF BLACK POINT DISEASE ON QUALITY OF WHEAT GRAIN

P. K. MALAKER, I. H. MIAN, K. A. BHUIYAN
M. M. A. REZA AND M. A. MANNAN

Abstract

An experiment was conducted to determine the effect of different levels of black point infection caused by *Bipolaris sorokiniana* and other fungal pathogens on some quality characters of wheat grain. Wheat grains were graded on a 0-5 scale based on levels of black point infection. Quality characters of grain viz., protein, fat, dry matter, ash and mineral contents under different grades were determined following standard methods. The dry matter and ash contents of grain decreased while the contents of protein and fat increased with the increasing severity of black point infection. The observations on macro and micro nutrient contents of grain indicated that the amount of nitrogen, phosphorus, calcium, magnesium, sulphur, and boron increased, whereas the contents of potassium, iron, zinc, copper and sodium decreased with the increase of black point infection. However, the reductions in copper content of black point affected grains under different grades of infection were not significant as compared to apparently healthy grains.

Keywords: Black point, *Bipolaris sorokiniana*, grain quality, wheat.

Bangladesh J. Agril. Res. 34(2) : 189-204, June 2009

PLANT DIVERSITY OF THE HORTICULTURAL FARM OF BANGLADESH AGRICULTURAL UNIVERSITY

A. HOSSAIN, M.A.S. CHOWDHURY, M.ST.T. ISLAM
P.K. MALAKER AND S.M. IQBAL

Abstract

A taxonomic survey was carried out to assess the diversity of plant genetic resources in the Horticultural farm of Bangladesh Agricultural University, Mymensingh. The data were collected during April 2004 to March 2005. A total of 25328 (including unidentified plant species) species were recorded in which trees, shrubs, herbs, climbers and woody grasses were 51.56, 27.60, 7.81, 10.41, and 2.61% of the total species, respectively. The total number of plants belongs to 98 families under 141 genera and 192 species (excluding unknown species). Among these, 65 fruit tree species under 38 genera and 25 families (of which 8 species were rare and endangered), 16 timber plant species under 12 genera and 9 families, 32 medicinal plant species under 29 genera and 24 families (of which 7 species were rate and endangered), 44 ornamental plant species under 34 genera and 25 families (of which 2 species were rare and endangered), 4 spices plant species under 4 genera and 4 families, 11 vegetables plant species under 9 genera and 6 families, 5 bamboo species under 2 genera and one family, 3 rattan (Bet) plant (which were rare and endangered) species under one genus and one family, 10 palm plant species under 10 genera and 2 families, and 2 rubber plant species under 2 genera and one family were recorded.

Keywords: Plant diversity, taxonomic survey.

Bangladesh J. Agril. Res. 34(2) : 205-213, June 2009

EFFECTS OF SHADE AND NITROGEN LEVELS ON QUALITY BANGLADHONIA PRODUCTION

M. MONIRUZZAMAN, M. S. ISLAM, M. M. HOSSAIN
T. HOSSAIN AND M. G. MIAH

Abstract

A field experiment was conducted to determine the optimum shade level and nitrogen fertilizer for quality Bangladhonia *(Eryngium foetidum L.)* production at the Bangahandhu Sheikh Mujibar Rahman Agricultural University (BSMRAU) Research Farm during December 2002 to May 2003. The treatments consisted of four shade levels (0, *25,* 50, and *75%* shades) and five nitrogen rates (0, 115, 138, 161, and 184 kg N/ha). Shades were artificially created by using nylon nets of different mesh sizes and colours. Fifty percent shade and application of 161 kg N/ha independently as well as in combination gave the maximum fresh yield of Bangladhonia. β-carotene and vitamin C contents in Bangladhonia leaves were maximum in full sun light (0%

shade) followed by 25 and 50% shade. Application of 161 kg N/ha produced the highest amount of β-carotene and vitamin C followed by 184 kg N/ha. The lowest amount of leaf fibre (1.30%) was recorded from 75% shade closely followed by 50% shade (1.76%), whereas the maximum amount of leaf protein was found at 50% shade. Application of 184 kg N/ha gave the highest amount of leaf protein and less leaf fibre that was followed by 161 kg N/ha. The results revealed that Bangladhonia performed better in terms of fresh yield and quality under 25-50% shade condition.

Keywords: Bangladhonia, shade, nitrogen, yield, quality.

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SOCIO-ECONOMIC ASSESSMENT OF WHEAT VARIETY SHATABDI IN SOME SELECTED AREAS OF BANGLADESH

M. ELAHI BAKSH, MD. JAHANGIR KABIR AND MRS. KALPONA KISPATTA

Abstract

The survey was conducted in two villages under Dinajpur and Thakurgaon Districts during March 2004 to assess the socioeconomic aspects of Shatabdi wheat variety adoption at farm level. Stratified random sampling technique was followed for farmer selection. All categories of farmers expected wheat varieties having high yielding potentialities with less disease and pest infestation, more heat tolerant, and bold grain with golden colour. New wheat variety Shatabdi is able to meet the maximum expected characters. Old variety Kanchan was more disease susceptible and new one was free from disease. A significant yield difference was found between new and old verities (Shatabdi yielded 3l% to 43% higher compared to Kanchan over the locations and farmers group). Gross margin (return over variable cost) of Shatabdi also higher compared to Kanchan. By cultivating new variety, farmers earned additional gross margin of Tk. 6446 to Tk. 8353 per hectare in Jagdal and Tk. 6097 to Tk. 9314 per hectare in Daulatpur over Kanchan. Cent percent farmers over the locations said that their income was increased by cultivating Shatabdi compared to old variety Kanchan. The non-adopter farmers wanted new variety seeds. All groups of farmers wanted training/video show for up-dating their technical know how.

Keywords: New vs old varieties; profitability level, farmers' adoption.

Bangladesh J. Agril. Res. 34(2) : 227-232, June 2009

EFFECT OF MULCHING METHOD AND PLANTING TIME ON THE YIELD AND YIELD ATTRIBUTES OF TOMATO IN HILL SLOPE

Z. A. FIROZ, M. M. ZAMAN, M.S. UDDIN AND M. H. AKAND

Abstract

An experiment was conducted at the Hill Agricultural Research Station, Khagrachari from September 2002 to February 2003 to find out the effect of mulching method (Mulching one month before planting, mulching just after planting and no mulching) and planting times (01 October, 16 October and 01 November) on the yield and yield attributes of tomato in hill slope. The highest yield (21.43 t/ha) was obtained from plant where mulch was given one month before planting. Among three planting times, the highest yield (15.27 t/ha) was obtained from 01 October planting. In case of combined effect, mulching one month before planting with 01 October planting produced the highest yield (28.06 t/ha) of tomato in hill slope.

Keywords: Mulching, planting time, tomato yield, hill slope.

Bangladesh J. Agril. Res. 34(2) : 233-238, June 2009

EFFECT OF PLANT GROWTH REGULATORS ON GROWTH AND YIELD OF MUKHI KACHU

MD. MOSLEH UD-DEEN

Abstract

An experiment was conducted with different concentrations of plant growth regulators to evaluate their effects on the growth and yield of late planted Mukhi Kachu *(CoIocsis esculenta).* Different treatments of uniconazole (growth retardant) showed significant influence on plant height, petiole length, number of leases per plant, weight of leaf and weight of petioles per hill, number and weight of corms and cormels per hill and yield of cormel. GA_3,

(growth promoter) enhanced foliage growth, flowering, and cormel development.

Keywords: Growth regulators, Mukhi Kachu *(Colocusis esculenta)* and yield.

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RESPONSE OF GARLIC TO ZINC, BORON AND POULTRY MANURE APPLICATION

S. NASREEN, M. N. YOUSUF, A. N. M. MAMUN
S. BRAHMA AND M. M. HAQUC

Abstract

Response of garlic (var. BARI Garlic-2) to zinc, boron, and poultry manure application along with a blanket dose of 150 kg N, 50 kg P, 100 kg K, and 40 kg S/ha was evaluated through field trials in the Grey Terrace Soil under AEZ 25 (Level Barind Tract) at Spices Research Centre, Bogra during two consecutive *rabi* seasons (2005-2006 and 2006-2007). Application of zinc, boron, and poultry manure significantly had increased plant height, number of leaves/plant, cloves/bulb, diameter, and weight of bulb and yield/ha in both years. The highest bulb yields of 6.10 t/ha in 2005-2006 and 6.23 t/ha in 2006-2007 were obtained from the Zn_5B_1 kg/ha plus 5 t/ha poultry manure treatment and it was significantly higher over all other treatments. Next to it, the treatment Zn_5B_1 kg/ha plus 2.5 t/ha poultry manure gave the highest bulb yield (5.99 t/ha in 2005-2006 and 6.00 t/ha in 2006-2007). The highest gross margin of Tk. 230594/ha in 2005-2006 and Tk. 234095/ha in 2006-2007 along with lower marginal rate of return (65 and 163%) were obtained with Zn_5B_1 kg/ha plus 5 t/ha poultry manure treatment. This treatment was not economical because of the higher cost involvement. Application of Zn at 5 kg/ha along with blanket dose of N, P, K, and S fertilizers would be profitable (MRR of 5650% in 2005-2006 and 1562% in 2006-2007) for garlic cultivation in the Gray Terrace Soil of Shibgonj, Bogra.

Keywords: Garlic, zinc, boron, poultry manure.

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CORRELATION AND PATH COEFFICIENT ANALYSIS IN FAT AND FATTY ACIDS OF RAPESEED AND MUSTARD

M. S. ISLAM, L. RAHMAN AND M. S. ALAM

Abstract

Twenty-two genotypes of *Brassica (B. rapa, B. juncea,* and *B. napus)* were studied for correlation co-efficient between major fatty acids and path co-efficient analysis to partition the cause and effect relationship into direct and indirect components. Correlation coefficient of major fatty acids revealed that significant and positive correlation was between palmitic and oleic acids, palmitic and linoleic acids, palmitic and cicosenoic acids, oleic and eicosenoic acids, linoleic and linolenic acids and eicosenoic and erucic acids, while significant and negative correlation was observed between palmitic and erucic acids, stearic and linolenic acids and oleic and erucic acids. Path coefficient revealed that direct effect of all fatty acids except palmitic acid on oil content was positive. Indirect effect of erucic acid through all other fatty acids except palmitic acid on oil content was negative, Indirect effect of palmitic acid via all other fatty acids except erucic acid was positive.

Keywords : Fat and fatty acids, rapeseed and mustard.

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EFFECTS OF MAGNESIUM ON THE PERFORMANCE OF POTATO IN THE TISTA MEANDER FLOODPLAIN SOIL

M.A.H. TALUKDER, M.B. ISLAM. S.M.A.H.M. KAMAL
M.A. MANNAF AND M.M. UDDIN

Abstract

The experiment was conducted in the farmers' field of the Farming Systems Research and Development (FSRD) site, Rangpur under Tista Meander Floodplain highland soils (AEZ # 3b) for three consecutive *rabi* seasons (2002-03 to 2004-05). The potato variety Cardinal was tested with 5 levels of magnesium

viz., 0, 5, 10, 15, and 20 kg/ha to observe its effects on potato and to find out the optimum and economic dose of Mg for potato. The three years' results revealed that magnesium had significant effects on tuber yield of potato. Significantly higher tuber yield (32.33, 31.63, and 28.03 t/ha in three successive years) was obtained from 10 kg/ha of Mg. Tuber yield tended to decrease with increasing rate of Mg beyond 10 kg/ha. Tuber yields increased over control by 18 and 31 % when magnesium was applied @ 5 and 10 kg/ha, respectively. Yield response to added Mg was quadratic in nature. The regression with Mg levels indicate that maximum tuber yield (30.32 t/ha) could be obtained at 13 kg/ha of Mg and the economic dose was also 13 kg/ha of Mg. Use efficiency of Mg was 512.25 kg tuber of potato per kg Mg per ha. After optimum level of Mg (13 kg/ha) tuber yield reduced by 3.83 kg for additional use of one kg Mg/ha.

Keywords: Potato, tuber yield, magnesium, use efficiency.

Bangladesh J. Agril. Res. 34(2) : 263-267, June 2009

EFFECTS OF PLANTING MATERIAL AND EARTHING-UP ON YIELD AND YIELD CONTRIBUTING ATTRIBUTES OF MUKHI KACHU

S.M.FAISAL, M.A.SALAM, M.S. ISLAM AND M.I. HOSSAIN

Abstract

An investigation was carried out at Agricultural Research Station, Pahartali, Chittagong during February to August 2002 to select suitable size of planting material and proper time of earthing-up to obtain higher yield of Mukhi Kachu. Three planting materials, primary corm (40g), half cut corm (20g), and secondary corm (10g) and four times of earthing-up, 1 month, 2 months, 3 months, and 4 months after planting were used. Different planting materials showed significant difference on weight of total corms/plot, weight of total cormels/plot and cormel yield. Different times of earthing-up showed significant effects on the parameters studied except no. of cormels/hill and weight of cormels/hill. The highest (3.71 t/ha) corm yield was obtained when primary corms were planted and earthing-up was done three months after planting. The combination of P1E (primary corm x 3 months after planting) gave the highest (8.37 t/ha) cormel yield.

Keywords : Mukhi Kachu, corm, cormel, planting material, earthing-up.

Bangladesh J. Agril. Res. 34(2) : 269-278, June 2009

IN VITRO PROPAGATION OF BANANA

M REZAUL KARIM, M. A. MALEK, SAJIA RAHMAN
M. AL-AMIN AND M. RUHUL AMIN

Abstract

An *in vitro* technique for plant regeneration using meristem-derived plantlets of banana cv. BARI Kola-l *(Musa* sp.) has been developed. Highest number of shoot regeneration was noticed on basal media supplemented with 7.5 mgL^{-1} BAP + *0.5* mgL^{-1} NAA at 30 days after inoculation (DAI). The mean number of shoots significantly reduced when the concentrations of BAP and NAA in the medium was high. Regenerated shoots were rooted on half strength MS medium containing 0.5 mgL^{-1} IAA + 0.5 mgL^{-1} IBA at 30 DAI. *In vitro* raised plantlets were transferred to poly bags containing ground soil and cowdung mixture (1:1) for acclimatization and hardening in room temperature (28-30°C) and the established plantlets are ready for planting in the field.

Keywords: In vitro propagation, banana (*Musa* sp.).

Bangladesh J. Agril. Res. 34(2) : 279-285, June 2009

RESPONSE OF NITROGEN AND PLANT SPACING OF TRANSPLANTED AMAN RICE

K. M. SALAHUDDIN, S. H. CHOWHDURY, S. MUNIRA
M. M. ISLAM AND S. PARVIN

Abstract

An experiment was conducted during July-December 2001 at the Agronomy field laboratory, Bangladesh Agricultural University, Mymensingh to study the effect of nitrogen levels and plant spacing on the yield and yield contributing characters of transplant Aman rice (var. BRRI Dhan 31). Five levels of nitrogen (0, 50, 100, 150, 200 kg N/ha) and three spacings (25 cm x 20 cm, 25 cm

x 15 cm, 25 cm x 10 cm) were included as treatment variables. A gradual increase in panicle length (24.50 cm), grains/panicle 110) and grain yield (4.91 t/ha) were observed with the increase in nitrogen levels upto 150 kg/ha and declined thereafter. Thousand-grain weight was not significantly influenced by application of different levels of nitrogen. The maximum grain yield (4.22 t/ha) was observed at the spacing 25 cm x 10 cm closely followed by 25 cm x 15 cm (4.21 t/ha). Wider spacing (25 cm x 10 cm) produced the tallest plant (108.38 cm), but significantly highest tllers/hill (8.06) and grains/panicle were recorded from (25 cm x 20 cm). Plant spacing had also no significant effect on 1000-grain weight. The interaction effect of nitrogen and plant spacing was significant in panicle length, grains/panicle, and grain yield. The higher grain yield (5.00 t/ha) was recorded from the treatment combination of 150 kg N/ha and 25 cm x 15 cm spacing, but statistically identical to same N dose with other two spacings. Response of grain yield to added N was quadratic. The optimum doses were found to be 132 kg N/ha for 25 cm x 20 cm, 119 kg N/ha for 25 cm x 15 cm and 177 kg N/ha for 25 cm x 10 cm spacing, yielding 4.38, 4.63 and 4.75 t/ha, respectively.

Keywords : Nitrogen, plant spacing, *aman* rice, grain yield.

Bangladesh J. Agril. Res. 34(2) : 287-301, June 2009

AGROBACTERIUM-MEDIATED GENETIC TRANSFORMATION OF TWO VARIETIES OF *BRASSICA:* OPTIMIZATION OF PROTOCOL

M. M. A. KHAN, A. B. M. A. H. K. ROBIN, M.A.N. NAZIM-UD-DOWLA, S. K. TALUKDER AND L. HASSAN

Abstract

Two rapeseed varieties, namely Tori-7 and BARI Sarisha-8, respectively, from *Brassica rapa* and *Brassica napus* were selected to observe the transformation ability. Petioles were inoculated in *Agrobacterium tumefaciens* strain LBA 4404 carrying a binary vector pBl2l with *GUS* (reporter) and *nptII* (kanamycin resistant) gene. The transformation experiment was performed by optimizing two important factors: preculture time and co-cultivation time and also selected out the best variety. Infection was most effective when explants were pre-cultured for 72 hours (80% GUS positive). and co-cultivated for 72 hours (72% *GUS* positive). The variety Tori-7 showed the best response to *GUS* assay (65% *GUS* positive). Callus induction was the highest in Tori-7, which were 6% with 72 hours of preculture period and 9% in 48 hours of co-cultivation. Number of putative transformed plantlets were highest in Tori-7 (7 plants) followed by BARI Sarisha-8 (3 plants).

Keywords: Transformation, *Brassica, GUS, Agrobacterium.*

Bangladesh J. Agril. Res. 34(2) : 303-311, June 2009

EFFECTS OF SEED TREATMENT AND SOIL APPLICATION WITH SOME INSECTICIDES ON STEMFLY AND POD BORERS ON MUNGBEAN

M. A. ZAHID, M, A. I. SARKER, M. M. ISLAM, M. A. HOSSAIN AND M. R. BEGUM

Abstract

For controlling stemfly *(Opheoniyia phaseoli)* and pod borers *(Helicoverpa armigera & Maruca vitrata* of mungbean insecticides *Carbofuran*, Carbosulfan, and Phenyl Pyrazol were applied as seed treatment and soil application during *kharif* II season (August to December) in 2004 and 2005 at Burirhat, Rangpnr. In two years, stemfly infested 86.67-93.33 percent rnungbean plants and caused 26.90-27.09 percent stem tunneling in untreated plots. Carbofuran in both seed treatment and soil application had similar effect on stemfly resulting 1.4 to 7.0 and 1.4 to 4.57 times less damage and stem tunneling, respectively, than the control. Pod borer damage did not differ significantly among the treatments in 2004, but differed in the second year. The yield of mungbean was significantly higher by the soil application of Corbofuran followed by the seed treatment by the same insecticides. But soil application of Carbofuran proved to be economical.

Keywords: Seed treatment, soil application, insecticides, stemfly and pod borers, mungbean.

Bangladesh J. Agril. Res. 34(2) : 313-322, June 2009

EFFECTS OF NITROGEN FERTILIZER AND ELEVATED CO_2 ON DRY MATTER PRODUCTION AND YIELD OF RICE CULTI VARS

M. A. RAZZAQUE, M. M. HAQUE, M. A. HAMID, Q. A. KHALIQ AND A. R. M. SOLAIMAN

Abstract

A pot experiment was conducted at Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur during the year 2003 to find out the dry matter production and yield of rice cultivars under different nitrogen levels and growing conditions. Thirty-day old single seedlings were transplanted in pot and were placed in 3 growing conditions, such as i) Open top chamber (OTC) with elevated CO_2 (570 ± 50 ppm), ii) OTC with ambient CO_2 (360 ± 50 ppm), and iii) open field condition. The three nitrogen levels used were, i) control, ii) optimum dose, and iii) supra optimum dose. Three rice cultivars used in the experiment were, i) BRRI dhan 39, ii) Khashkani, and iii) Shakkarkhora. Rice yield and dry matter production respond significantly to different environments. Increasing atmospheric CO_2 increased grain yield. Stem dry weight, leaf dry weight, leaf sheath dry weight and root dry weight were increased in elevated CO_2 than ambient CO_2 and field condition. BRRI dhan 39 gave highest yield (50.82 g/plant) at supra optimum N level in elevated CO_2 Local variety gave similar result under elevated CO_2 in optimum and supra optimum N levels. The lowest yield (15.09 g/plant) was produced by Shakkorkhora in field condition with no nitrogen application.

Keywords: Nitrogen, elevated CO_2, yield and dry matter.

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GLIRICIDIA LEAVES DECOMPOSITION: THE EFFECT OF PARTICLE SIZE ON MICROBIAL RESPIRATION

B.C. WALPOLA, K.K.I.U. ARUNA KUMARA, A.P. SENANAYAKE AND S.D. WANNIARACHCHI

Abstract

Legume leaves used as green manure are a potential alternative to commercial fertilizers for non-legume crop production. Therefore, many researches have been conducted to understand the pattern of legume leaf decomposition and its release of nutrients. A study on *Gliricidia* leaves decomposition was conducted under laboratory conditions to elucidate the effect of grinding size of *Gliricidia* leaves ($S_1 = \leq 0.5$ mm, $S_2 = 4$ mm, and $S_3 = 9$ mm) on microbial respiration and N mineralization after incorporation in to the soil. The early stages of the incubation were found to be significantly influenced by the particle size of the *Gliricidia* leaves. Particle size S_2 (4 mm) was reported to exhibit the highest C and NH_4+N mineralization. However, in the case of NO_3+N mineralization, no treatment was found to be significant. It could thus be hypothesized that physical protection of finely ground (< 0.5 mm) *Gliricidia* leaves was responsible for the relatively low rates of decomposition.

Keywords: Decomposition, mineralization, *Gliricidia* leaves.

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VARIATION OF GRAIN GROWTH OF WHEAT CULTIVARS

S.K. ADHIKARY, M.Z. ALAM AND N.K. PAUL

Abstract

An experiment was carried out to study the grain growth pattern of wheat *(Triticum aestivum* L.) cultivars and to find out association and linear regression of spike weight and grain weight with time. Spike characters indicated that cultivar differences were significant in all the cases with a few exceptions. Linear regression and correlation coefficients revealed that the association between both spike weight and grain weight with time were highly positively significant among the cultivars but their regression coefficients were non- significant.

Keywords: Grain growth, correlation, regression, wheat.

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GROWTH AND YIELD COMPONENTS OF WHEAT GENOTYPES EXPOSED TO HIGH TEMPERATURE STRESS UNDER CONTROL ENVIRONMENT

M. ATAUR RAHMAN, JIRO CHIKUSHI, SATOSHI YOSHIDA AND A. J. M. S. KARIM

Abstract

High temperature stress during grain-filling period is one of the major environmental constraints limiting the grain yield of wheat in Bangladesh. Crop growth response and relative performance of yield components of ten wheat genotypes were studied in two temperature conditions in glass rooms in a Phytotron to identify the genotype tolerant to high temperature stress. A favourable day/night temperatures of 15/10, 20/15, and 25/20 ^{0}C were maintained from sowing to 60 days after sowing (DAS), 61 to 80 DAS and 81 DAS to maturity, respectively, in one glass room (G_1); whereas day/night temperatures in another glass room (G_2) was always maintained at 5^{0}C higher than that of G_1. Green leaf area and number of tillers in different times, number of days for the occurrence of major crop growth stages, relative performance in yield components, grain yield and heat susceptibility index were estimated following the standard methods. The higher temperature enhanced plant growth, flowering, and maturation. Thus the number of days to booting, heading, anthesis, and maturity of wheat were significantly decreased that varied among the genotypes. Green leaf area and productive tillers/plant were drastically reduced in time under high temperature. The reduced number of grains/spike and smaller grain size resulted from drastic reduction in growth duration were responsible for the yield loss of wheat at high temperature. Out of ten wheat genotypes, three were characterized as high temperature tolerant based on their relative performance in yield components, grain yield and heat susceptibility index.

Keywords: High-temperature tolerance, wheat genotype, growth and yield components.

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STUDY ON PHENOLOGY AND YIELDING ABILITY OF BASMATI FINE RICE GENOTYPES AS INFLUENCED BY PLANTING DATE IN AMAN SEASON

M.A. MANNAN, M.S.U. BHUIYA, S.M.A. HOSSAIN AND M.I.M. AKHAND

Abstract

The experiment was conducted at the Bangladesh Rice Research Institute Farm, Gazipur in Aman season to determine the optimum time of planting and to find out the genotypes having high yield potential. Fine rice genotypes Basmati PNR, Basmati 370, Basmati 375, and Basmati-D were transplanted from 22 July and continued upto 7 October at an interval of 15 days both in 1999 and 2000. Thirty-day old seedlings were transplanted at a spacing of 20 cm **x** 15 cm. The tallest plant was found in the early-planted crop at maturity. Crop planted from 7 August to 7 September gave more number of tillers per m^2, panicles per m^2 and grains per panicle which resulted in higher grain yield. Compared to the 22 August planting, grain yield decreased by 11, 10, 10, 26, and 61 percent, respectively, when the crop was planted on 22 July, 7 August, 7 September, 22 September, and 7 October. The growth duration of the genotypes decreased with the advancement of planting date. Among the genotypes, Basmati PNR gave maximum grain yield followed by Basmati-D due to more number of panicles and lower percentage of spikelet sterility. The lower grain yield was found in Basmati 370 irrespective of planting date due to lower number of panicles and high percentage of spikelet sterility. The Basmati PNR matured 5-12 days earlier than the rest of the test genotypes. Thus, fine rice Basmati PNR and Basmati-D were most suitable to obtain higher grain yield when planted within 17-21 August.

Keywords: Basmati rice, time of planting, Aman season.

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IN VITRO ORGANOGENESIS OF LATIRAJ

M. J. HOSSAIN

Abstract

In vitro organogenesis of a lowland species of *Colocasia esculenta* sp. *esculenta* L. cv. Latiraj was assessed in relation to explant types (meristem, parenchymatous tissues and storage tissues); three levels of each of NAA, BAP, Kn, and 2,4-D; four culture environments, such as 16h 3000 lux light intensity, 24±2°C, 24h dark + 24±2°C, 24h dark + 30±3°C, and 12h diffuse light + 30±3°C. Only isolated meristem and parenchymatous tissues regenerated plants with various degree of morphogenic intensity with different combinations of growth regulators. Meristem under both light and dark and at 24±2°C with upto Kn 3.0 + NAA 3.0 showed proliferation with poor rate of growth, while Kn 1.0+ NAA 3.0 had comparatively good response. The parenchymatous tissues with above environments responded very quickly with varying degree of growth intensity. Kn+2,4-D was found least effective on regeneration from any explants. NAA and BAP had an effect on proliferation of shoot, root and other growth characters from both meristem and parenchymatous tissues under both light and dark conditions at 24±2°C. This combination showed a very high degree of proliferation and caused callusing to some extent when cultured at dark which developed shoots and roots quickly after transferring to light. Except NAA+BAP, no other combination formed stolon. The white colour storage tissues after 30 days turned yellowish followed by greenish with shiny pimples after 50 days indicating that the cultures with protocorm may be developed. Almost all the cultures under high temperature environments (30±3°C) neither survived nor proliferated. The meristems also died within 15-20 days, while others within 25-30 days. Thus, a temperature range of 30±3°C was in no way suitable for *in vitro* culture of lowland species of *Colocasia esculenta* cv. Latiraj.

Keywords: Organogenesis, auxins, cytokinins, meristem, parenchymatous tissues, storage tissues, *Colocasia esculenta* L. cv. Latiraj.

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PROBLEMS OF USUAL WEIGHTED ANALYSIS OF VARIANCE (WANOVA) IN RANDOMIZED BLOCK DESIGN (RBD) WITH MORE THAN ONE OBSERVATIONS PER CELL WHEN ERROR VARIANCES VARY FROM CELL TO CELL

MD. LUTFOR RAHMAN AND KALIPADA SEN

Abstract

It is well known that classical analysis of variance (ANOVA) is not suitable for heteroscedastic layouts. Weighted analysis of variance (WANOVA) is the only way to deal with such situations. Problems of usual WANOVA in Randomized. Block Design (RBD) with more than one observations per cell with interaction when error variances vary from cell to cell are discussed in this paper.

Keywords : Weighted analysis of variance, error variances, cell to cell.

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EFFECT OF DIFFERENT HOST PLANTS ON GROWTH AND DEVELOPMENT OF EPILACHNA BEETLE

M.S. HOSSAIN, A.B. KHAN, M.A. HAQUE, M.A.MANNAN AND C.K. DASH

Abstract

An experiment was conducted to study the effect of four different host plants viz., teasel gourd, bitter gourd, sponge gourd, and yard long bean on the growth and development of *Epilachna dodecastigma* Wied under laboratory condition. The number of eggs laid by female beetle was significantly highest feeding on teasel gourd leaves and lowest on yardlong bean leaves. Egg hatching was faster on yardlong bean and delayed on bitter gourd. The host plant, such as sponge gourd produced the large sized larvae, while large pupa and adult were developed by feeding teasel leaves. The smallest larvae, pupae, and adults were found on the consumption of yardlong bean leaves. Highest larval duration

was found on sponge gourd followed by bitter gourd and yardlong bean. Both larval and adult food consumption was highest on teasel gourd and lowest on yardlong bean. Considering the biological characteristics and leaf consumption, the plant teasel gourd appeared to be the best host plant for *E. dodecastigma.*

Keywords: Host plant, growth and development, *Epilachna dodecastigma*, leaf consumption.

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EFFECT OF DIFFERENT LEVELS OF NAA ON *IN VITRO* GROWTH AND DEVELOPMENT OF SHOOTS OF *DENDROBIUM* ORCHID

M. S. PARVIN, M. E. HAQUE, F. AKHTER, MANIRUZZAMAN AND A.B.M. KHALDUN

Abstract

The present study was conducted to investigate the effect of growth regulator NAA on *in vitro* shoot proliferation, rooting, and plantlet establishment of *Dendrobium orchid*. Among the different concentrations of NAA, the best increase in shoot weight (0.25 g) and shoot number (8.83) were observed from 0.1 mg/I NAA. The highest shoot length (2.60 cm), number of leaves (4.83), number of roots (5.15), and root length (2.67 cm) were obtained with 0.2 mg/I NAA at 60 days after transplanting.

Keywords : *Dendrobium orchid*, NAA, MS media.

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EFFECT OF IRRIGATION FREQUENCY AND FUNGICIDE SPRAY ON YIELD AND DISEASE INFECTION OF ONION

S.K. BISWAS, M.A. RAZZAQUE AKANDA, M. RAFI UDDIN AND P. K. SARKER

Abstract

A two-year field experiment was conducted at Regional Agricultural Research Station, Jessore during the *rabi* seasons of 2002—2003 and 2003-2004 to find out the level of disease incidence under different levels of irrigation and fungicide spray on the bulb yield of onion. Four irrigation levels: no irrigation (I_1), irrigation at 10 days interval (I_2), 20 days interval (I_3), and 30 days interval (1_4) with 4 spray schedules: no spray (F_1), one spray at 40 days after transplanting (DAT) (F_2), two sprays each at 40 and 55 DAT (F_3) and three sprays each at 40, 55, and 70 DAT (F_4) were used. Yield and yield attributes varied significantly ($p = 0.05$) between sprayed and unsprayed, and irrigated and non-irrigated treatments, respectively. Higher yields were obtained with the higher frequencies of irrigation and spray. Application of fungicide reduced the disease severity significantly, while irrigation had no significant effect on disease infection. But there was a decreasing trend of the disease severity with increasing irrigation frequency. The highest bulb yield of onion (12.45 t/ha) was obtained with a total water use of 245 mm in six applications including an effective rainfall of 16 mm and three sprays. The disease severity between sprayed and unsprayed plots ranged from 1.33 to 3.16 for I_1, 1.08 to 2.33 for I_2 1.16 to 2.83 for I_3, and 1.16 to 3.00 for I_4, respectively.

Keywords: Onion, disease incidence, irrigation, water use efficiency.

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EFFECT OF SEED TREATMENT AND FOLIAR SPRAY WITH FUNGICIDES IN CONTROLLING BLACK POINT DISEASE OF WHEAT

P.K. MALAKER AND I.H. MIAN

Abstract

The efficacy of seed treatment and foliar spray with fungicides in controlling black point incidence of wheat seeds was evaluated in the field. Two seed treating fungicides, namely Vitavax-200 and Homai-80WP were used @ 0.25% of dry seed weight and foliar spray with Tilt-250EC (0.05%) was applied in six different schedules. Untreated and unsprayed controls were also maintained. Seed treatment with either Vitavax-200 or Homai-

80WP significantly increased plant population and grain yield, but none of them was found effective in reducing black point incidence. On the other hand, foliar sprays with Tilt-250EC under all the spray schedules except spraying at 70 and 90 days after sowing (DAS) significantly minimized the disease severity over unsprayed control. Among the different spray schedules, spraying at 30, 40, 50, 60, 70, 80, and 90 DAS appeared to be most effective, which was similar to spraying at 30, 45, 60, 75, and 90 DAS in reducing black point incidence and increasing grain yield. Economic analysis on yield advantage showed that the highest additional gross margin of Tk. 6120/ha with BCR 2.57 was obtained from five sprays applied at 30, 45, 60, 75, and 90 DAS.

Keywords: Seed treatment, foliar spray, black point, wheat.

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EFFECT OF DIFFERENT LEVELS OF NPK FERTILIZERS AND IRRIGATION ON YIELD AND NUTRITIVE QUALITY OF MULBERRY LEAF

N. K. PAUL AND M. A. QAIYYUM

Abstract

Experiment was conducted at the research field of Bangladesh Sericulture Research and Training Institute, Rajshahi in 2001-2002 and 2002-2003 to investigate the effect of NPK fertilizers and frequency of irrigation on leaf yield, yield components and leaf quality characters of three mulberry varieties. Four levels of NPK fertilizers and three levels of irrigation were adopted. The treatments comprising 300 kg N, 150 kg P, and 100 kg K/ha/yr along with two irrigations in a month was found to be the best for higher leaf yield, leaf moisture and leaf nutrient contents of mulberry plants (var. BM-3).

Keywords: Mulberry, NPK fertilizers, irrigation, nutritive quality.

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EFFECT OF DEHAULMING ON YIELD OF SEED POTATOES

A. A. MAHMUD, SAJEDA AKHTER, M. J. HOSSAIN, M. K. R. BHUIYAN AND M. A. HOQUE

Abstract

The yield of seed size tubers was assessed in five standard potato cultivars (Cardinal, Multa, Ailsa, Heera, and Dheera) in relation to dates of dehaulming (65, 70, and 80 days after planting) in a Seed Potato Production Farm, Debijong, Panchagarh during 1996-97 and 1997-98. Dehaulming at 70 days gave maximum seed size tubers (19.75 t/ha ≈ 76%) but significantly identical to 75 days (19.56 t/ha ≈70%) and 80 days (18.69 t/ha ≈ 63%). Considering all the parameters studied, the performance of Heera proved to be best among the cultivars grown. Among the cultivars, the maximum seed tuber yield was recorded from Cardinal at 80 DAP (days after planting) followed by Heera and Cardinal at 70 DAP, Dheera and Ailsa at 75 DAP. In general, most of the cultivars gave the maximum seed tuber yield when the crop was dehaulmed at 70 and 80 DAP and the lowest from 65 DAP.

Keywords: Dehaulming, potato, seed production.

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IN VITRO CALLUS INITIATION AND REGENERATION OF POTATO

A. U. HAQUE, M. A. SAMAD AND T. L. SHAPLA

Abstract

The first experiment involving different explants and concentrations of 2,4-D and kinetin showed highly significant differences for length and weight of callus formed except interaction of callus weight. Leaf explant appeared to be best of all for callus length and weight when 1.0 mg/L 2,4-D + 0.25 mg/L kinetin concentration was used. Similarly, different explants versus different concentrations of BAP/GA_3/IAA showed

significant differences for shoot length and leaf number per plantlet and also for root length. However, interaction term confirmed node and node/internode explants produced better results in shoot length and number of leaves per plantlet when concentrations 1 .0 mg/L BAP + 0.1 mg/L GA_3 and 1.0 mg/L BAP + 0.2 mg/L GA_3, 1.0 mg/L BAP + 0.4 mg/L GA_3, respectively, were used. Similarly, internode explants produced better results for root length after 21 days plantlet^{-1} when concentration of 1.0 mg/L IAA + 0.25 mg/L GA_3 was used. Shoot tip explants also produced better results in root length after 28 days plantlet^{-1} when concentrations 1.0 mg/L IAA + 0.25 mg/L GA_3 were used.

Keywords: *In vitro*, callus initiation, regeneration, potato.

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SEED QUALITY DETERIORATION DUE TO TEMPORAL VARIATION OF BIOTIC AND ABIOTIC FACTORS IN CUCUMBER

A.B.M. KHALDUN AND MD. EHSANUL HAQUE

Abstract

Cucumber seeds were taken to assess the effect of temporal variation on the seed quality. Seeds were stored in three types of containers, such as metal (tin), polythene bag, and cloth bag. The containers were stored at room temperature and ambient relative humidity around three months. Seed quality factors viz., moisture content, germination percentage, vigor index, percentage of abnormal seedling, fresh seed, dead seed, hard seed, root-shoot ratio and amount of dry matter were recorded every 15 days interval. The initial moisture content of seed in tin, poly bag, and cloth bag were 10.66%, 10.13%, and 9.89%, respectively, but it was increased with increasing storage time after 60 days (11.08%, 10.67%, and 10.98%). The germination percentage was higher at 15 days after observation (DAO) for different containers like tin (90%), poly bag (86%), and cloth bag (85%) than after 60 DAO (86%, 84%, and 80%), respectively, on blotting paper substrate. The percentage of dead seed was increased from 2 to 10%, 5 to 12%, and 6 to 12% in tin container, poly bag, and cloth bag, respectively, from 15 DAO to 60 DAO. The vigor indexes of seedling were 14.58, 12.85, and 10.92 at 15 DAO in tin, poly bag, and cloth bag, respectively, which attained at 10.39, 10.26, and 10.08 at 60 DAO, respectively. The length of seedling was 25.85 cm, 25.15 cm, and 24.30 cm at 60 DAO in tin, poly bag, and cloth bag, respectively. Shoot-root ratio was found highest in tin container at 15 DAO (0.95) and lowest in cloth bag (0.70) at 60 DAO.

Keywords: Seed quality, cucumber, temporal variation, biotic and abiotic factors.

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HETEROSIS IN BOTTLE GOURD

A.K.M. QUAMRUZZAMAN, M.A. RASHID, M.A.T. MASUD AND M. NAZIM UDDIN

Abstract

Heterosis in bottle gourd was studied in a set of 13 F_1s with 26 parents. Results indicated highly significant differences for all the characters among the materials studied. Heterosis was higher for yield per plant, number of fruits per plant and individual fruit weight, medium in fruit length and fruit diameter, and lower in days to 1st harvest. Hybrids (F_1) 10 x 17 and 19 x 26 manifested highest heterosis over midparent (73.1%) and better parent (61.8%), respectively, for yield per plant.

Keywords : Heterosis, bottle gourd, hybrid.

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EFFECT OF FERTILIZER AND VARIETY ON THE YIELD OF SWEET POTATO

M.R. ALI, D.J. COSTA, M.J. ABEDIN, M.A. SAYED AND N.C. BASAK

Abstract

The field experiment was conducted during the *rabi* season of 2005-06 in the farmer's field of Multi-location Testing (MLT) site, Melandah, Jamalpur to evaluate the performance of sweet potato varieties as well as to determine the optimum dose of fertilizer of sweet potato. Two varieties of sweet potato viz., i) BARI Sweet

Potato-5 and ii) BARI Sweet Potato-7 and five fertilizer doses viz., i) Estimated fertilizer dose for average yield goal (EDI for average yield goal), ii) Integrated Plant Nutrient System (IPNS) basis fertilizer dose, iii) Fertilizer Recommendation Guide' 97, iv) Farmer's practice, and v) Control. The highest sweet potato yield was obtained from BARI Sweet Potato-7 with (IPNS) basis fertilizer doses (33.9 t/ha). The lowest sweet potato yield was obtained from BARI Sweet Potato-7 with control treatment. The highest gross return (112700 Tk./ha) and gross margin (10756 Tk./ha) was recorded from IPNS basis fertilizer treatment. The lowest gross return (40950 Tk./ha) and gross margin (40951) Tk./ha) was recorded from control treatment. But the cost and return analysis showed that the highest benefit cost ratio (24.95) and marginal rate of return (1452) was found from FRG/97 treatment due to lower additional cost.

Keywords: Fertilizer, IPNS, sweet potato varieties and yield.

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EFFECT OF MANAGEMENT AND SEED RATE ON THE PERFORMANCE OF WHEAT VARIETIES WITH VARYING SEED SIZES

M.A.Z. SARKER, P.K. MALAKER, M. BODRUZZAMAN AND N.C.D. BARMA

Abstract

An experiment was conducted with three wheat varieties of varying seed sizes at five seed rates in medium and high management at Wheat Research Centre, Dinajpur during 2004-05 Rabi season to determine the appropriate seed rates for the varieties under different management practices. On an average, high management increased grain yield by 18.4%, but the benefit-cost ratio (BCR) was higher in medium management. Higher grain yield was obtained from varieties Shatabdi (medium sized seed) and Prodip (large sized seed) compared to Sufi (small sized seed) in high management, whereas in medium management, all the varieties produced similar grain yield. Considering yield performance and BCR analysis, the seed rates of Sufi and Shatabdi might be 100 and 120 kg/ha, respectively, for both the managements. Seed rates of Prodip might be 120 and 140 kg/ha for medium and high management, respectively.

Keywords: Management, seed rate, seed size, variety.

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GENETIC DIVERSITY ANALYSIS IN *BRASSICA* VARIETIES THROUGH RAPD MARKERS

K. K. GHOSH, M. E. HAQUE, Ms. S. PARVIN, F. AKHTER AND M. M. RAHIM

ABSTRACT

This investigation was aimed at exploring the genetic diversity and relationship among nine *Brassica* varieties, namely BARI Sharisha-12, Agrani, Sampad, BINA Sharisha-4, BINA Sharisha-5, BARI Sharisha-13, Daulot, Rai-5, Alboglabra using Random Amplified Polymorphic DNA (RAPD) markers. In total, 59 reproducible DNA bands were generated by four arbitrary selected primers of which 58 (98.03%) bands were proved to be polymorphic. These bands ranged from 212 to 30686 bp in size. The highest proportion of polymorphic loci and gene diversity values were 37.29% and 0.1373, respectively, for BARI Sharisha-12 and the lowest proportion of polymorphic loci and gene diversity values were 8.47% and 0.0318, 8.47% and 0.0382 for BINA Sharisha-4 and Rai-5, respectively. A dendrogram was constructed using unweighted pair group method of arithmetic mean (UPGMA). The result of cluster analysis indicated that the 9 accessions were capable of being classified into 2 major groups. One group consists of BARI Sharisha-12, Agrani, Sampad, Daulot, Rai-5, Alboglabra. where Daulot and Rai-5 showed the lowest genetic distance of 0.049. And another group contains BINA Sharisha-4, BINA Sharisha-5, and BARI Sharisha-1 3, where BINA Sharisha-5 and BARI sharisha-13 showed genetic distance of 0.071.

Keywords: RAPD, Brassica, genetic distance, polymorphic band.

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GENOTYPIC VARIATION IN TRADITIONAL RICE VARIETIES FOR CHLOROPHYLL CONTENT, SPAD VALUE AND NITROGEN USE EFFICIENCY

MIAN SAYEED HASSAN, ABUL KHAIR, M. MOYNUL HAQUE
ABUL KALAM AZAD AND ABDUL HAMID

Abstract

Nitrogen % in both straw and grain, nitrogen uptake by straw and grain, total nitrogen uptake and physiological nitrogen use efficiency (PNUE) showed significant differences due to variable nutrient levels at maturity in traditional rice varieties. PNUE ranges from 40.58 to 49.88 (kg/kg N). Significantly higher PNUE without addition of nitrogen (Zero N) indicated the ability of utilization of the native nitrogen by traditional varieties. Traditional varieties produced 49.88 kg grain by the utilization of zero nitrogen treatment followed by 45.93 kg grain in cowdung (10 t/ha), while 40.58 kg grain by the application of 80 kg/ha nitrogen. The higher PNUE in zero nitrogen treatment confirmed the ability of producing similar yield level compared to added nitrogen treatment. Bashful chikon, might be important due to higher nitrogen content and Badiruzzman considered due to more straw nitrogen (0.71%). Barud also showed excellence with regards to PNUE and total nitrogen uptake. Leaf chlorophyll profile showed a very consistent level in all the varieties except Laichi. Soil plant analysis development (SPAD) value ranged from 34.06 to 41.69, while leaf nitrogen ranged from 2.99 to 3.49 %. SPAD value recorded over time showed four distinct patterns during 15 to 90 DAT.

Keywords : Genotypic variation, rice varieties, SPAD value, nitrogen use efficiency.

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MICROBIAL RESPIRATION AND NITROGEN MINERALIZATION IN SOIL AMENDED WITH DIFFERENT PROPORTIONS OF VERMICOMPOST AND COIR DUST

B. C. WALPOLA AND S. D. WANNIARACHCHI

Abstract

The effect of different combinations of vermicompost and coir dust on microbial respiration and nitrogen mineralization in soil was studied under laboratory conditions. Treatment with 75% vermicompost and 25% coir dust (T_2) demonstrated the highest carbon mineralization and $NH+_4$-N contents followed by treatment T_1 (100% vermicompost) and T_3 (50% vermicompost and 50% coir dust). Despite the varied NO_3-N contents at the initial stages of incubation, the NO_3-N content steadily increased for all the treatments at day 49 onwards. The highest NO_3-N content was observed in T_1 followed by that in T_2 and T_3. Such studies need be conducted under field conditions to reach a definite conclusion.

Keywords: Vermicompost, coir dust, mineralization.

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LEAD, CADMIUM AND NICKEL CONTENTS OF VEGETABLES GROWN IN INDUSTRIALLY POLLUTED AND NON-POLLUTED AREAS OF BANGLADESH

HABIB MOHAMMAD NASER, N. C. SHIL, N. U. MAHMUD
M. H. RASHID AND K. M. HOSSAIN

Abstract

The levels of lead (Pb), cadmium (Cd), and nickel (Ni) in spinach *(Spinacia oleracea)*, tomato *(Lycopersicon esculentum)* and cauliflower *(Brassica oleracea)* and in the rizosphere soils of the industrially polluted (Konabari, Gazipur; Keranigonj, Dhaka), and non-polluted (Bangladesh Agricultural Research Institute-BARI, Gazipur) areas were studied. Four samples from each area were collected during February 2008. Their concentrations varied with the metals and locations, showing the trend: Ni>Pb>Cd and directly polluted> indirectly polluted>non-polluted soils. The

order of the elements in spinach, tomato, and cauliflower and their concentration ranges in μg/g of dry weight were Ni (1.265-5.369), (2.031-4.957), (1.698-4.447); Pd (0.767-1.440), (1.027-1.968), (0.486-1.119); and Cd (0.559-1.40), (0.630-1.303), (0.506-0.782), respectively. Similarly, the order of the elements in rizosphere soils of spinach, tomato, and cauliflower and their concentration ranges in μg/g of dry weight were Ni (12.29-31.52), (13.67-31.98), (14.20-34.34); Pd (3.560-7.980), (3.900-8.447), (3.718-7.337); and Cd (1.473-3.760), (1.553-3.833), (1.640-3.670), respectively. Lead concentration was higher in tomato, followed by spinach and the least in cauliflower irrespective of the location. Cadmium and Ni concentration were found in the order of spinach>tomato> cauliflower, especially in the industrially polluted areas. Concentrations of metals in vegetable samples were related to their concentration in the corresponding soils. Lead, Cd, and Ni concentrations in the studied vegetables were higher than those found in vegetables from other countries, but they were lower than the maximum level allowed in India. Metal transfer factors from soil to vegetables are found to be significant for Cd, Pb and Ni.

Keywords: Cadmium, lead, nickel, polluted soils, vegetables.

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IN VITRO PROPAGATION OF POINTED GOURD (*Trichosanthes dioica* Roxb.) THROUGH ENCAPSULATED SHOOT TIPS

M. A. MALEK

Abstract

Plants were regenerated from encapsulated shoot tips of pointed gourd. Shoot tips isolated from multiple shoot cultures of AM-8 and AM-15 cultivars of pointed gourd were encapsulated in sodium alginate beads. For germination and shoot proliferation, encapsulated shoot tips (artificial seed) were cultured in MS basal medium containing different concentrations and combinations of BAP and NAA. Use of MS medium resulted in 90% conversion of encapsulated shoot tips into plantlets. The results exhibited that BAP and combinations of BAP and NAA play an important role in germination of artificial seed being encapsulated by sodium alginate beads. The plantlets were successfully established in earthen pot. Under the present study, limited experimental efforts have been made to establish the protocol for encapsulating the shoot tips for the production of artificial seed and their subsequent regeneration. It is the first report in Bangladesh in developing artificial seed production technique using vegetative tissue of pointed gourd.

Keywords: *In vitor* propagation, pointed gourd, shoot tips.

Bangladesh J. Agril. Res. 34(4) : 565-576, December 2009

EFFECT OF HARVESTING STAGES ON THE SEED QUALITY OF LENTIL (*Lens culinaris* L.) DURING STORAGE

A. KHATUN, G. KABIR AND M. A. H. BHUIYAN

Abstract

Laboratory experiments were carried out during August to September 2004 and 2005 at the Seed Technology Laboratory, Bangladesh Agricultural Research Institute, Gazipur, Bangladesh to determine the effects of harvesting stages on the seed quality of lentil. Lentil seeds of three varieties were harvested at three stages at 7-day intervals viz. i) when the pods were yellowish with a few yellow greens (H_1 stage), ii) when most of the pods were light brown with a few yellow (H_2 stage), and iii) when all the pods were completely brown and dry (H_3 stage). All the seeds were stored in earthen pot until conducting the laboratory study. Non-significant variation was observed in three varieties of lentil for most of the parameters studied. The highest germination percentage, root length, shoot length, seedling length and vigour index (vigour index-I and vigour index-Il) were observed in BARI Masur-4, and the lowest in BARI Masur-2. Harvesting stage had significant effect on some parameters studied. Seeds collected at the stage when most of the pods were light brown with a few yellow (H_2 stage) recorded the highest germination percentage, dry weight, root length, shoot length, seedling length and vigour index (vigour index-I and vigour-Il) in both the years. BARI Masur-4 seeds collected at H_2 stage recorded the highest dry weight and vigour index-I in both the years and vigour index-II in 2004.

Keywords: Lentil, harvesting stage, storage, seed quality.

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INTEGRATED APPROACH OF POND BASED FARMING SYSTEMS FOR SUSTAINABLE PRODUCTION AND INCOME GENERATION

M. ROBIUL ALAM, M. AKKAS ALI, M. AKHTAR HOSSAIN
M. S. H. MOLLA AND F. ISLAM

Abstract

Integrated farming with poultry, fish and crops can play a significant role in increasing manifold production, income, and nutrition and employment opportunities of rural populations. The research work was carried out at nine farmers' ponds covering area of 0.12 ha each in Farming Systems Research and Development (FSRD) site, Goyeshpur, Pabna during the year 2000-01 to 2002-03 to assess integrated pond based production, income and employment opportunity of the rural farm households. Three different components like fish, poultry and pattern based vegetables production were employed in the investigation. The results indicated that in integrated pond management, two additional enterprises viz., poultry and year round vegetables exhibited encouraging production over traditional management. The average fish production obtained from integrated pond management was 330.92% higher over the traditional management. The total economic return in terms of gross return and gross margin achieved from integrated pond management was Tk.59 133 and 38684 which were 1297.94 and 1496.53% higher over traditional pond management. The utilization of family labour round the year in pond based integrated production system contributed to improve the production as well as to create employment opportunity for income generation. The overall results revealed that the integrated pond management with poultry, fish and vegetables was an excellent approach for sustainable production, income generation and employment opportunity of the resource poor rural households.

Keywords: Pond based farming systems, production, income generation, employment opportunity.

Bangladesh J. Agril. Res. 34(4) : 585-595, December 2009

PERFORMANCES OF DIFFERENT HYBRID MAIZE *(Zea mays* L.) VARIETIES UNDER INTERCROPPING SYSTEMS WITH GROUNDNUT *(Arachis hypogaea* L.)

M.S. ALOM, N.K. PAUL AND M.A. QUAYYUM

Abstract

The experiment was carried out at Regional Agricultural Research Station, Bangladesh Agricultural Research Institute (BARI), Jessore to evaluate the performance of different varieties of hybrid maize under intercropping systems with groundnut in *rabi* seasons to find out the suitable intercropping system in increasing crop productivity and profitability of consecutive two years (2004 and 2005). Four sole crops of hybrid maize varieties (BHM-1, BHM-3, Pacific-11 and Pacific-984), one sole crop of groundnut (var. Jhingabadam) and eight intercropping systems of maize + groundnut under two planting methods viz., normal and paired row made 13 treatments were used. Treatments were arranged in a randomized complete block design with four replications. Among the intercropped treatments, four rows groundnut in between paired rows of hybrid maize var. Pacific-11 showed higher maize equivalent yield (13.56 t/ha in 2003-04 and 15.34 t/ha in 2004-05), groundnut equivalent yield (4.34 t/ha in 2003-04 and 4.91 t/ha in 2004-05), land equivalent ratio (1.54 in 2003-04 and 1.66 in 2004-05) as compared to other treatments.

Keywords : Hybrid maize varieties, intercropping systems, groundnut.

Bangladesh J. Agril. Res. 34(4) : 597-608, December 2009

ASSESSMENT OF IRRIGATION WATER QUALITY OF BOGRA DISTRICT IN BANGLADESH

M. S. ISLAM AND S. Z. K. M. SHAMSAD

Abstract

Some important physio-chemical parameters of surface and groundwater of Bogra District were evaluated for the criteria of

irrigation water quality. Forty four water samples were collected in the peak dry season (December-April) from different areas of Bogra District. The study revealed that temperature, pH, electrical conductivity (EC), total dissolved solids (TDS), sodium adsorption ratio (SAR), soluble sodium percentage (SSP), residual sodium carbonate (RSC), total hardness (Ht) and Kelly's ratio of waters were found within the permissible limits for irrigation purposes. Any initiative for surface and groundwater development for planned irrigation practices is highly encouraged.

Keywords: Irrigation water (surface and groundwater), quality, Bogra District.

Bangladesh J. Agril. Res. 34(4) : 609-622, December 2009

PERFORMANCE OF SEED POTATO PRODUCED FROM SPROUT CUTTING, STEM CUTTING AND CONVENTIONAL TUBER AGAINST PVY AND PLRV*

M. S. RAHMAN AND A. M. AKANDA

Abstract

The performance of seed tubers harvested from potato plants grown from sprout cutting, stem cutting and conventional seed tubers against PVY and PLRV were investigated. Sprout cutting, stem cutting and conventional seed tubers of variety Diamant were planted and second and third generation seed tubers were harvested. The least incidence of PVY and PLRV was recorded when seed tubers from sprout cutting were used. Whereas, the highest incidence of the viruses was observed where conventional seed tubers wete planted. Incidence of PVY, PLRV and their mixed infection was lower in earlier generations as compared to later generations. Performance of seed tubers produced from sprout cutting was better in respect of plant growth, tuber number and tuber yield per hill as compared to seed tubers obtained from stem cutting or conventional method.

Keywords: Sprout cutting, stem cutting, PVY, PLRV, growth, yield, potato.

Bangladesh J. Agril. Res. 34(4) : 623-631, December 2009

EFFECT OF PACKAGING TECHNIQUES AND CHLORINATION ON THE QUALITY AND SHELF LIFE OF COUNTRY BEAN (*Lablab niger*)

MOHAMMAD MIZANUR RAHMAN, MD. SHAHJAHAN
MD. MIARUDDIN AND MD. GOLAM FERDOUS CHOWDHURY

Abstract

The experiment was conducted to evaluate the effect of packaging materials on the quality and shelf life of country bean *(Lablab niger)* using passive modification of modified atmosphere packaging system. The modified atmosphere was created by making perforation in the packets made by polypropylene. Bean pre-treated with chlorine water and then packaging in selected polypropylene resulted substantial reduction in losses caused by weight loss and rotting/shriveling. These treatment combinations also considerably retained vitamin C, β-carotene, moisture content, etc. Under this condition, the retention of quality and shelf life of bean could be extended upto 8 days at ambient condition as compared to non-treated and without packaging.

Keywords : Packaging techniques, chlorination, shelf life, country bean.

Bangladesh J. Agril. Res. 34(4) : 633-643, December 2009

CONTRIBUTION OF RICE STRAW TO POTASSIUM SUPPLY IN RICE-FALLOW-RICE CROPPING PATTERN

P. K. SAHA, M. A. M. MIAH, A. T. M. S. HOSSAIN
F. RAHMAN AND M. A. SALEQUE

Abstract

A field experiment was conducted through 2001-2004 at the Bangladesh Rice Research Institute (BRRI), Gazipur Farm with a view to determining the contribution of rice straw to K supply and K-use efficiency for the next crop in Rice-Fallow-Rice cropping pattern. Two levels of chemical potassium-0 (K_0) and 66 kg K/ha (K_{66}) from muriate of potash (MoP)- were tested with or without straw incorporation. Results showed that the use of K either from inorganic fertilizer or from rice straw increased the plant height,

panicles/m^2, grain and straw yields of rice in both Boro and T. Aman seasons. However, the effect of K was more distinct in Boro season. On an average, 1.33 t/ha yield benefit of Boro rice was obtained with rice straw incorporation in K_0 plot. Application of K significantly increased the total K and P uptake of rice crops. Agronomic efficiency, partial factor productivity and physiological efficiency of K decreased with the increasing K level regardless of K sources in Boro season. Potassium replenishment through chemical fertilizer was not sufficient to balance K. However, incorporation of rice straw showed a positive K balance. Positive perceptible changes in soil characteristics and soil nutrient status (N, P and K) were observed due to K fertilization either from inorganic (MoP) or from organic sources.

Keywords: Contribution of rice straw application, K-supply, rice-fallow-rice cropping pattern.

Bangladesh J. Agril. Res. 34(4) : 645-659, December 2009

IN VITRO MICROPROPAGATION OF BANANA (*Musa spp.*)

MD. AL-AMIN, M. R. KARIM, M. R. AMIN, S. RAHMAN AND A. N. M. MAMUN

Abstract

The present study was conducted at the Biotechnology Laboratory, Biotechnology Division, Bangladesh Agricultural Research Institute (BARI), Gazipur during the period from September 2004 to June 2005 to investigate the effect of different concentrations of BAP and NAA on virus free plant regeneration, shoot multiplication and different concentrations of IBA and IAA on *in vitro* root formation of banana cv. BARI Banana-I. The culture meristem first turned brown in colour in 4-5 days which grew into a green globular hard coat mass after 30-35 days. From this ball like structure, adventitious plantlets were developed. Among the different concentrations, 7.5 mg/l BAP + 0.5 mg/l NAA showed highest shoot proliferation of 0.75, 2.75 and 6.25 shoots per explant at 10, 20 and 30 DAI, respectively. The longest shoot (1.03, 2.45 and 3.38 cm) at 10, 20 and 30 DAI, respectively, was produced by the treatment combination of 7.5 mg/l BAP + 0.5 mg/l NAA. The maximum number of leaves (2.50, 3.25 and 7.00 leaves/explant at 10, 20 and 30 DAI) were produced on the medium supplemented with the same treatment and it also produced the longest leaves, 0.85, 2.70 and 4.23 cm at 10, 20 and 30 DAI, respectively. For root initiation half strength MS medium supplemented with different levels of IBA (0, 0.5, 1 .0 and 1.50 mg/l) and IAA (0, 0.5 and 1.0 mg/l) was used. Root numbers varied with different concentrations of IBA and IAA. The highest number of roots were produced by 0.5 mg/l IAA + 0.5 mg/l IBA. The highest length (2.93, 4.63 and 5.88 cm) was recorded at 10, 20 and 30 DAI in the same treatment which was statistically significant. Meristem derived plantlets were transferred to poly bags containing 1:1 (ground soil : cowdung) mixture after 7 days hardening in room temperature (28-30°C) and established plantlet was ready for planting.

Keywords : Banana, regeneration, micropropagation, plantlet.

Bangladesh J. Agril. Res. 34(4) : 661-672, December 2009

EVALUATION OF SPAD AND LCC BASED NITROGEN MANAGEMENT IN RICE (*Oryza sativa* L.)

M.Sh. ISLAM, M. S. U. BHUIYA, S. RAHMAN AND M. M. HUSSAIN

Abstract

A study was conducted during Boro and T. Aman seasons of 2002 at Bangladesh Rice Research Institute (BRRI), Gazipur to see the relationship of SPAD (Soil plant analysis development) reading with chlorophyll and N contents of leaves and to determine the critical LCC (Leaf Colour Chart) value for rice crops. Hybrid varieties Sonarbangla-1 and BRRI hybrid dhan0l were used for both rice crops and BRRI dhan29 and BRRI dhan31 were used as checks for Boro and T. Aman crops, respectively. Sonarbangla-1, BRRI hybrid dhan0l and BRRI dhan29 had similar leaf chlorophyll contents in Boro season. The maximum chlorophyll content (1.6-1.8 mg/g leaf) was observed at 39-42 SPAD value. In T. Aman season, the inbred BRRI dhan3l showed lower amount of

chlorophyll (1.2-1.4 mg/g leaf) at 39-42 SPAD value compared to the hybrids Sonarbangla-1 and BRRI hybrid dhan 0l. Seasonal variation in chlorophyll content between Sonarbangla-1 and BRRI hybrid dhan0l was not large. Relationship between SPAD value and chlorophyll content was very close (R^2 =>0.8) at panicle initiation and flower initiation stages for all the varieties. Similar relationship was also observed in case of SPAD value and nitrogen content in leaves. The results indicated that the rice leaves showing higher SPAD readings (>35) had higher chlorophyll and nitrogen contents. The adjusted critical LCC values were 3.0 for Boro and 3.5 for T. Aman seasons for all rice varieties.

Keywords: Chlorophyll, nitrogen.

Bangladesh J. Agril. Res. 34(4) : 673-681, December 2009

SCREENING OF WHEAT GERMPLASM FOR THEIR SUSCEPTIBILITY AGAINST DIFFERENT SEEDLING DISEASES

M. U. AHMED, ABUL KHAIR AND I. H. MIAN

Abstract

Fifteen wheat germplasm, namely BAW-1033, BAW-l045, BAW-1056, BAW1061, BAW-1064, BAW-1004, BAW-l008, BAW-1027, BAW-1035, Sonalika, Gourob, Protiva, Shatabdi, Sourov and Kanchan (check) were screened against different seedling diseases in two consecutive years under inoculated condition. Before sowing, the soils of the experimental field were inoculated with five fungal pathogens, namely *Sclerotium rolfsii*, *Biplaris sorokiniana*, *Fusarium oxysporum*, *Pythium aphanidermatum*, and *Rhizoctonia solani*,. Considering the lower percent of diseased seedling and higher vigour index, four wheat germplasrn, namely Shatabdi, BAW-1045, BAW-1004 and Protiva were selected as tolerant materials against seedling diseases.

Keywords : Screening, wheat germplasm, seedling diseases.

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EFFECT OF IRRIGATION ON THE YIELD AND SCAB INFECTION OF POTATO

M. S. ISLAM, M. M. HOSSAIN, MD. SHARIFUL ISLAM AND M. A. HOSSAIN

Abstract

An experiment was conducted in Jamalpur during the Rabi seasons of 2004-2005 and 2005-2006 to investigate the yield and scab infection of potato variety Diamant under different irrigation frequencies and quantities. Three irrigation intervals, 7, 12 and 17 days along with three levels of water quantities equaling 50, 100 and 150% of depleted soil moisture were tested for yield and scab infection of potato tubers. It was observed in 2004-2005 that irrigation interval of 12 days and watering at 100% depletion of soil moisture produced the highest fresh and total yields of 24.64 t/ha and 27.56 t/ha, respectively, whereas irrigation interval of 7 days and watering at 150% of depleted soil moisture produced the lowest fresh and total yields (21.68 t/ha and 25.98 t/ha, respectively). In 2005-2006, irrigation interval of 12 days and watering at 100% depletion of soil moisture produced the fresh and total yields of 26.27 t/ha and 27.41 t/ha, respectively, and were not found statistically different from those obtained under water application of 150% depleted soil moisture and irrigation interval of 12 days. The scab infected tubers were found the highest 4.30 t/ha in 2004-2005 and 2.97 t/ha in 2005-2006 for water application of 150% depleted soil moisture and 7 days irrigation intervals. This indicates that scab disease is more susceptible to frequent and over irrigation.

Keywords: Irrigation interval, moisture depletion, scab disease.

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HAPLOID PLANTLET REGENERATION THROUGH ANTHER CULTURE IN OILSEED *Brassica* species

M. A. ALAM, M. A. HAQUE, M. R. HOSSAIN, S.C. SARKER AND R. AFROZ

Abstract

Anther of five varieties of *Brassica* species, namely BARI Shariaha-7, Tori-7, Agrani, Daulat and Safal were cultured *in vitro*

to observe their regeneration potentiality. Different concentrations and combinations of growth regulators were supplemented in MS medium. The range of callus induction was 12.50-87.50 %. Maximum callus induction (75.00%) was observed on MS +4 mg/L 2, 4-D + 1.0 mg/L BAP. Among the genotypes, BARI Sharisha-7 showed the highest percentage of callus induction (60.42%). Among the treatments, highest percentage of shoot regeneration (75.00%) was observed on MS + 4 mg/L BAP + 1.0 mg/L NAA. BARI Sharisha-7 also showed the highest rate of plant regeneration (66.67%). Root induction was highest (75%) on half strength MS medium supplemented with 1.0 mg/L IBA and 0.5 mg/L NAA. The plantlets with sufficient roots thus obtained were transferred successfully to plastic pots and subsequently to the field. BARI Sharisha-7 and Tori-7 survived easily in the pots as well as in the field but Safal was very poor in survivability both in the pots and in the field.

Keywords: *Brassica*, haploid, anther culture, *in vitro* regeneration.

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GENETIC DIVERGENCE ANALYSIS IN EGGPLANT *(Solanum melongena* L.)

A.K.M. QUAMRUZZAMAN, M.A. RASHID, S. AHMAD AND M. MONIRUZZAMAN

Abstract

Genetic divergence among 19 eggplant genotypes was estimated using Mahalanobis's D^2 statistic. Altogether five clusters were formed. Cluster I contained the highest number of genotypes (7) and cluster IV and V contained the lowest (2). The pattern of distribution of genotypes from different geographical locations into five clusters was random, demonstrating that geographical isolation may not be the only factor causing genetic diversity. The highest intra-cluster distance was observed for cluster V (1.067) and the lowest for cluster III (0.916). The highest inter-cluster distance was observed between cluster IV and V (10.748). Cluster V recorded the highest mean for plant height at last harvest (cm), leaf blade length (cm), leaf blade diameter (cm), leaf pedicel length (cm), fruit pedicel length (cm), prickle on calyx. Whereas, number of branches per plant, fruit diametre (cm), individual fruit weight (g), fruit yield (t/ha) and prickle on fruit pedicel were in cluster II with the highest means. Therefore, more emphasis should be given on cluster V for selecting genotypes as parents for crossing with the genotypes of cluster II which may produce new recombinants with desired traits.

Keywords: Genetic diversity, eggplant *(Solanum melongena* L.) and cluster analysis.

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IMPACT OF NITROGEN AND PHOSPHORUS ON THE GROWTH AND YIELD OF OKRA *[Abelmoschus esculentus* (L.) Moench] IN HILL SLOPE CONDITION

Z. A. FIROZ

Abstract

An experiment was conducted at the Hill Agricultural Research Station, Khagrachari from June to November 2004 to find out the effect of nitrogen (60, 80, 100 and 120 kg/ha) and phosphorus (80, 100 and 120 kg/ha) on the growth and yield of okra in hill slope condition during rainy season. The highest yield (16.73 t/ha) was obtained from 100 kg N/ha, which was statistically identical to 120 kg per hectare. In case of phosphorus, the highest yield of 15.77 t/ha was obtained from 120 kg P_2O_5/ha and was closely followed by the dose of 100 kg P/ha (4.73 t/ha). Considering the treatment combinations, the highest yield (19.22 t/ha) was produced by $N_{100}P_{120}$ and there were no significant variations among $N_{100}P_{100}$, $N_{120}P_{100}$ and $N_{120}P_{120}$. The highest gross return (Tk.193200) and net return (Tk.146l40) were obtained from $N_{100}P_{120}$. The BCR was also higher (4.08) under the same treatment combination.

Keywords: Nitrogen, phosphorus, okra growth and okra yield.

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POPULATION DYNAMICS OF MYCOFLORA AND INCIDENCE OF BLACK POINT DISEASE IN WHEAT GRAINS

P. K. MALAKER AND I. H. MIAN

Abstract

An attempt was made to monitor the prevalence of different fungi associated with floret lemma and developing grains of wheat and to assess the subsequent incidence of black point disease under different exposure periods of the spikes to airborne inocula of the causal fungi. Altogether 16 fungi representing 11 genera were detected from lemma and developing grains. The predominant fungi, in order of prevalence, were *A. alternata, B. sorokiniana, C. cladosporioides, C. lunata, Fusarium* spp. and *E. purpurascens.* Other fungi occurring less commonly were *A. triticina, C. pallescens, Nigrospora* sp., *Phoma* sp., *Chaetomium* sp., *B. tetramera, B. oryzae, Aspergillus flavus, A. niger* and *Doratomyces* sp. The incidence of all the fungi except *Fusarium* spp. was higher in lemma than in grains. In lemma, *A. alternata* occurred with the highest frequency, while the incidence of *B. sorokiniana* was found highest in grains. The population of *A. alternata, B. sorokiniana, C. lunata, E. purpurascens* and *Fusarium* spp. increased with the age of lemma and developing grains whereas the incidence of *C. cladosporioides* increased at early stages but declined at later stages of grain development. Other fungi did not follow any definite pattern in their incidence during grain development. The occurrence of black pointed grains per spike, percent black pointed grains and black point index were found increasing with the increase in exposure period of the spikes to airborne inocula of the causal fungi.

Keywords: Mycoflora, black point, wheat.

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EFFICACY OF MAHAPANCHA GAVYA (MPG) IN CONTROLLING DAMPING-OFF IN TOMATO CAUSED BY *PYTHIUM APHANIDERMATUM*

RAKESH KUMAR, INDRA HOODA AND S.S. KARWASRA

Abstract

Maha Pancha Gavya (MPG), a concoction made from five cow products was tested for its toxicity against *Pythium aphanidermatum (Edson) Fitz.* and its antagonists at 5, 10, 25, and 50% concentration in *in vitro* to find out if it can be used in integration for the control of damping-off in tomato in nursery beds. MPG was very effective inihibiting the growth of *P. aphanidermatum.* At the highest concentration, the growth of the pathogen was negligible. Isolates of *Trichoderma viride, T harzianum,* and *T. virens* were also sensitive to MPG at all the concentrations. Their radial growth decreased, but it was fluffy in nature and sporulated profusely. MPG was not toxic against two bacterial antagonists i.e., *Bacillus subtilis* and *Pseudomonas fluorescens.* Soil application of 10% MPG to nursery beds improved seedling stand and gave upto 48.27% tlisease control, which was more than that given by individual antagonists. However, MPG improved disease control efficacy of all the antagonists when it was used in combination with them. Integrated treatment with MPG and *B. subtilis* gave maximum disease control (65.33%). MPG enhanced seedling growth and it was more in combination with *T. viride* and *B. subtilis.* MPG in integration with neem cake and neem leaf extract gave complete control of damping-off and maxium increase in height of the tomato seedlings.

Keywords: Maha Panch Gavya (MPG), *Trichoderma, Pythium aphanidermatum,* integrated control, neem products, tomato, damping-off.

Bangladesh J. Agril. Res. 35(1) : 17-28, March 2010

FORECASTING OF WHEAT PRODUCTION IN BANGLADESH

Md. REZAUL KARIM, Md. ABDUL AWAL AND M. AKTER

Abstract

The present study was undertaken to find out appropriate model using seven contemporary model selection criteria that could best describe the growth pattern of wheat production in Bangladesh and its three major areas like Dmajpur, Rajshahi, and Rangpur districts during the time periods 1971-72 to 2004-05. It appeared from the study that the best fitted model for wheat production in Bangladesh, Dinajpur, Rajshahi, and Rangpur were quadratic, linear, and cubic model. It means that the assumption of constant annual rate of growth in percent that lies behind the use of exponential/compound model which is very common in describing growth pattern was not true for the growth pattern of wheat production in Bangladesh. In Dinajpur District, linear model seemed to be appropriate. Five-years' forecasts of wheat production in Bangladesh, Dinajpur, Rajshahi, and Rangpur districts in the year 2005/06 were 1.55, 0.31, 0.24, and 0.37 million tons, respectively, with a 95 percent confidence interval. The analysis found that if the present growth rates continue then the wheat production in Bangladesh, and Dinajpur, Rajshahi, and Rangpur districts would be 1.54, 0.35, 0.31, and 0.59 million tons, respectively, in the year 2009/10.

Keywords: Forecasting, wheat production in Bangladesh.

Bangladesh J. Agril. Res. 35(1) : 29-36, March 2010

DIVERSITY ANALYSIS IN BORO RICE *(ORYZA SATIVA* L.) ACCESSIONS

M.S. AHMED, KHALEDA AKTER, M. KHALEQUZZAMAN
E.S.M.H. RASHID AND M.K. BASHAR

Abstract

An experiment was conducted with 36 accessions of traditional (local) *boro* rice germplasm accessions of three different groups (20 accessions as Kaliboro, 12 as Jagliboro and 4 as Tepiboro) during Boro season 2004 at BRRI farm to identify the duplicates with the help of morph-agronomic characters. On the basis of D^2 values, the 36 genotypes were grouped into six clusters with a range of intra (0.00 for cluster II to 1.78 for cluster I) and inter cluster (1.99 between cluster I and III to 21.20 between cluster II and III) distances. Cluster I comprised the highest number of genotypes (10) and cluster II the lowest (1), while cluster III, IV, V, and VI included 6, 7, 5, and 7 genotypes, respectively. Differences in cluster means existed for almost all the characters. The highest mean value for seedling height (21.68 cm), 1000-grain weight (20.97 g) and grain yield/hill (6.87 g) were observed in cluster I, II for days to 50% flowering (116), panicle length (22.80 cm), grains/panicle (74), and grain length (8.35 mm), cluster IV for tillers/hill (16.44) and panicles/hill (14.17), cluster V for harvest index (0.32) along with cluster I and VI, and cluster VI for plant height (117.17 cm) and flag leaf area (30.68 cm^2). None of the 12 characters had the highest mean value under cluster III. The canonical variate analysis showed in general that the important characters for the differentiation in the descending order of importance were grain length, days to 50% flowering, grains/panicle, grain yield/hill, panicle length, flag leaf area, plant height, seedling height, 1000-grain weight, panicles/hill, harvest index, and tillers/hill, but the similar name group accessions are not duplicate mainly due to dissimilarity of grain length, days to 50% flowering, grains/panicle and grain yield/hill characters. It is apparent from the results that the same name group accessions were quite different from each other.

Keywords: Duplicate sorting, rice *(Oryza sativa* L.), germplasm.

Bangladesh J. Agril. Res. 35(1) : 37-50, March 2010

GROWTH AND YIELD PERFORMANCE OF DIFFERENT GENERATIONS OF SEED POTATO AS AFFECTED BY PVY AND PLRV

M. S. RAHMAN, A. M. AKANDA, I. H. MIAN
M. K. A. BHUIAN AND M. R. KARIM

Abstract

Performance of potato seed tubers of first, second, third, fourth, and fifth generations were evaluated against PVY and PLRV.

Potato plants grown from first generation seed tubers were free from PVY infection. Incidence of the virus was the minimal at second generation, which increased afterwards steadily by third, fourth, and fifth generations. Incidence of PLRV was minimal at first generation. It increased gradually with the advancement of generation seed tubers showing the highest incidence at fifth generation. The highest plant growth and tuber yield were recorded at second generation, which was followed by third, fourth, and fifth generations. The highest reduction in plant height, tuber number, and tuber yield were recorded in 5^{th} generation due to infection of PVY and PLRV.

Keywords: Generation evaluation, PVY, PLRV, growth, yield, potato.

Bangladesh J. Agril. Res. 35(1) : 51-64, March 2010

PRODUCTION POTENTIAL OF DIFFERENT VARIETIES OF HYBRID MAIZE (*Zea mays* L.) WITH GROUNDNUT (*Arachis hypogaea* L.) UNDER INTERCROPPING SYSTEM

M.S. ALOM, N.K. PAUL AND M.A. QUAYYUM

Abstract

The experiment was carried out at the Regional Agricultural Research Station, Bangladesh Agricultural Research Institute (BARI), Jessore to evaluate the performance of different varieties of hybrid maize under intercropping systems with groundnut in Rabi seasons for higher productivity and profitability. Four sole crops of hybrid maize varieties viz., BHM-1, BHM-3, Pacific-11, and Pacific-984, one sole crop of groundnut (var. Jhingabadam) and eight intercropping systems of maize + groundnut under two planting methods viz., normal and paired row made 13 treatments, were used for two consecutive years (2004 and 2005). Treatments were arranged in a randomized complete block design with four replications. Among the intercropped treatments, four rows groundnut in between paired rows of hybrid maize var. Pacific 11 showed higher total dry mater (TDM), leaf area index (LAI), crop growth rate (CGR), gross return, net return and benefit cost ratio (BCR) than the other planting systems tested in the experiment.

Keywords: Production potential, hybrid maize, groundnut, intercropping system.

Bangladesh J. Agril. Res. 35(1) : 65-76, March 2010

COMPARATIVE ECONOMIC ANALYSIS OF BORRWER AND NON-BORROWER BORO RICE FARMERS IN SOME SELECTED SITES OF MYMENSINGH DISTRICT

M. S. K. SARKAR, M. R. HASAN, M. A. FEARDOUS
M. M.H SHUHEL AND MONIRUZZAMAN

Abstract

The present study has been conducted to examine the differences in input use, costs and returns of the borrower and non-borrower rice farmers. One hundred samples from four villages under Tiishal Upazila of Mymensingh district were selected for the study. The study reveals that borrower farmers used more inputs and attained more returns through higher yield than their counterparts. The yields of rice per hectare were 5260.80 kg and 4177.34 kg for the borrower and non-borrower farmers, respectively. The gross returns and net returns were Tk. 41699.03 and Tk. 4475.64, respectively, for the non-borrower farmers and Tk. 51589.53. and Tk. 8821.68, respectively, for borrower farmers. The undiscounted BCRs were 1.73 and 1.12 in case of non-borrower farmers and 1.74 and 1.21 for the borrower ones. The study further reveals that credit could be judged as a vital player to increase higher yield through utilization of necessary production inputs.

Keywords: Borrower farmer, non-borrower farmer, cost and return.

Bangladesh J. Agril. Res. 35(1) : 77-82, March 2010

DETERMINATION OF CROP CO-EFFICIENT OF HYBRID MAIZE BY LYSIMETER STUDY

M. S. ISLAM AND M. A. HOSSAIN

Abstract

In a study at Joydebpur, the crop co-efficient values at initial, development, mid-season, and late season stages of hybrid maize (variety: BARI Hybrid Maize-I) were determined as 0.38, 0.87, 1.36, and 0.75, respectively. These locally determined values of BARI Hybrid Maize-I differed to some extent from those

recommended by FAO. The corresponding FAO values are 0.4, 0.80, 1.15, and 0.70. The reasons might be that the FAO values are the generalized ones and recommended for a wide range of locations. But those determined by this study are location specific. Another reason may be the use of specific variety of hybrid maize in this experiment. However, locally determined values are preferred to standard values (FAO values) to estimate location specific crop ET.

Keywords : Crop co-efficient, hybrid maize, lysimeter.

Bangladesh J. Agril. Res. 35(1) : 83-93, March 2010

ECONOMICS OF HYBRID MAIZE PRODUCTION IN SOME SELECTED AREAS OF BANGLADESH

M. R. KARIM, MONIRUZZAMAN AND Q. M. ALAM

Abstract

The present study is an attempt to assess the existing agronomic practices of hybrid maize cultivation, its profitability, constraints, and factors affecting hybrid maize production. The majority of the total farmers sowed seeds during the first week of December. The average seed rate was found to be 20.94 kg per hectare. About 16 varieties were found to cultivate by farmers, of which majority farmers used NK-40 followed by Pacific-II. All kinds of fertilizer used by the farmers were below the optimum level of recommendation. About 33 and 28 percent of the total variable cost was for human labour and chemical fertilizer, respectively. The average yield of hybrid maize was found higher than the national average. The average gross margin was observed to be Tk. 28456 on total variable cost basis. The cost per kilogram of maize cultivation was Tk. 4.12 and return from one kilogram of maize production was Tk. 7.80. It is found that the coefficient of human labour, land preparation, irrigation, urea and borax have significantly impact on gross return. Timely non-availability of seeds, high price of fertilizer, and low price of yield were the major problems for hybrid maize production. Farmers cultivated hybrid maize because of higher yield, higher income, and easy growing.

Keywords: Gross return, gross margin, and profitability.

Bangladesh J. Agril. Res. 35(1) : 95-100, March 2010

ESTIMATE OF GENETIC DIVERSITY IN SNAKE GOURD *(Trichosanthes cucumerina)*

M. KHATUN, M. G. RABBANI AND E. H. M. S. RAHAMAN

Abstract

The present investigation was conducted at the field and laboratory of the Department of Horticulture, Bangladesh Agricultural University, Mymensingh during the period from April 2004 to September 2004 to study the nature and magnitude of genetic diversity of 38 snake gourd genotypes collected from different regions of the country. Based on D^2 analysis, the genotypes were grouped into four different clusters, where the cluster I possessed maximum number (21) of genotypes followed by the cluster 11(8), III (7), and IV (2). Clustering pattern revealed that geographical diversity was not associated with genetic diversity i.e., genotypes collected from same location were grouped into different clusters. The maximum inter-cluster distance was observed between the clusters III and IV and that of minimum in between the clusters I and II. In case of intra-cluster distance, the maximum distance was observed in the cluster IV and that of minimum was observed in the cluster III. Considering cluster mean, the genotypes of cluster IV could be selected for yield per plant and other yield contributing characters.

Keywords: Cluster, D^2 analysis, genetic diversity, snake gourd *(Trichosanthes cucumerina).*

Bangladesh J. Agril. Res. 35(1) : 101-112, March 2010

TECHNICAL INEFFICIENCY OF WHEAT PRODUCTION IN SOME SELECTED AREAS OF BANGLADESH

M. KAMRUL HASAN AND S. M. FAKHRUL ISLAM

Abstract

The main objective of the study was to identify and analyze the inefficiency and yield gaps of wheat production in Bangladesh. The study employed farm level cross sectional data from three major wheat growing areas of Bangladesh. Yield of wheat was found to vary across locations and farm categories. The average

technical inefficiency of wheat production in Bangladesh is 16. This indicates a good potential for increasing wheat output by 16 percent with the existing technology and levels of inputs. Education and training on wheat of the farm operators was found to have significant effect on yield and technical efficiency of wheat production.

Keywords: Technical inefficiency, wheat production, yield gaps.

Bangladesh J. Agril. Res. 35(1) : 113-124, March 2010

EFFECT OF DROUGHT ON PHYSIOLOGY AND YIELD CONTRIBUTING CHARACTERS OF SUNFLOWER

M. I. HOSSAIN, A. KHATUN, M. S. A. TALUKDER
M. M. R. DEWAN AND M. S. UDDIN

Abstract

The present study was conducted during 1995 to April 1996 at Bangladesh Agricultural University, Mymensingh to investigate the effect of drought stress at various levels with a view to studying the physiological characters of sunflower associated with yield under drought condition. Two varieties (Kironi and Hysan-55) and five drought cycles were i) Daily watering, ii) 1 day without water, iii) 2 days without water, iv) 3 days without water, and v) 4 days without water imposed in the study. As a whole, drought treatment reduced the yield and yield contributing characters of sunflower. In most cases, the rate of reduction was higher in plants that received 4 days drought cycle followed by 3 days. The minimum reduction was observed in plants that received 1 and 2 days drought cycle. The growth parameters (CGR, RGR, NAR, and LAI) were reduced under drought treatments. Similar trend was followed in case of CSI values and RWC of the leaves. The rate of reduction for most of characters was higher in Hysan-55 than that of Kironi. Thus, the variety Kironi was found better than Hysan-55 in respect of physiological adaptation associated with yield under drought condition.

Keywords: Drought, physiology, sunflower.

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IN VITRO REGENERATION OF POPULAR TOBACCO VARIETIES OF BANGLADESH FROM LEAF DISC

M. A. RAHMAN, M.A. ALAM, M.R. HOSSAIN
A. HOSSAIN AND R. AFROZ

Abstract

Regeneration ability of five *Nicotiana* varieties viz., Virginia, Jati, Motihari, CC Bengal and Sumatra were investigated via callus induction using leaf discs. Explants were cultured on MS medium supplemented with different concentrations and combinations of plant growth regulators. Callus formation frequency was 67.20%. Among the varieties used, Motihari induced the highest percentage (97.50%) of callus followed by Jati (92.50%) in 2.0 rng/L Kinetin and 2.0 mg/L IAA. Shoots were induced from calli cultured on the same medium. Maximum shoot formation from leaf discs was 82.50% on medium supplemented with 2.0 mg/L Kinetin and 2.0 mg/L IAA. It was also revealed from this study that Motihari was the best variety for callus formation and subsequent plantlet regeneration which is a pre-requisite for vector mediated transformation for varietal improvement of *Nicotiana* species. The rooting response of regenerated shoots was observed by using $^1/_2$ MS medium with IBA (0.0, 0.5, and 1.0 mg/L). The highest root formation was found in Motihari (90%) with ½ MS medium supplemented with 0.5 mg/L IBA. After that regenerated plantlets with plenty of roots were transferred successfully to pots and subsequently to the field.

Keywords: Tobacco, *Nicotiana*, *in vitro* regeneration, callus induction, plantlet regeneration, leaf disc, phytohormone.

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IN VITRO CULTURE OF POINTED GOURD *(Trichosanthes dioica* Roxb.)

M. A. MALEK, D. KHANAM, M. KHATUN
M. H. MOLLA AND M. A. MANNAN

Abstract

An experiment was conducted to study the *in vitro* culture of pointed gourd. Cotyledon rescued from physiologically matured

seeds (PMS) and immatured seeds (IMS) of pointed gourd were used as explants. Cotyledon excised from PMS responded very well in all culture conditions. Plant regenerated from cotyledon of PMS ranged from 38 to 96% in different hormonal formulations of culture media. Highest percentage of shoot regeneration was observed in MS + 1.0 mg/l BAP and lowest in MS + 2.5 mg/l BAP. No plant regeneration was observed in cotyledon from immatured seeds. The highest percentage of root induction (99%) was achieved in half MS medium supplemented with 0.5 mg/l NAA. The regenerated plantlets were successfully established in earthen pot.

Keywords: Cotyledon, *in vitro*, pointed gourd.

Bangladesh J. Agril. Res. 35(1) : 143-148, March 2010

EFFECT OF HARVESTING TIME ON YIELD AND YIELD ATTRIBUTES OF CHICKPEA *(Cicer arietinum* L.)

A. KHATUN, M.A.H.BHUIYAN, A. NESSA
AND S.M. BYAZIED HOSSAIN

Abstract

Field experiments were carried out during 2004-2006 at Bangladesh Agricultural Research Institute Farm in Grey Terrace Soils, Agro-Ecological Zone (AEZ 28), Joydebpur, Gazipur, Bangladesh to determine the effects of harvesting time on yield and yield attributes of chickpea. Chickpea seeds of three varieties viz., BARI Chola-5, BARI Chola-6, and BARI Chola-8 were collected at three times viz., i) when the pods were yellowish with a few yellow greens (H_1 stage), ii) when most of the pods were light brown with a few yellow (H_2 stage), and iii) when all the pods were completely brown and dry (H_3 stage). All the seeds were stored in earthen pot until conducting the field study. Significant variation was not observed in three varieties of chickpea for most of the parameters studied. The highest pods/plant, seeds/pod, and seed yield were observed in BARI Chola-5 and the lowest in BARI Chola-8. Seeds collected at the stage when most of the pods were light brown with a few yellow (H_2 stage) recorded the highest pods/plant, seeds/pod, 1000-seed weight and seed yield. The highest seed yield was recorded from BARI Chola-5 when seeds were collected at H_2 stage.

Keywords: Chickpea, harvesting time, yield, yield attributes.

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BIOCHEMICAL BASIS OF RESISTANCE IN EGGPLANT (*Solanum melongena* L.) TO *Leucinodes orbonalis* Guenee AND THEIR CORRELATION WITH SHOOT AND FRUIT INFESTATION

A. K. M. KHORSHEDUZZAMAN, M. Z. ALAM, M. M. RAHMAN
M. A. KHALEQUE MIAN AND M. ISMAIL HOSSAIN MIAN

Abstract

Studies on the biochemical basis of resistance to *Leucinodes orbonalis* Guenee and their correlation with shoot and fruit borer damage in five selected brinjal genotypes done at Tamil Nadu Agricultural University, India during June to December 2005 showed that both shoot and fruit of less susceptible genotypes had the higher amount of poly phenol oxidase (PPO), phenylalanine ammonium lyase (PAL) and lignin and lower amount of reducing sugar. Significant negative correlation was found between percent infestation (shoot and fruit) with PPO, PAL and lignin content, whereas it was positively correlated with reducing sugar content. Among the biochemical constituents, PPO, PAL and lignin contents were negatively correlated with reducing sugar but PPO were positively correlated with PAL and lignin content and vice-versa.

Keywords: Biochemical basis, resistacace, eggplant, *Leucinodes orbonalis*.

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OPTIMIZATION OF NITROGEN RATE FOR AROMATIC BASMATI RICE (*Oriza sativa* L.)

M. A. MANNAN, M. S. U. BHUIYA, H. M. A. HOSSAIN
AND M. I. M. AKHAND

Abstract

The experiment was conducted with different Basmati rice varieties at the Bangladesh Rice Research Institute (BRRI) farm, Gazipur during 1999 and 2000 T.aman season. Four rice genotypes (Basmati PNR, Basmati 370, Basmati 375 and Basmati-D) were tested with 0, 25, 50, 75 and 100 kg N/ha to determine the optimum N level as well as to find out the genotype having high yield potential. The

plant height, tiller number, number of panicles, panicle length, spikelet sterility and straw yield increased with the increase of nitrogen levels upto 75 kg N/ha. Maximum plant growth at the highest level of N caused lodging of plant which increased spikelet sterility and lower number of grains per panicle and ultimately decreased grain yield. Genotype Basmati PNR having dwarf plant characteristics performed well at higher level of nitrogen (100 kg N/ha), while other genotypes having medium plant height responded well at lower level of nitrogen (52-56 kg N/ha).

Keywords: Basmati rice, nitrogen, aman season.

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A STUDY ON THE AGRICULTURAL MECHANIZATION IN SELECTED FARMS OF THAKURGAON SUGAR MILL

MD. GOLAM FERDOUS CHOWDHURY, MD. SARWAR HOSSAIN
M. A. SATTAR AND MD. SHIRAZUL ISLAM

Abstract

Mechanized cultivation plays significant role in sugarcane production in Bangladesh. A study was conducted in the Thakurgaon Sugar Mill farms in Thakurgaon District as an undergraduate project work in the Department of Farm Power and Machinery, Bangladesh Agricultural University, Mymensingh. The objective was to determine benefit-cost analysis of those farms. The farm management provided data on production cost and income for the year 2001-2002. On the basis of the supplied data, it was found that the three production farms were incurring loss and the experimental farm was found to be earning marginal profit. In this study, it was observed that the farms were spending huge amount on personnel and maintenance, which is probably peculiar nature of public enterprises. Bringing available land under production, adoption of more machines to reduce labour costs, and adoption of high yielding varietys appeared to be a partial solution to reduce the huge loss and to go for profit earning.

Keywords: Agricultural mechanization, farm implements, Thakurgaon Sugar Mill.

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EFFECTIVENESS OF THREE INSECTICIDES AGAINST MUSTARD APHID AND PREDATOR UNDER FIELD CONDITION

A. K. M. M. MAULA, M. M. R. SHAH, N. A. SIDDQUIE
M. A. A. MAMUN AND M. BEGUM

Abstract

Studies were conducted in the field to determine the effectiveness of three insectidicdes, Metasystox-R 25EC, Dimethion 40 EC, and Fentro 50 EC applied against mustard aphid, *Lipaphis erysimi* Kalt. and measure their toxic action on the predator *Coccinella septempunctata* L. The mustard plants were sprayed with the insecticides at 0.05% and 0.025% a. i. at 50 and 70 days after sowing. The mortality of both mustard aphid and the predator was assessed at 1, 4, and 7 days after first and second spraying of insecticides. Metasystox-R showed the most effectiveness among the three insecticides causing the highest mortality of mustard aphid followed by Dimethion and Fentro. But the lowest mortality of *Coccinella septempunctata* was obtained in Dimethion treated plot, and Fentro treated plot showed the highest mortality indicating that the Dimethion was less toxic and Fentro was more toxic to the predator.

Keywords: Effectiveness, insecticides, mustard aphid, predator.

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IN VITRO REGENERATION POTENTIALITY OF *BRASSICA* GENOTYPES IN DIFFERENTIAL GROWTH REGULATORS

M. M. A. KHAN, A. B. M. ARIF HASAN KHAN ROBIN
M.A.N. NAZIM-UD-DOWLA, S. K. TALUKDER AND L. HASSAN

Abstract

Petiole of six genotypes of oilseed *Brassica* viz. Tori-7, Sampad, Kallyania, BARI Sarisha-7, BARI Sarisha-8, and MM 20-3 were cultured in MS medium with different concentrations of BAP, NAA, and $AgNO_3$ for callus induction and subsequent plant regeneration. The highest percentage of callus induction (91.43%)

was observed in Tori-7 in the media supplemented with 2 mg/L BAP, 0.1 mg/L NAA and 2.0 mg/L $AgNO_3$. Calli were maintained in order to get sufficient number of regenerants. With the increased concentration of BAP, the highest percentage (57.14) of regenerants were found in Tori-7 followed by Sampad (33.13%) and BARI Sarisha-8 (31.42%) in MS media supplemented with 2.5 mg/L BAP, 0.1 mg/L NAA and 2.0 mg/L $AgNO_3$. Root formation from the regenerants was found best in half MS medium supplemented with 0.5 mg/L NAA in genotype Tori-7. Regenerated plantlets of four genotypes (Tori-7, BARI Sarisha-8, Kallyania, BARI Sarisha-7) were successfully established in the field.

Keywords: $AgNO_3$, BAP, *Brassica*, NAA, regeneration.

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DEVELOPMENT OF AN INTEGRATED MANAGEMENT APPROACH FOR POD BORER, *Helicoverpa armigera* (Hubner) ON CHICKPEA

MD. ALTAF HOSSAIN, MD. AZIZUL HAQUE, MASUM AHMAD AND M.Z.H. PRODHAN

Abstract

An experiment was conducted to develop an 1PM approach for the management of pod borer, *Helicoverpa armigera* (Hubner) in chickpea field. Out of seven modules studied, module 5 consisting of sequential first spray with *Helicoverpa* nuclear polyhedrosis viruses (HNPV) @ 500 LE/ha and second spray after seven days interval with Cypermethrin @ 1 ml/ litre gave the best protection with the lowest pod borer damage (4.62%) and provided the highest yield (2096 kg/ha) and maximum net return (Tk. 43746/ha) followed by module 3 where only RNPV was sprayed twice. But the most economic module for pod borer management was M_2 where chickpea intercropped with mustard was sown on 15 November. For best protection against pod borer, the most effective 1PM module was chickpea sown on 15 November and first spraying with HNPV @ 500 LE/ha just at 100% plant pod formation stage and second spray after 7 days with Cermethrin @ 1 ml/L, ensuring higher yield and return.

Keywords: Integrated management, pod borer, chickpea.

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EFFECT OF POTASSIUM APPLICATION ON WHEAT (*Triticum aestivum* L.) IN OLD HIMALAYAN PIEDMONT PLAIN

P. K. SAHA, A. T. M. S. HOSSAIN AND M. A. M. MIAH

Abstract

A field trial was conducted in Rabi season 2001-2002 at the Bangladesh Agricultural Research Institute's Agricultural Research Station (BARI ARS) farm, Thakurgaon to evaluate a higher dose of K (66 kg K/ha) for maximizing yield of wheat and sustain soil native K level for wheat in north-western (NW) region of Bangladesh. To accomplish the objective, three levels of K (T_1= K_0, T_2 = K_{66}, and T_3= K_{38} (Farmers' practice) were tested. T_1= K_0 and T_2 = K_{66} were tested under soil test based (STB) N_{116} P_{115} S_{36} $Zn_1B_{1.7}$ fertilization and these two treatments T_1 and T_2 were compared with the farmers' own fertilization practice N_{68} P_{24} K_{38} S_{16} Zn_0B_0 (T_3). Results showed that the treatment (T_2) i. e. K_{66} with STB dose produced the better yield of wheat (var. Protiva). The highest gross return of Tk. 35,610/- and the highest net-return of Tk. 30,479/- was obtained with the treatment T_2 (STB). The dose of 66 kg K/ha for wheat growing in Old Himalayan Piedmont Plain (AEZ-1) was not adequate, and thus needs to be increased to maintain the soil K reserve, since there was an apparent negative balance of K in the soil with sole use of chemical fertilizers. The recommended P dose of 24 kg P/ha in wheat season created a positive balance of P. The STB dose for S and Zn @36 and 1 kg/ha, respectively, in wheat season created a positive balance of S and Zn in soil.

Keywords: Potassium, fertilizer management, wheat and nutrient balance sheet.

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IN VITRO REGENERATION OF *Anthurium andreanum* cv. NITTA

S.A. ISLAM, M.M.R. DEWAN, M.H.R. MUKUL
M.A. HOSSEN AND F. KHATUN

Abstract

The present study was undertaken to investigate the effect of different combinations of NAA, IBA, and BAP on *in vitro* organogenesis of *Anthurium andreanum* cv. "Nitta" at the DEBTEC (Development of Biotechnology & Environmental Conservation Centre) Laboratory, Dhaka. Organogenesis from leaf mid rib to shoot initiation required 9.00 days and the best survivality was 80.00% percent at 30 DAI (Day after initiation) with the combination of 1 mg/L NAA and 1 mg/L BAP in MS media. Among the 20 hormone supplements, MS media containing 1 mg/L NAA and 1 mg/L BAP showed the highest shoot formation (68.30%), number of shoots/explant (3.37) and the longest shoot (4.65 cm) at 60 DAI. MS media without any hormone (control) showed the poorest performance in regeneration of shoots. On the other hand, MS media containing 1 mg/L IBA + 1 mg/L BAP showed the best performance in rooting of shoots (83.85%), highest number of roots (4.29/plantlet), root elongation (5.50 cm) were recorded at 60 DAI.

Keywords: *In vitro* regeneration, *Anthurium andreanum*.

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INFLUENCE OF SEED RATE AND METHOD OF SOWING ON THE PERFORMANCE OF BILATIDHONIA *(Eryngium foetidum* L.)

S. N. MOZUMDER, M. MONIRUZZAMAN, S. M. M. RAHMAN
P. C. SARKER AND S. M. FAISAL

Abstract

A field experiment was conducted at ARS, Raikhali, Rangamati during October 2003 to July 2005 to determine the optimum spacing and seed rate to maximize yield and profitability of Bilatidhonia *(Eryngium foetidum* L.). A factorial randomized complete block design was followed consisting four methods of sowing (D_1 = broadcast, D_2 = line sowing (10 cm), D_3 = line sowing (15 cm), and D_4 = line sowing (20 cm) and three levels of seed rate viz., S_1 = 20, S_2 = 30, and S_3 = 40 kg/ha. Broadcasting and closer spacing (10 cm) with 40 kg seeds/ha showed better performance in respect of yield, yield attributes and profitability. The maximum number of plants/rn^2 (590), fresh yield (46.89 t/ha), gross return (Tk. 1031 thousand), gross margin (Tk. 858.1 thousand/ha) and benefit cost ratio (5.32) were obtained from broadcast method of sowing with 40 kg-seed/ha.

Keyworeds : Seed rate and method of sowing, *Eryngium foetidum*.

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CROP AGRICULTURE OF BANGLADESH: CHALLENGES AND OPPORTUNITIES

MOHAMMAD H. MONDAL

Abstract

Crop agriculture in Bangladesh is constrained every year by challenges, such as a) Loss of Arabie Land, b) Population Growth, c) Climate Changes, d) Inadequate Management Practices, e) Unfair Price of Produces, and f) Insufficient Investment in Research. In Bangladesh, about 80,000 ha of arable land are going out of production every year. The loss is alarming and needs to be addressed immediately. The land use policy of the government should be updated and implemented immediately to stop further loss of arable land. Another problem to agriculture is the increase in the growth of population. The twin problem of arable land loss and population growth needs to be addressed simultaneously to ensure sustainable crop production. Country's crop production is also affected frequently by flood, drought, and salinity. Varieties/technologies tolerant to these natural hazards need to be developed. Renewable energy, reduction in the use of fossil fuels, and afforestation are recommended to mitigate the adverse effects of climate change. To sustain crop production, chemical fertilizers must be integrated with organic manure and costly non-urea fertilizers should continue to be subsidized. Incidence of pests and

diseases has lately become severe due to climate change impacts. Therefore, more varieties resistant to the pests should be evolved. Small and marginal farmers of Bangladesh have limited access to institutional credit. They are not eligible for microcredit of NGOs either. Establishment of a new institution/foundation in line with PKSF is recommended to meet their needs. These farmers do not have farmers' associations or cooperatives to bargain for fair price of their produces. Government might encourage establishment of farmers' cooperatives to ensure fair price of their produces. To make such cooperatives successful, top-down approach by the influentials must be avoided. Investment in agricultural research should as well be raised to at least 2% of GDP to help generate technologies to cope with climate change hazards and disseminate such technologies at farmer's level.

Keywords: Crop agriculture, challenges and opportunities.

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YIELD AND STORABILITY OF ONION (*Allium cepa* L.) AS AFFECTED BY VARYING LEVELS OF IRRIGATION

S.K. BISWAS, A. KHAIR, P.K. SARKER AND M.S. ALOM

Abstract

Bulb yield and storability of onions (cv. BARI Piaj-1) was studied against five levels of irrigation viz., no irrigation, irrigation at 10, 15, 20, and 30 days interval. Yield and storage losses were increased gradually with increasing number of irrigation. The highest yield of onion was obtained with a total of six irrigations at 10 days interval and it was at par with treatment that received four irrigations at 15 days intervals. Losses due to rotting, sprouting, and physiological weight loss were found higher in irrigated treatments. After six months of storage (from 1st week of April to 1st week of October), the maximum cumulative weight loss (56.72%) was recorded in onions irrigated at 10 days interval, while the minimum (46.80%) was recorded in non-irrigated onions.

Keywords: Storability, onion bulb, irrigation, storage losses.

Bangladesh J. Agril. Res. 35(2) : 257-265, June 2010

IN VITRO ROOT FORMATION AND PLANTLET DEVELOPMENT IN DENDROBIUM ORCHID

M. M. KHATUN, H. KHATUN, D. KHANAM AND MD. AL-AMIN

Abstract

The experiment was conducted to investigate the combined effect of different plant growth regulators with and without charcoal supplementation for root formation and plantlet development from protocorm like bodies (PLBS) of orchid. The combination of BAP + NAA, BAP + IAA, BAP + IBA, and IAA + IBA at different concentrations were studied. It revealed that the highest number of roots was obtained from 1.0 mg/L each of IAA + IBA combination (6.667) and the highest root length was recorded from 2.0 mg/L BAP + 1.0 mg/L IBA with charcoal supplementation. The treatment combinations, 1.0 mg/L each of BAP + NAA, BAP + IAA, BAP + IBA, and IAA + IBA were found best for producing more rooted plantlets with charcoal supplementation. It revealed that charcoal enhanced the root formation.

Keywords: Orchid, *Dendrobium*, hybrid, *In vitro* rooting.

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EFFECT OF UREA SUPER GRANULE ON THE PERFORMANCE OF CABBAGE IN YOUNG JAMUNA AND BRAHMAPUTRA FLOODPLAIN SOILS OF TANGAIL

M.J. HUSSAIN, M.Y. ALI, M. A. RAHMAN, M. A. QUAYYUM AND D. A. CHOUDURY

Abstract

A number of experiments were conducted at the Farming Systems Research and Development (FSRD) site, Palima, Tangail for three consecutive years to evaluate the efficiency of USG application in comparison with prilled urea on the yield and yield attributes of cabbage (cv. Atlas-70). There were five treatments, T_1= N_{195} (recommended N dose for HYG, used as prilled urea), T_2= N_{195} (recommended N dose for HYG, used as USG), T_3=N_{175} (N 10% reduction of recommended N dose as USG), T_4= N_{155} (N 20% reduction of recommended N dose as USG), and T_5= N_{105}

(Farmers' N dose used as prilled urea). Treatments T_1-T_4 received recommended dose of other nutrients ($P_{56}K_{162}S_{13}Mo_{0.6}CD_{3t}$) and T_5 received $P_{25}K_{90}S_0Mo_0CD_{51}$ Yield and yield-contributing characters of cabbage significantly responded to the application of USG. The highest head yield (78.1 t/ha) was obtained with the recommended dose of N as USG, and 10% (77.1 t/ha), and 20% (72.0 t/ha) less than the recommended dose of N as USG also produced higher yield than recommended prilled urea-N. Application of USG was found more efficient than prilled urea and the treatment $N_{195}P_{56}K_{162}S_{13}Mo_{0.6}CD_{3t}$ (recommended N as USG for HYG) was found profitable for cabbage cultivation in terms of yield and the treatment $N_{175}P_{56}K_{162}S_{13}Mo_{0.6}CD_{3t}$ (10% N reduction of recommended N dose as USG) was found profitable in terms of economic returns.

Keywords: USG, prilled urea, cabbage.

Bangladesh J. Agril. Res. 35(2) : 273-277, June 2010

EFFICACY OF MURIATE OF POTASH AND FOLIAR SPRAY WITH FUNGTCIDES TO CONTROL RED RUST DISEASE (*Cephaleurous parasiticus*) OF TEA

M. HUQ, M. ALI AND M. S. ISLAM

Abstract

An experiment was conducted to find out the efficacy of muriate of potash applied as a potash fertilizer and foliar spray with Bordeaux mixture + Cupraneb 224 kg/ha, Copper Hydroxide@ 2.24 kg/ha and Carbcndazim @ 750 g /ha to control red rust disease *(Cephaleuros parasiticus)* of tea. All treatments with fungicides and application of MP caused reduction in severity of red rust and gave increase in yield of made tea over the control, where any fungicide or MP was not applied. The tea yield was negatively and nearly correlated with severity of red rust disease. The most effective treatment was application of the potash fertilizer (MP), which was followed by foliar spray with Copper Hydroxide and Carbendazim.

Keywords: Muriate of potash, foliar spray with fungtcides, red rust disease.

Bangladesh J. Agril. Res. 35(2) : 279-285, June 2010

EFFECT OF MILD STRAIN ON SEVERITY OF PRSV-W INFECTION

M. F. RAHMAN, M. A AKANDA AND M. Z. A. SARKAR

Abstract

Studies were conducted to develop mild/avirulent strain of PRSV-W using nitrous acid, sodium azide and UV-radiation for the mutagenic treatments. Among the three mutagens' sodium azide at 3%, 4%, and 5%, and nitrous acid at 0.1M and 0.125M were proved to be effective in producing mild/avirulent strains of PRSV-W, while UV-radiation was proved to be ineffective. Evaluation on the effectivity of mild/avirulent strains in net house in protecting severe strain of PRSV-W proved that the efficiency of mild/avirulent strain to protect the severe strain of the virus was dependent upon the time gap between the mild strain inoculation and challenge inoculation. The challenge inoculation with the severe strain of PRSV-W after 12 days of mild strain inoculation could confer the cross-protection in about 64% pumpkin plants upto 40 days. The presence of mild/avirulent strains of PRSV-W in the asymptomatic plants challenged with severe strain of PRSV-W was tested by mechanical inoculation of *Chenopodium amaranticolor* to observe the development of characteristic local lesions of PRSV-W.

Keywords: PRSV, cross protection.

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CROP PRODUCTIVITY AS AFFECTED BY FERTILIZER MANAGEMENT OPTIONS IN BORO -T.AMAN CROPPING PATTERN AT FARMERS'FIELDS

M. AKKAS ALI, M. ROBIUL ALAM, M.S.H. MOLLA AND F. ISLAM

Abstract

The experiment was conducted at multilocation testing (MLT) site, Sujanagar, Pabna during the year of 2003-2004 to find out a soil test based economically viable fertilizer recommendation for the cropping pattern Boro-T. *aman*. Six treatments viz., moderate yield goal (MYG), high yield goal (HYG), integrated plant nutrient

system (IPNS), recommended fertilizer of FRG' 97 (BARC) guide (RF), farmers' practice (FP), and absolute control were employed for the study. The grain yield of Boro and T. *aman* rice increased 18 and 14%, respectively, by IPNS compared to farmers' practice. Total grain yield of rice was increased by about 16% in the IPNS fertilizer package compared to farmers' practice. Fertilizer nutrients supplied both from organic and inorganic sources in adequate amount have a positive effect on productivity of soil. On an average it was found that highest grain yields of Boro rice (5.37 t/ha) and T. *aman* (4.49 t/ha) were obtained from integrated plant nutrient system (IPNS) where farmers' practice gave yield of 4.55 and 3.94 t/ha. The highest average gross margin (70385 Tk./ha) and marginal benefit cost ratio (3.78) was also obtained from IPNS plots.

Keywords: Crop productivity, fertilizer management, cropping pattern.

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FACTOR DEMAND IN THE HEALTHY RICE SEED USE IN BORO AND T. AMAN: A CASE STUDY OF BANGLADESH

A.S.M. NAZRUL ISLAM AND S.M. FAKHRUL ISLAM

Abstract

Lack of healthy rice seed is considered as one of the most important constraints to rice production and productivity in Bangladesh. Healthy rice seed production and its use are pre-requisites for accelerate agricultural growth and this can play a leading role in bringing rural prosperity and economic transformation. Therefore, this study analyzes factors demand and elasticity of substitution of healthy rice seed. Data were collected from two different rice growing environments, namely Chuadanga and Gazipur. Primary data from 120 respondents were collected for Boro and T. Aman seasons. Allen Partial Elasticities were estimated for Boro and T.Aman rice for both the study areas. Healthy seed price was highly elastic and the results showed that an increase in the price of healthy seed would decrease its demand. The results showed that if the use of land increased then use of fertilizer, animal + power, seed, irrigation, and human labour would increase. In the T. Aman season, own price elasticities of all the factors had the correct signs. In Gazipur, with one percent increase in price, demand for land, animal power + mechanical power, seed, fertilizer and human labour would fall. The estimates on elasticity of substitution indicated that the best substitutes are land-seed, land-animal power plus mechanical power and land-labour in the Boro season. In the T.Aman season, the best substitutes were found to be land-irrigation in Chuadanga and land-animal power plus mechanical power, land-seed in Gazipur.

Keywords: Healthy rice seed, *boro*, T.aman.

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MOLECULAR CHARACTERIZATION OF ONION (*Allium cepa*) USING RAPD MARKERS

MANIRUZZAMAN, M. E. HAQUE, M. M. HAQUE M. A. SAYEM AND M. AL- AMIN

Abstract

A polymerase chain reaction (PCR) based approach, namely random amplified polymorphic DNA (RAPD) analysis was applied to l0 varieties of onion *(Allium cepa)* in order to assess the degree of polymorphism within the genes and to investigate if this approach was suitable for genetic studies of onion. For this study, ten cultivars of onion were evaluated for variability using a set of 15 random l0-mer primers. The polymorphisms in PCR amplification products were subjected to the unweighed pair group method for arithmetic averages (UPGMA) and plotted in a phenogram. The dendogram constructed from the similarity data showed that all the cultivars analyzed were related. Among them, 12 of the primers revealed scorable (168 bands) polymorphisms between cultivars of *A. cepa* and the rest did not show polymorphism in their genetic level. In this study, it was found that Bermis and India-2 were more dissimilar and on the other hand, Faridpuri and Bhati were the most similar in their genetic level.

Keywords: RAPD, onion, genetic diversity, polymorphism.

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EFFECT OF IRRIGATION ON THE GROWTH AND YIELD OF (*Daucus carota* ssp. *sativus*) CARROT IN HILL VALLEY

M.S. ALAM, S.A. MALLIK, D. J. COSTA, M.S. ALAM AND A. ALAM

Abstract

Experiments were conducted at Hill Agricultural Research Station, Khagrachari during the period from November to February in 2005-06 and 2006-07 to determine the appropriate irrigation schedule for carrot production in hill valley. The experiment consisted of five treatments of irrigation after plant established viz. No irrigation (I_0), irrigation at 1W: CPE of 0.6 (I_1), irrigation at 1W: CPE of 0.8 (1_2), irrigation at 1W: CPE of 1.0 (I_3) and irrigation at 1W: CPE of 1.2 (I_4). The amount of irrigation water (IW) was fixed at 4 cm. The experiment was laid out in RCBD with 3 replications. The treatments significantly influenced the growth, yield contributing characters and yield of carrot. Among the treatments, irrigation at IW: CPE of 1.2 gave the maximum yield (51.47 t/ha) which received 4 irrigations after plant stand with applied total irrigation water of 16 cm resulting in the highest net return of Tk. 120,443 with the highest BCR of 2.41. It also produced carrot at the lowest production cost of Tk. 1.66 per kg. Irrigation water use efficiency was obtained 1705.63 kg/ha/cm by this treatment.

Keywords: Irrigation, growth, yield, carrot.

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IN VITRO SHOOT REGENERATION THROUGH ANTHER CULTURE OF *BRASSICA* SPP.

M. A. SAYEM, MANIRUZZAMAN, S. S. SIDDIQUE AND M. AL-AMIN

Abstract

The experiment was conducted to investigate the performance of three different genotypes (BARI Sarisha-6, BARI Sarisha-8, and BARI Sarisha-11) in two different media viz., MS and B5 with different concentrations of phytohormone (2, 4-D) for callus induction from uninucleate stage anthers of *Brassica* and subsequent plant regeneration in MS media with different concentrations of phytohormone (BAP and NAA). Among the genotypes, BARI Sarisha-8 showed the best performance for all the parameters of callus induction. The performance of BARI Sarisha-6 was poor compared to others. Maximum rate of callus induction (%) was observed in MS + 0.5 mg/L 2, 4-D followed by B5 + 0.5 mg/L 2,4-D. The media combination MS + 1.0 mg/L BAP 0.3 mg/L 2,4-D showed the best performance for maintenance of calli. Significant variations were observed among the genotypes and media composition for shoot regeneration. Among the genotypes, BARI Sarisha-8 showed the best performance for shoot regeneration followed by BARJ Sarisha-l1. The genotype BARI Sarisha-8 produced higher percent of shoots/calli and required minimum days for shoot initiation. Higher percent calli without shoot were produced by the genotype BARI Sarisha-6. The media combination MS + 2.0 mg/L BAP + 0.5 mg/L NAA showed the best performance for shoot regeneration and required maximum days for shoot initiation.

Keywords: Regeneration, BARI Sarisha-6, BARI Sarisha-8, BARI Sarisha-11, anther culture, phytohormone

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COMPARATIVE STUDY ON YIELD AND YIELD ATTRIBUTES OF HYBRID, INBRED, AND NPT RICE GENOTYPES IN A TROPICAL IRRIGATED ECOSYSTEM

M. SIRAJUL ISLAM, SHAOBING PENG, ROMEO M. VISPERAS M. SULTAN UDDIN BHUIYA, S.M. ALTAF HOSSAIN AND A.W. JULFIQUAR

Abstract

Yield potential of 16 rice genotypes including 12 hybrids, 3 inbreds, and I new plant type (NPT), were studied at the International Rice Research Institute farm under optimum crop management to achieve maximum attainable yields during the wet season (WS) of 2004 and dry season (DS) of 2005. Yield and yield components were determined at maturity. 1R76712H produced the

highest grain yield (7.7 t/ha) followed by 1R75217H and Magat (7.6 t/ha) in WS; in DS, 1R79118H produced the highest grain yield (9.17 t/ha) followed by 1R73855H (8.9 t/ha) and SL-8H (8.8 t/ha. The high yield of hybrid rice was due to high harvest index (0.50). Hybrid produced significantly higher productivity (80.2 kg/ha/day) than inbred in DS, but the difference was not significant in WS. Hybrid produced higher spikelets/panicle and 1000-grain weight than inbred rice. Spikelet filling percent was higher in inbred than hybrid rice. The NPT rice genotype had the lowest spikelet filling percent, but the highest 1000-grain weight across the season.

Keywords: Yield, yield attributes, hybrid and inbred rice genotypes.

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EFFECT OF PLRV INFECTED SEED TUBER ON DISEASE INCIDENCE, PLANT GROWTH AND YIELD PARAMETERS OF POTATO

M.S. RAHMAN AND A.M. AKANDA

Abstract

An investigation was conducted to find out the effect of PLRV infected seed tubers on disease incidence, plant growth, and tuber yield of potato. The levels of PLRV infected seed tubers were 0, 10, 20, 33, and 100%. Presence of PLRV infected tubers at 20% and higher rate caused significant increase in disease incidence and reduction in plant height, stem number, tuber number, and tuber yield as compared to that in control. Incidence of PLRV in the experimental fields, reduction in plant height, stem number, tuber number, and tuber weight per hill was positively and linearly correlated with levels of their inoculum. Spraying of Nimbicidine against insect vector did not show significant influence on plant growth and tuber yield.

Keywords: Inoculum levels, disease incidence, PLRV, insecticide, growth and yield performance, potato.

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PERFORMANCE OF HEAT TOLERANT TOMATO HYBRID LINES UNDER HOT, HUMID CONDITIONS

M. S. ALAM, N. SULTANA, S. AHMAD
M.M. HOSSAIN AND A. K. M. A. ISLAM

Abstract

Eight hybrid tomato lines bred for heat tolerance by the Olericulture Division, BARI were studied to observe their fruit setting ability and yield performance under the hot, humid conditions at the Olericulture Farm of Bangladesh Agricultural Research Institute, Joydebpur, Gazipur during summer 2005. Percent fruit set in the lines was found to be within the range of 30 to 45 except C-7 (3×7) in which this was 52.85. The tallest plants having larger number of branches and the lowest flower drop were also observed in C-7 (3×7). Pollen viability ranged from 27.63 to 61.52 percent among the hybrids. The highest weight of individual fruits (56.02 g) and firmness (1.41 kg) was observed in C-5 (2×5). The largest fruit in respect of length and diameter was produced by C-8 (5x5). No significant variation was found among the lines in respect of days to 50% flowering and percent TSS. Significant difference wa observed for fruit number per plant ranging from 27 to 51. All of the lines produced remarkably high yields and C-7 (3x7) gave the highest yield per plant (1.73 kg) as well as per hectare (41.5 tons). The highest gross return (1867500 Tk/ha) and the maximum net return (1486748 Tk/ha) having the highest BCR (3.90) were recorded in C-7 (3×7).

Keywords: Heat tolerant, tomato hybrid, hot, humid.

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MORPHOLOGICAL AND PATHOGENIC VARIATIONS IN THE ISOLATES OF *RHIZOCTONIA SOLANI* IN BANGLADESH

B.K. GOSWAMI, K.A. BHUIYAN AND I.H. MIAN

Abstract

Rhizoctonia solani isolates were collected from soil of different agro-ecological zones of Bangladesh and also from infected plant

parts of different crops and grasses. Collected isolates were classified into five different cluster groups on the basis of morphological and cultural characters. Five isolates taking one from each of the five different cluster groups were selected to study their pathogenicity and host range on 35 different crops. Pathogenicity and host range of the isolates were determined by planting the seeds in water agar plate infested with *R. solani* isolates and incubated at 25 ^{0}C temperatures. After analyzing the morphological and cultural characters of the isolates, it was found that there was no relations between the isolates with respect to their origin from where they were collected. It indicated that the diversity among the isolates was not correlated with their origin. In case of host range and pathogenicity among the five selected isolates of different cluster groups, the isolate JES-16 was an avirulent isolate. The isolate SYL-30 had narrow host range and a low virulent isolate. The isolates DIN-8 and GAZ-18 possessed wide host range and might be considered as virulent isolates. The isolate GAZ-9 was a highly virulent isolate with a wide host range.

Keywords: Rhizoctonia solani, morphological and pathogenic variations, isolates.

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EFFECT OF *ALTERNARIA* BLIGHT ON THE SEED YIELD OF CAULIFLOWER *(Brassica oleracea* L.)

M. SAKHAWAT HOSSAIN AND M. M. HOSSAIN

Abstract

Effect *of Alternaria* blight *(Alternaria brassiceae* and *A. brassicicola)* on seed yield of cauliflower *(Brassica oleracea* L. var. *botrytis)* was studied during three consecutive growing seasons (2003-2004, 2004-2005, and 2005-2006) in winter under natural epiphytotic condition. There were two treatments viz., sprayed and unsprayed. BARI Cauliflower-1 was used as planting material and Rovral 50 WP (Iprodion) at 0.2% suspension was used as protective chemical to safe the crop against *Alternaria brassiceae* and *A. brassicicola.* Percent pod infection, pod area diseased, number of pods/plant and seed yield differed significantly between the sprayed and unsprayed (control) plots. Percent pod infection and pod area diseased ranged 35.3-62.4% and 94.7-97.6%, 1.9-2.2%, and 10.8-16.4% in sprayed and unsprayed plots in different, respectively. The number of pod/plant was 462-592 in sprayed and 281-395 in unsprayed plots. The seed yield/ha ranged 249.4-355.1 kg in unsprayed plots and 456.8-677.0 kg in Rovral sprayed plots. The seed yield increase were 59.6%, 171.4%, and 75.2% in 2003-2004, 2004-2005, and 2005-2006 cropping seasons, respectively.

Keywords: *Alternaria* blight, seed yield, cauliflower.

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CONSTRAINTS AND STRATEGIES TOWARDS IMPROVING CASSAVA PRODUCTION AND PROCESSING IN ENUGU NORTH AGRICULTURAL ZONE OF ENUGU STATE, NIGERIA

AKINNAGBE O.M.

Abstract

The study was undertaken to ascertain the constraints and strategies towards improving cassava production and processing in Enugu north agricultural zone of Enugu State, Nigeria. Data were collected from 60 cassava producers and processors (farmers) through the use of structured interview schedule. Multistage sampling technique was applied in the selection of respondents. Mean, standard deviation and exploratory factor analysis were used in realizing the objectives. The results showed that the major constraints to cassava production and processing were agronomic factors, technical/institutional factors and financial factors. The major strategies for improving cassava production and processing include making planting material available at the right time in the right places and at reduced prices, establishment of starch based industries in rural areas for processing cassava and formation of farmers' cooperative societies to enhance farmers' access to information and production facilities. The study, therefore, recommended that starch based industries should be established in rural areas for cassava processing in order to encourage both

producers and processors for added value. This will also encourage youth in agriculture for economic growth.

Keywords: Cassava production and processing, constraints and strategies, Nigeria.

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EVALUATION OF MOSQUITO NET BARRIER ON CUCURBIT SEEDLING WITH OTHER CHEMICAL, MECHANICAL AND BOTANICAL APPROACHES FOR SUPPRESSION OF RED PUMKIN BEETLE DAMAGE IN CUCURBIT

A. K. M. KHORSHEDUZZAMAN, Z. NESSA AND M. A. RAHMAN

Abstract

Seedling bed netted with mosquito net barrier against red pumpkin beetle, *Aulacophora foveicollis* (Lucas) in sweet gourd was evaluated with other chemical, mechanical, and botanical approaches during 2006-07 and 2007-08 cropping seasons. Among six treatments, results indicated that seedling bed of sweet gourd covered with mosquito net barrier upto 45 days before planting was found to be most effective and provided 97.59 and 100% protection with higher benefit cost ratio of 21.99 compared to 9.74 with Furadan 5G applied in soil; as of 4.35 using neem seed oil for the average of two years applied against red pumpkin beetle.

Keywords: Mosquito net barrier, cucurbit, pumkin beetle.

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VALIDATION OF DRAS MODEL FOR IRRIGATION OF WHEAT

P. K. SARKAR, M. S. ISLAM, S. K. BISWAS
M. A. HOSSAIN AND S. HASSAN

Abstract

The study was conducted to validate the Drought Assessment (DRAS) model developed by the Center for Environmental and Geographic Information Services (CEGIS) for irrigation scheduling of wheat (variety: Shatabdi). The performance of the model was compared with the results obtained from the BARI recommended irrigation schedule. The field experiments were carried out during the years 2005-2006 through 2007-2008 in two agro-ecological zones. The locations were RARS, Jamalpur under agro-ecological zone 9 and farmers' field of FSR site, OFRD, Barind, Rajshahi under agro-ecological zone 26. Six different irrigation treatments including one rainfed with three replications were considered for the study. In respect of yield, BARI recommended irrigation practice performed better in Jamalpur (3.642 t/ha on average). Application of net irrigation requirement (NIR) as per DRAS model based on reported value yielded highest (3.598 t/ha on average) in the Barind area, Rajshahi. However, the yields from all irrigated treatments were very close to each other. From three years' study, the model performance was found quite satisfactory for irrigated wheat, especially in drought prone areas like Barind, Rajshahi. In respect of water productivity, the model performed almost similar to the BARI recommended practice in Jamalpur. It performed better in Barind region where irrigation water was used by the crop more efficiently.

Keywords: DRAS model, irrigation, wheat.

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HETEROSIS ESTIMATES IN F_2 DIALLEL POPULATION OF SPRING WHEAT AT TWO DIFFERENT CULTURAL CONDITIONS

M. TUHINA-KHATUN, M. A. A. BARI, M. A. ZAMAN
H. BEGUM AND S. AKTER

Abstract

Spring wheat *(Triticum aestivum* L.) varieties Gaurab, Kanchan, Balaka, Sonora, Protiva, Pavon, and Anza were used as parent materials to estimate heterosis in a set of 7 × 7 diallel crosses. The diallel trial was carried out for seven parental material and their 21 F_2 progenies under two contrasting cultural conditions for different yield and yield contributing characters. Cultural conditions I is provided by the BARI recommended doses of fertilizer and irrigation, and 2 have no fertilizer but two irrigations once at crown root initiation stage and twice at panicle initiation stage. Heterosis

was measured as i) Relative heterosis and ii) Heterobeltiosis. The result of relative heterosis revealed cross Sonora × Anza exhibited superior performance for grain yield/plot in environment-i. Desirable negative heterosis was observed in cross Balaka × Anza in environment-I and Pavon x Anza in environment-2 for days to 50% heading character. For days to maturity, desirable negative heterosis was found in cross Pavon x Anza in both cultural environments. Estimate of heterobeltiosis for different yield contributing characters showed that cross Sonora x Anza exhibited highest heterosis for grain yield/plant in environment-1 and Kanchan x Balaka in environment-2. Cross Pavon x Anza exhibited superior relative heterosis and heterobeltiosis for 100-grain weight in both cultural environments. By comparing two cultural conditions, it was found that 1 is better than 2 for all the characters.

Keywords: Relative heterosis, heterobeltiosis, spring wheat, F_2 generation, GxE interaction.

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SURVEY ON MAJOR DISEASES OF VEGETABLE AND FRUIT CROPS IN CHITTAGONG REGION

M. T. HOSSAIN, S. M. M. HOSSAIN, M. A. BAKR
A. K. M. MATIAR RAHMAN AND S. N. UDDIN

Abstract

A survey was conducted during October 2006 to June 2008 to observe disease prevalence of vegetable and fruit crops in Chittagong region. Through the survey, 24 diseases with their incidence and severity were recorded. The average higher leaf infection in early blight of potato and fruit infection in soft rot of potato were recorded 37% and 39%, respectively. The highest leaf infection (43%) of early blight of tomato that was more frequented (mode) 36% in different locations with ±0.45% ranges (Standard error) for causing the disease as recorded at Sadar Anwara upazila of Chittagong. The highest fruit infection of soft rot of potato (43%) was recorded at Dohazari, Chandanaish upazila in Chittagong. The average of higher disease severity of leaf (27%) and fruit (33%) was recorded in early blight of tomato and soft rot of potato, respectively, and the highest disease severity of leaf (29%) and fruit (35%) was recorded in Phomopsis blight and early blight of tomato and soft rot of potato, respectively.

Keywords: Diseases, vegetable, fruit, survey.

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PHYSICO-MORPHOLOGICAL VARIATION IN HYACINTH BEAN [*Lablab purpureus* (L.) Sweet]

M. S. ISLAM, M. M. RAHMAN AND T. HOSSAIN

Abstract

Forty-four hyacinth bean genotypes were evaluated for different qualitative and quantitative characters during July 2005 to February 2006 at Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Gazipur. The genotypes showed considerable variations for most of the morpho-physical traits. Shape, size and colour of vein, leaf, petiole, stem, flower, pod and seed varied among the genotypes. Days to first flower ranged from 47.6 to 136.3 days indicating the presence of early variety. Individual pod weight varied from 1.47 (HB042) to 12.3g (HB009). The genotype HB027 produced the maximum number of pods/ plant (425) closely followed by HB001 (385). Similar trend was observed for pod yield/plant. The genotype HB027 produced the highest pod yield/plant (3.45kg) followed by HB001 (3.35kg). 100-green seed weight ranged from 4.0g to 73.33g, which indicated the presence of bold seeded genotypes. Among the genotypes, HB027 and HB007 produced very bold green seed and higher green pod yield/plant, therefore, they can be selected for both pod and green seed production purpose.

Keywords: Physico-morphological, hyacinth bean.

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SURVEY ON POSTHARVEST PRACTICES AND LOSSES OF LITCHI IN SELECTED AREAS OF BANGLADESH

M. M. MOLLA, M. N. ISLAM, T. A. A. NASRIN
AND M. A. J. BHUYAN

Abstract

A survey was conducted to assess the postharvest practices and lossess of litchi during May to June 2008. Three litchi growing

areas viz., Dinajpur, Ishurdi, and Natore, two urban areas, namely, Dhaka and Gazipur were selected for this study. Some indigenous postharvest practices were observed to follow in all the growing areas mostly by the growers and/or beparies those are involved in harvesting. These practices were as pre-cooling by keeping the harvested fruits under the shade of the trees, sorting based on damaged, pest infested, and disease infected fruits and so called believed cooling with litchi leaves during transportation. Nobody practices the grading of fruits. The usual packaging practices were observed mainly with bamboo baskets lining with litchi leaves and covering with gunny sheets. None of the aradthdars involved in packaging .The postharvest losses were reported mainly at harvesting (8.0%), handling from orchard to selling point by the growers and beparies involved in harvesting (4.61%) and after buying to consumption by the consumers (7.5%). Considering the channels involved in litchi marketing, the growers and/or beparies engaged in harvesting had the highest percent of losses (16% in Dinajpur, 12% in Ishurdi, and 11 % in Natore) followed by the consumers (7.5%).

Keywords: Litchi, harvesting practices, mode of packaging and transportation and postharvest losses.

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CHALLENGES OF POTATO CULTIVATION IN BANGLADESH AND DEVELOPING DIGITAL DATABASES OF POTATO

M. A. UDDIN, S. YASMIN, M. L. RAHMAN
S. M. B. HOSSAIN AND R.U. CHOUDHURY

Abstract

The study was conducted to build the union level digital database and maps of potato during 2008-09. Both primary and secondary data were used in the study. Data were collected from all blocks of four upazilas of four districts and farmers' level. Union, upazila, district, and country level digitized maps of Bangladesh were used in the programme. GIS, GPS, and MIS related IT were used in the study. Out of total cultivable land (1,00611 ha) in four upazilas, potato cultivated area and production were 27,414 ha and 3,32,424 t, respectively. Eighteen (18) varieties of potato were cultivated in the study areas, among them 13 were HYVs and 5 were local varieties. Out of 41 HYVs of potato developed by BARI upto 2008, 13 were cultivated in the study areas. Maximum (89.7%) area of HYV potato was covered by Diamant, Cardinal, Granola and Multa. At Chandina and Gozaria, potato area was only cultivated by HYVs. Shibganj and Pirganj shared 64 and 61% potato areas, respectively under HYVs. Average potato yields of these upazilas and Gozaria were 14.34 and 24.36 t/ha, respectively, during 2008-09. Production cost and selling price were Tk. 8.73 and 11.56 per kg, respectively at the time of harvest in 2009. Benefit Cost Ratio (BCR) of potato was 1.32 and maximum was 1.37 at Pirganj. Besides adopting high yielding and hybrid varieties, management practices should be improved. It is possible to increase potato production by vertical and horizontal expression.

Keywords: Union level digital database, maps, area, production, adoption, potato.

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IN VITRO REGENERATION THROUGH CALLUS IN POINTED GOURD *(Trichosanthes dioica* Roxb.)

M. A. MALEK, M. A. MANNAN, D. KHANAM
M. H. MOLLA AND M. KHATUN

Abstract

An efficient protocol was developed for *in vitro* plant regeneration and multiplication through callus culture in pointed gourd. Among the explants, highest percentage of cotyledon explants (92.00%) produced callus when this explant cultured in MS medium supplemented with NAA (0.1, 0.5, 1.0, 1.5, and 2.0 mg/l) and 2, 4-D (0.1, 0.5, 1.0, 1.5, and 2.0 mg/l). The highest number of shoots per explant was observed in MS + 0.5 mg/l BAP + 0.5 mg/l NAA followed by 1.0 mg/l BAP + 0.5 mg/l NAA when inter-node derived callus cultured in MS medium. Among the explants derived calli from leaf, inter-node and cotyledon in *in vitro* regeneration study, inter-node appeared as the most suitable explant for callusing and plant regeneration. The best response

towards root induction was achieved on half MS medium supplemented with 0.5 mg/l NAA. The regenerated plantlets were successfully established in prepared earthen soil pot.

Keywords: *In vitro* regeneration, pointed gourd.

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QUALITY OF TOMATO *(Lycopersicon esculentum* Mill.) AS INFLUENCED BY BORON AND ZINC UNDER DIFFERENT LEVELS OF NPK FERTILIZERS

M.A. SALAM, M.A. SIDDIQUE, M.A. RAHIM
M. A. RAHMAN AND M.G. SAHA

Abstract

The study was conducted at the vegetable research farm of the Horticulture Research Centre, Bangladesh Agricultural Research Institute, Joydebpur, Gazipur during the period 2006-2007 to investigate the effects of boron and zinc in presence of different levels of NPK fertilizers on quality of tomato. There were twelve treatment combinations which comprised four levels of boron and zinc viz., i) B_0Zn_0= 0 kg B + 0 kg Zn/ha, ii) $B_{1.5}Zn_{2.0}$= 1.5 kg B + 2.0 kg Zn/ha, iii) $B_{2.0}Zn_{4.0}$ = 2.0 kg B + 4.0 kg Zn/ha , iv) $B_{2.5}Zn_{6.0}$, 2.5 kg B + 6.0 kg Zn/ha and three levels of NPK fertilizers viz., i) 50% less than the recommended NPK fertilizer dose (50% <RD), ii) Recommended NPK fertilizer dose (RD), iii) 50% more than the recommended NPK fertilizer dose (50% >RD). The highest pulp weight (88.14%), dry matter content (5.34%), TSS (4.50%), acidity (0.47%), ascorbic acid (10.95 mg/100g), lycopene content (112.00 µg/100g), chlorophyll-a (41.00µg/100g), chlorophyll-b (56.00 µg/100g), marketable fruits at 30 days after storage (67.48%) and shelf life (16 days) were recorded with the combination of 2.5 kg B+ 6 kg Zn/ha and recommended dose of NPK fertilizers (N= 253, P= 90, and K= 125 kg/ha).

Keywords: Quality of tomato, boron and zinc, NPK fertilizer.

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GENOTYPE-ENVIRONMENT INTERACTION FOR COB YIELD AND MATURITY IN BABY CORN *(Zea mays* L.)

KAMRUN NAHAR, S. AHMED, M. A. L. AKANDA
M. A. A. MONDAL AND M. A. ISLAM

Abstract

Genotype-location interaction and phenotypic stability of cob yield and maturity parameters of eight baby corn genotypes including hybrids and composite varieties were assessed during *rabi* 2006-2007. Significant genotype-environment interactions were observed for all the characters under study. Pooled deviations were also found significant for all the characters except days to harvesting. The genotype Khoibhutta was found stable for days to tasselling, days to harvesting and yield of by product and suited to unfavourable environment. On the other hand, the BBC_1 was stable across environments for days to harvesting and cob yield. Genotype NS pop corn was stable for days to tasselling and suited to unfavourable environment and stable for yield of by-product and cob yield across the environments. The genotype BHM5 showed stable performance only for cob yield across the environments.

Keywords: Stability, genotype, environment, G × E, yield components, baby corn.

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EFFECTS OF DIFFERENT AGED POULTRY LITTER ON THE YIELD AND NUTRIENT BALANCE IN BORO RICE CULTIVATION

A.T.M. S. HOSSAIN, F. RAHMAN, P. K. SAHA
AND A.R.M. SOLAIMAN

Abstract

A two years' field trial was conducted to evaluate the effect of poultry litter (PL) incorporation of different ages on the yield, nutrient uptake and nutrient balance in Boro rice at BRRI experimental farm, Gazipur (AEZ-28 and land type-High Land) during 2004-05 and 2005-06 Boro seasons. Eight treatment combinations with different aged PL and chemical fertilizers along with a control treatment (no fertilizer) were tested. The treatment

combinations were 0, 30, 60, 90, and 120 days' aged poultry litter, farmers' 135 days aged poultry litter and 50% of soil test based (STB) chemical fertilizers. All PL treatments received poultry litter 3 t/ha and 50% of STB chemical fertilizers. In both years, 30 days old PL produced significantly higher rice yield with higher nutrient uptake.

Keywords: Poultry litter, aging, grain yield, nutrient balance.

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IN VITRO GROWTH AND DEVELOPMENT OF *DENDROBIUM* HYBRID ORCHID

H. KHATUN, M. M. KHATUN, M. S. BISWAS
M. R. KABIR AND M. AL-AMIN

Abstract

The experiment was conducted to investigate the combined effect of different plant growth regulators and charcoal supplementation in MS medium on growth and development of plantlets regenerated from protocorm like bodies (PLBs) of hybrid orchid. The combination of BAP + NAA, BAP + IAA, BAP + IBA, and IAA + IBA at different concentrations with charcoal supplementation was studied. The result revealed that the use of different growth regulators had significant effect on different parameters studied. The maximum weight of PLBs (5.123 g) was obtained from the combination of BAP + IBA at 1.0 mg/l each. The highest shoot height (3.239 cm) and maximum number of rooted plantlets (4.473) was obtained from 1.0 mg/l each of BAP + NAA combination. The maximum number of leaves (3.490) and the maximum length of leaves (1.946 cm) were obtained from 1.0 mg/l each of BAP + IBA and the highest leaf width (1.166 cm) was obtained from 0.5 mg/l BAP +1.0 mg/l IBA combination. The highest root length was obtained from 0.5 mg/l each of BAP + IAA and the maximum number of regenerated plantlets (20) was obtained from 0.5 mg/l IAA + 1.0 mg/l IBA combination. However, the maximum fresh weight of single shoot (0.219 g) and the maximum number of roots per plantlet (6.300) was obtained from 1.0 mg/I each of IAA + IBA combination.

Keywords; *Dedrobium*, orchid, hybrid, *In vitro* growth.

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NITROGEN UPTAKE AND PROTEIN YIELD IN LENTIL AS INFLUENCED BY SEED COLLECTION FROM DIFFERENT PARTS OF PLANTS

A. KHATUN, M. A. H. BHUIYAN AND T.K. DEY

Abstract

Field experiments were carried out during *rabi* (winter) seasons of 2004-2005 and 2005-2006 at the Bangladesh Agricultural Research Institute Farm, Gazipur to determine the effects of seeds collected from different plant parts on nitrogen content and nitrogen uptake, protein content, and protein yield of lentil. Lentil seeds were collected from different parts of lentil plants viz. i) seeds collected from upper parts (P_1), ii) seeds collected from middle parts (P_2), and iii) seeds collected from lower parts of lentil plants (P_3). Significant variation among the three test varieties of lentil was observed for nitrogen content and nitrogen uptake, and protein content where the highest concentration of nitrogen was observed in BARI Masur-4 which ultimately gave higher protein yield, while the lowest was in BARI Masur-2. Seeds collected from different plant parts had significant effect for nitrogen and protein content where P_3 site recorded the highest results. BARI Masur-2 seeds collected from lower parts of lentil recorded higher N content and protein content but BARI Masur-4 seeds collected from lower parts or BARI Masur-3 seeds collected from middle parts gave higher N uptake and protein yield.

Keywords: Lentil, nitrogen uptake, protein yield.

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EFFECT OF HIGH TEMPERATURE STRESS ON THE PERFORMANCE OF TWELVE SWEET PEPPER GENOTYPES

S. R. SAHA, M. M. HOSSAIN, M. M. RAHMAN
C. G. KUO AND S. ABDULLAH

Abstract

A study on heat tolerance in sweet pepper was conducted at the Asian Vegetable Research and Development Centre (AVRDC),

Taiwan from December 1999 to May 2000. Experiments were carried out to investigate the influence of 29/23°C and 24/18°C stress on 12 sweet pepper genotypes on growth, development, reproductive behaviour and yield potentialities and to verify the results of the phytotron study. Performance of 12 sweet pepper genotypes was evaluated under two different temperature regimes of 24/18° C and 29/23° C in the phytotron. Plant height was found higher at 29/23° C compared to 24/18° C. High temperature reduced percent fruit set as well as size of fruits. Individual fruit weight was higher (7.44-125.00 g) when grown at 24/18°C and lower (5.35-103.80 g) at 29/23°C. Out of 12 genotypes, SP00l, SP002, SP004, and SP012 performed poor in respect of per plant yield at higher temperature compared to the lower temperature. So, these four genotypes were considered to be heat sensitive than the others. Leaf proline content of the sensitive genotypes decreased under the high temperature conditions and the heat tolerant lines produced higher amount of proline indicating the role of proline in expressing the heat tolerant capability of sweet pepper genotypes concerned.

Keywords: High temperature stress, performance, sweet pepper.

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INHERITANCE OF TIP STERILITY IN RELATION TO AURICLE PIGMENTATION AND WAXY BLOOM IN THREE CROSSES OF HEXAPLOID WHEAT *(Triticum aestivum* L.)

R. PARVEEN, M. M. UD-DEEN AND G. KABIR

Abstract

Two Bangladeshi varieties, Aghrani and Ananda were found with normal spikes, pink auricle and non-waxy blooms. The variety Akbar resembled these characters except the auricle colour, where it was white. On the contrary, the selected line FM-147 was found with tip sterile, white auricle, and waxy bloom characters. The F_1s in three different crosses (AG × FM-147, AN × FM-147) were found with normal spikes, white auricle, and non-waxy bloom. The F_1 population of three crosses were found to segregate in the proportion of 3:1 with normal and tip sterile plants. Backcross progenies were found to segregate into 1:1 ratio with normal and tip sterile plants. These results indicated that a recessive gene controls the tip sterility. The auricle pigmentation in F_2s of the crosses between AG × FM-147 and AN × FM- 147 was found to show the ratio 3:1 with auricle of pink and white pigmentation. Backcross progenies showed also the ratio 1:1. The inheritance of auricle pigmentation was also found to be governed by a single recessive gene. The F_2s in three crosses showed the ratio 3:1 with waxy bloom and non- waxy bloom. Backcross progenies showed also the ratio 1:1 for these two characters. The F_2 populations for two characters at a time were found to segregate into a dihybrid ratio of 9:3:3:1 indicating the absence of any linkage between these two characters.

Keywords: Inheritance, tip sterility, hexaploid wheat.

Bangladesh J. Agril. Res. 35(4) : 543-551, December 2010

EFFECT OF NEEM BASED BOTANICALS ON CHICKPEA POD BORER UNDER LABORATORY CONDITION

M. M. RAHMAN, S. P. RAY AND M. S. HOSSAIN

Abstract

Different neem based botanicals, such as neem oil, neem seed kernel extract and neem leaf extract with trix were sprayed in three doses on chickpea pod borer. The weight of full fed larva (3.35mg), total life span (32.23+0.31) and the cumulative mortality percentage of larva (20.33%) were found to be highest in the dose of neem oil @1.5% + trix 5 mg and the lowest records of these parameters were found in untreated control. The antifeedant effect of different botanicals on chickpea pod borer larva was more in the above treatment as the highest cumulative mortality (11.67%) was recorded and the lowest (2.00%) in control. The maximum length, breadth, and weight of pupae were recorded from untreated control and the minimum length breadth, and weight of pupae were recorded in the highest dose of the botanicals.

Keywords: Evaluation, neem based botanicals extract, chickpea pod borer and infestation

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CORRELATION AND PATH ANALYSIS IN LEMON *(Citrus limon* L.)

M. I. HOSSAIN AND M. G. RABBANI

Abstract

Cienotypic and phenotypic correlations and their paths of contribution were estimated using morphological characters of sixty nine lemon genotypes. For most of the cases, the genotypic correlation coefficient values were greater than corresponding phenotypic ones, indicating strong inherent relationship among the traits. Plant height and diameter of fruits had positive and significant correlation with yield. Highly significant and positive correlations observed for % fruit set and number of fruits per plant with yield. Path analysis also revealed the importance of these two characters and would be considered for effective selection.

Keywords: Genotypic and phoetypic, path analysis, lemon.

Bangladesh J. Agril. Res. 35(4) : 561-571, December 2010

ECONOMIC FEASIBILITY OF SOYBEAN *(Glycine max* L.) PRODUCTION IN SOME SELECTED AREAS OF BANGLADESH

M. AKTER, M.A. MONAYEM MIAH, M.M.H. KHURRAM
M.S. RAHMAN AND Q. M. ALAM

Abstract

This study was conducted in two soybean growing areas, namely Noakhali and Laxmipur districts of Bangladesh during the year of 2007-2008. The results of the study indicated that soybean cultivation was profitable in both the areas since the gross margin was Tk.18407/ha. In general, undiscounted Benefit Cost Ratio (BCR) was found to be 2.23. Among the competitive crops, soybean was the second most profitable crop in the study areas. DRC ratio 0.39 indicated that soybean production had comparative advantage rather than import. Soybean was high yielding and low cost crop. Farmers of low income group can cultivate this crop for obtaining higher benefit. Proper training and regular monitoring are essential to popularize this crop and increase soybean production in the study areas of Bangladesh and needs mitigation of problems.

Keywords: Soybean production, relative profitability, comparative advantage.

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EFFECT OF DATE OF PLANTING AND SPACING ON THE YIELD ATTRIBUTES AND YIELD OF DIFFERENT VARIETIES OF COUNTRY BEAN *[Lablab purpureus* L. (Sweet)]

M. MONIRUZZAMAN, J. HASAN, N. U. AHMED
Z. A. FIROZ AND A. K. M. QUAMRUZZAMAN

Abstract

A field experiment on country bean *[Lablab purpureus* L. (Sweet)] was conducted at the Agricultural Research Station, Raikhali, Chandraghona, Rangamati during two consecutive cropping seasons (August 2005 to April 2007) to find out the effects of date of planting (30 Aug. 15 Sep., 30 Sep., 15 Oct., 30 Oct., 15 Nov. and 30 Nov.), plant spacing (75 cm x *75* cm and 100 cm x 100 cm) on the yield attributes and yield of three photosensitive country bean varieties (BARI Seem-I, BARI Seem-4, and Sitakundo local). 15 September planting gave maximum pod size, number of pods per plant, individual pod weight and pod weight per plant, while those of 30 September planting performed similar in respect of above three parameters except pod size. The pod yield decreased gradually from 15 September to 30 November planting. 15 September planting gave the highest pod yield (23.49 t/ha), which was at par with 30 September planting (23.26 t/ha. The highest number of pods per plant, individual pod weight, pod weight per plant, and pod yields were produced by BARI Seem-4 closely followed by Sitakundo local. The maximum pod yield (27.32 t/ha) was obtained from BARI Seem-4 planted at 30 September followed by the same variety with 15 September planting (26.54 t/ha), while the highest pod yield (22.01 t/ha) was obtained from BARI Seem-4 with 100 cm x 100 cm spacing. 30 September planting and 100 cm x 100 cm spacing combinedly

gave the maximum pod yield (26.33 t/ha), which was at par with the same spacing with 30 September planting (26.07 t/ha). The combination of 30 September planting, 100 cm x 100 cm spacing and BARI Seem-4 produced significantly the highest pod yield (32.24 t/ha). All the three varieties could be cultivated upto 30 September with good yield, but reasonable yield could be obtained upto 30 October planting with wider spacing.

Keywords: Planting time, spacing, photosensitive, country bean, *Lablab purpureus* L. (Sweet).

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CORRELATION AND PATH COEFFICIENT STUDIES IN CUCUMBER *(Cucumis sativus* L.)

M. NAZIM UDDIN, M.M. RAHMAN, M.U. MOLLA
M. SAIFULLAH AND L. YASMIN

Abstract

Thirty six diverse genotypes of cucumber those were selected and evaluated based on genetic as well as eco-geographical diversity study at the Research Farm, Olericulture Division, Horticulture Research Center, Bangladesh Agricultural Research Institute, Gazipur during October 2005 to February 2006 to determine the genotypic and phenotypic correlations along with their direct and indirect effects through path coefficient analysis in cucumber as to estimate the contribution of most important characters towards yield. In combination with correlation coefficient and path analysis, it was found that number of fruits per plant and single fruit weight gave the significant positive correlation coefficient with yield, and also produced the high positive direct effect. From the correlation coefficient and path analysis, it was revealed that the direct effect of single fruit weight, fruit width, number of fruits per plant was accounted almost equal or near to the correlation coefficient value which indicated the correlation explain the true relationship and the direct selection of genotypes through this traits would be effective. Vine length, number of branches per plant, flesh thickness, placental thickness, and days to 50% female flowering had determinative indirect effect towards yield need to be considered for simultaneous selection. Therefore, emphasis should be given to selection of these characters for the improvement of yield in cucumber.

Keywords: Cucumber, *(Cucumis sativus* L.), correlation, path cofficient studies.

Bangladesh J. Agril. Res. 35(4) : 595-603, December 2010

CONTRIBUTION OF VEGETABLE CROPS TO THE NATIONAL GDP OF BANGLADESH

M. R. KARIM, M.A. BASET, M. AKTER
M.A.K. AZAD AND S. BEGUM

Abstract

The study was conducted to estimate the contribution of vegetable crops to GDP in the national economy of Bangladesh during the financial year 2005-2006 at constant market price of 1999-00. For the purpose of GDP calculation of vegetable crops, both primary and secondary data were collected from the concerned scientists of BARI, BBS, and DAM. The total area of vegetable crop was found to be 574.39 thousand hectares and produced 13725.06 thousand metric tons of vegetables. The total export quantity was found to be 6046 metric tons of 54 kinds of different vegetables. Total foreign exchange earning was estimated at Tk. 1120.00 million through exporting only 0.044 percent of total vegetable production. Bangladesh produced total goods and services whose valuation at constant market price of Tk. 3150370.14 million in the financial year 2005-2006 where the contribution of agriculture and forestry was found to be Tk. 467436.18 million (14.84%). The value added of total vegetable crops was estimated Tk. 72060.16 million in the year 2005-06, while vegetable technologies contributed Tk. 36617.80 million. The contribution of total vegetable was estimated 15.42 percent, while vegetable technologies contributed 7.83 percent of agriculture and forestry to the national GDP.

Keywords: Contribution, vegetable, national GDP.

Bangladesh J. Agril. Res. 35(4) : 595-603, December 2010

CONTRIBUTION OF VEGETABLE CROPS TO THE NATIONAL GDP OF BANGLADESH

M. R. KARIM, M.A. BASET, M. AKTER
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Keywords: Contribution, vegetable, national GDP.

Bangladesh J. Agril. Res. 35(4) : 605-610, December 2010

INCIDENCE OF MAJOR TEA DISEASES IN BANGLADESH

M. S. ISLAM AND M. ALI

Abstract

An experiment was carried out for eight years to find out the role of disease promoting factors on economically potential diseases of tea due to season, topography, pruning, and variety. A total of six diseases viz. red rust, branch canker, horse hair blight, thread blight, black rot, and gall were recorded. The maximum average infestation of horse hair blight was found both in Tillah and Kunchi areas. In Flat areas, highest incidence was observed in case of branch canker. Red rust disease was found always lowest in all the Tiilah, Flat, and Kunchi areas. Branch canker was found to be highest both in Light Pruning and Deep Skiff receiving sections, while horse hair blight in Medium Skiff and Light Skiff sections. The infestation of horse hair blight, branch canker and thread blight were more on seedling. gall disease was found only on TV 1. Maximum diseases incidence except gall prevailed during May to August in general. Gall disease showed an increasing trend from the month of May to December.

Keywords : Incidence, major diseases of tea, Bangladesh.

Bangladesh J. Agril. Res. 35(4) : 611-619, December 2010

STUDY ON THE HETEROSIS IN HYACINTH BEAN *[Lablab purpureus* L. (SWEET)]

M. S. ISLAM, M. M. RAHMAN AND M. A. K. MIAN

Abstract

Twenty hybrids, hyacinth bean were developed by 5 X 5 diallel fashion crossing during winter season of 2005-2006 at the experimental field of Banghabandhu Sheikh Mujibur Rahman Agricultural University with a view to exploiting heterosis for some economic traits. The hybrids and their involving five parents were evaluated during June 2006 to January 2007 for heterosis study. The better parent heterosis was estimated for nine characters. Considering better parent heterosis, the solitary cross $P_1 \times P_2$ exhibited positive heterosis for number of pods per plant, pod yield per plant, 100-green seed weight and number of seeds per pod. Again the hybrid $P_1 \times P_2$ produced the highest heterobeltiotic effect of -3.9% for days to first flower. Out of 20 hybrids, only six produced heterotic effect for pod yield per plant. The cross $P_1 \times P_2$ exhibited the highest significant and positive heterosis (38.53%) on pod yield. So the cross $P_1 \times P_2$ can be selected as heterotic cross for pod yield and other useful traits. Per se performance showed that the cross combination $P_3 \times P_4$ produced the highest pod yield per plant (3.41 kg). However, the

crosses P, × P_2, P, × P_5, P_2 × P_5, and their reciprocals exhibited photo insensitive/earliness behaviour since they flowered in the month of August. Among them the hybrid P, × P_2 had the highest pod yield potential (3.02 kg/plant).

Keywords: Hybrid, heterosis, hyacinth bean, *Lablab purpureus* L. (Sweet).

Bangladesh J. Agril. Res. 35(4) : 621-630, December 2010

AN ECONOMIC STUDY OF MANGO *(Mangefera indica* L.) CULTIVATION IN CHAPAINAWABGANJ AND DINAJPUR DISTRICTS OF BANGLADESH

M. S. RAHMAN, M. A. MATIN, S. HOSSAIN
M. R. KARIM AND M.A. SALAM

Abstract

The study was conducted to find out the trend and profitability of mango production in Chapainawabganj and Dinajpur districts during the period of 2008-09. The study revealed that mango cultivation was found profitable in the study areas although return was negative during first four years of cultivation. The yield was found higher in Dinajpur compared to that in Chapainawabganj. The BCR was found to be 2.23 and 2.54 for Chapainawabganj and Dinajpur District, respectively. Internal rate of return (IRR) was found 20 percent for Chapainawabganj and 19 percent for Dinajpur District. In the study areas, farmers faced problems like lack of adequate good seedling, insecticides, natural disasters etc. during mango cultivation.

Keywords: Mango, profitability, net present value, internal rate of return.

Bangladesh J. Agril. Res. 35(4) : 631-642, December 2010

DIFFERENTIAL RESPONSES OF F_2-DERIVED F_5 BULKS OF FIVE WHEAT CROSSES TO HIGH TEMPERATURE

N.C.D. BARMA, M. A. ISLAM, M. A. HAKIM
AND D. K. R. SARKER

Abstract

The experiment was conducted to study the differential responses of the F_2-derived F_5 bulks of five wheat crosses to high temperature and to identify heat tolerant genotypes using heat susceptibility indices. Four best F_5 bulks from each cross along with five parents were tested at Dinajpur, Jessore, and Joydebpur under optimum (18-30 November) and late seeding (19-26 December) during 2003-04. Mean temperatures during grain filling duration in late seeding were 2.05°C, 3.13 °C, and 4.20°C higher than optimum seeding at Dinajpur (18.11.03), Jessore (30.11.03), and Joydebpur (24.11.03), respectively. Significant differences were observed between optimum and late seeding at each location for all morphophysiological traits except days to anthesis. Grain filling duration (GFD), physiological maturity, biomass, grain yield, and 1000-grain weight were significantly reduced in late seeding time at each location. Among the traits, number of grains per spike was the least affected by late planting. Both grain yield and grain-filling duration reduced simultaneously under late planting and as a result grain filling rate remained almost similar compared to optimum seeding. Genotypes showed wide range of variation for heat susceptibility indices (`S' value) based on both 1000-grain weight and grain yield. Among the 20 F5 bulks, 13 genotypes showed different levels of tolerance to high temperature having 'S' values (based on both 1000-grain weight and grain yield) less than unity. Out of which, three F5 bulks derived from Kanchan x Gourab crosss (KG-1, KG-2, and KG-3) and two F_5 bulks derived from Gourab x Fang 60 (GF-1 and GF-3), one each F_5 bulk derived from Kanchan x Pavon 76 cross (KP-3) and Gourab x Pavon 76 (GP-3) showed high yield potential as well as high 1000-grain weight. The heat tolerant genotypes based on 'S' estimates also found to be associated with relatively cool canopies i.e. high canopy temperature depression, high Chlorophyll retention, high stomata] conductance and high membrane thermostability. Based on the `S' values, the parents, Gourab, Fang 60, and Kanchan were found moderately heat tolerant (S>0.5<1.00) and Kalyansona and Pavon 76 were heat susceptible (S>1 .00). The F5 bulks with less susceptibility indices and high yield potential were identified for further evaluation.

Keywords: Differential response, heat susceptibility index, heat tolerance.

Bangladesh J. Agril. Res. 35(4) : 643-648, December 2010

GENE ACTION FOR YIELD AND ITS COMPONENTS IN HEAT TOLERANT TOMATO *(Solanum lycopersicum* L.)

S. AHMAD, A.K.M. QUAMRUZZAMAN AND M. NAZIM UDDIN

Abstract

A study on the attribute for yield and yield components of 28 F_1s and their eight parents in 8 x 8 diallel (excluding reciprocals) of heat tolerant tomato conducted at BARI Campus, Joydebpur, Gazipur showed that the magnitude of D were higher than H_I in case of flowers per cluster, percent of fruit set and fruit length indicating the predominance of additive components over dominance components. The values of the ratio of number of total dominant and recessive gene estimated were more than one for most of the characters except yield per plant, branches per plant, and plant height indicating the asymmetrical distribution of dominant and recessive alleles in the parents and an excess of dominant gene. Broad sense heritability were higher in all the parameters, but heritability in narrow sense were higher or relatively high for flowers per cluster, percent fruit set, fruits per plant, fruit length, branches per plant, plant height, and percent of viable pollen grain. The asymmetrical distribution of the positive and negative alleles at all loci was found for most of the characters.

Keywords: Gene action, yield and heat tolerant tomato.

Bangladesh J. Agril. Res. 35(4) : 649-656, December 2010

INFLUENCE OF ROOTSTOCK AND TIME OF T-BUDDING IN ROSE

S. N. MOZUMDER, M. MONIRUZZAMAN, A. S. M. MESBAHUDDIN
F. N. KHAN AND T. K. PAUL

Abstract

The experiment was conducted at Agricultural Research Station, Raikhali, Chandraghona, Rangamati Hill District during June 2004 to May 2005 to know the influence of rootstock and time of T-budding on the success and performance of grafted Hybrid-T rose cultivar Mirandi. A randomized complete block (factorial) design was followed having three types of stock and six times of budding in every month from 15 October to 15 March. The rootstock *Rosa gigantea* showed superiority on success of cutting and budding, branching, length of branch, number of leaves, and flower production over China rose *(Duck de bern* or *Archdule charles)* and white rose *(Rosa multiflora).* Budding success and all other performances in all varieties were better when budded in 15 November, 15 December, and 15 January. Rapid budbreak (6.67 days after budding) was observed in 15 January budding on Gigantea rootstock. The maximum success of budding (95.0%), shoot length (37.14cm), number of branches (3.23/plant), and flowers (1.47/plant) was found in the 15 December budding on Gigantea root stock.

Keywords: Rootstock, T-budding, Hybrid-T rose, time, cutting.

Bangladesh J. Agril. Res. 35(4) : 657-663, December 2010

GROWTH PARAMETER STUDY IN HYBRID ORCHID THROUGH *IN VITRO* CULTURE

H. KHATUN, M. M. KHATUN, D. KHANAM
M.A. MALEK AND M. Al-AMIN

Abstract

The experiment was conducted to investigate the combined effect of different plant growth regulators and charcoal supplementation in MS medium on growth and development of plantlets regeneration from protocorm like bodies (PLBs) of hybrid orchid. The combination of BAP + NAA, BAP + IAA, BAP + IBA, and IAA + IBA at different concentrations were studied. The result revealed that the use of charcoal and different growth regulators had significant effect on different parameters studied. The highest shoot height (3.85 cm) and maximum fresh weight of single shoot (0.880 g) was obtained from 1.0 mg/1 each of BAP + IAA combination. The maximum number of leaves (4.460) was obtained from *0.5* mg/I each of BAP + NAA and the highest leaf length (2.583 cm) was obtained from 1.0 mg/I each of BAP + IBA combination. However, the highest leaf width (1.120 cm) and the maximum number of regenerated plantlets (30) was obtained from 0.5 mg/I IAA + 1.0 mg/I IBA combination.

Keywords: Dendrobium, orchid, hybrid, *In vitro* growth, charcoal.

Bangladesh J. Agril. Res. 35(4) : 665-667, December 2010

DETERMINATION OF PEST COMPLEX, POPULATION ABUNDANCE AND DAMAGE TO COUNTRY BEAN *[Lablab purpureus* (Syn.)]

F. M. A. ROUF, M. A. SARDAR AND M. A. HAQUE

Abstract

The present study on pest complex of country bean was conducted at Regional Agricultural Research Station, Jessore, Bangladesh in *kharif* and *rabi* seasons of 2005-06 and 2006-07. Sixteen insect pests and one mite pest were recorded at different growth stages of country bean in the field. Eight insect pests and one mite pest occurred on the leaves. They were striped flea beetle, epilachna beetle, leaf miner, grasshopper, pumpkin beetle, leaf roller, jute hairy caterpillar, white fly, and red mite. Five species of insect pests viz., legume pod borer, gram pod borer, plume moth, aphid, and Taiwan tussock moth occurred on both flowers and pods. Taiwan tussock moth was found to be new record on country bean in Bangladesh. Thrips were not identified, but they infested flowers only. Pea pod borer and pod sucking bug (not identified) exclusively infested bean pods. Among pests complex of country bean in respect of flower and pod damage, the legume pod borer was the most abundant, serious and destructive insect pest of country bean.

Keywords: Pest complex, country bean, insect, mite.

Bangladesh J. Agril. Res. 35(4) : 679-694, December 2010

IMPACT OF HEALTHY SEED ON YIELD AND PESTS INCIDENCE IN RICE

A.S.M. NAZRUL ISLAM, S.M. FAKHRUL ISLAM AND M.A. TAHER MIAN

Abstract

The study was undertaken at Chuadanga and Gazipur districts representing as drought prone and favourable area, respectively. Farmers' participatory experiments were conducted in Boro and T.Aman seasons. Seeds were collected from farmer's own seed stock (unclean seed) and cleaned seed in the Seed Health Unit Laboratory at Bangladesh Rice Research Institute (BRRI). Five hundred grams of clean and healthy seeds of different rice varieties were distributed among the selected farmers. Data were collected from farmers' fields, which was analyzed by use of Area Under Progress Curve. Farmers perceived that a little portion of yield reduction is caused by discoloured and smutted seeds. With off types seeds, deformed seeds, insect damaged seeds also reduce yield. Healthy rice seed production and use are pre-requisites for accelerated agricultural growth and this could play a leading role in bringing rural prosperity and economic transformation. Area Under Progress Curve (Plant growth, insect and disease) showed that some agronomic, insect and disease variables were statistically significant between apparently healthy seeds and unclean seed plots in both the locations implying that there was less insect and pest attack in healthy seed plots than that of the farmers saved seed plot. The results also reveal that rice yield with healthy seeds were higher than that of the farmers saved seeds.

Keywords: Healthy seed, rice, pests and disease incidence

Bangladesh J. Agril. Res. 35(4) : 695-702, December 2010

EFFECT OF HEDGEROW SPECIES AND NITROGEN LEVEL ON THE YIELD AND YIELD COMPONENTS OF OKRA *(Abelmoschus esculentus* L Moench)

Z. A. FIROZ, M. K. ALAM, M. M. RAHMAN AND M. MOHIUDDIN

Abstract

An experiment was conducted at the Hill Agricultural Research Station, Khagrachhari from June 2002 to November 2004 to find out the effect of hedgerow species (ipil-ipil, indigofera, pigeonpea, pineapple with control) and different nitrogen levels viz. 50, 75, and 100% recommended dose of N on the yield and yield components of okra in hill slope condition during rainy season. The most satisfactory okra yild (15.05 t/ha) was in indigofera+100% N that was statistically at par with Indigofera +75% N.

Keywords: Hedgerow species, nitrogen level, okra yield.

Bangladesh J. Agril. Res. 35(4) : 703-715, December 2010

TECHNICAL EFFICIENCY OF 1PM AND NON- 1PM FARMERS FOR EGGPLANT *(Solanum melongena* Linn) CULTIVATION IN BANGLADESH

M.A. HOSSAIN, M.A. MATIN, M. AKTER AND A.N.M. R. KARIM

Abstract

The study was carried out in three intensively eggplant growing districts of Comilla, Jessore, and Bogra to investigate technical efficiency and the factors responsible for inefficiency of the technologies among the IPM and non-IPM farmers. The average level of technical efficiency among 1PM farmers was 79% and that of non-IPM farmers was 75%. This implies that under the existing technology, the level of output could be increased by 21% and 25%, respectively. 1PM farmers were 14% technically more efficient than non-IPM farmers. Training experience, education, extension linkage, and quality seedlings played a significant role in the technical efficiency for IPM technologies at farm level.

Keywords: Eggplant, IPM and non-IPM farmers, partial budgeting, technical efficiency.

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PRODUCTIVITY AND ECONOMIC PERFORMANCE OF MAIZE-GREEN MANURE-T.AMAN RICE CROPPING PATTERN UNDER DIFFERENT NUTRIENT MANAGEMENTS

M.A.K. MIAN, A.M.A. KAMAL, S.M.A. HOSSAIN AND N. ISLAM

Abstract

A study was carried out at the Regional Agricultural Research Station, Jessore in two consecutive years of 2004-2005 and 2005-2006 to evaluate the productivity and economic performance of Maize-Green *manure-Taman* rice cropping patterns under different nutrient management. Maize-Mungbean (brown manuring) -*T. aman* rice cropping pattern under high nutrient level of 266-46132-28-2.10-0.60 kg per ha of N-P-K-S-Zn-B for maize and 100-13-43-6.0-0.70 kg per ha of N-P-K-S-Zn for rice and moderate nutrient level of 186-34-95-201.60-0.60 kg per ha of N-P-K-S-Zn-B for maize and 74-11-33-4.5-0.40 kg per ha of N-P-K-S-Zn for rice was found for better yield performance, productivity, land use efficiency, production efficiency and profitability as compared to the existing cropping pattern of Wheat-Fallow T. *aman* rice. This pattern rendered 88-90% higher maize equivalent yield than the existing cropping pattern. Furthermore, Maize-*GM(Dhaincha)- 7'. aman* rice and Maize- GM (Soybean)-T. *aman* rice proved to be better cropping patterns in respect of the aforesaid parameters under high and moderate nutrient levels. Maize- GM (Mungbean) —T *aman* rice, *Maize-GM (Dhaincha)* —T. *aman* rice, and Maize GM (soybean) -*T. aman* rice cropping patterns produced higher grain yield of maize (9.91-10.39 t/ha) and rice (5.22-5.90 t/ha) in high nutrient level. *Dhaincha* produced the highest dry matter (7.66-8.24 t/ha) followed by soybean (5.78-6.19 t/ha) with the lowest in mungbean (5.01-5.50 t/ha) in high and moderate nutrient levels. Inclusion of mungbean (brown manuring) in the sequence provided an extra remuneration with seed yield of 530-1050 kg/ha. The balance of organic matter, total N, exchangeable K, available P, S, and Zn were positive and higher in Maize-GM *(Dhaincha)- T aman* rice, Maize-GM (Mungbean) -T *aman* rice and Maize-GM (soybean) -T *aman* rice cropping patterns than in Maize- FallowT.aman rice and Wheat-Fallow-T.aman rice cropping patterns in all nutrient levels. It is concluded that Maize-Mungbean (seed and brown manuring)-T. *aman* rice cropping pattern would be more productive and profitable technology for Jessore area in Bangladesh.

Keywords: Productivity, cropping pattern, nutrient management.

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EFFECT OF REMOVAL OF SOME PHOTOSYNTHETIC ORGANS ON YIELD COMPONENTS IN DURUM WHEAT (*Triticum aestivum* L.)

ALPAY BALKAN, TEMEL GENÇTAN AND OĞUZ BILGIN

Abstract

This research was carried out in experimental field of Field Crops Department of Agricultural Faculty of Namik Kemal University in randomized split block design with three replications per treatment during 2004-2005 and 2005-2006. The objective of this study was to find out the contribution rates of awn, flag leaf, 1st upper leaf blade, 2nd upper leaf blade and other leaf blades to main yield components in three durum wheat cultivars (cv. Kiziltan-91, Kunduru-1149, and Yelken-2000). The results of this experiment showed that removal of awn, flag leaf, 1st upper leaf blade, 2nd upper leaf blade, and other leaf blades reduced significantly spike weight, number of grains per spike, grain weight per spike, and 1000-grain weight except the number of spikelets per spike. It was concluded that the organs play an important role in grain yield in durum wheat during grain filling stage.

Keywords: Photosynthetic organs, yield components, durum wheat.

Bangladesh J. Agril. Res. 36(1) : 13-20, March 2011

TIME AND AGE SPECIFIC MATING SUCCESS OF BUMBLEBEE (*Bombus terrestris* L.) REARED AT DIFFERENT PHOTOPERIODIC REGIMES

M. R. AMIN AND V. J. KWON

Abstract

In this study, mating success of bumblebee, *Bombus terrestris* was recorded by five age groups of queens viz. 3, 5, 7, 9, and 11 days old, and the males were two days older than each age group of queens. Newly emerged males and queens were collected from different colonies and they were reared under four photoperiods e.g., L0:D24, L8:D16, L16:D8, and L24:D0 for observing the mating activities. Three days old queens with 5 days old males showed the lowest mating success at all photoperiodic regimes. Most of the couples mated within first 15 minutes of pairing and mating success increased with increasing duration of mating exposure. At the L0:D24 and L8:D16 photoperiodic regimes 9 days old queens with 11 days old males had the highest mating success (65.4 ± 3.3 and 85.0 ± 2.3%, respectively) whereas at L16:D8 and L24:D0 photoperiodic conditions, the highest mating success occurred when 7 days old queens paired with 9 days old males (92.1 ± 1.7 and 76.3 ± 3.2%, respectively). These results indicate that rearing of bees at different light regimes, age of bees and duration of mating exposure had significant effect on mating success of *B. terrestris.*

Keywords: Age, *Bombus terrestris,* mating, photoperiod, time.

Bangladesh J. Agril. Res. 36(1) : 21-28, March 2011

GENETIC DIVERSITY OF SOME RESTORER LINES FOR HYBRID RICE DEVELOPMENT

M. U. KULSUM, M. J. HASAN, H. BEGUM, M. M. BILLAH AND H. RAHMAN

Abstract

Genetic divergence of thirty six restorer lines was studied through Mohalanobis's D^2 and principal component analysis for nine characters. Genotypes were grouped into five different clusters. Cluster III comprised of maximum number of genotypes (eleven) followed by cluster I and IV. The inter-cluster distance was maximum between clusters II and IV (14.064) indicating wide genetic diversity between these two clusters followed by the distance between cluster II and V (10.353), cluster III and cluster IV (8.588). The minimum inter- cluster distance was observed between cluster I and cluster III (2.885) followed by cluster I and cluster V (4.359) and cluster III and cluster V (4.825) indicating that the genotypes of these clusters were genetically close. The

intra cluster distance in the entire five clusters was less, which indicated that the genotypes within the same cluster were closely related. Among the characters, number of tillers/hill, panicle length, number of filled spikelets/ panicle, spikelet fertility % and yield/plant contributed most for divergence in the studied genotypes. It indicates that these parameters can contribute more for yield in hybrid rice development.

Keywords: Rice, restorer line, genetic divergence, D^2.

Bangladesh J. Agril. Res. 36(1) : 29-40, March 2011

ECONOMIC ANALYSIS OF MUNGBEAN (*Vigna radiata)* CULTIVATION IN SOME COASTAL AREAS OF BANGLADESH

Q. M. SHAFIQUL ISLAM, M. S. RAHMAN, M.A. HOSSAIN AND M.S. HOSSAIN

Abstract

The study was conducted in two coastal mungbean growing districts, namely Noakhali and Patuakhali of Bangladesh during the period of 2008-09 with a view to estimating the technical efficiency of mungbean growers. The study revealed that mungbean production was found profitable. The benefit cost ratio (BCR) was 2.22 on full cost basis. The estimated results showed that the average level of technical efficiency among the sample farmers was 89%. This implies that given the existing technology and level of inputs, the output could be increased by 11 percent. Farmer's education and experience had positive significant effect on mungbean production. Fifty nine percent farmers produced outputs to the maximum frontier output level. Farmers in the study area mentioned some constraints like high price of fertilizer, insecticides, severe attack of insects, etc. to the production of mungbean at farm level.

Keywords: Profitability, mungbean, technical efficiency.

Bangladesh J. Agril. Res. 36(1) : 41-50, March 2011

EFFECT OF CRUDE SEED EXTRACT OF SOME INDIGENOUS PLANTS FOR THE CONTROL OF LEGUME POD BORER *(Maruca vitrata* F.) ON COUNTRY BEAN

F. M. A. ROUF AND M. A. SARDAR

Abstract

The crude seed extract of neem, black pepper, mahogani, and garlic bulb with three doses were evaluated against legume pod borer in the country bean field in two seasons *kharif* 2006 and *rabi* 2006-2007. The neem seed extract applied @150 and 100 g/l and mahogani seed extract @ 100 g/l of water 7 days intervals on the country bean showed better performance in the reduction of flower and pod damage with significantly higher yield of bean in both the seasons. The seed extracts lost the efficacy against legume pod borer after 7 days of application.

Keywords: Indigenous plant materials, crude extract, country bean, legume pod borer.

Bangladesh J. Agril. Res. 36(1) : 51-62, March 2011

RICE PRODUCTION IN BANGLADESH EMPLOYING BY ARIMA MODEL

M. A. AWAL AND M.A.B. SIDDIQUE

Abstract

The present study was carried out to estimate growth pattern and also examine the best ARIMA model to efficiently forecasting Aus, Aman and *Boro* rice production in Bangladesh. It appeared that the time series data for Aus and Aman were 1st order homogenous stationary but Boro was 2nd order stationary. The study revealed that the best models were ARIMA (4,1,4), ARIMA (2,1,1), and ARIMA (2,2,3) for Aus, Aman, and Boro rice production, respectively. The analysis indicated that short-term forecasts were more efficient for ARIMA models compared to the deterministic models. The production uncertainty of rice could be

minimized if production were forecasted well and necessary steps were taken against losses. The findings of this study would be more useful for policy makers, researchers as well as producers in order to forecast future national rice production more accurately in the short run.

Keywords: Production, ARIMA model and forecasting of rice.

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EFFECT OF BORON ON YIELD AND MINERAL NUTRITION OF MUSTARD (*Brassica napus*)

M.A. HOSSAIN, M. JAHIRUDDIN AND F. KHATUN

Abstract

An experiment was conducted for three years from 2003-04 to 2005-06 to find out the optimum rate of (boron) B application for maximizing nutrient uptake and yield of mustard in calcareous soil of Jessore, Bangladesh. Boron was applied at 0, 1, and 2 kg/ha. The mustard variety BARI Sarisha-8, *(B. napus* group) was selected for the experiment. Effect of B was evaluated in terms of yield and mineral nutrients (N, P, K, S, Zn, and B) uptake. The mustard crop responded significantly to B application. The optimum rate of B was found to be 1 kg/ha There was no significant difference between 1 & 2 kg B/ha in all the years. Boron and N concentrations of grain and stover were significantly increased with increased rate of B application indicating that B had positive role on protein synthesis. In case of P, S, and Zn, the concentrations were significantly increased but in case of K, it remained unchanged in stover. The grain B concentration increased from 19.96 µg/g in B control to 45.99 µg/g and 51.29 µg/g due to application of 1 kg and 2 kg B/ha, respectively. Concerning the effect of B on the nutrient uptake, six elements followed the order K> N> S> P> B> Zn and these were significantly influenced by B application.

Keywords: Mustard, boron, yield, nutrient uptake.

Bangladesh J. Agril. Res. 36(1) : 75-85, March 2011

EFFECT OF ZINC AND BORON ON YIELD AND YIELD CONTRIBUTING CHARACTERS OF MUNGBEAN IN LOW GANGES RIVER FLOODPLAIN SOIL AT MADARIPUR, BANGLADESH

M. A. QUDDUS, M. H. RASHID, M. A. HOSSAIN AND H. M. NASER

Abstract

An experiment was carried out in Calcareous Low Ganges River Floodplain Soil (AEZ 12) at Pulses Research Sub-Station (PRSS), Madaripur during Kharif I of 2008 and 2009.The objectives were to evaluate the effect of zinc (Zn) and boron (B) on the yield and yield contributing characters of mungbean (*Vigna radiata* L. Wilczek) and to find out the optimum dose of Zn and B for yield maximization. There were four levels of zinc (0, 0.75, 1.5, and 3.0 kg/ha and boron (0, 0.5, 1.0, and 2 kg/ha) along with a blanket dose of N_{20} P_{25} K_{35} S_{20} kg/ha. The experiment was laid out in RCBD with three replications. Results showed that the combination of $Zn_{1.5}B_{1.0}$ produced significantly higher yield (3058 kg/ha) and (2631 kg/ha, in the year 2008 and 2009, respectively. The lowest yield (2173 kg/ha) and (1573 kg/ha, were found in control (Zn_0B_0) combination. The combined application of zinc and boron were observed superior to their single application in both the years. Therefore, the combination of $Zn_{1.5}B_{1.0}$ might be considered as suitable dose for mungbean cultivation in Bangladesh. But from regression analysis, the optimum treatment combination was $Zn_{1.87}$ $B_{1.24}$ kg/ha for Madaripur.

Keywords: Zinc, boron, mungbean, yield and yield contributing characters.

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COMPARATIVE ADVANTAGE OF VEGETABLES PRODUCTION IN BANGLADESH

M. R. KARIM, S. HOSSAIN, M. A. RASHID, M. A.K. AZAD AND M.A.H.S. JAHAN

Abstract

The study was undertaken to assess the comparative advantage of production and export of vegetables from Bangladesh. Fifty four

kinds of different vegetables were exported from Bangladesh. The importing countries were mostly in the Middle East. The demand for summer vegetables was found higher than those of winter vegetables. Total export quantity was found 6046 metric tons of vegetables and earned foreign exchange of Tk. 1120 million, which was only 1.18 percent of total value of vegetable production in Bangladesh. Among the export marketing cost items, air freights charges was found highest. For all the vegetables, DRCs were observed to be less than unity implying that Bangladesh had comparative advantage in vegetable production.

Keywords: Export potential, vegetables, foreign exchange earnings.

Bangladesh J. Agril. Res. 36(1) : 97-102, March 2011

STABILITY STUDY FOR GROWTH DURATION AND GRAIN YIELD OF EXOTIC HYBRID RICE GENOTYPES IN BANGLADESH

P. L. BISWAS, H. N. BARMAN, S. GHOSAL, S. TOHIDUZZAAN AND M. HAZRAT ALI

Abstract

Twenty eight rice genotypes were evaluated for their stability in respect of grain yield and growth duration during *boro* season of 2007-08 over five locations viz. Gazipur, Jamalpur, Comilla, Jinaidhah, and Rajshahi. Variances for genotypes, locations, and G × E interactions were significant for both the traits. Linear components of G × E interactions were insignificant but non-linear components (pooled deviation) were significant. Considering stability parameters (b_1 and S^2 d_1) for days to maturity, genotypes Raja, Ropa-1, and Sera were least responsive to environment (b_1 =1) and minimum deviation from regression (S^2 d_1 = 0) were stable over the locations. The estimates of stability parameters for grain yield revealed that the genotypes Ropa-1, SL-8, Lily and Sera were higher grain yielder, b value were close to the unity and S^2d_1 value were near to the zero. So, these four genotypes could be considered as the most stable over the environments. Considering both growth duration and grain yield based on stability parameters, the genotypes Ropa and Sera were identified as most stable and could be recommended for release as varieties.

Key words: Hybrid rice, stability and exotic.

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INVESTIGATION INTO EFFECT OF CRUDE MIXTURE OF *Abrus precatorius* SEED ON HYPOTHALAMOPITUITARY GONADAL AXIS AND DEVELOPMENT OF ANTIFERTILITY IN MALE RATS

S. TALUKDER, M. A. HOSSAIN, S. SARKER AND M. A. H. KHAN

Abstract

To evaluate the *antifertility* effect of crude mixture of *A. precatorius* seeds at the dose level of 50 mg/kg body weight in adult male rats, after oral administration to male rats for 40 days, the rats were sacrificed and hormonal profiles, serum biochemistry, sperm count and histological changes were recorded. A sharp decrease in the serum levels of testosterone (0.70 ± 0.17 ng/ml), FSH (0.70 ± 0.22 lU/L), and LH (0.87 ± *0.35* IU/L) was detected compared to control (FSH, LH and testosterone levels 0.93 ± 0.15 ng/ml, 0.76 ± 0.28 IU/L, 1.44 ± .011 IU/L, respectively). A significant reduction of epididymal sperm count (2.34 million/mL) was noted in treated rats as compared to control group (7.87 million/mL). Histology of testes showed marked atrophy of the testes, which was characterized by disruption of the seminiferous epithelium and atrophy of the Leydig cells. Crude mixture of *A. precatorius* seed has a negative impact on male reproductive functions. It might be suggested that crude mixture of *A. precatorius* seeds might have antifertility property for male rats.

Keywords: *Abrus precatorius*, antifertility, male rat, testosterone.

Bangladesh J. Agril. Res. 36(1) : 111-122, March 2011

PROFITABILITY OF SOME BARI RELEASED CROP VARIETIES IN SOME LOCATIONS OF BANGLADESH

MST. ESMAT ARA BEGUM, MD. NOZRUL ISLAM
Q. M. ALAM AND S. M. BYAZID HOSSAIN

Abstract

An attempt was made to asses the costs and returns from the cultivation of selected crops in different locations. Fifty farmers were selected for collecting data for each crop through random sampling for the year 2006-07. Study revealed that per hectare total costs were Tk. 51341, Tk. 32275, Tk. 20983, Tk. 27819, Tk. 63012, Tk. 61928, Tk. 87828, Tk. 65163, and Tk. 57775 for the cultivation of maize, groundnut, mungbean, sweet potato, cabbage, cauliflower, tomato, cucumber, and okra, respectively. Sample farmers received Tk. 31280, Tk. 23221, Tk. 12957, Tk. 70981, Tk. 56546, Tk. 72820, Tk. 247076, Tk. 61437 and Tk. 94822 per hectare as net returns from the cultivation of maize, groundnut, mungbean, sweet potato, cabbage, cauliflower, tomato, cucumber, and okra, respectively. The benefit cost ratios over total costs were 1.61, 1.72, 1.62, 3.55, 1.90, 2.17, 3.72, 1.94, and 2.64 for the cultivation of maize, groundnut, mungbean, sweet potato, cabbage, cauliflower, tomato, cucumber, and okra, respectively. High costs of fertilizers and insecticides were the major constraints to higher production for most of the crops as mentioned by the sample farmers.

Keywords: Profitability, crops, locations.

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REACTION OF BARLEY GENOTYPES TO *Bipolaris sorokiniana*

M. M. RAHMAN, A. K. M. M. ALAM, N. NAHER
S. M. SHARIFUZZAMAN AND M. A. N. UDDIN

Abstract

A study on response of 29 barley genotypes resistant to Bipolaris leaf blight *(Bipolaris sorokiniana)* was conducted to investigate the relationship of the components of resistance of 29 barley genotypes. Data on five components of resistance viz., infection frequency (number of lesions per plant), lesion size (mm^2), percent leaf area affected by lesion, percent necrotic area on leaf, and disease severity were recorded as components of resistance. The genotypes fall into four clusters. Cluster I was to be the largest having 11 genotypes which was followed by cluster III, IV, and II. Considering the overall mean performances of different clusters, genotypes of cluster II showed better performance against resistance. From the cannonical variate analysis, it was found that three components like lesion size, necrosis, and 100-seed weight were found positive for the both vector, and these characters contributed maximum towards the divergence for disease development of the barley accessions.

Keywords: *Bipolaris sorokiniana*, barley, leaf blight

Bangladesh J. Agril. Res. 36(1) : 129-141, March 2011

FARMERS' EFFICIENCY ENHANCEMENT THROUGH INPUT MANAGEMENT: THE ISSUE OF USG APPLICATION IN MODERN RICE

M. SHAHE ALAM, M. SAIFUL ISLAM AND M. A. ISLAM

Abstract

A socio-economic study was carried out in two rice production environments (Gazipur and Tangail) to assess the comparative advantages of using urea super granule (USG) over prilled urea (PU) in modern rice production and to examine the differences in producers' technical efficiency between USG user and non- user in crop management. Stochastic frontier production model was employed to examine the farm specific technical efficiency difference in crop management between USG and PU users in the study areas. Analysis revealed that comparatively low amount (36%) of urea was needed in modern *boro* rice production using USG instead of PU. Nearly 366 % more labour was needed in the USG using plots compared to that of PU user plots, while weeding cost was a bit lower in USG using plots. Analysis also indicated that the sample farmers were able to achieve additional yield of 0.87 t/ha by using USG and this yield gain further resulted to

additional benefit of Tk. 11506/ha. For the resource poor rice farms, this benefit is considered to be substantive. Farmers' contact with the technology disseminators, training on rice production and the use of USG (instead of PU) were the important factors of increasing rice farmers' technical efficiency in crop management and productivity enhancement as well. According to the farmers' opinion, there were several constraints in using USG and out of those, requirement of more labour and non availability of USG in proper time were the dominant ones.

Keywords: Urea super granule, prilled urea, flood-prone ecosystem, technical efficiency, productivity.

Bangladesh J. Agril. Res. 36(1) : 143-150, March 2011

EFFECT OF ALLEY SIZE AND HEDGEROW PRUNING INTERVAL ON PHENOLOGY AND YIELD OF OKRA *[Abelmoschus esculentus* (L.) Moench] IN HILL SLOPE

Z. A. FIROZ, M. H. RASHID AND M. S. HUDA

Abstract

An experiment was conducted at the Hill Agricultural Research Station, Khagrachhari from May 2002 to November 2004 to find out the effect of alley size (3.0 , 4.0, and 5.0 m) and hedgerow pruning interval (1, 2, and 3 months) on phenology and fruit yield of okra in hill slope condition during the rainy season. The highest fruit yield (16.14 t/ha) was produced by the plants grown in 3.0 m size alley. In case of hedgerow pruning interval, the highest yield (16.07 t/ha was recorded from 2 months pruning interval and it was significantly different with other two pruning intervals. The treatment combination of 3.0 m size alley with I month pruning interval produced significantly highest yield (17.67 t/ha). The highest gross return (Tk.176700/ha), net return (Tk.120380/ha) and BCR (3.14) were also found from the same treatment though highest cost of production was involved in this treatment.

Key words: Alley size, pruning interval, phenology, okra yield, cost benefit.

Bangladesh J. Agril. Res. 36(1) : 151-163, March 2011

QUALITY OF TOMATO AS INFLUENCED BY BORON AND ZINC IN PRESENCE OF DIFFERENT DOSES OF COWDUNG

M. A. SALAM, M. A. SIDDIQUE, M. A. RAHIM
M. A. RAHMAN AND M. A. GOFFAR

Abstract

The experiment was carried out at the Vegetable Research Farm of the Horticulture Research Centre, Bangladesh Agricultural Research Institute, Joydebpur, Gazipur to investigate the effect of boron, zinc, and cowdung on quality of tomato. There were 16 treatments comprising four rates each of boron and zinc viz., B_0Zn_0. $B_{1.5}Zn_2$ B_2Zn_4 and $B_{2.5}Zn_6$ kg/ha and four rates of cowdung viz., CD_0, CD_{10}, CD_{15}, and CD_{20} t/ha. Every plot received 253 kg N, 90 kg P, 125 kg K, and 6.6 kg S per hectare. The results reflected that the highest pulp weight (90.24%), dry matter content (5.82%), ascorbic acid (11.2 mg/100g). lycopene content (147 µg/100g), chlorophyll-a (42.0 µg/l00g), chlorophyll-b (61.0 µg/100g), boron content (36 µg/g), zinc content (51 µg /g), marketable fruits at 30 days after storage (74%) and shelf life (17 days) were recorded with the combination of 2.5 kg B/ha + 6 kg Zn/ha, and 20 t/ha cowdung.

Keywords: Quality of tomato, boron and zinc, doses of cowdung.

Bangladesh J. Agril. Res. 36(1) : 165-172, March 2011

GENETIC DIVERGENCE IN POTATO *(Solanum tuberosum* L.)

M. A. SATTAR, M.Z. UDDIN, M.R. ISLAM
M.K.R. BHUIYAN AND M. S. RAHMAN

Abstract

Twenty eight genotypes of potato representing different sources collected from TCRC, BARI, Gazipur were tested for genetic divergence utilizing multivariate analysis. The genotypes were grouped into five clusters. No relationship was found between genetic divergence and geographic distribution. Number of tubers per plant and yield contributed maximum, while average weight of a tuber and weight of tubers per plant contributed high towards

total divergence which offered due attention to these characters while selecting for increased tuber yield. The inter-cluster distance (D^2) was maximum (36.29) between III and IV. The highest and the lowest intracluster distances (D^2) were 9.64 and 2.48 in cluster III and II, respectively.

Keywords: Potato, selection, genetic divergence, cluster analysis, tuber yield.

Bangladesh J. Agril. Res. 36(1) : 173-181, March 2011

EFFECT OF WATER STRESS ON STOMATAL CHARACTERS OF TWENTY ONE NEAR ISOGENIC LINES OF WHEAT *(Triticum aestivum* L.)

A. M. S. ALAM, G. KABIR, M. M. UD-DEEN AND E. HOQUE

Abstract

The present study was carried out to determine the effect of water stress on stomatal characters of flag leaf of wheat *(Triticum aestivum* L.) where five different irrigation regimes were considered as environments. Stomatal opening frequencies were significantly decreased by water stress in both the surfaces of the flag leaf in both irrigated and rainfed conditions in all the near isogenic lines of wheat. In rainfed condition, it was lower than irrigated condition. Similarly stomatal index also significantly differed in different irrigation treatments at three different positions in both adaxial and abaxial surface but under rainfed condition, it was lower than the irrigated condition in all the genotypes. The pore lengths of flag leaf in both adaxial and abaxial surfaces were found similar in size. It also varied among the different irrigations, but the variations were not remarkable. In rainfed condition, the pore lengths of different genotypes showed lower values than irrigated condition. Effects of water stress on stomatal pore breadths in both the surfaces were significantly decreased in rainfed condition. But in different irrigation conditions, stomatal pore breadth were non-significant among the genotypes. The effect of water stress on different stomatal characters in both surface of leaf in different lines of wheat were decreased.

Keywords: Water stress, stomatal characters, wheat .

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PERFORMANCES OF HEAT TOLERANT TOMATO (*Solanum lycopersicum*) HYBRIDS DURING RAINY SEASON

S. AHMAD, M. S. ISLAM AND M. A. HOQUE

Abstract

An investigation was undertaken with a view to observing the performance of newly developed summer tomato hybrids during May 2008 to September 2008 at experimental field of Horticulture Research Centre, BARI, Gazipur. Number of fruits per plant, individual fruit weight, fruit size, etc. was significantly higher when the plants were treated with hormone. Fruit yield per plant was quite high in the hormone treated plant (1.57 kg) compared to untreated plants (0.90 kg). In general, all the hybrids performed better when treated with hormone in respect of yield compared to their corresponding untreated plants. The hybrid WP7 × C51 had the highest individual fruit weight (56.0 g) Among the hybrids, HT019 × WP10 had the highest fruit yield per plant (1.87 kg) closely followed by C-11 × WP10 (1.81 kg) when the plants were treated with hormone. The untreated plants of the hybrid lines C-41 × WP8, HT019 × WP10 and C-41 × WP10 produced more than 1.0 kg of fruits per plant. This indicates that there is bright scope of tomato production during summer through with and without hormone application, though application of hormone had positive effect on tomato yield.

Keywords: Heat tolerant tomato hybrids, rainy season.

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IMPACT ASSESSMENT OF PHEROMONE TRAPS TO MANAGE FRUIT FLY ON SWEET GOURD CULTIVATION

ATANU RAKSHIT, A. N. M. REZAUL KARIM, TATJANA HRISTOVSKA AND GEORGE W. NORTON

Abstract

This paper assessed the economic benefits of managing fruit flies infecting sweet gourd using pheromones. In this study, a

pheromone called Cuelure imported by the Bangladesh Agricultural Research Council (BARC) was used for suppressing fruit fly infesting sweet gourd. Analysis of the potential benefits of farmers adopting the Cuelure technology projects that benefits over 15 years range from 187 million Taka or $2.7 million to 428 million Taka or $6.3 million, depending on assumptions. The projected rate of return on the BARI investment in pheromone research ranges from to 140 to 165 percent. The size of these returns implies that pheromone research at BARI has a high economic return and that Bangladesh benefits significantly as Cuelure becomes more widely available to farmers.

Keywords: 1PM, pheromone, sweet gourd, economic impact assessment.

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ASSESSMENT OF STORAGE LOSSES OF DIFFERENT PULSES AT FARMERS' LEVEL IN JAMALPUR REGION OF BANGLADESH

M. A. MANNAN AND N. TARANNUM

Abstract

A survey was conducted in Jamalpur region to investigate the losses of pulses during storage at farmer's level. It was observed that farmers used traditional methods for storing pulse crops. The containers, such as Jute bag with multiple (2-5) polythene lining inside (7.7% infestation), tin container with polythene lining inside by mixing sand with pulses (8.2% infestation), plastic container (7.8% infestation), plastic boium (8.6% infestation), and RC bottle (8.4% infestation) showed better performance for storing different pulse crops. The stored pulse of these containers had below 10% infestation level at low moisture content (below 10%) and high germination percentage (above 80%). In the study area, minimum number of farmers (1.81-3.45%) cultivated pulse crops since maximum arable lands were occupied by rice.

Keywords: Pulse storage practices, assessment of losses, store insect infestation.

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EFFECTS OF CO_2 AND NITROGEN LEVELS ON YIELD AND YIELD ATTRIBUTES OF RICE CULTIVARS

M. A. RAZZAQUE, M. M. HAQUE, Q. A. KHALIQ
A. R. M. SOLIMAN AND A. HAMID

Abstract

A pot experiment was conducted at Bangbandhu Sheikh Mujibur Rahman Agricultural University during July–December of 2003 to determine the effect of rice varieties under CO_2 enrichment and different levels of nitrogen supply. Plants were grown from seedling to maturity inside open top chamber under elevated CO_2 (570 ±50) ppm, ambient CO_2 (~360ppm) and open field condition. Cultivars responded considerably under different nitrogen levels. Increasing atmospheric CO_2 directly stimulated photoynthesis and plant growth resulting in increased grain yield. Among the cultivars, BRRIdhan 39 gave the highest yield (50.82 g/plant1) at supra optimum N level and elevated CO_2. Local varieties gave similar results under elevated CO_2 in optimum and supra optimum N level. The lowest yield was produced by the local variety Shakkorkhora (15.09 g) under ambient CO_2 with no nitrogen application.

Keywords: CO2 enrichment, nitrogen level, rice cultivars

Bangladesh J. Agril. Res. 36(2) : 223-230, June 2011

VARIABILITY AND PERFORMANCE OF SUPERIOR VELVET APPLE (*Diospyros discolor*) GERMPLASM IN THE HILLY REGION

M. AHMED, S. N. MOZUMDER, Z. A. FIROZ AND S. M. FAISAL

Abstract

The study was conducted at the Hill Tracts Agricultural Research Station, Ramgarh during two years in 2007 and 2008 to evaluate the variability and performance of selected 11 velvet apple germplasm. A lot of variations in different parameters were observed among the trees. The age of plant varied from 7 to 25 years having tree volume 58 m^3 to 428 m^3. The number of fruits

ranged from 42 to 674 per plant with single fruit weight 118 to 283 g. The length and diameter ranged from 6.63cm to 7.7cm and 5.73cm to 8.3cm, respectively. The maximum edible portion (68.3%) was recorded in DD RAM 011, while it was the lowest (47.6%) in DD RAM 001. The highest TSS% ranged from 7.28% to 14.9%. Highest yield per plant (103.67 kg) was observed in DD RAM 001 and it was lowest in DD RAM 008 (5.99 kg). All the parameters showed poor correlation among them. Considering the factors of weight and size, edible portion %, TSS %, taste, sweetness, and yield per plant, the line DD RAM 011 was found better than others.

Keywords: Variability, performance, velvet apple, hilly areas.

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YIELD RESPONSE AND NITROGEN USE EFFICIENCY OF WHEAT UNDER DIFFERENT DOSES AND SPLIT APPLICATION OF NITROGEN FERTILIZER

M. ATAUR RAHMAN, M. A. Z. SARKER, M. F. AMIN
A. H. S. JAHAN AND M. M. AKHTER

Abstract

A field experiment was conducted at the central research farm of Bangladesh Agricultural Research Institute, Gazipur for two consecutive years to verify the yield response of wheat variety Prodip to different doses and split applications of N fertilizer to determine appropriate N dose and application method for increasing NUE and grain yield of wheat. The treatments comprised of 12 combinations of three doses of nitrogen (80, 100, and 120 kg/ha) from urea, which were assigned in the main plots and four methods of N splitting *viz.*, application of all N as basal; 2/3rd basal plus 1/3rd as top dress at crown root initiation (CR1) stage; $^{1}/_{2}$ basal plus $^{1}/_{2}$ as top dress at CR1 stage; and 1/3rd basal with 1/3rd as top dress at CR1 plus 1/3rd as top dress at 1st node stage which were tested in the sub plots. Higher yield was achieved from N rate of 120 kgiha applied as three equal splits of one-third as basal during final land preparation, one-third as top dressing during CR1 and the rest one-third top dressing at first node stage. The yield advantage of wheat due to N treatments was attributed to higher thousand grain weight and spikes/m^2. Nitrogen content in wheat grain and straw was not affected significantly by different N treatment and their combinations, whereas plant N uptake was significantly influenced by N rate and N splitting and also due to the interaction of N rate and N splitting. Total N uptake was maximum under N rate of 120 kg/ha applied as three equal splits as 1/3rd basal with 1/3rd as top dress at CR1 plus 1/3rd as top dress at 1st node stage. Split applications of sub-optimal dose of N (80 kg/ha) resulted in negative gain in apparent NUE, but split applications, especially three split applications (1/3rd basal, 1/3rd at CR1, and 1/3rd at 1st node stage) of higher dose of N (100 and 120 kg/ha) resulted in positive gain in apparent NUE.

Keywords: Wheat grain yield, nitrogen management, N uptake and NUE

Bangladesh J. Agril. Res. 36(2) : 241-246, June 2011

STUDY ON THE CROSS COMPATIBILITY OF SOME LEMON GENOTYPES *(Citrus limon* L.)

M. I. HOSSAIN AND M. G. RABBANI

Abstract

An investigation was carried out at the Department of Horticulture, Bangladesh Agricultural University, Mymensingh to examine compatible relationship among the available lemon genotypes. Seven selected genotypes of lemon were used for hybridization. Crossings were performed following diallel fashion. The results revealed that the lower percentage of fruit setting as well as seed setting in some cross combinations noticed the existence of incompatibility among the selected genotypes. The percentages of fruit setting and seed setting were higher in the cross-pollination than in the self-pollination, which was an indication of self-incompatibility. To achieve seedless fruit setting, self-incompatibility may be used successfully.

Keywords: Cross compatibility, lemon genotypes.

Bangladesh J. Agril. Res. 36(2) : 247-253, June 2011

UPTAKE OF DIFFERENT NUTRIENT ELEMENTS BY LEGUME CROPS IN WHEAT -LEGUME- T. AMAN CROPPING PATTERN

M. J. U. SARKER, M. A. SIDDIKY, M. JAHIRUDDIN

M. H. MIAN AND M. S. ISLAM

Abstract

A study on nutrient uptake by different legume crops was carried out at two locations–one at Bangladesh Agricultural University farm Mymensingh and another at Regional Agricultural Research Station of Bangladesh Agricultural Research Institute, Jamalpur. The objective was to find out the optimum concentrations of different nutrient elements and its uptake by legume crops in a Wheat-Legume-T. Aman cropping pattern. The uptake of different elements was markedly varied by legume crops at both the locations in two consecutive years of the study. It was also noticed that cowpea removed the highest quantity of nutrient elements from the soils in the treated plots compared to mungbean and blackgram. Besides, stover received the maximum contents of potassium followed by nitrogen, phosphorus, and sulphur which was significantly different over legume seeds.

Keywords: Nutrient uptake, legume crops.

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PERFORMANCE OF BILATI DHONIA (*Eryngium foetidum* L.) UNDER THE CANOPY OF DIFFERENT TREE SPECIES

M. MONIRUZZAMAN AND A. K. M. QAMRUZZAMAN

Abstract

Performance of 'Bilati Dhonia' *(Eryngium foetidum* L.) grown under the shades of different tree species, namely guava, jackfruit, mango, jujube, and farmers' practice (grown under artificial shade) was evaluated at the Agricultural Research Station, Raikhali, Rangainati Hill District during two consecutive years of 2004-05 and 2005-06. The results revealed that plant height, leaf length, number of leaves per plant and fresh weight per plant were significantly higher under the canopies of various trees and farmers' practice than those grown under direct sun light. Different growth characters were better under the shades of jackfruit and guava trees than those of other species. Periods to first and 50% flowering under tree species were longer than that under direct sunlight. The highest fresh yield (mean of two years) of 'Bilati Dhonia' was found in the farmers' practice (27.58 t/ha), which was similar to those under guava (27.31 t/ha) and jackfruit trees (27.51 t/ha).

Keywords: Bilati Dhonia (*Eryngium foetidum* L.), tree shades, hilly area.

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GENETIC VARIABILITY OF SOME CYTOPLASMIC MALE STERILE LINES (CMS) OF RICE *(Oryza sativa* L.) GENOTYPES

M. J. HASAN, UMMA KULSUM, M. H. RAHMAN
M. HAZRAT ALI AND A. W. JULFIQUAR

Abstract

The desirable characteristics of fourteen genetically diverse CMS lines were assessed for their phenotypic acceptability, plant height (cm), days to 50% flowering. panicles per plant, stability for pollen sterility, panicle exertion rate and out crossing rate. The CMS lines viz. BRRI1A. IR 58025A. BRRI10A. BRRI9A. BRRI3A, IR 75608A, and 1132A have been found to be usable female parents for hybrid rice breeding due to their appreciable phenotypic acceptability, stable pollen sterility, panicle exertion rate and good out crossing rate. Panicle exertion rate of CMS lines had moderate heritability (38.34%) coupled with low genetic advance (2.34%) expected in the subsequent generations, that proved to be vulnerable to environmental fluctuation. The genotypic and phenotypic coefficient of variation was not remarkably varied from each other for most of the characters studied, indicated negligible environmental influence on these traits. Overall genetic correlation coefficients were higher than corresponding phenotypic correlation coefficients indicated strong relation present among the studied characters.

Keywords: Genetic variability, CMS lines, rice.

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EFFECT OF SOWING TIME AND PLANT SPACING ON THE YIELD AND YIELD ATTRIBUTES OF SWEET PEPPER (*Capsicum annuum)*

M. S. ALAM, S. R. SAHA, M. A. SALAM
M. S. ALAM AND M. K. ALAM

Abstract

An experiment was carried out at the Olericulture field of Horticulture Research Centre of BARJ, Joydebpur, Gazipur during September 2006 to April 2007 to investigate yield and yield attributes of sweet pepper as influenced by plant spacing and sowing time. There were altogether 21 treatments comprising seven sowing dates viz. 1 September, 15 September, 1 October, 15 October, 30 October, 15 November, 30 November and three spacings viz. 50 × 50 cm, 50x40 cm, and 50 × 30 cm. The experiment was laid out in a Randomized Complete Block Design (factorial) with three replications. The results of the experiment showed that majority of the yield and yield components significantly varied with variation of spacing and sowing time. Only number of fruits per plant and fruit yield per plant resulted significantly higher which reflected higher yield for 1 October sowing. The number of branches per plant, number of fruits per plant, fruit length, individual fruit weight, yield per plant were found significantly increased with the increasing plant spacings but other parameters were found to be significantly increased with the decreasing plant spacing. The combined effect of sowing date and plant spacing also had significant effect on different growth and yield parameters and yield. The highest yield (19.36 t/ha) of fruit was recorded from the earlier sowing (1 October) with the closest spacing (50 × 30 cm). But reasonable yield could be obtained up to 30 October with same spacing.

Keywords: Sowing time and plant spacing, yield and yield attributes, sweet pepper.

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EFFICACY OF SEDOMIL 72 WP AND RECOZEB 80 WP IN CONTROLLING RED RUST OF TEA

M. S. ISLAM AND M. ALI

Abstract

An experiment was conducted for two years to find out the efficacy of two fungicides Sedomil 72 WP (Mancozeb) and Recozeb 80 WP (Mancozeb + Metalaxyl) @ 1, 1.5, 2.0, and 2.5 kg/ha in controlling red rust disease (*Cephaleuros parasiticus)* of tea in both the years, Sedomil 72 WP and Recozeb 80 WP inhibited disease severity and disease progress. Among the treatments, the highest reduction in PDI was obtained with 2.5 kg/ha of the both fungicides. During 2008, Sedomil 72 WP showed 93.28% and Recozeb 80 WP showed 91.04% efficacy with the dose of *2.5* kg/ha of both fungicides, while it was 91.40% of both with same dose during 2009. In case of the dose of 2.0 kg/ha of both the fungicides caused disease reduction more than 80%, which is significantly similar to the dose of 2.5 kg/ha. Decreasing trend in disease infection was observed from the spray to final sprays of both the fungicides for all doses. The overall result suggests that the use of Sedomil 72 WP or Recozeb 80 WP may provide an economic advantage alone with 2.0 kg/ha.

Keywords: Efficacy of Sedomil 72 WP, Recozeb 80 WP, red rust of tea.

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PERFORMANCE OF GLADIOLUS UNDER PROTECTED CULTIVATION IN THE RAINY SEASON

M. S. ISLAM AND A. F. M. E. HAQUE

Abstract

An investigation was conducted with a view to observing the performance of two gladiolus genotypes during the rainy summer under poly tunnel production system. The genotype GL-027 produced taller plants (73.8 cm) with longer spike (97.2 cm) and longer rachis (51.7 cm) compared to the genotype GL-023. In respect of spike length (97.0 cm), rachis length (54.4 cm), weight

of corm per plant (16.0g) and weight of cormel per plant (30.3 g), 1 July planting was better than in 1 May planting. Plants grown under poly tunnel produced flower earlier (82.5 days) compared to plants grown without poly tunnel (84.6 days). Although difference of only two days in flower initiation is of no significance, but plants grown under poly tunnel performed better in respect of number of florets per spike (12.8), number of cormels per plant (8.2), weight of corm per plant (16.0 g) and weight of cormels per plant (30.6 g) than the plants grown without poly tunnel.

Keywords: Gladiolus, protected cultivation, rainy season.

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INVESTIGATION ON SELECTION CRITERIA FOR DROUGHT TOLERANCE OF BREAD WHEAT *(Triticum aestivum* L.) IN THE NORTH-WEST TURKEY

OĞUZ BiLGiN, ISMET BAŞER, KAYIHAN Z. KORKUT AND ALPAY BALKAN

Abstract

This study was carried out with 27 bread wheat genotypes during two crop seasons. The great variations were determined between first and second year means of genotypes for all characters. The correlation between grain yield and rate of water losses at heading stage, number of stomata and days to flowering in the first year were found significant and negative. The correlation only between grain yield and days to maturity was positive and significant in the second year. The highest direct positive effects on grain yield were computed for plant height in two years. Although rate of water losses at heading stage showed negative direct effect on grain yield in the first year, it influenced the grain yield positively in the second year. It can be concluded that plant height, days to flowering, maturity, and rate of water losses at heading stage might be effective selection criteria for drought tolerance in semi-arid regions, such as Tekirdağ.

Keywords: Bread wheat, flag leaf area, rate of water loss, glaucousness, stomata, grain yield.

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EFFECTS OF ORGANIC AND INORGANIC SOURCES OF K ON RICE YIELD AND SOIL K BALANCE IN THE RICE-RICE CROPPING SYSTEM

P. K. SAHA, M. AKTER, M. A. M. MIAH AND S. K. ZAMAN

Abstract

Field experiments were conducted through T. Aman 2003–Boro 2008 at the Bangladesh Rice Research Institute (BRRI), Gazipur Farm with a view to determining the appropriate dose of K fertilizer in soils under double rice cropping system and to find out the alternative source of K for wet land rice cultivation. Four levels of inorganic K (0, 33, 50 & 66 kg K/ha and farmers' practice from MoP) and one recycling of rice straw 4.5 t/ha (dry basis) were tested. Incorporation of rice straw into soil contributed significantly to grain yield in successive growing seasons comparable with inorganic K fertilizer. In clay-loam soil, K at the rate of 50 kg K/ha should be applied to obtain the maximum yield in both T. Aman and Boro rice seasons. Rice straw may be a potential alternative source of K for sustaining soil K fertility and maximizing rice yield. Agronomic use efficiency of K decreased with increasing K levels. A narrower balance of K was observed when rice straw or a higher dose of inorganic K fertilizer was used.

Keywords: K, rice yield, soil K balance, rice straw.

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COMBINING ABILITY AND HETEROSIS STUDIES IN TOMATO UNDER BACTERIAL WILT CONDITION

A. K. SINGH AND B. S. ASATI

Abstract

Thirteen diverse lines of tomato were crossed with three testers in line x tester mating fashion to study combining ability effects and heterosis for plant height, number of primary branches per plant, fruit weight, bacterial wilt incidence and yield per plant during *rabi* season of 2005-06 at Horticultural Research Farm, ICAR Research Complex for NEH Region, Umiam, (Meghalaya), India.

The analysis of variance revealed the predominance of non-additive gene action for all the traits. In respect of both gca & sca effects, the parents and hybrids differed significantly. Among the parents, Sel-2 and BT-117-5-3-1 were the best general combiners for yield per plant and other characters under study, and these may be used as valuable donors in the hybridization programme for producing promising combinations in bacterial wilt prone areas. Among the crosses, BT207 × KT-15, Type-I × KT-15, and FEB-2 × BT-117-5-3-l were the most valuable combiners for yield per plant and other characters under study could be utilized for bacterial wilt resistant breeding programmes. The highest heterotic effect over better parent was also exhibited by the cross Type-1 × KT-15 for yield per plant and plant height under bacterial wilt condition.

Keywords: Combining ability, heterosis, tomato, bacterial wilt.

Bangladesh J. Agril. Res. 36(2) : 319-331, June 2011

EFFECTS OF TEXTILE INDUSTRIAL WASTE WATER AND UPTAKE OF NUTRIENTS ON THE YIELD OF RICE

R. A. BEGUM, M. W. ZAMAN, A. T. M. A. I. MONDOL
M. S. ISLAM AND K. M. F. HOSSAIN

Abstract

An experiment was conducted at Mouchack textile industrial area of Gazipur for two consecutive years (1999-2000) to study the effects of use of industrial waste water on the yield, nutrient content, and uptake of Boro rice. The experiment was laid out in a randomized complete block design (RCBD) with three replications. The six treatments in this study were: T_1: uncontaminated field + fresh water, T_2: uncontaminated field + mixed water, T_3: uncontaminated field + contaminated water for non-contaminated field, and T_4: effluent contaminated field + fresh water, T_5: effluent contaminated field + mixed water, T6: effluent contaminated field + contaminated water for contaminated field. Among the six treatments, uncontaminated field + fresh water (T_1) showed the best positive effect on rice. The N, P. K, and S contents and uptake were higher in T_1, but Zn, Mn, Fe, Cu, and Pb were higher in T6 treatment. The treatment T_1, gave the highest grain yield (5.23 t/ha in 1999 and 5.40 t/ha in 2000), followed by mixed water (4.19 t/ha in 1999 and 4.24 t/ha in 2000) in both the growing seasons.

Keywords: Industrial waste water, heavy metal, textile waste water, yield, nutrient content, uptake and rice.

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IMPACT OF MICRO-FINANCE ON THE DEVELOPMENT OF STREE SHAKTI GROUP MEMBERS

K. V. BHAVYA AND K. B. UMESH

Abstract

Micro-finance helps the rural poor to improve their living standards and fulfill their credit needs. Stree Shakti Groups (SSGs) are new innovation in the field of rural economic development, to finance the rural women and also to satisfy their credit needs. This study mainly focuses on the impact of micro-finance on the development of SSG members. The study was undertaken in Doddaballapura taluk of Bangalore rural district of Karnataka state, India and the required data were collected from 100 SSG members and 30 non-SSG members. It was found that the number of income generating activities taken up by SSG members (five) was higher compared to non-SSG members (three) and the income generated from these activities was also higher compared to non-SSG members. There was significant growth in the amount of loan borrowed, repayment and savings over time among SSG members. SSG finance substantially enhanced employment opportunities for members compared to non-members, which led to improved income and living standard of members. Since SSGs play a major role in the development of women, there is a need to encourage more number of SSGs. The study also reveals that the performance of Non Governmental Organization (NGO) promoted SSGs was much better than Government promoted SSGs. Hence, more number of NGOs must be involved in promoting SSGs covering more womenfolk.

Keywords: Micro-finance, Stree Shakti group, self help group, impact, empowerment, non governmental organization.

Bangladesh J. Agril. Res. 36(2) : 351-356, June 2011

GENETIC VARIABILITY, HERITABILITY AND CORRELATION STUDY IN HYACINTH BEAN

M. S. ISLAM, M. M. RAHMAN AND M. A. K. MIAN

Abstract

Forty four hyacinth bean genotypes were studied to estimate the variability, heritability, genetic advance and correlation coefficients. There was a large variation among the genotypes for all the characters among which the number of pods per plant had highest (122 to 425). Green pod yield per plant varied from 0.46 kg to 3.45 kg indicating the presence of high yielding genotypes. High genotypic coefficient of variation was obtained for 100-green seed weight, pod yield per plant, number of pods per plant and harvesting duration. The highest heritability was observed for days to first flower (98.39%) followed by days to first harvest (96.1 %).The pod yield per plant also exhibited high heritability of 77.9% with highest genetic advance (68.28) indicating the possibility of selection to improve this traits. Yield of green pods showed highly significant and positive association with number of pods per plant (r=0.71**), individual pod weight (r=0.54**) and harvesting duration (r=0.198*), which indicates the importance of these characters during selection for high yielding genotypes in hyacinth bean.

Keywords: Genetic variability, heritability, hyacinth bean.

Bangladesh J. Agril. Res. 36(2) : 357-367, June 2011

EFFECT OF NITROGEN FOR YIELD MAXIMIZATION OF GARLIC IN OLD BRAHMAPUTRA FLOOD PLAIN SOIL

M. S. ZAMAN, M. A. HASHEM, M. JAHIRUDDIN AND M. A. RAHIM

Abstract

The experiment was conducted for two consecutive *rabi* seasons of 2005-06 and 2006-07 at the Regional Agricultural Research Station (RARS), Jamalpur to find out an optimum dose of nitrogen for the production of garlic (cv. Jamalpur local). There were six levels of nitrogen viz., 0, 50, 100, 150, 200, and 250 kg/ha. The experiment was laid out in randomized complete design with three replications. Results revealed that nitrogen had significant effects on almost all the parameters studied. Nitrogen @150 kg/ha produced the highest bulb yield (6.75 t/ha in 2005-06 and 7.19 t/ha in 2006-07) and there was a reduction of yield with further increment of nitrogen level. The control treatment receiving no fertilizer produced the lowest bulb yield in both the years. The yield benefit for 150 kg N/ha was 40% than the yield obtained from nitrogen control treatment when average of two years' yield is considered.

Keywords: Nitrogen, garlic, growth, bulb yield.

Bangladesh J. Agril. Res. 36(3) : 455-468, September 2011

GROWTH AND YIELD COMPONENTS OF WHEAT UNDER WATER STRESS OF DIFFERENT GROWTH STAGES

M. AKRAM

Abstract

A field experiment was conducted to determine the sensitivity of wheat to water stress and changes in water relations and yield of wheat *(Triticum aestivum* L.) under water stress conditions applied at different growth stages. The experiment comprised of two wheat cultivars and four water stress treatments, maintained by withholding water at tillering, anthesis, and at both stages. Water stress caused reduction in leaf relative water contents, water potential, osmotic potential, turgor potential, growth and yield components of both the wheat cultivars. The results indicated that high value of relative water contents were associated with increased yield and yield components. Consecutive stresses at both growth stages caused severe reduction in yield and yield components in both cultivars of wheat.

Keywords: Water stress, water relations, growth, *Triticum aestivum*, yield components.

Bangladesh J. Agril. Res. 36(3): 369-380, September 2011

ASSESSMENT OF NUTRITIVE VALUE IN MILLED RICE GRAIN OF SOME INDIAN RICE LANDRACES AND THEIR MOLECULAR CHARACTERIZATION

S. BANERJEE, G. CHANDEL, N. MANDAL
B. M. MEENA AND T. SALUJA

Abstract

The study was aimed at the evaluation of nutritive values in terms of total protein and some essential amino acid content of a set of 258 diverse rice landraces maintained in the Germplasm Section of Indira Gandhi Agricultural University at Raipur, Chhattisgarh. Protein content of milled grains ranged from 4.91% to 12.08% with the mean of 6.63%. Similarly wide variation was recorded in lysine content which varied from 1.73 to 7.13 g/l6g N, the mean being 4.62 g/I6g N. Grain protein and lysine levels varied two to three folds. Variation for lysine content (CV 23.68%) was higher than that of protein content (CV 12.45%). This clearly indicated the existence of wide genetic variability for protein and lysine contents in rice. Two sets of ten elite lines each containing high levels of protein and lysine were further analyzed separately for another essential amino acid tryptophan. In the set with high protein, the tryptophan levels varied from 0.36-0.88 g/16 g N, the mean being 0.642 g/l6 g N. Among the landraces containing high levels of lysine, the tryptophan content ranged from 0.256 to 0.86 g/16 g N, the average being 0.514. A positive correlation of tryptophan with lysine content (r = 0.076) and a strong negative correlation with total protein content (r = - 0.923) were recorded. Donor lines for breeding rice varieties with optimum protein quality were identified as potential donor parents for genetic improvement of rice for nutritious grains. Fourteen SSR primer sets were used to investigate the level of polymorphism among the ten elite landraces of extra early maturity group. The estimated similarity ranged from 20.18 to 69.00% reflecting much variation at the DNA level.

Keywords: Milled rice grain, protein, lysine, tryptophan, nutritive value of rice.

Bangladesh J. Agril. Res. 36(3) : 381-387, September 2011

EFFECT OF PRESERVED SEEDS USING DIFFERENT BOTANICALS ON SEED QUALITY OF LENTIL

A. KHATUN, G. KABIR, M. A. H. BHUIYAN AND D. KHANAM

Abstract

Laboratory studies were conducted with leaf powder of three plants to show the preservative effect for maintaining the quality of lentil seeds in storage. After processing and drying, seeds were preserved with different botanicals and stored them in earthen pots for eight months. Botanicals, such as whole leaf powder of neem *(Azadirachta indica),* dholkalmi *(Ipmoea sepiara),* and bishkatali *(Polygonum hydropiper)* were used at a dose of 5% w/w (25 g botanical per 500 g of lentil seeds). The lentil seeds were stored till next planting time and seed quality, such as moisture content, germination capacity, root length, shoot length of the seedlings and vigour index were observed. The highest values for all these characters except moisture content were significant when the seeds were preserved with neem leaf powder and bishkatali. Among three botanicals, dholkalmi was less effective.

Keywords: Lentil, botanicals, storage. seed quality.

Bangladesh J. Agril. Res. 36(3) : 389-396, September 2011

VARIATIONS IN DIFFERENT ISOLATES OF *Rhizoctonia solani* BASED ON TEMPERATURE AND pH

B. K. GOSWAMI, M. M. RAHAMAN, A. K M. A. HOQUE
K. BHUYAN AND I. H. MIAN

Abstract

An experiment was conducted to find out variation in isolated *Rhizoctonia solani* based on radial mycelial growth and sclerotial production. Five isolates of *Rhizoctonia solani* representing five clusters group were selected and were grown at different levels of temperature and pH on potato dextrose agar (PDA). It was observed that optimum temperature and pH for growth and scierotial production varied among the isolates. The rates of growth and sclerotial formation were not uniform at the same

levels of the two growth factors. The maximum mycelial growth of all isolates was found at 30°C. At 35°C, only GAZ-9 and GAZ-18 showed initiation of growth, but the rate was very slow. The optimum temperature for sclerotial production of the isolates GAZ-9, JES16, GAZ-18 SYL-26 was 30°C and for the isolate DIN-8 was 25°C. The optimum pH for maximum radial growth was 6 for DIN-8 and *7* for other four isolates. The maximum number of sclerotia was produced by DIN-8, GAZ-9, and SYL-30 at pH 8, 4, and *7*, respectively. The optimum pH for sclerotia formation in JES-16 and GAZ-18 was pH 6.

Keywords: *Rhizoctonia solani,* variations, temperature, pH.

Bangladesh J. Agril. Res. 36(3) : 397-406, September 2011

IN VITRO REGENERATION OF BRINJAL (*Solanum melongena* L.)

B. P. RAY, L. HASSAN AND K. M. NASIRUDDIN

Abstract

The effect of different explants and concentrations of BAP and NAA on induction of callus and plant regeneration of brinjal cv. Jhumki were investigated. The treatment combinations were BAP (0. 2.0. 3.0, and 4.0 mg/l) and NAA (0. 0.1, 0.5, and 1.0 mg/l). The rate of callus formation varied in different treatments. The highest amount of callus (48.66%) was produced on MS medium containing 2.0 mg/l BAP and 0.5 mg/l NAA from stem, and 8.2 days required for callus induction. The highest fresh weight of callus was 1.12g from stem and 0.48g from root. The number of shoot regenerated through callus from stem containing 2.0 mg/l BAP and 0.5 mg/l NAA was 3.4 (23.287%) and days required for 38.8 days. All regenerated plantlets survived in normal environment.

Keywords: NAA, BAP, regeneration, brinjal.

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EFFECT OF NPK ON THE INCIDENCE OF *ALTERNARIA* LEAF BLIGHT OF MUSTARD

F. KHATUN, M. S. ALAM, M. A. HOSSAIN
S. ALAM AND P. K. MALAKER

Abstract

A 2-year field study was carried out to find out the effect of three macro nutrients NPK on the severity of *Alternaria* leaf blight and yield of mustard. Nitrogen @ 80, 100, 120, 140, and 160, phosphorus @ 15, 30, and 45, and potassium @ 30, 60, and 90 kg/ha were applied. Among the nutrients, 120-3060 kg NPK/ha was considered as recommended dose on the basis of soil test. Fertilizer dose 120-30-90 kg/ha appeared to be the best combination of N, P, and K in reducing the disease incidence and to increase seed yield of mustard. Higher dose of K (90 kg/ha) decreased the incidence of *Alternaria* leaf blight but higher dose of nitrogen (140 and 160 kg N/ha) increased the disease incidence. The highest seed yield of 1718 kg/ha was obtained with 120-30-90 kg of NPK/ha which was statistically similar to the doses of 120-30-60 and 120-4560 kg of NPK/ha. Higher seed yield and lower disease severity was also observed under these three treatments as compared to other treatments.

Keywords: Mustard, *Alternaria* leaf blight, nutrient management.

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EFFECT OF HIGH TEMPERATURE ON YIELD ATTRIBUTING TRAITS IN BREAD WHEAT

KHAJAN SINGH, S. N. SHARMA AND YOGENDRA SHARMA

Abstract

High temperature stress is major constraint to bread wheat *(Triticum aestivum* L. Em. Thell) production. Generation of information on the effect of high temperature stress on various traits may be helpful for developing thermotolerance bread wheat variety. An experiment was conducted on a set of 10 diverse genotypes, their 45 F_1s and F_2s for identification of high temperature stress genotype. The experiment was conducted under

normal and late sown condition. The parent HD 2851, P8W 520, and HS 448, and the crosses HS 448 × PBW 520, UP 2614 × K 209 and PBW 520 × HD 2851 for grain yield per plant were least affected under late sown conditions. Heat stress intensity (Dvalue) clearly indicated that grain yield per pant biological yield per plant and grain yield per spike suffered revively under late sown conditions.

Keywords: Bread wheat, heat susceptibility index, tolerant genotypes.

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PROFITABILITY OF ONION CULTIVATION IN SOME SELECTED AREAS OF BANGLADESH

M. A. HAQUE, M. A. MONAYEM MIAH, S. HOSSAIN
M. S. RAHMAN AND MONIRUZZAMAN

Abstract

The present study was conducted in three major onion growing districts to estimate the profitability of onion cultivation. Total of 150 onion farmers taking 50 farmers from each area were selected randomly. The cost of onion cultivation was found to be Tk 93517 per hectare on total cost basis. Seedling cost (41%) was the major cost item followed by human labour cost (24%). The yield of onion was found 9869 metric tons per hectare. The gross margin and net return were found to be Tk. 85308 and 79487 per hectare, respectively. The benefit cost ratio was found 1.85. Inputs like human labour, seedling, manures, urea, TSP, irrigation, and insecticide had positive effect on the yield of onion. The profit obtained from onion cultivation was found higher than that of other competitive crops like mustard, groundnut, and cabbage. Non-availability of HYV onion seed at proper time, lack of technical knowledge, high price and non-availability of fertilizer in time, lack of appropriate storage facility were the major problems of onion cultivation in the study areas and needs immediate attention to solve these problems.

Keywords: Onion, input use pattern, profitability

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RESPONSE OF MAIZE VARIETIES TO ZINC FERTILIZATION

M. A. HOSSAIN, M. JAHIRUDDIN AND F. KHATUN

Abstract

Eight maize varieties viz. four composites (Mohor, Barnali, Khoibhutta, and BARI Maize-6) and four hybrids (BARI Hybrid Maize-1, BARI Hybrid Maize-3, BARI Hybrid Maize Top-1 & Pacific 984), were tested for their response to zinc fertilization (0 and 3 kg Zn/ha) at the Regional Agricultural Research Station (RARS), Jessore (AEZ-11, High Ganges River Floodplain) during 20022005. The varieties were not equally responsive to Zn addition. Except BARI Hybrid Maize-3, all other hybrids showed higher response to Zn compared to composite varieties. Among the hybrids, the Pacific 984 had the highest response followed by BARI Hybrid Maize-1 and BARI Hybrid Maize Top-1, the later two showed identical response. Comparing the composite varieties, their response can be ranked as Barnali ≈ Mohor > Khoibhutta > BARI Maize-6. The result suggests that BARI Hybrid Maize-3 and BARI Maize-6 were the most Zn inresponsive (Zn efficient) varieties. Further it appeared that Pacific 984 gave the highest seed yield, 10.46 t/ha due to Zn application. So, the farmers can grow this variety with an application of Zn @ 3 kg/ha in the deficient soil. The results also indicate that the farmers can cultivate BARI Hybrid Maize-3 in the moderately zinc deficient soils with a minimum dose (1 to 2 kg/ha) of Zn fertilization.

Keywords: Maize varieties, zinc fertilization.

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FIELD PERFORMANCE AND ECONOMIC ANALYSIS OF SOME COMMONLY USED INSECTICIDES AGAINST TEA MOSQUITO BUG, *Helopeltis theivora* W.

M. AHMED, S. K. PAUL AND M. S. A. MAMUN

Abstract

A study was undertaken to evaluate the field performance and economic analysis of some commonly used insecticides against Tea mosquito bug, *Helopeltis theivora* Waterhouse at Bangladesh Tea Research Institute (BTRI), Srimangal, Moulvibazar. Six different insecticides–Thiodan 35EC (Endosulfan), Ripcord 10EC (Cypermethrin), Decis 2.5EC (Deltamethrin), Dimethion 40EC (Dimethoate), Metasystox 25EC (Oxydemeton), and Malathion 57EC (Malathion) were applied in the plots as recommended dose of BTRI. The shoot infestation reduction as well as yield response of all the insecticides treated plots were superior over the control but there was no significant difference among the insecticidal treatments. Better field performance against *Helopeltis* was found in Malathion 57 EC treated plots in respect to shoot infestation reduction over control (87.09%). Per hectare yield (1910.33 kg) as well as per hectare net return (Tk. 300927.80) were also higher in Malathion 57EC treated plots. The highest marginal rate of return (2580.57%) was obtained by spraying Metasystox 25EC over control followed by Ripcord IOEC (1710.87%) and other insecticides. The most economically acceptable insecticide against tea mosquito bug was Metasystox.

Keywords: Field performance, economic analysis, insecticides, tea, *Helopeltis theivora.*

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CAUSES OF YIELD GAPS AND STRATEGIES FOR MINIMIZING THE GAPS IN DIFFERENT CROPS OF BANGLADESH

MOHAMMAD H. MONDAL

Abstract

The concept of yield gaps originated from the studies conducted by IRRI in the seventies. The yield gap discussed in this paper is the difference between the potential farm yield and the actual average farm yield. In Bangladesh, yield gaps exist in different crops ranging up to 60%. According to the recent study conducted by BRRI, the yield gap in rice was estimated at 1.74 t/ha. The existence of yield gaps was as well observed in rice, mustard, wheat and cotton in India. In India, yield gap varied from 15.5 to 60% with the national average gap of 52.3% in irrigated ecosystem. The yield gaps are mainly caused by biological, socio-economic, climate and institutional/policy related factors. Different strategies, such as integrated crop management (1CM) practices, timely supply of inputs including credit to farmers, research and extension collaboration to transfer the new technologies have been discussed as strategies to minimize yield gaps. Suggestions have been made to make credit available to resource-poor small farmers to buy necessary inputs. Reducing transaction cost, simplifying lending procedures and strengthening monitoring mechanism of the current credit system are, however, essential to enable the farmers to avail the credit facility. Efforts should be made to update farmers' knowledge on the causes of yield gaps in crops and measures to narrow the gaps through training, demonstrations, field visits and monitoring by extension agencies to achieve high yield. The government should realize that yield gaps exist in different crops of Bangladesh and therefore, explore the scope to increase production as well as productivity of crops by narrowing the yield gap and thereby ensure food security.

Keywords: Yield gaps, strategies, crops of Bangladesh.

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EFFICACY OF TWO ORGANIC AMENDMENTS AND A NEMATICIDE TO MANAGE ROOT-KNOT NEMATODE *(Meloidogyne incognita)* OF TOMATO *(Lycopersicon esculentum* L.)

M. I. FARUK, M. L. RAHMAN, M. R. ALI, M. M. RAHMAN AND M. M. H. MUSTAFA

Abstract

A field experiment was conducted in two consecutive years to find out the efficacy of poultry refuse (PR), mustard oilcake (MOC), and Furadan 5G for the management of root-knot disease *(Meloidogyne incognita)* of tomato. Soil was treated with PR @ 3 and 5 t/ha, MOC @ 0.3 and 0.6 t/ha 3 weeks before transplanting and Furadan 5G @ 40 kg/ha on the day of transplanting of tomato seedlings. PR @ 3 t/ha and MOC @0.3 t/ha were applied alone and also mixed with Furadan 5G @ 20 kg/ha. The soils of the experimental plots were inoculated with chopped severely galled *(M incognita)* roots of tomato at the time of treatment application. In both the years, considerable reduction in root-knot disease and increase in plant growth and fruit yield were achieved with different treatments with two organic materials applied alone or mixed with Furadan 5G. The most effective treatment was PR @ 3 t/ha + Furadan 5G @ 20 kg/ha followed by PR alone @ 5 t/ha. Efficacy of PR @ 3 t/ha and MOC @ 0.6 1/ha were also appreciable. In first year and second year, gall index values were 6.50 and 6.27 under control, respectively. The severity was reduced to 2.27-4.00 in first year and 1.73-4.07 in second year due to application of the four treatments. On the other hand, fruit yield under control was 50.9 t/ha at first year and 47.6 t/ha in second year. The highly effective four treatments increased fruit yield to 71.1-82.5 t/ha in first year and 60.8-82.0 t/ha in second year. The fruit yield of tomato was directly and linearly correlated with gall indices in tomato gall. Based on findings of the study PR @ 3 t/ha + Furadan @20 kg/ha and PR alone @ 5 t/ha were noted as effective treatment to manage root-knot disease of tomato.

Keywords: Poultry refuse, mustard oilcake, Furadan, *Meloidogjyne incognita*, tomato.

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ROOT INITIATION IN MUKHIKACHU (*Colocasia esculenta*)AS INFLUENCED BY IAA AND NAA

M. K. R. BHUIYAN, M. J. HOSSAIN, M. S. RAHMAN S. M. L. RAHMAN AND M. A. SATTAR

Abstract

In vitro root initiation in Mukhikachu *(Colocasia esculenta var. globulifera)* was assessed in a factorial experiment using three levels of IAA (0.5, 1.0, and 2.0 mg/l), three levels of NAA (0.5, 1.0, and 2.0 mg/l) and control. Fifty percent intact shoots were used as usual, which was named as normal cut explant and the rest 50 % shoots were cut slantly to expose fresh surface i.e., cambium zone and named as slant cut explant. Low levels of IAA (0.5mg/l) initiated the roots earliest (≈14 DAC) and gave the highest percentage of root (49.71). This treatment also gave the maximum roots/culture (3.63). Root initiation was higher (61.33 %) with slant cut when cultured on a medium containing 0.5 mg/l IAA. The cultures with slant cut end also produced more number of roots and longest roots whereas, the highest root initiation (45.05 %) was given by the treatment 1.0 mg/l NAA, but 2.0 mg/I NAA gave lower percentage of roots (39.89).The maximum number of roots/culture was also obtained by 1.0 mg/l NAA. Slant cut explant performed better regarding root initiation (%), number of roots/culture and length of roots. In this experiment, slant cut explant performed better than that of normal cut and either IAA (0.05 mg/l) or NAA (1.0 mg/l) might be used for root initiation in Mukhikachu.

Keywords: Root initiation, *Colocasia*, IAA, NAA.

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EFFECT OF PLANT SPACINGS ON THE PERFORMANCE OF HYBRID CABBAGE *(Brassica oleracea var. capitata)* VARIETIES

M. MONIRUZZAMAN

Abstract

A field experiment on cabbage *(Brassica oleracea var. capitata)* comprising two plant spacings viz. 60 × 40 cm and 60 × 45 cm and ten hybrid cabbage varieties viz. Green Rich, Green-621, Green Coronet, Summer Warrior, Rare Ball, Atlas70, Southern treasure, Laurels, K-K Cross and K-S Cross was conducted during 15 October to 12 February of 2005-07 at the Agricultural Research Station, Raikhali, Rangamati Hill District to find out the optimum plant spacing and suitable cabbage variety(s). The wider spacing of 60 × 45 cm resulted in significantly maximum number of folded leaves and head weight (without unfolded leaves) in comparison to closer spacing of 60 × 30 cm. The variety Green Coronet showed the highest plant height, number of unfolded leaves, length of the biggest loose leaf, widest leaf, head height, and head weight (with unfolded leaves).This variety took the highest duration (119 days), while Green621 took the lowest duration for harvest (105 days). Although Green Coronet grew vigorously, it did not produce the highest head yield. All the varieties had good head compactness except Laurels and Green Coronet which had medium and less compactness, respectively. The combination of 60 × 30 cm spacing with variety Southern Treasure and K-S cross produced the highest head diameter, but wider spacing of 60 × 45 cm accompanied by Southern Treasure produced the highest head weight without unfolded leaves followed by K-K Cross in both the years. The pooled analysis showed the highest marketable head yield (73.32 t/ha) in the combination of 60 x 40 cm spacing with K- K Cross, which was closely followed by Southern Treasure (71.71 t/ha) and Laurels (71.56 t/ha). The variety Green-621 was found suitable for early harvest with reasonable yield (67.82 t/ha).

Keywords: Cabbage, *Brassica oleracea var. capitata*, hybrid variety, spacing, head yield, Rangamati.

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SELECTION IN SEGREGATING POPULATION OF TOMATO *(Solanum lycopersicum)* FOR GROWTH, YIELD AND VIRUS RESISTANCE

M. S. ISLAM, S. AHMAD AND M. A. HOQUE

Abstract

Nineteen segregating lines of tomato were evaluated at the Horticulture Research Centre of BARI during winter season of 2008-2009 with a view to developing high yielding virus resistant varieties. Wide variation was observed among the lines in respect of number of fruits per plant (13.5-38.3), individual fruit weight (56.8-162.3g), fruit yield per plant (1.28-2.40 kg), and locule number of fruit (2.0-8.5). The highest number of fruits per plant was observed in the line 14-1-1-1-1, but its corresponding individual fruit weight was only 58.4g. The line 15-3-4-2-1 had the highest individual fruit weight (162.3g). The highest fruit yield was recorded from the line 15-3-4-2-1 (81.6 t/ha), which was closely followed by the line 15-1-2-2-1 (79.5 t/ha). Thirteen genotypes were found free from virus infection up to 60 days after transplanting, while the rest had very low (1.4 - 2.8%) virus incidence. Among the entries, considering yield and virus reaction, the lines, 8-1-3-4-1, 8-1-3-1-1, 8-1-3-2-2, 14-1-1-1-1, 15-3-4-2-1, 151-2-2-1 and 15-1-2-1-2 were selected for further evaluation and recommendation as varieties.

Keywords: Segregating population, tomato.

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CHANGES IN DIFFERENT FORMS OF K IN RICE RHIZOSPHERE UNDER K APPLICATION

M. S. UDDIN, M. J. ABEDIN MIAN, M. R. ISLAM
M. A. SALEQUE AND A. Z. M. MOSLEHUDDIN

Abstract

A pot experiment was conducted with four soils from two locations (BAU farm, Mymensingh and BADC farm, Madhupur, Tangail) in order to monitor the transformation of added K (soil

solution K, exchangeable K^+ and nonexchangeable K) in BRRI dhan-41 rhizosphere at saturation condition. There were six levels of K viz., 0, 30, 60, 90,120 & 150 kg/ha from MoP. Eight kg soil was taken into each pot. The K concentration in soil solution increased with increasing K addition and decreased with increasing incubation period. Soil solution K was drastically reduced at 45 days due to higher crop uptake. The amount of exchangeable K also increased with increment of added K and gradually decreased over time. The non-exchangeable K increased up to 45 days and then decreased up to 105 days.

Keywords: Rice rhizosphere, exchangeable K^+, non-exchangeable K.

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ESTIMATE OF HETEROSIS IN TOMATO *(Solanum lycopersicum* L.)

S. AHMAD, A. K. M. QUAMRUZZAMAN AND M. R. ISLAM

Abstract

A study was conducted to estimate heterosis of 21 tomato cross combinations involving seven parents at the experimental field of Olericulture Division of HRC, BARI during the winter seasons of 2005-2006. Analysis of variance indicated highly significant differences for all the characters suggesting the presence of genetic variability among the studied materials. Three combinations ($P_2 \times P_3$, $P_3 \times P_4$, $P_3 \times P_5$) showed significant early flowering, while two $P_1 \times P_7$ (16.67%) and $P_1 \times P_2$ (12.44%) for individual fruit weight. In the study, the cross combinations $P_4 \times P_7$ (62.31%), $P_2 \times P_6$ (37.44%), $P_4 \times P_6$ (34.77%), $P_2 \times P_7$ (33.67%), $P_3 \times P_7$ (32.09%), and $P_3 \times P_4$ (29.82%) manifested higher heterosis over better parent for yield per plant.

Keywords: Heterosis, tomato, genetic variability.

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ARSENIC TOXICITY IN AKITAKOMACHI RICE IN PRESENCE OF FE^{3+}-EDTA

MOLLA RAHMAN SHAIBUR AND SHIGENAO KAWAI

Abstract

An experiment was carried out hydroponically to investigate the arsenic (As) toxicity in rice (*Oryza sativa* L. cv. Akitakomachi) seedlings in presence of Fe^{3+}-EDTA. The As treatments (NaAsO2) were 0, 6.7, 13.4, 26.8, and 33.5 µM for 14 days. The whitish chlorotic symptom was pronounced in the fully expanded young leaves at 13.4 µM As treatment, suggesting that As-induced chlorosis might be Fe (iron)-chlorosis. Chlorophyll indices and Fe concentrations were reduced much in the shoots of As-treated chlorotic seedlings as compared to the control seedlings. Our result showed that As-toxicity largely depended on the concentrations of inorganic As in the medium and the higher was the concentration of As the higher was the As-toxicity.

Keywords: Arsenic, concentration, Fe-chlorosis, rice, young leaves.

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HEAVY METAL LEVELS IN VEGETABLES WITH GROWTH STAGE AND PLANT SPECIES VARIATIONS

HABIB MOHAMMAD NASER, SARMIN SULTANA, NASHIR UDDIN MAHMUD REBECA GOMES AND SHAMSUN NOOR

Abstract

Field experiment was conducted to compare and investigate the concentration levels of heavy metals in leafy vegetables with growth stage and plant species variations on an experimental field near the net house of Soil Science Division, Bangladesh Agricultural Research Institute, Joydebpur, Gazipur, Bangladesh during November 2008 to January 2009. Seeds of spinach (*Spinacia oleracea*), red amaranth (*Amaranthus tricolor*) and amaranth (*Amaranthus oleraseus*) were sown on 14 November 2008. Plant and soil samples were collected at different growth

stages, such as at 20, 30, 40, and 50 days after sowing (DAS). The concentrations of lead (Pb), cadmium (Cd), nickel (Ni), cobalt (Co), and chromium (Cr) in plant increased with the age of the plant, but the increase was not linear. The rate of increase of concentration of these metals at 20 to 30 DAS was found lower than that at 30 to 40 DAS, except Cr. Heavy metal content gradually increased at the early growing stage and fall during later stages of growth. The significant differences ($P < 0.01$) were observed between the mean metal concentrations in the three vegetables species. The Pb and Co concentrations in amaranth were found higher compared to those found in spinach and red amaranth. Spinach exhibited higher levels of Cd and Cr than those of other vegetables. However, the three vegetables did not differ significantly in its Ni concentration. The order of heavy metal level in different vegetables was Cd<Co<Pb<Ni<Cr. In vegetable species in respect of heavy metal concentration Cd, Ni, and Cr was highest in spinach and amaranth showed highest concentration in Pb and Co. The highest correlation between soil-plant was found for Cd, while the lowest for Ni. Metal concentrations in the vegetables studied were found lower than the maximum allowable level in India but the concentrations of Cd and Cr were higher than the allowable levels set by the World Health Organization (WHO).

Keywords: Vegetables, heavy metal, concentration, growth stage, plant species

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ON - FARM EVALUATION OF NATURAL TOXICANTS FROM *TEPHROSIA VOGELII* AND *PETIVERIA ALLIACEA* ON *MEGALUROTHRIPS SJOSTEDTI* AND *APION VARIUM* OF COWPEA *(Vigna Unguiculata* (L) WALP)

F. O. ALAO, T. A. ADEBAYO AND O. A. OLANIRAN

Abstract

The field study was conducted during the planting season of cowpea to evaluate the natural toxicant from *Tephrosia vogelii* and *Petiveria alliacea* and their mixture against *Megalurothrips sjostedti and Apion varium at* three different concentrations (5, 10, and 20% v/v). The experiment was set up in randomized complete block design. The field observations showed that the two insect pests were effectively controlled by the botanical insecticides compared with untreated plants. Also, the plant extracts at 20% and 10% v/v significantly protected cowpea pods and grains from the damage. However, higher grain yield was obtained from the plant treated with 20% v/v compared to those treated with 10%, 5% v/v and untreated plants. Combination of the two plant extracts at 20% v/v had the same efficacy with synthetic insecticide (Decis). Thus, these plant extracts can be used in organic farming.

Keywords: *Megalurothrips sjostedti, Apion varium, Tephrosia vogelii, Petiveria alliacea,* concentrations.

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EFFECT OF SOWING DATES AND VARIETIES ON THE SEVERITY OF *ALTERNARIA* BLIGHT OF MUSTARD

F. KHATUN, M. S. ALAM, M. A. HOSSAIN
P. K. MALAKER AND M. H. RASHID

Abstract

A study was carried out to find out the effect of sowing dates and varieties on the severity of *Alternaria* blight of mustard. Seeds of eight mustard varieties were sown on four different dates. Data on severity of the disease and seed yield were recorded. Disease severity differed significantly among the varieties. *B. campestris* varieties showed the higher disease severity compared to *B. napus* and *B. juncea*. The lowest disease severity was recorded in BARI Sarisha-11 which produced the highest seed yield. Percentages of leaf area diseased, leaf infection, siliqua infection, and spots per siliqua were found lowest under 21 October sowing, which were statistically lower than other sowing dates. The highest seed yield (1727 kg/ha) was recorded under 01 November sowing followed by 21 October sowing. Combination of sowing dates and varieties had a significant influence on disease severity and seed yield. Early sown (21 October and 1 November) BARI Sarisha 11 showed less disease severity and gave higher seed yield than other treatment combinations.

Keywords: Sowing dates, mustard, alternaria blight.

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INTEGRATED NUTRIENT MANAGEMENT FOR TOMATO-OKRA-INDIAN SPINACH CROPPING PATTERN

S. NOOR, N. C. SHIL, M. M. UDDIN AND M. K. ALAM

Abstract

Field experiment on Tomato-Okra-Indian spinach cropping pattern was conducted at a farmer's homestead of Tangail (AEZ 8) during 2007-08 and 2008-09 to find out a suitable combination of chemical fertilizers and organic manure for sustainable crop yield. There were 5 treatments comprising different percentages of the recommended chemical fertilizers (RCF) with two levels (0 and 5 t/ha) for tomato and three levels (0, 2.5 and 5 t/ha) for okra each of poultry manure and cowdung. No organic manure was used for the third crop Indian Spinach. The treatments were arranged in Randomized Complete Block Design with four replications. An amount of 75% dose of RCF ($N_{150}P_{40}K_{80}S_{20}Zn_2B_1$ kg/ha) along with poultry manure @ 5 t/ha appeared as the best suited combination providing tomato yield 95.3 t/ha and 88.2 t/ha for the first year and second year, respectively. Again, an amount of 75% dose of RCF ($N_{120}P_{35}K_{70}S_{15}Zn_2B_1$ kg/ha) along with poultry manure @ 2.5 t/ha appeared as the best package providing the highest okra yield (15.03 t/ha and 12.98 t/ha). The highest yield (36.3 t/ha and 33.7 t/ha for the first and second year, respectively) of Indian Spinach was recorded from (75% recommended N + PM residue), which was statistically identical with (100 % recommended N), but significantly higher over rest of the treatments. Poultry manure performed better over cow dung. A package of 75% recommended chemical fertilizer along with 5 t PM/ha appeared as the best suited combination providing higher yield and economic return.

Keywords: Integrated nutrient management, tomato, okra, Indian spinach.

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CHARACTERIZATION AND MAINTENANCE OF YAM (*Dioscorea* spp.) GERMPLASM

MD. TARIQUL ISLAM, RAIS UDDIN CHOWDHURY, ROZINA AFROZ, SAJIA RAHMAN AND MD. MAMTAZUL HAQUE

Abstract

Three experiments were conducted with 60 germplasm accessions of yam (*Dioscorea* spp.) at Plant Genetic Resources Centre of BARI for characterization and conservation of germplasm. Fifty-nine germplasm accessions of D. *alata* L. and one accession of D. *bulbifera* L. from different districts of Bangladesh were used. Clockwise twining direction was found in D. *bulbifera* and anti-clockwise twining direction was exhibited in all D. *alata* germplasm accessions. Potato like aerial tuber was found in D. *bulbifera*. Round, oval, elongate, flattened to irregular aerial tuber shape were found. Grayed-brown, brown to grayed-orange skin colour with yellow, yellow-orange to grayed-orange of aerial tuber flesh colour were observed among the yam germplasm accessions. Oval-oblong, cylindrical, flattened, corm, rhizome to irregular shape of underground stem or tubers were observed. Low, medium to dense types of spiniess of roots were found on the tubers. Grayed-orange, red to black tuber skin colour along with white, yellowish-white, yellow, yellow-orange, red to purple tuber flesh colours were found. Significant variations were also observed in stem shape at base, colour of stem, wing and petiole wing, position of leaf, leaf shape and distance between leaf lobes. Low to high phenotypic diversity was exhibited among the germplasm accessions. The germplasm accessions produced 1 to 30 under ground tubers per plant. The main tuber length ranged from 5.4 to 66.4 cm and breadth from 2.5 to 15.5 cm. The germplasm accessions produced 0.51 kg to 16.45 kg tuber yield per plant. The maximum variability was found in tuber yield per plant (98.74%) and the minimum was found in leaf length (12.55%).The under ground tubers of yam were harvested and replanted at an interval of two to three years from 1995 at PGRC. The plants were grown on bamboo trail in the field genebank. Necessary intercultural operations are done for maintaining the yam germplasm accessions.

Keywords: *Dioscorea*, characterization, phenotypic diversity, field genebank, Bangladesh.

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YIELD GAP AND PRODUCTION CONSTRAINTS IN RICE-WHEAT SYSTEM: SCENARIO FROM EASTERN UTTAR PRADESH

MAHENDRA SINGH

Abstract

The yield gap and the production constraints in the rice-wheat (R-W) system in eastern Uttar Pradesh were studied. The yield gap II (difference between the yield obtained at nearest demonstration plot and actual yield obtained on farmers' fields in a particular region) has been found 45 percent and 38 percent in rice and wheat crops, respectively, in the irrigated rice-wheat system. The technological and socio-economic constraints have accounted for 54 percent and 46 percent of the yield gap, respectively, in the system. Soil-related constraints rank first, followed by weed-related constraints. Among the individual constraints, zinc deficiency rank first followed by nitrogen deficiency and incidence of *Phalaris minor*. The study has concluded that for the sustainability of the R-W system, priority should be accorded to bridge the existing yield gap through addressing the production constraints.

Keywords: Production constraints, rice-wheat system, yield gap, socio-economic constraints

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POTASSIUM STATUS OF FOUR RICE GROWING SOILS OF BANGLADESH

M. S. UDDIN, M. J. ABEDIN MIAN, M. R. ISLAM
M. A. SALEQUE AND M. S. ISLAM

Abstract

Soils of varying K status were selected at the BAU farm, Mymensingh and BADC farm, Madhupur for conducting laboratory, pot, and field experiments to see the dynamics of potassium in wet land rice soils. The soils were BAU-1 (0.087 cmol/kg soil), BAU-2 (0.146 cmol/kg soil), Maddhupur-1 soil (0.097 cmol/kg soil), and Madhupur-2 soil (0.706 cmol/kg soil). Almost neutral silt loam soils (Sonatola series) of BAU firm developed on the recent alluvial deposits of Old Brahmaputra Flood Plain and the acidic clayey soils (Noadda and Kalma series) of BADC farm developed on Madhupur clay. The laboratory experiments were potassium release capacity of soils, Q/I relationships of potassium. Results of the experiments showed that BADC farm soils released more K than BAU farm soils. The Q/I relationship showed that the equilibrium exchangeable K (EK0) and labile K (KL) of Madhupur-2 soil were higher than other soils. The potential buffering capacity (PBC^K) was higher in BAU-2 (5.19±0.12 cmol/kg $(mol/L)^{1/2}$ soil followed by BAU-1 (4.07±0.09 cmol/kg $(mol/L)^{1/2}$) and then Madhupur-2 soil (2.23±0.04 cmol/kg $(mol/L)^{1/2}$). BAU farm soils adsorbed 55 to 60% of added K in non-exchangeable form, while it was 33 to 39% in BADC farm soils.

Keywords: K-release, soils, buffering capacity.

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EFFECT OF SULPHUR FERTILIZATION ON THE GROWTH AND YIELD OF GARLIC (*Allium sativum* L.)

M. S. ZAMAN, M. A. HASHEM, M. JAHIRUDDIN AND M. A. RAHIM

Abstract

The experiment was conducted for two consecutive *rabi* seasons of 2005-06 and 2006-07 at the Regional Agricultural Research Station (RARS), BARI, Jamalpur to find out an optimum dose of sulphur for yield maximization of garlic cv. Jamalpur local. There were six levels of sulphur viz., 0, 15, 30, 45, 60, and 75 kg/ha. A control treatment was in the experiment. The experiment was laid out in randomized complete block design with three replications. The fertilizer package $N_{150}P_{60}K_{120}Zn_4B_1$ kg/ha was applied to each plot as blanket dose. Results revealed that most of the growth and yield parameters increased progressively with increasing rate of sulphur application. Bulb yield increased with successive increase in the level of sulphur up to 45 kg/ha and thereafter decreased. The highest bulb yield (7.05 t/ha in 2005-06 and 7.22 t/ha in 200607) was achieved at 45 kg S/ha and the control treatment receiving no fertilizer had the lowest yield (3.21 t/ha in 2005-06 in and 3.26 t/ha in 2006-07). The yield benefit for 45 kg sulphur per ha was 34.2% in 2005-06 and 40.0% in 200607 over no sulphur. Sulphur at 45 kg/ha produced 54.5% and 54.9% higher yield over control treatment in both the years. The optimum and economic dose of sulphur for the yield of garlic were 44.0 and 43.6 kg/ha, respectively.

Keywords: Sulphur, garlic growth, and bulb yield

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THE CHANGING CROP PRODUCTION PRACTICES OVER THE YEARS: THE MYSTERY OF ECONOMICS

M. SHAHE ALAM, M. A. QUAYUM AND M. A. ISLAM

Abstract

The present study was undertaken in two production environments in order to estimate the level of growth in area and production of rice and maize over the years, and to assess the level of changes in area under different crops. Applying both descriptive and inferential statistics, the study revealed that, the growth in acreage and production of maize had much accelerated rate compared to that for rice over the period 1987-88 towards 1996-97 and in the subsequent periods. In the favourable environment, the acreage under MV Boro increased by 18% in 2008-09 compared to 2004-05. In *rabi* season, the area under maize increased to 46% and 21% in drought prone and favourable areas, respectively. The magnitude of area changes from rice to non-rice crops under favourable area was negative. Per hectare cost of maize cultivation in drought prone area was about 13% higher than that of favourable area resulting in better net return in maize production under favourable area. Family labour, farm size and market accessibility were the important determining factors for devoting areas to maize cultivation instead of rice.

Keywords: Growth rate, production environment, drought prone, non-rice crops and favourable area.

Bangladesh J. Agril. Res. 36(4): 669-676, December 2011

INTERCROPPING LENTIL WITH MUKHIKACHU (*Collocasia esculenta*) AT DIFFERENT PLANTING SYSTEMS

M. S. ALOM, M. N. ISLAM, B. L. NAG
M.M. HOWLADER AND M. A. HOSSAIN

Abstract

The experiment was conducted at the Regional Agricultural Research Station, BARI, Jessore during consecutive two years (2007-08 and 2008-09) to find out the comparative performance of different intercropped lentil with Mukhikachu for getting higher yield and economic return. Five treatments comprised of T_1= Sole lentil (30 cm apart continuous seeding), T_2 = Sole mukhikachu [(double row) = 20 cm/55/20 cm x 45 cm], T_3= Mukhikachu (double row) + 1 row of lentil 30 cm apart (33% seeding ratio) between 2 double row of mukhikachu, T_4 = Mukhikachu (double row) + 2 rows of lentil 30 cm apart (66%) between 2 double row of mukhikachu and T_5= Mukhikachu (double row) + lentil broadcast (100%). Intercropping systems did not affect the rhizome yield of mukhikachu significantly but affected the seed yield of lentil. Lentil and mukhikachu equivalent yield were the highest (5.87 in 2007-08 and 6.09 t/ha in 2008-09, and 27.24 in 2007-08 and 30.45 t/ha in 2008-09, respectively) in treatment T4. This treatment also gave the highest LER (1.63 in 2007-08 and 1.54 in 2008-09), net return (Tk. 290508 in 2007-08 and Tk. 368900/ha in 2008-09) with BCR of 4.19 in 2007-08 and 4.88 in 2008-09, respectively. It reveals that lentil could be grown easily in double row system of Mukhikachu without hampering yield of Mukhikachu with higher benefit and also enhanced lentil production in the area.

Keywords: Intercropping lentil with Mukhikachu, planting system.

Bangladesh J. Agril. Res. 36(4): 677-683, December 2011

IN VITRO STUDIES ON THE FUNGICIDAL EFFECT ON *TRICHODERMA* SPECIES IN TEA PLANTATION

M. S. ISLAM, M. ALI AND M. S. RAHMAN

Abstract

Tolerance of *Trichoderma* species collected from tea plantation to fungicides was evaluated *in vitro* using poisoned food method. Fungicides like Carbendazim 50 WP, Copperoxychloride 50 WP, Hexaconazole 5 EC, and Propiconazole 25 EC were used at two lower and two upper of recommended doses. The growth of *T. harzianum* was mostly inhibited by the Carbendazim 50 WP and Propiconazole 25 EC with the recommended doses; while *T. viride* could grow easily with the said doses. Both species of *Trichoderma* grew easily in medium containing Copperoxychloride even at highest doses. Hexaconazole 5 EC proved to be highly toxic with no growth of *Trichoderma harzianum* in treatments containing 40.0 and 42.05 ppm. At highest concentration (42.5 ppm) of Hexaconazole 5 EC, *T. viride* grew after 72 hours of incubation. It was 14.44% over the control on 4th day of plating.

Keywords: *In vitro*, fungicidal effect, trichoderma species, tea.

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DIMETHYL DISULFIDE- A POTENTIAL BIOPESTICIDE AGAINST ROOT-KNOT NEMATODE OF TOMATO (*Lycopersicon esculentum* L.)

M. I. FARUK, M. L. RAHMAN, M. M. H. MUSTAFA AND IR. J. COOSEMANS

Abstract

Dimethyl disulfide (DMDS), the natural biopesticide extracted from *Allium* spp., was evaluated against root-knot nematode (*Meloidogyne incognita*) of tomato (*Lycopersicon esculentum* L.) in greenhouse pot culture. All concentrations of DMDS viz. 30 ml, 60 ml, and 80 ml and Aldicarb @ 2g per square meter of soil were effective against root-knot disease under both wet and dry conditions of soil. Nematode incidence was reduced drastically by higher dose of DMDS and Aldicarb @ 2g but did not accelerate vegetative growth of tomato plant especially when tomato seedlings were transplanted immediately after soil treatment. Low concentration of DMDS (30 ml per square meter of soil) was found appropriate for controlling root-knot nematode of tomato, accelerating saprophytic nematode population in soil and also enhancing vegetative growth of tomato plant under dry condition of soil.

Keywords: Dimethyl disulfide, Aldicarb, *Meloidogyne incognita*, tomato.

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EFFECTS OF INTEGRATED USE OF FERTILIZERS AND MANURE ON YIELD AND NUTRIENT UPTAKE OF T.AUS RICE AND MUNGBEAN IN THE WHEAT-T.AUS RICE/MUNGBEAN-T.AMAN RICE CROPPING PATTERN

M. A. H. BHUIYAN, M. H. MIAN, M. S. ISLAM AND M. R. ISLAM

Abstract

An experiment was carried out at the Bangladesh Agricultural University (BAU) Farm, Mymensingh from *rabi* season of 1999 to *kharif-II* season of 2002 in the Old Brahmaputra Floodplain Soils (AEZ 9, Aeric Haplaquept) of Bangladesh to investigate the effect of integrated use of organic and inorganic fertilizers on yield and nutrient uptake of T.Aus rice and mungbean in the Wheat-T. Aus/Mungbean-T.Aman cropping pattern. There were four

treatments for wheat- T_1: Control, T_2: NPKSZnB (MYG), T_3: NPKSZnB (HYG) and T_4: NPKSZnB (MYG) + CD. The nutrient rates for four treatments of wheat were N0P0K0S0Zn0B0 kg/ha for T_1, $N_{80}P_{20}K_{50}S_{10}Zn_1B_1$ kg/ha for T_2, $N_{120}P_{30}K_{75}S_{15}Zn_2B_2$ kg/ha for T3 and N80P20K50S10Zn1B1 kg/ha + CD (5 t/ha) for T4. In T. Aus/Mungbean one-third plot of each treatment was cultivated by T. Aus rice and the rest two-thirds plot by mungbean. The rates of N, P, K, and S for T. Aus rice were, respectively, 60, 12, 32 and 5 kg/ha for MYG, and 90, 18, 48 and 7.5 kg/ha for HYG. The corresponding rates of P, K, and S for mungbean were 10, 13, and 5 kg/ha for average yield goal (AYG). The results showed that grain (3.46 t/ha) and straw yields (5.19 t/ha) of T. Aus rice increased significantly due to application of fertilizers. The highest mean seed yield of 0.56 t/ha and stover yield of 1.99 t/ha in mungbean were obtained from PKS plus inoculum plus residual NPKSZnB for HYG treatment. The N, P, K, S, Zn, and B uptake by T.Aus/Mungbean remarkably increased with increasing supply of nutrients. The highest uptake of N, P, K, S, Zn, and B by the crops was noted in the treatment T3 that received HYG fertilizers in T. Aus rice. The removal of N ranged from 27.3 to 63.2 kg/ha and 29.8 to 48.1 kg/ha, P from 5.62 to 15.80 kg/ha and 2.60 to 4.69 kg/ha, K from 35.8 to 71.8 kg/ha and 21.9 to 37.4 kg/ha, S from 4.08 to 10.26 kg/ha and 2.12 to 4.11 kg/ha, Zn from 44 to 132 g/ha and 56 to 101 g/ha, B from 17 to 70 g/ha and 7 to 16 g/ha by T.Aus rice and mungbean, respectively. Application of cowdung along with chemical fertilizers resulted in markedly higher uptake of nutrients. The application of NPKS (HYG) fertilizers remarkably increased the crop yield. The lowest grain yield and the lowest nutrient uptake were noted in control plots receiving no fertilizer or manure.

Keywords: T.Aus rice, mungbean, fertilizers, yield, uptake.

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INTEGRATED NUTRIENT MANAGEMENT FOR POTATO-MUNGBEAN-T.AMAN RICE CROPPING PATTERN UNDER LEVEL BARIND AGROECOLOGICAL ZONE

M. R. A. MOLLAH, NAJRUL ISLAM AND M. A. R. SARKAR

Abstract

A field experiment was conducted at the Multiplication Testing Site (MLT), Joypurhat Sadar upazila with Potato- Mugnbean –T.

Aman rice cropping pattern during November/2007 to November/2008 to verify different nutrient management approaches and to determine the economic dose of fertilizer for the said cropping pattern. The experiment was designed with five treatments for whole of the cropping pattern in a randomized complete block design with six replications. The treatments were, soil test based fertilizer dose for moderate yield goal, soil test based fertilizer dose for high yield goal, integrated plant nutrient management, farmers' practice, and control. Cowdung was applied at the first crop potato only in the cropping sequence. The varieties for potato, mungbean and T. *Aman* rice were Diamant, BARI Mung-6, and BR11, respectively. The results demonstrated that the tuber yield of potato, seed yield of mungbean, and grain yield of T. *Aman* rice were significantly influenced by the different treatments. The highest tuber yield (25.01 t/ha) was obtained from integrated plant nutrient management treatment. In mungbean, the highest seed yield (1384 kg/ha) was also recorded from NPKS for high yield goal with residual cowdung treatment. The results of NPKS application for high yield goal with residual cowdung had a positive effect on seed yield of mungbean. Grain and straw yields of T. *Aaman* rice were also significantly influenced by different treatments. The highest grain yield (5.68 t/ha) and straw yield (5.82 t/ha) were also observed in NPKS for high yield goal with residual cowdung treatment. The results also indicated that the residual cowdung had a positive effect on grain and straw yields of T. *Aman* rice. Cost and return analysis of different nutrient management packages for the whole cropping pattern showed that the highest marginal benefit cost ratio (8.64), gross return (Tk. 3,79,960/ha) and gross margin (Tk. 3,43,360/ha) were obtained from integrated plant nutrient management treatment and the lowest from soil test based fertilizers for moderate yield goal treatment. So, considering crop productivity, economic return, and soil fertility, integrated plant nutrient management for high yield goal with 5 t/ha cowdung could be recommended for the Potato-Mungbean-T *Aman* rice cropping pattern at Joypurhat and similar soils of Level Barind agroecological zone for sustainable higher yield.

Keywords: Integrated nutrient management, cropping pattern, level Barind agroecological zone.

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EFFECT OF EXTENSION CONTACT ON RICE PRODUCTIVITY IN SOME SELECTED SITES OF GAZIPUR DISTRICT

ABU ZAFAR MAHMUDUL HAQ

Abstract

The impact of extension contact is examined with a view to evaluating the agriculture extension in Bangladesh. It is found that the impact of extension contact is stronger for the comparatively near villages to upazila headquarters. This effect is weaker for those villages, which are comparatively away from upazila headquarters. Evident shows that the influence of extension contact is strongly positive and significant in the upazila where people are mostly involved in agricultural works. The results show that the impact of extension contact, which is one of the basic tenet of agricultural extension, as found in the yield of rice in the whole survey area, is strongly positive and significant. Some determinants of extension contact are also examined. Findings revealed that education of farmers, size of farm families, number of earners of farm families, irrigation and villages which are nearer to the upazila headquarters are key determinants for a household participation in extension contact.

Keywords: Extension contact, farmer, rice yield.

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AGRO-MORPHOLOGICAL CHARACTERIZATION AND ASSESSMENT OF VARIABILITY IN AROMATIC RICE GERMPLASM

M. PARIKH, N. K. MOTIRAMANI, N.K. RASTOGI AND B. SHARMA

Abstract

The present studies were carried out to characterize seventy-one aromatic rice germplasm from IGKV, Raipur. These germplasm were characterized and grouped on the basis of anthocyanin pigmentation, plant habit, and awning character. On the basis of pigmentation distribution in 10 plant parts, a total of twelve groups were formed with group one having no pigmentation and group twelve with pigmentation in 9 plant parts. On the basis of plant habit and awning character, three groups of each were formed. The genetic parameters for the ten agronomic traits indicated that the selection of genotypes may be done for fertile spikelets per panicle, spikelet density, spikelet sterility percentage, and hundred seed weight. Thus, on the basis of above characters, the genotypes Tulsi Mala, Baanspati, Ganga Balu, Samund Chini, Tulsi Amrit, Dudh Dhan, Kari Gilas, Shankar Jeera, and Jata Shankar may be selected for future study.

Keywords: Rice germplasm, characterization, genetic variability.

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HEAVY METAL POLLUTION OF SOIL AND VEGETABLE GROWN NEAR ROADSIDE AT GAZIPUR

HABIB MOHAMMAD NASER, SARMIN SULTANA, REBECA GOMES AND SHAMSUN NOOR

Abstract

Levels of lead, cadmium, and nickel in roadside soils and vegetables along a major highway in Gazipur, Bangladesh were investigated. Soil samples were collected at distances of 0, 50, 100, and 1000 m (meter) from the road. The concentrations of lead (Pb) and nickel (Ni) in soil and vegetables (bottle gourd and pumpkin) decreased with distance from the road, indicating their relation to traffic and automotive emissions. The concentration of cadmium (Cd) was found to be independent of distance from road. There were significant differences in the concentrations of lead, cadmium, and nickel for different plant species and soils at various distances. The heavy metals contents both in the soils and vegetables for every distance from the road was found in the order nickel>lead>cadmium.

Keywords: Pollution, heavy metal, roadside soil, vegetable.

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INFESTATION AND MANAGEMENT OF THE LEAF ROLLER (*Lamprosema indicata* Fab.) IN SOYBEAN (*Glycine max* L.)

G. C. BISWAS AND RABIUL ISLAM

Abstract

Infestation and management of leaf roller of soybean were studied in the field and laboratory of the Oilseed Research Centre (ORC), Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur during the *rabi* seasons of 200708 and 2008-09. Leaf roller infestation was observed in the 3rd week of January at the vegetative and flowering stages (45-60 days after sowing=DAS) of the crop and continued up to pre-maturity period (80-85 DAS). The highest leaf roller population (0.9 and 1.00/plant in 2008 and 2009, respectively) and infestation (90% plant in 2008 and 95% plant in 2009) were recorded in the last week of February at the pod formation stage of the crop (65-70 DAS). Among the treatments, hand picking technique reduced the highest plant and leaf (98%) infestation. The highest seed yield (1300 kg/ha) was obtained from Diazinon 60 EC treated plots, followed by hand picking+neem seed extract treated plot (1280 kg/ha). The highest BCR (3.00) was obtained from the hand picking technique plots followed by Diazinon 60 EC treated plots (2.66).

Keywords: Soybean, leaf roller, handpicking, neem seed extract.

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OPTIMUM WATER USE IN CONSERVATION TILLAGE FOR WHEAT CULTIVATION

K. K. SARKER, P. K. SARKAR, A. Z. SARKER
A. M. F. T. ISLAM AND WANG XIAOYAN

Abstract

Conservation tillage system offers numerous benefits over intensive tillage system. This experiment was conducted on conservation tillage using zero till-drill, power tiller operated seeder (PTOS) and bed planter along with farmer's practice of tillage by rotary tiller under different irrigation levels at Wheat Research Centre (WRC), Nashipur, Dinajpur. Irrigation water was applied by 5 irrigation levels at different growth stages of the crop. The irrigation levels were I0 (No irrigation), I1 (17-21 DAS), I2 (17-21 DAS + 50-55 DAS), I3 (17-21 DAS + 50-55 DAS + 75-80 DAS), and I4 (17-21 DAS + 35-40 DAS + 50-55 DAS + 75 – 80 DAS). It was observed that the sowing cost was reasonably reduced than that of the farmer's practice. Seasonal water use was less in PTOS than other tillage methods. Grain yield was significantly affected by tillage methods. The higher grain yield was found from PTOS, bed planting, and zero tillage than that of farmer's practice. There was no significant difference within the interaction effect of tillage methods and irrigations. The effect of irrigation level was found highly significant on grain yield. Water use efficiency increased with decrease of irrigation water use and decreased with increase of irrigation. Average yields in all tillage methods under I1, I2, I3, and I4 irrigation levels were found to increase by 33, 43, 52, and 51 percent, respectively, compared to that of I0.

Keywords: Conservation tillage, zero till-drill, PTOS, bed planting, and irrigation water.

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HETEROSIS AND QUALITATIVE ATTRIBUTES IN WINTER TOMATO (*Solanum lycopersicum* L.) HYBRIDS

M. R. ISLAM, S. AHMAD AND M. M. RAHMAN

Abstract

An investigation was carried out at the Research Farm of Olericulture Division of Horticulture Research Centre of Bangladesh Agricultural Research Institute (BARI) to evaluate the heterotic performance in F1 generation of tomato. The hybrids showed significant variation in heterosis. The highest heterobeltiotic effects were observed in the cross P_3 x P_8 (-18.46%) for earliness, P_1 x P_6 (8.57 %) for flowers per cluster, P_2 x P_6 (21.73%) for fruits per cluster, P_6 x P_7 (75.54%) for plant height, P_5 x P_6 (67.44%) for fruits per plant, P_9 x P_{10} (54.82 %) for yield per plant, P_2 x P_8 (21.21 %) for individual fruit weight, P_7 x P_8 (3.09 %) for fruit length, P_3 x P_8 (14.11 %) for fruit diameter and P_1 x P_6 (13.11 %) for brix content. In respect of fruit external characters like shape, pedicel area, shape of pistil scar, blossom end shape genotypes were found diverse. Internal qualitative character like firmness, fleshiness and less seeded and locule numbers were highly variable among the genotypes. Considering all the characters the crosses P_1 x P_8, P_2 x P_6, P_2 x P_7, P_2 x P_8, P_3 x P_8 and P_5 x P_6 were found suitable for further studies to variety selection.

Keywords: Heterosis, qualitative attributes, winter tomato.

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ECONOMICS OF RAINFED SERICULTURE-A STUDY IN THE DISTRICT OF UDAIPUR IN RAJASTHAN, INDIA

RUCHIRA SHUKLA

Abstract

Sericulture is a labour intensive agro-based rural industry, which provides periodical income throughout the year. In view of this, it is very much imperative to know the sericulture economics in

order to motivate new farmers to take up sericulture and increase their income. Therefore, a study was conducted with the help of personal interview of 70 rainfed sericulture farmers in Udaipur district of Rajasthan, India. The study concluded that in garden establishment, highest share of cost was associated with human labour (INR 14,400.00) followed by that for FYM (INR 2418.75). Similarly human labour (51.93%) accounted for highest element of cost in leaf production activities too owing to high labour wages and shortage of manpower. Labour (25.33%) was second major cost component next to mulberry leaf (38.64%) in silk cocoon production. The average yield of silk cocoon obtained was 1289.04 kg/ha per year. The net return obtained was INR 52039.32 and benefit cost ratio was 1.49.

Keywords: Sericulture, economics, mulberry, cocoon.

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STUDY ON AGRONOMICALLY AND ECONOMICALLY DOMINANT CROPPING PATTERNS IN SOME SELECTED AREAS OF BARISAL DISTRICT

MD. JAHANGIR KABIR AND MD. MONIRUL ISLAM

Abstract

The study area was Shanuhar village of Babugonj Upazila of Barisal district, which was selected purposively based on agronomic suitability of growing *rabi* crops. Necessary data were collected through focus group discussion (FGD) with 30 farmers including small, medium, and large farm households, school teachers, village leaders all the remaining by using pre design check list and structure schedule during May 2007 considering *rabi* season of 2006-2007. Usually, farmers of the village could not sow their crops within the optimum time. They transplanted Aman rice in late due to inundation of land and planting of *rabi* crops in late because of land unsuitability and long duration of T. Aman rice. Boro rice was adopted about 75% of the cropped area in *rabi* season but yield was low because of inadequate irrigation facilities. In contrast wheat needs comparatively less irrigation than Boro rice. Moreover, mungbean, mustard, lentil and grass pea produce reasonability good yield in rainfed condition. About 20-25 % land become suitable for seeding wheat by first week of December after harvesting T. Aman which indicated good prospect of growing wheat in the study village. Wheat is a more profitable *rabi* crop than other crops like grass pea, mustard, lentil. Farmers earned the highest per hectare gross return (Tk.98646) and gross margin (Tk.22870) from the Wheat – *Aus* rice -T. Aman rice pattern whereas Boro rice - Fallow - T. Aman pattern produced the lowest gross return (Tk.65918) and gross margin (Tk.10134). Higher benefit was achieved from the pattern Wheat – *Aus* rice -T. Aman rice because of less production cost and high price of wheat grain, though three cereals crops could exhaust soil nutrient so that Mungbean-Aus rice – T. Aman pattern may be alternate option to sustain soil health as well as productivity of the selected area.

Keywords: Agronomically, economically, dominant cropping patterns.

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PRESERVATION OF JACKFRUIT (*Artocarpus heterophyllus*) BY OSMOTIC DEHYDRATION

MD. MIZANUR RAHMAN, MD. MIARUDDIN, M.G. FERDOUS CHOWDHURY, MD. HAFIZUL HAQUE KHAN AND MD. MUZAHID-E-RAHMAN

Abstract

Preservation of jackfruit (*Artocarpus heterophyllus*) by osmotic dehydration method has been standardized. Four treatments of sugar concentration viz. 35^0, 40^0, 45^0, and 50^0 Brix were used for osmotic dehydration. After osmosis of the jackfruit slices in the sugar solutions these were laid on the cabinet drier for dehydration. After osmotic dehydration, the products were packed in high density polyethylene bags and stored in ambient temperature for a period of 8 months. The physico-chemical properties and the microbiological changes of the products were evaluated and a taste panel evaluated the organoleptic quality of the products during the storage period. Minimum microbial count was recorded for osmosis in 50^0 Brix sugar solution followed by 45^0 Brix sugar solution. The retention of vitamin A (ß- carotene),

vitamin C, total acid and total sugar was also better for osmosis in 45^0 Brix sugar solution followed by 50^0 Brix sugar solution. The product of 45^0 Brix solution when stored 8 months at room temperature secured highest score in organoleptic evaluation and was ranked " like moderately" followed by the product of 50^0 Brix solution. Considering the overall acceptance of sensory evaluations, retention of nutritional quality and quantity of sugar needed, the osmotic dehydrated jackfruit prepared by 45^0 Brix sugar solution could be selected for commercial processing.

Keywords: Jackfruit preservation, osmotic dehydration.

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PROFITABILITY OF FLOWER PRODUCTION AND MARKETING SYSTEM OF BANGLADESH*

NUSRAT HASAN MOU

Abstract

This study examines the production and profitability of some selected flowers in comparison with their competing crops. The study also attempts to identify the value chains and channels of flower marketing in Bangladesh. Stratified random sampling method was used to collect Primary data collected from the 32 farmers of Guptergaon under Phulpur Upazila in Mymensingh district and from the 21 flower traders, retailers and wholesalers of different flower trading zones in Dhaka city. The study reveals that gross margins of flower and vegetables per hectare were Tk.1,359,824.20 and Tk.46,362.14, respectively. The average marketing margin of three intermediaries i.e., BRAC, wholesaler-cum-retailer and retailer in Dhaka city, were Tk. 187.56, Tk. 638.39 and Tk.689.72 per 100 flowers, respectively. Lack of mother stock and their high price, price of fertilizer and insecticides, lack of scientific knowledge & training, attack by pest & disease, lack of extension work came out as major financial and technical problems of the flower farmers while inadequate & underdeveloped transportation & communication system, low market price, lack of market information, unstructured market are among major market related problems. On the other hand marketing intermediaries specified price instability, lack of adequate market information, lacking storage facilities, unsold flower, inadequate shop-space, demand fluctuation, strikes as their problems and constraints. Pertinent recommendations for facilitating flower production and developing an improved marketing system in Bangladesh include -a concentrated effort by the government and non-govt. agencies to provide appropriate trainings to farmers and traders, to provide appropriate production assistance and storage facility & to build countrywide permanent trading infrastructure, deployment of an Market Information System (MIS) and deployment of Entrepreneur-friendly SME and credit policies and packages for ensuring a balanced growth of the floriculture industry.

Keywords: Flower production in Bangladesh, flower marketing in Bangladesh, floriculture in Bangladesh, flower trading.

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GENETIC TRANSFORMATION IN WHITE JUTE THROUGH *AGROBACTERIUM* AND SALINITY SCREENING OF TRANSGENIC PLANT

M. N. AMIN, ASMA KHATUN, M. S. R. BHUIYAN
M. A. SAYED AND S. R. KHANDKER

Abstract

The experiment was conducted to establish an efficient and reproducible protocol for the plant regeneration and genetic transformation in white Jute (*Corchorus capsularis* L.). The regeneration and transformation processes depend on optimum growth conditions, suitable explants and varieties. An attempt was made for *Agrobacterium* mediated genetic transformation in white jute varieties using gene construct conferring both salt and drought tolerance (CIPK and Gly-1) along with the marker genes. Interestingly the two varieties (CVL-1 and Tricap-1) showed the response of both callus induction and plant regeneration on a single formulation i.e. MS medium supplemented with 2.0 mg/l BAP and 0.5 mg/l IAA. Explants were dipped to liquid culture of

* This research was conducted as part of MS course curriculum of the author.

bacteria for one minute and then transferred to co-cultivation media for 24 hours. Shoot regeneration from *Agrobacterium* infected cotyledon was found highest in variety CVL-1 (43%) than Tri cap (38%). After co-cultivation and selection histochemical *GUS* assay was performed in different varieties (vars. Tricap-1, CVE-3 & CVL-1). In the transformed explants, *GUS* reporter gene was expressed showing blue colour in the explants tissues. Among the varieties CVE-3 showed the highest expression blue colour in the explants tissues. Those transgenic plants are transferred to salt medium and soil for evaluation.

Keywords: Media, *Agrobacterium tumefaciens, Corchorus olitorius,* transformation.

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ECONOMIC PERFORMANCE OF GINGER (*Zingiber officinale* Rose.) CULTIVATION IN SOME SELECTED LOCATIONS OF BANGLADESH

Q. M. SHAFIQUL ISLAM, M. A. MATIN AND S. HOSSAIN

Abstract

The study was conducted in two ginger growing districts, namely Nilphamari and Khagrachari of Bangladesh during the period of 2009-10 to estimate the technical efficiency of ginger growers. The study revealed that ginger production was profitable and the average benefit cost ratio (BCR) was found 2.17. The estimated results showed that the average level of technical efficiency among the sample farmers was 85. This implies that given the existing technology and level of inputs, the output could be increased by 15 percent. In inefficiency model, the coefficient of farmer's education and experience in ginger cultivation was negative and significant. Sixty eight percent farmers produced outputs to the maximum frontier output level (81-95%). Farmers in the study area also mentioned some problems like incidence of root rot disease, high price of seed, insect infestation etc to its production.

Keywords: Economic performance of ginger cultivation, technical efficiency of farmers.

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PROBLEMS AND SUGGESTIONS FOR FARMERS' ADOPTION OF IPM PRACTICES IN RICE *(Oryza sativa* L) CULTIVATION

M. M. RAHMAN

Abstract

A study was carried out to determine the problems in IPM practices for rice cultivation faced by the farmers trained in IPM through Farmers' Field School (FFS) and also to find out the important probable suggestions for overcoming those problems. Data were collected from 158 respondent farmers sampled randomly from 1050 FFS farmers of Godagari Upazila in Rajshahi district. Twenty important problems regarding IPM practices were identified by interviewing teachers, extension personnel, experts and the sampled FFS farmers. Twenty possible solutions/suggestions for overcoming the problems were also collected by using the same procedure. The importance of the problem and the suggestions was measured by using 'Important Problem Score Index (IPSI)' and 'Important Solution Score Index (ISSI)' technique, respectively. The five most important problems as reported by the farmers ranked in the following order: i) need for much more labour, ii) lack of proper training for farmers about IPM, iii) lack of farmers' knowledge regarding IPM practices, iv) availability of insecticides and v) complexity of IPM practices. Similarly, the five most common suggestions were i) establishment of more IPM field school, ii) arrangement of farmers practical training, iii) introduction of IPM practices into the school/college academic course, iv) increase the farmers' awareness on environment pollution and v) to ensure proper supervision of extension worker. IPM is environment-friendly pest management system but due to its complexity need more knowledge and training. So, it is needed to give more emphasis in educational and motivational programme for increasing IPM practices for the farmers by the implementing agencies.

Keywords: Problems, suggestions, IPM practices, rice, cultivation.

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GENETIC DIVERGENCE IN CHICKPEA (*Cicer arietinum* L.)

M. A. SYED, M. R. ISLAM, M. S. HOSSAIN
M. M. ALAM AND M. N. AMIN

Abstract

Genetic diversity of 27 chickpea genotypes was studied through Mahalanobis D^2 and Principal Component analysis. The genotypes under study fall into five clusters. The cluster II contained the highest number of genotypes (11) and Cluster I contained the lowest. Cluster I produced the highest mean value for number of pods per plant. The inter cluster distances were much higher than the intra cluster distances. Cluster V exhibited the highest intra cluster distance while the lowest distance was observed in cluster I. The highest inter cluster distance was observed between cluster I and II while the lowest was between cluster III and V. Considering all the characters, it was suggested that the genotypes BD6549, BD6603, and BD6548 could used as parents for future breeding programs to develop high yielding varieties of chickpea.

Keywords: Chickpea, genetic diversity, multivariate, D^2 statistics, inter cluster distance and intra cluster distance.

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RESPONSE OF MUSTARD *(Brassica)* VARIETIES TO BORON APPLICATION

M. A. HOSSAIN, M. JAHIRUDDIN AND F. KHATUN

Abstract

An experiment was conducted at the Regional Agricultural Research Station (RARS), Jessore (AEZ11, High Ganges River Floodplain) during 2003-2006 to evaluate the response of different varieties of mustard to boron application. Boron application was made at 0 and 1 kg/ha. The mustard varieties responded to B application. The response of the three *Brassica* species followed the order: *B. napus* > *B. campestris* > *B. juncea*. The varieties chosen from *B. campestris* were BARI Sarisha-6, BARI Sarisha-9, and BARI Sarisha-12. The *B. napus* varieties were BARI Sarisha-7, BARI Sarisha-8, and BARI Sarisha-13. Varieties BARI Sarisha-10 and BARI Sarisha-11 were from the *B. juncea* group. The seed yield was positively and significantly correlated with the yield contributing characters viz. pods/plant, seeds/pod, and 1000-seed weight, but not with plant height and pod length. This result showed that boron had positive influence on reproductive development, not on vegetative. The result suggests that BARI Sarisha-10 and BARI Sarisha-11 were the most B in-responsive (B efficient) varieties. So the farmers can grow these varieties in the moderately B deficient soils with a minimum dose (0.5 kg/ha) of B application.

Keywords: Mustard, boron, B in-responsive.

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PROFITABILITY OF BARI RELEASED POTATO *(Solanum tuberosum* L.) VARIETIES IN SOME SELECTED LOCATIONS OF BANGLADESH

M.A. HAQUE, M. A. MONAYEM MIAH
S. HOSSAIN AND M. M. RAHMAN

Abstract

Potato is one of the important food crops in Bangladesh. Its demand is increasing day by day. The Tuber Crop Research Centre (TCRC) of BARI released 40 HYV potato varieties and disseminated them in the farmer's fields through different agencies. But most varieties were not adopted well by the farmers due to unknown reasons. Therefore, an attempt was made to assess the level of adoption and profitability of BARI released potato variety at farm level. Data were collected from 150 randomly selected potato farmers from Munshigonj, Bogra and Comilla districts during January-February 2010. The results indicated that 48% potato areas were covered by Diamant variety, 16% by Cardinal, 22% by Granola, and the rest 14% areas were covered by Binella, Asterix, Provento, Felsina, Multa and Hira. The cost of BARI released potato cultivation was Tk 2, 10,629 and Tk 1, 84,135 per hectare on full cost and variable cost basis. The major share of total cost was for seed (42%) followed by fertilizer (21%)

and human labour (14%). The average yield of potato was 26 t/ha with gross margin of Tk 1, 51,003 per hectare. The net return of potato cultivation was Tk 1, 24,509 per hectare. The benefit cost ratios were 1.59 and 1.82 on full cost and variable cost basis. Human labour, land preparation, seed, and irrigation had positive and significant effect on potato production. Non-availability of HYV seed at proper time, lack of technical knowledge, high price of seed and fertilizer, infestation of insect and diseases, and lack of storage facilities were the major problems of potato production.

Keywords: Profitability, potato, cost of cultivation.

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EFFECT OF DIFFERENT HEDGEROW SPECIES AND NITROGEN LEVEL ON THE SOIL PROPERTIES AND YIELD OF OKRA *(Abelmoschus esculentus L.* Moench)

Z. A. FIROZ, K. M. NASIRUDDIN AND M. F. MONDAL

Abstract

An experiment was conducted at the Hill Agricultural Research Station, Khagrachari from June 2002 to November 2004 to find out the effect of hedgerow species (Ipil-ipil, Indigofera, Pigeon pea , Pineapple with control) and different nitrogen levels (50, 75, and 100% recommended dose of N) on the soil properties and yield of okra in hill slope condition during the rainy season. Different soil properties were affected by hedgerow species and N level with okra crop. In maximum cases, Indigofera with 100% N showed better performance. The highest pH value 6.0, total nitrogen content 0.84, available phosphorus 4.4, exchangeable calcium 1.27 meq/100g, exchangeable sulphur 12.8 meq/100g, and CEC 21.5 were recorded from Indigofera with 100% N. The most satisfactory okra yield 15.05 t/ha was in Indigofera+100% N that was statistically at par with Indigofera+75% N.

Keywords: Hedgerow species, nitrogen level, soil properties, okra yield.

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MEASURING TECHNICAL EFFICIENCY OF ONION (*Allium cepa* L.) FARMS IN BANGLADESH

M. A. BAREE

Abstract

An attempt was made to determine the overall farm-specific technical efficiency or inefficiency of onion farms of Bangladesh. Farm-level data were used for the estimation of the parameters of Cobb-Douglas stochastic frontier production function. The model for technical inefficiency effects in the stochastic frontier included age, experience, education, and farm size. The elasticity of output with respect to land, labour, and capital cost was estimated to be positive values of 0.3026, 0.0718, and 0.0442, respectively, and also significant. With respect to seed and irrigation, it was found to be insignificant with negative values of 0.0045 and 0.0007. It indicates that per hectare yield of onion decreases if the amount of seed and irrigation hour increase. The coefficients of age, experience, and farm size were significant with expected negative signs, which means that the inefficiency effects in onion production decreases with increase in age, experience, and farm size. The technical efficiency of onion farms varied from 58% to 99% with mean value of 83%. It denotes that there is a scope to increase output per hectare of onion farm by 17% through the efficient use of production technology without incurring any additional costs.

Keywords: Technical efficiency, onion in Bangladesh.

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STANDARDIZATION OF PROTOCOL FOR *AGROBACTERIUM* MEDIATED TRANSFORMATION IN POTATO (*Solanum tuberosum* L.)

M. M. H. MOLLA, K. M. NASIRUDDIN, M. AL-AMIN
M. S. HAQUE AND MANIRUZZAMAN

Abstract

The experiment was conducted at the Laboratory of Biotechnology, Biotechnology Division, Bangladesh Agricultural

Research Institute, Gazipur1701 during July 2007 to June 2008. An efficient and reproducible protocol for the production of transgenic potato plants was developed by inoculating internode explants of potato with *Agrobacterium tumefaciens* strain LBA4404 carrying a binary vector pBI121 having one reporter gene (*gus*) and selectable marker gene (*nptII*) resistant to Kanamycin. The transformation experiment was done by optimizing two important parameters names infection time and co-cultivation period. Most of the explants produced shoots within 21 days on 5 mg/l Zeatin riboside (ZR) and 50 mg/l Kanamycin supplemented MS medium without introducing callus. The infected explants produced 8.27 and 6.42 shoots in Asterix and Diamant varieties, respectively within 21 days. Transgenes were confirmed by molecular analysis. DNA from well established rooted plants confirmed *nptII* positive through PCR analysis. The transformation rates were 28.97 and 24.37% in Asterix and Diamant, respectively. Putative transformed plants of Diamant and Asterix varieties produced roots in ½MS medium supplemented with 50/mg Cefotaxim, 50 mg/l Kanamycin and 0.5 mg/l IBA.

Keywords: Potato, *Agrobacterium* transformation, *nptII* gene, internode explant.

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EFFECT OF STORAGE CONTAINERS AND STORAGE PERIODS ON THE SEED QUALITY OF FRENCH BEAN (*Phaseolus vulgaris)*

K. M. KHALEQUZZAMAN, M. M. RASHID
M. A. HASAN AND M. M. A. REZA

Abstract

The experiment was conducted in the Laboratory, Department of Plant Pathology, HSTU, Dinajpur during April – July 2010 to know the effect of abiotic and biotic factors, storage periods and storage containers on the seed quality of French bean. Tin container showed the highest germination, normal seedlings and vigour index which were followed by polythene bag, where Gunny bag showed the lowest germination, normal seedlings and vigour index upto 60 days after storage. The highest 1000-seed weight, moisture content, abnormal seedlings, seed rot and incidence of the *Fusarium oxysporum* were recorded in Gunny bag, where the lowest of these parameters were recorded in Tin container. Seed colour of Tin container were more or less same as initial colour, but seeds of Gunny bag were changed into fade or brown colour at 60 days after storage. Moisture content, 1000-seed weight, abnormal seedlings, seed rot, fungi association were increased, but germination and normal seedlings were decreased with the increase of storage periods. Among the three containers, Tin container was the best and the Gunny bag was the worst storage containers upto 60 days of storage for French bean seed.

Keywords: Storage containers, storage periods, seed quality, French bean.

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NITROGEN RESPONSE BEHAVIOUR OF DEVELOPED PROMISING LINES OF T.AMAN RICE

P. K. SAHA, S. M. M. ISLAM, M. AKTER AND S. K. ZAMAN

Abstract

Nitrogen is the most limiting nutrient for rice. Modern high yielding rice varieties may have differences in accumulating and using N from soil and applied fertilizer. A field experiment with 8 rice genotypes was conducted during 2008 wet season (T.Aman season) to study the effect of different rates of N fertilization on the yield performance and nitrogen nutrition under irrigated condition. Among the tested varieties/lines, BR7155-20-1-3 produced the significantly highest grain yield of 5.04 t/ha at N30 level followed by Swarna (4.66 t/ha) at the same level of N with similar growth duration (140 days). Agronomic efficiency of added N ranged from 0.7 to 23.3 for the promising line BR7155-20-1-3 and 3.3 to 27.0 for variety Swarna. Grain yield at No was the highest in BR7155-20-1-3 followed by the variety Swarna and the lowest in BR7870-5 *(Nils)- I 0-HR8. Percent nitrogen recovery ranged from 50 to 63 for variety Swarna and 13 to 30 for promising line BR7155-20-1-3. The promising line BR7155– 20-

1-3 and the variety Swarna may be economically advantageous over the other varieties/ lines.

Keywords: Rice genotypes, nitrogen uptake, nNitrogen use efficiency, nitrogen recovery.

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STUDY ON INTERCROPPING CARROT WITH GROUNDNUT UNDER DIFFERENT ROW ARRANGEMENTS

M. R. I. MONDAL, F. BEGUM AND M. M. ALAM

Abstract

An experiment was conducted at Agricultural Research Station of BARI, Burirhat, Rangpur during two consecutive seasons of 2004-05 and 2005-06, respectively, to find out suitable row arrangement of carrot with groundnut for higher yield and economic return. There were six treatments, such as sole groundnut, sole carrot, one row of carrot in between two normal rows of groundnut, two rows of carrot in between two normal rows of groundnut, two rows of groundnut alternated with two rows of carrot and three rows of groundnut alternated with three rows of carrot. Results showed that monoculture produced the highest yields of individual crops but in intercropping system the highest groundnut equivalent yield (10.63 t/h and 11.10 t/ha) was obtained from two rows of carrot in between two rows of groundnut. The maximum land equivalent ratio (1.67 and 1.74), the highest gross return (Tk.212600/ha and Tk. 248400/ha) and net return (Tk.184881/ha and Tk.211680) were also obtained from the intercropping treatment with two rows carrot in between two normal rows of groundnut. But due to higher cost in this treatment, maximum benefit cost ratio (7.09 and 7.01) was obtained from the intercropping treatment with one row carrot in between two normal rows of groundnut in both the years.

Keyword: Intercropping, groundnut, carrot, yield and economic return.

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MANAGEMENT OF ORGANIC MANURE AND INORGANIC FERTILIZER IN THE MAIZE-MUNGBEAN/DHAINCHA-T. AMAN RICE CROPPING PATTERN FOR INCREASED CROP PRODUCTION

M. H. RAHMAN, M. R. ISLAM, M. JAHIRUDDIN AND M. Q. HAQUE

Abstract

The study was conducted at the On Farm Research Division (OFRD) farm, Rangpur from 2002-2003 to 2004-2005 to see the effect of inorganic fertilizers along with organic manure and mungbean residue on soil properties and yield of crops. For the first crop (maize), there were five treatments. After harvest of maize, mungbean and dhaincha *(Sesbania)* seeds were sown as per treatments. For T. Aman rice (third crop), each of the treatments (T2 and T3 plots) were subdivided into six, so there were altogether 15 treatments. Integrated use of manure and inorganic fertilizers (IPNS basis) produced comparable seed yield of maize with the chemical fertilizers alone irrespective of moderate or high yield goal basis (MYG or HYG). The highest maize yield of 10.02 t/ha was obtained from the treatment T5, which produced significantly highest yield over all other treatments. During the growing period of mungbean, temperature coupled with rainfall encouraged vegetative growth of mungbean and as a result, pod formation was low. The incorporation of *Sesbania* biomass and mungbean residue along with inorganic fertilizers for MYG produced identical grain yields of T.Aman rice with the fertilizers alone for HYG. The highest grain yield 4.31 t/ha was found in IPNS dhaincha along with fertilizers for HYG treatment. There was no remarkable change in post harvest soil status during the growing period. It may be concluded that addition of mungbean residues or *Sesbania* biomass before T. Aman rice may ensure higher crop productivity and sustain soil fertility.

Keywords: Management, soil fertility, yield, organic manure and IPNS.

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ASSESSMENT OF TECHNICAL EFFICIENCY OF INBRED HYV AND HYBRID RICE CULTIVATION AT FARM LEVEL

M. A. SALAM, M. A. B. SIDDIQUE AND J. PARVIN

Abstract

This study is very important in the present perspective of rice economy as comparative economics of inbred HYVs and hybrid rice production was very scanty. As such, the present study was conducted to examine the relative productivity, profitability, and comparative technical efficiency of inbred HYVs and hybrid rice production in some selected areas of Gazipur district. The study was conducted in four villages in Sadar Upzila under Gazipur district, namely Kesurita, Martarchar, Harinal, and Samantapur. A total of 80 farmers from the four villages were interviewed consisting of 40 farmers for hybrid and 40 for inbred HYVs rice. Data were generated by personal interview using structured questionnaire through conducting farm level survey. The analysis revealed that there was no significant difference between farmers' practices and recommended rate of hybrid seed, TSP, and MP. But the farmers used urea and seed of inbred HYVs significantly higher than recommend rate. Hybrid farms incurred total cost of Tk. 63377/ha and inbred farms incurred Tk. 61195/ha, respectively. Net returns obtained from hybrid rice was Tk. 59,056/ha whereas it was Tk. 42,818/ha for inbred HYVs rice. Average net return of inbred rice was 38% lower compared to that of hybrid rice. Benefit cost ratio of inbred and hybrid production was estimated to be 1.93 and 1.70, respectively. The average yield of inbred HYV was 6.03 t/ha and by product was 4.50 t/ha, while those of hybrid were 7.76 t/ha and 5.50 t/ha, respectively. The estimates of technical inefficiency implied that education, farming experience, extension contact, land type, seedling age, and number of seedlings per hill were the major determinants of inefficiency for both inbred and hybrid rice growers. The mean technical efficiency was about 80% for inbred and 86% for hybrid rice producers, respectively, indicating hybrid rice growers were technically more efficient than inbred growers. Higher-level of education and more contact with extension agents were found to contribute in reducing technical inefficiency of both inbred and hybrid rice producers. Although, inbred and hybrid rice producers faced some problems, but it was more severe for hybrid.

Keywords: Hybrid, inbred, productivity, technical efficiency, rice.

Bangladesh J. Agril. Res. 37(2): 251-262, June 2012

INTEGRATED NUTRIENT MANAGEMENT FOR SUSTAINING SOIL FERTILITY THROUGH CHICKPEA-MUNGBEAN-T.AMAN CROPPING PATTERN AT MADARIPUR REGION

M. A. QUDDUS, M. H. RASHID, M. A. HOSSAIN
H. M. NASER AND J. ABEDIN MIAN

Abstract

A field experiment was conducted on *Chickpea-Mungbean-T.Aman* cropping pattern at Pulses Research Sub-Station, Madaripur under Low Ganges River Floodplain Soils (AEZ-12) during 2007-08 and 2008-09 to find out the suitable fertilizer doses for this pattern. Four treatments were set up for each crop. For chickpea and mungbean, the treatments were T_1=Recommended fertilizer dose as per FRG, 2005 BARC ($N_{15}P_{18}K_{10}S_5Zn_{0.5}B_{0.5}$); T_2=Soil test based fertilizer dose ($N_{21}P_{23}K_{30}S_{18}Zn_2B_{1.5}$); T_3=Farmers' practice ($N_{23}P_{15}K_8$); and T_4=Control (without fertilizer). For T.Aman, the treatments were T_1= Recommended fertilizer dose as per FRG, BARC ($N_{66}P_7K_{12}S_6Zn_1$); T_2=Soil test based fertilizer dose ($N_{130}P_{14}K_{76}S_6Zn_{1.5}B_{1.0}$); T_3=Farmer practice ($N_{90}P_{10}K_{15}$); and T_4=control. Experimental results revealed that among the treatments the highest seed and stover/straw yields of chickpea (1524 kg/ha and 4049 kg/ha), mungbean (2208 kg/ha and 5121 kg/ha) and T.Aman (5414 kg/ha and 5615 kg/ha) were recorded in treatment T_2. This treatment was significant at 5% level except seed yield of chickpea in 2008-09. T_3 treatment showed significant difference with T_4 treatment. The lowest seed and stover/straw yields of all the crops were recorded in control treatment (T_4).

After completion of two years' pattern cycle, the organic matter, total nitrogen, phosphorus, sulphur, zinc, and boron were higher in treatment T_2. The economic analysis revealed that the highest BCR (2.57) was recorded in T_2, while the lowest value (2.14) was noted in T_4. Therefore, the soil test based fertilizer dose may be considered as suitable dose for this cropping pattern that ensure higher yield and increase soil fertility.

Keywords: Nutrient management, soil fertility, cropping pattern, productivity.

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PHYSIO-MORPHOLOGICAL FEATURES OF CHILLI ACCESSIONS UNDER MOISTURE STRESS CONDITIONS

M. A. I. KHAN, M. A. HOQUE, A. M. FAROOQUE
U. HABIBA AND M. A. RAHIM

Abstract

An experiment was carried out at the Bangladesh Agricultural University, Mymensingh during October 2005 to March 2007 to study the effect of different soil water levels on the physio-morphological features of ten Chilli (*Capsicum annuum* L.) accessions viz. C-0277, C-0297, BM-1, C-0100, BM-2, C-0265, C0272, C-0275, BM-3, and C-0271. The experiment was set up in pots under glasshouse condition. The water treatments were applied at 4 vegetative growth stages following withholding method (crude method) starting from 25 days after sowing and thereafter at every 7 days interval until final stage. The water treatments applied were W_1 = watering once a day; W_2 = watering at 4 days interval; W_3 = watering at 8 days of interval, and W_0 = no watering. Moisture capacity of polybag (analogous to field capacity) was determined by subtracting leached water from the original amount of water applied. In most of the parameters studied, W_2 gave the highest value, W_1 and W0 gave the lowest, while W3 in between. Only a slight deviation was noticed in case of root volume and root dry weight, where W0 produced the 2nd highest and highest values, respectively. The effects of different water treatments on all the growth parameters studied was significant in case of all accessions and growth stages. The accessions C-0271, C-0277, BM-1, and C-0297 produced higher dry matter.

Keywords: Physio-morphological, chilli accessions, stress condition.

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EFFECT OF BAU-BIOFUNGICIDE, NEEM OIL AND A NEMATICIDE ON THE ROOT-KNOT (*Meloidogyne javanica*) OF PAPAYA (*Carica papaya*)

M. A. A. PRADHAN, M. M. RAHAMAN, S. K. PAUL
M . U. AHAMAD AND B. K. GOSWAMI

Abstract

In a pot experiment, BAU-Biofungicide (*Trichoderma harzianum*) neem oil and curaterr (carbofuran) 5G were tested against root-knot (*Meloidogyne javanica*) of two papaya varieties Kashempuri and Deshi papaya. Seedlings were inoculated with second stage larvae of *M. javanica.* Neem oil (5 ml/ 10g seeds) and BAU-Biofungicide (1:4) were used as seed treatant and curaterr as side dressing. Both the bio-agents significantly increased the root and shoot growth of papaya plant and reduction of galls and eggmasses and suppressed the development of J2, J3, and J4 and adult females of *M. javanica*. Efficacy of BAU-Biofungicide was to reduce the gall and nematode development and to increase plant growth was similar to nematicide curaterr. BAU-Biofungicide gave higher effect in most of the growth characters compared to neem oil and prevented the development of adult females and juveniles like nematicide curaterr.

Keywords: Papaya, root-knot, BAU-Biofungicide, neem oil, curaterr.

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EFFECTS OF DOSES AND SPLITS OF FERTILIZER APPLICATION ON HARVESTING TIME, YIELD AND QUALITY OF MANGO cv. AMRAPALI*

BABUL C. SARKER AND M. A. RAHIM

Abstract

The experiment was carried out at the Germplasm Centre of Bangladesh Agricultural University, Mymensingh during the fruiting season of 2005-06 to investigate the effects of fertilizer and its installment of application on harvesting time, yield and quality of fruits of 8 years old mango plant cv. Amrapali. Four fertilizer doses i.e. T_1 : 50% of the fertilizer dose (cowdung 12.5 kg, urea 375 g, TSP200g, MoP125 g, gypsum 125 g and zinc sulphate 7.5 g per plant), T_2 : 100% of the fertilizer dose (cowdung 25 kg, urea 750 g, TSP400 g, MoP 250 g, gypsum 250 g and zinc sulphate 15 g per plant), T_3 : 150% of the fertilizer dose (cowdung 37.5 kg, urea 1125 g, TSP 600 g, MoP 375 g, gypsum 375 g and zinc sulphate 22.5 g per plant), and T_4 : control (no fertilizer) and three splits of application i.e. A_1 : One installment (whole fertilizer applied on 15 September), A_2 : Two installments (15 September and 15 March) and A_3 : Three installments (15 September, 15 March and 15 May) were included as treatments. Plants receiving 150% of the fertilizer dose in three installments caused delayed harvest by 11 days compared to control than that of the control. Plants treated with 150% of fertilizer dose in combination with three installments produced the highest number of fruits (96/ plant) as well as the highest yield (19.55 kg/plant) as compared to control (23/ plant and 3.48 kg/plant). Applying fertilizer at 150% of the fertilizer dose in three installments improved the fruit quality with regard to TSS, pH, titratable acidity, vitamin C, moisture content, dry matter content, reducing sugar, non reducing sugar and total sugar content over control. Thus, this treatment may be recommended for fertilizer management in mango cultivation.

Keywords: Effects of doses, splits of fertilizer dose, mango.

* a part of Ph. D research work of the first author

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EFFECTS OF INSECTICIDES ON SUGARCANE TERMITES IN MODHUPUR TRACT

M. N. ALAM, M. A. ALAM, M. ABDULLAH
M. BEGUM AND T. AHMED

Abstract

An experiment was conducted with insecticides, namely Krisban 50WP, Neptune 48EC, Aincoban 48EC, Greater 48EC, Chlorguard 48EC, Chlorban 40.8EC, Vifos 20EC, Luciban 20EC, Bismark 20SP, Imidagold 20SL, Lorsban 15G to find out their effectiveness for controlling sugarcane termites and on the growth and yield of sugarcane at Sreepur. All these insecticides were applied @ 2.25/0.20 Kg ha^{-1} or l ha^{-1} during plantation, April and May. All of them except Aincoban, Chlorgaurd and Bismark provided 71-97% termite population control. Germination of sugarcane bud was higher in chemical treated plot than the untreated control. Yield of cane increased in Greater 48EC, Chlorban 40.8EC, Luciban 20EC, Imidagold 20SL and Lorsban 15G treated plots.

Keywords: *Saccharum officinarum*, short residual, termite

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EVALUATION OF SOME SELECTED AGRONOMIC CHARACTERS ON YIELD OF CHILLI CULTIVARS/LINES USING ANALYSIS OF COVARIANCE

M. ASIF MASOOD, KHALID MAHMOOD KHOKHAR AND IRUM RAZA

Abstract

The study was carried out to see the effect of some agronomic variables on yield of chilli cultivars/lines using covariance analysis technique. Data were recorded for yield and other six agronomic variables, namely time to flowering (days), time to maturity (days), fruit weight per plant in grams, average fruit weight in grams, fruit width in centimeters, and fruit length in centimeters. Among six agronomic variables, fruit weight per plant (grams) is highly

significant and linearly related to the plant yield having value of correlation coefficient (r) 0.99 whereas average fruit weight (grams) was significant at 5 percent and linearly related to the yield having correlation coefficient value 0.55. Analysis of variance (ANOVA) and analysis of covariance (ANCOVA) were run by taking fruit weight per plant (grams) as covariate. The error mean square (EMS) without covariate was 1.344 under ANOVA, while error mean square was 0.007 under ANCOVA with covariate. The results depicted that use of covariate reduced error mean square in ANCOVA. It indicated that ANCOVA is more efficient than ANOVA for improving the results of the experiment.

Keywords: ANOVA, ANCOVA, error mean square, chilli cultivars/ lihes, agronomic variables and correlation analysis.

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ADOPTION AND DIFFUSION OF POWER TILLERS IN BANGLADESH

M. A. QUAYUM AND AMIN MUHAMMAD ALI

Abstract

The present study examines the extent of adoption of power tillers (PT) in Bangladesh and analyzes the variation in adoption across regions and across farms in selected areas to investigate the justification for wider use of power tillers. Primary and secondary data were used. Primary data were collected from 267 sample farmers from eight villages of four upazilas of four districts using proportionately stratified random sampling technique. Secondary data were collected from different published sources. The average growth rate of power tillers in Bangladesh was 21.0 percent during 1993-2003. Power tillers are unevenly distributed all over the country. The highest and the lowest adoption of power tillers were 44.4 and 3.6 percent in Rajshahi and Barisal divisions respectively. The percentage of area cultivated under power tiller is 69.6. Multiple regression analysis indicates that there is a significant relationship between number of PT and credit availability. The credit availability may be a decisive factor in increasing cropping intensity which requires reduction of turnaround time. Irrigated area, number of small farm holdings and credit availability are found to have significant and positive association with intensity of power tiller use in different regions of Bangladesh. Analysis of Logit Model applied to farm level data indicates that the educational level and income surplus of farmers have significant positive relationship with ownership of power tillers. The coefficients of adult family members and number of draught power owned by the farmers are however found to be significantly negative. The number of power tiller is increasing with the decreasing of draught animal power. Thus credit should be provided to the farmers and owners of all regions of the country to buy power tillers to adopt evenly to increase crop production profitably.

Keywords: Diffusion, power tillers, growth rate, distribution, credit availability.

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PROFITABILITY OF HYBRID MAIZE (*Zea mays* L.) SEED PRODUCTION UNDER CONTRACT FARMING IN BANGLADESH: A FARM LEVEL STUDY

M. A. HAQUE, MONIRUZZAMAN, M. S. RAHMAN AND Q. M. ALAM

Abstract

The study was conducted with three catagories of seed producers, namely BADC farms at Dattanagar, Jhenaidah and Tabunia, Pabna as public agency, LAL TEER Seed Company in Lalmonirhat district as private company and BRAC farm in Bogra district as NGO during Rabi season of 2007-08 to know the present status and profitability of hybrid maize seed production. A total of 60 hybrid maize seed contract growers and 120 maize (Non-seed) growers were selected randomly for the study. The cost of production was found higher for NGO (Tk. 66472/ha) than the public agency (64836/ha) and private company (Tk. 59352/ha). The yield of hybrid seed was highest under NGO (3780 kg/ha) than that of public agency and private company. Net return of hybrid seed production for contract growers was higher under public agency (Tk. 78204/ha) compared to private company (Tk. 39088/ha) and NGO (Tk. 33246/ha). Benefit cost ratio (BCR) was

higher for the contract growers of public agency (2.21) Net return of hybrid maize seed production was 50% higher than that of non-seed production. High price of seed and lack of technical knowledge were major constraints of hybrid maize seed production in the study areas.

Keywords: Hybrid maize, profitability, net return and benefit cost ratio.

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VEGETATIVE GROWTH, HARVESTING TIME, YIELD AND QUALITY OF MANGO (*Mangifera indica* L.) AS INFLUENCED BY SOIL DRENCH APPLICATION OF PACLOBUTRAZOL*

BABUL C. SARKER AND M. A. RAHIM

Abstract

The experiment was conducted during the fruiting season of 2005-06 to investigate the effects of paclobutrazol in manipulating the harvesting time, increasing yield and quality in mango (*Mangifera indica*) cv. BARI Aam-3 (Amrapali) plants at the BAU Germplasm Centre, FTIP, Department of Horticulture, Bangladesh Agricultural University, Mymensingh. Paclobutrazol at 2500, 5000, 7500, 10000 ppm, and control (water application) and two times of application (15 October and 15 December) were included in the study as treatments. Soil drench application of paclobutrazol at 10000 ppm and 7500 ppm on 15 October was more effective in suppressing vegetative growth i.e. terminal shoot length, number of leaves and leaf area compared to control. Both 7500 ppm and 10000 ppm paclobutrazol applied as soil drench on 15 October caused earlier panicle emergence by 19 days as well as harvesting by 15 days compared with control. Applying paclobutrazol at 7500 ppm on 15 October produced the highest number of fruits as well as yield per plant and the heaviest fruit compared with the lowest yield in control. Paclobutrazol at 7500 ppm applied on 15 October also resulted in higher edible portion, lower stone pulp ratio and peel pulp ratio, longer shelf life, higher TSS, increased vitamin C, lower titratable acidity, higher dry matter, reducing, non-reducing and total sugar contents as compared to control plants. The present results suggest that the application of paclobutrazol at 7500 ppm in October enhances yield and quality in mango.

Keywords: Yield and quality of mango, soil drench application of Paclobutrazol.

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BREEDING FOR IMPROVING FIBRE YIELD AND GREEN BIOMASS IN SUNNHEMP (*Crotalaria juncea* L.) GERMPLASM

D. KUMAR, M.K. TRIPATHI, S.K. SARKAR ARPITA DAS AND SANJOY SHIL

Abstract

Fifteen genetically diverse parental genotypes of sunnhemp belonging to different geographical origin were assessed to evaluate general and specific combining ability of parents and cross combinations, respectively, for selecting the superior parent combination. For this, fifteen parents and their 105 F1s were grown in a Randomized Block Design (RBD) with three replications and data were collected in respect of plant height, base diameter, green weight, fibre weight, stick weight and fibre percentage. Analyses of variances of diallel revealed that there was predominance of specific combining ability (sca) in almost all the characters except fibre percentage and general combining ability (gca) was significant only in case of plant height. From the gca effect of parents it can be seen that K-12 (B) and SUIN-056 showed good promise as general combiners and able to produce better cross combinations. However only one cross combination viz. SUIN–056 × SUIN–074 was recorded positive sca effects for all the characters. This cross combination along with SUIN–001 × SUIN–056 exhibited positive heterosis over the better parents in all the characters studied and can be used in breeding programme for producing improved sunnhemp population. Further, to exploit fully both additive and non-additive variances present in this population, random as well as chain crossing among the promising

* a part of Ph. D research work of the first author

crosses was found effective to exploit both additive and fixable epistatic effects.

Keywords: Combining ability, heterosis, gene action, fibre yield, green biomass and sunnhemp.

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VALUE ADDITION IN VEGETABLES PRODUCTION, PROCESSING AND EXPORT FROM BANGLADESH

M. S. HOQ, S. K. RAHA AND N. SULTANA

Abstract

Bangladesh has immense prospect for exporting vegetables to the world market and it has also produced high quality exportable fresh vegetable. Although the share of export earning in vegetables increasing day by day but export is constrained by several issues**.** Thus the present study was undertaken to determine the value addition, cost and return of vegetables production and export at different levels and also suggest some policy implication for improving the present system. The study was based on both primary and secondary data. The sample included vegetables producer, suppliers, and exporters. Vegetable producers and suppliers were selected from Ulokhola of Kaligonj Upazila and exporters were selected from Dhaka city (Motijheel, Kakrail, Shantinagar, Khilgaon, and Sham Bazar).Appling conventional profitability analysis the study revealed that per hectare production cost for cowpea, snake gourd, and bitter gourd were estimated at Tk. 73838, Tk.72,029 and Tk.1,04,644 respectively and value addition for cowpea, snakegroud, and bitter gourd were calculated at Tk.86,162, Tk.1,52,611 and Tk.2,37,356 respectively by farmers. The average estimated marketing costs incurred by suppliers were Tk.2906 per ton. The value addition by suppliers were Tk.3094 per ton. The average estimated marketing cost incurred by different exporters for UK, Saudi Arabia, Kuwait, and Qatar were Tk.1,69,442, Tk.98,429, Tk.1,03,499, and Tk.85,324 per ton, respectively. The value addition by different exporters for UK, Saudi Arabia, Kuwait, and Qatar were Tk.55,778, Tk.16,661, Tk.16,902, and Tk. 23,754 per ton respectively. Among all the cost items, airfreight charge was the highest. It was revealed from the study that bitter gourd cultivation is more profitable and BCR is also highest (3.27) and UK market was more profitable for vegetables export.

Keywords: Vegetable, value addition, supplier, exporter and export.

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MOLECULAR CHARACTERIZATION OF WHEAT (*Triticum aestivum* L.) GENOTYPES THROUGH SSR MARKERS

S. ISLAM, M. S. HAQUE, R. M. EMON
M. M. ISLAM AND S. N. BEGUM

Abstract

A study was undertaken to examine the genetic diversity of 12 wheat (*Triticum aestivum* L.) genotypes, using 4 simple sequence repeats (SSRs). A total of 10 alleles were found. Allele number per locus ranged from 2 to 4 with an average of 2.5. The polymorphic information content (PIC) values ranged from 0.2755 to 0.5411 with an average of 0.3839. The average gene diversity over all SSR loci for the 12 wheat genotypes was 0.4688, ranging from 0.3299 to 0.6042. Cluster analysis based on microsatellite allelic diversity discriminated the varieties into different clusters. Genetic diversity was the highest between variety Gourab and Akbar as well as Gourab and BAW-1064, showing a genetic distance value of 0.4697. The genetic distance was lowest between Balaka and Aghrani as well as Triticale and BAW-1036. Positive correlations were found between gene diversity, number of alleles, the allele size range and the types of repeat motif of microsatellite markers. It was found from this study that microsatellite markers could characterize and discriminate all of the genotypes. More primers should be used for saturation of different regions in further studies.

Keywords: *Triticum aestivum* L., simple sequence repeats, genetic diversity, cluster analysis.

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POPULATION ABUNDANCE OF RED SPIDER MITE IN DIFFERENT VEGETABLES ALONG WITH ITS SPATIAL DISTRIBUTION AND CHEMICAL CONTROL IN BRINJAL (*Solanum melongena* L.)

N. K. DUTTA, S. N. ALAM, M. K. UDDIN, M. MAHMUDUNNABI AND M. F. KHATUN

Abstract

Population abundance of red spider mite, *Tetranychus urticae* Koch., was studied in cucmber, ribbed gourd, bitter gourd, snake gourd, aroids and teasle gourd and efficacy of four new acaricides were tested against this pest in brinjal at the farmer's field of Norsingdi during 2009-2010. At the same time, the spatial distribution of this pest in brinjal crop was also studied. Results indicated that all the surveyed vegetables except bitter gourd were attacked by the mite with varying levels of infestation. However, the highest mite population per leaf was observed in brinjal (32.27) which was followed by cucumber (16.08) and teasle gourd (7.2). Mites were most densely populated in the lower canopy region in the brinjal plant. Among the tested acaricides, Lakad 1.8 EC (Abamectin) provided the highest (83.4%) reduction of mite population over control, although the other acaricides also gave good control of this pest.

Keywords: Red spider mite, population abundance, spatial distribution, chemical control.

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EFFECT OF BULB SIZE AND PLANT SPACING ON SEED PRODUCTION OF ONION (*Allium cepa* L.)

MD. ASADUZZAMAN, MD. MAINUL HASAN, MD. MAHMUDUL HASAN, MD. MONIRUZZAMAN, MOHAMMAD HUMAYUN KABIR HOWLADER

Abstract

A field experiment was conducted at the `Research Farm` of Regional Seed Production Office of Lal Teer Seed Limited, Dinajpur, Bangladesh during November 2008 to April 2009. The study was conducted to investigate the effect of bulb size and planting spacing on seed production of cultivar *Taherpuri* onion. Three bulb sizes [small (5±2g), medium (10±2g), and large (15±2g)] and four planting spacing [closest 25×15, closer 25×20, wider 30×15, and widest 30×20cm] was considered in this experiment. Number of flowering stalks, length of flowering stalks, number of umbels per plant, number seeded fruits, seed weight per umbel, 1000-seed weight and seed yield per hectare were measured to assess the onion seeds. The results revealed that the highest seed yield (776.67 kg) per hectare was obtained from the large bulb (15±2g) with the closest spacing of 25×15cm followed by small bulb size of same spacing. The maximum number of flowers per umbel (371.39), seed weight per umbel (0.80g) and 1000-seed weight (3.92g) were obtained from the largest bulb size (15±2g) with widest (30×20cm) planting spacing. Hence, large bulb size with closest plant spacing is suggested for onion seed production in northern part of Bangladesh.

Keywords: Bulb size, spacing, onion seed production.

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IMPACT OF POWER TILLERS ON PROFITABILITY OF SOME CROPPING PATTERNS IN SOME SELECTED AREAS OF BANGLADESH

M. A. QUAYUM, AMIN MUHAMMAD ALI AND M. A. SALAM

Abstract

A study was conducted to examine the impact of power tillers (PTs) on profitability of Boro rice based cropping patterns in some selected areas of Bangladesh in 2003. Six major Boro rice based cropping patterns out of 23 patterns in the study areas were examined to estimate the profitability differences among the power tiller and draught animal using farms round the year. Analysis revealed that gross return of MV Boro-MV T. Aus- MV T. Aman pattern is 10.5% higher for PT users than that for draught animal power (DAP) users. The total variable cost is 16.2% lower for PT users than that for DAP users resulting the gross margin 158% higher for PT users. Gross returns of MV Boro-MV T. Aus-LV T. Aman, MV Boro-Fallow- MV T.Aman and MV Boro-MV

T.Aman-Mustard, MV Boro-MV T. Aus-Fallow patterns are respectively, 9.7%, 8.1%, 23.4% and 35.3% higher for PT users than that for DAP users. The benefit cost analysis indicates that PT users obtain higher yield, higher gross return and higher BCR from MV Boro-Vegetables-MV T. Aman pattern than those of DAP users. Thus, among all six identified patterns, this pattern is more profitable for PT users. The production cost of all six patterns by PT users is substantially lower than those of DAP users. In general, these six patterns are also found to be more profitable when power tillers are used in place of animal power. Use of power tillers was observed to be associated with higher cropping intensity in the study areas.

Keywords: Cropping pattern, productivity, profitability, power tiller and draft power.

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EFFECT OF TIDAL SUBMERGENCE ON POTASSIUM NUTRITION AND YIELD OF RICE (*Oryza sativa* L.)

M.A. HAQUE

Abstract

Field experiments were conducted at Patuakhali Science and Technology University research farm during 2009 T. Aman season to investigate the effect of tidal submergence on potassium nutrition and yield of rice. The experiment included two levels of irrigation water source- i) tidal water and ii) ground water, and three levels of fertilizers- i) absolute control (no fertilizer), ii) NP (K omission), and iii) NPK (K addition). The rice varieties were BR23 (HYV) and Lalmota (traditional variety). A general increase in growth, yield and yield contributing parameters were found due to irrigation with tidal water. Tidal water contributed about 19% (BR23) and 11% (Lalmota) higher grain yield in Aman season 2009 compared to that grown with ground water. Potassium contents of rice grain and straw were always higher when plants are irrigated with tidal water. In general, tidal submergence increased K uptake of rice. The K uptake by BR23 under tidal water was about 47, 43 and 8 kg/ha more than those recorded with ground water irrigation under absolute control, K omission and K addition treatments, respectively whereas it was 31, 21, and 68 kg/ha, in Lalmota. The results indicated that whether fertilizers were applied or not plants absorb considerable amount of K from tidal water.

Keywords: Potassium, rice, tidal submergence.

Bangladesh J. Agril. Res. 37(3): 441-447, September 2012

STUDY ON THE PHYSICO-CHEMICAL CHARACTERISTICS OF LONGAN (*Euphoria longana*) GERMPLASM

M. M. KHATUN, M. R. KARIM, M. M. MOLLA
M. M. KHATUN AND M.J. RAHMAN

Abstract

A study on the physico-chemical characteristics of 15 promising longan germplasm was carried out at the fruit Research Farm of Horticulture Research Centre (HRC) as well as laboratory of Post harvest Technology Section of HRC and the Central Laboratory of Bangladesh Agricultural Research Institute, Joydebpur, Gazipur. The experiment was conducted during the fruiting season of 2010. Fifteen promising lines of longan germplasm including BARI Anshphal-1, BARI Anshphal-2, EL-Joy 003 to EL-Joy 015 of 12 years old were included in this experiment. A wide range of variations were observed among the germplasm in respect of different characteristics under the present study. Per cent edible portion was the highest in EL-Joy 010 (s76.57 %), EL-Joy 006 (74.55%), EL-Joy 003 (74.20 %) and the lowest in EL-Joy 012 (65.10 %). Total reducing and non-reducing sugar was the maximum in EL-Joy 009 (6.94 %) and BARI Anshphal-2 (16.50 %), respectively. BARI Anshphal-1 contained the highest amount of ascorbic acid (13.00 mg/100 g) and EL-Joy 009 possessed the maximum total soluble solids (22.30 %). The study revealed that BARI Anshphal-1, BARI Anshphal-2, EL-Joy 003, EL-Joy 006, EL-Joy 009, EL-Joy 010 were the best in respect of physical and chemical characteristics of fruits.

Keywords: Longan, physico-chemical characteristics, Vitamin-C.

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PERFORMANCE EVALUATION OF FERTIGATION AND MICRONUTRIENTS ON FRUIT YIELD AND QUALITY OF SUMMER TOMATO (*Lycopersicon esculentum* L.)

M. A. RAZZAQUE AKANDA, M. SHAHABUDDIN AHAMAD
M. S. RAHMAN, G. M. A. HALIM AND M. M. HASAN

Abstract

Fertigation was found technically and economically feasible for tomato cultivation in winter as well as in summer. An experiment was conducted with summer tomato (BARI Hybrid Tomato–4) having 2 drip irrigation levels with different levels of NPK and micronutrient (B, Zn, and Mg) during *kharif*-1 seasons of 2007 and 2008. The fertilizer levels were N_{100} P_{55} K_{120} kg/ha, N_{100} P_{55} K_{120} B_1 Zn_4 Mg_4 kg/ha, N_{100} P_{70} K_{140} kg/ha and N_{100} P_{70} K_{140} B_2 Zn_6 Mg_8 kg/ha and the irrigation levels were drip irrigation at 2 days interval and drip irrigation at 3 days interval. The highest marketable yield of summer tomato (35.90 t/ha and 27.12 t/ha) were obtained from the fertigation treatment with fertilizer doses of N_{100} P_{55} K_{120} B_1 Zn_4 Mg_4 kg/ha irrigated at 2 days interval in 2007 and 2008. The cull yield was also the lowest (2.53 t/ha and 1.15 t/ha) in this treatment in both the years. The lowest tomato yield (20.50 t/ha and 18.29 t/ha) were obtained from the treatment with fertilizer doses N100 P70 K140 kg/ha irrigated at 2 days interval where no micronutrients were used. Fruit quality parameters like TSS, Vitamin-C and β-carotene were also the highest for the best yielder. So, use of micronutrients with NPK showed a significant effect on quality fruits as well as yield of summer tomato. The best yielder treatment received 261.0 mm of seasonal water including an effective rainfall of 60.5 mm during the crop seasons. The highest BCR (4.41) was also found in the same treatment.

Keywords: Fertigation, micro-nutrients, fruit quality, net return.

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AGRO-ECONOMIC ANALYSIS OF TUBEROSE CULTIVATION IN SELECTED AREAS OF BANGLADESH

M.A. HAQUE, M. A. MONAYEM MIAH
S. HOSSAIN AND S. M. SHARIFUZZAMAN

Abstract

The study identified agronomic practices, analyzed relative profitability, and resource use efficiency of tuberose cultivation in Bangladesh during January 2010. Primary data were collected from 100 randomly selected farmers from Jessore and Chuadanga districts. The results revealed that the per hectare costs of tuberose cultivation were estimated at Tk. 2,00,761 and Tk. 1,29,283 over full cost and variable cost, respectively. The major share of total cost was for human labour (30%) followed by land use (23%), and fertilizer (17%). The total cost was 26% and 12% higher than its competitive crops banana and papaya, respectively. The yield of tuberose was 4,54,425 sticks per hectare. The gross margin and net return were Tk. 5,52,354 and Tk.4,80,876 per hectare, respectively. This net return was 65% higher than banana and 71% higher than papaya cultivation. The BCRs (benefit cost ratio) were 5.27 and 3.39 over variable cost and full cost basis, respectively. Production function revealed that human labour, seedling and irrigation had positive effect on tuberose cultivation. The lack of scientific knowledge, high yielding variety and efficient transport facility were reported to be major problems in tuberose cultivation.

Keywords: Tuberose, relative profitability, gross margin, net return and BCR.

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SCREENING OF MUSKMELON (*Cucumis melo* L.) GERMPLASM AGAINST SALINITY

M. A. MALEK, M. OBAIDUL ISLAM
M. MAMTAZUL HAQUE AND M. K. SULTAN

Abstract

Out of 78 germplasm of muskmelon (*Cucumis melo* L.), 67 germplasm (86%) survived against high salinity (13.82 ds/m) when screened at Benarpota, Satkhira, Khulna. These germplasm showed morphological variations in growth habit, leaf lobes, leaf pubescence, fruit shape, fruit ribs, fruit skin texture, flesh colour, flesh flavor, flesh texture, fruit splitting, fruit aroma, fruit size, seed coat colour, fruit skin colour at fully formed fruit and fruit skin colour at seed harvest maturity. The other qualitative characters, such as tendrils and flowering habit did not show morphological variations. Quantitative variations were observed in leaf length, leaf width, days to staminate flowering, days to pistillate flowering, fruit length, fruit width, fruit weight, number of fruits per plant, flesh thickness, number of seeds per fruit, days to fruit harvest and 1000-seed weight. Among the germplasm, BD-2255 and BD-9159 had no splitting of fruits. Therefore, these two germplasm can be selected for this trait. The characters, such as number fruits per plant and fruit weight exhibited highest number of fruits per plant (21) and maximum fruit weight (6.25 kg). These two characters should also be considered for improvement of muskmelon. Highest CV (%) was found in number of fruits per plants (36.35) followed by fruit weight (33.86).

Keywords: Muskmelon, germplasm, screening, salinity.

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ECONOMIC ANALYSIS OF RISKS IN FRUIT AND VEGETABLE FARMING IN OSUN STATE, NIGERIA

S. B. FAKAYODE, M. A.Y. RAHJI AND S. T. ADENIYI

Abstract

The study analyzed the risks involved in fruit and vegetable farming in Osun state, Nigeria. Specifically, the study examined the risk attitude of farmers, factors influencing risk attitude as well as farmer's perception on major sources of production and market risks. The study was based on a survey of 150 farmers, comprising 75 predominantly fruit and vegetable farmers, respectively, and covering 12 communities within the six agro-ecological zones in the state. Data were collected using a well structured questionnaire. Descriptive statistics, discriminant analysis and Kruskal–Wallis ranking analysis were used in the study. The study revealed that the average age of the fruit and vegetable respondent was 58.5 and 40.1, respectively, with the male respondents outnumbering the females in each case. The average year of experience was 30.8 and 15.3 for fruit and vegetable respondent, respectively. An average area of (5.36 and 2.21) ha was cultivated by the fruit and vegetable farmers, while orange and okra are the most widely grown fruit and vegetable crops. Damage by pest and disease, traditional methods of farming and weather dependency were the most perceived sources of production risk by the fruit and vegetable farmers. Perishability of produce, low price of produce, poor product handling and packaging as well as exploitation by middlemen were the most perceived sources of market risk. The study also revealed that maintaining good relationship with traders, selling at low prices due to perishability, selling within the locality and non-farm businesses were the major risk management strategies employed by the farmers. Based on the study findings, it is recommended that introduction of a more comprehensive agricultural insurance scheme and introduction of improved technology can ameliorate the effect of risks on fruit and vegetable farmers. Also, public intervention can facilitate better risk management through improved information system.

Keywords: Discriminant analysis, Kruskal-wallis ranking analysis, risk, fruit, vegetable.

Bangladesh J. Agril. Res. 37(3): 493-503, September 2012

CORRELATION AND PATH COEFFICIENT ANALYSIS OF MANGO (*Mangifera indica* L.)

D. A.N. MAJUMDER, L. HASSAN, M.A. RAHIM AND M. A. KABIR

Abstract

Sixty diverse genotypes of mango were selected from the Germplasm Centre of BAU during December 2007–August 2009 to determine the genotypic and phenotypic correlation along with their direct and indirect effects through path coefficients analysis in mango as to estimate the contribution of most important characters towards yield. It appeared that in most of the cases, the genotypic correlation values were higher than their corresponding phenotypic values. This suggests that there were strong inherent relationship between the traits. Percent flowering shoot had significant positive correlation with inflorescence per shoot, percent perfect flower, percent initial fruit set, number of fruits per plant and fruit weight both at phenotypic and genotypic levels. Fruit yield is determined by some components. The residual effects of genetic and phenotypic path analysis were 0.209 and 0.385, respectively, revealed higher genetic variability and also proved lower percent of environmental influence on the selected ten characters. In genotypic path analysis, number of fruits per plant had the highest positive direct effect (0.899) on yield. Higher positive direct effects were also observed for the characters inflorescence per shoot (0.539), percent perfect flower (0.816), and percent initial fruit set (0.292), and fruit weight (0.324). Leaf area, percent flowering shoot, number of fruits per plant, and fruit length showed negative direct effects towards yield. In phenotypic path analysis, except percent flowering, shoot per plant and fruit length and other characters also exhibited similar trend on yield as genotypic path coefficient. In combination with correlation coefficient and path analysis, it was found that number of fruits per plant and percent perfect flower gave significant positive correlation coefficients with yield and also produce the high positive direct effect. Thus, it was clear that plant height, inflorescence per shoot, percent perfect flower, percent initial fruit set per inflorescence, and fruit weight are the major component of fruit yield in mango.

Keywards: Mango (*Mangifera indica* L.), correlation, path coefficients studies.

Bangladesh J. Agril. Res. 37(3): 505-514, September 2012

A STUDY ON THE DRYING BEHAVIOUR OF A LOCAL VARIETY (LALPAKRI) OF POTATO (*Solanum tuberosum* L.)

AYESHA SARKER, M. N. ISLAM AND M. R. SHAHEB

Abstract

The study was carried out in the laboratory of the Department of Food Technology and Rural Industries, Bangladesh Agricultural University, Mymensingh during 2008-09 to analyze the drying behaviour of potato (var. Lalpakri) at variable air dry bulb temperature using a mechanical dryer. Fresh potatoes with 3, 5, 7 mm slices were used as raw materials for drying. The experiment showed that drying rate constant decreases with the increases in thickness and increasing loading density of potato slice, the rate of drying decreases but drying rate constant does not decrease proportionately. From the relationship between drying rate constant and thickness, the value of exponent 'n' of the power law equations was recorded 0.4586. It was observed that higher temperatures gave faster drying rate. From the exponential relationship between diffusion co-efficient (De) versus inverse absolute temperature ($Tabs^{-1}$), activation energy (Ea) for diffusion of water from local variety of potato (var. Lalpakri) was found to be 5.60 Kcal/gm-mole.

Keywords: Potato, drying behaviour, mechanical drying, arrhenious relationship and activation energy.

Bangladesh J. Agril. Res. 37(3): 515-527, September 2012

TRACE ELEMENTS CONTENT IN VEGETABLES GROWN IN INDUSTRIALLY POLLUTED AND NON-POLLUTED AREAS

HABIB MOHAMMAD NASER, NASHIR UDDIN MAHMUD
SARMIN SULTANA, REBECA GOMES, MUKHLESUR RAHMAN

Abstract

Field survey based laboratory studies were carried out to investigate trace elements contents in soils and vegetables collected from industrially polluted and non-polluted areas. The content of four trace elements, such as manganese (Mn), iron (Fe), copper (Cu), and zinc (Zn) in four popular vegetables, namely spinach (*Spinacia oleracea*), red amaranth (*Amaranthus tricolor*), bottle gourd (*Lagenaria vulgaris*), and pumpkin (*Cucurbita moschata*) and the rizosphere soils of the respective crops were collected from three locations viz. i) directly polluted (Kaliakoir, Konabari, Gazipur), ii) indirectly polluted (Zorun, Konabari, Gazipur), and iii) non-polluted (BARI, Gazipur) areas. In all four vegetables, a similar trend in metal contents was observed i.e. directly polluted>indirectly polluted>non-polluted. The Mn and Fe concentrations were found in the order of spinach>red amaranth>bottle gourd>pumpkin, whereas it was little bit irregular pattern for Zn. The Cu concentration was higher in spinach followed by red amaranth and the least in bottle gourd irrespective of the location. Mean concentration of Mn, Fe, and Cu in vegetables from investigated areas were below the recommended level except Zn. However, the higher concentrations of Mn, Fe, Cu, and Zn in the polluted (either directly or indirectly) area indicates that industrial activities, such as discharge their wastes and effluents into the natural ecosystems in most cases without any treatment, thus causing health hazard as well as environmental pollution, especially with heavy metals and organic toxic.

Keywords: Soil, vegetables, trace elements, concentration, pollution.

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EFFECT OF TILLAGE INTENSITY, FERTILIZER AND MANURE ON ROOT MASS DENSITY, SOIL PROPERTIES AND THEIR CORRELATION ON RICE (*Oryza sativa* L.) YIELD

M. M. SARKER, M. A. MATIN, M. G. HOSSAIN
M. M. R. SARKER AND M. S. HUDA

Abstract

An experiment was carried out at the Bangladesh Agricultural University Farm, Mymensingh during the Aman season of 2008 to study the effect of tillage intensity, fertilizer and manure on the root mass density soil properties and their correlation on rice yield (BRRI dhan 41). The experiment was laid out in a split plot design with three replications. The treatments were three tillage operations as factor A: one passing (P_1), two passing (P_2), and three passing (P_3) of a power tiller and four fertilizer and manure treatments as factor B: recommended dose of fertilizers (FM_0), 50% of N plus rest of recommended dose of fertilizers + cowdung @ 5 t/ha (FM_1), 50% of N plus rest of recommended dose of fertilizers + rice straw @ 5 t/ha (FM_2) and 50% of N plus rest of recommended dose of fertilizer + cowdung @ 2.5 t/ha plus rice straw @ 2.5 t/ha (FM_3). The highest and the lowest bulk densities were found in P_1FM_0 and P_3FM_2 treatments, respectively. The maximum soil moisture content and air filled porosity were obtained in P_3FM_1 treatment, whereas P_1FM_0 demonstrated the lowest soil moisture content. The maximum (8.09 mg cm^{-3}) and minimum (1.63 mg cm^{-3}) root mass densities were observed in P_3 (10 cm depth) and P_1 (10-20 cm depth) treatments, respectively. The highest grain yield was recorded in P_3FM_0 treatment. Root mass density was positively correlated with soil moisture content and grain yield, but negatively with bulk density.

Keywords: Tillage, fertilizer, manure, correlation, yield.

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VARIABILITY IN GRAIN QUALITY TRAITS OF AROMATIC RICE *(Oryza sativa' L.*)

M. PARIKH, N. K. RASTOGI AND A. K. SARAWGI

Abstract

The present study involved the evaluation of physio-chemical characters and cooking quality of 36 rice genotypes from Madhya Pradesh and Chhattisgarh. The fine grain genotypes like Rajim-12, Kalimuchh, and Munibhog were found good for moderate kernel length and L:B ratio; Rajabhog, Jhulari, and Baghmuchha for kernel length after cooking and L:B ratio of cooked rice Kalajira and Bikoni for head rice recovery%; Barang, Bantaphool, Gangabalu, and Bikoni for elongation ratio; Barang, Rajabhog, Gangabalu, Bikoni, and Chirainikhi for elongation index; Sonth, Rajim-12, Jhulari, Gangabalu, Jhilli Safri, and Bikoni for intermediate alkali values. These genotypes may be utilized as donors for improvement of quality traits. In the present study, superior genotypes were Rajm-12 for grain yield, kernel length, L:B ratio and kernel length after cooking; Rajabhog for grain yield, kernel length after cooking, L:B of cooked rice and elongation index; Bikoni for head rice recovery, elongation ratio, elongation index, and intermediate alkali values.

Keywords: Aromatic rice, grain quality, variability.

Bangladesh J. Agril. Res. 37(4): 559-571, December 2012

EVALUATION OF DRILL SEEDING PATTERNS AND NITROGEN MANAGEMENT STRATEGIES FOR WET AND DRY LAND RICE

M. AKKAS ALI, J. K. LADHA, J. RICKMAN
J. S. LALES AND M. MURSHEDUL ALAM

Abstract

Many Asian farmers are shifting from rice transplanting to direct seeding because the latter requires less labour, time, drudgery, and cultivation cost. Direct seeding is usually practiced in either wet or dry land preparation depending on water availability. The present study aimed at evaluating the potential of single and paired rows drill seeding patterns and five N management strategies on crop productivity, N use-efficiency, and apparent N balance. The experiment was laid out in a split plot design with two seeding patterns as main plots and five N treatments as subplots with three replications. Drill seeding did not affect grain yield, water, and N use-efficiencies and N balance. Grain yield increased with LCC-based N management with the lower N fertilizer input. Soil available N after 2 years of rice cropping was similar to the amount at the beginning indicating most of applied fertilizer N was lost.

Keywords: Drill seeding, planting pattern, N-use efficiency, and N balance.

Bangladesh J. Agril. Res. 37(4): 573-582, December 2012

MULTIVARIATE ANALYSIS IN ONION (*Allium cepa* L.)

M. H. RASHID, A. K. M. A. ISLAM, M. A. K. MIAN
T. HOSSAIN AND M. E. KABIR

Abstract

Thirty genotypes collected from India, Burma, and Bangladesh were studied for thier genetic divergence using Mahalanobi's D^2 and Rao´s canonical analysis. Altogether five clusters were formed. The pattern of distribution of genotypes into five clusters was random demonstrating that the geographical isolation might not be the only factor causing genetic diversity. Leaf length and sulfur content contributed predominantly towards genetic divergence. Cluster III recorded the highest means for number of leaves per plant, leaf length, bulb length, plant height, and bulb yield. The results obtained from D^2 analysis were confirmed by canonical analysis. The genotype G12 showed highest mean performance for moisture content (88.49%), G13 for leaf length (39.06 cm), G15 for neck diameter at vegetative stage (11.21 mm), bulb length (49.09 mm), plant height (64.82 cm) and as well as bulb yield (13.17 t/ha), G19 for percent sulfur content (0.84) and G26 for number of leaves per plant (12), respectively.

Keywords: Onion, multivariate analysis, genetic divergence.

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COMBINING ABILITY ANALYSIS USING CMS BREEDING SYSTEM FOR DEVELOPING HYBRIDS IN RICE (*Oriza sativa*)

SHYAM CHANDRA GHOSH, P. K. CHANDRAKAR
N. K. RASTOGI, D. SHARMA AND A. K. SARAWGI

Abstract

Using line x tester mating design with three CMS lines and seven elite testers, the general combining ability (GCA) of parents and specific combining ability (SCA) of crosses were carried out for grain yield and its attributes. The SCA variance was greater than the GCA variance for grain yield and yield components, suggesting the preponderance of dominance and epistatic gene action in expression of these traits. The line CRMS 31 A and IR 79156 A were recorded as good combiners for head rice recovery percent. The tester NPT 80-1 was good general combiner for grain yield per plant and TOX 981-11-2-3 for both grain yield per plant and head rice recovery percent. The cross combinations APMS 6 A/ET 1-13, CRMS 31 A/ET 1-12, and IR 79156 A/ NP T 80-1 were found to be outstanding with respect to grain yield per plant, head rice recovery percent, and spikelets per panicle. The cross APMS 6 A/NPT 2-2-6941 was good combiner for head rice recovery percent. These promising lines, testers, and crosses revealed wide scope for enhancing the grain yield in the CMS line or three line breeding system based rice improvement programme to develop rice hybrids.

Keywords: Rice, CMS line, general combining ability (GCA), specific combining ability (SCA), grain yield.

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ADOPTION AND PROFITABILITY OF BARI LENTIL VARIETIES IN SOME SELECTED AREAS OF BANGLADESH

M. S. RAHMAN, M. A. HOSSAIN
M. J. U. SARKER AND M. A. BAKR

Abstract

Lentil is an important pulse crop widely grown in Bangladesh. It ranks first among the pulses in terms of area and consumers' preference. BARI has developed many improved lentil varieties and disseminated to the farmers fields. The up-to-date information regarding adoption and financial profitability of this crop are unknown to the researchers and policymakers. Therefore, the study was conducted in Jhenaidah and Jessore districts to determine the adoption status and profitability of BARI lentil production and to examine the factors affecting the yield of BARI lentil during 2010-2011. Cobb-Douglas production function was used. The study revealed that 98% of the total lentil cultivated areas were occupied by BARI lentil varieties in the study areas. The average level of adoption of BARI Masur-3, BARI Masur-4, BARI Masur-5 and BARI Masur-6 were 49%, 47%, 1% and 1%, respectively at farm level. The cultivation of BARI lentil was profitable to the farmers since the per hectare total cost, gross return and net return of BARI lentil cultivation were Tk 52,734, Tk 80,572 and Tk 27,838, respectively. Functional analysis revealed that seed, urea, mechanical power cost and pesticides had positive effect on the yield of lentil production. Unavailability of latest BARI lentil seed, lack of technical know-how, lack of training, and diseases (root rot and stemphylium blight) were the main constraints to BARI lentil cultivation at farm level. BARI Masur-3 and BARI Masur-4 were the highly adopted varieties. The lentil production was profitable to the farmers in the study areas.

Keywords: Adoption, profitability, lentil, Bangladesh.

Bangladesh J. Agril. Res. 37(4): 607-616, December 2012

EFFECTS OF NITROGEN AND POTASSIUM ON GROWTH AND YIELD OF GLADIOLUS CORMS

F.N. KHAN, M.M. RAHMAN, A. J. M. S. KARIM
K. M. HOSSAIN

Abstract

A study was conducted at the Floriculture Research Field of Horticulture Research Centre of Bangladesh Agricultural Research Institute (BARI) during the period from November 2006 to May 2008 to determine the optimum rate of N and K for better growth and yield of corm and cormel of gladiolus. The treatment combination N150 K200 kg/ha produced the longest plant (42.1 cm), the broadest leaf (1.93 cm), the maximum percentage of spikes (88.1%), and corm (97.6%), the heaviest and the largest corm (19.5 g and 4.11 cm, respectively), cent percent flowering sized corm, and the highest corm number and cormel yield (1,20,000 and 1.66 t/ha, respectively). The corm produced from this treatment combination also showed better performances in the next year in respect of plant emergence (100%), florets/spike (13.1), spike and rachis length (82.2 cm and 45.4 cm, respectively), flower stick weight (57.1 g) and percentage of flower sticks (113%).

Keywords: Nitrogen, potassium, corm, cormel, gladiolus.

Bangladesh J. Agril. Res. 37(4): 617-624, December 2012

GENETIC DIVERSITY ANALYSIS OF PARENTAL LINES FOR HYBRID DEVELOPMENT IN RICE (*Oryza sativa* L.)

M. J. HASAN, UMMA KULSUM, M. M. H. RAHMAN
M. M. H. CHOWDHURY AND A. Z. M. K. A. CHOWDHURY

Abstract

Genetic divergence of 40 parental lines comprising 30 restorer and 10 maintainer lines were studied through Mohalanobis's D^2 and principal component analysis for eleven characters. Genotypes were grouped into five different clusters. Cluster V comprised maximum number of genotypes (thirteen) followed by cluster I and II. The inter-cluster distance was maximum between clusters I and V (13.495) indicating wide genetic diversity between these two clusters followed by the distance between cluster I and 11 (9.489), cluster IV, and cluster V (8.969) and cluster I and cluster III (8.039). The minimum inter-cluster distance was observed between cluster II and cluster III (3.034) followed by cluster 111 and cluster IV (3.834) and cluster II and cluster V (4.945) indicating that the genotypes of these clusters were genetically close. The intra cluster distance in the entire five clusters was more or less low which indicated that the genotypes within the same cluster were closely related. Among the characters panicle weight contributed most for divergence in the studied parental lines. Difference in cluster means existed for almost all the characters studied. Highest mean value for number of effective tillers (7.8), days to 50% flowering (95.5), panicles/m^2 (192.6), panicle weight (2.9), spikelet fertility (84.8), number of grains/panicle (177.8), days to maturity (123.6), and grain yield/plot (1065.5) were observed in cluster I indicated the parental lines fallen in this cluster having the genetic potentiality to contribute better for yield maximization of hybrid rice.

Keywords: Rice, parental lines, genetic divergence.

Bangladesh J. Agril. Res. 37(4): 625-634, December 2012

SUITABILITY OF INTERCROPPING SESAME WITH MUKHIKACHU

M. R. ISLAM, M. A. K. MIAN AND M. T. RAHMAN

Abstract

A field experiment was conducted at the Regional Agricultural Research Station, Ishurdi, Pabna, Bangladesh during 2008-09 and 2009-2010 to find out the suitable intercrop combination of sesame with mukhikachu for getting higher productivity and economic return. Five treatments comprised of T_1 = sole mukhikachu (double row:20 cm/55 cm/20 cm × 45 cm), T_2=sole sesame (30 cm×5 cm), T_3 = mukhikachu (double row:20 cm/55 cm/20 cm × 45 cm) + one row sesame (30%), T_4 = mukhikachu (double row:20 cm/55 cm/20 cm × 45 cm) + two row sesame (60%), and T_5 = mukhikachu (double row:20 cm/55 cm/20 cm × 45 cm) + sesame broadcast

(100%). The results showed that intercropping systems affected the cormel yield of mukhikachu and seed yield of sesame. Mukhikachu yield decreased with the increase of sesame population in intercropped combination. The highest mean mukhikachu equivalent yield (15.65 t/ha), land equivalent ratio (1.83), gross return (Tk.187585/ha), gross margin (Tk. 114265/ha), and benefit cost ratio (2.56) were obtained from two rows of sesame (30 cm × 5 cm) in between two double rows (20 cm/55 cm/20 cm × 45 cm) of mukhikachu. Sole crop of sesame gave the lowest mukhikachu equivalent yield (4.02 t/ha), gross return (Tk.48125/ha), gross margin (Tk. 19655/ha), and benefit cost ratio (1.69). Two years' study revealed that two rows of sesame (60%) in between two double rows (20 cm/55 cm/20 cm × 45 cm) of mukhikachu was found profitable intercropping combination.

Keywords: Intereropping, sesame, mukhikachu, sole crop, gross return.

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ROLE OF AMF ON PLANT GROWTH, NUTRIENT UPTAKE ARSENIC TOXICITY AND CHLOROPHYLL CONTENT OF CHILLI GROWN IN ARSENIC AMENDED SOIL

F. E. ELAHI, M. A. U. MRIDHA, F. M. AMINUZZAMAN

Abstract

Mycorrhizal fungi have their most significant effect on plant growth and have shown to reduce arsenic contamination to chilli. The present experiment was carried out to determine the influence of AMF inoculation on plant growth, nutrient uptake, arsenic toxicity, and chlorophyll content of chilli grown in arsenic amended soil. Chilli was grown in arsenic amended soils with or without mycorrhizal inoculation. Three levels of arsenic concentrations (10 ppm, 100 ppm, and 500 ppm) were used. The seed germination was affected more by the two treatment variables. Root length, shoot height, root fresh weight, shoot fresh weight, root dry weight, shoot dry weight were higher in AMF inoculated plants in comparison to their respective treatments and decreased significantly with the increase rate of arsenic concentrations. Less arsenic content, higher chlorophyll, and nutrient uptake were recorded in mycorrhiza inoculated chili plants. The present findings indicated that AMP inoculation not only minimize arsenic toxicity, but also can increase growth and nutrient uptake of chilli.

Keywords: Mycorrhizal fungi, arsenic contamination, chilli.

Bangladesh J. Agril. Res. 37(4): 645-652, December 2012

INFLUENCE OF SULPHUR ON MORPHO-PHYSIOLOGICAL AND YIELD PARAMETERS OF RAPESEED (*Brassica campestris* L.)

FERDOUSI BEGUM, FEROZA HOSSAIN
MD. RAFIQUL ISLAM MONDAL

Abstract

Field experiments were conducted at the Central Research Station of Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur during the period from November to February in 2004-05 and 2005-06 to evaluate the effect of different levels of sulphur (0, 20, 40, 60, and 80 kg/ha) on rapeseed variety BARI Sarisha-15. Results showed that the most of the growth parameters and yield attributes were significantly influenced by different doses of sulphur. The growth parameters, yield and yield contributing characters were increased with the increasing levels of sulphur fertilizer up to 60 kg S/ha and with the doses beyond that were found to decrease. All growth parameters like plant height, leaf area, dry matter accumulation, leaf area index, crop growth rate, net assimilation rate, and relative growth rate and all yield components, such as number of siliquae per plant, seeds per siliqua, 1000-seed weight and seed yield per plant were found maximum from the treatment with 60 kg S/ha, which was at par with 80 kg S/ha. The highest seed yield (1990 and 1896 kg/ha) were found when S was used @ 60 kg/ha. The same treatment gave 24.71 % and 24.32 % higher seed yield than the control treatment, which were statistically identical with dose at 80 kg /ha of sulphur in both the years.

Keywords: Rapeseed, sulphur, morpho- physiological parameters, and yield parameters.

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USE OF TRICHO-COMPOST AND TRICHO-LEACHATE FOR MANAGEMENT OF SOIL-BORNE PATHOGENS AND PRODUCTION OF HEALTHY CABBAGE SEEDLINGS

M. S. NAHAR, M. A. RAHMAN, M. G. KIBRIA
A. N. M. REZAUL KARIM AND S. A. MILLER

Abstract

Tricho-compost, a *Trichoderma* based compost fertilizer, was developed by mixing a definite concentration of spore suspension of a *Trichoderma harzianum* strain with measured amounts of processed raw materials, such as cowdung, poultry refuse, water hyacinth, vegetable wastes, sawdust, maize bran, and molasses. Tricho-leachate, a liquid by-product of the Tricho-compost, was obtained during decomposition of Tricho-compost materials. These bioproducts were tested both in the laboratory and in seedbed nurseries to evaluate their effectiveness against soil-borne pathogens for growing cabbage seedlings. Application of Tricho-compost and Tricho-leachate reduced the seedling mortalities of cabbage caused by *Sclerotium rolfsii* by about 98%. In laboratory tests, *Trichoderma harzianum*, after re-isolation from Tricho-compost and tricho-leachate, was also found to be highly effective to arrest the growth of *S. rolfsii. T. harzianum* destroyed the radial growth of *S. rolfsii* mycelium by 59.7% after five days, and effected total destruction of the mycelium in 10 days. In seedbed nurseries, soil applications of Tricho-compost and Tricho-leachate significantly increased the seedling germination rate and reduced the incidence of soil-borne diseases and infestation of root-knot nematodes. Field experiment showed that combined application of Tricho-compost and Tricho-leachate reduced the seedling mortalities by 40.9% to 64.5% in Gazipur and 53.3% to 62.1% in Bogra. Application of Tricho-leachate at 500 ml per sq. metre increased plant weight by about 55.6%, and reduced the seedling mortality by about 84.0% in Gazipur. Seedbed nurseries treated with Tricho-compost and Tricho-leachate had only *Pythium* spp as a soil-borne pathogen, whereas the control plot had as many as four soil-borne pathogens - *Pythium, Rhizoctonia, Sclerotium* and *Fusarium* spp. Use of richo-compost and Tricho-leachate also reduced the infestation of root-knot nematode by about 80.7% to 91.0%. The results clearly showed that use of Tricho-compost and Tricho-leachate is highly effective for production of healthy cabbage seedlings.

Keywords: Cabbage seedling, tricho-compost, tricho-leachate, root-knot nematode, *Sclerotium rolfsii.*

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EFFECT OF GA_3 AND ROW RATIO OF RESTORER (R) AND CMS LINES (A) ON DIFFERENT CHARACTERS AND SEED PRODUCTION OF BRRI HYBRID DHAN[2]

M.H. RAHMAN, M.M KHATUN, M.S.R. KHAN
M.A.K. MIAN AND M.G. RASUL

Abstract

An experiment was conducted at the experimental farm of Bangladesh Rice Research Institute (BRRI), Gazipur, during November to May 2009-10 to study the effect of GA_3 and row ratio of restorer and CMS lines on different characters and F_1 seed production of BRRI hybrid dhan[2]. The treatments were of four levels of GA_3 viz., (i) control, (ii) 150 g/ha, (iii) 250 g/ha, and (iv) 350 g/ha and five row ratios (R:A) viz., (i) 2:8, (ii) 2:10, (iii) 2:12, (iv) 2:14, and (v) 2:16. Different doses of GA_3 significantly influenced growth and yield components of rice except total tillers/hill and 1000-grain weight. The highest F_1 seed yield (2.34 t/ha) of BRRI hybrid dhan2 was obtained with an application of GA_3 @ 250 g/ha which enhanced the maximum number of effective tillers, the highest number of grains/panicle, panicle exsertion rate and outcrossing rate. The lowest seed yield (1.10 t/ha) was produced without application of GA_3 i.e., control. The row ratio of 2:12 and 2:8 produced the highest (2.05 t/ha) and the lowest (1.63 t/ha) F1seed yield, respectively. The interaction between GA_3 and row ratio of restorer and CMS lines was significant for F_1 seed yield. The highest F_1 seed yield (2.90 t/ha) was obtained with the application of GA_3 @ 250 g/ha at the row ratio of 2:12 (R: A). The lowest seed yield (0.95 t/ha) was recorded without application of GA_3 (control) at row ratios of 2:16.

Keywords: GA_3, row ratio, out crossing rate, yield and hybrid seed production.

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RESPONSE OF MUSTARD TO BORON FERTILIZATION

M. H. RASHID, M. M. HASAN, M. AHMED
M. T. RAHMAN, K. A. M. M. RAHMAN

Abstract

A field experiment was carried out in non-Calcareous Floodplain Soil of Spices Research Sub-Station, Lalmonirhat under AEZ 2 during the rabi season of 20072008 and 2008-09. The objectives were to evaluate the effect of boron on the yield of mustard and to screen out the suitable variety tested against different boron levels for maximizing yield. Three varieties of mustard viz., BARI Sharisha-11, 13, and 14 and 5 levels of boron (0, 0.5, 1.0, 1.5 and 2.0 kg/ha) along with a blanket dose of N120 P35 K65 S20 Zn3.0 kg/ha were used in the study. Results revealed that BARI Sharisha-11 performed better with 1.5 kg B/ha which produced 1.82 t/ha seed. However, from regression analysis, a positive but quadratic relationship was observed between seed yield and boron levels. The optimum dose of boron was appeared to be 1.7 and 1.6 kg B/ha for Lalmonirhat during 2007-08 and 2008-09, respectively.

Keywords: Response of mustard, boron, yield.

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GENOTYPIC AND PHENOTYPIC VARIABILITY IN MANGO (*Mangifera indica* L.)

D. A. N. MAJUMDER, L. HASSAN
M.A. RAHIM AND M. M. KABIR

Abstract

Sixty mango genotypes were studied to find out their variability, heritability, and genetic advance. Significant variations were observed in 20 characters. There were also considerable differences between the genotypic and the phenotypic coefficients of variation for almost all the characters which indicated the influence of environment on the expression of these traits. Among the studied characters, GCV and PCV were high for weight of harvested fruits per plant, % fruit harvest per inflorescence, % initial fruit set per inflorescence, number of fruits per plant and number of main branches per inflorescence. All the characters showed considerably high heritability which ranged from 56.21 to 98.24% and the genetic advance (as % of mean) was high for the maximum traits. High heritability coupled with high genetic advance was observed in weight of harvested fruits per plant, % initial fruit set per inflorescence, % of flowering shoot, number of inflorescences per shoot, percent fruit harvest per inflorescence, number of main branches per inflorescence, number of fruits per plant, number of inflorescences per shoot, plant height (cm), and percent perfect flowers which indicated that these characters were less influenced by environment confirming predominance of additive gene action and therefore, selection in favour of these characters would be feasible for yield improvement of mango.

Keywords: Variability, heritability, genetic advance and mango.

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PERFORMANCE OF TWELVE MANGO CULTIVARS GROWN IN DIFFERENT AGRO-ECOLOGICAL ZONES OF BANGLADESH

K. KOBRA, M.A. HOSSAIN, M.A.H. TALUKDER
M.A.J. BHUYAN

Abstract

Twelve commercial and promising mango cultivars were evaluated at three agroecological zones of Bangladesh viz., Akbarpur (AEZ 29), Chapai Nawabgonj (AEZ 11), and Gazipur (AEZ 28) during 2006-07 to investigate their regional adaptability. Cultivars included in the experiment were Ashwina, BARI Aam-1, Bombai, Deori, Fazli, Gopalbhog, Kalia, Khirsapat, Langra, Lata Bombai, Rani Passand, and Surjapuri. The plants were transplanted in the field during July 1993. Tree volume was the maximum (79.78 m^3) in Khirsapat and the minimum in Lata Bombai (21.92 m^3). Langra had the highest percentage of perfect flower (27%), while the lowest was in Deori and Kalia (5%). The earliest and latest fruit was harvested from BARI Aam-1 and

Ashwina, respectively, at all locations. All the cultivars were harvested 3-5 and 8-10 days earlier at Akbarpur and Gazipur, respectively, compared to that at Chapai Nawabgonj. The highest individual fruit weight was obtained from Fazli at all locations, while Gopalbhog (130 g) had the lowest fruit weight at Akbarpur and Surjapuri at Chapai Nawabgonj (172 g) and Gazipur (140 g). Total soluble solids content was reasonably high in all the cultivars at each location (around 20%) except Ashwina, Lata Bombai, and Surjapuri which contained around 16% TSS. Lata Bombai was highly susceptible to anthracnose, floral malformation, and stem-end-rot at almost all the locations. Other cultivars showed low to medium susceptibility to all these diseases. The highest and lowest fruit producing cultivars were Khirsapat (206) and Lata Bombai (106) at Gazipur, while Rani Passand (196) and Bombai, Lata Bombai (92) at Akbarpur but at Chapai Nawabgonj, these were Langra (325) and Deori (117), respectively. Cultivar Fazli (83.61 kg) was the highest yielder by weight, while Lata Bombai (18.35 kg) was the lowest. Among the locations, Chapai Nawabgonj was the most favourable for plant growth, perfect flower production, and yield, and least favourable for pests and diseases. The overall result of the experiment indicated that good quality mango could also be grown successfully under Akbarpur and Gazipur conditions adopting appropriate variety like Khirsapat.

Keywords: Mango cultivars, agro-ecological zones of Bangladesh.

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ECONOMICS OF MARIGOLD CULTIVATION IN SOME SELECTED AREAS OF BANGLADESH

M.A. HAQUE, M. A. MONAYEM MIAH
S. HOSSAIN AND M. ALAM

Abstract

Marigold cultivation is now a profitable enterprise to the farmers, but the socioeconomic data and information of this flower are very scarce in Bangladesh. Therefore, the study was conducted to identify agronomic practices, analyze relative profitability, and input-output relationship during February 2011. Primary data were collected from 100 randomly selected farmers from Jessore and Jhenaidah districts. The results indicated that 95% farmers cultivated T- 004 line and only 5% farmers cultivated T- 003 line of marigold. The per hectare costs of marigold cultivation were Tk. 1,47,234 and Tk. 1,02,858 on full cost and variable cost, respectively. The major share of full cost was for human labour (34%), land use (18%), fertilizer (15%), and irrigation (10%). The yield of marigold was 2,650,447 flowers per hectare. The gross margin and net return were Tk.1, 62,186 and Tk.1, 17,812 per hectare, respectively. The net return was 81% higher than lentil, 85% higher than mustard, and 6% lower than potato cultivation. The benefit cost ratios were 2.57 and 1.80 on variable cost and full cost basis, respectively. Cobb-Douglas production function revealed that human labour, land preparation, seedling, urea, TSP, MoP, and irrigation had positive effect on marigold cultivation. The lack of technical knowledge, non-availability of high yielding variety, and infestation of insects and diseases were major problems for marigold cultivation. Therefore, necessary steps from concerned authority are needed to overcome these problems.

Keywords: Marigold, gross margin, net return, BCR.

Bangladesh J. Agril. Res. 37(4): 721-728, December 2012

EVALUATION OF TROPICAL SUGARBEET *(Beta vulgaris* L). GENOTYPES UNDER BANGLADESH CONDITION

M. S. ISLAM, S. AHMAD, M. N. UDDIN AND M. A. SATTAR

Abstract

An investigation was undertaken to study the feasibility of sugarbeet cultivation under Bangladesh condition during winter season of 2009-2010. Seeds of 14 sugarbeet genotypes were sown in the experimental field of Horticulture Research Centre of BARI, Gazipur on 10 November 2009. Visible root swelling in all genotypes started between 36 and 40 days after sowing (DAS). Nine genotypes had white root colour while rest were red purple. Plant height varied from 26.8 cm to 55.0 cm at 165 DAS. Similarly, whole plant weight among the genotypes ranged from 0.76 kg to 1.60 kg. Mean root yield in all genotypes was 66.22 t/ha when harvested at 165 DAS, which was decreased to 56.29 t/ha at

180 DAS. However, the highest root yield was recorded from the genotypes SB001 (85.30 t/ha) closely followed by SB006 (84.40 t/ha) at 165 DAS. All the genotypes showed lower yield potential at 180 DAS compared to 165 DAS. Severe leaf shedding and drying up of the root in the later stage might be the reason for yield reduction. Nine genotypes had more than 10% sucrose and can be considered for sugar producing genotypes. Five genotypes had very less sucrose content in the root and can be useful for vegetable purpose. The genotypes SB001 and SB006 had comparatively high amount of sucrose (13.0%) in the root. The fungal disease *Sclerotium* root rot and the insect *Spodoptera litura* were found the most limiting factor for sugarbeet cultivation.

Keywords: Sugarbeet, root, sucrose, *Beta vulgaris.*

Bangladesh J. Agril. Res. 37(4): 729-736, December 2012

EFFECT OF DIFFERENT PACKAGING SYSTEMS AND CHLORINATION ON THE QUALITY AND SHELF LIFE OF GREEN CHILLI

MOHAMMAD MIZANUR RAHMAN, MD. MIARUDDIN
MD. GOLAM FERDOUS CHOWDHURY
MD. HAFIZUL HAQUE KHAN AND M.A. MATIN

Abstract

The experiment was conducted to evaluate the effect of packaging materials on the quality and shelf life of green chilli (*Capsicum annuum*) using passive modification of modified atmosphere packaging system. The modified atmosphere was created by making perforation in the polypropylene packets. Green chilli pre-treated with chlorine water and then packaging in 0.3% perforated polypropylene packet resulted substantial reduction of weight loss and rotting/shriveling. These treatment combinations also considerably retained vitamin C, ß-carotene, moisture content, etc. Under this condition the retention of quality and shelf life of green chilli could be extended up to 10 days at ambient condition as compared to non-treated and without packaging.

Keywords: Packaging systems, chlorinations, shelft life, green chilli.

Bangladesh J. Agril. Res. 38(1): 1-9, March 2013

EFFECT OF COMBINED APPLICATION OF CATTLE MANURE AND EM ON THE YIELD AND YIELD COMPONENTS OF GROUNDNUT (*Arachis hypogaea* L.)

THAYAMINI H. SERAN AND N. SUTHAMATHY

Abstract

The field experiment was conducted at the Eastern Region of Sri Lanka to evaluate the effects of cattle manure with EM soil application on the yield and yield components of groundnut (*Arachis hypogaea* L.) *cv Indi*. It consisted of 10 treatments replicated four times in a randomized complete block design. Treatments were five levels (0, 5, 10, 15 and 20 t/ha) of cattle manure (CM) with and without EM soil application. Air dry cattle manure was incorporated into soil two weeks before sowing and EM solution was sprayed to soil at two week intervals from flowering to maturity of the crop. All other agronomic practices were followed according to the recommendation. The results showed that the increase of cattle manure (up to 15 t/ha) combined with EM increased the number of pods, weight of pods and kernels per plant, 100-kernel weight, shelling % and total yield. Higher kernel yield (3.42 t/ha) was obtained from 15 t/ha CM + EM application. The kernel yield in the control treatment (chemical fertilizer only) was 2.78 t/ha, which was comparable to 2.81 t/ha of kernel with 15 t/ha CM application alone. This study revealed that cattle manure at the rate of 15 t/ha coupled with EM would give better yield of groundnut and it can replace chemical fertilizer use.

Keywords: Combined application of manure and EM, yield, yield components of groundnut.

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GENETIC DIVERSITY ANALYSIS IN *Brassica rapa* USING MORPHOLOGICAL CHARACTERS

N. JAHAN, S. R. BHUIYAN, M. Z. A.TALUKDER
M. A. ALAM AND M. PARVIN

Abstract

A field experiment was conducted in the experimental field of Genetics and Plant Breeding Department, Sher-e Bangla Agricultural University, Dhaka, Bangladesh to study on genetic diversity in ten F_4 lines obtained through intervarietal crosses along with 8 released varieties of *Brassica rapa* during November 2007 to February 2008. Different Multivariate analyses were performed to classify 18 genotypes. All the genotypes were grouped into four clusters. Cluster IV was the largest comprising of 7 genotypes and cluster II was the smallest with 2 genotypes. Cluster II had the highest intra-cluster distance and Cluster I had the lowest intra cluster distance. Inter cluster distance was maximum (11.697) between clusters II and III. The results revealed that genotypes chosen for hybridization from clusters with highest distances would give high heterotic F_1 and broad spectrum of variability in segregating generations. The characters-number of primary branches/plant, number of secondary branches/plant and days to 50% flowering contributed maximum towards divergence among *Brassica* genotypes. Considering cluster distance, inter genotypic distance and other agronomic performance G2 and G14 from cluster I; G18 from cluster II; G1, G9 and G12 from cluster III and G16 and G17 from cluster IV may be considered as better parents for future uses in hybridization program.

Keywords: *Brassica rapa*, morphological characters and genetic diversity.

Bangladesh J. Agril. Res. 38(1): 19-28, March 2013

DEVELOPMENT OF INSECTICIDE APPLICATION SCHEDULE FOR MANAGEMENT OF FLOWER THRIPS AND POD BORER IN MUNGBEAN (*Vigna radiata* L.)

MD. ALTAF HOSSAIN

Abstract

The experiments were conducted to develop insecticide (Imidachlorpid, Imitaf 20SL at 0.5 ml/l) application schedule for the effective management of thrips and pod borer attacking mungbean during kharif-I season of 2010 and 2011. In both the years, suppression of thrips population and pod borer infestation were higher in double sprayed treatment than single spraying. Single spraying at 35 DAS (100% flowering) and 42 DAS (100% podding stage) suppressed flower infestation by thrips upto 86 and 93%, respectively, during 2010 and 100 & 96%, respectively, during 2011. Double spraying at 42 DAS (100% podding) and 49 DAS (seed developing stage) reduced more pod borer infestation as much as 81-83%. In kharif-I 2010, significantly the highest yield (1798 kg/ha) and MBCR (4.67) were obtained from the plots sprayed twice with Imidachlorpid at 42 DAS (100% podding) and 49 DAS (seed developing stage) but in kharif-I 2011, significantly the highest yield (1457 kg/ha) and MBCR (5.75) were obtained from the plots sprayed twice with Imidachlorpid at 35 DAS (100% flowering) and 42 DAS (100% podding stage). The double spray schedule appeared to be more effective than single spraying against pod borer. But single spray at 42 DAS (100% podding stage) appeared as more effective against flower thrips.

Keywords: Insecticide application schedule, thrips, pod borer, management, mungbean.

Bangladesh J. Agril. Res. 38(1): 29-39, March 2013

EFFECT OF SOWING DATES ON YEAR ROUND PRODUCTION OF FOLIAGE OF CORIANDER (*Coriandrum sativum* L.)

M. MONIRUZZAMAN, M. M. RAHMAN, M. M. HOSSAIN
A. J. M. SIRAJUL KARIM AND Q. A. KHALIQ

Abstract

Four genotypes of coriander (CS001, CS002, CS003, and CS004) were planted at twenty different dates starting from 01 March 2008 at 15 days interval to 15 February 2009 at the research farm of the Department of Horticulture, Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Gazipur to assess the genotypes for year round production of foliage of coriander. It revealed that the number of plants/m^2 and foliage yield/ha decreased with the increase of temperature. The 01 January 2009 sowing gave the maximum foliage yield (6.38 t/ha) followed by 01 December 2008 sowing (6.05 t/ha). The genotype CS003 was the best yielder followed by CS001 and CS002. Performances of genotypes were the poorest during hot periods i.e. 01 April 2008 to 01 October 2008. The genotypes CS001, CS002 and CS003 performed better with regard to foliage production from 01 September 2008 to 15 February 2009 and in 15 March 2008, while the genotype CS008 gave better result from 15 October 2008 to 01 February 2009.

Keywords: Sowing dates, year round, coriander, *Coriandrum sativum L.*, foliage yield.

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EFFECT OF SOIL AND FOLIAR APPLICATIONS OF ZINC AND IRON ON THE YIELD AND QUALITY OF ONION (*Allium cepa* L.)

A. P. TRIVEDI AND K.N. DHUMAL

Abstract

A field experiment was carried out at the research farm of National Research Centre for Onion and Garlic, Manjari, Pune (Maharashtra), India during *kharif* season of 2004 and 2005 to find out the effect of application of zinc and iron and their different modes of applications on growth, yield, and quality of onion. There were 27 treatment combinations with Zn and Fe were applied either in the soil or as foliar spray with cow dung slurry/FYM/gibbrelic acid/amino acids/2,4D to onion. Application of Zn significantly increased the bulb weight (73.9 g), bulb yield (45 t/ha) when applied with 2,4-D (3 ppm) as foliar spray. Zinc application significantly influenced the bulb quality and recorded the highest 'A' grade bulbs and the lowest poor quality 'C' grade bulbs when applied with 2,4-D (81.9%) as foliar spray. The maximum medium 'B' grade bulbs were obtained with the application of Fe with cow dung slurry (11.4%).

Key words: Onion, zinc, iron, yield, quality.

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RESPONSE OF CHILLI (*Capsium annuum* L.) TO ZINC AND BORON APPLICATION

N. C. SHIL, H. M. NASER, S. BRAHMA
M. N. YOUSUF AND M. H. RASHID

Abstract

Field trial on chilli (cv. *Bogra* local) was conducted in Grey Terrace Soil under AEZ-25 (Level Barind Tract) at Spice Research Centre, Bogra during *rabi* seasons of 2005-2006, 2006-2007 and 2007-2008. The objectives were to evaluate the response of chilli to zinc and boron and to find out the optimum dose of zinc and boron for maximizing the yield. Treatments for this study comprised of four levels each of zinc (0, 1.5, 3.0, and 4.5 kg/ha) and boron (0, 1.0, 2.0, and 3.0 kg/ha) along with a blanket dose of N_{130} P_{60} K_{80} S_{20} M_{10} kg/ha. The experiment was set up in a randomized block design (factorial) with 3 replications. The integrated use of zinc and boron was found superior to their single applications. The interaction effect between zinc and boron was significant in case of yield of dry chilli and weight of ripe chilli/plant. The highest yield (1138 kg/ha) was recorded from Zn_3B_1 kg/ha, which was closely followed by Zn_3B_2, $Zn_{4.5}B_2$ and the lowest (703 kg/ha) in control (Zn_0B_0). The yield benefit over control varied from 4.4 to 61.9 % due to interaction effect. Consecutive three years studies showed almost similar trend of

results. However, from regression analysis, the optimum-economic dose of zinc was found to be 3.91 kg/ha whereas it was 1.70 for boron. Hence, a package of ($Zn_{3.91}$ $B_{1.70}$ kg/ha) along with the said blanket dose may be recommended for maximizing the yield of chilli in the study area.

Keywords: Chilli, zinc, boron, optimum yield.

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COMPARATIVE EFFECTIVENESS OF SEED TREATING AND FOLIAR INSECTICIDES AGAINST SUCKING PESTS OF COTTON AND IMPACT ON THEIR NATURAL ENEMIES

S. M. A. HOSSAIN, M. A. BAQUE AND M. R. AMIN

Abstract

The Imidacloprid insecticide, Gaucho 70 WS at 1.5, 2.5, 3.5, 4.5 and 5.5 g/kg seed was used as seed treatment and monocrotophos 40 WSC at 1120 ml/ha was applied as foliar spray on CB9 cotton cultivar to suppress aphid, whitefly and thrips, and impact on their natural enemies during 2008-2011 at the Regional Cotton Research Station, Dinajpur, Bangladesh. The activity of natural enemies, such as ladybird beetle, lacewing, syrphid, and spider population on the sucking pests attacking cotton cultivar CB9 and yield of cotton were recorded. Imidacloprid significantly reduced aphid, whitefly, and thrips population on cotton crops compared to untreated control or foliar spray of monocrotophos 40 WSC at 1120 ml/ha. Ladybird beetles, lacewings, syrphids, and spiders were abundant in the field but their population decreased in the treated plots compared to untreated control. The CB9 cotton cultivar produced significantly higher yield (1.73 t/ha) with a benefit cost ratio 12.47 when seeds were treated with Imidacloprid at 5.5 g/kg fuzzy seed. This study indicated that Imidacloprid (Gaucho 70 WS) used as a seed treatment may be suggested to the cotton growers for controlling sucking pests.

Keywords: Effectiveness, cotton, imidacloprid, seed treatment, sucking pest, natural enemies, monocrotophos.

Bangladesh J. Agril. Res. 38(1): 71-76, March 2013

STUDIES ON GENETIC DIVERGENCE IN MAIZE (*Zea mays*) INBREDS

M. A. ALAM, A. A. KHAN, M. R. ISLAM
K. U. AHMED AND A. B. M. KHALDUN

Abstract

Genetic divergence in 17 CIMMYT Maize inbred lines including one check were assessed based on some morphological traits and grain yield using Mahalanobis' D^2-statistics. The experiment was carried out in alpha lattice design with two replications at Regional Agricultural Research Station, Ishurdi Pabna during the winter 2010-2011. The genotypes were grouped into four clusters. The cluster II contained the highest number of lines (6), while the cluster I contained only single genotype. The maximum inter-cluster distance was noticed between the cluster I and IV and minimum between cluster I and II. The highest intra-cluster distance was observed in the cluster IV and lowest in cluster I. The genotypes in the cluster III showed better performances having shorter growth duration, short stature, shortest ear height, better shelling percentage and reasonable yielding ability. It is expected that crossing of inbred lines belonging high to medium D^2 values may tend to produce high heterosis for yield. Ear aspect had the greatest contribution to the genetic divergence. Days to pollen shedding, silking, maturity, and 1000-grain weight were found to be responsible for primary differentiation.

Keywords: Maize, inbred, divergence, clusters, and PCA.

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VARIABILITY AND CHARACTER ASSOCIATION IN BANGLADHONIA (*Eryngium foetidum* L.)

S. N. MOZUMDER, M. M. RAHAMAN AND M. M. HOSSAIN

Abstract

The experiment was conducted at the Horticulture Field Laboratory of Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur during November 2005 to July 2006. Twelve

genotypes of Bangladhonia (*E. foetidum* L.) were collected from different parts of Bangladesh and evaluated them to analyze the variations. Most of the yield attributing characters and individual plant performances exhibited insignificant differences among the genotypes. All the genotypes had the similar plant and leaf size, number of leaves/plant, weight of leaves/plant, flowering behavior, yields and other qualitative characters. Greater positive correlation was observed between plant populations with yield performances. The symmetric performance indicted that all the genotype belongs from the same species of *E. foetidum* L. and there was no major phenotypic or genotypic variation among them.

Keywords: Bangladhonia, genotype, multivariate, analysis, performance.

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ADOPTION OF BARI MUNG VARIETIES AND ITS CONSTRAINTS TO HIGHER PRODUCTION IN SOUTHERN REGION OF BANGLADESH

Q. M. SHAFIQUL ISLAM, M. A. MONAYEM MIAH
M. S. RAHMAN AND M. S. HOSSAIN

Abstract

Mungbean is a popular and widely grown pulse in Bangladesh. Coastal farmers are cultivating BARI-Mung varieties, but many farmers are still reluctant to adopt these improved varieties that need to be identified. Therefore, the study was conducted in three mungbean growing coastal districts, namely Barisal, Patuakhali, and Noakhali of Bangladesh during 2010-2011 to assess the extent of technology adoption and constraints to BARI-Mungbean production. The study focused the level of technology adoption in terms of variety use, input use and agronomic practices. The study revealed that farmers followed the recommended practices which were very encouraging. All the farmers adopted improved mungben varieties of which 51% farmers adopted BARI Mung-5 variety. The level of adoption of seed rate, use of urea, and MoP was found to be high. The level of adoption of agronomic practices like ploughing, sowing time, weeding and insecticides use were also found to be high. The farmers were mostly influenced by DAE personnel and neighboring farmers in adopting improved mungbean technology. Multiple regression revealed that experience, training, organizational membership, relation with different media, and mungbean suitable area had positive and significant influence in increasing the area under mungbean cultivation. Most farmers showed positive attitude towards improved mungbean cultivation of which 67% farmers wanted to increase its cultivation in the next year. The major constraints to improved mungbean production were high price of insecticides, lack of labour and disease and insect infestation. Farmers required improved mungbean seeds and production technology which may increase the yield and income of the farmers.

Keywords: BARI Mung, adoption index, southern region, and constraints.

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ADAPTABILITY OF WHEAT VARIETIES IN STRONGLY ACIDIC SOILS OF SYLHET

M. ATAUR RAHMAN, N. C. D. BARMA, M. H. SARKER
M. M. R. SARKER AND M. M. I. NAZRUL

Abstract

A field trail was carried out at South-Surma, Sylhet, in 2009-10 and at FSRD site Jalalpur, Sylhet in 2010-11 in collaboration with WRC and OFRD, BARI to examine the response of 7 wheat varieties at two levels of lime in split-plot design where lime was applied in main plots and different wheat varieties were grown in sub-plots. The seeds were sown on 05 December 2009 and 30 November 2010 for the growing season of 2009-10 and 2010-11, respectively. The wheat varieties used in this study were Shatabdi, Sufi, Sourav, Bijoy, Prodip, BARI Gom-25 and BARI Gom-26. The index of relative performance of each variety in comparison to mean yield of all varieties under the contrast conditions of liming and non-liming was estimated to determine relative adaptability of wheat variety under experimental soil conditions. The result indicated that most of the yield components viz., spikes/m^2, 100-grain weight, and grain yield of wheat were significantly improved by liming for both the years and locations. There were variations

in lime response among the wheat varieties. The index of relative adaptability (IRA %) for yield of BARI Gom-26 and Bijoy was more than 100% for both the years. The results indicated that these two wheat varieties are relatively tolerant to low pH and could be adapted in acidic soil of Sylhet.

Keyword: Low pH tolerant wheat variety, soil acidity, wheat adaptability.

Bangladesh J. Agril. Res. 38(1): 105-114, March 2013

ESTIMATION OF GENETIC DIVERGENCE IN LABLAB BEAN (*Lablab purpureus* L.) GENOTYPES

M. SALIM, S. HOSSAIN, S. ALAM, J. A. RASHID AND S. ISLAM

Abstract

An experiment for diversity analysis with 66 genotypes of lablab bean (*Lablab purpureus* L.) was conducted at Department of Genetics and Plant Breeding, Bangladesh Agricultural University (BAU) during 2009-2010. Data were collected from all experimental plants on the following characters: days to first flowering, days to 50% flowering, days to first pod setting, no. of pods per plant, wt. of 20 pods (g), pod yield per plant (g), pod length (cm), number of seeds per pod, number of seeds per plant, 100-seed weight (g), and seed yield per plant (g). As per multivariate analysis, the genotypes were grouped into seven clusters. The highest number of genotypes 15 was included in cluster V followed by cluster II, which contained 13 genotypes. Cluster III, I, VI, IV contained 12, 11, 6, and 5 genotypes, respectively. The cluster VII which included 4 genotypes was the smallest among the 7 clusters. It is important to note that the highest amount of genetic divergence within the cluster group was noticed in the cluster VII having only 4 genotypes. The inter-cluster distances (D^2) were higher than the intra-cluster distances. The inter-cluster D^2 values varied from 2059.094 to 19302.6. The distances between the cluster VII and V; VII and VI; VII and II and VII and I were comparatively high than the other inter-cluster distances. The genotypes of these clusters were thus more diversified for yield and yield contributing characters. The intracluster distance (8502.795) observed in cluster VII revealed maximum diversity among themselves. While the least variation (625.372) was noticed between genotypes of the cluster II signifying the closeness of the genotypes included in this cluster. Data on the contribution of individual characters towards divergence suggested that no. of pods per plant contributed maximum (34.033%) to the genetic divergence followed by pod yield per plant and 100-seed weight. The genotypes of the cluster VII produced highest pods per plant and those of the cluster II produced lowest pod yield per plant. Seed yield per plant was found to be highest in cluster VII and lowest in cluster II. Results of the study suggested that selection for these traits in climbing genotypes might be effective. By strategically using this diversity, the breeder can develop high yielding varieties of lablab bean.

Keyword: lablab bean, genetic parameter, genetic divergence, cluster, cluster mean, percent divergence.

Bangladesh J. Agril. Res. 38(1): 115-125, March 2013

EFFECT OF MULCHING AND TILLAGE ON YIELD AND KEEPING QUALITY OF GARLIC (*Allium sativum* L.)

M. A. KABIR, M. A. RAHIM, D. A. N. MAJUMDER AND T. M. T. IQBAL

Abstract

An experiment was carried out at the Horticulture Farm, Bangladesh Agricultural University, Mymensingh during rabi season of 2006-2007 to study the effects of different thickness of water hyacinth mulch and tillage on the storage life of garlic. The experiment was consisted of five depths of water hyacinth mulch (0, 6, 8, 10, and 12 cm) and two methods of tillage (conventional and zero). It was laid out in the split plot design with three replications. The study revealed that the bulbs from the zero tillage showed the highest storage quality resulting in the lowest weight loss (8.45%), insect infested bulbs (6.67%) as well as rotten bulbs (2.44%) after 150 days of storage. In contrast, bulbs grown under conventional tillage with no mulch and 6 cm thick mulch had the lower storage quality compared to those of other treatment combinations. The result showed that garlic production under zero tillage with 12 cm mulch could be used for better storability.

Keywords: Tillage, thick mulch, storage, and garlic.

Bangladesh J. Agril. Res. 38(1): 127-136, March 2013

EFFECT OF IRRIGATION ON HARVESTING TIME AND YIELD IN MANGO (*Mangifera indica* L.)

BABUL C. SARKER AND M. A. RAHIM

Abstract

An experiment was carried out at the BAU Germplasm Centre, Department of Horticulture, Bangladesh Agricultural University, Mymensingh to investigate the effect of irrigation on harvesting time, yield and quality attributes of mango cv. BARI Aam -3 (Amrapali) during the period from September 2005 to July 2006. There were seven treatments in the experiment viz., Irrigation at 15th October, Irrigation at 15 October and 15 November, Irrigation at 15th of each month starting from October and continued up to December, Irrigation at 15th of each month starting from October and continued up to January, Irrigation at 15th of each month starting from October and continued up to February, Irrigation at 15th of each month starting from October and continued up to March and Control (no irrigation). The plants those were irrigated twice on 15 October and 15 November exhibited the highest number of panicles per plant (137.33) compared to the lowest number of panicles per plant (9.00) in the treatment where irrigation was given at 15th of each month starting from October and continued up to March. Two irrigations at 15 October and 15 November produced the highest number of fruits per plant (61.67) and irrigation applied on 15th of each month starting from October and continued up to December produced the lowest number of (11.00) fruits. Maximum yield (12.50 kg/plant) was recorded from the plants which were irrigated twice on 15 October and 15 November as compared to minimum yield (2.15 kg/plant) in plants irrigated on 15th of each month starting from October and continued up to December. Irrigation applied on 15th of each month starting from October to March resulted in the longest shelf life (7.28 days) as compared to control (5.63 days).

Keywords: Irrigation, harvesting time, yield of mango.

Bangladesh J. Agril. Res. 38(1): 137-143, March 2013

STUDY ON INTERCROPPING LEAFY VEGETABLES WITH OKRA (*Abelmoschus esculentus* L.)

F. AHMED, M. N. ISLAM, M. S. ALOM
M. A. I. SARKER AND M. A. MANNAF

Abstract

A field experiment on intercropping of okra and leafy vegetables was conducted at Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur and Agricultural Research Station, Burirhat, Rangpur during Kharif-I season of 2010 and 2011 to find out suitable crop combination for higher productivity and economic return. Seven treatments viz., sole okra (50cm × 40cm), okra 100% (in row) + red-amaranth 100% (broadcast), okra 100% (in row) + red-amaranth 75% (broadcast), okra 100% (in row) + leaf amaranth 100% (broadcast), okra 100% (in row) + leaf amaranth 75% (broadcast), okra 100% (in row) + jute as patshak 100% (broadcast), okra 100% (in row) + jute as patshak 75% (broadcast) were used. Intercropping reduced okra yield but total productivity increased due to additional yield of vegetables. In both the locations, sole okra produced the highest yields (15.82 t/ha at Joydebpur and 13.79 t/ha at Burirhat). Among the intercropping treatments, the highest okra yields (15.42 t/ha at Joydebpur and 12.64 t/ha at Burirhat) were obtained from okra 100%+ red amaranth 75% combination. The lowest okra yield (13.16 t/ha at Joydebpur and 11.75 t/ha at Burirhat) was recorded in okra 100% + jute as patshak 100% combination. The highest okra equivalent yield (23.00 t/ha) was recorded in okra 100% + red amaranth 100% at Joydebpur and in okra 100% + leaf amaranth 100% (21.79 t/ha) at Burirhat. These treatment combinations also gave the highest gross margin (Tk. 227180/ha at Joydebpur and Tk. 214600/ha at Burirhat) and benefit cost ratio (5.66 at Joydebpur and 5.58 at Burirhat). The results revealed that cent percent red amaranth (broadcast) or leaf amaranth intercropped with cent percent okra might be suitable combination for higher productivity and economic return at Joydebpur and Burirhat, respectively.

Keywords: Okra, leafy vegetables and intercropping.

Bangladesh J. Agril. Res. 38(1): 145-154, March 2013

YIELD AND QUALITY OF MANGO (*Mangifera indica* L.) AS INFLUENCED BY FOLIAR APPLICATION OF POTASSIUM NITRATE AND UREA*

BABUL CHANDRA SARKER AND M. A. RAHIM

Abstract

The experiment to determine the effects of KNO_3 and urea in manipulating the harvesting time and increasing yield as well as quality of nine years old mango (*Mangifera indica* L.) cv. Amrapali plants was carried out at the BAU Germplasm Centre, Department of Horticulture, Bangladesh Agricultural University, Mymensingh during the period from September 2006 to July 2007. The five treatments included in the experiment were potassium nitrate at 4%, 6% and 8%; urea at 2% and 4% and the control (water spray). Foliar spraying of urea at 4% exhibited better performance in relation to terminal shoot length, number of leaves and leaf area and potassium nitrate at 4% gave superior results with respect to length and breadth of panicle and number of secondary branches per panicle compared to control. The plants sprayed with KNO_3 at 4% expressed earlier panicle appearance by 17 days as compared to delayed appearance of panicle in untreated control plants. The plants received KNO_3 at 4% produced the highest number of panicles per plant (220.67) whereas the control plants had the least number of panicles (107.67). Regardless of concentration, KNO_3 and urea manifested slightly earlier harvest (5 days) compared to control. Plants treated with KNO_3 at 4% noted the highest number of fruits per plant (136.67) compared to control (62.67). The treatment urea at 4% resulted in the biggest fruit (202.83g) and the control plants exhibited the smallest fruit (175.00g). Potassium nitrate at 4% gave maximum yield (23.14 kg/plant) as compared to minimum yield (9.12 kg/plant) in the control (water spray).

Keywords: Yield and quality of mango, foliar application, potassium nitrate, urea.

* A part of Ph. D. research.[1]Principal Scientific Officer, Pomology

Bangladesh J. Agril. Res. 38(1): 155-163, March 2013

EFFECT OF GA_3 AND ROW RATIO ON FLORAL TRAITS OF COMPONENT LINES OF BRRI HYBRID DHAN2

M.H. RAHMAN, M.M KHATUN, M. S. R. KHAN
M. M. HAQUE AND M.G. RASUL

Abstract

Component lines (A and R lines) of BRRI hybrid dhan2 were assessed under treatment of GA_3 application and row ratio on days to 5% and 50% flowering, duration of opening of floret, angle of open floret, filament length, anther length, stigma length, panicle exsertion rate, stigma exsertion rate and outcrossing rate. The CMS line viz; BRRI 10A have been found to be usable female parents for hybrid rice seed production due to their stigma length, stigma exsertion rate, duration of blooming, anther length and filament length. The different between genotypic and phenotypic variation was not remarkable for most of the characters studied indicating negligible environmental influence on the traits. The maximum duration of opening of floret (158.10 min) and angle of floret opening (28.87^0) were obtained with the application of 350 g GA_3 ha^{-1}. The improvement in the floral traits with increased GA_3 level might be due to increased availability of GA_3 which enhanced floral traits. The CMS line can be used as potential female parent in hybrid rice seed production of BRRI hybrid dhan2.

Keywords: CMS line, restorer line, floral traits, GA_3 and row ratio, hybrid rice.

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PROFITABILITY OF ROSE CULTIVATION IN SOME SELECTED AREAS OF JESSORE DISTRICT

M.A. HAQUE, M. A. MONAYEM MIAH
S. HOSSAIN AND M. ALAM

Abstract

Rose cultivation is now a profitable enterprise to the farmers, but the socioeconomic data and information of this flower are very scarce in Bangladesh. So, the present study was conducted to

identify agronomic practices, analyze relative profitability, and input-output relationship during December 2010. A total of 100 rose growing farmers were randomly selected for this study. The results indicated that 100% farmers cultivated Lincoln variety of rose. The costs of rose cultivation were Tk. 3,87,569 and Tk. 2,75,214 per hectare on full cost and variable cost basis, respectively. The major share of full cost was incurred for human labour (30%), followed by land use (23%), fertilizer (17%), and irrigation (12%). The yield of rose was 5,40,107 flowers per hectare. The net return from rose cultivation was Tk. 23,31,196 per hectare. The benefit cost ratios were 2.29 and 1.63 on variable cost and full cost basis, respectively. The highest profit was obtained from rose cultivation compared to its competitive crops like potato+jute, lentil+til and mustard+mungbean for rose. Human labor, land preparation cost, seedling, urea, TSP, MoP and irrigation had positive effect on the yield of rose. Lack of technical knowledge, non-availability of HYV seedling, and infestation of insects and diseases were major problems found in rose cultivation. Government should take necessary steps to overcome these problems.

Keywords: Rose, profitability, gross margin, net return, BCR.

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COMPARATIVE EFFECTIVENESS OF NEEM EXTRACTS AND SYNTHETIC ORGANIC INSECTICIDE AGAINST MUSTARD APHID

G. C. BISWAS

Abstract

Effectiveness of different doses of neem extracts and a synthetic organic insecticide against mustard aphid was studied in the experimental farm of the Oilseed Research Centre, Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur, during two consecutive years 2010-2011 and 2011-2012 for the control of mustard aphid. Eight treatments were evaluated against mustard aphid under field condition. The maximum aphid population was (180 per plant) observed at the pod formation stage of mustard crop. Among the treatments, Malataf (Malathion 57EC) @ 2ml/l significantly reduced the highest aphid population (93.75%) over pretreatment which produced the highest seed yield (1440 kg/ha) of mustard. The neem leaf extracts reduced 63.16-72.55% aphid population in mustard while neem seed extract reduced 73-81% aphid population over pretreated plants in both the years. Among the different doses of neem extracts, the highest aphid population reduction over pretreatment (81%) was recorded from 50g neem seed per litre of water treated plots with high MBCR (3.88) followed by 75g neem seed/l treated plots having reduction of 80% and MBCR 3.78.

Keywords: Effectiveness, neem extracts, doses, synthetic insecticide, mustard aphid.

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EVALUATION OF CORIANDER (*Coriandrum sativum* L.) GENOTYPES FOR SEED YIELD AND YIELD CONTRIBUTING CHARACTERS

M. MONIRUZZAMAN, M. M. RAHMAN, M. M. HOSSAIN
A. J. M. SIRAJUL KARIM AND Q. A. KHALIQ

Abstract

Fourteen genotypes of coriander (*Coriandrum sativum* L.) from diversed sources were evaluated at Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur during the *rabi s*eason of 2007 to 2008 to select the promising genotype (s) for higher seed yield. The genotype CS005 took the minimum days for bolting (38.00), while CS003 took the maximum (60.00 days) which developed 50% most early flowers (134.3 days) and the tallest plant (116.10 cm). The maximum number of primary and secondary branches were obtained from CS004 (8.70/plant) and CS001 (15.41/plant), respectively. Umbels/plant ranged from 12.70 (CS010) to 33.37 (CS003), while umbellates/ umbel ranged from 4.75 (CS003) to 6.67 (CS010). The maximum number of seeds were obtained from CS011 (35.63/umbel and 684.3/plant) and the lowest per umbel from CS005 (15.00) and per plant from CS010 (163.3). The highest fruit set was obtained from CS011 (48.20%) followed by that of CS007 (46.30%). The genotype CS002 had the maximum 1000-seed weight (12.00 g) and CS004

the minimum (1.65 g). The genotypes CS011 and CS007 gave the highest seed yield per plant (5.79 and 5.57g) as well as per hectare (1.34 and 1.05 t). The highest germination of seed was recorded in CS003 (84.4%) and the lowest in CS004 (67.96%). The genotypes CS004, CS005, CS010, CS013, and CS014 were attacked with stem gall disease. It might be concluded from the study that the genotypes differed significantly in most of the parameters and offer a good scope of selection of better genotypes for desired traits.

Keywords: Coriander, genotypes, *Coriandrum sativum* L., seed yield, selection, BSMRAU.

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PERFORMANCE OF BARI MANGO (*Mangifera indica* L.) VARIETIES IN CHITTAGONG REGION

H. BARUA, M. M. ALAM PATWARY AND M. H. RAHMAN

Abstract

Five mango varieties developed by Bangladesh Agricultural Research Institute (BARI) were evaluated at ARS, Pahartali, Chittagong during January to June 2012 to find out the suitable variety. The earliest flowering as well as harvesting were observed in BARI Aam-1 and the latest in BARI Aam-8. Number of fruits per tree varied from 51 to 117. Maximum number of fruits (117) per tree was obtained from BARI Aam-8, while minimum fruits (51) from BARI Aam-4 (Hybrid). The heaviest fruit (373.0 g) was obtained from BARI Aam-4 (Hybrid), while the lightest fruit (172.6 g) was in BARI Aam-3. Maximum yield per plant was found in BARI Aam-8 (33.59 kg) followed by BARI Aam-4 (19.02 kg), whereas it was lowest in BARI Aam-1(14.42 kg). The highest edible portion (78.66 %) was recorded in BARI Aam-4, while the lowest (65.99%) was obtained from BARI Aam-1. The highest TSS content (21.36%) was recorded in BARI Aam-3, whereas the lowest TSS content (16.51%) was observed in BARI Aam-2.

Keywords: Growth, flowering, fruit characteristics, mango.

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PERFORMANCE OF DIFFERENT HYV MUSTARD VARIETIES WITH SUGARCANE (*Saccharum officinarum*) AS INTERCROP IN FARMERS' FIELDS

M. N. ISLAM, M. S. RAHMAN, F. AHMED
M. S. ALOM AND M. AKHTERUZZAMAN

Abstract

A field experiment was conducted at farmer's field of Kushtia Sadar upazila under Kushtia district during the period from November 2009 to January 2012 to find out suitable mustard varieties for intercropping with sugarcane. Five rapeseed/mustard varieties viz., Improved Tori -7, BARI Sarisha-9, BARI Sarisha-11, BARI Sarisha-14 and BARI Sarisha-15 were intercropped with sugarcane. Results showed that different intercropping combinations significantly influenced yield and yield components of mustard. The mustard variety BARI Sarisha-11 produced the highest seed yield (2199 kg/ha). Mustard varieties in intercropped situation depressed cane yields by 2.79-9.96% compared to sole cane yield. The highest cane equivalent yield (111.28 t/ha) was recorded in sugarcane + mustard var. BARI Sarisha-11 combination. The highest gross return (Tk. 633098/ha), gross margin (Tk. 518078/ha) and benefit cost ratio (5.50) were also obtained from the same combination which was followed by sugarcane + mustard var. BARI Sarisha-14 combination. The results revealed that BARI Sarisha-11 or BARI Sarisha-14 might be grown with sugarcane as intercrop in Kushtia area for getting maximum profit.

Keywords: Intercropping, HYV mustard, sugarcane, farmers' field.

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GENOTYPIC AND PHENOTYPIC CORRELATION AND PATH ANALYSIS IN DURUM WHEAT (*Triticum turgidum* L. var. *durum*)

A. A. KHAN, M. A. ALAM, M. K. ALAM
M. J. ALAM AND Z. I. SARKER

Abstract

An experiment was conducted at Regional Agricultural Research Station, Ishurdi during the 2009-10 cropping season with the objective of estimating the associations between yield and yield-related traits and to identify direct and indirect effects of characters on grain yield in durum wheat. The result showed significant variation among the genotypes for all the characters studied. Significant positive correlation was found for plant height, number of spikes/m^2 and 1000-grain weight with grain yield. Heading days and maturity days showed negative correlation with grain yield. Maturity days, number of spikes/m^2 and 1000-grain weight had significant positive direct effects on grain yield. Number of grains/spike had also direct positive effect, but in low magnitude. The indirect effect of heading days and plant height on grain yield was found mainly through maturity days and 1000-grain weight. It can be concluded that emphasis should be given on heading days and plant height along with 1000-grain weight, number of spikes/m^2 and number of grains/spike for selection of durum wheat genotypes.

Keywords: Durum wheat, correlation, path analysis.

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IDENTIFICATION OF FACTORS INFLUENCING YIELD GAPS IN MUSTARD, POTATO AND RICE IN SOME SELECTED AREAS OF BANGLADESH AND STRATEGIES TO MINIMIZE THE GAPS

A. S. M. MAHABUBUR RAHMAN KHAN, MD. MAZHARUL ANWAR, SALMA AKTER, MD. ZULFIKAR HAIDER PRODHAN AND MOHAMMAD H. MONDAL

Abstract

On-farm trials funded by Krishi Gobeshona Foundation (KGF) were conducted at Shibganj(Bogra), Mithapukur (Rangpur), and Ulipur(Kurigram) upazilas to determine and minimize yield gaps in mustard, potato, boro, and T.Aman rice of Mustard/Potato-Boro-T.Aman rice cropping pattern during 2011-12. To conduct the trials, one bigha (1200 sq.m) land was divided into two-where trial plots received the recommended technology and farmers' plots (control) traditional technology. The trials were carried out with mustard, boro, and T.Aman rice at Shibganj and potato, boro, and T.Aman at both Mithapukur, and Ulipur locations. Fertilizers were applied according to BARC Fertilizer Guide, 2005 and plant protection measures taken following IPM techniques in trial plots. Traditional practices were followed in farmers' plots. Data on yield and yield components were taken and analyzed statistically using paired t-test. Gross return and gross margin were calculated based on production & variable costs and prevailing market price of the produces. The yield of mustard in trial plots was 49.7% (yield gap) higher than that in farmers' plots. The yields of potato in trial plots were 37.66% and 33.96% (yield gap) higher over farmers' plots at Mithapukur and Ulipur sites, respectively. Likewise, yields of boro rice at Shibganj, Mithapukur and Ulipur in trial plots were 16.67%, 22.03%, and 17.61% (yield gap) higher compared to those of farmers' plots. At all three locations, yields of T.Aman in trial plots were also 17.37%, 21%, and 23% (yield gap) higher over farmers' plots. In addition, gross return, gross margin, and BCR in trial plots were found higher than those of farmers' plots. Results revealed that yield gaps varying from 16.67% to 49.7% exist in boro, T.Aman rice, potato and mustard. The gaps could be attributed to difference in the use of variety and management practices in fertilizers and pests between trial and farmers' plots. The yield gaps might be minimized by using HYVs of crops and improved management practices, especially in fertilizers and pests at field level. It is, therefore, necessary to explore the scope to increase the yields of the crops by minimizing yield gaps using improved technologies. The support of extension agencies through demonstrations, field visits and monitoring is essential to minimize the yield gaps.

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FERTILIZER MANAGEMENT FOR WHEAT CROP IN THE HIMALAYAN PIEDMONT SOIL

A. T. M. SAKHAWAT HOSSAIN, F. RAHMAN
G. M. PANAULLAH AND M. A. SALEQUE

Abstract

An experiment was conducted at the farmers' fields in the Himalayan Piedmont soil to evaluate the soil test based (STB) fertilizer dose on wheat crop practicing in the rice – wheat cropping sequence during the Rabi season 2002-2003. Three fertilizer treatments: (i) no fertilizer (control), (ii) local farmers' fertilizer management practice (FP) and (iii) soil test based fertilizer dose (STB) were tested in 10 farmers' fields. The soils of the test fields were acidic and light textured. Results showed that the control plot produced a mean yield of 1.54 t/ha, which increased to 3.96 t/ha with FP and 4.98 t/ha with STB fertilizer dose. The STB fertilizer dose also increased the nitrogen, P, K and S uptake by wheat. Wheat yield showed a strong linear relationship with N, P, K, and S uptake. Partial factor productivity (PFP) of fertilizer (sum of N, P, K and S) was 25.2 kg/kg in FP and that in STB was 24.6 kg/kg. Slightly lower PFP in STB than that of FP may be attributed to the higher dose of N and K in the former. However, the significant yield increase in STB compared with FP encouraged farmers to practice STB fertilizer application for wheat cultivation.

Keywords: Soil test based fertilizer dose, wheat crop, Himalayan Piedmont soil.

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EFFECT OF STORAGE PERIODS ON POSTHARVEST QUALITY OF PUMPKIN

M. A. RAHMAN, M. MIARUDDIN, M. H. H. KHAN
M. A. T. MASUD AND M.M. BEGUM

Abstract

The fully matured pumpkins (*Cucurbita moschata* Poir) of BARI Pumpkin-1 and BARI Pumpkin-2 were harvested from the experimental field of Horticulture Research Centre, BARI, Gazipur, Bangladesh. They were then stored under ambient room conditions (27-31 °C and 75-90% RH) for various periods ranged from 15 days to 120 days. The effect of different storage periods was assessed by evaluating their impact on changes in quality attributes of pumpkins. Results indicated that a slow but steady weight loss occurred in pumpkin with maximum loss of 18 and 21% after 120 days of storage in BARI Pumpkin-1 and BARI Pumpkin-2, respectively. β-carotene and ascorbic acid contents were decreased throughout the whole storage time, however, they were drastically reduced during first 30 days of storage. Total soluble solids content increased until 45 days of storage followed by a decrease with progress in time. Titratable acidity was slowly decreased and simultaneously pH value was increased throughout the storage period. The results indicated that storage conditions need to be managed carefully to slow down any changes in fresh pumpkin.

Keywords: Pumpkin, postharvest storage, ambient conditions, nutritional degradation.

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LONG-TERM ASSESSMENT OF RICE PRODUCTION SCENARIO IN BANGLADESH: A MACRO DYNAMICS

M. SHAHE ALAM AND M. A. ISLAM

Abstract

Despite high pressure of population on land and other natural resources, Bangladesh has made remarkable progress in food production over the last three and a half decades. The shrinking trend in land availability for crop production is another challenge ahead of the economy. The declining trend in cultivable land was quite sharp in the period of 1990 to 2005. Although the population has doubled, cereal food production has increased in the range of 100-125% during this period. The progress is the result of development and dissemination of modern high-yielding rice and wheat varieties supported by favourable public policies. There has been impressive technological advancement in the rice sector. Bangladesh Rice Research Institute (BRRI) made substantial contribution in the recent past and a total of 59 modern high

yielding rice varieties (HYVs) suitable for different production ecologies have been released after independence in 1972. Although the progress in variety development was slower during the seventies and eightees, it was triggered up in the later decades and a quantum of achievement was made after 2000. The rate of varietal development was almost double in the last quarter of the decades compared to that made in the seventees. During the period of 1972 to 1980, the share of modern rice in total production was only 29%, but by the year 1985, it increased to 41% and jumped to nearly 90% by 2010 implying a highly impressive contribution of the diffusion of modern rice technologies in the overall supply of cereal foods in the country.

Keywords: Long-term assessment, rice production scenario, macro dynamics.

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COMPOSITIONAL NUTRIENT DIAGNOSIS (CND) OF ONION (*Allium cepa* L.)

M. N. YOUSUF, S. AKTER, M. I. HAQUE
N. MOHAMMAD AND M.S. ZAMAN

Abstract

Nutritional constraints often restrict yields of crops in farmers' fields. Plant nutrient status is currently diagnosed using empirically derived nutrient norms from arbitrarily defined high and low yielding subpopulations above a quantitative yield target. Generic models can assist Compositional Nutrient Diagnosis (CND) in providing a yield cutoff value between high-and low-yielding subpopulations for small databases. The objectives of the present study were to determine minimum bulb yield target of high yielding subpopulations in farmers' fields and to know nutritional difference between high and low yielding subpopulations. Data were collected at random using a survey database of 42 observations from nine districts of northern region of Bangladesh where high yielding varieties of onion (cv. BARi Piaz-1) are being extensively cultivated. Nutrient composition was determined form leaf at 45-50 days after transplanting. Mean, median, minimum, maximum, standard deviations, skewness of yield as well as

nutrient concentration for N, P, K, S, Ca, Mg, Na, Zn, Mn, Fe, and B were determined and a R (undetermined elements), which comprises all nutrients not chemically analyzed and quantified in onion. Row centered log ratio and cumulative variance ratio function of each nutrient was calculated. The CND generic model gave 10.61 t/ha as minimum cutoff yield of the high-yield subpopulation. Boron was identified as the core yield limiting nutrient for onion in piedmont plain, floodplain and basin soils of Bangladesh. However, S, N, P, and Zn also play a significant role for increasing bulb yield of onion. Onion in farmers' fields of northern region of Bangladesh may require higher B fertilizer dose for better bulb yield. From the studied piedmont plain, floodplain and basin soils of Bangladesh, the yield limiting nutrients were established the following series: B>S>N>P>Zn>Fe>Ca>K>Mg.

Keywords: Nutritional constraints, nutrient diagnosis, CND, onion.

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CHANGES IN SOIL PHYSICAL PROPERTIES AND CROP PRODUCTIVITY AS INFLUENCED BY DIFFERENT TILLAGE DEPTHS AND CROPPING PATTERNS

M. K. ALAM AND N. SALAHIN

Abstract

A series of field experiments was conducted at BARI central farm to observe the changes in soil densities, moisture retentive properties, and crop productivity as influenced by different tillage depths and cropping patterns. The tillage depth showed significant effect on wheat yield. Grain yield of wheat significantly increased from 2.86 t/ha (minimum tillage depth) to 5.33 t/ha (tillage depth up to 20-25 cm). Tillage depths and cropping patterns individually and their interaction significantly affected the yield of BRRI dhan32. The highest grain yield of rice (5.82 t/ha) was found in the tillage depth up to 20-25 cm under wheat-dhaincha-T. aman cropping pattern, whereas the lowest yield (2.08 t/ha) was found in the minimum tillage depth under wheat-fallow-T. aman cropping pattern. Soil densities and soil moisture retentive properties were significantly affected by interaction of tillage depths and cropping

patterns. The bulk density and particle density of soil were decreased but the porosity and soil moisture at field capacity and permanent wilting point were increased with the increase of tillage depths. Tillage depth up to 20-25 cm by chisel plough under wheatdhaincha-T. aman cropping pattern conserved more moisture in the soil profile and improved other soil physical properties i.e. reduced the bulk density, increased porosity, increased water holding capacity and available water content of soil, thus maintained an optimum soil water infiltration rate and soil strength. The study revealed that the soil physical properties were significantly improved and crop yield significantly increased under tillage depth up to 20-25 cm by chisel plough under wheat-dhaincha-T. aman cropping pattern.

Keywords: Tillage depth, soil physical properties, cropping pattern, wheat yield.

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DRYING KINETICS OF GINGER RHIZOME (*Zingiber officinale*)

M. A. HOQUE, B. K. BALA, M. A. HOSSAIN AND M. BORHAN UDDIN

Abstract

This paper presents the drying kinetics of ginger rhizome under blanched and nonblanched conditions using hybrid solar dryer and mechanical tray dryer at three temperature levels. The drying rate increases with the increase in drying air temperature and blanching also increases the drying rate. The drying rate depends on shape and size of the ginger rhizomes. The highest drying rate was found for sliced samples of ginger rhizome followed by splitted and whole root samples. Five thin layer drying models were fitted to the experimental data of blanched and sliced ginger rhizomes. The Page equation was found to be the best to predict the moisture content of sliced ginger rhizome in thin layer. The agreement between the predicted and experimental results was excellent. Colour of ginger rhizomes was slightly changed after drying. Lightness of ginger rhizomes decreased with an increase in drying temperature for all samples except sliced and blanched samples. For drying of ginger rhizome, it should be sliced and blanched and dried below 70^0C for better quality dried products.

Keywords: Ginger rhizome, hybrid solar dryer, tray dryer, blanching, thin layer drying model, colour change.

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THE IMPACT OF AGRICULTURAL EXTENSION CONTACT ON CROP INCOME IN BANGLADESH

ABU ZAFAR MAHMUDUL HAQ

Abstract

The impact of extension contact on crop income is examined with a view to evaluating the agricultural extension in Bangladesh. The scope of the study was ten villages of Gazipur district. The objectives of the study are to i) determine the factors influencing the benefit of extension services in terms of farm income, ii) determine the factors affecting the extension contact of farmers, and iii) suggest some policy guidelines to improve the extension services in Bangladesh. The sample of the study consists of 1000 farmers. Data came from field survey and multistage random sampling technique was used in order to collect data. The results indicated that the impact of extension contact coefficient on crop income is positive and significant. Evidence shows that the influence of extension contact coefficient is strongly positive and significant in the comparatively nearer villages to upazila headquarters, while this effect is weaker for those villages, which are comparatively away from upazila headquarters. It is found that many farmers did not receive extension contact and the effect of extension contact is weak on crop income compared to other factors such as irrigation and chemical fertilizer. It is assumed that there was enough scope to increase extension contact in the study areas. Some determinants of extension contact were also examined. The study concludes that agricultural extension is necessary to increase among the farmers.

Keywords: Intercropping, HYV mustard, sugarcane, farmers' fields.

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GENETIC DIVERSITY IN EXOTIC MAIZE (*Zea mays* L.) HYBRIDS

M. A. ZAMAN AND M. A. ALAM

Abstract

An experiment in alpha lattice design with three replication including 39 exotic maize hybrids was conducted at the Research farm of Regional Agricultural Research Station, BARI, Ishuardi, Pabna during Rabi season 2010-11 for analysis the genetic divergence in exotic maize hybrids. The genotypes were grouped in to seven clusters. Cluster VI comprised the maximum genotypes (13) indicating overall genetic similarity among them. The minimum genotype (1) was contained in the cluster III and V**.** The highest inter-cluster distance was observed between cluster V and III followed by cluster I and III and cluster III and VII suggesting wide diversity between them and the genotypes in these cluster could be used in hybridization program for obtaining a wide spectrum of variation among the segregates. The highest intra-cluster distance was observed in cluster VII and the cluster III and V were contained only one genotype and hence, their intra cluster distance was zero. The mean values of cluster IV recorded the highest yield per hectare (11.60 ton/ha) with medium plant height, days to maturity, days to 50% tasseling, silking and shelling percentage. Selection on the basis of plant aspect and ear aspect the genotypes of cluster III ranked first but plant height was high with medium seed size, medium yield, medium shelling percentage and also in late in case of maturity. The mean values of cluster V shown overall medium in case of yield and all yield contributing characters. Qualitative characters contribute maximum towards genetic divergence. Therefore, the genotypes from cluster III, V and VI could be utilized as source materials for getting desirable new recombinants with early maturity and higher yield.

Keywords: Genetic divergence, cluster analysis, D^2 analysis, maize (*Zea mays* L.).

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GENETIC DIVERSITY IN MANGO (*Mangifera Indica* L.) THROUGH MULTIVARIATE ANALYSIS

D. A. N. MAJUMDER, L. HASSAN, M. A. RAHIM AND M. A. KABIR

Abstract

The genetic divergence was assessed in 60 mango genotypes through D^2 statistics and principal component analysis. The genotypes under study were grouped into eight clusters and the diversity was influenced by the morphological characters, not by the geographical distribution of the genotypes. The clustering pattern revealed that the genotypes collected from the same region did not fall in the single cluster. The maximum inter cluster distance was noticed between cluster II and cluster VIII, and the lowest between clusters VII and cluster VIII. From the cluster means, cluster I was high yielding and ranked first in terms of number of secondary branches per inflorescence, percent fruit set per inflorescence, and yield per plant. Cluster VIII had only one genotype which produced the highest percentage of flowering shoots, % perfect flowers, number of fruits per plant, and %TSS. The genotypes of cluster VII produced the biggest sized fruits. The first nine characters of the principal component axes with eigen values above unity accounted for 88.3% of the total variation among the fifteen characters. Weight of harvested fruits per plant (0.990 and 0.181), number of fruits per plant (0.101 and 0.607) and individual fruit weight (0.027 and 0.107) for both the vectors were positive across two axes indicating the important components of genetic divergence. The genotypes belonging to clusters I, VII and VIII with high to moderate genetic distances might be recommended for use in crossing programs to produce new recombinants with desired traits.

Keywords: Genetic diversity, multivariate analysis, cluster analysis, and mango.

Bangladesh J. Agril. Res. 38(2): 355-361, June 2013

REQUIREMENT OF N, P, K, AND S FOR YIELD MAXIMIZATION OF BITTER GOURD (*Momordica charantia*)

SHAMIMA NASREEN, R. AHMED AND M. NAZIM UDDIN

Abstract

Experiments were carried out at the research field of Horticulture Research Centre, BARI, Joydebpur during *kharif* seasons of 2010 and 2011 to find out the requirement of N, P, K, and S application for obtaining higher yield of bitter gourd (var. BARI Karola-1). There were 14 treatment combinations comprising four levels each of N (0, 90, 20,150 kg/ha), P (0, 20, 40, 60 kg/ha), K (0, 40, 80, 120 kg/ha), and S (0, 20, 30, 40 kg/ha). A blanket dose of 2 kg B, 4 kg Zn, and 5 ton cowdung/ha was used. The maximum fruits/plant, fruit size, and single fruit weight and yield of bitter gourd was achieved from the treatment $N_{120}P_{40}K_{80}S_{30}$ kg/ha and the lowest from the control treatment. The yield benefit for the best treatment over the control was 208% in 2010 and 137% in 2011. Response to N and P was more pronounced in comparison to K and S. The yield increased linearly with increasing rates of N up to 120 kg/ha, P up to 40 kg/ha, K up to 80 kg/ha, and S up to 30 kg/ha and thereafter decreased. The highest gross margin (Tk. 486867/ha) and marginal rate of return (8083%) was also obtained from the same treatment. Overall results reveal that application of $N_{120}P_{40}K_{80}S_{30}$ kg/ha along with a blanket dose of 2 kg B, 4 kg Zn and 5 ton cowdung/ha appears to be the best treatment for maximizing the yield of bitter gourd in Grey Terrace Soil (AEZ-28) of Joydebpur.

Keywords: Yield maximization, bitter gourd, requirement of NPK, and S.

Bangladesh J. Agril. Res. 38(2): 363-371, June 2013

DEGRADATION OF SOIL PROPERTIES UNDER GINGER, TURMERIC, AROID, AND JHUM RICE CULTIVATION IN HILLY AREAS OF BANGLADESH

N. SALAHIN, R. A. BEGUM, S. HOSSAIN
M. M. ULLAH AND M. K. ALAM

Abstract

An experiment was conducted in Hill Agricultural Research Station (HARS), Khagrachhari during 2011-2012 to estimate the soil loss and changes in soil properties under indigenous cultivation methods of ginger, turmeric, aroid, and jhum rice in hill slopes. The use of indigenous cultivation methods for growing different crops has created negative impact on soil productivity in hill slope. Among the four crops, the annually highest soil loss (22.68 t/ha) occurred by ginger cultivation which was statistically similar with turmeric (16.52 t/ha) followed by aroid (12.02 t/ha) and lowest soil loss (7.92 t/ha) occurred by jhum rice cultivation. There were no significant changes in soil physical properties like soil texture, bulk density, soil moisture content, field capacity. Organic matter and all the nutrients were higher in eroded soil than the post-harvested soil. A considerable amount of organic matter along with macro and micronutrients has been depleted through traditional method of crop cultivation.

Keywords: Hill soil, crop cultivation, soil erosion, soil properties.

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ASSESSING APHID INFESTATION IN INDIAN MUSTARD (*Brassica juncea* L.) UNDER PRESENT AND FUTURE CLIMATE SCENARIOS

B. BAPUJI RAO, V. U. M. RAO, LINITHA NAIR
Y. G. PRASAD, A. P. RAMARAJ AND C. CHATTOPADHYAY

Abstract

Mustard (*Brassica juncea* L.) production in India suffers from aphid, *Lipaphis erysimi* (Kaltenbach), infestation considerably. Role of weather on the incidence and development of mustard

aphids was assessed from experimental data from six north Indian locations. Aphid appearance and population build up was found to be regulated by temperature and time to attain peak population was relatively short in warm humid climates than in cool climates. Aphids appeared generally when the accumulated thermal time ranged between 810-847 and diurnal temperature range had a key role on the pest build up. Functional relations developed from the present study between aphid incidence and peak population using previous weeks weather and pest data for majority of the locations could be used for taking of any prophylactic/control measures. Projections on aphid population in future climates using generated weather variables indicated that warming may not increase aphid population at all locations uniformly.

Keywords: Indian mustard, aphids, climate change, forewarning models.

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FISH-PADDY CROP ROTATION PRACTICE IN SOUTH-WEST COASTAL REGION OF BANGLADESH: A PROFITABLE TECHNOLOGY FOR THE POOR FARMERS

ANUPAM KUMAR ROY, ALOKESH KUMAR GHOSH SHEIKH TAREQ ARAFAT AND KHANDAKER ANISUL HUQ

Abstract

The study was conducted at the farmer's pond at Sadar Upazilla of Bagerhat District, South-west coastal region of Bangladesh during the period from May 2006 to April 2007 to understand the present status of crop rotation practice and assess the production and cost benefit ratio of the existing culture practices. Two treatments viz., the crop rotation with paddy (T_1) and the shrimp-prawn-fish culture (T_2) were used in the studies. Shrimp (*Penaeus monodon*), prawn (*Macrobrachium rosenbergii*), and catla (*Catla catla*) were stocked at 20000, 10000, and 250 individuals/ha, respectively, in both treatments. In T1, aquaculture phase was from May to December 2006, and the episode of paddy (BRRI dhan 28) cultivation was initiated after full harvest of aqua products and continued till April. Similar farm inputs were given for the common components in both the treatments. Shrimps were harvested four months following stocking in both T_1 and T_2 treatments. . In T_1, production of shrimp, prawn, and catla were 347.20, 355.35, and 140.4 kg/ha, respectively and in T_2, productions were 354.38, 432.37, and 204.7 kg/ha, respectively. In T_1, total paddy production was 6200 kg/ha. Net benefit in T_1 and T_2 was Tk. 300,477 and Tk. 262,561/ha, respectively.

Keywords: Crop rotation, shrimp, prawn, fish production, economics.

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FARMERS' PERCEPTION ABOUT VARIETY DEVELOPMENT AND ABIOTIC STRESSES ON POTATO CULTIVATION IN BANGLADESH

M. A. MONAYEM MIAH, T. M. B. HOSSAIN, S. HOSSAIN M. S. KADIAN AND M. HOSSAIN

Abstract

The socio-economic information on variety development and abiotic stresses of potato cultivation at farm level are scarce in Bangladesh. Therefore, an attempt was made to assess farmers' perceptions about variety development and different abiotic stresses on potato cultivation. Primary data were collected from 240 potato farmers of Bogra and Chittagong district. The study revealed that Granula, Cardinal, and Lalpakri were the most preferred potato varieties in Bogra, while Diamant and Dohazari were the dominant varieties in Chittagong. Most farmers (70.87%) believe that the current potato yield (21.5-22.67 t/ha) can be further increased through introducing new HYVs. Drought and heat were two important limiting factors towards achieving the higher levels of potato yield. High yielding ability was considered as the most desirable varietal character and this was opined by almost 92.1% respondents, followed by drought resistant (61.13%), proper late blight control (58.75%), availability of adequate fund (57.77%), heat tolerant (53.60%), early maturity (61.5%), and good demand (44.5%) for HYV potatoes, whereas good test (81.7%), higher price (69.6%) and good storability

(65.2%) were reported for local varieties. Low yield, susceptible to diseases, late maturity and low demand were the reasons for abandoning some potato varieties in the past. Dohazari variety for Chittagong and Lalpakri for Bogra have higher levels of tolerance against abiotic stresses. Finally, early maturity followed by drought tolerance, heat tolerance, and salinity tolerance were important attributes farmers wanted in new potato varieties.

Keywords: Farmers' perception, variety development, abiotic stress, potato cultivation.

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GENETIC DIVERGENCE IN RAPESEED-MUSTARD (*Brassica rapa* L.)

M. H. KHAN, M. M. ALI, S. R. VHUIYAN AND F. MAHMUD

Abstract

An experiment was conducted at the experimental farm of Sher-e-Bangla Agricultural University, Dhaka, during November 2009 to February 2010 to study the genetic divergences of 32 genotypes of *Brassica rapa* L. through principal component analysis and Mohalanobis D^2 analysis. Analysis of variance indicated that considerable genetic variability were existed among the 32 genotypes. On the basis of D^2 analysis, the genotypes were grouped into 6 clusters. Cluster III had the maximum number of 11 genotypes, while the cluster IV and cluster V had only 2 genotypes each. The highest inter-cluster distance was observed between cluster I and V (21.871), while the lowest in the cluster II and III (4.237). The intra cluster distance was the maximum in cluster V (0.469) and minimum in cluster III (0.116). The characters yield per plant, number of siliquae per plant, and days to maturity were found prominent towards the genetic divergence. The genotypes G-15 and G-19 from cluster IV and G-1, G-3, G-4, G-10, G-18, and G-24 from cluster I were suitable for creating more variability for higher yield per plant through hybridization.

Keywords: Genetic divergence, rapeseed-mustard, *Brassica rapa* L.

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EFFECT OF N, P, K, AND Mg APPLICATION ON YIELD AND FRUIT QUALITY OF MANDARIN *(Citrus reticulata)*

SHAMIMA NASREEN, R. AHMED, M. A. ULLAH AND M. A. HOQUE

Abstract

The study was carried out at the farmer's field of Juri Upazilla, Maulavibazar District during 2008-2009, 2009-2010, and 2011-2012 to find out the proper combination of fertilizer nutrients that promotes better fruit yield and quality of mandarin (cv. Khashi Kamla). The treatments were Native nutrient i.e., control (T_1), $N_{150}P_{50}K_{150}Mg_{30}$ (T_2), $N_{200}P_{75}K_{175}Mg_{40}$ (T_3), $N_{250}P_{100}K_{200}Mg_{50}$ (T_4), $N_{300}P_{125}K_{225}Mg_{60}$ (T_5), and $N_{200}P_{75}K_{175}Mg_0$ (T_6) g/plant/year. In addition, 20 kg cowdung/plant was used as blanket dose. Yield components, yield, and TSS content (%) of mandarin varied significantly due to variation of nutrients in all the test years. Fruit yield/plant was improved significantly with increase in NPK and Mg dose irrespective of years. Application of Mg in combination with NPK increased 17-157% mean fruit yield over magnesium control. Significantly the highest yield and yield attributes were recorded under treatment $N_{300}P_{125}K_{225}Mg_{60}$ g/plant (T_5) along with 20 kg cowdung/plant in all the years. Total soluble sugar (%) content was also maximum in trees receiving $N_{300}P_{125}K_{225}Mg_{30}$ g/plant. The highest gross margin and marginal rate of return were achieved by the same treatment (T_5). The lowest fruit yield/plant was obtained from untreated control plot (native nutrient). Three years' study revealed that application of $N_{300}P_{125}K_{225}Mg_{60}$ along with 20 kg cowdung/plant would be economically optimum for achieving higher yield and better fruit quality in mandarin grown under piedmont plain soil.

Keywords: Effects of N, P, K, and Mg, yield of mandarin, fruit quality of mandarin.

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EFFECT OF SEED RATE AND SOWING METHOD ON FOLIAGE PRODUCTION OF DIFFERENT GENOTYPES OF CORIANDER (*Coriandrum sativum* L.)[1]

M. MONIRUZZAMAN, M. M. RAHMAN, M. M. HOSSAIN
A. J. M. SIRAJUL KARIM AND Q. A. KHALIQ

Abstract

A field experiment on coriander (*Coriandrum sativum* L.) was conducted at Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur during February 2009 to April 2009 to find out the optimum seed rate in relation to sowing methods for maximizing foliage yield of coriander. Four genotypes (CS001, CS002, CS003 and CS008) and three sowing methods (continuous line sowing spaced at 10 cm, 20 cm and broadcast method) and three levels of seed rate (30, 40 and 50 kg/ha) were used as treatment variables.. The result showed that genotype CS003 singly gave the maximum plant height, number of leaves/plant, single plant weight and plant weight/m^2 and thus gave the highest foliage yield/ha. Line sowing (10 cm), broadcast method with seed rate @ 50 kg/ha independently produced the maximum foliage weight/m^2 and foliage yield/ha. Line sowing (10 cm) with 50 kg/ha seed rate produced the highest foliage yield in case of CS001, CS002 and CS003 genotypes, which was closely followed by broadcast method and the same seed rate. But line sowing (10 cm) as well as broadcast method coupled with 40 kg/ha seed rate gave better foliage yield in genotype CS008.

Keywords: Coriander, *Coriandrum sativum L*., sowing method, seed rate, and green foliage.

[1] This is a part of Ph.D dessertation.

Bangladesh J. Agril. Res. 38(3): 447-453, September 2013

SPLIT APPLICATION OF INORGANIC FERTILIZERS IN POTATO (*Solanum tuberosum* L.)-HYBRID MAIZE (*Zea mays* L.) INTERCROPPING SYSTEM

M. N. ISLAM, M. AKHTERUZZAMAN AND M. S. ALOM

Abstract

The experiment was conducted at the research field of Agronomy Division, BARI, Joydebpur, Gazipur during the *rabi* season of 2009-10 and 2010-11 to find out economic fertilizer dose along with time of split application of fertilizers to potato-hybrid maize intercropping system for higher productivity. Six treatment combinations were derived through combining two fertilizer doses F_1 = 255-55-140-40-6-2 and F_2 = 320-73-170-50-6-2 kg/ha NPKSZnB and three levels of split applications viz., S_1 = 1/3 N and full of PKSZnB (basal as broadcast) + 1/3 N top dressed at 30 DAP (days after planting) of potato + 1/3 N top dressed after potato harvest, S_2 = 1/3 N & ½ of PKSZnB (basal in potato rows) + ½ of PKSZnB (basal for maize) + 1/3 N top dressed at 30 DAP of potato + 1/3 N top dressed after potato harvest and S_3 = ¼ N & ½ of PKSZnB (basal in potato rows) + ½ of PKSZnB (basal for maize) + ¼ N top dressed at 30 DAP of potato + ¼ N top dressed at 60 DAP of potato to maize rows only + ¼ N top dressed after potato harvest. Sole crops of hybrid maize and potato with recommended fertilizer dose of 255-55-140-40-6-2 and 135-30-135-15-4-0.5 kg/ha NPKSZnB were included for comparison. The highest tuber yield of potato (24.24 t/ha) and grain yield of maize (9.48 t/ha) were obtained from respective sole crops with recommended fertilizer management. The highest potato equivalent yield (30.26 t/ha), gross return (Tk. 363120/ha), gross margin (Tk. 258620/ha), and benefit cost ratio (3.47) were obtained from F1S3. The results revealed that fertilizer dose of 255-55-140-40-6-2 kg/ha NPKSZnB along with its split application, ¼ N and ½ of PKSZnB (basal in potato rows) + ½ of PKSZnB (basal for maize) + ¼ N top dressed at 30 DAP of potato + ¼ N top dressed at 60 DAP of potato to maize rows only + ¼ N top dressed after potato harvest, might be economically profitable for potato hybrid maize intercropping system.

Keywords: Split application, inorganic fertilizers, potato-hybrid maize intercropping.

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FARM LEVEL POTATO (*Solanum tuberosum* L.) CULTIVATION IN SOME SELECTED SITES OF BANGLADESH

S. M. SHAHRIAR, M. KAMRUL HASAN AND M. KAMRUZZAMAN

Abstract

The study was carried out in two intensive potato growing areas (Rangpur and Munshigonj) to estimate the technical efficiency of potato producers and to describe the level of variation in potato productivity due to differences in input use. Data were collected from 60 farmers (30 farmers from each district) using simple random sampling technique. Average technical efficiency was 86% implying that on average 14% inefficiency remained at producers' level. The application of human labour, MoP, and weedicides would increase potato yield significantly. On the other hand, the coefficient of urea and pesticide cost was found negative and significant which advarsely effect the yield of potato. Moreover, the coefficient of operated land and extension linkage were found negative and significant implying that with further increase in operated land and extension linkage, technical efficiency would increase. Munshigonj was found to be more suitable area for potato production. The performance of self-produced and stored potato seeds are poor compared to the seeds from BADC. Supply of quality seeds to the farmers should be ensured by strengthening seed production and distribution system both in public and private sectors.

Keywords: Potato cultivation, technical efficiency, Rangpur, Munshigonj

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MICROPROPAGATION OF STRAWBERRY (*Fragaria ananassa*) THROUGH RUNNER CULTURE

M. ASHRAFUZZAMAN, S. M. FAISAL, D. YADAV
D. KHANAM AND F. RAIHAN

Abstract

In vitro propagation of strawberry was conducted at the Biotechnology Lab. of BARI, Joydebpur, Gazipur. For shoot induction, five BAP concentrations viz., 0.0 (Control), 0.5, 1.0, 1.5, and 2.0 mg/l and for root induction four IBA concentrations viz., 0.0 (Control), 0.5, 1.0, and 1.5 mg/l were used. The highest average number of shoots (7) and the highest average length (3.34 cm) of shoot was observed at the concentration of 0.5 mg/l BAP. The highest average number of leaves (5) was also observed at the same concentration. Among the five rooting concentrations, IBA @ 0.5 mg/l showed the best performance in all the parameters studied. The highest number (6) of roots/culture and the longest (3.05 cm) roots were also obtained from this concentration. Half strength MS media without IBA concentration did not show any response regarding root induction.

Keywords: Proliferation, micropropagation, strawberry, inoculation.

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EFFECT OF RATE OF ARBUSCULAR MYCORRHIZA INOCULUM ON TOMATO *(Solanum lycopersicum)* SEEDLINGS

M. A. H. BHUIYAN

Abstract

An experiment on the effect of rate of Arbuscular mycorrhiza (AM) inoculum on tomato seedlings was conducted at Bangladesh Agricultural Research Institute, Joydebpur, Gazipur, Bangladesh for two consecutive years. Seven rates of AM inoculum viz., 0, 0.5, 1.0, 1.5, 2.0, 2.5, and 3.0 kg/m^2 were tested. Cowdung was used at a rate of 5 kg/m^2. Seeds were sown in 10 cm apart lines on 13 November 2007 and 11 November 2008, and the seedlings were thinned out to about 3 cm from seedling to seedling within a week of germination. Roma VF was used as a variety of tomato. Biomass yield, root colonization, spore number, and nutrient uptake by tomato seedlings increased remarkably with the rates of AM inoculum. The biomass yield followed a quadratic trend with the increase of AM inoculum rate from 0 to 2.0 kg/m^2 in 2007-08 and 0 to 1.5 kg/m^2 in 2008-09.

Keywords: Tomato seedlings, Arbuscular mycorrhiza, nutrient uptake.

Bangladesh J. Agril. Res. 38(3): 481-489, September 2013

FERTILIZER MANAGEMENT IN HYBRID MAIZE (*Zea mays* L.) MUKHIKACHU (*Colocasia esculenta*) RELAY CROPPING SYSTEM

M. N. ISLAM, M. AKHTERUZZAMAN, M. S. ALOM
M. A. I. SARKER AND M. A. MANNAF

Abstract

The experiment was conducted at the research field of Agronomy Division, BARI, Joydebpur, Gazipur and ARS, Burirhat, Rangpur during consecutive two years of 2009-10 and 2010-11 to find out optimum fertilizer dose for hybrid maize-mukhikachu relay cropping system. Five fertilizer combinations viz, Recommended fertilizer of hybrid maize (RFM) + 112 kg N/ha, RFM + 25% recommended fertilizer of mukhikachu (RFK), RFM + 50% RFK, RFM + 75% RFK and RFM + 100% RFK were tested on hybrid maize-mukhikachu relay cropping system. Sole crops of hybrid maize (cv. BARI Hybrid Maize-5) and mukhikachu (cv. Bilashi) with their respective recommended fertilizer dose (maize: 255-55-140-40-6-2 kg/ha NPKSZnB and mukhikachu: 112-32-95-22 kg/ha NPKS) were included for comparison. Grain yield of sole maize with recommended fertilizer practice was identical with other fertilizer combinations at both the locations. Yield and yield components of mukhikachu under different fertilizer management practices increased with the increase of fertilizer levels up to RFM + 50% RFK and then decreased at both the locations. Edible yield of sole kachu with recommended fertilizer practice was the highest but it was identical to RFM + 50% RFK at both the locations. The highest maize equivalent yield (Joy: 24.26 t/ha, Buri: 31.56 t/ha) and gross return (Joy: Tk 291120/ha, Buri: Tk 378720/ha) was recorded in RFM + 50% RFK. But the highest gross margin (Joy: Tk 207035/ha, Buri: Tk 291570/ha) was obtained from RFM + 25% RFK at Joydebpur and from RFM + 50% RFK at Burirhat. The highest benefit cost ratio (Joy: 3.69, Buri: 4.64) was found from RFM + 112 kg N/ha at both the locations. The results revealed that recommended fertilizer dose (255-55-140-40-6-2kg/ha NPKSZnB) of hybrid maize plus 112 kg N/ha (extra) might be economically profitable for hybrid maize mukhikachu relay cropping system at both the locations.

Keywords: Fertilizer management, hybrid maize-mukhikachu relay cropping.

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SCREENING OF DIFFERENT PLANT EXTRACTS AGAINST LEAF SPOT (*Cercospora arachidicola* and *Cercosporidium personatum*) OF GROUNDNUT (*Arachis hypogaea* L.)

M. H. HOSSAIN AND I. HOSSAIN

Abstract

A study was undertaken to evaluate effectiveness of foliar spray with 33 plant extracts against leaf spot (Tikka) of groundnut caused by *Cercospora arachidicola* and *Cercosporidium personatum*. Bavistin and BAU-Biofungicide were included in the experiment as checks and spray of plain water represented control. Almost all treatments gave considerable reduction in disease incidence and increase in growth parameters, pod and haulm yield compared to control. The most effective materials were Bavistin 50 WP, BAU-Biofungicide, leaf extract of neem, tomato, datura black, and datura white. The materials decreased spot number per leaf, defoliation per plant, incidence of leaf spot, and number of infected leaf per plant by 35.45 -60.07, 42.06-72.20, 51.97–63.58, and 38.33 to 46.89 % and increased pod yield and haulm yield by 64.37-111.41 and 32.3574.71 %, respectively. The materials may be recommended against the disease after economic analysis.

Keywords: Groundnut, leaf spot disease, plant extract, BAU-biofungicide and Bavistin.

Bangladesh J. Agril. Res. 38(3): 505-513, September 2013

PANIKACHU (*Calocasis esculenta L. Schott*) CULTIVATION IN SOME SELECTED AREAS OF BANGLADESH: AN AGRO-ECONOMIC PROFILE

M. A. HAQUE, M. A. MONAYEM MIAH, S. HOSSAIN AND A. N. LUNA

Abstract

Panikachu is a nutritious vegetable contributing to the total supply of vegetables during the summer in Bangladesh. Many farmers cultivate this crop from their innovative ideas. Researchers are unable to formulate adequate research design for its varietal

improvement and technology packages. Therefore, the study was conducted in two panikachu growing districts, namely Joypurhat and Jessore during February 2011 to know the profitability of panikachu cultivation. In total, 100 panikachu farmers were selected of which 50 farmers from each area were selected randomly to collect primary data. The results indicated that the costs of panikachu cultivation were Tk. 2,67,726 and Tk. 1,84,530 per hectare on total cost and variable cost basis, respectively. The major share of total cost was for human labour (45%), land use (17%), and fertilizer (15%). The yield for rhizome and stolon were 24.94 tons and 23.29 tons per hectare. The gross margin and net returns were Tk. 2,06,058 and Tk. 1,22,862 per hectare. The benefit cost ratios was 1.46. Human labour, manure, urea, TSP, MoP, insecticides, and irrigation had positive effect on the yield of panikachu. Lack of technical knowledge about improved cultivation practices, non-availability of HYV seedling, and low price of product were major constraints to panikachu cultivation.

Keywords: Panikachu, input use pattern, gross margin, net return, BCR.

Bangladesh J. Agril. Res. 38(3): 515-521, September 2013

CORRELATION AND PATH ANALYSIS OF DURUM WHEAT *(Triticum turgidum* L. var. *Durum)*

A. A. KHAN, M. A. ALAM, M. K. ALAM
M. J. ALAM AND Z. I. SARKER

Abstract

A study was conducted to examine relationship between important traits of durum wheat and their direct and indirect effects on grain yield. Research work was conducted during the winter season of 2009-10 under irrigated optimum seeding condition at Regional Agricultural Research Station, Bangladesh Agricultural Research Institute, Ishurdi, Pabna with 10 advanced genotypes. A wheat variety was used as check. Positive and significant correlation was found for plant height, spikes/m^2, and 1000-grain weight with grain yield. Head days and maturity days showed considerable negative correlation with grain yield. Maturity days, spikes/m^2, and 1000-grain weight had significant positive direct effects on grain yield. Grains/spike had direct positive effect but in low magnitude. The indirect effect of head days and plant height on grain yield was found mainly through maturity days and 1000-grain weight. It can be concluded that more emphasis should be given on head days and plant height along with 1000-grain weight, spikes/m^2, and grains/spike during selection for dururn wheat improvement.

Keywords: Durum wheat, correlation, path analysis, direct and indirect effects on grain yield.

Bangladesh J. Agril. Res. 38(3): 523-529, September 2013

PERFORMANCE OF DIFFERENT CROP SPECIES WITH POINTED GOURD (*Trichosanthes dioica* Roxb.)

M. S. ALOM, B. L. NAG, M. N. ISLAM, F. AHMED AND S. AKTHER

Abstract

The experiment was conducted at the Regional Agricultural Research Station, Jessore during the period from November 2008 to April 2010 to find out the suitable component crop and planting system under intercropping system with pointed gourd for higher yield and economic return. The treatment combinations were T_1 = Pointed gourd (PG) sole, T_2 = PG + radish + mungbean (1 row at the boarder of the bed) + amaranth (broadcast), T_3 = PG + radish + mungbean (2 rows at the boarder of the bed) + shabuj shak (broadcast), T_4 = PG + radish + Indian spinach (1 row at the boarder of the bed), T_5 = PG + radish + Indian spinach (2 rows at the boarder of the bed) and T_6 = PG + radish + mungbean: Indian spinach (1 : 1 row at the boarder of the bed). The fruit yield (26.27-30.50 t/ha) of pointed gourd did not affect by sole and different intercropping systems. The highest pointed gourd equivalent yield (68.02 t/ha), gross return (Tk.1020300/ha) and net return (Tk.631466/ha) and benefit cost ratio (2.62) was obtained from the intercropping combination of PG + radish + Indian spinach (2 rows at the boarder of the bed).

Keywords: Intercropping of crop species, pointed gourd, component crops.

Bangladesh J. Agril. Res. 38(3): 531-544, September 2013

STUDY OF HETEROSIS IN HEAT TOLERANT TOMATO *(Solanum lycopersicum)* DURING SUMMER

M. M. ALAM PATWARY, M. MIZANUR RAHMAN, SHAHABUDDIN AHMAD, M. A. KHALEQUE MIAH AND HAIMONTI BARUA

Abstract

An experiment was conducted at the Vegetable Research Field of Olericulture Division, Horticulture Research Cente, Bangladesh Agricultural Research Institute (BARI), Gazipur during May to October 2008 to study heterosis using eight parents viz., P_1, P_2, P_3, P_4, P_5, P_6, P_7, and P_8. Most of the combinations showed better parent heterosis for earliness. Eight crosses showed positive heterosis for flower production. The highest heterotic effect for fruit set (%) was found in the cross $P_6 \times P_7$ (62.59%) followed by that in P7 × P8 (60.49%) and P1 × P7 (40.00%). For fruits per plant, 8 crosses provided more than 15 % heterosis over better parent. Considering fruit yield per plant, higher degree of heterosis was manifested by 24 hybrids over better parent ranging from 13.58 to 282.63 %. Cross combination P_4 x P_7 showed the maximum significant positive heterosis followed by P_6 x P_7 (187.84 %), P_4 x P_8 (166.97 %), P_3 x P_7 (146.08 %), P_3 x P_6 (103.92 %), and P_1 x P_7 (100.45 %) and the minimum in P_4 x P_6 (13.58 %). For viable pollens, P_3 x P_5 (20.56 %) exhibited the highest positive heterosis. In case of shelf life, the highest heterosis was observed by the cross P_3 x P_6 (22.78 %) followed by that in P_4 x P_6 (22.29 %) and P_2 x P_6 (14.40 %). For fruit flesh thickness, 12 hybrids exhibited more than 10 % heterosis. Pollen tubes as well as viable pollens showed positive correlation with fruit set.

Keywords: Tomato, heterosis, heat tolerant tomato, summer.

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EVALUATION OF MAINTAINER AND RESTORER LINES FOR YIELD AND YIELD CONTRIBUTING TRAITS OF RICE (*Oryza sativa* L.)

M. J. HASAN, UMMA KULSUM, L. F. LIPI A. AKTER AND A. K. M. SHAMSUDDIN

Abstract

An experiment was conducted at Bangladesh Rice Research Institute (BRRI), Gazipur during T.Aman season of 2007 with a view to evaluating seven maintainer and 30 restorer lines for yield and yield contributing characters for selecting promising maintainer and restorer lines for developing rice hybrids in our local environment. Significant variations were noticed among the parental lines for all the characters studied. The CMS lines Gan46A and BRRI9A could be used as female parents in hybrid seed production due to good yield and yield contributing characters recorded in their corresponding maintainer lines. Restorer line BR168R could offer high yield potentiality in heterosis breeding due to its superior yield contributing characters in local environment.

Keywords: Yield contributing characters, maintainer and restorer lines, hybrid rice.

Bangladesh J. Agril. Res. 38(4): 563-572, December 2013

EFFECT OF ZINC, BORON AND MOLYBDENUM ON THE SEED YIELD OF CARROT (*Daucus carota* L.)

H. C. MOHANTA, M. M. HOSSAIN, M. S. ALAM M. H. REZA AND M. M. ISLAM

Abstract

An experiment was conducted at the research field of Bangabandhu Sheikh Mujibur Rahman Agricultural University, Salna, Gazipur during October 2006 to May 2007 to evaluate the effects of zinc, boron, and molybdenum on the seed yield of carrot. The soil of the studied field was deficient in zinc, boron, and molybdenum and represents Salna Series of Shallow Red Brown Terrace under Madhupur Tract (AEZ-28). Four (4) levels each of zinc (0, 2.0, 4.0, and 6.0 kg/ha), boron (0, 1.0, 2.0, and 3.0 kg/ha) and molybdenum

(0, 0.5, 1.0, and 1.5 kg/ha) were used to formulate 11 treatment combinations to observe their effects on the seed yield of carrot (cv. Bejo Shetal). A blanked dose of $N_{120}P_{54}K_{150}S_{20}$ kg/ha was also applied to nourish the crop. The experiment was laid out in a randomized complete block design with three replications. The seed yield of carrot was significantly increased due to integrated effects of zinc, boron and molybdenum. The highest seed yield (362.28 kg/ha) was found with $Zn_{4.0}B_{2.0}Mo_{1.0}$ kg/ha combination, which was 283% higher over control. The maximum germination percentage (91.30) and vigor index (4.99) of seed was also recorded from the same treatment package and thus may be recommended for the production of carrot seed in the studied or alike area of the country.

Keywords : Carrot, seed yield, zinc, boron, molybdenum.

Bangladesh J. Agril. Res. 38(4): 573-578, December 2013

EFFECT OF SEED STALK PRUNING AND BORON APPLICATION ON THE SEED YIELD OF SUMMER ONION (*Allium cepa* L.) IN THE HIGH BARIND TRACT

M. M. R. SARKER, M. J. U. SARKER, A. S. M. M. R. KHAN
M. S. ISLAM AND M. S. HOSSAIN

Abstract

The experiment was carried out at FSRD site, Kadamshahar, Godagari, Rajshahi during 2009-10 and 2010-11 to find out the number of seed stalk and optimum boron dose for seed production of summer onion in High Barind Tract (AEZ 26). The treatments comprised three levels of seed stalk (0, 4, and 6) and three rates of boron application (0, 1, and 2 kg/ha). It revealed that the seed stalks and boron either in single or combination had significant effect on the yield and yield contributing characters of onion seed. The combination comprising 4 stalks with 2 kg B/ha and 6 stalks with 1 kg B/ha were found to be the best choice for achieving higher seed yield of onion. The highest seeded fruit/umbel (4.06 and 4.55) and seed yield (669 and 713 kg/ha) were recorded from 6 stalks/plant fertilized with 1 kg boron/ha which was statistically identical to 6 stalks/plant fertilized with 2 kg boron/ha and 4 stalks/plant with 2 kg/ha boron in the High Barind Tract.

Keywords: Seed stalk pruning, boron application, summer onion, high Barind tract.

Bangladesh J. Agril. Res. 38(4): 579-587, December 2013

EFFECT OF SPLIT APPLICATION OF NITROGEN FERTILIZER ON YIELD AND YIELD ATTRIBUTES OF TRANSPLANTED AMAN RICE (*Oryza sativa* L.)

MD. KAMRUZZAMAN, MD. ABDUL KAYUM, MD. MAINUL HASAN
MD. MAHMUDUL HASAN, JAIME A. TEIXEIRA DA SILVA

Abstract

Improper doses and splits of nitrogenous fertilizer are two major constraints achieving higher yield of transplanted aman rice in Bangladesh. A field experiment was carried out to study the effect of different levels and split application of nitrogen (N) fertilizer on yield and yield attributes of transplanted aman rice (var. BRRI dhan30). The experiment was laid out in a split-plot design with four split levels of N : T_1 [⅓ N at basal + ⅓ N at 25 days after transplanting (DAT) + ⅓ N at 50 DAT], T_2 [½ N at 25 DAT + ½ N at 50 DAT], T_3 [⅓ N at 15 DAT + ⅓ N at 30 DAT + ⅓ N at 45 DAT], T_4 [¼ at N 15 DAT + ½ N at 30 DAT + ¼ N at 45 DAT] in the main plot and four levels of N in the sub-plot: control (0 kg N/ha), N_1 (40 kg N/ha), N_2 (80 kg N/ha), and N_3 (120 kg N/ha). Data collected were total tillers/hill, effective tillers/hill, number of grains/panicle, grain yield (t/ha), biological yield (t/ha) as well as some other morphological characters. Among the N splits, treatment T_3 produced highest total tillers/hill (16.45), effective tillers/hill (12.73), panicle length (24.97 cm), grains/panicle (127.92), grain yield (5.53 t/ha), biological yield (12.87 t/ha), and harvest index (42.79%). Among the N levels, treatment N_3 produced highest total tillers/hill (16.50), effective tillers/hill (12.69), grains/panicle (130.36), grain yield (5.40 t/ha), and biological yield (12.66 t/ha). Conversely, the treatment combination of N_3 and T_3 produced the highest value for most of the traits evaluated, namely total tillers/hill (18.03), effective tillers/hill (14.97), grains/panicle (137.48), grain yield (5.77 t/ha), biological yield (13.08 t/ha), and harvest index (44.10%). Hence, the treatment combination of N_3 and T_3 is suggested to bring higher economic benefit from transplanted aman rice in the study area.

Keywords: Transplanted aman rice, levels of nitrogen, split application, yield attributes.

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PROFITABILITY OF GARLIC (*Allium sativum* L.) CULTIVATION IN SOME SELECTED AREAS OF BANGLADESH

M.A. HAQUE, M. A. MONAYEM MIAH, M. S. HOSSAIN
A. N. LUNA AND K. S. RAHMAN

Abstract

The current production of garlic can't meet up the increasing demand of Bangladesh. Due to unknown reasons, the area and production of garlic have not been increased at desired level. Therefore, the study was conducted in Magura and Faridpur districts during 2008-2009 to analyze the relative profitability, input-output relationship, and constraints to garlic production. Primary data were collected from 100 randomly selected garlic farmers for the study. Per hectare costs of garlic cultivation were Tk. 65493 and Tk. 51747 on full cost and variable cost basis. The major share of total cost was human labour (30%) and seed (25%). The yield of garlic was 6.15 metric tons per hectare. The gross margin and net return were Tk. 70660 and Tk 56914 per hectare, respectively. The benefit cost ratio was 1.87. The net returns from garlic cultivation were 68%, 59%, and 0.64% higher than mustard, groundnut and cabbage cultivation. Cobb-Douglas production function revealed that human labour, land preparation cost, manure, TSP, irrigation and insecticide had positive effect on the yield of garlic. Non-availability of HYV garlic seed, lack of technical knowledge about improved cultivation practices of garlic, infestation of insects and diseases and low market price were the major problems for garlic cultivation.

Keywords: Garlic, input use, profitability, gross margin, net return, BCR.

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CHARACTER ASSOCIATION AND PATH CO-EFFICIENT ANALYSIS IN *Brassica rapa* L.

M. H. KHAN, S. R. BHUIYAN AND F. MAHMUD

Abstract

The experiment was carried out with 32 genotypes of *Brassica rapa* including two commercially cultivated varieties as checks to study their mean, range, cv (%) correlation co-efficient, and path co-efficient considering 10 different morphological characters at the experimental farm of SAU, Dhaka during November 2009 to February 2010. Significant variation was observed among all the genotypes for all the characters studied except 1000-seed weight. In general, genotypic correlations were higher than the phenotypic correlations. It indicates that there was an inherent association among them which was adversely influenced by the environment. Days to flowering showed positive significant correlation with days to maturity. Plant height showed positive significant correlation with number of primary branches/plant. Number of primary branches/plant showed positive significant correlation with siliquae/plant. Length of siliquae showed positive significant correlation with seeds/siliquae. Number of secondary branches, number of siliquae/plant, days to maturity, seeds/siliquae, and 1000-seed weight showed positive significant association with yield/plant. Path analysis showed that number of primary branches/plant, number of siliquae/plant, number of secondary branches/plant, and number of seeds/siliquae had direct effect on seed yield/plant. Considering analytical findings of correlation co-efficient, path co-efficient analysis and field performance, the genotypes G-15, G-19, G-1, G-3, G-4, G-10, G-18 G-21, and G-24 would be suitable for future hybridization programme.

Keywords: Character association, path co-efficient analysis, *B. rapa*.

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YIELD PERFORMANCE OF OYSTER MUSHROOM (*Pleurotus ostreatus)* ON DIFFERENT SUBSTRATES

D. DAS, M. KADIRUZZAMAN, S. K. ADHIKARY
M.Y. KABIR AND M. AKHTARUZZAMAN

Abstract

An experiment was conducted at Mushroom Lab of Horticulture Centre under Department of Agricultural Extension (DAE), Khairtala, Jessore to determine the performance of different substrates on the yield of oyster mushroom (*Pleurotus ostreatus*). Sugarcane bagasse, sawdust, and coconut coir individually and

their combinations were used as substrates. The experiment was laid out in Completely Randomized Design (CRD) with five replications. Data were taken from 1st and 2nd flush of different growth and yield attributes of mushroom. The maximum number of effective fruiting bodies was obtained from sawdust (40) and the lowest number (31.6) from combination of sawdust and coconut coir (1:1). In the 1st flush, the maximum weight of individual fruiting body was observed in coconut coir and minimum in sawdust. The highest biological (186.06 g) and economic yield (180.64 g) were obtained from coconut coir and the lowest from sugarcane bagasse. The maximum and minimum harvest index was found in 1st flush at coconut coir and combination of sawdust and sugarcane bagasse (1:1), respectively. Most yield attributes were found higher in coconut coir. Economic yield was positively correlated to number of effective fruiting bodies, pileus diameter, and biological yield.

Keywords: *Pleurotus ostreatus*, sugarcane bagasse, coconut coir, saw dust, mushroom, and yield.

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ASSESSMENT OF SOIL CARBON STOCK OF SOME SELECTED AGROECOLOGICAL ZONES OF BANGLADESH

P. K. SAHA, M. S. RAHMAN, M. KHATUN
A. T. M. S. HOSSAIN AND M. A. SALEQUE

Abstract

The present investigation assessed the soil organic carbon (SOC) stocks of four AEZs in Bangladesh which included AEZ-1 (Old Himalayan Piedmont Plain), AEZ 3 (Tista Meander Floodplain), AEZ-4 (Karatoya-Bangali Floodplain), and AEZ 9 (Old Brahmaputra Floodplain). Three land types – high land (HL), medium high and (MHL) and low and (LL) – were considered in the SOC assessment. The SOC stock was estimated by multiplying SOC (%) with bulk density (g/cc) and soil depth (cm). Across the AEZs and land types, the SOC (%) decreased with the increase in soil depth. The SOC (%) was the highest in the low land and the lowest in the high land over the AEZs. The soil bulk density in every AEZ increased with soil depth. Bulk density of soil for medium high and varied from 1.26 g/cc to 1.67 g/cc, for high and from 1.33 g/cc to 1.55 g/cc, and for low land it was 1.13 g/cc to 1.44 g/cc. The SOC stock at 0-20 cm depth was higher (14.19-4.67 t/ha) in low land followed by medium high land (8.25-4.58 t/ha) and high land (6.46-3.39 t/ha) for all AEZs. Among the four AEZs, the highest SOC stock was found in AEZ-1 irrespective of land types.

Keywords: SOC stock, bulk density, agroecological zones, land types.

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POTATO (*Solanum tuberosum* L.) VARIETY DEVELOPMENT THROUGH HYBRIDIZATION: A NEW ERA IN BANGLADESH

B. C. KUNDU, M.S. ISLAM, M. A. KAWOCHAR AND M. H. RASHID

Abstract

Systematic research on potato variety development has been in practice in Bangladesh since 1960, but until 2012, not a single variety was developed in this country through conventional breeding method, mainly due to the short day climatic factors which are not congenial for potato plants to flower. Due to the diversified efforts, TCRC scientists were able to make a breakthrough to overcome the climatic barriers. Flowering was induced in HYV potatoes and produce berries in the year 2000. After hybridization and continuous selection, five hybrid clones were placed in a RYT in 2010-11 from a batch of 502 kg F_1 seedling tubers produced from 45 gram hybrid seeds of 2001-02. Based on the performances of SYT, AYT, RYT and on-farm trials, three varieties were released by the NSB in 2012 as BARI Alu-35, BARI Alu-36, and BARI Alu-37. Their genotype numbers are 4.5W, 4.26R, and 4.40, their mean yields were 38.36, 33.82, and 34.88 t/ha in AYT, 44.01, 41.84, and 40.58 t/ha in RYT, and 38.87, 38.52, and 37.53 t/ha in on-farm trials, respectively.

Keywords: Potato, hybridization, Bangladesh.

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VARIABILITY AND HERITABILITY ANALYSIS IN SHORT DURATION AND HIGH YIELDING *Brassica rapa* L.

M. H. KHAN, S. R. BHUIYAN, M. H. RASHID
S. GHOSH AND S. K. PAUL

Abstract

The experiment was carried out with 32 genotypes of *Brassica rapa* including two commercially cultivated varieties as checks to study their inter-genotypic variability, heritability, GCV, PCV, genetic advance, and CV percent considering 10 morphological characters at the experimental farm of SAU, Dhaka during November 2009 to February 2010. Significant variation was observed among the genotypes for all the characters studied except thousand seed weight. High GCV and PCV values were observed for number of secondary branches/plant. High heritability values along with low genetic advance in percentage of mean were obtained for 1000-seed weight, number of secondary branches/plant, seeds/siliquae, and siliquae length. Highly significant positive association of seed yield per plant was observed with number of primary branches/plant, number of secondary branches/plant and number of siliquae/plant. Considering variability among the genotypes, heritability, genetic advance**,** percent co-efficient of variance, and field performances, the genotypes G-15, G-19, G-1, G-3, G-4, G-10, G-18, G21, and G-24 were found suitable for future breeding programme.

Keywords: Variability, heritability, *Brassica rapa* L.

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EFFICACY OF FUNGICIDES AND ORGANIC OILS TO CONTROL POWDERY MILDEW DISEASE OF JUJUBE (*Ziziphus mauritiana* Lam.)

M. Z. HOQUE, A. M. AKANDA, M.I. H. MIAN
AND M. K. A. BHUIYAN

Abstract

Powdery mildew (*Oidium erysiphoides* f.sp. z*iziphi*) is the major disease of Indian jujube (*Ziziphus mauritiana*) in Bangladesh. An experiment was conducted to test the efficacy of six fungicides, two organic oils, and a detergent against the disease. Tested fungicides were Tilt (Propiconazole) @ 0.05%, Folicur (Hexaconazole) @ 0.1%, Bavistin DF (Carbandazim) @ 0.2%, Dithane M-45 (Mancozeb) @ 0.3%, Thiovit 80 WG (Sulpher) @ 0.3%, and Cupravit (Copper) @ 0.3%, the oils were Mustard oil @ 0.5% and Neem oil 0.5%, and the Detergent (Trix) @ 0.5%. The materials were applied as foliar spray for seven times at an interval of 15 days. All of the fungicides and two oils gave significant decrease in severity of powdery mildew and increased fruit yield of Indian jujube irrespective of varieties, locations and over times. Among the treatments, Folicur, Tilt, Thiovit, and Dithane M-45 sprays were found effective than others. The severity index values on two jujube varieties were 3.89-4.50 at Mowna and 4.00-4.53 at Ishurdi in control treatment. The severity indices were reduced to 1.45-1.96 at Mowna and 1.33-2.07 at Ishurdi due to application of Tilt, Folicur, Thiovit, and Dithane M-45, which gave increase in fruit yield over control by 68.88, 63.69, 63.04, and 54.63% in Apple Kul and 83.25, 77.87, 77.39, and 70.36% in BAU Kul, respectively. Most of the treatments were able to reduce number of spotted fruits. The best effective fungicide was found to be Tilt followed by Folicur and Thiovit in reducing disease severity of powdery mildew as well as other fruit diseases like fruit spot and fruit rot and increase fruit yield of Indian jujube. Therefore, Tilt/Folicur may be recommended for jujube growers to control the powdery mildew disease in commercial orchard.

Keywords: Fungicides, organic, powdery mildew jujube.

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EFFECT OF PLANTING TIME AND NITROGEN APPLICATION ON THE YIELD AND SEED QUALITY OF T. AMAN RICE (*Oryza sativa* L.)

A. S. M. I. HUSSAIN, M. M. HOQUE, M. N. HUDA
D. HOSSAIN AND M. SHAHJAHAN

Abstract

A field experiment was conducted at the research farm of Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur during June 2006 to December 2007 to find out the effect of planting time and nitrogen fertilization on the yield and seed quality of T.Aman rice. BR11 (Mukta) was transplanted at different dates from 5 July to 19 August at 15 days interval. The rates of N used in the experiment were 80, 100, 120, and 140 kg N/ha,. Plant height, number of tillers/hill, grain yield, and yield components parameters varied significantly due to transplanting of rice at variable dates. The optimum time of planting was found to be 4 August compared to other dates of transplanting. Result indicates that this variety planted in optimum time gave higher yield with high quality of rice seed. In comparison to early and late planting, earlier planting of the variety was better as the late planted crops were severely affected by adverse environmental condition during reproductive phase. The poor grain yield in early or late planting was due to higher percentage of spikelet sterility. The varieties responded positively with increment of N levels upto 120 kg N/ha. The higher number of panicles/m^2, lower percentage of unfilled grain, and heavier individual grain contributed to increase grain yield of this verity. It is, therefore, suggested to transplant BR11 rice in the first week of August in Aman season. The application of N of 100 -120 kg/ha with three splits is optimum for achieving higher grain yield and better quality of rice seed.

Keywords: BR11, planting time, nitrogen, yield, seed quality.

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INFLUENCE OF SEED RATES AND LEVELS OF NPK FERTILIZERS ON DRY MATTER ACCUMULATIONS AND YIELD PERFORMANCE OF FOXTAIL MILLET (*Setaria italica* L. Beauv.)

M. S. HASAN, M. H. RASHID, Q. A. RAHMAN
AND M. H. AL-MAMUN

Abstract

A study was carried out in the Agronomy Field Laboratory, Bangladesh Agricultural University, Mymensingh, Old Brahmaputra Flood Plains Soil (AEZ-9) during December 2001 to April 2002 to find out the effect of seed rates and NPK levels on dry matter accumulation and grain yield of foxtail millet *(Setaria italica* L. Beauv.). Four seed rates viz., 8,10,12, and 14 kg/ha and five levels of NPK fertilizers viz., $N_0P_0K_0$, $N_{10}P_8K_5$, $N_{20}P_{16}K_{10}$, $N_{30}P_{24}K_{15}$, and $N_{40}P_{32}K_{20}$ were included in a split plot design with three replications. Dry matter accumulation pattern was determined by harvesting 10 plants randomly at 30, 60, 80, and 102 DAS (days after swing). The yield and yield contributing characters of foxtail millet were influenced by seed rates and NPK levels except tillers per plant and 1000-grain weight significantly. Generally its production rate was 0.86 t/ha when it was grown in char lands in sandy loam soils, the highest grain yield (1.62 t/ha) was produced by 10 kg seeds/ha, which was identical with 12 kg seeds/ha. In case of NPK levels, the treatment was $N_{30}P_{24}K_{10}$. In case of interaction, the treatment combination 12 kg seeds/ha and $N_{30}P_{24}K_{15}$ produced the highest grain yield (1.77 t/ha. In case of interaction, the treatment combination 12 kg seeds/ha and $N_{30}P_{24}K_{15}$/ha gave the highest grain yield.

Keywords: Seed rates, NPK fertilizers, dry matter, yield and yield contributing characters, foxtail millet.

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VARIABILITY, CORRELATION AND PATH ANALYSIS IN LABLAB BEAN (*Lablab purpureus* L.)

M. SALIM, S. HOSSAIN, S. ALAM
J. A. RASHID AND S. ISLAM

Abstract

The results of the study carried out during 2009-2010 with lablab bean (*Lablab purpureus*) are presented in this paper. Data were recorded from all experimental plants on the following characters as number of pods/plant, pod yield/plant (g), number of seeds/pod, number of seeds/plant; seed yield/plant (g), Range, mean, genetic parameter, correlation co-efficient and path coefficient were studied. High heritability coupled with high expected genetic advance in percentage of mean were observed for most of the characters. The coefficients of correlation showed that seed yield/plant was positively and significantly correlated with days to first flowering, days to 50% flowering, days to first pod setting, number of pods/plant, pod yield/plant and seeds/pod, number of seeds/plant, and seed yield. Path coefficient analysis showed that days to first flowering, days to 50% flowering, number of pods/plant, 20 pod weight (g), pod yield/plant, pod length, number of seeds/pod, number of seeds/plant, 100-seed weight influenced seed yield/plant directly in positive direction. Among the characters, number of seeds/plant had high positive correlation with seed yield/plant. Days to first pod setting exhibited negative direct effects on seed yield. From this result, it can be concluded that days to first flowering, days to 50% flowering, number of pods/plant, pod yield/plant, number of seeds/pod, number of seeds/plant, 100-seed weight are the most important yield contributing characters as they influenced pod yield and seed yield directly in positive direction.

Keywords: Lablab been, genetic parameters, correlation coefficient, and path coefficient.

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GROWTH AND YIELD OF WHEAT (*Triticum aestivum*) UNDER DEFICIT IRRIGATION

P. K. SARKAR, M. S. U. TALUKDER, S. K. BISWAS AND A. KHATUN

Abstract

Timing and the extent of water deficit were studied in a field experiment on wheat (cv. Shatabdi) for three consecutive years from 2003-04 through 2005-06 at Jamalpur area. The effects of number and timing of irrigation application on yields were investigated under variable soil moisture condition in the root zone of different treatments. Eight deficit irrigations, including one no stress and one rainfed treatments were selected to subject the crop to various degrees of soil water deficit at different stages of crop growth. Measured amount of irrigation water was applied as per schedule prescribed for a particular treatment. Grain yield (GY), biomass, harvest index (HI), and water productivity (WP) were reasonably affected by deficit irrigation. Other yield contributing parameters like 1000-grain weight, grains/spike and spike, length were also affected by different levels of deficit irrigation. During grain formation stage, water deficit did not affect the grain yield but saved water significantly. Such water deficit treatments also shortened the grain maturation period. Differences in grain and straw yield among the stressed and no stress treatments are comparatively small, and statistically insignificant in some cases. The highest water productivity (2.02 kg/m^3) was observed in treatment which was irrigated only once at crown root initiation stage (T_2) although the yield was comparatively low. The CRI (crown root initiation) stage was found the most sensitive to water stress. Water stress at vegetative stage also reduced the yield considerably.

Keywords: Deficit irrigation, water productivity, leaf area index, dry matter, consumptive use.

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COMPARATIVE ECONOMIC PROFITABILITY OF MV T. AUS RICE (*Oriza sativa* L.) CULTIVATION UNDER DIFFERENT CROP MANAGEMENT PRACTICES IN SOME SELECTED AREAS OF CHUADANGA DISTRICT

M. A. QUAYUM AND M. A. SALAM

Abstract

A study was conducted to estimate the productivity gap in MV T.Aus rice between potential farm and actual farm as well as examine the factors responsible for MV T.Aus rice yield gaps in Chuadanga. In the Aus season, 80 demonstration plots managed by Department of Agriculture Extension and 80 farmers' managed plots were selected from four villages of Chuadanga sadar upazila. Data were collected in two phases using structured questionnaire. Both tabular and statistical techniques were employed for analyzing the data. The analysis has further been extended to estimate the contribution of individual technical factors to the yield and the input-output relations. The average yield of MV Aus rice were 2.84 t/ha and 3.31 t/ha in the farmers' plots and demonstration plots, respectively, indicating 17% yield gain in the demonstration plots. The production cost per hectare on full cost and cash cost basis were 16 and 1% higher, respectively, in the demonstration plots than that in the farmers' plots. But the unit cost of production on full cost and cash cost basis were lower 0.60 and 15%, respectively, in the demonstration plots than that in the farmers' plots. The benefit cost ratio (BCR) was also higher on full cost and cash cost basis in the demonstration plots compared to farmers' plot. Analysis further indicated that there is ample scope of increasing modern Aus yield by 0.29 t/ha through adopting appropriate variety, timely sowing and proper irrigation as well as weeding at the farm level.

Keywords: Economic profitability, MV T. Aus rice, crop management.

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IDENTIFICATION OF MAINTAINER AND RESTORER LINES IN LOCAL AROMATIC RICE (*Oryza sativa* L.)

M. ALI, M. A. HOSSAIN, M. J. HASAN AND M. E. KABIR

Abstract

The availability of stable cytoplasmic male sterility and fertility restoring system is vital for commercial exploitation of heterosis in rice. The experiment was conducted to identify stable maintainers and restorers for three CMS lines having wild abortive type sterility inducing genes in local rice germplasm. One hundred and twenty nine test crosses were made by using 43 aromatic rice genotypes and three CMS lines. Pollen sterility and spikelet fertility of the raised F_{1s} were assessed in consecutive 2006-2007 Boro and 2007 T. Aman seasons. Pollen sterility was categorized as 100% sterility for complete sterile (CS), 9199% as sterile (S), 71-90% as partial sterile (PS), 31-70% as partial fertile (PF), 21-30% as fertile (F), and 0-20% sterility as full fertile (FF). Pollen sterility of F_{1s} in Boro 2006-07 season ranged from 18.83 to 100%, while in T. Aman 2007 season, it ranged from 15.28 to 100%. Whereas spikelet fertility in Boro 200607 season ranged from 0.86 to 69.71% and in T. Aman 2007 season, it ranged from 1.97 to 82.91% with CMS line IR58025A. Out of 43 F_{1s} with IR58025A, two were found complete sterile (IR58025A/Kaliijira-9 and IR58025A/ Sorukamini-2) and three as full fertile (IR58025A/ Agali, IR58025A/Benaful, and IR58025A/Khasa). With CMS line IR62829A, pollen sterility ranged from 2.77 to 100% in Boro 2006-07 season and 0.96 to 100% in T. Aman 2007 season. Spikelet fertility status of the same combinations ranged from 0 to 75.41% in Boro 2006-07 season and 1.76 to 88.36% in T. Aman season 2007. Six crosses were identified as complete sterile and seven as full fertile for the said combination. In case of IR68885A four crosses were found as complete sterile, and a single cross as full fertile. The local aromatic line, Kalijira-9 and Sorukamini

were identified as maintainer for IR68885A which was common with IR58025A. The local aromatic line Benaful was identified as restorer for IR58025A and IR62829A.

Keywords: Pollen sterility, spikelet fertility, maintainer, restorer lines.

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INBRED AND HYBRID SEED PRODUCTION POTENTIALITY OF TOMATO (*Lycopersicon esculentum* L.) GENOTYPES AND THEIR YIELD PERFORMANCE DURING SUMMER

L. YESMIN, M. S. ISLAM, M. M. RAHMAN
M. N. UDDIN AND S. AHMAD

Abstract

An investigation was made with a view to estimating inbred and hybrid seed production potentiality as well as fruit yield potentiality of 11 tomato genotypes and their hybrids during November 2009 to September 2010 at Bangladesh Agricultural Research Institute, Gazipur. The highest number of fruits per plant was recorded from the genotype C41 (59.66). The highest fruit yield per plant (2.94 kg) was recorded from the genotype WP8 followed by that of C11 (2.93 kg). In respect of seed yield performance, the genotype C51 produced the highest number of seeds per fruit (47.66), while the line C41 produced the highest seed yield per plant (7.66 g). Per hectare seed yield varied from 263.0 kg (C41) to 53.79 kg (MP5). The highest per plant (6.33 g) and per hectare (139.26 kg) hybrid seeds were produced by the cross combination of C11 X C51 followed by that of WP8 × C11. The fruit weight and fruit yield of the hybrids were much higher compared to their superior parents during the summer season. Among the six tomato hybrids, WP7 X C51 had the highest fruit weight (67.60 g) and produced the highest fruit yield per plant (1.43 kg) followed by BARI Hybrid Tomato-4 (1.24 kg). The other two hybrids, WP8 X C51 (1.08 kg/plant) and C51 X WP10 (1.1 kg/plant) were also found promising.

Keywords: Tomato genotype, inbred, cross combination, hybrid seed.

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PERFORMANCES OF DIFFERENT SOURCES OF ARBUSCULAR MYCORRHIZA ON TOMATO (*Lycopersicon esculentum*) SEEDLINGS

M. A. H. BHUIYAN, M. E. ALI, M. R. KHATUN
F. ALAM AND M. B. BANU

Abstract

An experiment on the effect of different sources of Arbuscular mycorrhiza (AM) fungi on tomato seedlings (var. Roma VF) was conducted at the Bangladesh Agricultural Research Institute, Gazipur during *rabi* 2007-08 and 2008-09. Eight sources of AM fungi *viz.*, AM-01 (Jessore), AM-02 (Rahmatpur), AM-03 (Joydebpur), AM-04 (Ullapara), AM-05 (Jamalpur), AM-06 (Hathazari), AM-07 (Ishurdi), and AM-08 (Rajshahi) were studied along with a control and mixed sources on tomato seedlings. Soil based AM inoculum at the rate of 2.0 kg/m^2 was used. Biomass yield of tomato (Roma VF) increased from 14.8% to 53.6% in 2007-08 and 32.1% to 58.4% in 2008-09 over control by inoculation with different sources of AM. The highest biomass yield (301 mg/seedling) of tomato (Roma VF) was observed with AM-05 (Jamalpur source), which was higher to all AM sources except AM-07 (Ishurdi source). Nutrient uptake by tomato seedlings was improved by inoculation with AM fungi. The AM fungi from all the sources appeared to be effective in enhancing the growth and development of tomato seedlings.

Keywords: Arbuscular mycorrhiza (AM), tomato seedlings, nutrient uptake.

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POLYMORPHISM STUDY IN BARLEY *(Hordeum vulgare)* GENOTYPES USING MICROSATELLITE (SSR) MARKERS

MANIRUZZAMAN, M. Z. A. TALUKDER, S. ROHMAN
F. BEGUM AND M. AMIRUZZAMAN

Abstract

The experiment was conducted at the Molecular Breeding Lab of Plant Breeding Division, Bangladesh Agricultural Research

Institute (BARl) to assess the inter and intra species diversity within the barley genotypes. Ten barley genotypes were used for polymorphism study through SSR markers. Among them, six markers showed distinct polymorphism within the barley genotypes. It was observed that the genotypes BB-1 and BB-3 were more diverged (0.255) compared to other genotypes. On the other hand, the genotypes BB-2, P-33, P-19, and P-25 were very much similar in their genetic level (83.00%) followed by BB-2, BB-4, BHL-19, P-19, BHL-18, BB-5, P-19, P-25, and P-33 (78.70%). The two dimensional graphical view of Principal Coordinate Analysis (PCO) showed the spatial distribution of the 10 barley genotypes along the two principal axes. The genotypes viz., BB-1 and BB-3 were found far away from centroid of the cluster and rest of the genotypes were placed around the centroid (Fig. 8). The genotypes that placed far away from the centriod were more genetically diverged compared to the genotypes placed near the centriod which were likely to be genetically more similar.

Keywords: Barley, SSR marker and diversity.

Bangladesh J. Agril. Res. 39(1): 47-57, March 2014

AN ECONOMIC SURVEY OF COWPEA (*Vigna unguiculata*) STORAGE PRACTICES IN KWARA STATE, NIGERIA

FAKAYODE, B. SEGUN, OMOTESHO, A.OLUBUNMI
AND ADEBAYO, T. ZAINAB

Abstract

Grain cereals are the food security staples of the poor masses around the globe. However, a significant proportion of these crops, especially cowpea are lost during storage. This is more so the case in Africa where postharvest losses due to the absence of efficient storage for cowpea is alarming: between 30-70 percent. This study, therefore, examined the adoption of improved cowpea storage practices/facilities by cowpea farmers and traders in Nigeria, using Kwara State as case study. The study specifically investigated factors affecting cowpea storage practices. For the study, 180 households involved in cowpea storage activities were selected across the study area and interviewed. Data analysis tools were the descriptive statistics and logistic regression tools. The descriptive statistics was employed to analyse the socio-economics and cowpea storage practices of respondents, while the logistic regression tool was used to identify factors affecting respondents' likelihood to adopt popular improved cowpea storage technique 'crib' in the study area. The study results indicate that most of the respondents have not had any form of formal education. The common storage agro-chemicals used by the respondents were actellic liquid, actellic dust, and phostoxin. Crop storage practices identified in the study area were the traditional ones, involving the use of old drums, jute bags, earthen pots, gourds and rhumbus. The improved/modern storage practices identified comprised the use of cribs and a handful patronage of public silos. Logistic regression results showed that the perception of respondents about storage pest as threats to their crops, their household size, and credit availability variables are significant at 5 percent level, implying that these variables determine respondents' likelihood to adopt the crib storage technique for their cowpea. However, the type of education whether formal or informal acquired by the respondents' variable is insignificant and therefore, does not determine respondents' likelihood to adopt the crib storage technique for their crops. Factor identified as constraints to efficient storage practices were inadequate credit facilities, high costs of and poor access to improved storage facilities. The study, therefore, concludes that there is an urgent need for the provision of credit facilities to cowpea farmers and grain traders alike, subsidy on improved storage facilities and ease of access to the improved storage facilities

Keywords: Logistic regression, descriptive statistics, threat, likelihood, food security, cereal.

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PERFORMANCE OF DIFFERENT PROTOCOLS ON *IN VITRO* TUBERIZATION IN POTATO (*Solanum tuberosum*)

M. ZAKARIA, M. M. HOSSAIN
M. A. KHALEQUE MIAN AND T. HOSSAIN

Abstract

Five protocols of micro tuberization were used to induce large size microtuber in three recommended potato varieties, namely

Cardinal, Diamant, and Heera under complete dark condition. Tuberization was the earliest (11.8 days) in the protocol P_2 (MS + 5 mg/l BAP + 500 mg/l CCC + 8% sucrose), which was closely followed by that in P_1 (12.7 days) (MS + 5 mg/l BAP + 50 mg/l coumarin + 8% sucrose). Maximum number of microtubers/flask (12.8) was obtained from the protocol P_1 followed by that of P_2 (11.6) that contained growth retardant; but higher average weight of microtuber was obtained in the protocols P_5 (30 days old plantlet + MS media containing 40 meq K + 10 mg/l BA + 9% sucrose), P_4 (MS + 10 mg/l BA + 8% sucrose), and P_3 (MS + 5.0 mg/l BAP + 6% sucrose) which contained BA in absence of growth retardant. The average weight of microtuber was the highest (329.0 mg) in protocol P_5, followed by that in P_4 (280.7 mg), while it was the lowest in protocol P_1. The variety Diamant produced maximum average weight of microtuber (246.3 mg), while Heera produced minimum (226.1 mg), which was statistically similar to Cardinal (228.7 mg). The highest percentage (52.2) of >300 mg size and lowest percentage (19.3) of <150 mg size microtuber was produced in P_5 protocol in the variety Diamant. On overall consideration, all the varieties performed best with the protocol P_5.

Keywords: Protocol, microtuber, potato.

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EFFECTS OF FOLIAR APPLICATION OF POTASSIUM ORTHOPHOSPHATE ON GRAIN YIELD AND KERNEL QUALITY OF WHEAT (*Triticum aestivum*) UNDER TERMINAL HEAT STRESS

M. ATAUR RAHMAN, M. M. RAHMAN, M. M. HASAN
FARIDA BEGUM AND M. A. Z. SARKER

Abstract

A field experiment was conducted at Bangladesh Agricultural Research Institute (BARI) farm, Gazipur to evaluate the effect of foliar application of potassium orthophosphate on grain yield and kernel quality of wheat under the terminal heat stress imposed by late sowing for two consecutive years (2008-09 and 2009-10). Five combinations of foliar applications of potassium orthophosphate and Tilt were tested on three wheat varieties, namely Kanchan, Shatabdi, and Prodip. The result indicated that foliar application of potassium orthophosphate was effective in increasing SPAD value (Measure of leaf chlorophyll content) and leaf area of all the wheat varieties, whereas Tilt application was effective only in Kanchan. The grain size of wheat in terms of 1000-grain weight was improved and thereby contributed to grain yield. Also the foliar application of potassium orthophosphate decreased the number of immature, smaller and deformed kernel, and thus improved the kernel quality. Two foliar sprays of 0.1% potassium orthophosphate solution at 70 DAS (Days after sowing) and 80 DAS performed better results than other applications. There were varietal differences in response to foliar treatments and the variety Prodip and Shatabdi were more responsive to potassium orthophosphate compared to Kanchan. Potassium orthophosphate could be suggested to improve grain yield and kernel quality of wheat under terminal heat stress condition.

Keyword: Osmotic solute, heat stress, wheat genotype, kernel quality, SPAD value.

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ADOPTION OF RECOMMENDED POTATO (*Solanum tuberosum*) PRODUCTION TECHNOLOGIES BY THE POTATO GROWERS OF SOME SELECTED AREAS OF BANGLADESH

MD. IBRAHIM KHALIL, MD. ENAMUL HAQUE
AND MUHAMMAD ZIAUL HOQUE

Abstract

The main objective of this study was to determine the extent of adoption of improved potato production technologies by the potato growers. Data were collected from 231 potato growers of three highly concentrated potato growing Upazilas, namely Pirgachha (Rangpur), Munshiganj Sadar (Munshiganj), and Shibganj (Bogra) during October 2010 to February 2011. The potato growers showed marked individual differences in their socio-economic characteristics and majority of them belonged to middle age category having small family size, primary level of education,

small farm size, medium innovativeness, and medium contact with extension personnel. The study revealed that highest proportion of the respondents in Munshiganj Sadar belonged to high adoption category in case of BARI recommended potato variety (72.6%), optimum planting time (87.7%), use of balanced fertilizers (45.2%), whereas medium adoption categories were found in quality potato seed (52.1%), proper seed size (47.9%), fertilizer application methods (71.2%), optimum irrigation (89%), earthing up (84.9%), plant protection (74%), and low adoption categories were found in maintaining proper spacing (42.5%). In Pirganj of Rangpur, highest proportion of the respondents belonged to high adoption category in case of BARI recommended potato variety (77%), optimum planting time (83.8%), whereas medium adoption categories were found in the use of quality potato seed (64.9%), balanced fertilizer (43.2%), proper seed size (52.7%), fertilizer application methods (87.8%), optimum irrigation (97.3%), earthing up (86.5%), plant protection (93.2%), and low adoption categories were found in maintaining proper spacing (64.9%). In Shibganj of Bogra, highest proportion of the respondents were found in high adoption category in case of BARI recommended potato variety (75%), optimum planting time (86.9%), whereas medium adoption categories were found in use of quality potato seed (52.4%), balanced fertilizers (47.6%), fertilizer application methods (78.6%), optimum irrigation (95.2%), earthing up (88.1%), plant protection (76.2%), and low adoption categories were found in maintaining proper spacing (59.5%) and proper seed size (57.1%). The study also revealed that highest (53.4%) proportion of the respondents in Munshiganj Sadar belonged to high potato yield (above 29 ton/ha) farmer category while medium potato yield (between 19 to 29 t/ha) category were found in other two areas i.e., Shibganj (58.80%) and Pirgachha (79.50%). Education, farm size, subsistence pressure, annual income, contact with the sources of information, farming experience, attitude, and knowledge on potato production showed significant positive relationship with adoption of improved potato production technologies.

Keywords: Technology, potato production, adoption, yield.

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EFFECTIVENESS OF INDIGENOUS PLANT POWDERS AS GRAIN PROTECTANT AGAINST *Callosobruchus chinensis* (L.) IN STORED CHICKPEA (*Cicer arietinum*)

M. A. HOSSAIN, M. A. A. BACHCHU
K. S. AHMED AND M. A. HAQUE

Abstract

The effectiveness of 17 indigenous plant powders as grain protectant were assessed against *Callosobruchus chinensis* (L.). The results indicated that among all the tested plant materials, tobacco leaf powder (TLP) had promising effects on inhibiting oviposition and reducing adult emergence, seed infestation, and weight loss by *C. chinensis*. Tobacco leaf powder offered complete protection of chickpea seeds applied at 20.0 g/kg seeds. Its lower doses exhibited efficacy in dose dependant manner. The lowest number of eggs (24.60), egg bearing seeds (23.40), adult emergence (23.20), seed infestation (8.28%), and weight loss (0.50%) were obtained from the TLP treated at 10.0 g/kg seeds, while the highest of these parameters were in untreated control. In the ovicidal test, TLP showed 100% inhibition at 20.0 g/kg seeds over control. The lowest number of adults (37.20) were emerged when larvae bearing seeds were treated with TLP at 20.0 g/kg seeds along with 59.39% retardation over the control and had no adverse effect on seed germination up to 3 months.

Keywords: Plant powders, chickpea seeds, protectant, *Callosobruchus chinensis*.

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PERFORMANCE OF SINGLE AND MIXED RHIZOBIAL INOCULANTS ON NODULATION, DRY MATTER AND SEED YIELD OF LENTIL (*Lens culinaris*)

M. A. H. BHUIYAN, D. KHANAM, M. T. RAHMAN
M. H. R. SHEIKH AND M. M. H. BHUIYAN

Abstract

Field experiments were carried out at Regional Agricultural Research Station (RARS), Ishurdi, Pabna during the *rabi* season of

2005-06 and 2006-07 to find out the effectiveness of *Rhizobium* strains for achieving higher yield of lentil, the variety BARI Masur–4. There were six treatments that were *Rhizobium* strains-BARI RLc-104, BARI RLc-105, BARI RLc-106, BARI RLc–107, mixed culture of the four strains, and control (no *Rhizobium*). The experiment was designed in randomized complete block having 4 replications of each treatment.The rhizobial inocula were peat based and used @ 1.5 kg/ha. A basal dose of P @ 22 kg/ha, K @ 42 kg/ha, S @ 20 kg/ha, and @ 5 kg Zn/ha was used for all treatments. The highest nodule number (11.7/plant in 2006 and 10.3/plant in 2007) and dry nodule weight (10.53 mg/plant in 2006 and 9.58 mg/plant in 2007) were found with mixed culture. Mixed culture produced the highest seed yield in 2006 (1.36 t/ha, 37.4% higher over uninoculated control) and in 2007, BARI RLc-104 recorded the highest seed yield (1.23 t/ha, 60.3% higher over uninoculated control). However, all the strains including mixed culture had similar seed yields over the years.

Keywords: *Rhizobium*, lentil, nodulation, yield.

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ADOPTION OF MUNGBEAN TECHNOLOGIES AND TECHNICAL EFFICIENCY OF MUNGBEAN (*Vigna radiata*) FARMERS IN SELECTED AREAS OF BANGLADESH

M. A. HAQUE, M. A. MONAYEM MIAH
A. M. ALI AND A. N. LUNA

Abstract

Mungbean is one of the most important pulse crops in Bangladesh. The demand of mungbean is very high due to its good taste. To date, different national institutes released 14 improve mungbean varieties with complete package of technologies and disseminated them to the farmers. But, the farm level adoption of mungbean varieties, their economics, and farmer's efficiencies are not well known to the researchers and policy planners. Therefore, the study assessed the farm level adoption of mungbean technologies, technical efficiency of mungbean growers, and find out constraints to its higher production. Data were collected from 283 randomly selected mungbean farmers from Jessore, Kushtia, and Barisal districts during March-April 2009. The highly adopted mungbean varieties were BARI Mung-3, 4 and 5. Technologies, such as ploughing, weeding, and seed rate occupied higher level of adoption. Sowing time and insect-pest control were medium level and irrigation was lower level adoption. In case of chemical fertilizer, urea secured higher level of adoption followed by TSP and MoP. The yield and net return of mungbean was 1196 kg and Tk. 15678 per hectare, respectively. The benefit cost ratio was 1.69 and 2.47 on full cost and cash cost basis, respectively. About 67% farmers achieved more than 90% technical efficiency level. Twenty eight percent farmers' technical efficiency level, between 81-90% and the rest 5% farmers' technical efficiency level was less than 80%. Diseases and pest infestation, lack of good quality seed, lack of knowledge about improved technologies were the major constraints to mungbean cultivation. Government should provide hand-on training and distribute quality seed to the farmers for increasing the area of mungbean cultivation.

Keywords: Mungbean, adoption, technical efficiency.

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CABBAGE *(Brassica oleracea)* AND CAULIFLOWER *(Brassica oleracea)* MARKETING IN SELECTED AREAS OF BANGLADESH

M. S. HOQ, M. A. MATIN, T. M. B. HOSSAIN AND S. HOSSAIN

Abstract

The study was conducted in two districts Comilla and Jessore to examine the marketing chain, marketing cost, and margin, problems and some probable solutions for cabbage and cauliflower marketing. A total of 92 respondents consisting of 20 vegetable growers and 72 vegetables traders were selected as sample for the present study. A multi-stage simple random sampling technique was used for selection of samples. Both primary and secondary data were used for the study. About 60% farmers used van to carry the vegetables to the market. Average cauliflower marketing cost of farmer was higher than cabbage which was Tk.36.59 per quintal due to its special transportation arrangement. On the basis of the

intermediaries, seven marketing chain were identified as a dominant. The chain Farmer→Local Traders (Faria) → Bepari→ Aratdar (urban) →Retailer (urban) →Consumer was identified as most dominant. About 39.60% product runs through this chain. In cauliflower marketing local traders, Bepari, retailer (urban) and retailer (rural) incurred the highest marketing cost than cabbage which were averaged Tk.65.75, Tk.248.47, Tk.205.69, and Tk.78.21, respectively, due to its perishable nature. In the case of farmers, local traders (Faria) and Bepari transportation cost is the highest. Commission charge was highest in the case of retailer (urban) and spoilage and damage cost was the highest for retailer(rural).The marketing cost was the highest for Bepari which were estimated Tk.212.74 for cabbage, Tk.219.87 for cauliflower and the marketing margin was highest for retailer (urban) which were estimated Tk.108.52 for cabbage and Tk.130.09 for cauliflower. Inadequate storage facilities and dominance of intermediaries were the major marketing problems identified by the farmers. Unstable price, barrier to entry in the terminal market, delays on ferryghat and spoilage and damage were the major marketing problem faced by the different intermediaries. The study suggested improving the storage facilities and establishment of organization to solve marketing problem of the farmers. Easy access of vegetables carrying vehicle in the terminal market, arrangement of separate cargo ferry would reduce the spoilage and damage of vegetables in the trader's level.

Keywords: Cabbage, cauliflower, marketing chain, marketing cost and net margin.

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EFFECT OF HYDROPRIMING METHOD ON MAIZE (*Zea mays*) SEEDLING EMERGENCE

K. U. AHAMMAD, M. M. RAHMAN AND M. R. ALI

Abstract

The research work was carried out at the Seed Laboratory of Agronomy Department of Bangladesh Agricultural University, Mymensingh during the period from February to April in 2008 to find out the effect of hydropriming methods on maize seedling emergence.

The hydropriming methods were-T_1 (Non-priming), T_2 (14 hours soaking + drying + storing), T_3 (18 hours soaking + drying + storing), T_4 (22 hours soaking + drying + storing), T_5 (14 hours soaking + surface drying), T_6 (18 hours soaking + surface drying), and T_7 (22 hours soaking + surface drying). Effect of different hydropriming methods on seedling emergence performance of maize was evaluated at two moisture levels viz., 30% and 60% moisture of saturated sand in the experiment. Germination percentage, germination index and mean germination time were influenced significantly by hydropriming methods. The highest germination percentage, germination index, and lowest mean germination time were recorded with T_6 (18 hours soaking + surface drying).

Keywords: Hydropriming, maize, seedling emergence.

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EFFECT OF DIFFERENT IRRIGATION AND TILLAGE METHODS ON YIELD AND RESOURCE USE EFFICIENCY OF BORO RICE (*Oryza sativa)*

M. R. KARIM, M. M. ALAM, J. K. LADHA
M. S. ISLAM AND M. R. ISLAM

Abstract

An experiment was carried out in Bangladesh Agricultural Research Institute (BARI) farm during 2010-11 to evaluate yield and resource use efficiency of transplanted boro rice under two tillage and three irrigation methods. Two tillage methods viz., conventional tillage with puddle transplanted rice and reduced tillage unpuddled transplanted rice and three irrigation methods viz., sprinkler irrigation, alternate wetting and drying (AWD) and flood irrigation were used as treatment variables. Grain yield was 7.62% higher in sprinkler and 4.72% higher in AWD irrigation method over flood irrigation method. Irrespective of tillage methods, reduced tillage method holds 4.62% higher yield production over conventional tillage method. Water use efficiency was found highest in sprinkler irrigation method (0.83 kg/m^3) and in reduced tillage method (0.773 kg/m^3). Labour required for land preparation was 15 md/ha in reduced tillage, whereas it was 38 md/ha in conventional tillage method. Seedling uprooting and

transplanting required higher labour in reduced tillage method over conventional tillage. Fuel consumptions (49.78 l/ha) and electricity (3475.11 Kwhr/ha) was also less in reduced tillage method. Reduced tillage had less land preparation and fuel cost over conventional tillage method. But seedling uprooting and transplanting cost was higher in reduced tillage. Irrigation and total cost of production was 7753 Tk./ha and 69972 Tk./ha in Sprinkler × RT method. Benefit cost ratio was also higher in sprinkler irrigation (1.81) and reduced tillage method (1.82).

Keywords: Reduced tillage, sprinkler irrigation, water use efficiency, yield.

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COMPARATIVE ECONOMICS OF CASHEW NUT KERNEL PROCESSING TECHNOLOGY IN BASTAR REGION OF INDIA

PRAVEEN KUMAR VERMA, S. K. NAG[2] AND S. K. PATIL

Abstract

The paper has studied the economic viability of improved technology (Introduced under NAIP component-3) for extraction of cashew kernel from cashew nut in Bastar region of Chhattisgarh, India. Cost concept has been used to calculate economics of cashew kernel. The technology (Boiling, steaming, cutting, drying, and peeling) has been found viable over conventional practices (Traditional manual separation by stone or hammer) on account of higher recovery of 40 percent and cost reduction by 29.71 percent. Overall net profit per unit (One unit includes one boiler, one steamer, two cutter, one dryer, six peelers and cost of land, depreciation and interest on working capital) in the case of improved technology has been estimated to be Rs 7.32 lakh. Cost of production in machine extraction practices was 202.80 Rupees per kilogram of cashew in spite of traditionally practiced 288.56 Rupees per kilogram. The cost benefit ratio was found higher in machine extraction (1.57) as compare to traditionally practiced (0.169). The mechanical decortications and separation could not only save time and money, also reduced women drudgery (due to manual breaking by stone or hammer to separate kernel). The technology has been found suitable for promotion of entrepreneurship on the processing of cashew kernel from cashew nut in the production catchments which otherwise is not properly utilized.

Keywords: Cashew nut kernel, comparative economics, Bastar region, India.

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EFFECT OF FARMERS' PRACTICES FOR THE MANAGEMENT OF INSECT PESTS OF YARD LONG BEAN (*Vigna unguiculata)*

M. S. UDDIN, M. M. RAHMAN, M. Z. ALAM
M. M. HOSSAIN AND M. E. HOQUE

Abstract

The research activity was conducted in major intensive yard long bean growing areas, such as Jessore, Dhaka, Narsingdi, Comilla, and Chittagong of Bangladesh to know farmers' practices (FPs) for managing major insect pests of yard long bean during March 2009 to October 2009 in the farmers' fields. The study comprised survey of sample farmers through intensive field visit for field data collection and inspection. A total of 5 farmers' practices (FPs) were identified viz., Farmers' Practice 1 (FP_1) comprised chemicals plus mechanical plus cultural plus field sanitation, FP_2 comprised chemicals plus cultural plus field sanitation, FP_3 consisted of combination of chemicals plus field sanitation, FP_4 having combination of mechanical plus cultural plus field sanitation and FP_5 utilized combination of cultural plus field sanitation. Among the sample farmers, 81.33% practiced chemicals plus non-chemical methods, while 18.67% practiced only non-chemical methods. Considering infestation level, pod yield, BCR, and arthropod pests diversity, the performance of FP_1 (chemical + mechanical + cultural + field sanitation methods) was adjudged as the best for managing pod borer and aphid and was revealed as the most suitable option (94.10% infestation reduction) for managing major insect pests of yard long bean in those areas of Bangladesh.

Keywords: Farmers' practices, insect pests management, yard long bean.

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GENETIC DIVERSITY ANALYSIS IN SPRING WHEAT (*Triricum aestivum L.*)

M. F. AMIN, M. HASAN, N. C. D. BARMA
M. G. RASUL AND M. M. RAHMAN

Abstract

Genetic divergences of 50 wheat lines were studied through Mohalanobis's D^2 and principal component analysis for fourteen characters. Genotypes were grouped into four different clusters. Cluster II comprised maximum number of genotypes (twenty one) followed by cluster IV. The inter-cluster distance was maximum between clusters I and III (12.29) indicating wide genetic diversity between these two clusters followed by the distance between cluster I and cluster II (8.28), and cluster III and cluster IV (7.97). The minimum inter-cluster distance was observed between cluster II and cluster IV (4.193) followed by cluster I and cluster IV (4.339) and cluster II and cluster III(4.390) indicating that the genotypes of these clusters were genetically close. The intra cluster distance of all the four clusters was more or less low which indicated that the genotypes within the same cluster were closely related. The highest inter genotypic distance (0.9166) was observed between the genotypes G_{40} and G_{41} and lowest (0.0993) between the genotypes G_{22} and G_{43}. Among the characters, heading days, maturity days, plant height (cm), canopy temperature at vegetative stage, canopy temperature at grain filling stage, grain filling rate (g $d^{-1}m^{-2}$), 1000-grain weight (g), and grains $spike^{-1}$ contributed most for divergence in the studied genotypes. Cluster I had the highest mean for grain yield (4711.2 kg/ha), grain filling rate (17.5 g $d^{-1}m^{-2}$), chlorophyll content at anthesis, and plant height (93 cm). Crosses between I & III, I & II, and III & IV have greater chances to generate more heterotic F_1s. Considering magnitude of genetic distance, contribution of different traits toward the total divergence, magnitude of cluster means for different traits and performance the genotypes G10, G 11, G12, G35, G40, G48 of cluster I, G7 of cluster II, G41, G5,and G3 of cluster III and G46, G21 of cluster IV may be considered as good parents for future hybridization program to produce high yielding genotypes.

Keywords: Wheat, parents, genetic divergence.

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SCREENING OF CARRIER MATERIALS TO FORMULATE *TRICHODERMA HARZIANUM* BASED BIO-FUNGICIDE AGAINST FOOT AND ROOT ROT DISEASE OF TOMATO *(Lycopersicon esculentum* L.)

M. I. FARUK, M. L. RAHMAN, M. M. H. MUSTAFA
M. M. RAHMAN AND M. A. RAHMAN

Abstract

Eight different organic matters were tested for their suitability as carrier materials to prepare *Trichoderma harzianum* based bio-fungicides for controlling foot and root rot disease of tomato caused by *Sclerotium rolfsii*. Four independent experiments were conducted and found that the carrier materials used singly or in combinations were suitable to prepare the bio-fungicides. Mixed use of carrier materials gave better results as compared to single ones. When wheat bran + rice bran, wheat bran + MOC+ rice bran, grasspea bran + rice bran, and grasspea bran +MOC+ rice bran were used as carrier materials. *T. harzianum* based bio- fungicides reduced seedling mortality of tomato by 20.33, 19.33, 24.33, and 19.34%, respectively. Treatment of soil with those bio-fungicides previously infested with S. *rolfsii* caused considerable increased in shoot and root growth of tomato. Based on the findings of investigation, the above mentioned carrier materials might be used to prepare *T. harzianum* based bio-fungicides.

Keyword: *Trichoderma harzianum*, *Sclerotium rolfsii*, tomato seedling, bio-fungicide.

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TOTAL DRY MATTER PRODUCTION OF POTATO, MUNGBEAN AND T. *AMAN* RICE AS INFLUENCED BY NUTRIENT MANAGEMENT OF POTATO-MUNGBEAN-T. AMAN RICE CROPPING PATTERN

M. A. H. S. JAHAN, M. A. R. SARKAR
M. SALIM, N. ISLAM AND T. P. TIWARI

Abstract

A field experiment was conducted at the Regional Wheat Research Centre (RWRC) of the Bangladesh Agricultural Research Institute,

Gazipur, Bangladesh for 2 consecutive years during 2006-07 and 2007-08 with the objective to find out the optimum nutrient management practice on total dry matter production (above ground part) of each component crop of potato-mungbean-t. *aman* rice cropping pattern. Twelve nutrient management treatments were tested in RCBD with 3 replications. Treatments were, T_1=HYG (0-198-44-194-24-6-1.2), T_2=MYG (0-140-34-138-18-4.5-0.9), T_3=IPNS (10000-168-38-170-18-6-1.2), T_4=STB (0-171-40-164-22-5-1), T_5=FP (0-97-16-91-0-0-0), T_6=CON (0-0-0-0-0-0-0), T_7=HYG+CRI, T_8=MYG+CRI, T_9=IPNS+CRI, T_{10}=STB+CRI, T_{11}=FP+CRI, T_{12}=CON+CRI kg/ha CDNPKSZnB, for potato; T_1=HYG (0-24-40-48-24-3-1.2), T_2=MYG (0-20-36-40-20-2-1), T_3=IPNS (5000-9-37-36-21-3-1.2), T_4=STB (0-20-36-40-22-2-1), T_5=FP (0-6-5-4-0-0-0), T_6=CON (0-0-0-0-0-0-0), T_7=HYG+CRI , T_8=MYG+CRI, T_9=IPNS+CRI, T_{10}=STB+CRI, T_{11}=FP+CRI, T_{12}=CON+CRI kg/ha CDNPKSZnB for mungbean and T_1=HYG (0-80-16-44-12-2-0), T_2=MYG (0-56-12-32-8-1.5-0), T_3=IPNS (5000-65-13-32-9-2-0), T_4=STB (0-68-15-37-11-2-0), T_5=FP (0-39-37-12-0-0-0), T_6=CON(0-0-0-0-0-0-0),T_7=HYG+CRI, T_8=MYG+CRI, T_9=IPNS+CRI, T_{10}=STB+CRI,T_{11}=FP+CRI, T_{12}=CON+CRI kg/ha CDNPKSZnB for t. aman rice. HYG treatment without or with crop residues incorporation produced the highest TDM in potato, mungbean and t. aman rice followed by IPNS and STB along with or without CRI. The lowest TDM was recorded in control plot without CRI. The increasing trend of TDM was observed in the crop residues incorporation plots than non-incorporation plots. It was observed that there were significant and positive linear relationship between TDM and yield of potao, mungbean, and t. aman rice at 60 DAP, 60 DAS, and 90 DAT, respectively, in both the years.

Keywords: Dry matter, potato, mungbean, t. aman rice, nutrient, and crop residue management.

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VARIABILITY AND HERITABILITY ANALYSIS IN F_4 GENOTYPES OF *Brassica rapa L.*

N. JAHAN, M. H. KHAN, S. GHOSH, S. R. BHUIYAN AND S. HOSSAIN

Abstract

A field experiment was conducted in the experimental field of Genetics and Plant Breeding Department, Sher-e Bangla Agricultural University, Dhaka, Bangladesh to study variability in 10 F_4 lines obtained through intervarietal crosses along with 8 released varieties of *Brassica rapa*. Significant variation was observed among all the genotypes for all the characters studied. Considering genetic parameters high genotypic co-efficient of variation (GCV) was observed for number of secondary branches per plant, siliquae per plant, yield per plant, whereas days to maturity showed very low GCV. High heritability with low genetic advance in percent of mean was observed for days to maturity which indicated that non-additive gene effects were involved for the expression of this character and selection for such trait might not be rewarding. High heritability with moderate genetic advance in percent of mean was observed for plant height and days to 50% flowering indicating that this trait was under additive gene control and selection for genetic improvement for this trait would be effective. Considering, inter genotypic variability, heritability, and genetic advance, % co-efficient of variation and other agronomic performance G_2, G_{14}, G_{18}, G_1, G_9, G_{12}, G_{16}, G_{17} may be considered to be better parents for future uses in hybridization programme.

Keywords: Variability, heritability, *Brassica rapa* L.

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IMPACT OF SHIFTING OF LAND UNDER CEREAL CROPS TO JUJUBE CULTIVATION IN SELECTED AREAS OF BANGLADESH

S. KHANDOKER, M. A. MONAYEM MIAH, M. KHATUN MOHAMMAD SHAMSUL HOQ AND NANDA DULAL KUNDU

Abstract

Area shift in favour of fruits has been suggested as a viable option to stabilize and raise farm income, enhance agricultural growth, and increase employment opportunities. Studies on micro-level decision taking for area shift in favour of fruits are very scanty. Therefore, an attempt was made to assess the socioeconomic status of jujube farmers, relative profitability of jujube cultivation, and factors influencing the shifting lands from cereal to jujube cultivation. The study was conducted in three districts, namely

Pabna, Natore and Chapai Nababgonj during 2012-13. A total of 180 farmers taking 60 from each district were selected randomly for the study. The per hectare costs of jujube cultivation were Tk. 2,77,232 in the 1st year; Tk. 2,27,925 in the 2nd year; and Tk. 1,90,217 in the 3rd year. The average yields of jujube were found highest in the 3rd year (15.54 t/ha) followed by 2nd year (9.96 t/ha). Per hectare net returns from jujube cultivation were Tk. 1,45,978 in the 2nd year and Tk 3,45,720 in the 3rd year. The total cost of jujube cultivation was around 50% higher than the costs incurred for different cropping patterns. The net return of jujube cultivation was 57% higher compared to different cropping patterns. The shifting of cereal lands to jujube cultivation was reported to be a profitable enterprise as indicated by higher BCR (1.47), net present value (Tk. 2,31,791), and internal rate of return IRR (94%) of jujube cultivation. Relative income and education turned out to be positively significant, whereas age and food crop requirements at home negatively significant for shifting decision from cereal crops to jujube cultivation. Disease and insect infestation, lack of training facilities, and lack of access to credit were the major constraints for jujube cultivation. Jujube cultivation may be encouraged from state authority to increase farmers' income.

Keywords: Shifting land, cereal crops, jujube, relative profitability, and net returns.

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GENETIC DIVERSITY OF FRUIT BORER, *HELICOVERPA ARMIGERA* (LEPIDOPTERA: NOCTUIDAE) BASED ON RANDOM AMPLIFIED POLYMORPHIC DNA-POLYMERASE CHAIN REACTION

A. K. M. Z. RAHMAN, M. A. HAQUE, S. N. ALAM
P. YASODHA AND V. BALASUBRAMANI

Abstract

The genetic variability of *Helicoverpa armigera* (Hübner) at different agro-ecological zones of Bangladesh in comparison with Indian population was conducted in India during September 2008 to February 2009. A total of 12 *H. armigera* populations of which 10 populations collected from different agro-ecological zones of Bangladesh and two populations from India were tested for their genetic variability. Eight out of the ten primers produced scorable PCR products by amplifying the template DNA with taq polymerase and were subjected for analysis. Those eight primers got amplified to a total of 138 markers which produced polymorphic markers. The similarity coefficient based on 138 RAPD markers ranged from 0.000 to 0.777 of the pair-wise combination among twelve samples of *H. armigera*. An UPGMA dendrogram based on Jaccard's similarity coefficient was constructed for the 12 samples of *H. armigera*. The dendrogram showed that *H. armigera* population from Bangladesh had 25 to 45 percent similarity, and in its Indian population the similarity remained within this range.

Keywords: *Helicoverpa armigera,* genetic diversity, RAPD-PCR, primers.

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INSECT PESTS OF GROUNDNUT (*Arachis hypogaea* L.), NATURE OF DAMAGE AND SUCCESSION WITH THE CROP STAGES

G. C. BISWAS

Abstract

Thirty six species of insect pests were found to infest the different growth stages of groundnut crop at Gazipur, Bangladesh during the rabi seasons of 2008-09 and 2009-10. Among the recorded pest species, the hairy caterpillar, *Spilarctia obliqua* (Walker); common cutworm, *Spodoptera litura* F.; jassid, *Empoasca terminalis* Distant ; leaf miner, *Stomopteryx nerteria* M. and leaf roller, *Anersia ephippias* (Meyr.) were considered as the major pests, while the rests were of minor importance on the basis of their population densities/plant, nature and extent of damage and yield reductions. Most of the major and minor pests infested

during the vegetative to pre-maturity stages (45-95 DAS) and the maximum infestation occurred during pod formation and pod filling stages (50-80 DAS) of the crop in both the years.

Keywords: Insect pests, groundnut, damage, succession, crop stages.

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COMBINING ABILITY STUDY IN WATERLOGGED TOLERANT MAIZE (*Zea mays* L.)

M. N. AMIN, M. AMIRUZZAMAN, A. AHMED AND M. R. ALI

Abstract

Combining ability was studied for kernel yield and yield components in a 8×8 diallel cross of waterlogged tolerant maize. Significant general and specific combining ability variances were observed for all the characters studied. Additive genetic variance was preponderant in plant height, ear height, ear length, ear diameter, and kernel weight and non-additive gene action was involved in days to silking, number of kernels per ear and kernel yield. The parental lines E-31 and E-79 were found to be the best general combiners for yield. The good combining parents for different traits could be used in hybridization to improve yield and other desirable traits as donor parents for the accumulation of favourable genes. The cross combinations, E 31× E 40, E 31× E 64, E 31× E 79, E 38× E 40, E 58× E 79, E 63× E 79, E 64 × E 79 showing significant and positive sca effects can be used for commercial hybrid variety development after verifying them at different locations.

Keywords: Heterosis, combining ability, grain yield, maize.

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GENOTYPE X ENVIRONMENT INTERACTION FOR GRAIN YIELD OF MAIZE (*Zea mays* L.) INBREDS UNDER SALINITY STRESS

A. BISAWAS, U. SARKER, B. R. BANIK
M. M. ROHMAN AND M. Z. A. TALUKDER

Abstract

An experiment was conducted on Maize (*Zea mays* L.) to investigate the genotype × environment interaction for gain yield of maize inbreds under salinity stress. The objective of this study was to evaluate G × E interactions and yield stability in multi-environmental trials across wide ecological stress environments. Prescreened thirteen maize inbred lines collected from CYMMT, India were evaluated for phenotypic traits at different salinity conditions (8dS, 12dS and 16dS) with normal environment. The environmental mean and genotypic mean ranged from 10.3 to 49.7 g and 10.9 to 52.8 g, respectively. The regression coefficient (b_i) values of these genotypes ranged from 0.44 to 1.66. Among the genotypes P43, CZ29 and CZ33 produced higher grain yield and highly responsive under different salinity level. On the other hand considering the P_i, b_i, S^2d_i and AMMI bi-plot analysis the genotypes E32, P29 and P35 showed almost stable performance across the different salinity conditions.

Keywords: Maize *(Zea mays* L.) inbred lines, genotype × environment interaction, salinity stress, grain yield, Bangladesh.

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EFFECT OF NITROGEN, PHOSPHORUS, POTASSIUM, AND SULPHUR ON THE GROWTH AND SEED YIELD OF CORIANDER (*Coriandrum sativum* L.)

M. N. YOUSUF, S. BRAHMA, M. M. KAMAL
S. AKTER AND M. E. K. CHOWDHURY

Abstract

A field experiment was conducted at the Spices Research Centre, Shibgonj, Bogra, Bangladesh during the *rabi* seasons of 2008-2009

and 2009-2010 to determine the requirement of N, P, K, and S of coriander (BARI Dhania-1) for achieving satisfactory seed yield of this crop. Different levels of nitrogen (0, 40, 70, and 100 kg/ha), phosphorus (0, 25, 50, and 70 kg/ha), potassium (0, 30, 60, and 90 kg/ha), and sulphur (0, 10, 20, and 30 kg/ha) were distributed in the plot. The experiment was tested in randomized complete block design with three replications. There was positive impact of application of those nutrients on the yield and yield contributing characters of coriander up to a moderate level of $N_{70}P_{50}K_{30}S_{20}$ kg/ha. The highest seed yield (2.06 t/ha in 2008-2009 and 2.09 t/ha in 2009-2010) was obtained with this moderate application of N, P, K, and S (70, 50, 30, and 20 kg/ha, respectively) and yield was declined with higher doses of these elements. The fertilizer treatment $N_{70}P_{50}K_{30}S_{20}$ was observed to be the best suitable dose for coriander cultivation on Grey Terrace Soil of Amnura Soil Series under AEZ-25(Level Barind Tract) of Bangladesh.

Keywords: Coriander, growth, nitrogen, phosphorus, potassium, sulphur, seed yield.

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YIELD AND YIELD ATTRIBUTES OF RAPESEED – MUSTARD (*Brassica*) GENOTYPES GROWN UNDER LATE SOWN CONDITION

MD. MAHBUBUL ALAM, FERDOUSI BEGUM AND PRYANKA ROY

Abstract

A field experiment was conducted at the Central Research Station of BARI, Gazipur for two consecutive years 2010-11 and 2011-12 with 30 varieties/ genotypes of rapeseed-mustard under three dates of sowing viz., 25 November, 5 December, and 15 December to determine changes in crop phenology, growth and yield of mustard genotypes under late sown condition when the crop faced high temperature. Days to flowering and maturity were different at different planting times. Date of sowing significantly influenced plant height, siliquae/plant, seeds/siliqua, seed yield, and oil content of seed in both the years. The highest seed yield (1310 and 1535 kg/ha) was obtained from the first planting (25 November) in both the years, which was significantly different from two other dates of sowing. Yield and yield attributes of different varieties varied significantly. Among the varieties, BARI Sarisha-16 of *Brassica juncea* gave significantly the highest seed yield (1495 and 1415 kg/ha), which was statistically identical to BJDH-11, BJDH-12, BJDH-05, BJDH-20, and BARI Sarisha-6 and significantly different from all other varieties. Interaction effect of variety and sowing date significantly influenced plant height, number of siliquae per plant, number of seeds per siliqua, seed yield, and strover yield. The highest seed yield (1758 and 1825 kg/ha) were recorded from BJDH-11 and BARI Sarisha-16 of *Brassica juncea* at 25 November planting and BJDH-11 produced the highest yield at 15 December in both the years. The maximum strover yield (3758 and 3825 kg/ha) were obtained from BJDH-11 and BARI Sarisha-16 of *Brassica juncea* at 25 November planting during 2010-11 and 2011-12. The highest oil content of seeds (44.4 % and 45.9%) were obtained from the seed of BARI Sarisha-6 and BARI Sarisha-14 at 25 November planting in both the years.

Keywords: Late sowing time, genotype, and yield.

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DEVELOPMENT OF SUITABLE PACKAGE FOR TRANSPORTATION OF GUAVA (*Psidium guajava* L.)

M. N. AMIN, M. A. HOSSAIN, M. S. MIAH
M. S. HASSAN AND M. A. HOQUE

Abstract

Guava (*Psidium guajava* L.) is a perishable and climacteric fruit. The peel surface of guava is soft. During transportation, guava surface is rupture lack of proper packaging. Two types of corrugated fibre board (CFB) cartons of 7 and 5 ply and one type of wooden box were designed and fabricated for transportation of guava in Farm Machinery and Postharvest Process Engineering (FMPE) Division, Bangladesh Agricultural Research Institute, Gazipur in 2013. The dimensions of the cartons were 513 x 300 x 240 mm and 400 x 300 x 300 mm. The 7 ply cartons of both the size were found better than those of 5 ply cartons in terms of static load bearing capacity. The carton of 513 x 300 x 240 mm was better than that of second one. The holding capacities of these cartons were about 18-20 kg of guava. The static load bearing capacities of both

the cartons of 7 and 5 ply cartons were 90 and 70 kg, respectively. Green matured guava was harvested, sorted and packed in different packages, such as bamboo basket, wooden box, plastic crate, and CFB cartons. They were transported from Sharupkhati of Barisal to Gazipur by a track. Then the guava packages were opened in FMPE Division, BARI, Gazipur and stored at ambient temperature (28.8 ± 2°C) and humidity (87± 2%) for 8 days. The highest shelf-life of guava was found in wooden box without wrapping and the lowest shelf-life was in CFB cartons with polyethylene (0.05 mm) having 2% perforation. Wooden box was found suitable as packaging material for transportation of guava in terms of freshness, shelf-life, and packaging cost. Packaging cost of CFB cartons was higher followed by that of plastic crate, wooden box, and bamboo basket. Packaging costs of plastic crate and wooden box were cheaper than those of CFB cartons and bamboo basket. Plastic crate and wooden box should be used for local market to transport the fruits. CFB carton may be used for export market or supper market.

Keywords: Development, suitable package, transportation.

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OPTIMIZATION OF FERTILIZER RATE BASED ON FARMERS' PRACTICE IN POTATO-HYBRID MAIZE RELAY CROPPING SYSTEM

M. N. ISLAM, M. AKHTERUZZAMAN AND M. S. ALOM

Abstract

The experiment was conducted at the research field of Agronomy Division, BARI, Joydebpur, Gazipur during consecutive seasons of 2011-12 and 2012-13 to optimize fertilizer rate for potato hybrid maize relay cropping system. Seven treatments viz., T_1= Farmers' fertilizer dose of potato (FFDP: $N_{504}P_{162}K_{309}$ kg/ha) + Farmers' fertilizer dose of hybrid maize (FFDM: $N_0\,P_0\,K_0$ kg/ha), T_2= FFDP + 100% N of recommended fertilizer dose of hybrid maize (RFDM: $N_{255}\,P_{55}\,K_{140}\,S_{40}\,Zn_6\,B_2$ kg/ha), T_3= FFDP + 100% N & 25% others of RFDM, T_4= FFDP + 100% N & 50% others of RFDM, T_5= Recommended fertilizer dose of potato (RFDP: $N_{198}\,P_{44}\,K_{194}\,S_{24}\,Zn_6\,B_{1.2}$ kg/ha) +100% N of RFDM, T_6= RFDP +100% N & 25% others of RFDM, and T_7= RFDP +100% N & 50% others of RFDM were tested on potato-hybrid maize relay cropping system. Potato (var. Diamant) and hybrid maize (var. BARI Hybrid Maize-9) were used in this experiment. Results indicated that yield of potato (28.38 - 28.83 t/ha) did not differ significantly but yield of hybrid maize (4.90 - 8.74 t/ha) varied significantly under different treatments. The higher grain yield (8.74 t/ha) of hybrid maize was recorded in farmers' fertilizer dose of potato or recommended fertilizer dose of potato (8.61 t/ha) along with 100% N plus 25% other fertilizers or 100% N plus 50% other fertilizers from recommended dose of hybrid maize. The highest potato equivalent yield (41.94 t/ha) and gross return (Tk. 335520/ha) were obtained from FFDP along with 100% N plus 25% others of RFDM (T_3). But the highest gross margin (Tk. 219790/ha) and benefit cost ratio (3.01) were found from RFDP along with 100% N plus 25% others of RFDM (T_6). The results revealed that recommended fertilizer rate of potato ($N_{198}\,P_{44}\,K_{194}\,S_{24}\,Zn_6\,B_{1.2}$ kg/ha) along with 100% N plus 25% other fertilizers from recommended fertilizer rate of hybrid maize ($N_{255}\,P_{55}\,K_{140}\,S_{40}\,Zn_6\,B_2$ kg/ha) might be optimum for potato hybrid maize relay cropping system for obtaining higher economic return.

Keywords: Optimization, fertilizer rate, potato, hybrid maize and relay cropping.

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RESPONSE OF CORIANDER (*Coriandrum sativum* L.) FOLIAGE TO DIFFERENT RATES AND METHODS OF NITROGEN APPLICATION

M. MONIRUZZAMAN, M. M. RAHMAN, M. M. HOSSAIN
A. J. M. SIRAJUL KARIM AND Q. A. KHALIQ

Abstract

The experiment was conducted at Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur during January 2009 to February 2009 taking two coriander (*Coriandrum sativum* L.) lines, CS001 and CS003 to determine the nitrogen requirement of coriander foliage crop and to select the best method of nitrogen application for maximizing foliage yield. The experiment was laid out in randomized complete block design with three replications

having five nitrogen doses (0, 20, 40, 60, and 80 kg/ha) and four methods of N application (entire N dose as basal, ½ N as basal, and ½ N at 30 days after sowing as top dressing, ½ N as basal and ½ N at 30 DAS as foliar spray and 2/3 N at 20 DAS, 1/3 N at 30 DAS, and 1/3 N at 40 DAS as foliar spray). The nitrogen dose of 80 kg/ha and ½ N as basal and ½ N at 30 days after sowing as top dressing independently gave the maximum plant height, number of leaves/plant, single plant weight, plant weight/m^2, and foliage yield/ha. Nitrogen @ 80 kg/ha applied half as basal and half at 30 DAS as top dress produced maximum foliage yield/ha closely followed by 60 kg and 40 kg N/ha with the same application method. The highest gross margin was recorded from 80 kg N/ha applied half as basal and half at 30 DAS as top dress (Tk. 262.705 thousand/ha) followed by 60 kg N/ha with the same application method (Tk. 259.529 and Tk. 254.342 thousand/ha, respectively) and these two combinations also gave the highest benefit-cost ratio of 6.90.

Keywords: Nitrogen rate, application method, foliage production, *Coriandrum sativum* L.

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CHANGES IN PHYSICOCHEMICAL ATTRIBUTES OF SWEET PEPPER (*Capsicum annum* L.) DURING FRUIT GROWTH AND DEVELOPMENT

M. A. RAHMAN, G. M. A. HALIM, M. G. F. CHOWDHURY
M. A. HOSSAIN AND M. M. RAHMAN

Abstract

Changes in physicochemical attributes of sweet pepper var. 'BARI Misti Morich-1' during fruit growth and development were studied. Capsicum flowers were tagged on the day of anthesis and fruits were harvested at three days interval started on 33 days after anthesis (DAA) until 48 DAA, when turned to light green colour. Length, diameter, and weight of fruits were linearly increased from 33 DAA to 48 DAA. Dry matter content, TSS, firmness, and shelf life of fruits were also gradually increased with lengthen the harvesting time from flower anthesis and reached from 5.1 to 7.3%, 4 to 5%, 7.1 to 14.5 kgf cm^{-2} and 9.6 days to 21.3 days, respectively, from 33 DAA to 48 DAA. However, ascorbic acid content of fruits was sharply decreased from 68 to 56 mg/100g from first harvest to last harvest, respectively. Hue angle declined with time while chroma and lightness values increased with fruit maturity. Considering all physical and nutritional characteristics and shelf life along with sensory evaluation scores, fruits of BARI Misti Morich-1 was found suitable to harvest after 45 days of anthesis, when they attained length 12.2 cm, diameter 8.8 cm, and weight 191g. Moreover, fruits were crispier, glossy with attractive colour and flavour and contained 58 mg/100g ascorbic acid at this maturity stage.

Keywords: Fruit maturity, fruit development, postharvest quality, shelf life, capsicum.

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DIVERGENCE ANALYSIS OF DROUGHT TOLERANT GENOTYPES OF WHEAT (*Triticum astivum* L.)

M. A. ZAMAN, M. N. A. SIDDQUIE, M. MAHBUBUR RAHMAN
M. Y. ABIDA AND M. J. ISLAM

Abstract

Thirty genotypes of wheat were grown in an Alpha Lattice Design with three replications for evaluation and divergence analysis. Seeds were sown on 24 November 2011 at Regional Wheat Research Centre, Bangladesh Agricultural Research Institute, Shyampur, Rajshahi. Significant variation was observed among the genotypes and these are grouped into six clusters. Clusters III and VI were comprised of maximum number of genotypes (6) followed by clusters I, IV, and V with 5 genotypes and the minimum genotypes (3) were in cluster II. The maximum inter-cluster distance was recorded between the Cluster VI and Cluster II followed by cluster III and Cluster II, which indicates that genotypes belonging to these distant clusters could be used in hybridization programme for getting a wide spectrum of variation among the segregates. The minimum inter-cluster distance was found between the Cluster IV and Cluster I followed by that of Cluster V and Cluster IV. The maximum intra-cluster distance was recorded in Cluster II, consisted of three genotypes of diverse

origin followed by Cluster V consisting of five genotypes which indicated that the genotypes of these clusters might have considerable diversity among themselves. While the minimum distance was computed in Cluster I composed of five genotypes which indicated that these genotypes were genetically very close to each other. Considering the eigenvalues of all principal component analysis the PC1, PC2, PC3, PC4, and PC5 with values contributed 30.78%, 20.11%, 17.75%, 10.93%, and 7.63%, respectively, of the total variation. The results revealed from the present study that the first principal component had high positive component loading from grains/spike and high negative loading from grain yield. Considering the clusters mean value, the genotype of Cluster II and VI are most divergent and maximum heterosis and wide variability in genetic architecture may be expected from the crosses between the genotypes belonged to these clusters. More specifically the cluster II could be selected for dwarf in nature, early heading and maturity and bold grain size. The genotypes from the cluster IV could be selected for maximum spikes/m^2 and maximum grain yield. The positive value of both vectors for days to heading and spikes/m^2 indicated that these traits had the highest contribution towards divergence among the 30 drought tolerant wheat genotypes.

Keywords: Heritability, divergence, D^2 distance, genotype, hybridization and wheat.

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EFFECT OF GA_3 AND NAA ON PHYSIO-MORPHOLOGICAL CHARACTERS, YIELD AND YIELD COMPONENTS OF BRINJAL (*Solanum melongena* L.)

M. MONIRUZZAMAN, R. KHATOON, M. F. B. HOSSAIN
M. K. JAMIL AND M. N. ISLAM

Abstract

The experiment on brinjal *(Solanum melongena* L.) having seven growth regulators viz., control, 30 ppm GA_3, 40 ppm GA_3, 50 ppm GA_3, 20 ppm NAA, 40 ppm NAA, and 60 ppm NAA and two varieties viz., BARI Begun-5 and BARI Begun -10 was conducted at the field of Plant Physiology Section of HRC during the *rabi* season (November 2011 to May 2013) to find out the suitable variety responsive to growth regulators and to determine the suitable dose of growth regulator for brinjal production. The GA_3 (Gibberellic acid) and NAA (Naphthalene acetic acid) had no significant effect on plant height and stem diameter at the end of the crop period and days to 100% flowering. NAA 40 ppm produced highest percentage of long and medium styled-flower, leaf photosynthesis and Fv/Fm (efficiency of photosystem II), number of fruits /plant and fruit yield (45.50 t/ha). The variety BARI Begun-5 was earlier to 100% flowering which took 44 days after transplanting which outyielded BARI Begun-10. NAA 40 ppm coupled with BARI Begun-5 gave the maximum Fv/Fm, long-styled flower percent, number of fruits/plant, and the highest fruit yield (49.73 t/ha).

Keywords: Gibberellic acid (GA_3), napthalene acitic acid (NAA), leaf photosynthesis, fruit yield, brinjal.

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AGRICULTURAL ADAPTATION STRATEGIES TO CLIMATE CHANGE IMPACTS IN AFRICA: A REVIEW

AKINNAGBE O.M AND IROHIBE I. J.

Abstract

Climate change is expected to intensify existing problems and create new combinations of risks, particularly in Africa. The situation is made worst due to factor such as widespread poverty, over dependence on rain fed agriculture, inequitable land distribution, limited access to capital and technology, inadequate public infrastructure, such as roads, long term weather forecasts and inadequate research and extension. By lessening the severity of key damages to the agricultural sector, adaptation is the key defensive measure. Adaptation to climate change involves changes in agricultural management practices in response to changes in climate conditions. This paper reviews agricultural adaptation strategies employed by farmers in various countries in Africa in cushioning the effects of climate change. The common agricultural adaptation strategies used by farmers were the use of drought resistant varieties of crops, crop diversification, changes in

cropping pattern and calendar of planting, conserving soil moisture through appropriate tillage methods, improving irrigation efficiency, and afforestation and agro-forestry. The paper concluded that improving and strengthening human capital through education, outreach programmes, extension services at all levels will improve capacity to adapt to climate change impact.

Keywords: Adaptation strategies, agriculture, climate change, impacts and Africa.

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GENETIC VARIABILITY OF YIELD AND ITS CONTRIBUTING CHARACTERS ON CIMMYT MAIZE INBREDS UNDER DROUGHT STRESS

MD. GOLAM AZAM, UMAKANTA SARKER
MANIRUZZAMAN AND BHAGYA RANI BANIK

Abstract

This experiment was conducted in a randomized block design with three replications at Bangladesh Agricultural Research Institute, Gazipur-1701 during the rabi season of 2010 with 25 maize inbred lines. Correlation and path coefficient analysis were done for yield and some other traits. Genotypic variations were observed for ear height and grains/row. The highest broad sense heritability (h^2_b) was observed for yield/plant followed by ear height and 1000-grain weight. Maximum genetic advance in percentage of mean (GA) was recorded for yield/plant (92.652) and ear height (75.87). The yield/plant showed significant positive genotypic correlation (r_g) with cob diameter (0.440) and grains/row (0.265). Significant negative correlation was observed between ear height and yield and also for days to 50% tasseling. The highest direct positive effect was obtained for rows/cob. These studies suggest that cob diameter, row per cob, grains/row and ear height were the most important yield contributing factors and an attempt should, therefore, be made for an effective selection of these traits.

Keywords: Maize (*Zea mays* L.), variability, correlation, path analysis, Bangladesh.

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EFFECT OF OSMOPRIMING ON THE EMERGENCE OF MAIZE (*Zea mays* L.) SEEDLING

K. U. AHAMMAD, M. M. RAHMAN AND M. AHMED

Abstract

The research work was carried out at the Seed Laboratory of Agronomy Department of Bangladesh Agricultural University, Mymensingh, Bangladesh during the period from March to November in 2008 to find out the effect of different osmopriming techniques on seedling emergence of maize. Seventeen osmopriming techniques viz., T_1 = 1% Na_2SO_4, T_2 = 3% Na_2SO_4, T_3 = 5% Na_2SO_4, T_4 = 1% K_2HPO_4, T_5 = 3% K_2HPO_4, T_6 = 5% K_2HPO_4, T_7 = 1% $ZnSO_4$, T_8 = 3% $ZnSO_4$, T_9 = 5% $ZnSO_4$, T_{10} = 1% $Ca(H_2PO_4)_2$, T_{11} = 3% $Ca(H_2PO_4)_2$, T_{12} = 5% $Ca(H_2PO_4)_2$, T_{13} = 1% H_2O_2, T_{14} = 3% H_2O_2, T_{15} = 5% H_2O_2, T_{16} = Hydropriming, T_{17} = Non-priming (control) were used as experimental variables. Different osmopriming methods on seedling emergence performance of maize was evaluated at two moisture levels viz., 30 and 60% moisture of saturated sand in the experiment. Germination percentage, germination index and mean germination time were influenced significantly by osmopriming methods. Seed priming with 3% $ZnSO_4$ showed the highest seedling emergence which was followed by 1% H_2O_2 and 3% Ca $(H_2PO_4)_2$.

Keywords: Maize, osmopriming, emergence.

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LEACHING LOSSES OF NITROGEN, PHOSPHORUS AND POTASSIUM FROM THE SANDY LOAM SOIL OF OLD BRAHMAPUTRA FLOODPLAIN (AEZ-9) UNDER CONTINUOUS STANDING WATER CONDITION

M. N. ISLAM, M. M. RAHMAN, M. J. A. MIAN
M. H. KHAN AND R. BARUA

Abstract

An experiment was conducted at the net house of the Department of Soil Science, Bangladesh Agricultural University (BAU),

Mymensingh, Bangladesh during February to June (boro season) of 2009. The objective was to find out the leaching loss of N, P, and K in the Old Brahmaputra Floodplain Soil under continuous standing water (CSW) condition. The soil was sandy loam in texture having pH 6.6, total N 0.08%, available P 7.00 mg/kg, exchangeable K 0.07 me/100g soil, and available S 7.5 mg/kg. The experiment was laid out in completely randomized design with three replications. There were six treatments, such as T_0 (control), T_1 (N_{120} P_{25} K_{60} S_{20} recommended dose), T_2 (N_{180} P_{37} K_{90} S_{30} kg/ha i.e., 150% of the recommended dose), T_3 (75% N of T_1 from chemical fertilizer and 25% N from cowdung 2.5 t/ha and PKS of recommended dose from chemical fertilizer on the basis of PKS content in cowdung), T_4 (as T_1 but N_{109} kg/ha from USG) and T_5 (as T_1 but N applied as foliar spray). The nutrients P, K, and S were applied as basal dose in the pots while urea was applied in three equal splits except T_4 and T_5. One USG per pot was placed after 7 days of transplanting in T_4. In T_5, urea was applied as foliar spray at 10 days interval. Leachates from individual pots were collected at 15 days intervals to determine the amount of loss of NPK. Results showed that leaching loss of NPK in the sandy loam soil under CSW condition varied widely due to different treatments over time. The total leaching loss of N, P, and K during the growing season varied from 22.23 to 91.21, 0.063 to 1.95, and 35.22 to 42.01 kg/ha, respectively. Application of chemical fertilizer at higher rates resulted in greater loss of nutrients. Integrated approach of fertilizer management could minimize such losses to a great extent. Application of N in the form of USG reduced the N loss significantly.

Keywords: Leaching loss, plant nutrients, sandy loam soil, continuous standing water, boro rice.

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PROFITABILITY OF CROP CULTIVATION UNDER DIFFERENT LAND TENURIAL ARRANGEMENTS IN SOME SELECTED SITES OF BANGLADESH

M. A. ISLAM AND K. L. MAHARJAN

Abstract

Proper land tenurial arrangements perceived as an important strategy for input use and agricultural production in utilization of land resource. Government of Bangladesh initiated due measures in this respect by formulating and declaring the land reform ordinance 1984.The main quest of this study is to identify the profitability of crop cultivation and factors influencing gross revenues in the variousl and tenurial arrangements under this land reform ordinance 1984. In search of this research question, a case study was conducted in two Upazilas (sub districts) of Bangladesh based on cross section data. This data were collected by purposive stratified sampling technique in the year 2013. Benefit cost ratio (BCR) was used to identify the profitability of crop cultivation under different land tenurial arrangements. Ordinary least square (OLS) regression method was used to identify the factors influencing gross revenues of the share cropped land of owner cum tenant farmers. This study reveals that the aspects of land reform ordinance have been implemented in output sharing aspect but not in input cost sharing aspect. Again BCR in leased land was higher than share cropped land. Moreover, regression analysis indicates that farm size had significant positive impact on gross revenues. The study holistically reveals that lease arrangements could be judged as a vital player to increase gross revenue as well as profit inshare cropped lands.

Keywords: Benefit cost ratio, ordinary least square regression method, land tenure, agricultural production, Bangladesh.

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EFFECT OF RELATIVE HUMIDITY, INITIAL SEED MOISTURE CONTENT AND STORAGE CONTAINER ON SOYBEAN (*Glycine max* L. Meril.) SEED QUALITY

M. R. ALI, M. M. RAHMAN AND K. U. AHAMMAD

Abstract

To find out the effect of storage relative humidity, seed moisture content and type of storage container on soybean seed quality, an experiment was conducted at the Seed Laboratory, Department of Agronomy, Bangladesh Agricultural University Mymensingh in 2008 and 2009. In 2008, soybean seed has 96% initial germination and in 2009 seed having 98% initial germination was stored at 8% and 12% initial moisture levels in two types of storage containers viz., cloth bag and polythene bag (0.06mm thickness). The final seed moisture content, germination percentage, germination index, and seedling dry matter of the seed under different treatments were measured at 60,120, and 180 days after storage (DAS). The experiment was arranged in a completely randomized design with three replications. In 2008, highest germination percentage (89.33%) of soybean seed was retained at 180 days after storage (DAS) for those stored at 8% initial seed moisture content (SMC) in polythene bag at 50% relative humidity. Germination index and seedling dry matter decreased with increased initial seed moisture content irrespective of storage containers used. In 2009, highest germination percentage (92.67%) of soybean seed was retained at 180 DAS for those stored in polythene bag at 8% initial SMC at 50% of the relative humidity. Those stored in cloth bag at 12% SMC showed rapid germination loss and the value went down to 0.00 in both the years. Vigour index and seedling dry matter decreased with increased initial seed moisture content irrespective of storage containers used.

Keywords: Soybean, relative humidity, seed moisture, container, viability, vigour.

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DETERMINATION OF FERTILIZER DOSE FOR MAIZE IN POTATO-MAIZE-T. AMAN RICE CROPPING PATTERN

M. J. U. SARKER, M. ALI, A. K. CHOUDHURY
M. Z. H. PRODHAN AND MST. A. AKHTER

Abstract

A field experiment was conducted at the Multilocation Testing Site (MLT) Sherpur, Bogra (AEZ 4) during November 2007-08 to October 2008-09 to find out a suitable fertilizer dose for maize as a succeeding crop following potato under Potato-Maize- T.Aman rice cropping pattern. The treatments were, T_1: Soil test based (STB) fertilizer dose of NPKS following FRG, 2005, T_2: STB of 75% recommended dose of PKS + full N, T_3: STB of 50% recommended dose of PKS + full N and T_4: Farmers practice. From the two years' results, it was found that the most profitable grain yield of maize (7.54 t/ha) was obtained from the treatment T_2 and the lowest (6.16 t/ha) was in T_4 (Farmer's practice). Economic analysis showed that the treatment T_2 gave the highest net return, benefit cost ratio was also higher in maize. Fertilizer dose could be reduced by 25% for N. Considering all the issues, maize was best fitted crop under Potato-Maize-T. Aman cropping sequence in AEZ 4 at MLT site Sherpur, Bogra.

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PRODUCTION POTENTIALS AND ECONOMICS OF CHICKPEA-RICE BASED CROPPING SYSTEM IN SYLHET AREA (AEZ-20)

MD. RAYHAN SHAHEB, MAHMUDUL ISLAM NAZRUL AND M. J. U. SARKER

Abstract

Global food and feed demands have been projected to double in the 21st century, which will further increase the pressure on the use of land, water and nutrients. To increase food productivity, production potential and economic returns, improvement of cropping system may play a vital role in this regards. A study was

conducted to determine the economic consequences of two cropping patterns viz., ICP: Improved Cropping Pattern (Chickpea-T.Aus-T.Aman) and FECP: Farmer's Existing Cropping Pattern (Fallow-T. Aus-T. Aman) through incorporation of modern high yielding varieties and improved management practices for crop production at farmers' fields of Sylhet during three consecutive years 2009-10, 2010-11, and 2011-12, respectively. The experiment was laid out in randomized complete block design with six dispersed replications. The pooled data showed that the improved management practices for the pattern provided higher yield in T.Aus and T.Aman rice, respectively. The gross return and gross margin of ICP were higher compared to that of FECP with only 21% extra cost. The higher benefit cost ratio (2.20), rice equivalent yield (10.29 t/ha), production efficiency (27.36 kg/ha/day), land-use efficiency (91.32%) and sustainable yield index (0.41) indicated the superiority of the ICP over the FECP. Higher rice equivalent yield indicate that ICP is suitable in Sylhet region for increasing crop productivity and cropping intensity.

Keywords: Improved cropping pattern, agro-economic performance, land use efficiency, production efficiency, fallow land utilization.

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EFFECT OF PLANT SPACING AND NITROGEN LEVELS ON NUTRITIONAL QUALITY OF BROCCOLI *(Brassica oleracea* L.)

M. S. RONI, M. ZAKARIA, M. M. HOSSAIN AND M. N. SIDDIQUI

Abstract

The study was carried out in the research field and laboratory of the Department of Horticulture, Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Gazipur-1706 during October 2011 to April 2012 to determine optimum level of nitrogen and spacing for improving the nutritional quality of broccoli. There were 15 treatments in the experiment comprising five levels of N viz., 0, 80, 120,160, and 200 kg/ha and three plant spacings viz., 60cm x 60cm, 60cm × 45cm, and 60cm × 30cm. The results revealed that the highest ascorbic acid content (50.38 mg/100g) was obtained from $S_{60X30}N_0$ and the highest β-carotene content (50.67 IU/100g) was found in $S_{60X60}N_0$. Maximum Ca (0.556%) was found in $S_{60X60}N_0$ whereas maximum Fe (159.002 ppm) was in $S_{60X60}N_{200}$. The maximum P content (0.081%) was observed in $S_{60X60}N_{160}$ and maximum K content (0.854%) was found in $S_{60X45}N_{120}$.

Keywords: Nitrogen, plant spacing, β-carotene, ascorbic acid, broccoli.

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EFFECT OF HYDROPRIMING AND SOIL MOISTURE REGIMES ON YIELD AND YIELD COMPONENTS OF MAIZE (*Zea mays* L.)

K. U. AHAMMAD, M. M. RAHMAN, M. A. M. MOLLA AND M. G. AZAM

Abstract

The experiment was conducted at the research field of Regional Agricultural Research Station, Jessore during two consecutive rabi seasons of 2008-2009 and 2009-2010 to find out the effect of hydropriming on the performance of maize seeds under variable soil moisture regimes. The treatments of the experiment were two priming methods viz., i) Hydropriming, ii) Non-priming and four moisture regimes viz., i) Wet condition, ii) Field capacity, iii) 75% of field capacity, and iv) 50% of field capacity. Results showed that yield and yield contributing characters (plant population/m^2, number of cobs/m^2, length of cob, diameter of cob, 100-grain weight) were influenced significantly by hydropriming. Yield and yield contributing characters were highest when hydroprimed seeds were sown at field capacity whereas it was the lowest at 75% of field capacity from non- primed seeds. Days to tasseling, days to silking, and days to maturity were reduced when hydroprimed seeds were sown at field capacity. At 50% of field capacity, no germination was occurred.

Keywords: Hydropriming, maize, soil moisture, yield.

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NUTRIENT MANAGEMENT ON LEAF AREA INDEX OF POTATO-MUNGBEAN-T.AMAN RICE CROPPING PATTERN

M. A. H. S. JAHAN, M. A. R. SARKAR AND M. SALIM

Abstract

A field experiment was conducted at Regional Wheat Research Centre of the Bangladesh Agricultural Research Institute, Joydebpur, Gazipur, Bangladesh for 2 consecutive years during 2006-07 and 2007-08. The objective was to find out the optimum nutrient management practice on leaf area index of each component crop of potato-mungbean-T.Aman rice cropping pattern. Twelve nutrient management treatments were tested in RCBD with 3 replications. Treatments combination based on cropping pattern were T_1=HYG (0-198-44-194-24-6-1.2 for potato; 0-24-40-48-24-3-1.2 for mungbean ; 0-80-16-44-12-2-0 for T.Aman rice), T_2=MYG (0-140-34-138-18-4.5-0.9 for potato; 0-20-36-40-20-2-1 for mungbean ; 0-56-12-32-8-1.5-0 for T.Aman rice), T_3=IPNS (10000-168-38-170-18-6-1.2 for potato ; 5000-9-37-36-21-3-1.2 for mungbean ; 5000-65-13-32-9-2-0 for T.Aman rice), T_4=STB (0-171-40-164-22-5-1 for potato; 0-20-36-40-22-2-1 for mungbean ; 0-68-15-37-11-2-0 for T.Aman rice), T_5=FP (0-97-16-91-0-0-0 for potato ; 0-6-5-4-0-0-0 for mungbean ; 0-39-37-12-0-0-0 for T.Aman rice), T_6=CON (0-0-0-0-0-0-0 for potato, mungbean and T.Aman rice) kg/ha CDNPKSZnB, T_7=HYG+CRI, T_8=MYG+CRI, T_9=IPNS+CRI, T_{10}=STB+CRI, T_{11}=FP+CRI, T_{12}=CON+CRI for potato-mungbean T.Aman rice cropping pattern, respectively. Average of two years data showed that HYG+CRI treatment gave maximum LAI followed by HYG, IPNS+CRI, IPNS, STB+CRI, and STB treatments at 60 days after planting (DAP) for potato, at 50 days after sowing (DAS) for mungbean, at 60 days after transplanting (DAT) for T.Aman rice, respectively. For potato, there was a significant ($p \leq 0.01$) and positive linear relation between the LAI at 60 DAP and the tuber yield. While there was a significant ($p \leq 0.01$) and positive linear relationship between the LAI at 50 DAS and seed yield of mungbean. In case of T.Aman rice, there was a significant ($p \leq 0.05$) as well as positive linear relationship between the LAI at 60 DAT and the grain yield of rice.

Keywords: Leaf area index, potato, mungbean, T.Aman rice, nutrient and crop residue management.

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INFLUENCE OF INTEGRATED ORGANIC-INORGANIC NITROGEN ON GROWTH AND NUTRIENT CONCENTRATION OF SUMMER ONION (*Allium cepa)*

SAIMA SULTANA, ALOK KUMAR PAUL
DEEDER SULTANA AND JHARNA RANI SARKER

Abstract

An experiment was carried out to assess the effect of integrated organic and inorganic nitrogen on growth and nutrient concentration in summer onion (*Allium cepa* var. BARI Piaz-2). The study was done on a silty clay loam soil of Sher-e-Bangla Agricultural University Farm, Dhaka during *kharif* (March to October) season. The soil of the experimental site belongs to the Tejgaon series of AEZ No. 28, Madhupur Tract, classified as Shallow Red Brown Terrace Soils in Bangladesh soil classification system. Twelve treatments were used in the experiment and in each treatment, different combinations of urea, cowdung, and vermicompost were used to supply nitrogen (N) at the rate of 120 kg/ha. The treatments were arranged in a RCBD with three replications included- control or no fertilizer supplied (T_1), 120 kg N/ha supplied from urea (T_2), 100 kg N/ha supplied from urea with 20 kg from cowdung (T_3), 100 kg N/ha supplied from urea with 20 kg from vermicompost (T_4), 80 kg N/ha supplied from urea with 40 kg from cowdung (T_5), 80 kg N/ha supplied from urea with 40 kg from vermicompost (T_6), 60 kg N/ha supplied from urea with 60 kg from cowdung (T_7), 60 kg N/ha supplied from urea with 60 kg from vermicompost (T_8), 40 kg N/ha supplied from urea with 80 kg from cowdung (T_9), 40 kg N/ha supplied from urea with 80 kg from vermicompost (T_{10}), 120 kg N/ha supplied from cowdung (T_{11}), 120 kg N/ha supplied from vermicompost (T_{12}). Data on plant height, number of leaves, leaf length, bulb length, and bulb weight of onion were recorded. Samples of bulb and leaf were

analyzed for determining the total nitrogen, phosphorous, potassium, and sulphur content. Height of plant ranged from 24.25 to 39.25 cm with lowest and highest value from T_1 and T_5, respectively. Like plant height, the longest leaf length (34.35 cm) and bulb length (2.79 cm) was observed in T_5, whereas the shortest leaf length (21.20 cm) and bulb length (2.40 cm) was recorded in T_1 treatment. Similarly treatment T_5 showed the highest value for both bulb weight (30.40 g) and bulb yield (12.16 t/ha), whereas the lowest bulb weight (14.90 g) and bulb yield (5.96 t/ha) was obtained from T_1 treatment. Statistically insignificant variations were recorded on number of leaves/plant. The highest nitrogen, phosphorous, potassium and sulphur content in bulb (2.30, 0.185, 1.71 and 0.96%, respectively) and in leaf (2.91, 0.183, 2.45, and 0.98%, respectively) were recorded in treatment T_5. Whereas, the lowest nitrogen, phosphorous, potassium, and sulphur content in bulb (1.41, 0.055, 0.89, and 0.66%, respectively) and in leaf (2.15, 0.053, 1.71 and 0.63%, respectively) was found in T_1. Therefore, the overall results suggest that treatment T_5 which supplied 40 kg N/ha from cowdung and rest 80 kg from inorganic urea resulted in maximum plant growth and nutrient concentration and can be recommended for optimum production of summer onion.

Keywords: *Allium cepa*, organic nitrogen, summer onion, growth parameters and vermicompost.

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MULTIVARIATE ANALYSIS IN YELLOW INBRED LINES OF MAIZE *(Zea mays* L.)

M. AMIRUZZAMAN, M. N. AMIN, M. QUADIR AND M. H. RASHID

Abstract

Twenty five yellow inbred lines of normal maize were evaluated for eleven parameters to study the genetic divergence using Mahalonabis's D^2 and Rao's canonical variate analysis. The twenty five inbreds fell into five distinct clusters. The intra-cluster distance in all the five clusters was more or less low, indicating the genotypes within the same clusters were closely related. The highest inter-cluster distance was observed between cluster I and VI and the lowest between the cluster II and III. The cluster IV and V each contained the highest number of genotypes. Cluster V showed the highest mean values for kernel yield and all the yield contributing traits except 1000-kernel weight and cluster II had the lowest mean values for plant and ear height and maturity characters. Days to silking, ear length, number of kernels/row, 1000-kernel weight and kernel yield showed maximum contribution towards total divergence among different characters. Based on medium to high inter-cluster distances, per se performances and desirable traits, fourteen yellow inbred lines viz. BIL 77, BIL 97, CML 287, CML 470, CML 480, CML 486, CZ 2370-22-2, CZ 2370-24-3, CZ 2370-28-2, CZ 23 70-31-3, IPB 911-2, IPB 911-22, IPB 911-36 and IPB 911-50 were selected for future hybridization program. Crossing between these genotypes have the chance to obtain higher heterosis with high performing crosses.

Keywords: Maize (*Zea mays* L.), Inbred lines, genetic divergence.

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MOLECULAR IDENTIFICATION OF PARASITOID, *Encarsia formosa* GAHAN IN *Bemisia tabaci* (GENNADIUS) AND DETERMINATION OF ITS SECONDARY ENDOSYMBIONTS

JAHAN, S. M. H., LEE, K-Y., HOWLADER, M. I. A. BASHAR H. M. AND HASAN G. N

Abstract

In this study two pairs of primers based on mitochondrial cytochrome oxidase subunit 1 (mtCOI) region and 28S ribosomal RNA (rRNA) gene region were used for identifying very tiny and morphologically indistinguishable parasitoid *Encarsia formosa* (Gahan) which are specific to *this insect*. The fragment amplified by these primer pairs were 860 and 650 bp in length. Species specificity test showed that all *E. formosa* specimens were detected with no cross reactions with other aphelinid species, including *E. sophia* (Girault & Dodd), *E. luteola, E. Inaron and E. Nigricephala*. Using phylogenetic cladogram by the sequences analysis of both mtCOI and 28S rRNA genes could be detected in *E. formosa* accurately in all replicates. *Cardinium* and *Wolbachia*

secondary endosymbiont were also detected in *E. Formosa* used by PCR amplification as well as sequence analysis of 16S-23S rDNA gene region. The molecular technique developed here would be useful for rapid and precise species identification, determination of the host spectrum and more effective utilization of *E. formosa*. This research work has been performed from January 2011 to June 2012 at the insect molecular physiology lab in the Republic of Korea.

Keywords: Molecular identification, mtCOI, *Encarsia formosa*, Secondary endosymbiont, *Bemisia tabaci*.

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INTERCROPPING CHILLI WITH SWEET GOURD AT VARYING PLANT POPULATION

M. S. ALOM, M. N. ISLAM, M. BISWAS
A. H. M. M. RAHMAN TALUKDAR, AND M. A. T. MASUD

Abstract

The experiment was conducted at the experiment stations of Bangladesh Agricultural Research Institute (BARI) at Joydebpur and Jamalpur during two consecutive seasons of November 2010 to June 2012 to find out the appropriate plant population of chilli (var. Manikgonj local at Joydebpur and Jamalpur local at Jamalpur) for intercropping with sweet gourd (var. BARI Misti Kumra-2) for higher productivity and economic return. The treatments were : T_1= Sole sweet gourd (2.0 m x 2.0 m), T_2=Sole chilli (50 cm x 40 cm), T_3= Sweet gourd (100%) + chilli (100%), T_4= Sweet gourd (100%) + chilli (60%), T_5= Sweet gourd (100%) +chilli (50%) and T_6= Sweet gourd (100%) + Chilli (40%). Averaged over the years, fruit yield of sweet gourd was reduced significantly when intercropping with more than 50% chilli. Intercropping sweet gourd with chili combination (100%) + chilli (40%) gave the highest sweet gourd equivalent yield (35.74 t/ha and 17.95 t/ha), gross return (Tk. 357400/ha and Tk. 179500/ha), gross margin (Tk. 274346/ha and Tk.124600/ha) and benefit cost ratio (4.30 and 3.27), respectively at Joydebpur and Jamalpur. The maximum land equivalent ratio (1.52 at Joydebpur and 1.56 at Jamalpur) was also obtained from sweet gourd (100%) + chilli (40%) intercropping system. The results revealed that 40% chilli population (20,000/ha) might be optimum for intercropping with sweet gourd (100%) for higher productivity and economic return.

Keywords: Sweet gourd, Chilli, Intercropping systems.

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EFFECT OF ZINC AND BORON ON YIELD AND YIELD CONTRIBUTING CHARACTERS OF LENTIL IN LOW GANGES RIVER FLOODPLAIN SOIL AT MADARIPUR, BANGLADESH

M. A. QUDDUS, H. M. NASER, M. A. HOSSAIN
AND M. ABUL HOSSAIN

Abstract

A study was conducted in Calcareous Low Ganges River Floodplain Soil (AEZ 12) at Regional Pulses Research (RPRS), Madaripur during the Rabi season of 2010-12.The objectives were to evaluate the effect of Zinc (Zn) and Boron (B) on the yield and yield contributing characters of lentil (*Lens culinaris* Medic) and to estimate the optimum dose of Zn and B for yield maximization. There were 16 treatment combinations comprising four levels each of Zinc (0, 1.0, 2.0 and 3.0 kg/ha) and Boron (0, 0.5, 1.0 and 1.5 kg/ha) along with a blanket dose of N_{20} P_{16} K_{30} S_{10} kg/ha were used. The treatments were arranged viz. T_1= Zn_0B_0; T_2= $Zn_0B_{0.5}$; T_3= $Zn_0B_{1.0}$; T_4= $Zn_0B_{1.5}$; T_5= $Zn_{1.0}B_0$; T_6= $Zn_{1.0}B_{0.5}$; $T_{7=}$ $Zn_{1.0}B_{1.0}$; T_8= $Zn_{1.0}B_{1.5}$; T_9= $Zn_{2.0}B_0$; T_{10}= $Zn_{2.0}B_{0.5}$; T_{11}= $Zn_{2.0}B_{1.0}$; T_{12}= $Zn_{2.0}B_{1.5}$; T_{13}= $Zn_{3.0}B_0$; T_{14}= $Zn_{3.0}B_{0.5}$; T_{15}= $Zn_{3.0}B_{1.0}$ and T_{16}= $Zn_{3.0}B_{1.5}$. The experiment was laid out in RCBD with three replications. Results showed that the combination of $Zn_{3.0}B_{1.5}$ produced significantly higher seed yield (1156 kg/ha). The lowest seed yield (844 kg/ha) was found in control (Zn_0B_0) combination. The combined application of zinc and boron were superior to their single application. Therefore, the combination of $Zn_{3.0}B_{1.5}$ may be considered as suitable dose for lentil cultivation in Bangladesh. But from regression analysis, the optimum treatment combination was $Zn_{2.85}B_{1.44}$ for Madaripur, Bangladesh.

Keywords: Zinc, boron, lentil yield and yield contributing characters

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SCREENING OF CHICKPEA GENOTYPES AGAINST SALINITY STRESS

MD. SHAHEENUZZAMN

Abstract

The experiment was conducted during the period from December 13, 2010 to May 13, 2011 at the Crop Physiology Lab, Agronomy Division, Bangladesh Agricultural Research Institute (BARI). In Hoagland culture solution, 70 (Seventy) genotypes of chickpea were tested during germination and seedling stage at 0, 5, 10 and 15 dS/m salinity levels. Distilled water (0 dS/m) was used as a control. Germination percentage (GP), relative germination percentage (RGP), germination rate (GR), relative germination rate (RGR), root length (RL), relative root length (RRL), shoot length (SL), relative shoot length (RSL), vigor index, total dry matter (TDM) and relative total dry matter (RTDM) were found to be affected by salinity. Genotypes BD-6061, BD-6066 BD-6071, BD-6060, BD-6067 and BD 6078 performed better at 10 dS/m and survived up to 15 days after germination as evaluated on the basis of germination percentage (GP), relative germination percentage (RGP), total dry matter (TDM) and relative total dry matter (RTDM). These genotypes could be selected for further investigation under pot culture and field evaluation in the saline area.

Keywords: Chickpea, Genotype, Salinity level, Hongland and Pot culture

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GENETIC DIVERGENCE STUDY IN SALINITY STRESS TOLERANT MAIZE (*Zea mays* L.)

A. BISWAS, U. SARKER, B. R. BANIK
M. M. ROHMAN AND M. A. KHALEQUE MIAN

Abstract

The study was conducted to investigate the genetic diversity of some maize inbreds under salinity stress condition using Mahalanobis's statistic (D^2) and principal component analysis. Analysis of variance showed significant difference for all the characters. Results of multivariate analysis revealed that seventeen inbred lines formed five clusters at 12 dS level of salinity. The highest intra-cluster distance was recorded in cluster IV containing three genotypes and the lowest was in cluster V having one genotype. The inter cluster D^2 values revealed maximum distance among the clusters. The highest inter cluster distance was observed between clusters IV & III and lowest was between V & I. Cluster IV had the highest cluster means for cob height, tassel length, cob length, SPAD value, number of seeds/cob, 100 seed weight, cob diameter and grain yield per plant. Considering cluster distance, inter-genotypic distance, cluster mean and other agronomic performances the genotypes CZ29, CZ33 and P43 from cluster IV and E135, E158, E169, P29 and P45 from cluster III may be considered as better parents for future hybridization programs to obtain desirable segregates in respect of different yield and yield contributing characters under salinity stress.

Keywords: Maize *(Zea mays* L.), inbred lines, genetic divergence, salinity stress, cluster analysis, grain yield.

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EFFECT OF NITROGEN, PHOSPHORUS, POTASSIUM AND SULPHUR ON THE YIELD OF MANGO

SHAMIMA NASREEN, A. M. KAMAL, M. A. SIDDIKY
R. P. RANNU AND M. S. ISLAM

Abstract

The experiment was conducted at the research field of Regional Horticulture Research Station, Chapai Nawabganj during 2010-11, 2011-12 and 2012-13 to find out the proper combination of fertilizer nutrients (N, P, K and S) in presence of organic manure for obtaining higher yield of mango (var. BARI Aam-1). The treatments were native nutrient i.e. control (T_1), $N_{360}P_{80}K_{150}S_{50}$ (T_2), $N_{560}P_{120}K_{200}S_{70}$ (T_3), $N_{760}P_{160}K_{250}S_{90}$ (T_4), $N_{960}P_{200}K_{300}S_{110}$ (T_5), and $N_{1100}P_{300}K_{500}S_{120}$ i.e. farmers practice (T_6) g/tree/year. In addition, 20 kg cowdung/tree was used as blanket dose. Number of fruits/tree, individual fruit weight, fruit size, stone weight, peel weight, TSS content and yield of mango varied significantly due to variations of nutrients in all the years. The highest yield and

yield attributes were recorded under treatment $N_{960}P_{200}K_{300}S_{110}$ g/tree and it was statistically identical with $N_{760}P_{160}K_{250}S_{90}$ g/tree. The lowest yield was obtained from untreated control plot (native nutrient). The yield benefit for the best treatment (T_5) over the control was 86% in 2010-11, 64% in 2011-12 and 73% in 2012-13. The highest gross margin (Tk 2509/tree in 2010-11, Tk 2651/tree in 2011-12 and Tk 2478/tree in 2012-13) and marginal rate of return (2375% in 2010-11, 2225% in 2011-12 and 2300% in 2012-13) was also obtained from the same treatment. Three years' study revealed that application of $N_{960}P_{200}K_{300}S_{110}$ g/tree along with a blanket dose of 20 kg cowdung/tree appears to be the best treatment and economically optimum for achieving higher yield of mango in Chapai Nawabganj region.

Bangladesh J. Agril. Res. 39(4): 641-659, December 2014

TUBER YIELD AND NUTRIENT BALANCE OF POTATO (*Solanum tuberosum* L.) CULTIVATION AS INFLUENCED BY DIFFERENT NUTRIENTS MANAGEMENT UNDER AEZ-28

M. A. H. S. JAHAN, M. A. R. SARKAR, N. C. D. BARMA
M. N. A. MONDAL AND M. N. S. FERDOUSI

Abstract

A field experiment was conducted at Regional Wheat Research Centre of the Bangladesh Agricultural Research Institute, Joydebpur, Gazipur for 2 consecutive years during 2006-07 and 2007-08. The objectives were to find out the optimum nutrient management practice on tuber yield, nutrient balance and economics of potato cultivation. Twelve nutrient management treatments were tested in a randomized complete block design with 3 replications. Treatments were T_1=HYG (0-198-44-194-24-6-1.2), T_2=MYG (0-140-34-138-18-4.5-0.9), T_3=IPNS (10000-168-38-170-18-6-1.2), T_4=STB (0-171-40-164-22-5-1), T_5=FP (0-97-16-91-0-0-0), T_6=CON (0-0-0-0-0-0-0), T_7=HYG+CRI, T_8=MYG+CRI, T_9=IPNS+CRI, T_{10}=STB+CRI, T_{11}=FP+CRI, T_{12}=CON+CRI kg ha^{-1} CDNPKSZnB for potato. The highest tuber yield of potato was obtained from STB+CRI (27.64 t ha^{-1}) followed by IPNS+CRI (27.35 t ha^{-1}), STB (27.10 t ha^{-1}), IPNS (26.83 t ha^{-1}), HYG+CRI (26.52 t ha^{-1}) and HYG (26.10 t ha^{-1}) in 2006-07. Similar trend was found in 2007-08. The highest tuber yield and yield contributing parameters were noticed in CRI plots than without CRI. Except N, remaining nutrient balance like P K S Zn and B were found positive in case of HYG, MYG, IPNS and STB along with or without CRI nutrient managements. The balance was found almost negative in case of FP and CON. The highest BCR was observed in STB+CRI (3.96) followed by STB (3.93), IPNS+CRI (3.76), and IPNS (3.74). The higher gross return (Tk. 283331 ha^{-1}) and also gross margin (Tk. 211761 ha^{-1}) was observed from the same treatment.

Keywords: Potato, Tuber yield, Nutrient balance, Economics and Crop Residue Incorporation.

Bangladesh J. Agril. Res. 39(4): 661-673, December 2014

STUDY ON DRYING KINETICS OF SUMMER ONION

MD. MASUD ALAM, MD. NURUL ISLAM
AND MD. NAZRUL ISLAM[2]

Abstract

The present study was concerned with the kinetics of drying of summer onion. Drying was done in a mechanical dryer at constant air flow using blanched and unblanched onion with variable temperature (52, 60 and 68^{0}C) and thickness (3, 5 and 7 mm). Drying rate was increased with increase of temperature and decreased with the increase in thickness in blanched and unblanched onion. Blanched onion showed higher drying rate than unblanched onion. Drying rate constant and thickness can be expressed as power low equations. The value of index "n" were found to be 1.277 and 0.845 for onion indicating that the external resistance to mass transfer was highly significant. The effect of temperature on diffusion co-efficient follows an Arrhenius type relationship. The activation energy (E_a) for diffusion of water was found 5.781 Kcal/g-mole for unblanched and 2.46 Kcal/g-mole for blanched onion when onions were dried in mechanical dryer.

Keywords: Onion**,** drying rate constant, diffusion coefficient, activation energy.

Bangladesh J. Agril. Res. 39(4): 675-683, December 2014

EVALUATION OF INBRED LINES OF MAIZE (*Zea mays* L.) THROUGH LINE × TESTER METHOD

M. N. AMIN, M. AMIRUZZAMAN, A. AHMED AND M. R. ALI

Abstract

Maize inbred lines were evaluated by using line × tester method involving 11 lines and 3 testers for grain yield and its components through estimation of general combining ability (gca) and specific combining ability (sca) effects. Highly significant genotypic differences were observed indicated wide range of variability present among the genotypes. The crosses with high sca effect for grain yield were evolved from high × low general combiner parents which reveled additive × dominance type of gene action. The cross combinations 9MS4-1 × L22, 9MS4-1 × L486, 9MS4-2 × L431, 9MS4-11 × L486 and 9MS4-15 × L431 with high positive sca effect having high mean values might be used for obtaining high yielding hybrids. The information on the nature of gene action with respective variety and characters might be used depending on the breeding objectives.

Keywords: Maize (*Zea mays* L.), Line × tester method, inbred lines, combining ability.

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FEASIBILITY OF INTERCROPPING LEAFY VEGETABLES AND LEGUMES WITH BRINJAL

M. R. ISLAM, M. T. RAHMAN, M. F. HOSSAIN AND N. ARA

Abstract

An experiment was conducted during 2010 and 2011 to find out the suitable crop combination for increasing total productivity, return and maximize land utilization through intercropping system. Six treatments viz. Brinjal 100% + Red amaranth 100%, Brinjal 100% + Leaf amaranth 100%, Brinjal 100% + Jute as patshak 100%, Brinjal 100% + Mungbean 60%, Brinjal 100% + Blackgram 60% and sole of base crops (brinjal) were used in the study. Results showed that different intercropping combination did not influenced yield and yield contributing characters of brinjal. The yield of brinjal comparatively lower in intercropping but total productivity increased due to additional yield of leafy vegetables and legumes. The increases in total productivity in terms of brinjal equivalent yield (BEY) was 8.80 to 26.67 t/ha in intercrop combination compared to base crop. All the intercropping combinations were higher in terms of brinjal equivalent yield, gross return and benefit cost ratio (BCR) over sole crops. Among the intercropping combinations, Brinjal 100% (100 cm × 75 cm) + Mungbean 60% (three rows mungbean in between brinjal rows maintained 30 cm apart rows with continuous seeding) was the most feasible and profitable intercropping system in respect of brinjal equivalent yield (20.85 t/ha), gross return (Tk.312750/ha), gross margin (Tk.212693/ha) and benefit cost ratio (3.13).

Keywords: Intercropping, leafy vegetables, legumes, brinjal.

Bangladesh J. Agril. Res. 39(4): 693-707, December 2014

EFFECT OF SEED PRIMING ON MAIZE (*Zea mays* L.) SEEDLING EMERGENCE UNDER DIFFERENT SOWING DATES

M. M. RAHMAN, K. U. AHAMMAD AND M. AHMED

Abstract

The experiment was carried out at the research field of Regional Agricultural Research Station, Jessore during 2009-10 and 2010-2011 to find out the effect of priming and ambient temperatures due to different sowing dates on emergence of maize seedlings. The experiment consisted of two priming methods viz., i) Priming, ii) Non-priming, and ten sowing dates viz., i) 15 November, ii) 30 November, iii) 15 December iv) 30 December v) 14 January vi) 29 January vii) 13 February viii) 28 February, ix) 15 March, and x) 30 March. The experiment was laid out in a randomized complete block design with three replications. Results showed that germination percentage, germination index, mean germination time and dry matter/plant were influenced significantly by priming. The highest germination percentage, germination index, dry matter/plant and lowest mean germination time were recorded

from primed seed sown in March followed by February and November sowings but those were very poor in December and January sowings. So, primed seeds should be sown in November and February for better stand establishment of maize.

Keywords: Seed priming, maize (*Zea mays* L.), sowing date, seedling emergence.

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EFFECT OF THICKNESS OF POLYTHENE BAG ON SEED QUALITY OF SOYBEAN

M. R. ALI, M. M. RAHMAN AND K. U. AHAMMAD

Abstract

An experiment was conducted at the Seed Laboratory of Regional Agricultural Research Station (RARS), Jamalpur during the period from May to November 2010 to study the effect of thickness of polythene bags on quality of soybean seed during storage. Seven levels of thickness of polythene bags viz. i) 0.02mm, ii) 0.03mm, iii) 0.04mm, iv) 0.05mm, v) 0.06mm, vi) 0.07mm and vii) 0.08mm were include as treatment in the trial. Seed moisture content, germination percentage, vigor and seedling dry matter weight were taken during May to November 2010 at two month intervals. Results showed that during the storage period the lowest seed moisture content and highest germination percentage, vigor index, seedling dry matter weight and field emergence were found for seed stored in 0.08mm thickness polythene bags. The germination of seed at two months after storage ranged 76% to 95.3% and that was in the range of 0% to 90.7% after six months of storage under ambient room condition. Soybean seed could be stored safely at ambient condition with more than 80% germination for six months by keeping them in polythene bags having thickness between 0.03mm to 0.08mm with 8% seed moisture content.

Keywords: Soybean, polythene thickness, seed moisture, viability, vigour.

Bangladesh J. Agril. Res. 40(1): 1-16, March 2015

THE THIRD GENOTYPIC CLUSTERS OF *Bemisia tabaci* (GENNADIUS) (HEMIPTERA: ALEYRODIDAE) FOUND IN BANGLADESH

S. M. H. JAHAN, K. Y. LEE AND M. I. A.HOWLADER

Abstract

The sweet potato whitefly, *Bemisia tabaci* is a species complex that possessed several biotypes including different genotypic clusters within species, which may differ from each other genetically and physiologically but morphologically alike. This study was performed by molecular analysis for easy identification of whitefly and describes its biotype throughout Bangladesh. Whiteflies have been identified from different places of Bangladesh based on mitochondrial cytochrome oxidase subunit I (mtCOI) gene and 16S ribosomal RNA gene sequences analysis. The mtCOI sequences of BW3 (collected from eastern part of Bangladesh) whitefly were diverged by 14.5% and 15.1% compared with B and Q biotypes from Korea and it also diverged by 15.4% and 13.7% from each other compared to BW1 (collected from southern part of Bangladesh) and BW2 (collected from northern part of Bangladesh), respectively within the country. The 16S rRNA sequences of BW3 whitefly were more deviated by 41.5%, 10.7%, 42.7% and 12.6% compared with the country populations from BW1, BW2, B and Q biotypes, respectively. Moreover, it showed high divergences from indigenous whiteflies of southern and northern part of Bangladesh which clustered in a different clade on both mtCOI and 16S rRNA phylogeny. Therefore, till date three genotypic cluster of indigenous whitefly BW1, BW2 and BW3 are identified from Bangladesh.

Keywords: *Bemisia tabaci*, BW3, mtCOI gene, 16S rRNA gene and indigenous whitefly.

Bangladesh J. Agril. Res. 40(1): 17-34, March 2015

GRAIN YIELD, NUTRIENT BALANCE AND ECONOMICS OF T. *AMAN* RICE CULTIVATION AS INFLUENCED BY NUTRIENT MANAGEMENT

M. A. H. S. JAHAN, M A R SARKAR, N. C. D. BARMA
M. N. A. MONDAL, M. N. S. FERDOUSI

Abstract

A field experiment was conducted at Regional Wheat Research Centre of the Bangladesh Agricultural Research Institute, Joydebpur, Gazipur, Bangladesh during 2007 and 2008. The objectives were to find out the optimum nutrient management practice for grain yield, nutrient balance and economics of T. *Aman* rice. Twelve nutrient management treatments (with and without CRI) were tested in RCBD with 3 replications. Treatments were T_1=HYG (0-80-16-44-12-2-0), T_2=MYG (0-56-12-32-8-1.5-0), T_3=IPNS (5000-65-13-32-9-2-0), T_4=STB (0-68-15-37-11-2-0), T_5=FP (0-39-7-12-0-0-0), T_6=CON (0-0-0-0-0-0-0), T_7=HYG+CRI(Crop residue incorporation), T_8=MYG+CRI, T_9=IPNS+CRI, T_{10}=STB+CRI, T_{11}=FP+CRI, T_{12}=CON+CRI kg ha^{-1} CDNPKSZnB for T. *Aman* rice. On an average, maximum grain yield of T. *Aman* rice was obtained from STB+CRI (5.24 t ha^{-1}) followed by IPNS+CRI (5.13 t ha^{-1}), STB (5.12 t ha^{-1}), IPNS (5.03 t ha^{-1}), HYG+CRI (4.50t ha^{-1}) and HYG (4.41 t ha^{-1}). Numerically but not statistically higher yield and yield contributing parameters were noticed in CRI plots than without CRI. Except N and K remaining nutrient balance like P S Zn and B were found positive in case of HYG, MYG, IPNS and STB along with or without CRI nutrient managements while FP and CON (Control) showed negative balance. The maximum BCR was observed in STB (3.25) followed by STB+CRI (3.14) and IPNS (2.98) and similar trend was observed in MBCR.

Keywords: T. *Aman* rice, yield, nutrient balance, nutrient management and crop residue incorporation.

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STUDY ON WATER SORPTION ISOTHERM OF SUMMER ONION

MD. MASUD ALAM AND MD. NAZRUL ISLAM

Abstract

The water sorption characteristics of dehydrated onion and onion solutes composite by vacuum drying (VD) and air drying (AD) were developed at room temperature using vacuum desiccators containing saturated salt solutions at various relative humidity levels (11-93%). From moisture sorption isotherm data, the monolayer moisture content was estimated by Brunauer-Emmett-Teller (BET) and Guggenheim-Anderson-de Boer (GAB) equation using data up to a water activity of 0.52 and 0.93 respectively. Results showed that in case of non treated samples the monolayer moisture content values (W_o) of BET gave slightly higher values than GAB (9.7 vs 8.2) for VD, while GAB gave higher value than BET (11.0 vs 9.8) for AD. It is also seen that the treated and non treated onion slice and onion powder absorbed approximately the same amount of water at water activities below about 0.44 and above 0.44 the treated samples begin to absorb more water than the non treated samples. It was observed that 10-20% added of sugar gave no change in water sorption capacity while the amount of sorbed water increases with increasing amount added salt for mix onion product.

Keywords: BET equation, GAB equation, Monolayer moisture content, Water activity.

Bangladesh J. Agril. Res. 40(1): 53-60, March 2015

EFFECT OF NITROGEN LEVEL AND LEAF CUTTING FREQUENCY ON FOLIAGE AND SEED YIELDS OF CORIANDER

M. MONIRUZZAMAN AND M. M. RAHMAN

Abstract

A field experiment was conducted at BSMRAU farm, Gazipur to evaluate the effects of four nitrogen levels (0, 40, 80 and 120 kg/ha)

and four levels of leaf cutting (no cutting, one cutting at 30 DAS, two cuttings at 30 & 45 DAS and three cuttings at 30, 45 & 60 DAS) on three genotypes of coriander (*Coriandrum sativum* L.) (CS001, CS002 and CS003). The genotype CS003 produced the highest foliage yield (8.92 t/ha) and the genotype CS001 gave the highest seed yield (0.93 t/ha). The maximum foliage and seed yields were obtained from the N application at 80 kg N/ha. The maximum foliage yield (11.21 t/ha) was recorded with the three cuttings, but the highest seed yield was noted with the one cutting (1.06 t/ha). The 80 kg N/ha coupled with three cuttings gave the top most foliage yield while the same rate accompanied with one cutting gave the top most seed yield for all genotypes.

Keywords: Nitrogen, leaf cutting, green leaf, seed yield, coriander and *Coriandrum sativum* L.

Bangladesh J. Agril. Res. 40(1): 61-69, March 2015

GREEN COB AND FODDER YIELD OF SWEET CORN AS INFLUENCED BY SOWING TIME IN THE HILLY REGION

M. SHAHEENUZZAMN, R. R. SAHA, B. AHMED
J. RAHMAN AND M. SALIM

Abstract

A field experiment was conducted at the farm of Hill Tract Agricultural Research Station, Ramgarh, Khagrachari Hill District during *rabi* season of 2010-11 and 2011-12 to determine the optimum sowing time for better yield of green cob as well as fodder of sweet corn (var. BARI Sweet corn-1) in the hilly region. Five sowing dates (November 20, November 30, December 10, December 20 and December 30) were included in the study. During 2010-11, the highest green cob yield was obtained from 20 November sowing (8.43 t/ha) followed by 30 November sowing (7.81 t/ha) and the lowest yield (5.00 ton/ha) from 20 December sowing. During 2011-12, the maximum green cob yield (8.60 t/ha) was also obtained from 20 November, which was statistically identical with that of 30 November (8.03 t/ha), 10 December (7.67 t/ha) and 20 December (8.11 ton/ha) sowing. Average of two years result showed that the maximum fodder yield (39.99 t/ha) was obtained from 30 November sowing which was at par with that of 20 November sowing. Maximum TSS (Total soluble sugar) value of Sweet corn was obtained from 20 November sowing during 2010-11 and 30 November sowing during 2011-12. Across over two years, 20 November to 30 November sowing was found suitable for sweet corn production in the hilly areas in terms of green cob and fodder yield and also TSS value.

Keyword: Sweet corn, green cob, fodder and hill region.

Bangladesh J. Agril. Res. 40(1): 71-76, March 2015

YIELD RESPONSE OF SUMMER COUNTRY BEAN TO BORON AND MOLYBDENUM FERTILIZER

SHAMIMA NASREEN, M. A. SIDDIKY, R. AHMED AND R. P. RANNU

Abstract

Field experiments were conducted in the Grey Terrace Soil (*Aeric Albaquept*) under AEZ-28 at the Bangladesh Agricultural Research Institute (BARI) farm, Gazipur during summer seasons of 2010 and 2011 to determine the optimum rate of boron and molybdenum combination for maximizing the yield of summer country bean (var. BARI Sheem-3). Four levels each of B (0, 1, 2 and 3 kg ha^{-1}) and Mo (0, 0.5, 1.0 and 1.5 kg ha^{-1}) were used as treatment variables. The results indicated that application of B and Mo fertilizer combination exerted significant influence on the number of pods $plant^{-1}$, individual pod weight and pod yield ha^{-1} in both the years. The highest pod yield (9.58 t ha^{-1} in 2010 and 9.42 t ha^{-1} in 2011) was produced by the combination of 2 kg B and 1.5 kg Mo ha^{-1} and it was statistically identical with 2 kg B and 1.0 kg Mo ha^{-1} combination. Addition of B beyond 2 kg ha^{-1} along with higher doses of Mo created a detrimental effect to reduce yield irrespective of years. The results revealed that application of 2 kg B and 1 kg Mo ha^{-1} combination with a blanket dose of 50 kg N, 40 kg P, 60 kg K and 20 kg S ha^{-1} plus cowdung 5 t ha^{-1} might be optimum for summer country bean cultivation in Grey Terrace Soil of Gazipur.

Keyword: Country bean, summer, boron, molybdenum and yield.

Bangladesh J. Agril. Res. 40(1): 77-93, March 2015

SEED YIELD, NUTRIENT BALANCE AND ECONOMICS OF MUNGBEAN CULTIVATION AS INFLUENCED BY DIFFERENT NUTRIENTS MANAGEMENT UNDER AEZ-28

M. A. H. S. JAHAN, M. A. R. SARKAR, N. C. D. BARMA
M. N. A. MONDAL AND M. N. S. FERDOUSI

Abstract

A field experiment was conducted at Regional Wheat Research Centre of the Bangladesh Agricultural Research Institute, Joydebpur, Gazipur, Bangladesh for 2 consecutive years during 2007 and 2008 to find out the optimum nutrient management practice for seed yield, nutrient balance and economics of mungbean. Twelve nutrient management treatments were tested in RCBD with 3 replications. Treatments were without CRI T_1=HYG (0-24-40-48-24-3-1.2), T_2=MYG (0-20-36-40-20-2-1), T_3=IPNS (5000-9-37-36-21-3-1.2), T_4=STB (0-20-36-40-22-2-1), T_5=FP (0-6-5-4-0-0-0), T_6=CON (0-0-0-0-0-0-0) and with CRI T_7=HYG+CRI, T_8=MYG+CRI, T_9=IPNS+CRI, T_{10}=STB+CRI, T_{11}=FP+CRI, T_{12}=CON+CRI kg ha^{-1} CDNPKSZnB for mungbean. The maximum seed yield of mungbean was obtained from STB+CRI (1.57 t ha^{-1}) followed by IPNS+CRI (1.54 t ha^{-1}), STB (1.54 t ha^{-1}), IPNS (1.52 t ha^{-1}), HYG+CRI (1.44 t ha^{-1}) and HYG (1.41 t ha^{-1}) in 2007. Similar trend was found in 2008. Numerically higher yield and yield contributing parameters were noticed in CRI plots than without CRI. N and K balance were found negative in all the treatments. P, S, Zn and B balance were found positive in case of HYG, MYG, IPNS and STB along with or without CRI nutrient managements. While in case of FP and CON, the balance was shown almost negative. The maximum gross return and margin was obtained from STB+CRI followed by STB. Slightly higher BCR (3.00) was recorded from STB followed by STB+CRI (2.91).

Keywords: Mungbean, Seed yield, Economics, Nutrient balance and Crop Residue Incorporation.

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CONSTRAINTS AND SUGGESTIONS FOR MODERN VARIETY POTATO PRODUCTION TECHNOLOGY

A. B. M. SHARIF UDDIN, M. MOSTAFIZUR RAHMAN, M. HASANUL KABIR KAMALY, M. BASHIRUL ALAM AND M. MOHIUDDIN SHEIKH

Abstract

A study was carried out to determine the production constraints of modern varieties of potatoes and also find out the probable suggestions to overcome the constraints as verified the views between the farmers and extension officials. Data were collected from 232 farmers sampled randomly from 1547 potato growers and 51 extension officials from 153 population available from the study area of three upazila namely; Durgapur, Mohanpur and Bagmara under Rajshahi district of northwest area of Bangladesh. The study area was selected through multistage sampling procedure with continuous field observation and consultations with teachers, extension personnel, experts and contact farmers along with literatures reviewed. Thus, twenty important constraints regarding potato production were identified and possible suggestions for overcoming the constraints were suggested by using the same procedure. The importance of the constraints and the suggestions were measured by using 'Important Constraints Score Index (IPSI)' and 'Important Suggestion Index (ISSI)'. Out of 20 constraints and suggestions views of farmers and officials differed significantly for 15 items and 13 items.

Keywords: Constraints, suggestions and potato production.

Bangladesh J. Agril. Res. 40(1): 109-119, March 2015

EFFECT OF SOWING DATES AND GENOTYPES ON THE YIELD OF CORIANDER (*Coriandrum sativum* L.)

M. MONIRUZZAMAN, M. M. RAHMAN, M. M. HOSSAIN
A. J. M. SIRAJUL KARIM AND Q. A. KHALIQ

Abstract

A field experiment on coriander (*Coriandrum sativum* L.) taking five sowing dates viz. November 01, November 16, December 01,

December 16 and December 31 and four selected genotypes viz. CS001, CS007, CS008 and CS011 was conducted during the Winter season of 2009-10 at Bangabandhu Sheikh Mujibur Rahman Agricultural University to study heat efficiency for the crop. The crop sown on November 16 and the genotype CS011 showed the highest heat use efficiency for dry matter, seed and stover yield. Heat use efficiency for dry matter as well as seed yield increased from November 01 to November 16 and then decreased with delayed sowing. November 16 sowing coupled with CS011 gave the maximum heat use efficiency for seed yield. Growing Degree Days (GDD) showed a positive linear response with dry matter accumulation and coefficient of regression was high in November 16 sowing as well as in CS011. Heat use efficiency showed a negative linear response with maximum ($y = 2.058 – 0.054$, $R^2 = 0.682$*), minimum ($y = 2.123 – 0.070x$, $R^2 = 0.687$*) and mean ($y = 2.13 – o.063x$, $R^2 =0.709$*) temperature but positive linear response with relative humidity ($y = 0.074x – 5.593$, $R^2 = 0.702$*).

Keywords: Heat use efficiency (HUE), Growing Degree Days, Coriander genotypes, dry matter and sowing dates.

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MOLECULAR DIVERGENCE OF SECONDARY ENDOSYMBIONT, *CARDINIUM* IN *BEMISIA TABACI* (GENNADIUS) AND ASSOCIATES

JAHAN, S. M. H., LEE, K-Y., HOWLADER, M. I. A.
BASHAR H. M. K AND HASAN G. N.

Abstract

Whitefly, *Bemisia tabaci* (Hemiptera : Aleyrodidae) harbors numerous secondary endosymbionts, which are transmitted from mother to offspring by both horizontally and vertically, that have crucial role on host selection, biology, and evolution. Bacteria, *Cardinium* was identified in *B. tabaci* as well as in other whitefly population from many different countries by comparing 16S rDNA sequences. *Cardinium* were detected in all tested indigenous *B. tabaci* populations of Bangladesh, Myanmar, Nepal, and the Philippines as well as Q1 biotype of Korea. It was absent in B biotype of Korea and Q biotype of China. *Cardinium* was also detected in three out of five tested *Aleurodicus dispersus* population as well as in five out of seven *Trialeurodes vaporariorum*, whereas they were not detected in *Tetraleurodes acaciae* populatuion. In adition, *Cardinium* was detected in parasitoid *Encarsia formosa* attacking *B. tabaci*. Among the 19 whitefly populations from different countries, present studies identified four phylogenetic groups of *Cardinium*, thereby demonstrating the high diversity of this genus. *Cardinium* phylogeny suggests a correlation of geographical range with ecological variation at the species level.

Keywords: Molecular divergence, Intra-specific variation, *Aleurodicus dispersus*, Endosymbiont, *Bemisia tabaci* and *Cardinium.*

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FIELD PERFORMANCE AND FRUIT QUALITY OF STRAWBERRY GENOTYPES UNDER SUBTROPICAL CLIMATE

M. MOSHIUR RAHMAN, M. M. RAHMAN, M. M. HOSSAIN
M. A. KHALEQUE MIAN AND Q. A. KHALIQ

Abstract

Thirteen strawberry genotypes collected from different sources were evaluated at the Fruit Research Field of Pomology Division, HRC, BARI, Gazipur, Bangladesh during the winter season of 2009-2010 and 2010-2011 for yield, yield contributing characters and nutrient components of fruit. Among the 13 genotypes studied, the plants of FA 005 produced the maximum number of fruits (43.50 plant^{-1}) followed by FA 006 and FA 007 (37.50 plant^{-1}), while FA 009 and FA 013 produced the minimum number of fruits (9.00 plant^{-1}). The heaviest fruits were produced by FA 006 (18.73 g) followed by FA 007 (17.40 g) and FA 005 (16.96 g) which were statistically similar, while the lightest fruit was found

in FA 014 (5.11 g). The fruit yield plant^{-1} of different genotypes varied from 52.00 to 737.70 g and plants of FA 005 produced the maximum yield followed by FA 006 (702.30 g plant^{-1}) and these were significantly higher than those of others. The minimum yield plant^{-1} was recorded in FA 013 and FA 014. The TSS content was highest in FA 007 (8.50 %) followed by FA 017 (8.17 %), whereas the lowest was in FA 009 (6.33 %). The TSS to acid ratio was maximum in FA 006 (11.32) followed by FA 017 (11.24), FA 007 (10.80) and FA 005 (10.62), while the lowest was in FA 011 (6.95). The sugar to acid ratio significantly ranging from 3.60 to 5.98, and it was maximum in FA 006 (5.98). Plants of FA 005 contained the maximum amount of ascorbic acid (77.33 mg 100g^{-1}) followed by FA 006 (76.00 mg 100g^{-1}), while the minimum in FA 010 (53.00 mg 100g^{-1}).

Keyword: Strawberry, field performance, yield and fruit quality.

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CORRELATION AND PATH COEFFICIENT ANALYSES IN BASMATI RICE

M. RATNA, S. BEGUM, A. HUSNA, S. R. DEY AND M. S. HOSSAIN

Abstract

Correlation and path coefficient analyses among fourteen morphological characters were studied in six advanced lines of Basmati rice and one commercial check, namely BRRI Dhan 29. In general, genotypic correlation coefficients were higher than the corresponding phenotypic correlation coefficients suggesting that the environmental influence reduces the relationship between yield and yield contributing characters of rice. Correlation coefficient analysis showed significant positive correlation between plant height and panicle length at genotypic level. Number of filled spikelets/panicle showed significant positive correlation with yield at both genotypic and phenotypic levels but significant negative correlation was observed between plant height and yield. Number of effective tillers/plant had negative significant correlation with panicle length and with number of unfilled spikelets/panicle at genotypic level. Number of ineffective tillers/plant had significant negative correlation with 1000-seed weight at both genotypic and phenotypic levels. Path coefficient analysis revealed highest positive direct effect of number of filled spikelets/panicle on grain yield but plant height and number of unfilled spikelets/panicle had negative direct effect on grain.

Keywords: Correlation coefficient, genotypic level, path coefficient, rice and *Oryza sativa.*

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DETERMINATION OF MATURITY INDICES OF BER (*Zizyphus Mauritiana* Lam.) VAR. BARI KUL-2

M. N. ISLAM, M. M. MOLLA, T. A. A. NASRIN A. S. M. M. UDDIN AND K. KOBRA

Abstract

A study was conducted at Fruit Research Farm and Postharvest Technology Laboratory of Horticulture Research Centre, Bangladesh Agricultural Research Institute during the period from October 2009 to February 2010 to determine the maturity indices of ber. The ber variety BARI Kul-2 was selected for conducting the study. Ber fruits were tagged at fruit setting stage and harvested at 90, 100, 110, 120 days after fruit set (treatments). The physicochemical characters like fruit weight and size, specific gravity, TSS (%), sugar (%), acidity (%), pulp-stone ratio, TSS-acid ratio, sugar-acid ratio as well as subjective sensory attributes like fruit colour and texture, and storage traits like storage life, physiological weight loss (%), ripening status and decay, browning and shriveling (%) of harvested fruits were evaluated for determining the proper stage of commercial maturity. The fruit weight, TSS (%), pulp-stone ratio, TSS/acid ratio, sugar-acid ratio and specific gravity of BARI Kul-2 were found 24.33g, 15.60, 15.66, 39.72, 16.14 and 0.98, respectively, at 110 days after fruit set. Considering all the physical and chemical characters matching

with subjective parameters, fruits of BARI Kul-2 was found commercially mature after 110 days of fruit set when the fruits turned into light greenish yellow to greenish yellow colour and specific gravity less than 1.00.

Keyword: Ber, *Zizyphus mauritiona* Lam and maturity indices.

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FLORAL BIOLOGY OF INDIGENOUS PUMMELO GENOTYPES

M. A. HOQUE

Abstract

Flower morphology and bud development of pummelo accessions CG-1, CG-18 and CG-151 were studied at the Pummelo Orchard of Regional Agricultural Research Station, BARI, Akbarpur, Moulvibazar and the Horticulture Laboratory of Bangabandhu Sheikh Mujibur Rahman Agricultural University during 2008-2009. Pummelo flowers were bisexual, bore singly on leaf axils or in clusters with or without leaf on stem in all accessions, and colour were white. Calyx diameter varied from 0.94 in CG-1 to 1.02 in CG-18. Number of petals per flower ranged from 4.0 to 4.5. Anthers were yellow in colour and only CG-151 produced few rudimentary styles. Diameter of stigma varied from 0.39 mm to 0.49 mm. Number of locules per ovary was in between 14.6 to16.0 and number of ovules per locules varied from 4.0 to 9.0. Stages of floral bud development from initiation to anthesis were divided into 9 distinct stages. In pummelo, a total of 27.7 to 31.2 days were required from a bud initiation to reach its fully developed stage. Suitable time for emasculation of pummelo flowers was found within 26 days from flower bud initiation. Between 3:00am to 5:00am, about 76% flowers were found to be opened and between 4:00pm to 5:00pm in all the three accessions, dehiscence of pollens was recorded. Abscission of stamen, petal and style started after 50.8, 76.4 and 162.3 hrs and completed after 128.4, 137.9 and 228.3 hrs of anthesis, respectively.

Keywords: Floral morphology, pummelo and bud development.

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DETERMINATION OF OPTIMUM MATURITY STAGE OF BANANA

M. N. AMIN, M. M. HOSSAIN, M. A. RAHIM AND M. B. UDDIN

Abstract

Time of harvest based on maturity indices is very important for fruit quality. Fruits harvested before optimum maturity may not ripe adequately and may not develop adequate flavor, while fruits harvested late (over-matured) have a shorter postharvest life and deteriorate rapidly. Climacteric fruits can be harvested after reaching full maturation, and before reaching the ripening stage. The tissue culture suckers of BARI Kola1 and Sabri Kola varieties were used for the study. The experiment was conducted at the Farm Machinery and Postharvest Process Engineering Division, Bangladesh Agricultural Research Institute, Gazipur in 2009-10. Optimum maturity stage of banana fruits reduced the postharvest losses and extended the storage life of fruits. BARI Kola 1 and Sabri Kola reached to flowering stages 10 and 15 months after planting, respectively. The optimum maturity stages of BARI Kola 1 and Sabri Kola were found to 120 and 100 days after emergence of flowering (DAEF) in summer and 130 and 110 DAEF in winter seasons, respectively. Higher pulp to peel ratio and yield of both the varieties was found in summer than those of winter season. The pre-harvest loss of banana fruits started at the point when it just exceeded the optimum maturity stage. Decreasing trend of shelf-life and firmness of fruits for both the varieties were observed with the advancement of maturity. On the other hand, dry matter content, angularity, pulp to peel ratio, and yield of banana fruits increased with the advancement of harvesting days. Degree days of these varieties were found to be 1750 and 1620, respectively.

Keywords: BARI Kola 1, Sabri Kola**,** optimum maturity stage, shelf-life, degree days and physico-chemical properties.

Bangladesh J. Agril. Res. 40(2): 205-215, June 2015

RESPONSE OF ELEVATED TEMPERATURE ON CARBOHYDRATE ACCUMULATION AND GRAIN YIELD IN DIFFERENT WHEAT CULTIVARS

SOYEMA KHATUN, AND JALAL UDDIN AHMED

Abstract

In order to study the response of terminal heat stress on carbohydrate accumulation and grain yield of three wheat cultivars namely BARI Gom-25, BARI Gom-26 and Pavon 76 were sown on 18 November, 2011 in experimental field of Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur in Bangladesh and two temperature regimes viz. normal (23°C in open field) and elevated (6 ± 1°C higher compared to open field mean air temperature in polythene chamber) were created. Elevated temperature shortened the grain filling duration by 5-day in BARI Gom 25 and BARI Gom 26 and 10-day in Pavon 76. Under elevated temperature condition grain starch synthesis was found to be stopped at 25 days after anthesis (DAA) in Pavon 76 which in BARI Gom 26 appeared 5-day later (30 DAA) in spite of higher level of soluble sugar in grain. Results indicate that early failure of conversion of sugar to starch rather than supply of soluble sugar under elevated temperature condition were responsible for shortening of grain filling duration and smaller grain size in all wheat cultivars. Smaller reduction of grain size and grain number along with smaller reduction of grain weight per main stem under elevated temperature condition finally contributed to sustain negligible loss of grain yield, biological yield and harvest index in BARI Gom-25 and BARI Gom-26 compare to Pavon-76.

Keywords: Starch, soluble sugar, heat stress and wheat.

Bangladesh J. Agril. Res. 40(2): 217-227-00, June 2015

EFFECT OF PHOSPHORUS IN REDUCING ARSENIC AVAILABILITY IN SOILS AND ARSENIC UPTAKE BY MAIZE

HABIB MOHAMMAD NASER, SARMIN SULTANA
SOHELA AKHTER AND ROWSHAN ARA BEGUM

Abstract

A pot experiment was carried out in the net house of Soil Science Division of Bangladesh Agricultural Research Institute (BARI), Joydebpur Gazipur on 16 March 2010 and 12 January 2011 with a view to studying the effect of P addition to As-contaminated soils and the consequences on As uptake of maize (*Zea mays* L.) plants. Experiments were conducted in consecutive two years. Arsenic was added to the pots at the rates of 0, 20 and 30 mg kg^{-1}, and P at 0, 30 and 60 mg kg^{-1}. Thus there were seven treatment combinations, i.e., As_0P_0, $As_{20}P_0$, $As_{30}P_0$, $As_{20}P_{30}$, $As_{20}P_{60}$, $As_{30}P_{30}$, and $As_{30}P_{60}$. Phosphorus fertilization increased total As uptake, but the increase was restricted to the root. As concentration of root was much higher than that of shoot. As concentrations in shoot and root were positively correlated (r = 0.913, r = 0.975; $P<0.01$) in 2010 and 2011, respectively, and plant As was positively correlated to the plant P in shoot (r = 0.883 and 0.875; $P<0.01$) and in root (r = 0.829, $P<0.05$ and 0.917; $P<0.01$). The plants took up much greater amounts of P than as. The results presented here indicate P supply may effect in higher As allocation to the plant parts, which has practical application in soil-crop systems. These findings could have important implications for human health and agricultural systems, since it may reduce As contamination through the consumption of crops (phytoextraction) grown on contaminated soils.

Keywords: Soil, arsenic, phosphorus, uptake and mize.

Bangladesh J. Agril. Res. 40(2): 229-233, June 2015

EFFICACY OF FUNGICIDES TO CONTROL *STEMPHYLIUM* BLIGHT (*STEMPHYLIUM BOTRYOSUM*) OF LENTIL

M. SHAHIDUZZAMAN, M. ABUL HOSSAIN, N. D. KUNDU

Abstract

A field experiment was carried out during *rabi* seasons of 2011-12 and 2012-13 to evaluate the efficacy of fungicides in controlling *Stemphylium* blight (*S. botryosum*) of lentil. Five fungicides were evaluated under higher disease pressure (10^6 ml^{-1}) of *Stemphylium* blight. Results revealed that Foliar spray (4 sequences) with Rovral 50WP (Iprodione) @ (0.2%) and Secure 600WG (Fenamidione+Mancozeb) @ (0.2%) at an interval of 7 days effectively controlled the disease and increased yield of lentil by 31.99% and 28.20%, respectively. The fungicides may be selected for control of the disease.

Keywords: Efficacy, *Stemphylium* blight, fungicide and Lentil.

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STATUS OF CONSERVATION AGRICULTURE BASED TILLAGE TECHNOLOGY FOR CROP PRODUCTION IN BANGLADESH

M. ISRAIL HOSSAIN, M. J. U. SARKER AND M. ARSHADUL HAQUE

Abstract

Conservation agriculture (CA) based tillage technology permits direct seeding through the moderate level of crop residue. CIMMYT introduced this technology in the farmers' field of Bangladesh for wheat crop in collaboration with Wheat Research Centre, Bangladesh Agricultural Research Institute (BARI). Farmers accept CA based tillage technologies considering the advantages of higher yields, reduced cost of tillage operation, and minimum turn around time between the crops. Up land crops are more suitable under these tillage technologies. Weed management in rice cultivation is not yet in a good shape. Most of the tillage implements are operated by imported Chinese two wheel tractor (power tiller). There are few four wheel tractor CA implement using in research farm. Local manufacturers are being fabricated these cost effective small minimum tillage seed drill, raised bed planter, zero till drill, and strip till drills efficiently in different districts of Bangladesh. Farmers accept CA technologies in their field, especially raised bed planting and minimum tillage technology. There are about 425 numbers of raised bed planters and 865 minimum tillage seed drill in the country. Area coverage under bed planting and minimum tillage system are 5764 ha and 21850 ha, respectively. There are 20125 numbers of farmers involved in raised bed farming. There is a big prospect accelerating the CA based tillage technology in the farmers' field as irrigation water availability becoming limited or more costly. Mind set up is the big issue for adopting CA tillage technology. Training and multi disciplinary approaches can push forward these tillage technologies ahead.

Keywords: Conservation agriculture, zero tillage, minimum tillage, strip tillage and bed planting.

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EVALUATION OF SWEET POTATO GENOTYPES AGAINST SALINITY

FARIDA BEGUM, M. AZIZUL HAQUE
M. S. ALAM AND H. C. MOHANTA

Abstract

Ten sweet potato lines/varieties were studied for growth response under NaCl salt stress condition. The rooting ability, in terms of root number, root length and root volume was studied. Growth in terms of root and shoot dry weight was also studied. A variation was recorded among the eight varieties and two lines in different doses of NaCl for growth responses in terms of rooting ability. The genotypes BARI SP-9, showed rooting ability up to 20 dS^{-m} among the 10 genotypes. The genotypes BARI SP-2, BARI SP-3, BARI SP-7, BARI SP-9 and line SP-613 showed increase in root

number upto 6 dS^{-m} as compared to control. Accumulation of Na^+ increased with a concomitant decrease in K^+. Sweet potato plantlet transport less amount of Na^+ and more amount of K^+ to the shoot. Genotypes BARI SP-7 and BARI SP-9 showed better performance upto15dS^{-m}.

Keywords: Salinity, sweet potato, seedling growth, accumulation of Na^+ and K^+

Bangladesh J. Agril. Res. 40(2): 259-270, June 2015

IMPROVEMENT FROM MUSTARD-*BORO*-T. *AMAN* CROPPING PATTERN TO MUSTARD-*BORO*-JUTE-T. *AMAN*

M. M. RAHMAN, M. A. RAHAMAN, M. AHMED
M. M. UDDIN, AND A. K. CHOUDHURY

Abstract

The experiment was conducted at the farmers field of FSRD site, Elenga and MLT site Modhupur, Tangail during two consecutive years 2011-12 and 2012-13 to study the productivity, production efficiency, land use efficiency and economic return of the improved cropping pattern (Mustard - Boro - Jute -T. Aman) against the existing cropping pattern (Mustard -Boro - T. Aman) through incorporating of modern crop varieties and improved management practices. The experiment was laid out in randomized complete block design with six dispersed replications. The pooled data of improved management practice for the pattern produced significantly higher yield in Mustard and T. Aman rice respectively and also gave additional jute yield. The gross return and gross margin were higher in improved pattern compared to that of existing farmer's pattern with only 149 and 151% extra cost at FSRD site, Elenga and MLT site Modhupur, respectively. The higher benefit cost ratio (1.74 and 1.79), rice equivalent yield (22.41 and 21.82), production efficiency (40.19 and 39.48) and land-use efficiency (95.75 and 96.48) indicated the superiority of the improved pattern over the farmer's existing pattern at both sites. Higher rice equivalent yield indicates that improved cropping pattern (Mustard - Boro - Jute -T. Aman) could be suitable in Tangail region for increasing crop productivity as well as cropping intensity.

Keywords: Improved cropping pattern, rice equivalent yield, land use efficiency and production efficiency.

Bangladesh J. Agril. Res. 40(2): 271-278, June 2015

PERFORMANCE OF LENTIL VARIETIES UNDER RELAY AND MINIMUM TILLAGE CONDITIONS IN T. AMAN RICE

M. R. ISLAM, M. K. UDDIN AND M. O. ALI

Abstract

A study on comparative productive efficiency and feasibility of lentil varieties both at relay and minimum tillage were conducted at the Regional Agricultural Research Station, BARI, Ishurdi, Pabna, Bangladesh during the *rabi* season of 2007-08 and 2008-09. Three lentil varieties viz. BARI Masur-2, BARI Masur-3 and BARI Masur-4 and two sowing methods viz. relay sowing and furrow sowing (Minimum tillage) were compared. The highest seed yield (1.59 t/ha) was obtained from BARI Masur-4 because of highest number of pods/plant and plant population/m^2 while lowest from BARI Masur-2 (1.39 t/ha). The sowing methods had significant effect on the seed yield of lentil. Crops sown in furrows produced higher seed yield (1.60 t/ha) than that of crops in relay sowing. The interaction effect between varieties and sowing methods also had significant effect on the seed yield and yield attributes. The lentil variety BARI Masur-4 when grown in furrows gave the highest seed yield (1.70 t/ha). Though seed yield and gross return were highest in furrow sowing but highest benefit cost ratio (4.67) was found in relay sowing method.

Keywords: Lentil, relay and minimum tillage.

Bangladesh J. Agril. Res. 40(2): 279-289, June 2015

EFFECTIVENESS OF DIFFERENT SUBSTRATE MATERIALS TO PREPARE *Trichoderma harzianum* BASED BIO-FUNGICIDES TO CONTROL FOOT AND ROOT ROT *(Fusarium oxysporum)* OF TOMATO

M. I. FARUK, M. L. RAHMAN, M. M. RAHMAN
R. ISLAM AND M. A. RAHMAN

Abstract

An investigation was undertaken to evaluate the effectiveness *Trichoderma harzianum* based bio-fungicides multiplied on different substrates. The substrates was rice bran, wheat bran, grass pea bran and their combinations with mustard oilcake (MOC) were used to mass culture *T. harzianum* for the management of foot and root rot disease of tomato seedling caused by *Fusarium oxysporum* in seedbed. All combinations of carrier materials were found effective for preparing *T. harzianum* based bio-fungicides to promote germination, seedling growth and reducing pre-emergence and post-emergence mortality of tomato seedling under *F. oxysporum* inoculated seedbed soils. The shoot length, shoot weight, root length and root weight of tomato seedling were enhanced significantly by the application of different substrate materials of *T. harzianum* based bio-fungicides under *F. oxysporum* inoculated seedbed conditions. The individual (rice bran, wheat bran, grass pea bran) and combination of substrates (rice bran + wheat bran, rice bran + mustard oilcake, rice bran + wheat bran + MOC and wheat bran + grass pea bran + MOC) were equally suitable for mass culturing of effective *T. harzianum* bio-fungicides for the management of foot and root rot disease of tomato seedling in seedbed condition.

Keyword: *Trichoderma harzianum*, bio-fungicide, *Fusarium oxysporum*, tomato seedling and seedbed.

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TECHNICAL AND ECONOMIC PERFORMANCE OF COMBINED HARVESTER IN FARMERS' FIELD

M. A. HOSSAIN, M. A. HOQUE, M. A. WOHAB
M. A. M. MIAH AND M. S. HASSAN

Abstract

Labour scarcity, harvesting loss, timely harvesting and harvesting cost are crucial in rice and wheat harvesting in Bangladesh. Combined harvester is a newly introduced harvesting machine in Bangladesh. This study was undertaken to evaluate the technical and economic performance of combine harvester available in farmers' field and farmer's perception regarding the use of combined harvester. Field tests of two new (CLASS and Daedong) and two refresh (Kukje and Anower) combine harvesters were conducted for harvesting rice and wheat in the farners' field of Jessore, Pabna, Dinajpur and Thakurgaon districts during 2011-12. Primary data were collected from 30 adopter and 30 non-adopter farmers from each district of Bogra, Rangpur, Dinajpur and Thakurgaon through direct interviewingduring 2012-13. Information was also collected from different combine harvester traders available in Bangladesh. Average time, cost and grain saving by combine harvester over manual methods were 97.50, 35.00 and 2.75%, respectively. Benefit cost ratio of CLASS, Daedong, Kukje and Anower combined harvesters were found to be 2.68, 2.11, 2.29 and 2.70, respectively. The payback periods of refresh combined harvesters were lower than the new combined harvester. There were some mechanical problems observed in refresh combined harvesters during field operations. New harvester was observed almost trouble free and popular to the famers. Scarcity of spare parts and mechanic service were the main problems for repair and maintenance of the combined harvesters in farm level. Considering the technical performance of combine harvester and demand of the farmers, new combined harvester may be introduced in commercial basis in Bangladesh.

Keywords: Benefit cost ratio, field capacity, harvesting efficiency, harvesting loss, payback period, rice and wheat.

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GENETIC VARIABILITY, CHARACTER ASSOCIATION AND PATH ANALYSIS IN *BRASSICA rapa* L. GENOTYPES

S. NAZNIN, M. A. KAWOCHAR, S. SULTANA
AND M. S. R. BHUIYAN

Abstract

Thirty three genotypes of *Brassica rapa* L. were evaluated in order to find out their inter-genotypic variability; character association and path coefficient of seed yield/plant and its component characters. BARI sarisha-6 x TORI-7 S-45 showed best result in terms of early maturity (75 days) and higher seed yield/plant (5.28g) than check varieties. The character, plant height, was highly influenced by the environment whereas, all other characters influenced the least. Number of secondary branches/plant showed the highest phenotypic and genotypic coefficient of variation. Moreover, number of siliquae/plant, number of secondary branches/plant and number of primary branches/plant showed high heritability (93.16%, 75.69% and 68.03%, respectively) couple with high genetic advance in percent of mean (37.74%, 73.55% and 26.82%, successively). The seed yield/plant showed significant positive correlation with number of siliquae/plant (r_g = 0.7011**, r_p = 0.5684**), number of primary branches/plant (r_g = 0.5611**, r_p = 0.4016*) and number of secondary branches/plant (r_g = 0.5160**, r_p = 0.4098*) revealing that selection based on these traits would be judicious. Path analysis showed that the number of siliquae/plant (0.4679), number of primary branches/plant (0.2823) and number of secondary branches/plant (0.0092) were the most important contributors to seed yield/plant. The results indicated that number of siliquae/plant, number of primary branches/plant and number of secondary branches/plant can be used as selection criteria to increase seed yield/plant in rapeseed.

Keywords: Genetic variability, heritability, character association, path analysis and *Brassica rapa* L.

Bangladesh J. Agril. Res. 40(2): 325-332, June 2015

SUITABILITY STUDY OF LOCAL BUSH BEAN CULTIVARS INTERCROPPED WITH HYBRID MAIZE UNDER DIFFERENT PLANTING SYSTEM IN HILLY AREAS

M. SHAHEENUZZAMN, A. BISWAS, N. CHAKMA
M. N. ISLAM AND M. SALIM

Abstract

An intercropping experiment was conducted on hill valley at Hill Agricultural Research Station, Ramgarh and Kharachhari during two consecutive *rabi* seasons of 2012-13 and 2013-14 to select suitable local bush bean cultivar for intercropping with hybrid maize in hilly areas of Bangladesh. Seven intercropping treatments viz., T_1 = Normal maize spacing (75 cm × 25 cm) + 2 rows black seeded bush bean,T_2 = Normal maize spacing (75 cm × 25 cm) + 2 rows pink seeded bush bean,T_3 = Maize wider spacing (100 cm × 25 cm) with 1 plant/hill + 3 rows black seeded bush bean,T_4 = Maize wider spacing (100 cm × 25 cm) with 1 plant/hill + 3 rows pink seeded bush bean, T_5 = Maize wider spacing (100 cm × 50 cm) with 2 plants/hill + 3 rows black seeded bush bean, T_6 = Maize wider spacing (100 cm × 50 cm) with 2 plants/hill + 3 rows pink seeded bush bean and T_7 = Sole maize spacing (75 cm × 25 cm) were used. Sole hybrid maize produced the highest grain yield at both the locations. Bush bean cultivars in intercropped situation depressed hybrid maize yields by 7.15-37.29% at Ramgarh and 2.56-37.51% at Khagrachhari compared to sole hybrid maize. The highest maize equivalent yield of 23.10 t/ha at Ramgarh and 24.08 t/ha at Khagrachhari was recorded in maize wider spacing (100 cm × 25 cm) with 1 plant/hill + 3 rows pink seeded bush bean combination (T_4). The same treatment also showed the highest gross return (Tk 277200/ha at Ramgarh and Tk 288960/ha at Khagrachhari), gross margin (Tk 180050/ha at Ramgarh and Tk 191810/ha at Khagrachhari) and benefit cost ratio (2.85 at Ramgarh and 2.97 at Khagrachhari). The result revealed that maize wider spacing (100 cm × 25 cm) with 1 plant/hill + 3 rows

pink seeded bush bean could be suitable and economically profitable for hybrid maize and bush bean intercropping in hill valleys of Bangladesh.

Keywords: Suitability, intercropping, hybrid maize, bush bean and hilly areas.

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GROWTH AND DRY MATTER PARTITIONING IN SELECTED SOYBEAN (*Glycine max* L.) GENOTYPES

M. S. A. KHAN, M. A. KARIM, M. M. HAQUE
A. J. M. S. KARIM AND M. A. K. MIAN

Abstract

The experiment was conducted at the experimental site of Agronomy Department, Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Salna, Gazipur during the period from January to June 2011 to evaluate twenty selected soybean genotypes in respect of growth, dry matter production and yield. Genotypic variations in plant height, leaf area index, dry matter and its distribution, crop growth rate and seed yield were observed. The plant height ranged from 40.33 to 63.17 cm, leaf area index varied from 3.01 to 8.13 at 75 days after emergence, total dry matter ranged from 12.25 to 24.71 g per plant at 90 days after emergence (DAE). The seed yield ranged from 1745 to 3640 kg per hectare. The genotypes BGM 02093, BD 2329, BD 2340, BD 2336, Galarsum, BD 2331 and G00015 yielded 3825, 3447, 3573, 3737, 3115, 3542 and 3762 kg per hectare, respectively and gave higher than others contributed by higher crop growth rate with maximum number of filled pods. Seed yield of soybean was positively related to total dry matter at 45 DAE ($Y = 632.19 + 659.31X$, $R^2 = 0.46$) and 60 DAE ($Y = 95.335 + 405.53X$, $R^2 = 0.48$). The filled pods per plant had good relationship with seed yield ($Y = 1397 + 41.85X$, $R^2 = 0.41$) than other components.

Keywords: Growth, dry matter, soybean and seed yield.

Bangladesh J. Agril. Res. 40(3): 347-361, September 2015

FARMERS LAND TENURE ARRANGEMENTS AND TECHNICAL EFFICIENCY OF GROWING CROPS IN SOME SELECTED UPAZILAS OF BANGLADESH

ISLAM M. A. AND MAHARJAN K. L.

Abstract

There are different land tenure arrangements in crop cultivation in Bangladesh. It is needed to detect how farmers could maximize the benefits from proper utilization of their resources and technologies in these prevailing different land tenure arrangements in crop cultivation. The main quest of this study is to analyze the actual production level and how much is deviated from maximum attainable production level in terms of technical efficiencybased on average gross revenue of output ha^{-1} in the cultivated various types of crops among different categories of farmers and identifies the impact of the factors associated with technical efficiency.In search of this research question a case study was conducted in two Upazilas (Sub districts) in Bangladesh based on cross section data. This data were collected from January to March, 2013. Age of the household head, education, farm size, off-farm income and other concerned issues were assessed. Maximum likelihood estimation and ordinary least square regression techniques were used to estimate the parameters of the stochastic production frontier.Ordinary least square regression was used to identify the factors associated with technical efficiency. The study reveals that the technical efficiency varied among different categories of farmers. But land rent (0.0575) and weed management (0.0838) had significant positive impact on technical efficiency. This detects the potentiality to improve the technical efficiency by taking proper measures in land tenure arrangements in consideration of land rent andprovide required weed management support for the farmers.

Keywords: Stochastic frontier approach, maximum likelihood estimation, ordinary least square regression method, land tenure and agricultural production.

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FACTORS AFFECTING THE ADOPTION OF IMPROVED VARIETIES OF MUSTARD CULTIVATION IN SOME SELECTED SITES OF BANGLADESH

M. A. MONAYEM MIAH, SADIA AFROZ
M. A. RASHID AND S. A. M. SHIBLEE

Abstract

Mustard is a leading oil crop in Bangladesh. Relevant data and information on the adoption of improved mustard varieties is very scanty and sporadic in Bangladesh. Therefore, an attempt was made to assess the extent of adoption of improved mustard varieties and their management practices at farm level. The study used data from 540 mustard growing farmers under Manikgonj, Rajshahi and Dinajpur districts. Probit regression model along with other descriptive statistics were used to analyze the collected data. Analysis revealed that the farm level adoption of different production practices were not encouraging as most farmers did not follow the recommendations made by Bangladesh Agricultural Research Institute (BARI) for mustard cultivation. The variety adoption scenario was also discouraging since only 40% of the farmers cultivated improved mustard varieties. However, farmers showed positive attitude towards adoption of improved mustard varieties since about 53% of the adopters wanted to increase area under improve mustard cultivation in next growing season considering the high yielding ability, low cultivation cost, high profit, and less labour requirements. Although mustard is considered to be a profitable crop, many farmers showed negative attitude towards its production due to some drawbacks. Non-availability of improved mustard seed was also found to be a barrier to its adoption at farm level.

Keywords: Improved mustard, variety adoption, farmers' attitude and production practices.

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SOME BIOLOGICAL PARAMETERS OF BRINJAL SHOOT AND FRUIT BORER, *LEUCINODES ORBONALIS* GUENEE (LEPIDOPTERA: PYRALIDAE) ON POTATO IN LABORATORY CONDITION

M.A. MANNAN, K.S. ISLAM, M. JAHAN AND N. TARANNUM

Abstract

Studies were made on the biology of brinjal shoot and fruit borer (BSFB), *Leucinodes orbonalis* Guenee feeding on peeled potato tubers as host in the laboratory. It was observed that moths were active at night for mating, oviposition and adult emergence. Adult emergence started just after sunset and it was maximum (88.90%) during the first half of the night. Maximum mating occurred at late night where 90.80% mating occurred in the first night of adult emergence. Oviposition occurred in the second night of emergence when 86.62% of eggs were deposited during the first half of the night. A female laid 288.05 eggs in 2.65 days in summer and 185.55 eggs in 2.70 days in winter. The egg hatching and larval and pupal period of BSFB were 4.13, 10.40 and 6.60 days, respectively in summer and 6.90, 14.50 and 10.65 days in winter. BSFB needs 10.40 and 14.50 days to complete its larval period in summer and winter, respectively. Pupal period lasted for 5-13 days. Life cycle from egg to adult was 17-44 days. The longevity of male and female adult was 3.50 and 6.20 days in summer and 4.85 and 8.90 days in winter. Temperature in two seasons showed variations in the biology of BSFB.

Keywords: Biology, adult longevity, brinjal shoot and fruit borer, mating, oviposition, larval and pupal period.

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EFFICACY OF FUNGICIDES IN CONTROLLING BOTRYTIS GRAY MOLD OF CHICKPEA (*Cicer arietinum* L.)

M. SHAHIDUZZAMAN

Abstract

A field experiment was carried out at Regional Pulses Research Station (RPRS), Madaripur during *rabi* season of 2011-12 and 2012-

13 to evaluate the most effective fungicides in controlling Botrytis Gray Mold (BGM) of Chickpea. Five different fungicides e.g. Propiconazole (Tilt 250 EC), Carbendazim (Bavistin DF), Fenamidone+Mancozeb (Secure 600 WG), Difenoconazole (Score 250 EC), Tebuconazole (Folicure 250 EC) were evaluated under natural condition. Results revealed that among the five fungicides Fenamidone+Mancozeb (Secure 600WG) sprayed at the rate of 1g/L with 7 days interval gave the lowest BGM score of 3.80 and 4.00 in 1-9 scale during 2011-12 and 2012-13 and produced highest yield of 1547 and 1443 kg/ha, respectively. Besides, the highest BGM was scored by the untreated control plot (6.26 and 6.33) and produced the lowest yield of 988 and 853 kg/ha during the two consecutive years.

Keywords: Chickpea, *Cicer arietinum* L. fungicides and Botrytis Gray Mold.

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BRINJAL SHOOT AND FRUIT BORER INFESTATION IN RELATION TO PLANT AGE AND SEASON

M. A. MANNAN, K. S. ISLAM AND M. JAHAN

Abstract

Brinjal shoot and fruit borer infestation varied significantly in relation to plant age and season. The peak shoot infestation was 8.56% in the 10th week of transplanting. No infestation of BSFB was found up to 5 weeks of transplanting. The shoot infestation was initiated in the 6th week of transplanting which increased to a little higher level in the next week. Then it showed an exponential increase of shoot infestation up to 10th week after which it declined steadily. Flowering and fruit setting started in the 9th week of transplanting. Infestation of brinjal shoot and fruit borer (BSFB) shifted to fruits from shoots causing a steady declined in the trend of shoot infestation. Plant age had significant effect (r^2=0.87) on fruit infestation. The fruit infestation reached the highest level (38.56%) in 14th week of transplanting. However, the level of infestation at different ages of the plant may vary depending on the location, temperature, variety etc. The shoots and fruits of brinjal plant were found to be infested by BSFB throughout the year, although the level of infestation varied. Maximum shoot and fruit infestation was found in the month of September.

Keywords: Brinjal shoot and fruit borer, *Leucinodes orbonalis*, infestation, plant age and seasonal fluctuation.

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PROFITABILITY OF BETEL LEAF (*Piper betle* L.) CULTIVATION IN SOME SELECTED SITES OF BANGLADESH

Q. M. S. ISLAM, M. A. MATIN, M. A. RASHID
M. S. HOQ AND MONIRUZZAMAN

Abstract

The study was conducted in four betel leaf growing areas, namely Barisal, Chittagong, Rajshahi and Kustia district during 2013-14 to assess the cultivation practices, physical productivity, profitability, and to explore the constraints to betel leaf cultivation. The study has been designed to investigate the economics of betel leaf production considering intensive cultivated areas for recent information in Bangladesh. From each district, two upazilas were selected considering the concentration of betel leaf growers and easy access. Also from each upazila, two blocks and from each block 20 farmers were selected with the consultation of Upazila Agriculture Officer and Sub Assistant Agriculture Officer. The study revealed that betel leaf cultivation was profitable in the study areas, although BCR in the first and second years was below one which was due to high initial cost. The highest yield and gross return of betel leaf cultivation were in the fifth year. The benefit cost ratio was found highest in 6-10 year followed by 5th and 11-15 year. The benefit cost ratio at 12%, 15% and 20% rate of interest were 1.27, 1.25 and 1.21 respectively. Internal rate of return (IRR) was calculated 62% in current situation, IRR 37% was found by 10% decrease of return and 39% by 10% increase of cost. The problems like leaf rot disease, high price of boroj materials, low price of betel leaf, high price of oilcake, etc. were facing by the betel leaf farmers.

Keywords: Betel leaf, BCR, IRR, NPV and constraints.

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GENETIC DIVERGENCE IN *Brassica rapa* L.

S. NAZNIN, M. A. KAWOCHAR, S. SULTANA
N. ZEBA AND S. R. BHUIYAN

Abstract

Different multivariate analysis techniques were used to classify 33 *Brassica rapa* L. genotypes. The genotypes were grouped into five clusters. Cluster I contained the maximum number of genotypes. Cluster III earned the highest cluster mean value for number of primary branches/plant, number of secondary branches/plant, number of siliquae/plant and seed yield/plant. Therefore, more emphasis can be given on cluster III for selecting genotypes as parents for the hybridization program. The highest intra-cluster distance (3.822) was found in cluster I and the lowest (0.000) in cluster V. The highest inter-cluster distance (15.705) was observed between clusters III and V showing wide diversity among the groups. Principal component analysis (PCA) showed that the first three principal components accounted for 99.38 % of the total variation observed. Analysis of the factor loading of the component character indicated that the characters number of siliquae/plant, plant height and days to maturity were found responsible for genetic divergence. The role of number of siliquae/plant in both the vectors was important components for genetic divergence in these materials. Among the possible 528 combinations, the highest inter-genotypic distance (1.5975) was observed between G-27 (BARI Sarisha-9 x BARI Sarisha-6 S-62) and G-31 (BARI Sarisha-15). Considering group and inter-genotypic distance, cluster mean, contribution of different characters towards the total divergence and other agronomic performance the genotypes G-19 (BARI Sarisha-6 x TORI-7 S-48), G-20 (F_6 x BARI sarisha-9 S-52), G-27 and G-30 (BARI Sarisha-6 x TORI-7 S-37) from cluster III; G-26 (F_6 x BARI Sarisha-9 S-15) and G-31 from cluster IV and G-33 (BARI Sarisha-6) from cluster V would be considered as better parents for future hybridization program.

Keywords: Genetic diversity, principal component analysis, principal coordinate analysis, cluster analysis and *Brassica rapa* L.

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VARIABILITY AND HERITABILITY ANALYSIS IN SPRING WHEAT (*Triricum aestivum* L.) GENOTYPES

M.F. AMIN, M. HASAN, N. C. D. BARMA
M. M. RAHMAN AND M. M. HASAN

Abstract

The experiment was carried out with 50 wheat lines to study their inter-genotypic variability, heritability, GCV, PCV, genetic advance, and CV percent considering 14 morphological characters at the experimental field of Regional Wheat Research Centre RWRC), Bangladesh Agricultural Research Institute (BARI), Gazipur during November 2010 to March 2010. Significant variation was observed among the genotypes for all characters studied. High GCV and PCV values were observed for grain filling duration, grain filling rate, and seed yield. High heritability along with higher genetic advance was observed for DTH, DTA, DPM, GFD, GFR, PHT, $CHL_{A,}$ spikelets/spk., and yield kg/ha. The remaining traits showed lower heritability coupled with low genetic advance in percent of mean. Considering variability among the genotypes, heritability, genetic advance, percent co-efficient of variation, and field performances, the genotypes G 3, G 10, G 11, G 12, G13, G 21, G 29, G 35, G 38, G 40, G 46 and G 48 were found suitable for future breeding programme.

Keywords: Wheat, Genotypes, Variability and Heritability .

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LARVICIDAL EFFICACY OF SOME INDIGENOUS PLANT EXTRACTS AGAINST EPILACHNA BEETLE, *EPILACHNA VIGINTIOCTOPUNCTATA* (FAB.) (COLEOPTERA: COCCINELLIDAE)

R. ARA, M. A. A. BACHCHU, M. O. KULSUM AND Z. I. SARKER

Abstract

The study was carried out to assess the larvicidal efficacies of some indigenous plant seed extracts against epilachna beetle,

Epilachna vigintioctopunctata in the laboratory of the Department of Entomology, HSTU, Dinajpur, Bangladesh. Petroleum ether and methanol solvent extracts of ata (*Annona squamosa*), neem (*Azadirachta indica*), dhutura (*Datura metel*) and castor (*Ricinus communis*) seeds were evaluated for their larvicidal properties against the larval stage of *E. vigintioctopunctata*. The result revealed that all the tested plant extracts had more or less insecticidal effect against the larvae and their progeny. Among the plant extracts, ata seed extract in methanol solvent performed the highest toxicity (LD_{50} value 0.031 mg/insect) in larval stage after 72 hours exposure time. The effects of the extracts on fecundity, fertility and F_1 adult emergence of the epilachna beetle at doses 4.0, 2.0 and 1.0 ml/l of water including untreated control were also evaluated. The result indicated that, among the extracts, ata seed extract at maximum dose (4.0 ml/l water) showed the highest efficacy with the inhibition of total eggs (74.1%), viable eggs (80.4%) and number of emergent adult progeny (87.3%). The result also revealed that the number of eggs, number of viable eggs and F_1 progeny production decreased with the increase of doses. All the treated doses effectively reduced the epilachna beetle as compared to untreated control.

Keywords: Plant extracts, petroleum ether, methanol solvent, larval mortality and *Epilachna vigintioctopunctata*.

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EFFECT OF PLANTING DATES ON THE YIELD OF BROCCOLI GENOTYPES

M. A. HAFIZ, A. BISWAS, M. ZAKARIA, J. HASSAN AND N. A. IVY

Abstract

This experiment was conducted during September 2011 to March 2012 in the experimental field of Department of Horticulture, Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Gazipur to find out the effect of planting date on the yield of broccoli genotypes. There were five genotypes viz., Early green, Forest green, Green calabrese, Premium crop and Green king and four planting dates viz., 2 October, 27 October, 21 November and 16 December. The treatment effects were statistically analyzed and found significant in most of the characters studied. Genotype Green calabrese was the highest in average plant height (53.70 cm). Green king produced the maximum spread diameter (69.23 cm), stem diameter (30.35 mm) and early initiation of floral head. Genotype Early green performed the best regarding head weight (343.87 g), yield per plant (477.4 g) and yield (19.10 t/ha). Broccoli planted on 21 November initiated early flower head, maximum head diameter (16.99 cm), head weight (314.49 g), yield per plant (453.64 g) and total yield (18.15 t/ha). The genotype Early green planted on 21 November showed the best performance in yield per plant (580.17 g) and yield hectare (23.21 t/ha).

Keywords: Broccoli genotype(s), planting date and yield.

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VARIABILITY, CORRELATION AND PATH ANALYSIS IN PUMPKIN (*Cucurbita moschata* L .)

S. SULTANA, M. A. KAWOCHAR, S. NAZNIN A. SIDDIKA AND F. MAHMUD

Abstract

Twenty one genotypes of pumpkin (*Cucurbita moschata* L.) were evaluated to measure the variability among the genotypes for several characters, estimate genetic parameters, association among the characters and their contribution to yield. There was a great deal of significant variation for all the characters among the genotypes. High variability was observed in number of female flowers/plant, number of male flowers/plant, single fruit weight and fruit yield/plant. All the characters except days to first male flowering and days to first female flowering showed high heritability along with high genetic advance in percent of mean. The positive and strong association of number of female flowers/plant (r_g=0.918, r_p=0.839), number of male flowers/plant

(r_g=0.687, r_p=0.638), fruit length (r_g=0.691, r_p= 0.520), fruit breadth (r_g=0.518, r_p=0.420) and single fruit weight (r_g=0.492, r_p= 0.431) with fruit yield/plant revealed the importance of these characters in determining fruit yield/plant. On the other hand, days to first male flowering (r_g = -0.623, r_p = -0.550) and days to first female flowering (r_g= -0.689, r_p= -0.543) correlated significantly and negatively with fruit yield/plant. The path co-efficient analysis revealed that the highest positive direct effect was recorded in number of female flowers (0.887) to fruit yield and high direct effect was found in case of days to first female flowering (0.798). Fruit breadth was observed to have the highest positive indirect effect (0.899). In case of fruit length (0.381) and single fruit weight (0.398), the significant positive correlation with fruit yield/plant was observed because of the combination of the direct and indirect effects of fruit length and single fruit weight to fruit yield/plant. Overall, the results indicated that days to first female flowering, number of female flowers, fruit length, fruit breadth and single fruit weight can be used as useful selection criteria to increase fruit yield/plant in pumpkin.

Keywords: Pumpkin, variability, correlation and path co-efficient analysis.

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EFFECT OF SOWING DATE AND PLANT SPACING ON SEED PRODUCTION OF CAULIFLOWER

M. F. HOSSAIN, N. ARA, M. R. UDDIN
M. R. ISLAM AND M. G. AZAM

Abstract

The experiment was conducted at Regional Agricultural Research Station, Ishurdi, Pabna during *rabi* season of 2011-2012 and 2012-2013 to find out the appropriate sowing date and optimum plant spacing for seed production of cauliflower (var. BARI Phulcopi-1). Four sowing dates viz., 20 September, 1 October, 10 October and 20 October and three plant spacings viz., 60 cm × 50 cm, 60 cm × 60 cm and 60 cm × 70 cm were used as treatment variables.

Significant variation in seed yield and yield contributing characters of cauliflower were observed due to execution of different sowing dates and plant spacing. Number of branches plant^{-1}, number of pods plant^{-1} and number of seeds pod^{-1} showed the highest in 1 October sowing as a result the highest seed yield (361.69 kgha^{-1}) was obtained from same date of sowing. Sowing on 10 October and 20 October reduced seed yield drastically compared to that obtained from 1 October sowing. The lowest seed yield (188.54 kgha^{-1}) was obtained from 20 October sowing. On the contrary, closer spacing (60 cm × 50 cm) produced the highest seed yield (315.88 kgha^{-1}) and the wider spacing (60 cm × 70 cm) produced the lowest seed yield (254.07 kgha^{-1}). However, combination of 1 October sowing with 60 cm × 50 cm plant spacing produced the highest seed yield (414.81 kgha^{-1}) due to higher number of seeds pod^{-1}. The seed yield decreased after 10 October sowing irrespective of plant spacing. So, early sowing (1 October) with closer spacing (60 cm× 50 cm) would be economically profitable for cauliflower seed production in North-Western part of Bangladesh.

Keywords: Cauliflower, sowing, spacing, yield and seed.

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RESPONSE OF LENTIL TO BIO AND CHEMICAL FERTILIZERS AT FARMER'S FIELD

M. A. H. BHUIYAN, M. S. ISLAM AND M. S. AHMED

Abstract

Field trials were carried out at the Farming System Research & Development site, Hatgavindapur, Faridpur, On-Farm Research Division of Bangladesh Agricultural Research Institute during rabi seasons of 2006-2007 and 2007-2008 with the objectives to evaluate the response of lentil to *Rhizobium* biofertilizer and to reduce the use of N-fertilizer under farmer's field condition. The experiment was laid out in Randomized Complete Block Design (RCBD) with four replications. Unit plot size was 4 m x 5 m. Four fertilizer treatments viz. T_1: 24-22-42-20-5 kg N-P-K-S-Zn ha^{-1},

T_2: 50-22-42-20-5 kg N-P-K-S-Zn ha^{-1}, T_3: 0-22-42-20-5 kg N- P-K-S-Zn ha^{-1} + *Rhizobium* Inoculum and T_4: Farmer's practices were studied. Farmer's practice was 25-18-21-0-0 kg N-P-K-S-Zn ha^{-1}. BARI Masur-4 and peat based rhizobial inoculum (strain BARI RLc-102) @ 1.5 kg ha^{-1} were used. Result revealed that application of *Rhizobium* biofertilizer along with PKSZn chemical fertilizers produced the highest nodule number (11.62 $plant^{-1}$) and nodule weight (11.94 mg $plant^{-1}$), and the seed yield 1.44 t ha^{-1}. The seed yield was higher in T_3 treatments ($N_0P_{22}K_{42}S_{20}Zn_5$ + Inoculum) than T_1 ($N_{24}P_{22}K_{42}S_{20}Zn_5$) and T_2 ($N_{50}P_{22}K_{42}S_{20}Zn_5$) treatments. No variation was observed in seed yield in treatments T_1, T_2 and T_3 but significantly different from farmer's practice. Farmer's practice showed the lowest yield. Economic analysis revealed that T_3 treatment i.e. PKSZn plus *Rhizobium* inoculum gave the highest 5.36 benefit cost ratio (BCR) followed by T_1 4.68 and T_2 3.61. It is evident from the experiment that application of biofertilizer can be used as substitute of nitrogenous fertilizer for higher yield of lentil at farmer's field in Faridpur.

Keywords: Lentil, biofertilizer, chemical fertilizers, nodulation, yield and benefit cost ratio.

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SOWING TIME AND VARIETAL PERFORMANCE OF WHEAT AT HIGHER ELEVATION IN HILL ENVIRONMENT AT KHAGRACHHARI

M. ATAUR RAHMAN, M. MOHABBATULLAH, C. K. DAS
U. K. SARKER AND S. M. M. ALAM

Abstract

The field experiment was conducted at the Hill Agricultural Research Station, BARI, Khagrachhari for the two consecutive years (2009-10 and 2010-11) to find out the wheat variety suitable for hilly environment and investigate the interaction of sowing dates and varieties to recommend the promising variety with proper sowing time. The experiment was laid out in split-plot design with three replications where three dates of sowing (Nov. 20, Nov. 30 and Dec. 10) were assigned in the main plots and five modern wheat varieties (Shatabdi, Sufi, Sourav, Bijoy and Prodip) were tested in the sub-plots. The yield responses of wheat varieties during the two years showed that there were significant varietal differences under the experimental soil and environmental conditions. The variety Bijoy gave maximum grain yield closely followed by Sourav in both years. Shatabdi produced higher yield under early sowing (Nov. 20) but yield was decreased due to late sowing (Dec. 10). Initially the plant population and finally spikes/m^2 were affected by late sowing that caused less yield in Shatabdi. The mean yield of all varieties pulled over the sowing time indicated that wheat yield was not affected due to delay sowing up to 10th December. The experimental result demonstrated that Shatabdi could be recommended only for early sowing whereas Bijoy and Sourav could be recommended both for early and late sowing under the experimental soil and environmental conditions at hilly region of Khagrachhari.

Keywords: Wheat variety, sowing time, adaptation and higher elevation.

Bangladesh J. Agril. Res. 40(4): 529-536, December 2015

GENETIC DIVERSITY OF MAIZE (*Zea mays* L.) INBREDS UNDER SALINITY STRESS

M. M. ROHMAN, B. R. BANIK, A. BISWAS AND M. S. RAHMAN

Abstract

The study was conducted to investigate the genetic diversity of some maize inbreds under salinity stress condition using Mahalanobis's statistic (D^2) and principal component analysis. Analysis of variance showed significant difference for all the characters. Results of multivariate analysis revealed that twenty five inbred lines formed five clusters at 8 dS level of salinity. The highest intra-cluster distance was recorded in cluster III containing eight genotypes and the lowest was in cluster II having one genotype. The highest inter cluster distance was observed between clusters II & V and lowest was between I & III. Cluster II had the

highest cluster means for plant height, cob height, above ground dry mass, cob per plant, cob length, and grain yield per plant. Considering cluster distance, inter-genotypic distance and other agronomic performances the genotypes CZ12, CZ19, CZ26, CZ29, CZ31, CZ32, CZ33 & CML470 from cluster III and CZ27, CZ37, CML251 and CML456 from cluster V may be considered as better parents for future hybridization programs to obtain desirable segregate in respect of different yield and yield contributing characters under salinity stress.

Keywords: Maize *(Zea mays* L.), inbred lines, genetic divergence, salinity stress, cluster analysis and grain yield.

Bangladesh J. Agril. Res. 40(4): 537-550, December 2015

GENOTYPIC VARIATIONS IN GROWTH, YIELD AND YIELD COMPONENTS OF SOYBEAN GENOTYPES UNDER DROUGHT STRESS CONDITIONS

J. A. CHOWDHURY, M. A. KARIM, Q. A. KHALIQ
A. R. M. SOLAIMAN AND J. U. AHMED

Abstract

A pot experiment was carried out in a venylhouse at Bangabandhu Sheikh Mujibur Rahman University during 2012 to investigate the growth, yield and yield contributing characters of ten selected soybean genotypes viz., Shohag, BARI Soybean-6, BARI Soybean-5, BD2331, BD2329, BD2336, BD 2340, BGM2093, G00015 and BGM2026 under drought stress and control conditions. Plant height, number of leaves, leaf area, shoot and root dry weight of all the genotypes were significantly affected by the stress. Among the genotypes Shohag, BARI Soybean-6 and BD2331 were found tolerant in relation to the growth under water stress conditions. The reduction in RGR values was more in the susceptible genotypes at the later stages of growth than in the tolerant genotypes. Seed yield of the genotypes was reduced from 42 to 68% due to drought (water) over non-stress. Susceptible genotypes showed greater reduction in seed yield than the tolerant genotypes.

Keywords: Soybean genotypes, drought, growth and yield.

Bangladesh J. Agril. Res. 40(4): 551-566, December 2015

ADOPTION OF RAISED BED TECHNOLOGY IN SOME SELECTED LOCATIONS OF RAJSHAHI DISTRICT OF BANGLADESH

M. A. MONAYEM MIAH, MONIRUZZAMAN, S. HOSSAIN
J. M. DUXBURY, J. G. LAUREN

Abstract

The study evaluated the adoption and farmers' practice of raised bed technology at farm level since the close of the Soil Management Collaborative Research Support Program (SMCRSP) through a follow-up survey conducted at Durgapur Upazila of Rajshahi district. Data for the study were collected from 195 adopters and 65 non-adopters through a pre-tested interview schedule during May, 2011. The survey findings showed that the raised bed technology had a strong demonstration effect and were adopted well (56%) by the respondent farmers. The probability of adopting this technology was significantly influenced by extension contact, societal membership, and the number of male member in the household. Due to lack of machine, most farmers prepared raised bed by hand (82.7%) without maintaining recommended bed size. The most cultivated crops on bed were wheat (cultivated by 97.95% farmers) maize (27.69%) onion (16.41%) and mungbean (12.31%). Respondent farmers mentioned various positive benefits of bed technology and willing to continue this practice in future with increased area of land. This immerging technology increased cop productivity and farmers' income to some extent. To popularize the raised bed technology among farmers, bed planter should be available to the farmers and the positive benefits should be broadcasted in the mass media

Keywords: Bed planter, raised bed technology and adoption.

Bangladesh J. Agril. Res. 40(4): 567-580, December 2015

INFLUENCE OF ETHEPHON ON RIPENING AND QUALITY OF WINTER TOMATO FRUIT HARVESTED AT DIFFERENT MATURITY STAGES

M. MONIRUZZAMAN, R. KHATOON, M. F. B. HOSSAIN
M. T. RAHMAN AND S. N. ALAM

Abstract

An experiment taking tomato fruits (cv. BARI Tomato-14) of three maturity stages (mature green stage, breaker stage and half ripen stage) and four ethephon levels [control (distilled water spray), 500, 750 and 1000 ppm] was carried out at the laboratory of plant physiology section of Horticulture research centre, Bangladesh Agricultural Research Institute) during February 14, 2013 to February 27, 2014 to find out the suitable stage of fruit maturity for post harvest application of ethephon (ethrel) for tomato ripening. The source of ethrel was Spectrum (ethephon 39%) manufactured in the United States of America. Treatment with 500 - 1000 ppm ethephon hastened ripening of tomato by 4 days in mature green stage but by 2 and 4 days in breaker stage tomatoes when compared with control fruits. The highest value of rotting was shown by half ripen tomatoes. The 1000 ppm ethrel gave the maximum rotting irrespective of maturity stages. However, the maximum weight loss and shelf life were found in green mature tomatoes. The shelf life of tomato fruits of green mature and breaker stage tomatoes treated with 500 and 750 ppm was also high. The percentage of rotting and weight loss was increased with gradual advancement of time. The highest value of weight loss and shelf life was recorded in green mature tomatoes without ethephon and with 500 and 750 ppm ethephon treatment. The highest value of vitamin-C, TSS and titrable acidity were shown by half ripen and pH by green mature tomatoes at different days of storage. The ethephon concentration of 750 ppm gave the maximum vitamin-C at 6 and 9 days of storage but 1000 ppm gave the maximum TSS% followed by 750 ppm ethephon. The ethephon @ 750 ppm produced the maximum TSS at 9 day of storage in mature green tomatoes but in breaker and half ripen stage tomatoes 750 ppm ethephon gave TSS identical to 1000 ppm at different days of storage. The residue level of ethrel in tomato fruits treated with all ethephon concentrations at 3 and 5 days of storage was below 2 mg/kg which is safe for human health. Therefore, treated tomatoes should be consumed after 3 days of ethephon application.

Keywords: Maturity stage, ethephon (ethrel), ripening, quality, postharvest and tomato.

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PERFORMANCE OF SEPARATED TILLERS OF TRANSPLANT AMAN RICE AT DIFFERENT LEVELS OF UREA SUPER GRANULES

K. S. RAHMAN, S. K. PAUL AND M. A. R. SARKAR

Abstract

An experiment was conducted at the research field of Department of Agronomy, Bangladesh Agricultural University, Mymensingh during June to December 2012 to investigate the effect of age of tiller seedlings, number of tiller seedlings hill^{-1} and application of urea super granules (USG) on the yield and yield contributing characters of transplant *Aman* rice (cv. BRRI dhan52). The experiment consisted of two ages of tiller seedlings *viz.* 25 and 35-days old, three levels of tiller seedlings hill^{-1} *viz*. 1, 3 and 5 seedlings hill^{-1} and three levels of USG *viz*. 0, 1.8 (55 kg N ha^{-1}) and 2.7g USG (80 kg N ha^{-1}) four hill^{-1} in every alternate row. The experiment was laid out in a Randomized Complete Block Design (Factorial) with three replications. The highest plant height, number of effective tillers hill^{-1}, number of total tillers hill^{-1}, number of total spikelets panicle^{-1}, number of grains panicle^{-1}, grain yield and harvest index were found in 1.8 g USG applied @ one granule 4-hill^{-1}. The highest number of sterile spikelets panicle^{-1} was found in control treatment and the lowest in 1.8 g USG. The highest number of effective tillers hill^{-1}, number of total spikelets panicle^{-1} and grain yield ha^{-1} was found when 5 tiller seedlings were transplanted hill^{-1} combined with 1.8 g USG. Application of urea super granules 1.8 g (55 kg N ha^{-1}) at 10 days after transplanting @ one granule 4-hill^{-1} in every alternate row

with 25 day old tiller seedlings using 5 tiller seedlings hill^{-1} was found beneficial for grain yield of transplant Aman rice. Tiller separation could be an alternative source of seedling during seedling scarcity.

Keywords: Age of tiller seedlings, transplant Aman rice and USG, yield.

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EFFECT OF PLANT GROWTH REGULATORS ON FLOWER AND BULB PRODUCTION OF HIPPEASTRUM (*Hippeastrum hybridum* Hort.)

M. K. JAMIL, M. M. RAHMAN, M. M. HOSSAIN
M. T. HOSSAIN, AND A. J. M. SIRAJUL KARIM

Abstract

The experiment was conducted at the Horticultural research field of Bangabandhu Sheikh Mujibur Rahman Agricultural University, Salna, Gazipur during October 2008 to July 2009 to investigate the effect of plant growth regulators on flower and bulb production of Hippeastrum. There were ten treatments comprising three concentrations of three growth regulators viz., IAA (20, 60 and 100 ppm), ethrel (100, 300 and 500 ppm) and GA_3 (100, 300 and 500 ppm) along with control (soaked in water). The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications. Flower and bulb characteristics of Hippeastrum were influenced significantly by different levels of growth regulators. Application of IAA at 60 and 100 ppm and GA_3 at 100, 300 or 500 ppm twice as foliar spray at an interval of 30 days promoted the number of bulblets on the treated plants. Ethrel at a concentration of 100 ppm increased the number of flowers per scape (4) and showed earliness in days to flower scape emergence (72.33 days) and first flower open (88.67 days). On the other hand, the biggest size of flower (15.14 cm x 12.44 cm) and flower scape (40.28 cm x 21.95cm) at harvest and the maximum days for flowering (11.50 days) were evident from plants treated with 500 ppm GA_3. The highest number of bulblets per plot (40.00), bulbs

weight per plot (4056 g) along with bulb yield (40.56 t/ha) were also obtained in GA_3 at 500 ppm.

Keywords: Hippeastrum, indole-acetic acid (IAA), 2-chloroethylphosphonic acid (Ethrel), gibberrellic acid (GA_3), Hippeastrum flower and bulb yield.

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EFFECT OF BAP AND SUCROSE ON THE DEVELOPMENT OF CORMEL IN MUKHI KACHU

M. K. R. BHUIYAN, S. M. SHARIFUZZAMAN AND M. J. HOSSAIN

Abstract

In vitro cormel development in Mukhi Kachu *(Colocasia esculenta)* Var. Bilashi was assessed in an experiment using three levels of BAP (0, 5 and 10 mg/l) and four levels of sucrose (0, 5, 10 and 15 %). Individual shoot excised from multiple shoot was used as explant in this experiment. *In vitro* cormel formation of *Colocasia* is an important means of organogenesis, which initiated earlier with 10% sucrose in 15% culture, whereas 15% sucrose produced cormels in 50% culture. While BAP at 10 mg/l formed cormels in 32.5% cultures but these two factors together formed cormels in 85% cultures, having 2.5 cormel per culture. The cormel weighed upto 1.7 g and contained 81.5% dry matter.

Keywords: Mukhi Kachu, BAP, sucrose and cormel development.

Bangladesh J. Agril. Res. 40(4): 607-618, December 2015

VARIABILITY, CORRELATION AND PATH CO-EFFICIENT ANALYSIS OF BITTER GOURD (*Momordica charantia* L.)

M. H. KHAN, S. R. BHUIYAN, K. C. SAHA
M. R. BHUYIN AND A. S. M. Y. ALI

Abstract

Seventeen genotypes of bitter gourd (*Momordica charantia* L.) were studied in a field experiment conducted at the experimental field of Sher-e-Bangla Agricultural University, Dhaka, during April 2009 to September 2010. The objectives of the study were to

measure the variability among the genotypes for yield and yield contributing characters, estimate genetic parameters, association among the characters and their contribution to yield. There was a great deal of significant variation for all the characters among the genotypes. Considering genetic parameters high genotypic co-efficient of variation (GCV) was observed for branches per vine, yield per plant and number of fruit per plant whereas low genotypic co-efficient of variation (GCV) was observed for days to first male and female flowering. In all the cases, it was found that phenotypic co-efficient of variation was greater than genotypic co-efficient of variation. Highest genotypic and phenotypic co-efficient of variation was observed in branch per vine, fruit length, fruit weight and number of fruit plant which indicated a wide variability among the genotypes and offered better scope of selection. The results obtained showed that fruit length showed low direct and positive effect on yield per plant and indirect positive effect on yield per plant via fruit diameter and average fruit weight. Similar result was found for fruit diameter. Average fruit weight and number of fruits per plant showed high direct and positive effect on yield per plant. Path analysis revealed that average fruit weight, number of fruits per plant, days to male flowering and fruit length had positive direct effect on fruit yield. Considering group distance and the agronomic performance, the inter genotypic crosses between G2& G5; G2&G14; G14&G15; G2&G15; G10&G11; G10&G13; G11&G13; G5&G15; G5&G14 might be suitable choice for future hybridization programme.

Keyword: Bitter gourd, momordica charantia, GCV, correlation, path coefficient.

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EFFECT OF NITROGEN ON DIFFERENT GENOTYPES OF MUNGBEAN AS AFFECTED BY NITROGEN LEVEL IN LOW FERTILE SOIL

M. A. RAZZAQUE, M. M. HAQUE, M. A. KARIM
A. R.M. SOLAIMAN AND M. M. RAHMAN

Abstract

A pot experiment was conducted at Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur during *kharif-II* season (August to November) of 2010 to find out the nitrogen acquisition and yield of mungbean genotypes affected by different levels of nitrogen fertilizer in low fertile soil. Ten mungbean genotypes viz., IPSA-12, GK-27, IPSA-3, IPSA-5, ACC12890053, GK-63, ACC12890055, BARI Mung-6, BUmug- 4 and Bina moog- 5 and six nitrogen fertilizer levels viz. 0, 20, 40, 60, 80 and 100 kg N ha^{-1} were included as experimental treatments. Results indicated that increasing applied nitrogenous fertilizer in low fertile soil increased nitrogen acquisition of mungbean which increased number of pods $plant^{-1}$ and seeds pod^{-1} and finally increased yield of mungbean upto 60 kg N ha^{-1} irrespective of genotype and thereafter decreased. Genotype IPSA -12 produced the highest seed yield (14.22 g $plant^{-1}$) at 60 kg N ha^{-1}. The lowest yield (7.33 g $plant^{-1}$) was recorded in ACC12890053 in control. From regression analysis, the optimum dose nitrogen for mungbean cultivation in the low fertile soil is 54 kg ha^{-1}.

Keyword: Yield, nitrogen level, nitrogen acquisition and low fertile soil.

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PERFORMANCE OF DIFFERENT CROPS PRODUCTIVITY ENHANCEMENT THROUGH ADAPTATION OF CROP VARIETIES AT CHARLAND IN BANGLADESH

M. N. ISLAM, M. S. RAHMAN, M. S. ALOM
AND M. AKHTERUZZAMAN

Abstract

Charland that are emerged as islands within the river channel or as attached land to the riverbanks as a result of erosion and accretion. In crop production systems, screening of adaptable crop varieties for charland is necessary to address the climate change issues. Hence, five separate experiments were conducted at charland of the Padma River in Kushtia district during November 2012 to May 2013 to select suitable varieties of lentil, hybrid maize, soybean, potato and mustard for increasing crop productivity. The experiment comprised four lentil varieties viz., BARI Masur-4, BARI Masur-5, BARI Masur-6 and a local cultivar; four hybrid

maize varieties namely BARI Hybrid maize-5, BARI Hybrid maize-7, BARI Hybrid maize-9 and Pacific-11; three soybean varieties like BARI Soybean-5, BARI Soybean-6 and Shohag; four potato varieties viz., BARI Alu-7, BARI Alu-8, BARI Alu-31 and Belgium; and five mustard varieties viz., BARI Sarisha-11, BARI Sarisha-13, BARI Sarisha-14, BARI Sarisha-15 and BARI Sarisha-16 were evaluated separately in five trials for their adaptation in charland. Among the studied crops, lentil var. BARI Masur-6, maize var. BARI Hybrid maize-9, soybean var. BARI Soybean-6, potato var. BARI Alu-7 and mustard var. BARI Sarisha-11performed better in the charland under climate change situation in Bangladesh.

Keywords: Crop productivity, adaptation, crop varieties, Charland and climate change.

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IMPACT OF HARVEST STAGE ON SEED YIELD QUALITY AND STORABILITY OF FRENCH BEAN

MD. RAYHAN SHAHEB, MD. NAZMUL ISLAM, ASHRATUN NESSA MD. ALTAB HOSSAIN AND AYESHA SARKER

Abstract

Good quality seeds are one of the least expensive but vital factors influencing yield potential and key to agriculture progress. Studies were conducted both in the field and laboratory with the objective to observe the impact of harvest stage on the seed, quality and storability of French bean. Five harvest stages viz., H_1-deep green with light yellow colours of pod, H_2-50% green and 50% yellowing of pods, H_3-light brown with few yellow colour pods, H_4-90% brown colour of pods and H_5-100% brown colour and dried pods were considered as treatments for field trial. Harvested seeds were then stored in both cool room and ambient conditions up to 16 months and performed seed quality studies in every 4 months. The treatment combination of laboratory studies were T_1: H_1 seed storage in cool room (SSCR), T_2: H_1 seed storage in ambient (SSAB), T_3: H_2 SSCR, T_4: H_2 SSAB; T_5: H_3 SSCR; T_6: H_3 SSAB; T_7: H_4 SSCR; T_8: H_4 SSAB; T_9: H_5 SSCR and T_{10}: H_5 SSAB. Experiments were laid out in a RCBD and CRD in the field and laboratory, respectively. Results revealed that the highest seed yield and quality of French bean was observed in H_3. On the contrary, seed harvested in H_4 and stored in cool room (with the mean temperature 18-20^{o}C and relative humidity around 60-70%) recorded the highest storability compared to ambient condition. However, seeds harvested in H_3 and H_5 were also showed better storability in cool room as well as ambient conditions. To sum up, all the seed quality parameters were satisfactorily well up to 12 months of storage, then it declined in quality.

Keywords: Harvest stage, French bean, seed yield, seed storage and seed quality.

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EFFICACY OF SOME INSECTICIDES AGAINST INSECT PESTS OF MUNGBEAN (*Vigna radiata* L.)

MD. ALTAF HOSSAIN

Abstract

Efficacy and profitability of insecticidal management practices using different insecticides were tested against insect pests of mungbean at Pulses Research Center, Ishurdi, Pabna, Bangladesh during two consecutive seasons of *kharif-1* 2013 and 2014. Insect infestations were reduced significantly by the application of synthetic insecticides. Spraying of Imidachloprid (Imitaf 20 SL) @ 0.5 ml/l of water showed the best efficacy in reducing flower infestation and thrips population followed by Fipronil (Regent 50 SC). Spraying of Thiamethoxam + Chlorantraneliprol (Voliam flexi 300 SC) @ 0.5 ml/l of water showed the best efficacy in reducing pod borer and flea beetle infestations. Spraying of Fipronil (Regent 50 SC) performed highest efficacy against stemfly infestation. The yield and the highest net return were obtained from Voliam flexi 300 SC, the highest benefit was obtained from Regent 50 SC treated plots. This might be due to the higher cost of Voliam flexi that reduced the profit margin and showed the lower marginal benefit cost ratio (MBCR) compared to Regent. Therefore, considering the efficacy and benefit,

spraying of Fipronil (Regent 50 SC) @ 0.5 ml/l is the most profitable insecticidal management approach against insect pests of mungbean followed by Imidachloprid (Imitaf 20 SL) at the same dose.

Keywords: Insecticide, management, insect pests and mungbean.

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FARM LEVEL IMPACT STUDY OF POWER TILLER OPERATED SEEDER ON SERVICE PROVIDERS' LIVELIHOOD IN SOME SELECTED SITES OF BANGLADESH

M. A. MONAYEM MIAH AND M. ENAMUL HAQUE

Abstract

The custom hiring of power tiller operated seeder (PTOS) is highly profitable at farm level and service providers could improve their livelihood through this machine. The data and information on these aspects are scarce in Bangladesh. Therefore, an attempt was made to conduct this study to assess the uses pattern and the impacts of PTOS operations on service providers' livelihood. A total of 53 service providers were randomly selected and interviewed for this study from Dinajpur and Rajbari districts. The study revealed that most respondents provided PTOS services almost throughout the year. The custom hiring of PTOS created many positive impacts on the livelihoods of the service providers. PTOS made a remarkable improvement in the livelihoods of its service providers in the study areas. The respondent service providers experienced a considerable increase in their land holdings (8.6%), annual income (63.4%), livestock resources (44%), farm equipment (20%), household assets position, and dwelling houses (42%). The increased income of beneficiaries are mostly spent on farm machinery, nutritious food, cloths, health care, education, and making of houses that indicate higher standard of riding to some extent, compared to pre PTOS service period. The service providers faced some problems like higher fuel cost, lack of riving facility, non-availability and higher price of spare parts, roller jam, and lack of trained driver. Financial support and technical assistance regarding PTOS should be made available by the government for service providers and local manufacturers for the higher adoption of PTOS in Bangladesh.

Keywords: PTOS, custom hire, service provider and livelihood.

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GENETIC DIVERGENCE IN PUMPKIN (*Cucurbita moschata* L.) GENOTYPES

S. SULTANA, M. A. KAWOCHAR, S. NAZNIN
H. RAIHAN AND F. MAHMUD

Abstract

Genetic diversity using Mahalanobis' D^2 technique was studied for yield and its components on twenty one genotypes of pumpkin (*Cucurbita moschata* L.). Quantification of variability for each character was done using the Shannon Weaver Diversity Index. High degree of variation was exhibited within the collection, as reflected by mean diversity index value of 0.80. Data were subjected to principal component analysis (PCA), principal coordinate analysis (PCO), canonical variate analysis (CVA) and non-hierarchical clustering to identify suitable parents having distant relationship for hybridization program. The genotypes were grouped into five different clusters. Cluster IV contained the maximum number of seven genotypes whereas cluster I contained least number having only one genotype. The lowest inter-genotypic distance (0.75) was found between BD-2174 and BD-9489 where the highest (47.46) was between BARI Mistikumra-1 and BD-2150. The maximum inter cluster distance was observed between cluster II and III (17.922) and the minimum inter cluster distance was observed between cluster II and IV (6.825). The maximum intra cluster distance was noticed for the cluster V (0.261) and the minimum intra cluster distance was found in cluster I (0.00). Cluster I contained the highest mean values for pedicel length of male flower, number of male flowers/plant, fruit length, fruit breadth, single fruit weight and fruits/plant. Cluster II contained the highest mean values for days to first male and female flowering. Cluster III contained the highest mean values

for leaf breadth, pedicel length of female flower and number of female flowers/plant. Leaf breadth, pedicel length of male flower, number of male flowers/plant and fruits/plant were the important components of genetic divergence in the studied materials. Based on inter cluster distance, inter genotypic distance and consideration of desirable characters for high yield potential, the genotypes G19 (BARI Mistikumra-1) and G20 (BARI Mistikumra-2) from cluster II; G21 (BD-2150) from cluster I and G1 (BD-2151) and G13 (BD-266) from cluster III can be selected as better parents for future hybridization program.

Keywords: *Cucurbita moschata* L., principal component analysis, cluster analysis and genetic divergence.

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DEVELOPMENT OF UNION LEVEL DIGITAL DATABASES AND MAPS OF MAIZE GROWING AREAS AT PIRGONJ IN THAKURGAON DISTRICT

M. A. UDDIN, K. S. RAHMAN, M. M. RAHMAN
N. MOHAMMAD AND A. F. M. TARIQUL ISLAM

Abstract

A study was conducted during 2012-13 to build union level digital databases and maps of maize growing areas using both primary and secondary data. Primary data were collected from maize growing areas of the upazilla namely Pirgonj of Thakurgaon district. For summer and winter maize; union, upazila, district and country level digitized maps were used in the study. Geographical Information System (GIS), Global Positioning System (GPS) and Management Information System (MIS) related Information Technology (IT) were also applied. Total cultivable land 28138 ha in Pirgonj upazila and area and production of maize were 5100 ha and 34508.75 t respectively. Sixteen (16) varieties were cultivated in the study areas and maximum area (74.09%) of maize was cultivated by the executive varieties NK40, Pacific 984, 900M Gold, 900M, 3396, and Supergold. Average maize yield of the study areas was 6.77 t/ha during 2012-13. A web site was developed for variety wise area coverage data collection of maize as well as for other crops. This web site can also be used in mobile phone.

Keywords: Maize, area, cultivation, production, variety, union, ICT and digital database.

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DETERMINATION OF OPTIMUM SAMPLE SIZE FOR MEASURING THE YIELD CONTRIBUTING CHARACTERS OF BOTTLE GOURD

N. MOHAMMAD, M. S. ISLAM, K. S. RAHMAN
M. M. RAHMAN AND S. NASRIN

Abstract

To improve efficiency in collecting data from field experiment on fruit attributes of bottle gourd (Lau), the sample size was studied for sample size at Olericulture Division, Horticulture Research Centre (HRC) of Bangladesh Agricultural Research Institute (BARI) Gazipur during 2012-13. The treatments/varieties were LS 0026-5-3, LS 0012-5-3, LS 117-F-1, LS 117-A-2 and BARI Lau-3. Fruit length, breadth and weight of bottle gourd (Lau) data were collected from the experimental plot. The data were used to design optimum sampling plan from equal number of observations per cell. The observation on fruit length (cm), breadth (cm) and weight (kg) were taken from 5 plots/treatments at random. A randomized complete block design (RCBD) with 3 replications and five treatments/varieties was used in this experiment. Five (5) plants per plot and 2 fruits per plants (10 fruits per plot) were the original sampling plan for this experiment. A sampling plan of selecting 4 plants at random and measuring 2 fruits per selected plant (8 fruits per plot and plots were $25m^2$ i.e. 10m long and 2.5m wide) was found to be optimum and economical for taking measurements of fruit attributes in field experiments on bottle gourd.

Keywords: Measurement, optimum sample size, sampling technique and bottle gourd.

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TRIPLE CEREAL SYSTEM WITH FERTILIZER AND PLANTING MANAGEMENT FOR IMPROVING PRODUCTIVITY IN COASTAL SALINE SOILS OF BANGLADESH

M. ATAUR RAHMAN, M. ATIKUR RAHMAN
N. C. D. BARMA AND T. P. TIWARI

Abstract

A field experiment was conducted on a saline environment of Shatkhira to assess the feasibility of an intensive wheat-maize-rice cropping system with crop residue used as mulch, bed planting and fertilizer management to improve productivity. Three levels of fertilizers (Recommended dose of NPKS fertilizers, recommended fertilizers plus 50% additional K and S and recommended fertilizers with 2 t/ha ash) were assigned in main plots and four combinations of soil management and mulching (Conventional flat, Conventional with straw mulching @ 3 t/ha, Bed planting, and Bed with straw mulching @ 3 t/ha) were kept in subplots with three replications. Rice straw mulch was used after wheat sowing, wheat straw mulch was applied after maize sowing. Rice was puddle transplanted without mulch. Crop varieties like BARI Gom-25, BARI Hybrid Maize-7, and BRRI Dhan 39 were used for wheat, maize and rice, respectively. Chemical analysis of soils after two years of experimentation and the response of component crops for the two cropping cycles indicated that straw mulching either on bed or flat soil was equally effective in preventing rapid development of soil salinity in the dryer periods and thereby resulted in better stand establishment contributing to higher spikes/m^2 of wheat and ears/m^2 of maize. Available nutrient contents in soil, especially P (Olsen), B and K were improved when straw much was applied in bed or flat plantings. Application of ash with recommended fertilizer was effective in improving grain yields of component crops as compared to other fertilizer treatments without ash. The highest grain yield of wheat and maize was achieved when recommended dose of fertilizers plus ash with straw mulching were applied either in bed or flat soil condition for both the years. Treatment effect was not noted on rice yield in the first year, however the residual effect of treatments and its combinations became significant in the second year. Like wheat and maize, rice yield positively increased by fertilizer+ ash and mulching. Straw mulch and ash application contributed to soil salinity mitigation, favoured crop establishment and improved the yields of component crops.

Keywords: Straw Mulch, bed planting, soil salinity, cropping system, ash application and soil fertility.

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PRODUCTIVITY AND PARTIAL BUDGET ANALYSIS IN WHEAT-RICE SEQUENCES AS INFLUENCED BY INTEGRATED PLANT NUTRITION SYSTEM AND LEGUME CROPS INCLUSION

MD. SHAKHAWAT HOSSAIN, M. A. R. SARKAR, M. JAHIRUDDIN
A. K. CHAKI AND ASM M. R. KHAN

Abstract

The experiments were carried out at the Regional Wheat Research Centre, Rajshahi of Bangladesh Agricultural Research Institute (BARI) for two consecutive years, 2009-10 and 2010-11 to evaluate the agro-economic productivity of Wheat-Rice cropping sequence as influenced by integrated plant nutrition system (IPNS) and inclusion of legume crops. The experiment comprised of four cropping sequences viz. Wheat-Mungbean- T. *Aman* rice, Wheat-Blackgram- T. *Aman* rice, Wheat-Sesbania- T. *Aman* rice and Wheat-Fallow- T. *Aman* rice; and six nutrient treatments viz. 100% recommended nutrient rates, IPNS with 3 t ha^{-1} poultry

manure (PM), IPNS with 6 t ha^{-1} PM, IPNS with 5 t ha^{-1} cowdung (CD), IPNS with 10 t ha^{-1} CD and farmers' practice (FP). It was carried out in a split-plot design assigning cropping sequences in the main plots and nutrient treatments in the sub-plots with three replications. For the IPNS, the 100% nutrient rates were adjusted with manure and fertilizers. Inclusion of mungbean in the Wheat-Rice cropping sequence showed higher production cost but it gave higher system productivity, gross return, gross margin, benefit-cost ratio and production efficiency. This cropping sequence gave on an average 57% higher wheat equivalent yield (WEY) compared to the existing Wheat-Rice sequence followed by blackgram included cropping sequence. The IPNS based fertilizer and manure application had better yield performance, WEY, gross margin, gross return, benefit-cost ratio, production efficiency and land use efficiency as compared to 100% chemical fertilizers or FP. It is concluded that the Wheat-Mungbean-Rice cropping sequence with IPNS approach is a productive and profitable technology for crop cultivation.

Keywords: Wheat-Rice sequence, crop productivity, production efficiency, land use efficiency and partial budget analysis.

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BIOLOGY AND MANAGEMENT OF FRUIT BORER, *Virachola isocrates* (Fab.) INFESTING GUAVA

M. M. H. KHAN

Abstract

Two experiments were conducted to study the biology of guava fruit borer, *Virachola isocrates* (Fab.) and to evaluate the effectiveness of management practices for managing fruit borer, *Virachola isocrates* (Fab.) in Sharupkathi variety of guava. The biology including morphometrics of guava fruit borer were studied in the laboratory of the Department of Entomology, PSTU, Dumki, Patuakhali during May to October, 2012. Results revealed that incubation period, larval period, pupal period of this borer ranged from 8-10, 17-46, 7-33 days, respectively and total life cycle was completed within 30 to 60 days. Adult longevity ranged

from 4-7 days. The average length of full grown larva was 17.45 mm, and breadth across thorax and abdomen were 3.36 and 2.80 mm, respectively. The average length of pupa was 15.90 mm, and breadth across thorax and abdomen were 3.68 and 2.89 mm, respectively. The average length of adult body was 16.90 mm, and breadth across thorax and abdomen were 3.91 and 2.94 mm, respectively. The average length of antennae was 10.35 mm. The mean length of pro-, meso and metathoracic legs was 7.55mm, 8.10mm and 10.45 mm, respectively. The metathoracic leg was longer as compared to pro and mesothorarcic legs. The length of fore wing across the upper and lower margin ranged from 16.00 mm to 18.00 mm and 11.50 mm to 12.00 mm, respectively. The length of hind wing across the upper and lower margin ranged from 10.00 mm to 11.00 mm and 8.00 mm to 9.00 mm, respectively. The breadth of fore wing across the middle ranged from 10.50-11.00 with mean breadth of 10.78 mm. Likewise, the breadth of hind wing across the middle ranged from 11.00-14.00 with mean breadth of 12.55 mm. The results on the percent infestation reduction over control revealed that package with field sanitation + collection of infested fruits + application of Superior (Chlorpyrifos + Cypermethrin) 505 EC @ 1 ml/ l water, and package consisting of field sanitation + collection of infested fruits + bagging of fruits with polythene bag gave 100 % control of the pest. These two packages may be used for the large scale cultivation of 'Sharupkathi' variety in Bangladesh.

Keywords: Biology, fruit borer, *virachola isocrates* (Fab.) and guava, management.

Bangladesh J. Agril. Res. 41(1): 53-66, March 2016

PRODUCTIVITY OF GARLIC UNDER DIFFERENT TILLAGE METHODS AND MULCHES IN ORGANIC CONDITION

M. A. KABIR, M. A. RAHIM AND D. A. N. MAJUMDER

Abstract

An experiment was conducted at the field of USDA-Alliums project, Bangladesh Agricultural University, Mymensingh to study the effect of tillage and mulches on the growth and yield of garlic.

The experiment consisted of three tillage conditions (conventional, puddling and zero tillage) and four mulches (control, rice straw, water hyacinth and *Curcuma amada* leaf). The results revealed that different mulches had remarkable contributions on the growth and yield of garlic. The highest values of growth parameters as well as bulb yield were obtained from rice straw mulch identical with that of water hyacinth mulch. Different tillage also had significant influence on yield and yield contributing traits of garlic. Garlic cultivated under zero tillage showed remarkable variation in terms of percent emergence. Puddling and zero tillage practices resulted in higher yield compared to the conventional tillage. It was also noticed that both the tillage conditions as well as mulches showed profound effects on the yield and yield contributing parameters. Moreover, the highest net return (196647Tk. /ha) and the highest BCR of 2.90 was obtained from zero tillage with rice straw.

Keywords: Tillage, mulches, growth, productivity and garlic.

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IN VITRO CONSERVATION OF TARO *(Colocasia esculenta* var. *globulifera)* AS INFLUENCED BY MANNITOL

M. K. R. BHUIYAN, M. J. HOSSAIN AND M. M. HAQUE

Abstract

In vitro conservation of germplasm plays a vital role in maintenance breeding and also has many advantages over the conventional system. The experimental results for conservation of *Colocasia* sp. also proved this. In relation to explants and osmoticum, meristem and axillary bud could be conserved for 24 months while meristem-base died after 6 months. Mannitol as osmoticum @ 4% performed nicely to conserve *Colocasia* upto 24 months. Only meristem and axillary bud could be conserved for 24 months with the use of 4 % mannitol. But other level of mannitol remained culture alive for varying periods (6 to 12 months). After 24 months, the plant height was 6.5 cm for the meristem and 6.4 for axillary bud.

Keywords: *Colocasia*, mannitol, meristem and axillary bud.

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EFFECT OF WEED EXTRACTS AGAINST PULSE BEETLE, *Callosobruchus chinensis* L. (*COLEOPTERA: BRUCHIDAE*) OF MUNG BEAN

M. A. AHAD, M. K. NAHAR, M. R. AMIN
S. J. SUH AND Y. J. KWON

Abstract

The n-hexane extracts of the weeds 'bhatpata' *Clerodendrum viscosum*, 'kashiature' *Cassia tora*, 'dhakishak' *Dryoptris filix-max*, 'bonmorich' *Croton bonpalandianum* and 'ghagra' *Xanthium strumarium* were used to evaluate their effectiveness for suppressing pulse beetle, *Callosobruchus chinensis* reared on mung bean *Vigna radiata* grains. The investigations were done with 1, 2 and 4% n-hexane extracts of the weeds and an untreated control. The weed extracts exhibited considerable effectiveness which varied with weed species, concentrations and exposure durations. The higher concentrations showed the higher rate of insect mortality, fecundity, adult emergence inhibition, and grain protection. The LC_{50} values of the extracts ranged from 5.3 to 7.8, 4.7 to 6.5 and 4.1 to 6.0 g/100 ml at 24, 48 and 72 hours after treatment, respectively. The fecundity inhibition varied from 31.7 to 78.7%, adult emergence inhibition from 33.8 to 81.1%, and grain damage inhibition from 10.3 to 60.1% when 'bhatpata' with concentration of 1 g/100 ml and 'ghagra' with concentration of 4g/100 ml were applied, respectively. Among the tested weeds, ghagra (4g/100 ml) showed better efficacy against *C. chinensis* compared to other tested extracts and may be suggested to control pulse beetle and protection of mung bean grains.

Keywords: Adult emergence, bruchids, fecundity, grain damage, toxicity and weed extracts.

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RESPONSES OF GARLIC TO ZINC, COPPER, BORON AND MOLYBDENUM APPLICATION IN GREY TERRACE SOIL OF AMNURA SOIL SERIES

M. N. YOUSUF, M. M. HASAN, S. BRAHMA
DEEDER SULTANA AND A. H. M. FAZLUL KABIR

Abstract

A field experiment was conducted at the Spices Research Centre, Shibgonj, Bogra, Bangladesh during *rabi* (winter) seasons of 2008-09 and 2009-10 to determine the requirement of Zn, Cu, B and Mo of garlic (BARI Garlic-2) along with a blanket dose of cowdung 5 t, 100 kg N, 40 kg P, 100 kg K and 30 kg S/ha for achieving satisfactory bulb yield of this crop. Different levels of zinc (0, 1.0, 1.5, 3.0 and 4.5 kg/ha), copper (0, 0.5, 1.0 and 1.5 kg/ha), boron (0, 1.0, 2.0 and 3.0 kg/ha) and molybdenum (0, 0.5 and 1.0 kg/ha) were distributed in the plot. The experiment was tested in randomized complete block design with three replications. The positive impact of application of those nutrients plant height, number of leaves per plant, cloves per bulb, diameter and weight of bulb and yield of garlic up to a moderate level of $Zn_{3.0}Cu_{1.0}B_{3.0}Mo_{1.0}$ kg/ha. The highest bulb yield (4.87 t/ha in 2008-09 and 6.6 t/ha in 2009-10) was obtained from $Zn_{3.0}Cu_{1.0}B_{3.0}Mo_{1.0}$ kg/ha and yield was declined with higher dose of these elements except Mo. The fertilizer treatment $Zn_{3.0}Cu_{1.0}B_{3.0}Mo_{1.0}$ kg/ha was observed to be the best suitable dose for garlic production on Grey Terrace Soil of Amnura Soil Series under AEZ-25 (Level Barind Tract) of Bangladesh.

Keywords: Garlic, growth, bulb yield, zinc, copper, boron and molybdenum.

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RESPONSE OF N, P AND K ON THE GROWTH AND FLOWERING OF HIPPEASTRUM (*Hippeastrum hybridum* Hort.)

M. K. JAMIL, M. M. RAHMAN, M. M. HOSSAIN
M. T. HOSSAIN AND A. J. M. SIRAJUL KARIM

Abstract

An experiment was conducted at the Horticultural Research Field of Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Salna, Gazipur during September 2008 to May 2009 to determine the response of hippeastrum (cv. 'Apple Blassom) to different combinations of nitrogen, phosphorus and potassium levels. There were 14 treatment combinations comprising four levels of nitrogen viz., 0, 100, 200, and 300 $kgha^{-1}$; five levels of phosphorus viz., 0, 200,300, 400 and 500 $kgha^{-1}$ and five levels of potassium viz., 0, 100, 200, 300 and 400 $kgha^{-1}$ with an exclusively Cowdung treatment at the rate of 10 tha^{-1} . The experiment was laid out in a Randomized Complete Block Design with three replications. The growth and flowering parameter of hippeastrum were significantly influenced by combined application of N, P & K.The highest values in respect of leaves per plant (8.6), leaf breadth (5.4 cm), number of plants per bulb (3.07), flower scape per plant (2.07), flowers per scape (4.2), length and diameter of flower (14 cm x 13.83 cm), flower scape (43.33 cm x 29.37 cm) and flowering duration (10.7 days) were observed with $N_{200}P_{400}K_{300}$. The same treatment showed earliness in days to flower scape emergence (172.3 days), days to flower bud appearance (185.3 days) and days to first flower open (189.3 days). The biggest flower (14.00 cm x 13.83 cm), longest flower scape (43.33 cm), maximum number of flowers per scape (4.20), and maximum flowering duration (11.5 days) were also exhibited by the treatment $N_{200}P_{400}K_{300}$ .The control treatment ($N_0P_0K_0$) recorded the lowest values except days to first leaf emergence, days to flower scape emergence, days to flower bud appearance and days to first flower open.

Keywords: Hippeastrum, nitrogen, phosphorus, potassium and flower yield.

Bangladesh J. Agril. Res. 41(1): 103-113, March 2016

FIELD PERFORMANCE OF BARI UREA SUPER GRANULE APPLICATOR

M. A. HOQUE, M. R. KARIM, M. S. MIAH
M. A. RAHMAN AND M. M. RAHMAN

Abstract

Field performance of BARI Urea Super Granule (USG) applicator was evaluated on BARI research stations (Gazipur, Pabna, and Barisal) and farmer's field (Pabna, Barisal, Magura, Narshingdi, Jhenadah, Sirajgang, Rajbari and Jhalkathi) during the *boro* season of 2012-13. The applicator was tested with four treatments- application of USG by hand (165 kg/ha), application of USG by BARI USG applicator (165 kg/ha), application of prilled urea at USG rate (165 kg/ha) and application of prilled urea at farmers practice. In the farmer's field, USG applicators were evaluated with the traditional broadcasting of granular urea. Similar yield of rice was obtained from machine and hand application of USG in all locations. Higher yield of rice was obtained from USG than granular urea. During field test, average field capacity and efficiency of the applicator were 0.138 ha/h and 81%, respectively. Considering custom hiring, the net income per year was Tk. 71750 and the payback period was 3 days. The price of the applicator is Tk. 3500.

Keywords: USG applicator, field capacity, field efficiency and payback period.

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ASSESSMENT OF MICROBIAL QUALITY OF WATER IN POPULAR RESTAURANTS IN SYLHET CITY OF BANGLADESH

AYESHA SARKER, SHARMISTA DASH, MD. MOZAMMEL HOQUE
SULTAN AHMED AND MD. RAYHAN SHAHEB

Abstract

Microbial contaminations of drinking water constitute a major burden on human health. Interventions to improve the quality of drinking-water provide significant benefits to health. An assessment of microbial quality of water in the samples obtained from different popular restaurants of Sylhet City Corporation, Bangladesh were analyzed in the laboratory. Our aims were to find out the microbial properties of water, to analyze the potable water qualities of the restaurants and also to compare it with different standards to assess the health risk of people. The microbial tests viz. MPN, TVC and total coliform test were studied. Results revealed that all the water samples were fecal contaminated and had a great chance of contamination by other pathogenic bacteria. Results indicated that most of the samples were significantly positive to MPN test and TVC bacteria were highly significant. The risk score for coliform bacteria also remarked high risk for human health according to WHO standards and were not suitable as potable water. Our recommendations are therefore, water supply authority including restaurant owners should take necessary steps for the maintenance of microbial quality of water and microbial assessments should be done very often to leading a hygienic water distribution environment of the city.

Keywords: Microbial properties, water quality, fecal coliform, MPN index and human health.

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EFFECT OF SOWING TIME AND VARIETY ON SEED GERMINATION AND VIGOUR INDEX OF WHEAT

MD. RAYHAN SHAHEB, MD. NAZMUL ISLAM
M. SIDDIKUR RAHMAN, AND ASHRATUN NESSA

Abstract

Experiments were carried out in research field and laboratory of Seed Technology Division, Bangladesh Agricultural Research Institute, Gazipur during *rabi* season of 2008-09 and 2009-10 to find out the effect of sowing time and variety on seed germination and vigour index of wheat after harvest of the crop. There were two sets of treatments, comprising a) three dates of sowing viz., 20 November, 5 December and 20 December; and b) three varieties

viz., ‘Bijoy’, ‘Sufi’ and ‘Prodip’. Split plot design and complete block design were followed in field and laboratory experiments, respectively. Results revealed that the highest seed germination 93.33% was recorded in ‘Prodip’ sown on 20 December, 2008 and ‘Bijoy’ sown on 5 December, 2009. However, all the varieties showed more than 83% seed germination at all dates of sowing of wheat. The highest vigour indices, 1.53 and 1.41 were found in the seeds of ‘Sufi’ sown on 20 November in both the years of 2008 and 2009, respectively.

Keywords: wheat, sowing time, variety, seed germination and vigour index.

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TREND AND OUTPUT GROWTH ANALYSIS OF MAJOR FRUITS IN CHITTAGONG REGION OF BANGLADESH

M. JAMAL UDDIN, S. R. DEY AND TAHMINA TASLIM

Abstract

The study analyzed the trends, growth rates of area, production and yield of major fruits in Chittagong region and identified factors contributing to output growth during 1993/94-2009/10 using secondary data. The fruits under study were mango, jackfruit, litchi, guava, banana, papaya, ber, pomelo, pineapple, watermelon, lime and lemon. The study revealed that the area of all fruits increased over the period except banana, ber, pomelo and water melon. The highest increase in area was estimated for guava (131.6%) and the lowest for jackfruit (6.4%). Similarly, the production of all fruits over the period was increased except banana and pineapple. The average annual growth rates of area, production and yield for all fruits were found to be positive in all periods (i.e, period I: 1993/94-1997/98; Period II: 1998/99-2003/04, and Period III: 2004/05-2009/10). But the magnitude of the growth rates of area for all fruits varied significantly. The growth rates of area for mango, jackfruit, litchi and pineapple were increased impressively and significantly. This might be due to the adoption of improved variety and management practices by the farmers. The growth rate of area, production and yield of banana decreased drastically over the period due to absence of modern variety of banana and lack of improved management practices in the region. The growth rates of production for mango were found to be highest in the period III (2004/05-2009/10). But the growth rate of yield of mango was found to be decreased significantly over the periods due to improper management against the pest and diseases by the farmers. The highest percentage of output changed was observed in Banana (149%) followed by pineapple (106%) and jackfruit (83%) between the periods. The lowest percentage of output changed was found in guava (11.7%). The contribution of area was the highest in changing output for mango, jackfruit, litchi, guava, ber, pomelo, watermelon, lime and lemon. The contribution of yield was the highest for banana (135.57%), papaya (76.92%) and pineapple (158.62%) for changing output indicated that the increased area was more responsible for changing in output growth of selected fruits. To increase the growth rate of fruits, improved variety and management practices should be disseminated through undertaking special programme and strengthening research-extension linkage in the Chittagong region.

Keywords: Trends, fruits, area, production, yield, output growth and Chittagong region.

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EFFECT OF FLOODING ON GROWTH AND YIELD OF MUNGBEAN GENOTYPES

M. R. AMIN, M. A. KARIM, M. R. ISLAM
S. AKTAR AND M. A. HOSSAIN

Abstract

The field experiment was carried out with some selected mungbean genotypes viz., IPSA-13, VC-6173A, BU mug 2, BARI Mung-5 and IPSA-12 to observe the effect of 4-days flooding on their growth and yield of mungbean under field conditions at Bangabandhu Sheikh Mujibur Rahman Agricultural University,

Gazipur, Bangladesh during September to November, 2011 maintaining 3-5 cm standing water at 24 days after emergence. Days to flowering and maturity delayed in flooded plants over control depending on the genotypes. Flooding significantly reduced Total Dry Matters (TDM), number of pods per plant, seed size and seed yield of the mungbean genotypes over control. Considering higher seed yield, larger seed size and less yield reduction relative to control VC-6173A, BU mug 2 and IPSA-13 were found tolerant to soil flooding condition.

Keywords: Soil flooding, growth and yield and mungbean genotypes.

Bangladesh J. Agril. Res. 41(1): 163-171, March 2016

NITROGEN FIXATING ABILITY OF MUNGBEAN GENOTYPES UNDER DIFFERENT LEVELS OF NITROGEN APPLICATION

M. A. RAZZAQUE, M. M. HAQUE, M. A. KARIM AND A. R. M. SOLAIMAN

Abstract

A pot culture experiment was conducted at the Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Gazipur during kharif II, 2012 to evaluate the nodulation, biological nitrogen fixation and yield potential of genotypes of mungbean under varying levels of N application. There were 10 mungbean genotypes viz. IPSA-12, GK-27, IPSA-3, IPSA-5, ACC12890055, GK 63, ACC12890053, BU mug 4, BARI Mung 6 and Binamoog-5, each genotype treated with six levels of N (0, 20, 40, 60, 80 and 100 kg N ha^{-1}). Among the genotypes, the IPSA 12 at 40 kg N ha^{-1} produced the maximum number of nodules (14.54 $plant^{-1}$) as well as the highest nitrogen fixation (2.684 µmol C_2H_4). This resulted in the highest seed yield (14.22 g $plant^{-1}$). The genotype ACC12890053 recorded the lowest nodulation (6 $plant^{-1}$), nitrogen fixation (1.134) and seed yield (7.33 g $plant^{-1}$).

Keywords: Genotypic variability, nitrogen fixation and yield.

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GENETIC VARIABILITY, CHARACTER ASSOCIATION AND PATH ANALYSIS IN MAIZE (*Zea mays* L.)

S. BEGUM, A. AHMED, S. H. OMY
M. M. ROHMAN AND M. AMIRUZZAMAN

Abstract

Twenty-two maize hybrids were evaluated to find out their variability, character association and path coefficient of grain yield and its component characters. Significant differences were found among the genotypes for the characters studied. Ear length and grain yield (t/ha) had moderate genotypic coefficient of variation (GCV) and phenotypic coefficient of variation (PCV), but the had the low environmental co-efficient of variation (ECV). The heritability for all the characters was high. The characters viz. plant height, ear height and 1000-grain weight, showed high heritability along with high genetic advance. Ear length, ear diameter and kernel per row had highly significant positive correlation with grain yield. However, the deviations between genotypic and phenotypic correlation and magnitude of environmental correlation suggested considerable influence of growing environment in expressing almost all the characters. Path coefficient analysis revealed that plant height (0.659), ear length (0.934) and kernel-rows per ear (0.715) had highly significant positive direct effect on grain yield suggesting their importance during selection. Simultaneous restricted selection should be done for number of kernel rows per ear.

Keywords: Genetic variability, heritability, character association, path analysis and *Zea mays*.

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EFFECT OF VARIOUS CEREALS ON THE DEVELOPMENT OF *CORCYRA CEPHALONICA* (STAINTON) AND ITS EGG PARASITOID *Trichogramma chilonis* (Ishii)

M. NASRIN, M. Z. ALAM, S. N. ALAM
M. R. U. MIAH AND M. M. HOSSAIN

Abstract

Eight types of cereals viz., wheat grain, chopped wheat, paddy grain, rice grain, maize grain, chopped maize, rice bran, mixture of rice bran and chopped rice were fed to observe the development parameters like egg, larva, pupa and adult stages of *Corcyra cephalonica* (stainton) for three consecutive generations. The parasitism efficiency of *Trichogramma chilonis* (Ishii) was also evaluated on the resultant host eggs of *C. cephalonica*. The *C. cephalonica* revealed the highest number of eggs (115.6 female^{1}), higher hatchability (92.9%), extented larval duration (45.9 days), increased larval weight (0.058 gm), survival rate (88.3%), adult emergence rate (93.5%), and male and female longevity (7.7, 7.2 days respectively) when they were reared on chopped wheat. On the other hand, the lowest number of egg was found on paddy husk (29.2 female^{-1}). The lowest hatchability (45.6%), larval duration (45.9 days), larval weight (0.029gm), and survival rate (38.2%), pupal duration (17.9 days) adult emergence (42.0%), male and female longevity (4.8 and 4.7 days respectively) were found on paddy husk. The effect of food materials also reflected on the parasitism efficiency of the egg parasitoid *T. chilonis*. The highest percent egg parasitization was done by the *T. chilonis* on the host eggs, reared on chopped wheat (94.8±0.07%) followed by wheat grain (82.5±0.08%) and chopped maize (73.8±0.09%). On the other hand, the lowest parasitism was obtained when the larvae were reared on paddy husk (42.2±0.14 %) and paddy grain (48.8±0.05 %).

Keywords: Cereals, *C. cephalonica*, development, parasitism and *Trichogramma chilonis.*

Bangladesh J. Agril. Res. 41(2): 195-205, June 2016

EFFECT OF DROUGHT STRESS ON GAS EXCHANGE CHARACTERISTICS OF FOUR SOYBEAN GENOTYPES

J. A. CHOWDHURY, M. A. KARIM, Q. A. KHALIQ
A. U. AHMED AND M. S. A. KHAN

Abstract

An experiment was conducted in a venylhouse at the environmental stress site of Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur during September to December 2012 to determine the changes of photosynthesis and some related traits under drought stress in soybean genotypes. Four studied genotypes viz. Shohag, BARI Soybean-6 and BD2331 (relatively stress tolerant) and BGM2026 (susceptible) were tested against two water regimes such as water stress and non-stress. Results indicated that gas exchange characteristics were positively correlated with plant growth. Photosynthesis and stomatal conductance showed more reduction in susceptible genotypes than the tolerant ones. Transpiration rate was found minimal in tolerant genotypes. Changes in leaf growth attributes of the four selected genotypes were compared under drought (water) stress conditions which is one of the major plant parts related to gas exchange. Generally, drought stress decreased the leaf area more in susceptible genotype than tolerant genotype. From the result, genotype BGM2026 which recorded the lowest photosynthesis, stomatal conductance, leaf area but highest transpiration rate was considered as drought susceptible whereas BARI Soybean-6, Shohag and BD2331 were more drought stress tolerant which have better mechanisms of drought tolerance.

Keywords: Soybean, drought, photosy on thesis, transpiration and stomabal conductance.

Bangladesh J. Agril. Res. 41(2): 207-219, June 2016

EFFECT OF DROUGHT STRESS ON AGRO-MORPHOLOGICAL TRAITS OF LENTIL (*Lens culinaris* Medik.) RECOMBINANT INBRED LINES

M. H. RAHIMI, S. HOUSHMAND, M. KHODAMBASHI
B. SHIRAN AND S. MOHAMMADY

Abstract

To evaluate the effect of drought stress on agro-morphological traits of lentil, an experiment was conducted using 168 F6:7 inbred lines along with their parents in RCB design with three replications. Analysis of variance revealed significant differences among lines in terms of all studied characters in both normal and stress conditions. Comparing with non-stress condition, drought stress reduced pod weight per plant, seed yield and pod number per plant to 54%, 45.3% and 42.2%, respectively. Correlation coefficient of biological yield, pod number per plant, pod weight per plant and harvest index (HI) with seed yield was positive and significant. Stepwise regression analysis showed that biological yield, HI, pod weights per plant and leaf length determined 87.6% of seed yield variations and biological yield had the most function. Maximum values of genotypic and phenotypic coefficient of variations were observed for seed yield, pod weight per plant and pod number per plant. The highest values of heritability found in leaf width (h^2= 0.77), seed diameter (h^2= 0.69) and plant height (h^2= 0.66). Evaluation of stress tolerance index (STI) showed that lines 125 and 160 were the most tolerant lines, which could be recommended for cultivation in areas that subject to terminal drought stress.

Keywords: Lentil, drought stress, recombinant lines, genotypic parameters and yield components.

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INFLUENCE OF SUCROSE AND ALUMINIUM SULPHATE ON VASE LIFE OF CUT HIPPEASTRUM FLOWER (*Hippeastrum hybridum* Hort.)

M. K. JAMIL, M. M. RAHMAN, M. M. HOSSAIN
M. T. HOSSAIN AND A. J. M. S. KARIM

Abstract

An experiment with Hippeastrum flower (*Hippeastrum hybridum* Hort.) cv. 'Apple Blossom' comprising three sucrose concentrations viz., 0 (control), 2 and 4 % and five aluminium sulphate concentrations viz., 0 (control), 0.25, 0.50, 0.75 and 1.0 mM at the Horticulture Laboratory of Bangabandhu Sheikh Mujibur Rahman Agricultural University, Bangladesh during the period from April 01 to April 30, 2009. The experiment was laid out in a Completely Randomized Design (CRD) with three replications. Sucrose, aluminium sulphate and their combinations had significant influence on most of the parameters studied. Transpiration loss and water uptake ratio decreased significantly with the increased sugar levels and aluminium sulphate upto 0.75 mM beyond which they were increased. Transpiration loss and water uptake ratio was found minimum in the vase solution containing 4% sucrose (0.78) and 0.75 mM aluminium sulphate (0.80), which ultimately resulted in an enhanced vase life (9.2 days for sucrose and 9.11 days for aluminium sulphate) of cut Hippeastrum flower. A linear relationship between water uptake and vase life of flowers was found (y = 0.056x + 5.791). Sucrose 4% and aluminium sulphate 0.75 mM in combination gave maximum total water uptake, maximum days to onset of deterioration, the highest average fresh weight of single scape at 6^{th} and 10^{th} day after setting the trial. Transpiration loss and solution uptake ratio was found maximum in the combination of 4% sucrose and 0.75 mM aluminium sulphate (0.48) with the longest vase life of 10.33 days of cut Hippeastrum flower cv. 'Apple Blossom'.

Keywords: Sucrose, aluminium sulphate, transpiration loss, vase life, Hippeastrum flower and *Hippeastrum hybridum* Hort.

Bangladesh J. Agril. Res. 41(2): 235-250, June 2016

STUDY ON MORPHO-PHYSIOLOGICAL TRAITS IN SPRING WHEAT (*Triticum aestivum* L.) UNDER RAINFED CONDITION

M. RAHMAN, N. C. D. BARMA, B. K. BISWAS
A. A. KHAN AND J. RAHMAN

Abstract

Nine morphological and physiological traits were taken to assess genetic parameters, association between the traits and grain yield and partition correlation of yield with other traits, which were purposefully considered as the important strategy for the investigation. Therefore, the main objective of the present investigation was to find out suitable morpho-physiological traits that could be invariably used for the yield improvement of spring wheat grown under drought stress condition. Thirty wheat diverse genotypes were evaluated under drought stress field condition in Alpha Lattice Design with three replications. The study revealed wide range of variability and high broad sense heritability for most of the traits (early ground coverage, canopy temperature, peduncle length, relative water content, number of spikes per m^2 and 1,000-grain weight). Genetic advance in percent of mean suggested that there is enough scope for further improvement of genotypes for the characters studied. Correlation studies exhibited that grain yield was positively and significantly associated with early ground coverage and 1000-grain weight. The path analysis also revealed a maximum direct effect on grain yield contributed by 1000-grain weight. Early ground coverage and 1000-grain weight had a significant and spikes per m^2 had positive indirect effect on grain yield. Therefore, these three traits were found to be most important for wheat breeding under drought stress. As these traits can be evaluated quickly and easily, hence breeders can choose these traits for selecting potential wheat genotypes for further breeding programs.

Keywords: Correlation, morpho-physiological traits, path analysis and spring wheat.

Bangladesh J. Agril. Res. 41(2): 251-258, June 2016

EFFECT OF HONEY BEE POLLINATION AND CURD SCOOPING ON SEED YIELD OF CAULIFLOWER

M. A. ROUF, M. A. RAHIM, M. A. SIDDIQUE AND M. B. MEAH

Abstract

The experiment was conducted to study the effect of honey bee pollination and curd scooping on seed production of cauliflower (*Brassica oleracea* var. *botrytis* L.) cv. 'Poushali'. Eighteen combinations of treatments comprising three types of pollination viz., open pollination (natural pollination), using bees for pollination inside net (planned pollination) and plants inside net without bees (control) and six kinds of curd scooping viz., 25%, 50% and 75% of curd cutting, cross curd cutting, central curd cutting and no curd cutting (control). Honey bee (*Apis cerana* L.) was used as pollinator. Seed yield and yield attributes were significantly influenced by both factors and their combinations. Central curd cutting influenced early flowering and siliqua maturity compared to other curd cutting treatments. Planned honey bee pollination was found to inflict maximum impact on the seed production of cauliflower with an increase in seed yield of 45.46% and 23.17% higher over plants grown inside net without bees and open pollination, respectively. Central curd scooping increased 26.52% higher yield than that of no curd cutting treatment. Planned bee pollination and central curd cutting independently as well as in combination gave the maximum yield attributes of seed viz., primary and secondary flower stalks/plant, number of siliquas/plant, length of siliqua, number of seeds/siliqua,1000 seed weight, seed yield and seed germination percent of cauliflower. Planned pollination coupled with central curd cutting gave the maximum seed yield of 607.43 kg/ha in cauliflower.

Keywords: Cauliflower, curd scooping, honey bee pollination and seed production.

Bangladesh J. Agril. Res. 41(2): 259-271, June 2016

VARIABILITY AND PATH CO-EFFICIENT FOR YIELD AND YIELD COMPONENTS IN RICE

SK. SAMEERA, T. SRINIVAS, A. P. RAJESH
V. JAYALAKSHMI AND P. J. NIRMALA

Abstract

Twenty five rice varieties were evaluated for their variability with regard to yield and yield components. Estimates of heritability and genetic advance as per cent mean were also obtained for the above traits. In addition, studies on character associations and path co-efficients were also undertaken. The results revealed high variability, heritability and genetic advance as per cent mean for productive tillers per plant, number of tillers per plant, number of grains per panicle and number of filled grains per panicle, while days to maturity was recorded with high heritability coupled with low genetic advance as per cent of mean. Further, yield was observed to be positively associated with number of tillers per plant, productive tillers per plant, number of grains per panicle and number of filled grains per panicle. Among these, number of tillers per plant, productive tillers per plant and number of filled grains per panicle were noticed to exert high direct effects on grain yield per plant. High indirect effects of most of the traits were noticed mostly through productive tillers per plant indicating importance of the trait as selection criteria in crop yield improvement programmes.

Keywords: Correlation, grain yield, heritability, path analysis, rice, variability and yield components.

Bangladesh J. Agril. Res. 41(2): 273-286, June 2016

GENETIC DIVERSITY OF MUSKMELON USING MULTIVARIATE TECHNIQUE

S. RAHMAN, M. A. K. MIAH AND H. RAHMAN

Abstract

An experiment was conducted at the experimental farm of Plant Genetic Resources Centre (PGRC), Bangladesh Agricultural Research Institute (BARI), Gazipur in 2011 to estimate genetic diversity through multivariate technique. Based on multivariate analysis and application of covariance matrix for non-hierarchical clustering, 64 genotypes of muskmelon were grouped into six clusters to indicate the existence of considerable diversity among the genotypes. The cluster IV consisted of single genotypes (BD2303). The highest number of genotypes possessed in Cluster I. The first principal axis largely accounted for the variation among the genotypes which alone contributed 25.65% of the variations. The highest inter genotypic distance (2.878) was observed between the genotypes BD2303 and BD2313 followed by the genotypes BD2303 and BD2314 (2.808).The highest intra cluster distance was computed for cluster III (0.839) followed by cluster I (0.751). Cluster VI showed the least intra cluster distance which indicated that the genotypes in this cluster were more or less homogeneous. The inter cluster distances were larger than the intra cluster distances suggesting wider genetic diversity among the genotypes of different clusters. Cluster mean pointed out the heavier fruit in cluster IV (2533.3g). The size of this cluster was also far different from all other clusters. Similarly, the highest total fruit weight per plant was found in cluster IV (13.5 kg) which was also far different from other clusters. So it revealed that genotypes of this cluster could be used for developing high yielding variety. Cluster VI showed the highest brix reading (5.6%). Therefore, the genotypes of this cluster could be used for the development of sweet muskmelon variety. Hybridization between the genotypes of cluster IV and those of cluster VI could develop high yielding sweet muskmelon variety(s).

Keywords: Genetic diversity, *Cucumis melo*, Cluster and Multivariate analysis.

Bangladesh J. Agril. Res. 41(2): 287-296, June 2016

DEVELOPMENT OF INTEGRATED PEST MANAGEMENT APPROACHES AGAINST *Helicoverpa armigera* (Hubner) IN TOMATO

A. K. M. Z. RAHMAN, M. A. HAQUE, S. N. ALAM
K. BEGUM AND D. SARKER

Abstract

Five IPM packages viz. T_1=Pheromone trap @ 70 traps ha^{-1} + Neem seed kernel extract @ 50 g L^{-1} of water; T_2=Pheromone trap + HaNPV @ 0.4 ml L^{-1} of water and *Bt* @ 2.0 g L^{-1} of water; T_3=Pheromone trap + Neem seed kernel extract + HaNPV and *Bt*; T_4=Pheromone trap + *Trichogramma chillnis* @ 50,000 ha^{-1} and *Bracon hebetor* @ 1200 ha^{-1}; T_5=Pheromone trap + Neem seed kernel extract + *T. chilonis* and *B. hebetor* were evaluated against *H. armigera* in tomato. The lowest fruit infestation by number (12.55%) was attained from T_5 followed by T_2 (15.49%). Significantly the lowest fruit infestation by weight was found in treatment T_2 (10.60%) followed by T_5 (11.73%). The highest yield was obtained from T_5 (29.74 t ha^{-1}) followed by T_2 (26.77 t ha^{-1}). The highest marginal benefit cost ratio was achieved from T_2 (3.41) followed by T_5 (3.35). Hence, considering benefit cost ratio, T_2 and T_5 packages may be the effective tools for managing *H. armigera* in tomato.

Keywords: IPM, pheromone trap, HaNPV, *Bt*, neem, *Helicoverpa armigera* and tomato.

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EFFECT OF STORAGE DURATION ON THE STORED PUPAE OF PARASITOID *Bracon hebetor* (Say) AND ITS IMPACT ON PARASITOID QUALITY

M. S. ALAM, M. Z. ALAM, S. N. ALAM
M. R. U. MIAH AND M. I. H. MIAN

Abstract

The ecto-endo larval parasitoid, *Bracon hebetor* (Say) is an important bio-control agent. Effective storage methods for *B. hebetor* are essential for raising its success as a commercial bio-control agent against lepidopteran pests. The study was undertaken to determine the effect of storage duration on the pupae of *Bracon hebetor* in terms of pupal survival, adult emergence, percent parasitism, female and male longevity, female fecundity and sex ratio. Three to four days old pupae were stored for 0, 1, 2, 3, 4, 5, 6, 7 and 8 weeks at 4 ± 1°C. The ranges of time for adult emergence from stored pupae, production of total adult, survivability of pupae, parasitism of host larvae by the parasitoid, longevity of adult female and male and fecundity were 63.0 -7.5 days, 6.8-43.8/50 host larvae, 13.0-99.5%, 0.0 -97.5%, 0.00-20.75 days, 0.00-17.25 days and 0.00-73.00/50 female, respectively. The time of adult emergence and mortality of pupae increased but total number of adult emergence, survivability of pupae, longevity of adult female and male decreased gradually with the progress of storage period of *B. hebetor* pupae. The prevalence of male was always higher than that of female. Therefore, short-term storage of *B. hebetor* pupae could be stored for up to 4 weeks without disturbing the functioning of the parasitoid. It is important for sustaining and accumulating large numbers of parasitoids in mass rearing programs and subsequent use of field application.

Keywords: Cold storage, pupae, *Bracon hebetor* and biological control.

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EVALUATION OF INBRED LINES OF BABY CORN THROUGH LINE × TESTER METHOD

A. AHMED, S. BEGUM, S. H. OMY
M. M. ROHMAN AND M. AMIRUZZAMAN

Abstract

Seven lines of baby corn were crossed with 3 testers in a Line × Tester (L × T) mating design and the resulting 21 crosses along with parents and standard check 'Baby Star' were evaluated to develop high yielding baby corn hybrids during *rabi*, 2014-15. Variance due to sca was larger than gca variance for all the

characters indicating the preponderance of non additive gene action in the expression of various traits. Among the parents, BCP/S_4-29, BCP/S_4-31 and tester VS/S_3-1 and VS/S_3-26 were found as good general combiners for baby corn yield and important yield contributing characters. Considering baby corn yield, number of cobs/plant and other performances, the crosses BCP/S_4-2×VS/S_3-1, BCP/S_4-5×VS/S_3-8, BCP/S_4-10×VS/S_3-8, BCP/S_4-22×VS/S_3-26 and BCP/S_4-29×VS/S_3-1 were selected as promising baby corn hybrids.

Keywords: Baby Corn, inbred lines, SCA, GCA and line × tester method.

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EFFECT OF FOLIAR APPLICATION OF ZINC ON YIELD OF WHEAT GROWN BY AVOIDING IRRIGATION AT DIFFERENT GROWTH STAGES

S. SULTANA, H. M. NASER, N. C. SHIL
S. AKHTER AND R. A. BEGUM

Abstract

A field experiment was carried out at micronutrient experimental field of Soil Science Division, BARI, Joydebpur, Gazipur to study the effect of foliar application of zinc on yield of wheat (BARI Gom-25) grown by skipping irrigation at different growth stages of the crop. The experiment was designed in a split plot design on sixteen treatments comprising four irrigation treatments (regular irrigation, skipped irrigation at crown root initiation, skipped irrigation at booting stage and skipped irrigation at grain filling stages of wheat growth) and four foliar application of zinc (0.0%, 0.02%, 0.04% and 0.06% of zinc). Zinc Sulphate Monohydrate ($ZnSO_4$. H_2O) was used as a source of Zn. The interaction effect of irrigation and foliar application of zinc significantly influenced the yield and yield components of wheat. The highest yield (5.59 t ha^{-1}) was recorded in normal irrigation which was identical with skipping irrigation at flowering and heading stage with 0.06% foliar application of zinc. Skipping irrigation at crown root initiation stage had the most negative effect on growth and yield. Skipping irrigation at flowering and heading stage of wheat with 0.04% foliar application of zinc gave the identical yield in regular irrigation with 0.04% and 0.06% foliar application of zinc. Thus, foliar application of zinc played a major role on yield and yield components of wheat at later stages of growth. The response of foliar application of Zn was positive and quadrate in nature. The optimum dose was appeared as 0.04% foliar application of zinc for grain yield of wheat in the study area of Joydebpur, Gazipur (AEZ-28).

Keywords: Foliar, zinc, irrigation, wheat and yield.

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INHERITANCE MECHANISM OF YIELD AND YIELD COMPONENTS IN TOMATO

M. A. GOFFAR, A. AHMED AND G. M. A. HALIM

Abstract

A set of 9x9 half diallel cross comprising of promising genotypes was studied to analyze the inheritance pattern of yield components in tomato. Hayman's analysis of variance (ANOVA) indicated importance of both additive and non-additive genetic components for all the thirteen yield contributing characters. The ANOVA showed unidirectional dominance, asymmetrical gene distribution and residual dominance effects for all the characters studied. Five out of the thirteen characters viz., number of flowers/cluster, individual fruit weight, fruit breadth, number of locules and number of seeds/fruit followed the simple additive-dominance genetic model. The rest of the characters showed non-allelic gene interaction or epistasis. P_6 had most of the dominant genes for both number of flowers/cluster and number of locules, while P_3 contained most dominant genes for individual fruit weight and P_5 possessed that for both fruit breadth and number of seeds/fruit. The estimates of components of variance demonstrated involvement of both additive and dominant components in the inheritance of all those five characters. The distribution of

dominant and recessive genes was equal in the parents for only fruit breadth. There was drastic influence of environment on these characters following simple additive-dominance genetic model except fruit breadth.

Keywords: Tomato, inheritence, additive and non-additive genetic components and epistasis.

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EFFECT OF FERTILIZER ON CORIANDER SEED PRODUCTION

M. M. KAMROZZAMAN, S. AHMED AND A. F. M. R. QUDDUS

Abstract

A field experiment on coriander (*Coriandrum sativum* L.) was carried out during *rabi* seasons of 2011-12 and 2012-13 in Low Ganges River Flood Plain Soil under AEZ-12 at Farming System Research and Development Site, Hatgobindapur, Faridpur to find out optimum and economic doses of fertilizers for coriander (var. BARI Dhania-1) for sustainable higher yield and to update balanced fertilizer recommendation for target yield. The experiment was laid out in a randomized complete block design with 8 treatments viz. T_1=$N_{118}P_{47}K_{26}S_{10}Zn_{2.2}B_{0.8}$ Kgha^{-1}, T_2= $N_{147}P_{47}K_{26}S_{10}Zn_{2.2}B_{0.8}$ Kg ha^{-1}, T_3= $N_{147}P_{59}K_{26}S_{10}Zn_{2.2}B_{0.8}$ Kg ha^{-1}, T_4= $N_{147}P_{47}K_{32}S_{10}Zn_{2.2}B_{0.8}$ Kgha^{-1}, T_5= $N_{118}P_{59}K_{32}S_{10}Zn_{2.2}B_{0.8}$ Kgha^{-1}, T_6= $N_{147}P_{59}K_{32}S_{10}Zn_{2.2}B_{0.8}$ Kg ha^{-1}, T_7= $N_{88}P_{35}K_{19}S_8Zn_{1.6}B_{0.6}$ Kg ha^{-1} and T_8= Native nutrient (Control). The highest seed yield (1373 kg ha^{-1}) was obtained from the treatment T_3 which was statistically similar with T_1, T_2, T_3, T_4, T_5 and T_6 treatments. The soil test based treatment T_1 produced 1311 kg yield ha^{-1} and yield difference of ther added fertilizer treatment with T_1 was only 5%. The fertilizer added treatments didn't exert the significant difference with soil based treatment (T_1) on yield and yield contributing characters. However, T_1 treatment appeared to be the best suited combination because of its higher gross margin Tk 41,769 ha^{-1}, capability in reducing nutrient cost Tk 13106 ha^{-1} and the highest marginal rate of return (MRR) (108%) whereas treatment T_3 covered 21% MRR and the highest nutrient cost among the treatments and hence treatment, $N_{118}P_{47}K_{26}S_{10}Zn_{2.2}B_{0.8}$ Kg ha^{-1} (100% NPKSZnB from STB dose) may be recommended for coriander seed production in the study area.

Keyword: Fertilizer, seed, coriander and *coriandrum sativum*.

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DEVELOPMENT OF MOUZA LEVEL DATABASES OF POTATO IN MUNSHIGONG, BOGRA & RANGPUR DISTRICT

M. A. UDDIN, K. S. RAHMAN, M. M. RAHMAN
N. MOHAMMAD AND S. NASRIN

Abstract

A study was conducted to build the mouza and union level databases of potato during 2011-12 using both primary and secondary data. Primary data were collected from potato growers of unions of three upazilas, namely Vober Char, (Gazaria, Munshigonj), Atmul, (Shibganj, Bogra) and Mittipur (Pirganj, Rangpur), respectively. Mouza, union, upazila and district level digitized maps of Bangladesh were used in the program. GIS, GPS, MIS, Modem and mobile phone technologies were used. Databases of different parameters such as area, production, yield, and varietal information etc. of potato were obtained. Mouza have been used as the smallest unit of land use management for agriculture because it has administrative boundary and social identity. Average yield of potato was 17.45 t/ha in the study areas during 2011-12. Out of total potato areas 69.06% was cultivated by HYVs and the rest 30.94% by local varieties. Out of 46 HYVs released by BARI, 11 varieties were cultivated in the study areas during the same period. Databases and maps developed by data collection from root level (Farmer's field, mouza, block and union etc.) may help to identify variety wise area coverage of potato.

Keywords: Potato, cultivation, variety, mouza, HYV and database.

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STUDY ON COMBINING ABILITY AND HETEROSIS FOR EARLINESS AND SHORT STATURED PLANT IN MAIZE

M. HOQUE, F. AKHTER, M. KADIR, H. A. BEGUM AND S. AHMED

Abstract

An experiment was carried out in 6x6 diallel crosses for combining ability analysis for grain yield, maturity and growth parameters in maize. Analysis of variance for combining ability showed that mean square value due to GCA and SCA were highly significant for all characters except SCA in days to tasseling and days to maturity indicated that all but two traits were governed by both additive and non-additive gene action. Variances due to GCA were much higher in magnitude than SCA indicated additive gene effects were much more important for all characters except cob length, thousand grain weight and ear height. The Parent P_5 was the best general combiner for yield and most of the yield contributing characters. The Parent P_1 & P_2 were best general combiner for both dwarf and earliness. The crosses showing significant SCA effects for yield involving average x average, average x low and low x low general combining parents. The crosses P_3xP_6 & P_4xP_5 showed either significantly or numerically higher heterosis than checks BHM-5, BHM-7 & BHM-9 for yield.

Keywords: Maize, GCA, SCA and heterosis.

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SCREENING OF MUNGBEAN (*Vigna radiata* L. Wilczek) GENOTYPES UNDER NUTRIENT STRESS IN SOIL

M. A. RAZZAQUE, M. M. HAQUE, M. M. RAHMAN
M. M. BAZZAZ AND M. S. A. KHAN

Abstract

A pot experiment was conducted at the Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur during *kharif* season of 2010 to investigate the genetic divergence of some mungbean genotypes under nutrient stress condition using Mahalanobis' statistic (D^2) and principal component analysis. Analysis of variance showed significant difference for all the characters. Results of multivariate analysis revealed that 200 mungbean genotypes formed five clusters at nutrient stress condition where cluster II had the maximum genotypes (83) followed by cluster I (65), cluster III (30), cluster IV (9) and then cluster V (13). The highest intra-cluster distance was observed between cluster IV containing lowest 9 genotype and cluster V containing 13 genotypes. The highest inter-cluster distance was observed between cluster IV and III and lowest was observed between cluster V and Cluster I. Cluster III had the highest cluster mean for total dry matter, root dry mass, pods per plant, seeds per pod, 1000 seed weight and seed yield. Considering cluster distance and other agronomic performance the genotypes IPSA 1, IPSA 12, IPSA 5 and others genotypes from cluster III may be considered for better performance under nutrient stress condition.

Keywords: Mungbean, nutrient stress, cluster analysis and seed yield.

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ASSOCIATION OF YIELD AND YIELD RELATED TRAITS IN AROMATIC RICE (*Oryza sativa* L.)

A. H. AKHI, M. A. K. MIAH, N. A. IVY
A. ISLAM AND M. Z. ISLAM

Abstract

Sixty cross combinations of SakkhorkhoraR and IR58025A were studied in the experimental field of Bangabundhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Salna, Gazipur during July 2010 to November 2010, to assess the character association & contribution of characters towards grain yield in restorer lines. The correlation study revealed that days to first flowering showed significant positive relationship with seed yield per plant at genotypic levels. Days to maturity showed significant positive relationship with number of tillers per plant at both genotypic and phenotypic level and effective panicles per plant at genotypic level. Plant height showed highly significant positive

relationship with effective panicles per plant at both genotypic and phenotypic level. Path analysis study revealed that effective panicles per plant (0.2153) had the highest positive direct effect followed by days to first flowering (0.1492), plant height (0.0646), spikelet fertility status (%) (0.0242) and number of seeds per panicle (0.0241). Days to maturity, spikelet sterility status, effective panicles per plant, plant height, number of tillers per plant, number of seeds per panicle and spikelet fertility status had positive indirect effects on grain yield. So, based on the study days to first flowering, plant height, spikelet fertility status, effective panicles per plant were identified as the important characters to be considered in the selection for improvement of aromatic rice genotypes.

Keywords: Aromatic rice, character association and path analysis.

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EFFECT OF PLANTING SYSTEM OF POTATO AND PLANT DENSITY OF MAIZE ON PRODUCTIVITY OF POTATO- HYBRID MAIZE INTERCROPPING SYSTEM

A. A. BEGUM, M. S. U. BHUIYA, S. M. A. HOSSAIN
AMINA KHATUN AND S. K. DAS

Abstract

The experiment was conducted at Agronomy Research Field, Bangladesh Agricultural Research Institute, Gazipur during 2010-11 to find out the appropriate planting system of potato and plant density of maize in potato- hybrid maize intercropping system for maximum yield and economic return. Ten treatments were evaluated viz., T_1= Potato whole tuber single row (75 cm × 20 cm) + 125% hybrid maize (75 cm × 20 cm), T_2=Potato whole tuber single row (75 cm × 20 cm) + 100% hybrid maize (75cm × 25 cm), T_3= Potato whole tuber single row (75 cm × 20 cm) + 83% hybrid maize (75 cm × 30 cm), T_4= Potato half tuber paired row (20 cm/ 55 cm × 20 cm) + 125% hybrid maize (75 cm × 20 cm), T_5= Potato half tuber paired row (20 cm/ 55 cm × 20 cm) +100% hybrid maize (75 cm × 25 cm), T_6= Potato half tuber paired row (20 cm/ 55 cm × 20 cm) + 83% hybrid maize (75 cm × 30 cm), T_7= Sole potato whole tuber single row planting system (60 cm × 25 cm), T_8 = Sole potato half tuber paired row (20 cm/ 55 cm × 20 cm), T_9= Sole hybrid maize in normal spacing 75 cm × 25 cm (sole HM1) and T_{10}= Sole hybrid maize (75 cm × 25 cm) sown 30 days after potato planting (sole HM2). The results revealed that sole planting of both potato and maize produced the maximum yields. In case of sole potato, potato half tuber paired row planting system was better than potato whole tuber single row planting system. On the other hand, the performance of sole HM1 was better than sole HM2 in relation to growth, yield and economic performance. Over all T_1 treatment (potato whole tuber single row planting system with 125 % hybrid maize population) was the best intercropping system for getting higher yield and economic return as well as less relative crowding coefficient with better crop performance ratio.

Keyword: Planting system, plant density, PAR interception, dry matter, RCC, CPR, relative yield, equivalent yield, potato and maize.

Bangladesh J. Agril. Res. 41(3): 411-418, September 2016

EFFECTIVENESS OF SOIL AND FOLIAR APPLICATIONS OF ZINC AND BORON ON THE YIELD OF TOMATO

S. SULTANA, H. M. NASER, S. AKHTER AND R. A. BEGUM

Abstract

Field experiment was carried out for two consecutive years to study the effectiveness of soil and foliar application of micronutrients on the yield of tomato (*Lycopersicon esculentum* Mill.) at the Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur. The micronutrients zinc (Zn) in the form of zinc sulphate ($ZnSO_4.7H_2O$) at the rate of 0.05 % and boron (B) in the form of boric acid (H_3BO_3) at the rate of 0.03% were applied as foliar spray at three different stages of plant growth i.e (i) before flower initiation; (ii) after fruit set when it becomes

approximately marble sized; and (iii) at 20 days interval of second spray. The tomato yield and its contributing yield traits were significantly affected by foliar fertilizer treatments as against soil application of B and Zn fertilizers. Among various treatments, foliar application of Zn (0.05 %) + B (0.03%) produced maximum fruit yield (85.5 and 81.7 t ha^{-1} in 2013 and 2014, respectively) while the control no application of Zn (0.0) and B (0.0) produced 66.8 and 60.7 t ha^{-1} in 2013 and 2014, respectively and it was statistically identical with soil application of B and Zn @ 2 and 6 kg ha^{-1} (T_5), respectively. The increment of yield was 19.2 to 31.1% and 7.57 to 18.3%, respectively, over control and soil application. The integrated use of foliar application of micronutrients and soil application of macronutrients are recommended to enhance tomato yield.

Keywords: Foliar applications, zinc, boron, tomato and yield.

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EFFECT OF DIFFERENT STAKING METHODS AND STEM PRUNING ON YIELD AND QUALITY OF SUMMER TOMATO

M. S. ALAM, N. ISLAM, S. AHMAD
M. I. HOSSAIN AND M. R. ISLAM

Abstract

The study was carried out during summer of 2012 with BARI hybrid tomato 4, planted in the Olericulture farm of Bangladesh Agriculture Research Institute, Joydebpur, Gazipur, Bangladesh to find out the response of plants to some staking and pruning treatments on yield, fruit quality and cost of production. A two factor experiment consisting of three staking methods and four level of pruning, laid out in complete block design with three repetitions. Plants were staked on inverted 'V' shaped staking, high platform and string. The plants were pruned to two stem, three stem, four stem and no pruning as control. Results showed that significantly the highest total number of fruits per plant (37.1), marketable fruits per plant (33.7), yield per plant (1.68 kg) and total yield (44.6 t/ha) were produced by the plants having the treatment string staking with four stem. The highest fruit set (43.50%) was found in the plants staking with string having three stems. Plants grown on string staking allowing two stem gave the maximum length (4.71 cm), diameter (4.83 cm) and weight (53.4g) of single fruit as well as maximum fruit firmness (3.43 kg-f cm^{-2}). From the economic point of view, it was apparent that summer tomato produced by string staking with four stem pruning exhibited better performance compared to other treatment combinations in relation to net return and BCR (2.10).

Keyword: Stalking method, stem pruning, summer tomato and yield.

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GENETIC DIVERGENCE IN EGGPLANT (*Solanum melongena* L.) GENOTYPES

M. R. KARIM, M. M. RAHMAN AND A. K. M. QUAMRUZZAMAN

Abstract

Multivariate analysis of twenty six genotypes of eggplant were done to estimate the genetic diversity and to select the potential parents for a successful hybridization program. As per PCA, D^2 and cluster analysis, the genotypes were grouped into five clusters. The highest inter-cluster distance was between Cluster II and Cluster III (37.82) and the lowest between Cluster I and Cluster III (4.39). Cluster III showed the maximum intra-cluster distance (1.58), whereas Cluster II showed the lowest intra-cluster distance (0.48). Considering the magnitude of genetic distance and agronomic performance, the genotypes SM 208 and SM 209 from Cluster II and SM 201, SM 218 and SM 227 from Cluster III might be suitable for efficient hybridization program. On the other hand the genotypes of Cluster I (SM 206, SM 210, SM 211, SM 212, SM 213, SM 215, SM 216, SM 217, SM 221, SM 224, SM 225 and SM 226) possess all the superior characters in respect of yield and yield related component. Thus the genotypes SM 206, SM 216, SM 217, SM 224 and SM 225 from

this Cluster could be selected to develop high yielding eggplant varieties.

Keywords: Eggplant, D^2, genetic diversity, hybridization, multivariate analysis and PCA.

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SCREENING OF SOYBEAN (*Glycine max* L.) GENOTYPES UNDER WATER STRESS CONDITION

J. A. CHOWDHURY, M. A. KARIM, Q. A. KHALIQ
A. R. M. SOLAIMAN AND J. U. AHMED

Abstract

Fifty soybean genotypes were screened for their water stress tolerance in a vinylhouse of Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur during January to May, 2011. The objective of this study was to screen for drought tolerant soybean genotype(s) for improving yield of soybean under rainfed condition in Bangladesh. Water stress was imposed throughout the growing period by withholding irrigation until appearance of wilting symptom. Water stress caused an overall reduction in seed yield of soybean. However, reduction in seed yield due to water stress varied among the soybean genotypes. Variations were measured by tolerance indices, ranking and cluster analysis. Considering stress tolerance indices, ranking and cluster analysis, the genotypes BARI Soybean-5, BARI Soybean-6, Shohag and BD2331 were found as tolerant to water stress.

Keywords: Drought, soybean, screening and yield.

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EFFECT OF OSMOPRIMING ON GERMINATION OF RICE SEED

M. N. HASAN, M. A. SALAM, M. M. I. CHOWDHURY
M. SULTANA AND N. ISLAM

Abstract

The experiment was conducted at the Seed Laboratory, Department of Agronomy, Bangladesh Agricultural University, Mymensingh during the period from September to October 2011 to study the effect of chemical priming of seed on germination and growth of rice seedling cv. BRRI dhan 29. Seeds were soaked in 3% and 5% solutions of $CaCl_2$, $ZnSO_4$ and KCl for 24, 30, 36, 42, 48, 54, 60 hours, respectively. A control was maintained where seeds were subjected to no priming treatment. The experiment was laid out in a Completely Randomized Design with three replications. Primed seeds were tested for germination and vigour on sandy soil media (60:40) in petridish under field capacity. Seed quality tests included mean germination time, shoot length, shoot dry mass, root length and root dry mass. The results revealed that priming treatments had significant influence on germination and all the growth parameters of rice seedlings. Priming with 3% $ZnSO_4$ for 30 hours showed the highest germination percentage and the lowest mean germinaion time. Priming with 5% KCl for 54 hours showed the highest root length while 5% of the same solution for 24 hours showed the highest root dry mass. On the contrary, seeds having no priming treatment showed the lowest values for germination, vigour index, shoot length,shoot dry mass, root length and root dry mass and the highest mean germination time. The present study concludes that rice seed cv. BRRI dhan29 could be primed with 3% $ZnSO_4$ solution for 30 hours for improving germination and seedling growth.

Keyword: Priming, germination, seed vigour and rice seedlings.

Bangladesh J. Agril. Res. 41(3): 461-470, September 2016

DIVERSITY OF INSECT PESTS AND NATURAL ENEMIES AS INFLUENCED BY GROWTH STAGES AND PEST MANAGEMENT PRACTICES IN RICE

M. A. BAKAR AND M. M. H. KHAN

Abstract

In order to measure the diversity of insect pests and natural enemies in rice ecosystem, the present study was conducted in the research farm of Patuakhali Science and Technology University, Dumki, Patuakhali during the period from January to June 2012 in

boro rice season. Diversity indices of insect pests and their natural enemies were found to be affected by the combined effect of rice growth stages and management practices. Diversity indices of insect pests and their natural enemies differed according to treatments and crop growth stages. In case of insect pests, the untreated control treatment showed the highest diversity index (1.67) at maximum tillering stage and spray (Bipolar 55EC @ 10 ml/10 L of water) + perching at early tillering stage also showed highest richness (26.14) and the highest evenness (0.921) in spray at seedling stage. The highest reciprocal form of Berger-Parker's Dominance index (D) was found in untreated control at maximum tillering stage (3.03) for insect pests. In case of natural enemies, perching showed the highest diversity index (1.88) at reproductive stage. Spraying of insecticide at early tillering stage also showed highest richness (5.06) and the highest evenness (0.982) was in perching at seedling stage. The highest D value was found in perching at reproductive stage (4.67) for natural enemies.

Keywords: Diversity, growth stage, insect pest, natural enemies and pest management practices.

Bangladesh J. Agril. Res. 41(3): 471-480, September 2016

EVALUATION OF SOME ADDITIVES FOR ACCEPTABILITY WITH ZINC PHOSPHIDE BAIT AGAINST RODENT

M. SHAH ALAM AND A. T. M. HASANUZZAMAN

Abstract

Laboratory and field study were conducted to evaluate the effects of some bait additives namely molasses, sugar, dry fish and powder milk mixed with wheat flour to increase the acceptability of additives mixed bait and the efficiency of poison bait. The findings showed that the additives mixed plain bait led to an increase the palatability and consumption rate. The most accepted plain bait for rodent was the bait combination molasses + wheat flour followed by sugar + wheat flour. The highest mortality was observed from the bait in the treatment combination powder milk + dry fish + wheat flour +Zn_3P_2 (90%) followed by (powder milk + molasses + dry fish + wheat flour + Zn_3P_2) (80%) in laboratory. The average zinc phosphide bait consumption was highest in the treatment dry fish + wheat flour +Zn_3P_2 (1.56 g/rat/day) followed by molasses + dry fish + powder milk + wheat flour + Zn_3P_2 (0.80 g/rat/day). All these additives mixed with zinc phosphide increase the consumption rate and the efficacy of bait. In field trial the higher population reduction (76-86%) was achieved from the bait dry fish + wheat flour + Zn_3P_2 followed by dry fish + powder milk + wheat flour + Zn_3P_2 (76-80%) and the lowest in powder milk + wheat flour + Zn_3P_2 (30%). All these additives mixed with zinc phosphide increased the consumption rate and the efficacy of poison bait.

Keywords: Additives, acceptability, consumption and zinc phosphide, rat.

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YIELD PERFORMANCE OF STRAWBERRY GENOTYPES

S. CHOWHAN, M. M. HOSSAIN, M. A. HOQUE
G. RASUL AND M. S. RONI

Abstract

Five strawberry genotypes ('Rabi 3', 'Camarosa', 'BARI Strawberry 1', 'BADC Strawberry' and 'Festival') were evaluated for their field performance. The maximum number of leaves/plant (14.2), canopy spread (31.82 cm) and runners/plant (7.2) were found with 'Camarosa', 'Festival' and 'Rabi 3' respectively. Festival took the lowest number of days to flower initiation (32.5). The highest number of flowers (23.64) and fruits/plant (19.98) were found in 'Camarosa'. The heaviest (21.83 g) and the largest sized individual fruit (1539.31 mm^2) were produced by 'Festival'. Fruit TSS (%) was the highest (15.83) in BARI Strawberry-1. Genotype 'Festival' gave the highest fruit yield (12.94 t/ha) and 'BADC Strawberry' yielded the lowest (6.15 t/ha). Considering growth, yield and quality of fruit, genotypes 'Festival' and 'Camarosa' were found promising under the climatic condition of Salna.

Keywords: Strawberry genotype, plant growth, fruit yield and fruit quality.

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ADOPTION OF WHEAT VARIETIES IN BANGLADESH: EXPERT ELICITATION APPROACH

M. A. RASHID AND TANVIR M. B. HOSSAIN

Abstract

The study was undertaken to find out variety wise adoption rate of wheat in Bangladesh through expert elicitation procedure. Many varieties have been developed by Wheat Research Centre (WRC) but in details of varietal information and adoption information database was not developed which is very important and valuable for the scientist and policy planner. This study through expert elicitation for constructing detail varietal development and adoption database is timely and necessary for the research institute. From all over the Bangladesh 14 experts was invited to share their valuable knowledge and experience on wheat cultivation and adoption in the country. The average age of the experts were 54 yrs and average experience on wheat adoption was 22.65 yrs. The wheat expert informed that 13 major varieties are adopted by the farmers in the recent year(2013-14). Among those varieties, BARI Gom-24 (Prodip) covered highest cultivated area (186026 ha) which shared 41.03% of total wheat cultivated area. BARI Gom-21 (Shatabdi), BARI Gom-26 and BARI Gom-23 (Bijoy) ranked 2nd, 3rd and 4th position according to the share of cultivated area covered. The seed production information showed that BADC the only wheat seed producer supplied 24912.60 mt of wheat seed in the year 2013-14. The trend of seed production by different wheat variety revealed that over the period 2010-14, the seed production of BARI Gom-24 (Prodip) increased and BARI Gom-21 (Shatabdi) decreased. Increased seed production trend of Prodip variety leaded to highest adopted area of that variety. The main reason behind highest adopted area of Prodip variety was it's very attractive attributes like high yield, big spike, large grain and lodging tolerance character. Although the Prodip covered highest area but other newly developed variety like BARI Gom-25, BARI Gom-26, BARI Gom-27 and BARI Gom-28 were the most promising varieties which showed increasing adoption path among the expert. These varieties have very good potentiality due to having short duration, tolerance to terminal heat stress, tolerant to salinity and lodging attributes. Satisfying higher demand for wheat consumption and ensuring food security through providing alternative to rice are the major concerning issue of the policy planner and the scientist. Therefore, the study have been undertaken to fulfill this issues.

Keywords: economics, expert elicitation and varietal adoption.

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EFFECT OF PRETREATMENTS AND PACKAGING ON THE GROWTH OF BACTERIA IN VALUE ADDED SUMMER ONION PRODUCTS

M. MASUD ALAM AND M. NAZRUL ISLAM

Abstract

The experiment was carried out to investigate the bacteria in fresh and different processed onion. Total number of viable bacteria (cfu/g) in fresh onion and dehydrated processed onion packed in High Density Ploy Ethylene (HDPE) and Aluminum foil (ALF) was estimated at 0, 6 and 12 month interval following storage at room temperature (RT, 20-25^{0}C) and refrigerated temperature (RFT, 5^{0}C). Samples tested were fresh onion (S_0), dried onion (S_1), blanched and dried (S_2), blanched + sulphited and dried (S_3), 25% salt osmosed and dried (S_4), 60% sugar osmosed and dried (S_5) and 55/15% sugar-salt osmosed dried onion (S_6). It was found that the lowest bacterial count ($2X10^1$ and $9X10^1$ cfu/g) was given by 25% salt osmosed onion (S_4) and the Total Number of Vialed Bacteria (TVB) count in the other samples varied in the order of S_3‹ S_6 ‹ S_5‹ S_2 ‹ S_1 ($45\text{-}97x10^3$ cfu/g) and sample S_1 having no pretreatment before drying gave the highest TVB among the samples and the preservation effect was only due to reduction of a_w during drying.

Keywords: Pretreatments, packaging, bacteria and value added summer onion.

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ORGANOGENESIS IN OKRA (*Abelmoschus esculentus* L. Moench.): A PLANT RECALCITRANT TO TISSUE CULTURE

M. R. KABIR, S. AHMED AND M. A. Y. AKHOND

Abstract

Seedling-derived cotyledonary nodes and hypocotyl explants of BARI Dherosh-1 were cultured *in vitro* on MS medium supplemented with varying concentrations of 2, 4-Dichlorophenoxy acetic acid (2, 4-D), 6-Benzylaminopurine (BAP), Thidiazuron (TDZ), BAP with 1-Nepthaleneacetic acid (NAA), BAP with Indole 3-butyric acid (IAA) and Zeatin with IAA along with a control. Shooting response (100%) with callus was only observed from cotyledonary nodes on thidiazuron (TDZ) where hypocotyls produced only callus or callus with roots on different concentrations of plant growth regulators. Considering the shooting response, the cotyledonary nodes of BARI Dherosh-1 were cultured on various concentrations of TDZ for regeneration. The highest percentage (64.0) with maximum number (6.8) of shoots per explant were observed in 0.044 µM TDZ in 8.4 days. The regenerated shoots were rooted on ½ strength MS, MS supplemented with 2.46 µM IBA and 0.53 µM NAA. The highest percentage (83.3) and minimum days (9.7) required for root induction were recorded in 2.46 µM IBA. The rooted plantlets were transferred to soil and hardened in the plastic pots under green house conditions. The rooted shoots grew normally under natural conditions following acclimatization.

Keywords: *Abelmoschus esculentus*, cotyledonary node and TDZ, IBA.

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RESYNTHESIS OF NEW R LINES IN *Brassica napus* L.

M. A. MIAH, M. G. RASUL AND M. A. K. MIAN

Abstract

Identification of male fertility restorer genotypes for rapeseed CMS lines towards hybrid development in spring habit rapeseed (*Brassica napus* L.) adapted for short day winter season was studied. The experiment was conducted at the experimental farm and laboratory of Bangabandhu Sheikh Mujibur Rahman Agricultural University, Salna, Gazipur during October, 2008 to March, 2011. An exotic CMS-based F_1 hybrid of rapeseed was selfed to get F_2 generation with a view to resynthesizing restorer line. As a result a restorer line for Nap248A Z_1 and Nap248A Z_2 cytoplasmic male sterile lines was identified in the F_3 generation of the exotic F_1 rapeseed hybrid which appears as the first case so far reported as achievement in Bangladesh in this regard. Genetic analysis further revealed fertility restoration for Nap248A Z_1 and Nap248A Z_2 cytoplasmic male sterility was controlled by a single dominant nuclear gene as a simple genetic phenomenon.

Keywords: Fertility restorer, *Brassica napus* L. and dominant gene.

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NUTRITIVE VALUE AND YIELD POTENTIAL OF OKRA (*Abelmoschus esculentus* L. Moench) GENOTYPES

A. BISWAS, M. M. HOSSAIN, Z. ALAM
M. M. ISLAM AND A. BISWAS

Abstract

Two experiments were conducted at the research field and laboratory of the Department of Horticulture, Bangabandhu Sheikh Mujibur Rahman Agricultural University, Salna, Gazipur, during April 2012 to September 2013 to find out the yield performance and nutritional quality of seven genotypes of okra in Bangladesh. The results revealed that the highest yield of okra obtained from BARI Dherosh-1 (14.9 t/ha) and the lowest yield was obtained from Hybrid Raja (5.76 t/ha). The highest fruits per plant were recorded from BARI Dherosh-1 (24.27 fruits/plant). The genotype Green Hybrid produced the lowest edible fruit per plant (10.27). Maximum virus infestation was recorded in genotype Hybrid Raja (100%) and the lowest in Arka Anamika (76.67%). Anamika performed well in many aspect such as yield (12.95 t/ha), fruits per plant (19.83), number of branches per plant

(6). The highest content of free ascorbic acid was recorded in Nabik (3.35 mg/100gm) and the minimum ascorbic acid content was observed in Green Hybrid (1.987 mg/100g). Hybrid Moti had the maximum amount of β-carotene (0.15 IU/100 g), while minimum amount of β-carotene was found in IPSA Okra (0.09IU/100 g). The highest K content was observed in IPSA Okra (1.091%) and the lowest in Hybrid Raja (1.06%). The highest amount of Fe was observed in Hybrid Moti (139.60 ppm) and the lowest amount of Fe was observed in Green Hybrid (111.80 ppm). The present results revealed that the yield was maximum in BARI Dherosh-1 while Hybrid Moti was superior in nutritive value.

Keywords: Okra genotype(s), nutritive value and yield potentiality.

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VARIABILITY AND CHARACTER ASSOCIATION IN CINNAMON GERMPLASM

S. N. MOZUMDER, N. NATH, N. AKTER
S. AKTER AND B. R. BANIK

Abstract

The experiment was conducted at the Regional Spices Research Center, BARI during May 2014 to April 2015 to study the variability and character association in cinnamon germplasm taking the characters - tree growth, leaf characteristics, bark thickness, specific bark weight and quality of bark of cinnamon plants. Range, variance and coefficient of variation of 30 different characters showed variations in 53 cinnamon accessions. High coefficient of variation was found for base girth, main stem height, number of tertiary branches/plant, tree volume, fresh and dry bark weight of tertiary branches. Bark thickness and specific bark weight gradually declined from main stem to lateral branches. The hierarchical cluster analysis with single scaled dendrogram showed eight clusters due to variation among the germplasm. Cluster III contained maximum 14 genotypes followed by cluster I and cluster VII, each having 12 genotypes. Association analysis revealed that significant correlation of base girth with tree volume, and secondary branches/plant had also significant correlation with leaf thickness and tree volume. It also revealed that significant correlation of fresh bark thickness of main stem with fresh bark thickness of primary, secondary and tertiary stems, also with fresh and dry bark weight of main, primary, secondary and tertiary stems. Specific bark weight had also significant correlation with fresh and dry bark weight of main, primary, secondary and tertiary barks.

Keywords: Variability, correlation, cinnamon, germplasm, cluster and dendrogram.

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COMBINING ABILITY AND HETEROSIS ON YIELD AND ITS COMPONENT TRAITS IN MAIZE (*Zea mays* L.)

M. Z. A. TALUKDER, A. N. M. S. KARIM
S. AHMED AND AMIRUZZAMAN

Abstract

Combining ability and heterosis were studied in a 7×7 half diallel cross in maize for grain yield and yield contributing characters. Significant general and specific combining ability variances were observed for all the characters studied. The significant estimates of GCA and SCA variances suggested the importance of both additive and non-additive gene actions for the expression studied traits. In these studies, variances due to SCA were higher than GCA for all charactesr, which revealed the predominance of non additive gene action (dominance and epistasis) for controlling these traits. Parents P_1 and P_4 were excellent general combiner for days to tasseling and silking while P_1 and P_5 for early maturity. P_4 for short height and, P_4 and P_7 for higher thousand kernel weight. The parents P_4 and P_6 having good combining abilities for yield. Heterosis estimation was carried out using two commercial varieties NK40 and 900MG. When standard commercial check NK40 was used, the percent heterosis for kernel yield varied from -51.39 to 12.53%. Among the 21 F_1s, 3crosses exhibited significant positive heterosis for kernel yield. The highest

heterosis was exhibited by the cross $P_4 \times P_6$ (12.43%), $P_6 \times P_7$ (10.89%) and $P_2 \times P_3$ (9.87%) respectively. Compared with 900MG as check, the percent heterosis for kernel yield varied from -53.73 to 7.01%. Among the 21 F_1s, none of the crosses exhibited significant positive heterosis for kernel yield. The highest heterosis were exhibited by the crosses $P_4 \times P_6$ (7.01%), P_6 x P_7 (5.55%) and $P_2 \times P_3$ (4.57%). The crosses showed significant positive SCA values could be used for variety development after verifying them across the agro-ecological zones of Bangladesh.

Keywords: Combining ability, heterosis, GCA, SCA, maize (*Zea mays* L.) and nature of gene action.

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BIO-RATIONAL MANAGEMENT OF WHITEFLY (*Bemisia tabaci*) FOR SUPPRESSING TOMATO YELLOW LEAF CURL VIRUS

M. M. ALAM, M. N. ISLAM, M. Z. HAQUE
R. HUMAYUN AND K. M. KHALEQUZZAMAN

Abstract

Whitefly (*Bemisia tabaci*) is the vector of *tomato yellow leaf curl virus* (TYLCV), is a serious pest of vegetables and other crops worldwide. The experiment was conducted at Bangladesh Agricultural Research institute (BARI) during two consecutive years of 2009 and 2010 to select a suitable bio-rational management practice against white fly, transmitting TYLCV. Treatments comprising tomato variety Ratan with diseased plant uprooting, spraying admire, applying admire on trap crop (marigold), spraying neem, sesame and mustard oil with trix and the untreated control were used in this experiment. The variety Opurba with similar materials as described above was used. Percent virus infected tomato plants ranged from 1.33 to 19.00 in two consecutive years, where the highest infection was recorded in control plot with variety Opurba and the lowest was recorded in variety Ratan treated with Admire. Consequently, the highest yield (47.70 and 52.36 t ha^{-1} in 1st and 2nd year, respectively) in the plots of variety Ratan treated with admire and the lowest yield was recorded in untreated control plots with variety Opurba (14.75 and 30.30 t ha^{-1}) for the two consecutive years. A strong positive correlation was observed between whitefly population and % TYLCV infection for both the years and both varieties of tomato. While a negative correlation was observed between % TYLCV infection with number of fruits $plants^{-1}$ and yield (t ha^{-1}) for both the years and in both varieties of tomato. These results are consistent with the occurrences of TYLCV, which have been associated with the percent virus infection in relation to yield and yield contributing characters of tomato.

Keywords: Disease, management, tomato, *tomato yellow leaf curl virus* (TYLCV) and white fly.

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PROFITABILITY OF SUNFLOWER CULTIVATION IN SOME SELECTED SITES OF BANGLADESH

M. KHATUN, TANVIR M. B. HOSSAIN, M. A. MONAYEM MIAH
S. KHANDOKER AND M. A. RASHID

Abstract

The study was conducted in Bogra and Satkhira districts to assess the socioeconomic status, profitability, problems and prospects of sunflower cultivation in Bangladesh. A total of 100 sunflower cultivating farmers, taking 50 farmers from each district, were randomly selected for this study. About 18% female farmers were also found to cultivate sunflower due to its beauty and easy cultivation method. Majority of the farmers had only one year experience of sunflower cultivation. Per hectare cost of producing sunflower was estimated as Tk. 62,199. Per hectare net return and BCR were Tk. 10,863 and 1.18, respectively which indicated that sunflower cultivation was profitable. Stochastic frontier function revealed that the use of labour, seed, organic fertilizers, cost of irrigation, and land type had positive and significant effect on the yield of sunflower. Average technical efficiency of the farmers was 86% which implies that there is a scope of increasing

productivity of sunflower by 14% using current level of inputs by increasing the farmers' efficiency. Lack of irrigation facility, scarcity of seed on time, absence of sunflower oil mill and sunflower market, low demand for sunflower, high cost of seed, etc. were the major problems of sunflower production and marketing. In spite of having some problems 18% female farmers became interested to cultivate and 46% farmers of Satkhira district mentioned that their demand for edible oil is becoming fulfil. So there is great potentiality of sunflower cultivation in Bangladesh. The availability of sunflower seed with low cost and establishment of sunflower oil mill is needed to sustain this crop in Bangladesh. Therefore, import dependency on soybean oil will be reduced.

Keywords: Sunflower cultivation, financial profitability, technical efficiency and potentiality.

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INFESTATION OF FOUR MUSTARD VARIETIES BY *Lipaphis erysimi* (Kalt) IN RELATION TO DIFFERENT LEVELS OF IRRIGATION

M. A. MANNAN AND N. TARANNUM

Abstract

An experiment was conducted to find out the influence of three irrigation levels (no irrigation, one irrigation and two irrigation) on four mustard varieties (Tori-7, BARI Sharisha-6, BARI Sharisha-9 and BARI Sharisha-8). The non-irrigated plots had highest aphid population (34.96/plant) and lowest (11.16 aphids/plant) in two irrigation. The variety BARI Sharisha-8 showed lowest (5.34 aphids/plant) aphid infestation and its yield was highest (2.05 ton/ha). Interaction effects indicated that the crop escaped from the aphid incidence in the variety BARI Sharisha-8 irrigated 2 times and produced highest yield (2.37 ton/ha). The differences in the aphid population at three irrigation levels affected the yield contributing characters and it was negatively correlated (correlation coefficient value 'r' ranged from -0.91 to 1.0).

Keywords: Infestation, *Lipaphis erysimi* (Kalt) and irrigation.

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EFFECT OF FERTILIZER MANAGEMENT ON PRODUCTIVITY OF POTATO-HYBRID MAIZE INTERCROPPING SYSTEM

A. A. BEGUM, M. S. U. BHUIYA, S. M. A. HOSSAIN AMINA KHATUN AND S. K. DAS

Abstract

The experiment was conducted at the research field of Agronomy Division, Bangladesh Agricultural Research Institute (BARI), Gazipur during 2011-12 to find out proper combination of fertilizer nutrients of potato hybrid maize intercropping system for higher productivity and economic return. Ten fertilizer dose viz., F_1= Control (without fertilizer), F_2=$_{260}P_{72}K_{148}S_{48}Zn_4B_2$ (100% recommended fertilizer, RF for hybrid maize HM), F_3=$N_{180}P_{40}K_{180}S_{20}Zn_4B_{1.2}$ (100% RF for potato), F_4=$N_{440}P_{112}K_{328}S_{68}Zn_6B_2$ (100% RF for HM + 100% RF for potato), F_5=$N_{352}P_{90}K_{262}S_{54}Zn_6B_2$ (80% RF for HM + 80% RF for potato), F_6=$N_{395}P_{102}K_{283}S_{63}Zn_6B_2$ (100% RF for HM + 75% RF for potato), F_7=$N_{350}P_{92}K_{238}S_{58}Zn_6B_2$ (100% RF for HM + 50% RF for potato), F_8= $N_{375}P_{94}K_{291}S_{56}Zn_6B_2$ (100% RF for potato + 75% RF for HM), F_9=$N_{310}P_{76}K_{254}S_{44}Zn_6B_2$ (100% RF for potato + 50% RF for HM) and F_{10}=$N_{320}P_{73}K_{170}S_{50}Zn_6B_2$ kg ha^{-1} (BARI RF for potato hybrid maize intercropping) were tested on potato hybrid maize intercropping system. BARI Alu-8 (Cardinal) variety of potato and BARI Hybrid maize-7 variety of hybrid maize were used in this study. Maximum photosynthetically active radiation interception, leaf area index and total dry matter production of intercropped potato and maize were observed at the highest fertilizer level $N_{440}P_{112}K_{328}S_{68}Zn_6B_2$ kg ha^{-1} (100% RF for HM + 100% RF for potato). The highest tuber yield of potato (30.20 t ha^{-1}) and grain yield of maize (9.48 t ha^{-1}) were observed from fertilizer dose of $N_{375}P_{94}K_{291}S_{56}Zn_6B_2$ (100% RF for potato + 75% RF for HM). The highest potato equivalent yield (40.47 t ha^{-1}), gross return (Tk.526110 ha^{-1}), gross margin (Tk. 381957 ha^{-1}) and benefit cost ratio (3.65) were also observed from the same fertilizer rate. The

results revealed that fertilizer dose of $N_{375}P_{94}K_{291}S_{56}Zn_6B_2$ kg ha^{-1} (100% RF for potato + 75% RF for HM) might be economically profitable for potato hybrid maize intercropping system.

Keywords: Fertilizer management, potato, hybrid maize and intercropping.

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GENETIC DIVERGENCE ANALYSIS IN PAPAYA (*Carica papaya* L.) GENOTYPES

N. ARA, M. MONIRUZZAMAN, FERDOUSI BEGUM
M. MONIRUZZAMAN AND R. KHATOON

Abstract

The experiment on papaya (*Carica papaya* L.) consisting of fourteen genotypes from diversd gene pool was conducted at the Regional Agricultural Research Station, Ishurdi, Pabna during April 2013 to May 2014 to study the nature and magnitude of genetic divergence and eventually identification of suitable genotypes for use in breeding program. Multivariate analysis was subjected to assess the genetic diversity and Mahalanobis' generalized distance (D^2) was used to assess the divergence present among the genotypes. The fourteen genotypes were grouped into four clusters. The cluster IV had the maximum genotypes (5) followed by cluster I having 4 genotypes and cluster II having 3 genotypes. Cluster III had the minimum genotypes (2). The inter-cluster distances were greater than intra-cluster distances in all cases, suggesting wider genetic diversity among the genotypes of different groups. The highest intra-cluster distance was observed in cluster III and the lowest in cluster II. The maximum inter-cluster distance was estimated between clusters I and IV (11.3212), moderate distance between clusters II and IV (9.961) and clusters III and IV (7.568), and that of the lowest between clusters I and III. Cluster III recorded the highest mean values for fruit length, plant height at last harvest, number of fruits/plant, weight of fruits/plant and fruit yield, while cluster IV exhibited the maximum mean values for pulp thickness, plant height at 1st harvest and the second highest mean values for fruit length, fruit breadth and TSS. Therefore, more emphasis should be given on cluster III for selecting genotypes as parents for crossing with the genotypes of cluster IV which may produce new recombinants with desired traits.

Keywords: Genetic diversity, Papaya (*Carica papaya* L.), Mahalanobis' distance (D^2) and Cluster analysis.

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IDENTIFICATION OF OKRA SHOOT AND FRUIT BORER INFESTING OKRA AND THEIR DISTRIBUTION IN BANGLADESH

M. A. MAZED, M. Z. ALAM, M. R. U. MIAH
M. S. HOSSAIN AND M. I. H. MIAN

Abstract

A survey was conducted during July 2009 to October 2010 to know the occurrence of okra shoot and fruit borer species that infest okra in Bangladesh. Infested okra fruits were collected from eleven selected locations representing 11 Agro-ecological Zones of Bangladesh and reared in the laboratory. A total of 423 adult individuals consisting of 188 male and 235 female moths emerged from the infested fruits. The male and female ratio was 1.00:1.25. The morphological characteristics of adult moths were recorded. Head and thorax of adults are ochreous white; forewings are pale white with a wedge shaped horizontal green patch in the middle and hind wings are silvery creamy white in color. The males are smaller than the females in size and the females are V-shaped at the end of the anal part but the males have thick hairs at the end of the anal part. Pupae are chocolate brown, bluntly rounded and enclosed in grey colored inverted boat shaped cocoon formed in the fruit or in the sand. Full grown caterpillars measured 1.64 cm in length and their color is brownish with white streaks dorsally and pale yellow ventrally, without finger tipped process. The recorded morphological characteristics ware compared with

standard key and the insects were identified as *Earias vittella* belonging to the family Noctuidae.

Keywords: Identification, Distribution, *Earias vittella*, Okra, Okra shoot and fruit borer.

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IPNS BASED FERTILIZER MANAGEMENT FOR RICE IN COASTAL ZONE OF BANGLADESH

M. N. ISLAM, M. I. U. SARKAR, M. H. ALI
A. ISLAM AND P. K. SAHA

Abstract

A series of field experiments were conducted at farmers' fields under Ganges Tidal Floodplain (AEZ-13) during 2012-2014 to identify suitable fertilizer management practices for maximizing rice yield. The treatments were: T_1 = AEZ basis BRRI recommended fertilizer dose (BRRI dose), T_2 = Rice Straw (RS)/Cowdung (CD) + IPNS (Integrated Plant Nutrition System) basis fertilizer management (RS/CD+IPNS) and T_3 = Farmers' Practice (FP). BRRI dhan27 (T. Aus), BRRI dhan49 and BRRI dhan54 (T. Aman) and BRRI dhan29 and BRRI dhan47 (Boro) were used as test varieties of rice. All fertilizers except urea were applied at final land preparation. In T. Aus and T. Aman seasons, urea was applied in two equal splits as FP. In Boro season, urea was added in three equal splits as FP. Urea Super Granule (USG) was applied at 12-15 DAT for T_1 and T_2 treatments. Treatment RS + IPNS gave 19-27% higher grain yield over FP and it saved full dose of K and S and partial dose of P fertilizer. Treatment CD + IPNS gave a 10-16% higher grain yield over FP and it saved full dose of P, K and S fertilizer in T. Aus and T. Aman seasons. On the other hand, BRRI recommended fertilizer dose gave 7-15% higher grain yield over FP.

Keywords: AEZ-13, chemical fertilizer, cowdung, rice straw and USG.

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USE OF ORGANIC AMENDMENT FOR MANAGEMENT OF FUSARIUM WILT OF GLADIOLUS

L. YASMIN AND M. A. ALI

Abstract

The experiment was conducted at Horticulture Research Centre (HRC), Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur during 2009-2011 following RCB design with four replications. Eight soil amendments such as Poultry refuse (5 t ha^{-1}), Mustard oil cake (600 kg ha^{-1}), *Sesbania rostrata* (5 t ha^{-1}), Municipal waste compost (5t ha^{-1}), BARI Trico- compost (2t ha^{-1}), Leachate (200 ml m^{-2}) were evaluated against Fusarium wilt of gladiolus caused by *Fusarium oxysporum* f. sp. *gladioli* under field condition. Poultry refuse was very effective in inhibiting the disease resulting maximum germination (99.98%), spike length (73.90 cm), rachis length (43.70 cm), florets $spike^{-1}$ (12.63), flower sticks $plot^{-1}$ (38.75) and corm $plot^{-1}$ (60.23) and cormel yield ha^{-1} (2.51 t). Mustard oil cake, BARI Trico-compost and *Sesbania rostrata* compost were also effective in inhibiting the disease and resulting better spike length, rachis length, florets $spike^{-1}$, flower sticks $plot^{-1}$ and corm $plot^{-1}$ and cormel yield.

Keywords: Gladiolus, *Fusarium oxysporum*, Fusarium wilt, Poultry refuse, Mustard oil cake and BARI Trico-compost

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PURITY ANALYSIS OF NINE PESTICIDES COLLECTED FROM EIGHT LOCATIONS IN BANGLADESH

AFROZA BEGUM, M. W. AKON, M. S. AHMED AND S. N. ALAM

Abstract

The study was undertaken to determine the purity of available marketed brands of nine selected pesticide groups viz., chloropyriphos, diazinon, carbofuran, pyrazosulfuranethyle, dimethoate, cypermethrin, carbendazim, mencozeb and

quinalphos. These pesticides were collected from local markets of eight locationsviz., Rajshahi, Rangpur, Dinajpur, Bogra, Chittagong, Mymensing, Comilla, Norshingdi and Jessoredistricts of Bangladesh where extensive usage of pesticides was recorded. Among the 66tested pesticides, 66.66 % (44 in number) were found >90% pure in terms of active ingredient (AI). The purity range of about 12% of the total tested brands was 80%-90%. And the remaining 21.34% were less than 80 % pure, of which three pesticide brands contained no active ingredient (AI) at all.

Keywords: Active ingredients, pesticide and purity.

Bangladesh J. Agril. Res. 41(4): 695-711, December 2016

OPPORTUNITIES OF GROUNDNUT CULTIVATION AND MARKETING SYSTEM IN CHAR LANDS OF BANGLADESH

M. S. HOQ, Q. M. S. ISLAM, S. KHANDOKER AND M. A. MATIN

Abstract

Bangladesh has vast char area but most of the char lands are not suitable for crop production. So the present study was undertaken to examine the suitability of crop production by assessing adoption, relative profitability, marketing system, production and marketing problems of rabi season groundnut in char lands of Faridpur, Jamalpur, and Kishoreganj districts during 2013-2014. The sample size of the study was 225 including 90 groundnut farmers and 135 traders. The study revealed that the highest (56%) percent of groundnut farmers cultivated Dhaka-1 variety and only 23% of all farmers cultivated BARI chinabadam-8.The per hectare production cost of groundnut was Tk 61,547, net return was Tk.42,033 and BCR was 1.68. The partial budgeting analysis showed that if the farmers cultivated groundnut instead of its competitive crops, they would receive Tk. 24,445 additional to sesame and Tk.21,990 additional to wheat cultivation. The average estimated marketing costs was highest (Tk.1388/quintal) for Stockist and lowest (Tk.55/quintal) for Arathdar. Net marketing margin was also highest (Tk.1212/quintal) for Stockist and lowest (Tk.59/quintal) for Arathdar. Marketing chain-v was the most efficient than other five chains because it has single involvement of intermediary. The major problems identified by farmers were lack of irrigation facilities (34%), low rate of seed germination (31%), and lack of cultivable land (29%). Major marketing problems were lack of cash capital (82%), and lack of storage facilities (55%) etc. Arrangement of institutional credit with low interest rate (80%), collateral free credit (45%), and arrangement of storage facilities (72%) were the trader's opinion to minimize the marketing problems of groundnut. Therefore the study will be helpful to increase groundnut cultivation and improved the marketing system in char lands of Bangladesh.

Keywords: Adoption, relative profitability, marketing efficiency, groundnut and char lands.

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EFFECT OF SPACING AND FERTILIZER MANAGEMENT ON THE YIELD AND YIELD ATTRIBUTES OF MUKHIKACHU (*Colocasia esculenta* Schott.)

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Abstract

Field experiments were carried out in the Agronomy field of BARI, Joydebpur, RARS, Jamalpur and RARS, Ishurdi during two consecutive *kharif* seasons of 2012 and 2013 to determine the suitable plant spacing and optimum fertilizer dose for higher yield of mukhikachu. Three levels of spacing viz., 60 cm x 60 cm, 60 cm x 45 cm and 60 cm x 30 cm and three levels of fertilizer dose viz., recommended dose (3000-96-27-81-18 kg ha^{-1} of CD-N-P-K-S), 25% less than the recommended dose and 25% higher than the recommended dose were used as treatment variables. The experiments were laid out in factorial randomized complete block design with three replications. Results revealed that the closer

spacing (60 cm x 30 cm) in combination with 25% higher than the recommended fertilizer dose gave the maximum edible yield of mukhikachu (two years average) at all locations (20.04 t ha^{-1}, 20.75 t ha^{-1} and 16.63 t ha^{-1} at Joydebpur, Jamalpur and Ishurdi, respectively). The wider spacing (60 cm x 60 cm) coupled with 25% less than the recommended fertilizer dose produced the lowest yield (two years average). The maximum benefit- cost ratio (two years average) was obtained from the combination of the recommended fertilizer dose and 60 cm x 30 cm spacing, that were 2.93 at Joydebpur and 3.42 at Ishurdi, while at Jamalpur the maximum benefit-cost ratio (two years average) was found maximum from 60 cm x 30 cm spacing with 25% higher than the recommended fertilizer dose (3.12).

Keywords: Mukhikachu, spacing, fertilizer, yield, benefit-cost ratio and *Colocasia esculenta* schott.

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EFFICACY OF SOME NEW GENEARATION INSECTICIDES AND A BOTANICAL AGAINST MUSTARD APHID AND THEIR TOXICITY TO COCCINELLID PREDATORS AND FORAGING HONEYBEES

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Abstract

Field studies were carried out to evaluate the efficacy of four new generation insecticides along with a botanical against mustard aphid (*Lipaphis erysimi* Kalt.) and their toxicity to coccinellid beetles and foraging honeybees during 2014-15 at Bangladesh Agricultural Research Institute (BARI), Gazipur, Bangladesh. Buprofezin 40 SC was found to be the most effective against aphid offering the lowest aphid population (1.56/ top10cm central twig) at 7 days after spraying (DAS) which was statistically identical to Diafenthiuron 500SC (1.85/ top10cm central twig). Among the treatments, Azadiractin 1EC appeared to be safest to coccinellid beetles and foraging honeybees because it recorded the highest number of beetle (7.50 /5 plants) and honeybee (9.64 /plot/5 min) population at 7 DAS, although honeybee population did not vary statistically with that of Buprofezin 40 SC and Lufenuron 5EC treated plots. Indoxacarb 145SC was found to be the most toxic against honeybees. However, the highest yield was obtained from Buprofezin 40 SC (1.57 t ha^{-1}) treated plot although this was statistically identical to that Diafenthiuron 500SC (1.52 t ha^{-1}) and Azadiractin 1EC (1.48 t ha^{-1}) treated plots.

Keywords: Mustard aphid, predators, honeybee, insecticides and neem product.

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SOIL FERTILITY STATUS OF SOME OF THE INTENSIVE CROP GROWING AREAS UNDER MAJOR AGRO-ECOLOGICAL ZONES OF BANGLADESH

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Abstract

Laboratory studies on soil fertility evaluation was carried out across major agro-ecological zones (AEZs) of Bangladesh to know the nutrient status of soils and to relate those with soil properties like pH, organic matter, CEC, and clay content. Thirty five composite soil samples were collected from intensive crop growing sites, which covered 17 AEZs of Bangladesh. After proper processing, the samples were analyzed for texture, pH, organic carbon, CEC, exchangeable cations (K, Ca, Mg and Na), total N, available P and S following standard methods. The textural class of the soils collected from AEZ 12 and 13 appeared to be mostly clay. Clay loam soil was found in AEZ 4, 8, 9, 11, 25 and 28. Loamy soil was seen in AEZ 1 while AEZ 22, 23 and 29 were mostly sandy textured. The results revealed that 65.7% of the tested soil was acidic while 25.7% was alkaline in nature. All the tested soils showed lower pH_{KCl} compared to pH_{H2O} thus possessed negative charge. About 68.6% of the collected soils contained low

(1.10-1.70%) level of organic matter, 25.7% soils retained it at medium level (1.71-2.40) and 5.7% soils at very low level (<1.0%). All the tested soils appeared to be deficient (< 0.12%) in nitrogen content. 68.6% soil samples had the low level of available P while only 8.6% retained it an optimum amount. About 80% of the tested soils contained low level of available S (7.9-14.7 mg kg $^{-1}$) although coastal regions soils hold higher amount of available S. High CEC (20-38 cmol kg^{-1}) was found in clay rich soils of AEZ 10, 11, 12, and 13. Study revealed that 40% of the collected soils were very low, 31.4% were low, 8.6% each of medium and optimum, and 11.4% contained high level of exchangeable K. The calcareous soils (AEZ 10, 11, 12 and 13) contained very high level of Ca. Non calcareous soils also showed fairly good level of Ca content except AEZ 1, 3, 23 and 29. Sandy textured soils of greater Dinajpur, Rangpur, Moulvibazar showed lower level of exchangeable Mg. About 86% of the tested soils had the lower (< 2%) potassium saturation percentage (KSP), which needs K application for sustainable crop production. Estimate showed that 44% variability for CEC may be attributed by clay content and the relationship was significant (p = 0.05). Again, 50.4 and 65.6% variability in exchangeable K and Mg, respectively may be governed by clay content of the soils, while such relationship for Ca was non-significant. CEC may contribute 62.2, 92.3 and 83.9% variability for exchangeable K, Ca and Mg content in soils, respectively. The fertility status of most of the studied soils (except AEZ 10, 12, 13 and to some extent 11) appeared to be low to very low, which demand judicious management in order to achieve food security and to conserve the soil fertility.

Keywords: Soil fertility, agro-ecological zones, texture, organic matter and cation exchange capacity.

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EFFECT OF NITROGEN AND PHOSPHORUS ON GROWTH AND SEED YIELD OF FRENCH BEAN

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Q. NAHER AND MD. D. H. BHUIYAN

Abstract

Field experiments were conducted during *rabi* (winter) seasons of 2010-11 and 2011-12 at the Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur to study the effects of nitrogen and phosphorus on growth, dry matter production and yield of French bean. A randomized complete block design was followed with 10 combinations of N (0,50, 100, 150 and 200) and P (0,22, 33, 44 and 55) kg ha^{-1} along with a blanket dose of control. All the treatments showed the maximum leaf area index (LAI) at 65 days after sowing (DAS). All the treatments showed the maximum total dry matter production, crop growth rate and net assimilation rate at harvest and at 55-65 DAS, respectively in both the years. LAI, dry matter production, CGR, NAR and seed yield significantly increased with the increase in nitrogen and phosphorus level upto 150 kg N and 44 P kg ha^{-1}, respectively. Similar trend was followed in maximum number of pods (9.45) and seed yield (1563.33 kg ha^{-1}). The treatment comprising with 150 kg N and 44 P Kg ha^{-1} gave the highest seed yield which was 51.40 and 54.30 % higher than control.

Keywords: French bean, growth, dry matter production, nitrogen, phosphorus and seed yield.