Annual Research Programme

(2015-2016)

Horticulture Division

Programme area: Improvement of horticultural crops through induced mutation and advanced techniques

Project 1	**:**	**Varietal improvement of tomato using induced mutation and advanced techniques**
Objectives	**:**	To develop varieties with - High yield potential - Resistant/tolerant to biotic and abiotic stresses - Longer harvesting duration, longer selflife
Personnel assigned	**:**	Dr. M. Rafiqul Islam, SSO and Head (P.I) Dr. Md. Abdul malek, PSO and Head (Plant Breeding Div.) Dr. Md. Jahangir Alam, CSO and Head (Entomology Div.) Dr. Mahbuba Kaniz Hasna, SSO (Plant Pathology Div.) M.N.N. Mazumder, SO Dr. Reema Ashrafi, SO Farid Ahmed, SO Md. Rashedur Rahman Rajib, SO Md. Abdur Rahman, SA-1 Md. Mahabubur Rahman, SA-1
Status	**:**	Two lines (Phili-1, HM-2671) performed better in three consecutive years at different locations. Application will be done to SCA for releasing new varieties next year.
Source of Fund	**:**	GOB
Experiment 1	**:**	**Zonal Yield Trial of promising lines of tomato in winter and late winter**
Objectives	**:**	To compare yield potential of tomato genotypes
Transplanting	**:**	Winter : Oct. 10, 2015 Late winter : Dec. 30, 2015
Treatments	**:**	Genotypes: HM-2853, HM-2722, HM-2671, Philli-1 with control Binatomato-6,7
Experimental design	**:**	RCBD with 3 replications
Locations	**:**	Farmer's field and on station trial (Mymensingh, Magura, Comilla & Khagrachari)
Unit plot size	**:**	5 m x 4 m
Data to be collected	**:**	Plant height, harvesting duration, number of fruits/plant, average fruit yield/plant and fruit yield/plot, yield (t/ha)
Experiment 2	**:**	**Growing of M_1 population of summer tomato**
Objectives	**:**	To create genetic variability for yield improvement in summer
Growing season	**:**	February to June 2016
Treatments		Dose: 0, 100, 200, 300 Gy Genotypes: Phili-1, Phili-2 with check variety BARI summer tomato
Experimental design	**:**	Row Planting
Locations	**:**	BINA Farm, Mymensingh
Data to be collected	**:**	Plant height, harvesting duration, number of fruits/plant, average fruit yield/plant and fruit yield/plot

Project 2	**:**	**Varietal improvement of okra (Lady's finger) using induced mutation and advanced techniques**
Objectives	**:**	To develop varieties with - High yield potential - Early fruit bearing - Tolerance to fruit borer and YMV - Longer harvesting duration - Increase of softness (soft fiber) - Small size with good taste - Short stem
Personnel assigned	**:**	Dr. M. Rafiqul Islam, SSO and Head (P.I) Dr. Mirza Mofazzal Islam, PSO & Head (Biotech. Div.) Dr. Md. Jahangir Alam, CSO and Head (Entomology Div.) Dr. Mahbuba Kaniz Hasna, SSO (Plant Pathology Div.) M.N.N. Mazumder, SO Dr. Reema Ashrafi, SO Farid Ahmed, SO Md. Rashedur Rahman Rajib, SO Md. Abdur Rahman, SA-1 Md. Mahabubur Rahman, SA-1
Status	**:**	On-going
Source of fund	**:**	GOB
Experiment 3	**:**	**Growing of M_2 population of okra (Lady's finger) during winter season**
Objectives	**:**	To select okra mutant lines with high yield potential and tolerance to fruit borer and YMV
Growing season	**:**	October 2015 to March 2016
Treatments	**:**	Number of mutant populations
Experimental design	**:**	Row planting
Location	**:**	Mymensingh
Data to be collected:	**:**	Plant height, harvesting duration, number of fruits/plant, fruit yield/plot, fruit borer and YMV resistant plants and softness of fruits
Experiment 4	**:**	**Growing of M_2 generation of okra (Lady's finger) during summer season**
Objectives	**:**	To select mutant lines with high yield potential and tolerance to YMV
Growing season	**:**	February to June 2016
Treatments	**:**	Number of mutant lines
Location	**:**	Mymensingh
Data to be collected:	**:**	Plant height, harvesting duration, number of fruits/plant, fruit yield/plot, fruit borer resistant plants and softness of fruits

Project 3 : **Varietal improvement of eggplant (Brinjal) using induced mutation and advanced techniques**

Objectives : To develop varieties with
- Tolerance to shoot and fruit borer
- High yield potential
- Early fruit bearing

Personnel assigned : Dr. M. Rafiqul Islam, SSO and Head (P.I)
Dr. Mirza Mofazzal Islam, PSO & Head (Biotech. Div.)
Dr. Md. Jahangir Alam, CSO and Head (Entomology Div.)
Dr. Mahbuba Kaniz Hasna, SSO (Plant Pathology Div.)
M.N.N. Mazumder, SO
Dr. Reema Ashrafi, SO
Farid Ahmed, SO
Md. Rashedur Rahman Rajib, SO
Md. Abdur Rahman, SA-1
Md. Mahabubur Rahman, SA-1

Status : On-going
Source of fund : GOB

Experiment 5 : **Screening and growing of M_2 generation of eggplant (Brinjal) against shoot and fruit borer**

Objectives : -To compare yield potential of elite genotypes of eggplant.
-To select shoot and fruit borer tolerant genotypes.

Growing season : July to December 2015
Treatments : Selected genotypes
Experimental design : Row planting
Location : Mymensingh
Data to be collected: : Plant height, rate of shoot and fruit borer infestation, harvesting duration, number of fruits/plant, average fruit yield/plant, fruit yield/plot and disease susceptible plants

Experiment 6 : **Growing of M_3 generation of eggplant (Brinjal)**

Objectives : To create genetic variability for yield improvement and shoot and fruit borer tolerances

Growing season : Nov. 2015 – Feb. 2016

Treatments : Screened mutants with check varieties
Experimental design : Row planting

Location : Mymensingh
Data to be collected: : Plant height, rate of shoot and fruit borer infestation, harvesting duration, number of fruits/plant, average fruit yield/plant, fruit yield/plot and disease susceptible plants

Project 4 : **Varietal improvement of chili using induced mutation and advanced techniques**

Objectives : To develop mutant varieties with
- High yield potential
- High pungency
- Resistance to Anthracnose

Personnel assigned : Dr. M. Rafiqul Islam, SSO and Head
Dr. Mirza Mofazzal Islam, PSO & Head (Biotech. Div.)
Dr. Md. Jahangir Alam, CSO and Head (Entomology Div.)
Dr. Mahbuba Kaniz Hasna, SSO (Plant Pathology Div.)
M.N.N. Mazumder, SO (P.I)
Dr. Reema Ashrafi, SO
Farid Ahmed, SO
Md. Rashedur Rahman Rajib, SO
Md. Abdur Rahman, SA-1
Md. Mahabubur Rahman, SA-1

Status : This programme has been initiated in 2014 (Rabi season) as M_3 mutants. Before this, Chilli seed were irradiated in 2013 at Seiberdorf Laboratory, IAEA, Vienna and M_1 plants were grown there. M_2 plants were grown during 2014 in Seiberdorf Laboratory, IAEA, Vienna. Plant progeny M_3 were harvested in this year. Selection and harvest of M_4 population with desirable characters is going on. Advanced yield trail with desirable mutants will be done next year.

Source of fund : GOB

Experiment 7 : **Advanced Yield trial of selected mutants of chilli (M_4)**

Objectives : High yield potential
:
Increase pungency

Growing season : Oct. - Dec, 2015

Treatments : Genotypes: selected mutants with check varieties

Experimental design : RCBD with 3 replications

Location : Mymensingh (HQ), Comilla, Khagrachari, Bogra and Magura

Data to be collected: : Plant height, harvesting duration, number of fruits/plant, average fruit yield/plant and fruit yield/plot

Experiment 8 : **Growing of M_2 generation of chili**

Objectives : To select mutants of chili for high yield potential

Growing season : Oct. - Dec, 2015

Treatments : Dose: 0, 80, 150 Gy
Genotypes: Kalobindu morich, Balijuri and Surjomukhi,

Experimental design : Row planting

Location : Mymensingh (HQ)

Data to be collected: : Plant height, harvesting duration, number of fruits/plant, average fruit yield/plant and fruit yield/plot

Project 5 : **Collection and screening of local and exotic germplasms of fruits, vegetables, spices and flowers**

Objectives :
- Collection of seeds of fruits, vegetables, spices and flowers from different regions of the country.
- Selection of stress (drought, salinity) tolerant genotypes of fruits, vegetables, spices and flowers.

Personnel assigned : Dr. M. Rafiqul Islam, SSO and Head
Dr. Mirza Mofazzal Islam, PSO & Head (Biotech. Div.)
Dr. Md. Jahangir Alam, CSO and Head (Entomology Div.)
Dr. Mahbuba Kaniz Hasna, SSO (Plant Pathology Div.)
M.N.N. Mazumder, SO (P.I)
Dr. Reema Ashrafi, SO
Farid Ahmed, SO
Md. Rashedur Rahman Rajib, SO
Md. Abdur Rahman, SA-1
Md. Mahabubur Rahman, SA-1

Status : On going

Source of fund : GOB

Experiment 9 : **Collection and screening of onion, garlic, ginger and cumin for high yield potential**

Objectives :
- Collection of seeds of fruits, vegetables and spices from different regions of the country.
- Screening of high yield potential of onion, garlic, ginger and cumin.

Growing season : Rabi season : November to February, 2015
Kharif-1 season : March to June, 2016
Kharif-2 season : July to October, , 2016

Treatments : Genotypes

Experimental Design : RCBD with 3 replications
Location : Ishurdi, Bogra (onion, garlic), Khagrachari (ginger, cumin),
Total area : Pot/ Field experiment
Data to be collected : Mortality percentage, plant height, harvesting duration, number of fruits/plant, average
fruit yield/plant, fruit yield/plot and disease susceptible plants

Experiment 10 : **Growing of M_2 generation of Garlic, Onion and Zinger**

Objectives :
- Development of mutants of garlic, onion and zinger with high yield potential

Growing season : Rabi season : November to February, 2015
Kharif-1 season : March to June, 2016
Kharif-2 season : July to October, , 2016

Treatments : Genotypes

Experimental Design : RCBD with 3 replications
Location : Ishurdi, Bogra (onion, garlic), Khagrachari (zinger, cumin),

Data to be collected	:	Mortality percentage, plant height, harvesting duration, number of fruits/plant, average fruit yield/plant, fruit yield/plot and disease susceptible plants
Experiment 11	:	**Growing of M_2 generation of Bottle gourd**
Objectives	:	- To select desirable mutants of bottle gourd for yield potential. - Screening of those bottle gourd on desirable size, shape and color.
Growing season	:	Rabi season : November to February, 2015
Treatments	:	Selected M_1 population with check variety (BARI LAU-4)
Design	:	Row planting
Location	:	Mymensingh (HQ) and Satkhira
Data to be collected	:	Mortality percentage, plant height, harvesting duration, number of fruits/plant, average fruit yield/plant, fruit yield/plot and disease susceptible plants
Experiment 12	:	**Collection and screening of seeds of different germplasms of Zinnia, Marigold and Sunflower**
Objectives	:	- Collection of seeds of different germplasms of Zinnia, Marigold and Sunflower from different regions. - Screening of those flowers on size, shape, color, smell and yield potential.
Growing season	:	Rabi season : November to February, 2015
Treatments	:	innia, Marigold and Sunflower
Experimental Design	:	RCBD with 3 replications
Location	:	Mymensingh (HQ)
Plot size	:	4m × 5m
Data to be collected	:	Mortality percentage, plant height, harvesting duration, number of flowers/plant, average flowers yield/plant, flowers yield/plot, color variation and disease susceptible plants
Experiment 13	:	**Collection and screening of seeds/propagating material of different germplasms of Pomegranate, Orange, Lemon and Grapes.**
Objectives	:	- Collection of seeds/propagating material of different germplasms of Pomegranate, Orange, Lemon and Grapes from different regions. - Screening of those fruits on sweetness, size, shape, color and of high yield potential.
Experimental period	:	Kharif-1 season : March to June, 2016 Kharif-2 season : July to October, , 2016
Treatments	:	omegranate, Orange, Lemon and Grapes
Experimental Design	:	RCBD with 3 replications
Plot size	:	15m × 10m
Location		Mymensingh (HQ) / Khagrachari
Data to be collected	:	Mortality percentage, plant height, harvesting duration, number of fruits/plant, average fruits yield/plant, fruits yield/plot and disease susceptible plants

Project 6 : **Radiosensitivity of horticultural crops for mutation induction**

Objectives :
- To establish dose range of gamma irradiation for induced mutation
- To determine LD_{50}, GR_{50}, GR_{30}

Personnel assigned : Dr. M. Rafiqul Islam, SSO and Head (P.I)
Dr. Mirza Mofazzal Islam, PSO & Head (Biotech. Div.)
Dr. Md. Abdul malek, PSO and Head (Plant Breeding Div.)
Dr. M. A. K. Azad, PSO (Plant Breeding Div.)
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Md. Abdur Rahman, SA-1
Md. Mahabubur Rahman, SA-1

Status : Ongoing
Source of fund : GOB

Experiment 14 : **Radiosensitivity of cucumber, sweet gourd, bottle gourd and bitter gourd**

Objectives :
- To establish dose range for induced mutation
- To determine LD_{50}, GR_{50}, GR_{30}

Growing season : All the year round
Treatments : Dose: 0, 75, 150, 300, 450 & 600 Gy
Experimental design : RCBD with 3 replications
Location : Mymensingh
Data to be collected : Germination (%), seedling height, leaf number, epicotyl length, dry weight, leaf area

Experiment 15 : **Radiosensitivity of onion, garlic, zinger and cumin**

Objectives :
- To establish dose range for induced mutation
- To determine LD_{50}, GR_{50}, GR_{30}

Growing season : All the year round

Treatments : Dose: 0, 75, 150, 300, 450, 600 Gy
Experimental design : RCBD with 3 replications
Location : Mymensingh

Data to be collected : Germination (%), seedling height, leaf number, epicotyl length, dry weight, leaf area

Experiment 16 : **Radiosensitivity of Zinnia, Marigold and Sunflower**

Objectives :
- To establish dose range for induced mutation
- To determine LD_{50}, GR_{50}, GR_{30}

Growing season : All the year round
Treatments : Dose: 0, 5, 10, 20, 50, 100 Gy

Experimental design	:	RCBD with 3 replications
Location	:	Mymensingh
Data to be collected	:	Germination (%), seedling height, leaf number, epicotyl length, dry weight, leaf area and dry weight

Experiment 17 : **Radiosensitivity test of Pomegranate and Orange (Seed/ Vegetative propagation)**

Objectives	:	- To establish dose range for induced mutation - To determine LD_{50}, GR_{50}, GR_{30}
Growing season	:	All the year round
Treatments	:	Dose: Dose: 0, 5, 10, 20, 50, 100 Gy
Experimental design	:	RCBD with 3 replications
Location	:	Mymensingh
Data to be collected	:	Germination (%), seedling height, leaf number, epicotyl length, dry weight and leaf area.

Project 7 : **Varietal improvement of papaya using induced mutation and advanced techniques**

Objectives	:	To develop varieties with - High yield potential - Early fruit bearing - Tolerance to YMV - Longer harvesting duration - Light reddish flesh colour - Increase sweetness
Personnel assigned	:	Dr. M. Rafiqul Islam, SSO and Head (P.I) Dr. Mirza Mofazzal Islam, PSO & Head (Biotech. Div.) Dr. Md. Jahangir Alam, CSO and Head (Entomology Div.) Dr. Mahbuba Kaniz Hasna, SSO (Plant Pathology Div.) M.N.N. Mazumder, SO Dr. Reema Ashrafi, SO Farid Ahmed, SO Md. Rashedur Rahman Rajib, SO Md. Abdur Rahman, SA-1 Md. Mahabubur Rahman, SA-1
Status	:	Two hundred seventy four M_1 plants are growing on and plant progeny row will be raised in next season.
Source of fund	:	GOB

Experiment 18 : **Screening and growing of M_2 generation of papaya**

Objectives	:	To compare yield potential of elite genotypes of papaya.
Growing season	:	All the year round
Treatments	:	Number of elite genotypes of papaya
Experimental design	:	Row planting
Location	:	Khagrachari, Comilla
Data to be collected:	:	Plant height, harvesting duration, number of fruits/plant, average fruit yield/plant, PRVS disease susceptible plants

Project 8	**:**	**Accelerating breeding for mutation induction in cucurbits**
Objectives	**:**	To develop haploid production
Personnel assigned	**:**	Dr. M. Rafiqul Islam, SSO and Head (P.I) Dr. Mirza Mofazzal Islam, PSO & Head (Biotech. Div.) M.N.N. Mazumder, SO Farid Ahmed, SO Dr. Reema Ashrafi, SO Md. Rashedur Rahman Rajib, SO Md. Abdur Rahman, SA-1 Md. Mahabubur Rahman, SA-1
Status	**:**	Ongoing
Source of fund	**:**	GOB
Experiment 19	**:**	**Pollen irradiation for fruit set in sweet gourd for accelerated breeding**
Objectives	**:**	To develop haploid and double haploid variety
Growing season	**:**	All the year round
Dose	**:**	0, 50, 100, 200, 300, 400 Gy
Treatments	**:**	Number of elite genotypes of sweet gourd
Experimental design	**:**	Row planting
Location	**:**	HQ, Mymensingh
Data to be collected:	**:**	Fruit sett/female flower, fruit setting (%), pollen viability (%)
Experiment 20	**:**	**Accelerated breeding of cucurbits through anther culture microspore and embryo rescue techniques**
Objectives	**:**	- To develop haploid and doubled haploid plant for accelerated breeding
Growing season	**:**	All the year round
Dose	**:**	0, 50, 100, 200, 300, 400 Gy
Treatments	**:**	Number of elite genotypes of cucurbit
Experimental design	**:**	CRD with 3 replications
Location	**:**	HQ, Mymensingh
Data to be collected:	**:**	Mortality percentage, plant height, harvesting duration, number of fruits/plant, average fruit yield/plant and disease susceptible plants

Project 9	:	**Development of Onion, Zinger, Turmeric and Garlic mutant varieties through induced mutation**
Objectives	:	- Collection of seeds of Garlic, Onion, Turmeric and Zinger from different regions of the country. - Screening of high yield potential of onion, garlic, turmeric and zinger
Personnel assigned	:	Dr. M. Rafiqul Islam, SSO and Head (P.I) Dr. Mirza Mofazzal Islam, PSO & Head (Biotech. Div.) M.N.N. Mazumder, SO Dr. Reema Ashrafi, SO Farid Ahmed, SO Md. Rashedur Rahman Rajib, SO Md. Abdur Rahman, SA-1 Md. Mahabubur Rahman, SA-1
Status	:	New
Source of fund	:	BARC core Research Fund
Project 10	:	**Development of horticultural new crop varieties and management technologies through mutation and advanced techniques**
Objectives	:	- Development of high yielding and nutritious mutant varities of horticultural crops through peaceful use of nuclear techniques. - Development of eco-friendly technologies for horticultural crops through management practices. - Development of production and management technologies for spices.
Personnel assigned	:	Dr. M. Rafiqul Islam, SSO and Head (P.D) Dr. Mirza Mofazzal Islam, PSO & Head (Biotech. Div.) M.N.N. Mazumder, SO Dr. Reema Ashrafi, SO Farid Ahmed, SO Md. Rashedur Rahman Rajib, SO Md. Abdur Rahman, SA-1 Md. Mahabubur Rahman, SA-1
Status	:	New
Source of fund	:	GOB kormosuchi Funded by Agriculture Ministry

Head of the Horticulture Division	CSO (RC)	Director (Research)

Research Budget for Horticulture Division in 2015-2016 (in 000 Taka)

Projects	No. of Expts.	Labour	Chemicals/ Glasswares	Travel	Inputs	Project total
1. Varietal improvement of tomato using induced mutation and advanced techniques	2	140	30	110	80	360
2. Varietal improvement of okra (Lady's finger) using induced mutation and advanced techniques	2	90	30	70	50	240
3. Varietal improvement of eggplant (Brinjal) using induced mutation and advanced techniques	2	90	30	30	70	220
4. Varietal improvement of chili using induced mutation and advanced techniques	2	50	-	20	40	110
5. Collection and screening of local and exotic germplasm of fruits, vegetables, spices and flowers	5	100	30	200	100	430
6. Radio sensitivity test of horticultural crops for mutation induction	4	100	100	20	100	320
7. Varietal improvement of papaya using induced mutation and advanced techniques	1	100	-	100	100	300
8. Techniques in accelerating plant mutation in cucurbits	2	100	200	20	200	520
9. Development of Onion, Zinger and Garlic mutant varieties through induced mutation (BARC Core Research Fund)	-	-	-	-	-	-
10. Development of horticultural new crop varieties and management technologies through mutation and advanced techniques (GOB kormosuchi Fund)	-	-	-	-	-	-
Total	20	770	420	570	740	2500

* Labour wage will be paid from the institute centrally

Head of the Horticulture Division CSO (RC) Director (Research)