

**ANNUAL RESEARCH REVIEW WORKSHOP
2024-25**

**AREA-I:
VARIETAL DEVELOPMENT PROGRAMME (VDP)**

**COMPONENT – 1A
RICE BREEDING**



**PLANT BREEDING DIVISION
BANGLADESH RICE RESEARCH INSTITUTE
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Summary

For the development of rice varieties under different ecosystems 760 crosses were made and 655 crosses were confirmed during 2024-25. A total of 5,83,611 individual plants were advanced from F₂₋₅ generation following single seed decent (SSD) method under rapid generation advance (RGA) technique. From Line-Stage Testing (LST) trial, 11,785 genotypes were selected based on yield and other agronomic performances. A total of 1,427 genotypes selected from observational yield trial (OYT) and 768 advanced breeding lines were selected from different yield trials (PYT, AYT, RYT, ALART and PVT). National Seed Board (NSB) of Bangladesh has released four promising genotypes such as BR9158-19-9-6-50-2-HR1 for tidal submergence prone environment of Barishal region, IR16F1148 as a shorter duration submergence tolerant variety for submergence prone farmers' field of Bangladesh, BR10260-5-15-21-6B for shallow flooded condition of up to 80-100 cm water depths to be cultivated in tidal flood prone coastal region and shallow flood prone haor region of Bangladesh and BR11716-4R-102 as a salt-tolerant rice variety suitable for saline-affected southern coastal regions as BRRI dhan109, BRRI dhan110, BRRI dhan111 and BRRI dhan112, respectively, for cultivation in T. Aman season. On the other hand, promising genotype BR11337-5R-72 was released as BRRI dhan113 as a short duration Boro variety for cultivation throughout the country. The average yield of BRRI dhan109 is 6.0 t/ha, but with standard cultivation practice, produce 6.5 t/ha yield with a growth duration of 147 days and plant height 128 cm. It has high protein content i.e. 10.6 % and high amylose content which is 25.4%. The thousand grain weight of this variety is 31 gm having medium bold grain which is mostly preferred by the farmers of Barisal region. BRRI dhan110 is a shorter duration submergence tolerance rice variety having *Sub1* gene can tolerate three weeks of complete submergence and can produce 5.0 t/ha yield. Under rainfed condition, the average yield is 6.0 t/ha with a growth duration of 123 days. Depending on the flooding duration, the duration may be increased up to 140 days. The clean rice is medium slender to medium bold with white grain having medium amylose content, non-sticky and soft cooked rice which is very good to taste. The weight of 1000 grain is 19.9 grams. BRRI dhan111 can produce 4.7 t/ha yield under shallow flooded condition (up to 1.0 meter flood height) but can give 5.7 t/ha yield under non-stress condition. Plant height is taller (162 cm) but having a very strong culm which is tolerant to lodging as well as have ratooning ability, and photosensitive with a growth duration of 146 to 160 days. It has high amylose content with medium bold grain having thousand grain weight of 27.5 gm. BRRI dhan112 is notable for its lodging tolerance. It boasts an average yield of 5.0 ton per hectare, with a potential range of 4.14 to 6.12 tons per hectare depending on salinity stress with 120-125 days growth duration. The key characteristic of BRRI dhan112 is its robust tolerance to 12 dS/m salinity during the critical seedling stage (up to 3 weeks). Furthermore, it can withstand 8 dS/m salinity throughout all other salt-sensitive growth phases, from the vegetative to the reproductive stage, while still producing a high yield. BRRI dhan113 has an average yield of 8.15 t/ha but it can produce 10.1 t/ha under optimum management with a growth duration of 143 days, producing 11.5% higher yield than BRRI dhan88. This new short-duration, high-yielding rice variety is characterized by an erect flag leaf, 8.4% protein content, 19.4 g thousand-grain weight, and medium-slender grain type.

Development of Upland Rice (B. Aus). A research initiative is focused on the development of novel upland rice varieties engineered with multiple advantageous traits. The primary objectives for these varieties encompass enhanced adaptability to drought-prone upland ecosystems, a reduced growth duration targeting around hundred days from emergence to maturity, and accelerated seedling emergence with high vigor and a robust plant architecture designed to confer tolerance to lodging. The overarching goal for this breeding program is to achieve a sustainable grain yield within the range of 4.0 to 4.5 tha⁻¹. In 2024-25, 24 crosses were made using 30 parents. Twenty crosses were confirmed as true F₁s through hybridity test. Total 3,008 segregating progenies from 18 crosses (F₂-F₅ generation) were harvested from FRGA nursery and grown in the subsequent generation. In LST trial, 245 lines out of 1,161 lines were selected on the basis of desirable plant type, grain quality and uniformity at

flowering under field condition. A total of 19 entries were selected considering growth duration, yield, uniformity of morpho-agronomic traits and superiority over the three standard checks namely BRRI dhan65, BRRI dhan89 and Hasikalmi from 301 advanced breeding lines in OYT. Fifteen genotypes were selected from 34 tested entries on the basis of yield and short growth duration in PYT. In AYT, eight genotypes were selected from 16 tested entries. In RYT, four genotypes such as BR12248-5R-22, BR12248-5R-37, BR10756-2B-8-72 and BR12860-5R-79 promoted to ALART for next season among 11 tested entries. Root characteristics of RYT genotypes compared to deep rooting *Aus* landrace Morichboti shows that the selected four genotypes were promising for drought tolerance.

Development of Jhum Rice. The Jhum Rice breeding program aims to develop high-yielding ($\geq 3.5 \text{ t ha}^{-1}$) drought-tolerant varieties with variable grain amylose content (10-19% and $>25\%$) and good eating quality, suitable for jhum cultivation and acceptable to the tribal population of Chattogram hill districts. Thirty crosses were made using 17 parental genotypes from local Jhum cultivars, exotic varieties, single BRRI variety, promising advanced breeding lines having low to high level of apparent amylose content. Six crosses were confirmed as true F_1 . Total 5,222 segregating progenies from 23 crosses (F_2 - F_5 generation) were harvested from FRGA nursery and grown in the subsequent generation. Two AYT_s were conducted in 2024. In AYT-1, none of the entries were selected. In AYT-2, two advanced breeding lines, three area-specific popular jhum landraces and three inbred BRRI varieties were evaluated in hotspot condition. Finally, three genotypes were selected from five-tested entries in AYT-2. Among all the entries, despite heterogeneity in climatic condition and topographic situation, BRRI dhan66, BRRI dhan71 and BRRI dhan83, were the top yielder entries and selected for hotspot jhum ALART in the next season.

Development of Partially Irrigated Rice (T. Aus). The objective of this project was to develop transplanted Aus rice (T. Aus) varieties with multiple desirable traits, including short growth duration (95-115 days), high yield potential (5.5-6.5 t/ha), tolerance to lodging and heat stress (particularly during the reproductive phase), resistance to pre-harvest sprouting, and improved grain quality. A total of 30 crosses were made using 43 parent lines, yielding 1,353 F_1 seeds. Seventeen crosses were confirmed as true F_1 s. In total, 74,600 progenies from 143 crosses were advanced using FRGA method during T. Aus season. Three hundred twelve uniform lines were selected from 5,200 lines of 17 crosses in line stage testing (LST). In observational yield trial (OYT), 20 genotypes from 256 were selected based on growth duration, yield performance, morpho-agronomic uniformity, and superiority over two standard checks. In advanced yield trial (AYT#1), four genotypes were selected from 38 entries compared to three standard checks. In advanced yield trial (AYT#2), nine entries were selected from 20 lines, showing superior performance over four standard checks. In AYT#3, which focused on Aus-based cropping patterns in non-saline tidal areas, eight entries were selected from 18 tested lines compared to the check varieties BRRI dhan27, BRRI dhan106, and Gota IRRI. From RYT#1, two genotypes were selected out of ten and from RYT#2 (RTV resistance), one genotype was selected from nine entries along with the check varieties BRRI dhan48, BRRI dhan85, and BRRI dhan98. An advanced line adaptive research trial (ALART) for BB was conducted at eight BB hotspot areas using three breeding lines viz. BR11866-5R-147, BR11867-5R-103 and BR11867-5R-442. The breeding lines showed similar yield with the standard check varieties. Therefore, the genotypes were not recommended for further trial. In total, 163 parental lines were maintained in T. Aus program for using parents and check in LST program. The genetic trend analysis was performed using data from 1,794 advanced breeding lines of transplanted Aus rice evaluated across six locations (Gazipur, Rajshahi, Cumilla, Sonagazi, Kushtia, and Rangpur) between 2020 and 2024. The results indicated a genetic gain of 1.67% per year, corresponding to a yield increase of 56.0 kg/ha/year, demonstrating promising progress in breeding high-yielding transplanted Aus rice genotypes

Development of rice for shallow flooded and semi deep-water environment. The major objectives of the project were to develop high yielding (4.0-5.0 t/ha) rice varieties for deep ($>1.0 \text{ m}$), shallow flooded (up to 1.0 m depth), shallow deep (30 cm water) and medium deep

(50-60 cm water) areas along with submergence, facultative elongation and hypoxia tolerance. In total, 14 crosses were made by utilizing 14 parents and produced 630 F₁ seeds. In total five F₁ crosses were confirmed through QC SNP panel genotyping and analysis. A total of 12,743 progenies out of 16,111 progenies of 61 crosses (8,376 progenies of 22 F₂ crosses, 2,128 progenies of 7 F₃ crosses, 1,075 progenies of 15 F₄ crosses, 1,164 progenies of 19 F₅ crosses) were advanced through RGA. From LST population, 1,122 lines from 20 crosses were genotyped with ten trait markers using custom SNP panel among which 232 lines were selected based on uniformity and priority traits markers. From yield trial, a total of 420 genotypes were tested out of which 88 genotypes were selected based on phenotypic acceptance, growth duration, survivability and higher yield performance. In OYT, the genotype BR12932-5R-18 produced the highest yield (3.6 t/ha) which is significantly higher than the check variety BRRI dhan91 (1.9 t/ha) whereas in PYT, the genotype BR12485-5R-42 (3.28 t/h) produced the highest yield which was significantly higher than the check variety BRRI dhan91 (1.85 t/ha). In AYT#1, the genotype BR10260-7-19-2B produced the highest yield (3.73 t/h) which was significantly higher than the check variety BRRI dhan91 (2.59 t/ha). In AYT, the genotype BR11186-5R-119 produced the highest yield (2.94 t/h) which was significantly higher than the check variety BRRI dhan91 (2.09 t/ha). The heritability obtained for growth duration, plant height and yield were ranged from 77%-88%; 74% - 89% and 60 % - 93% indicating high level of precision in these experiments. Through maintenance breeding 20 shallow flood tolerant genotypes and land races were grown and maintained for future use.

Development of rainfed lowland rice (RLR): The project aims to develop genotypes superior to standard varieties and adaptable to rainfed lowland environment in T. Aman season. In T. Aman 2024-25, 26 crosses using 27 parents for forward breeding, nine crosses for photosensitive and four back crosses were made, and 30 crosses were confirmed as true hybrids using 10-SNP *indica* QC panel. In Boro 2024-25, 30 crosses for forward breeding and 14 crosses for heat tolerance were made, and 25 crosses were confirmed as true hybrids using 10-SNP *indica* QC panel. A total of 13,657 individual progenies from 66 crosses of F₂ and F₅ generations and total 14,712 progenies from 55 crosses of F₂-F₃ generations were advanced during T. Aman and Boro seasons, respectively through field RGA method. Out of 7,210 F_{5:6} LST lines derived from 23 different crosses, 1028 genotypes were selected with selection intensity of 14.3%. Most of the selected materials from LST contained genes of high amylose as well as the presence of the favorable alleles of *xa5*, *xa13* and *Xa21* for bacterial leaf blight (BLB), *BPH32* for BPH, and *Gm4* for gall midge (GM). A total of 64 genotypes were evaluated in observation yield trials (OYT) at Gazipur, Cumilla and Rangpur. Among the tested genotypes, 24 genotypes were selected and forwarded in advanced yield trial (AYT). In AYT, 40 genotypes were evaluated in two trials at Gazipur, Cumilla and Rangpur, and 13 genotypes were found promising to advance. Among the 35 tested genotypes under regional yield trials (RYTs), three were selected for re-trial. Genetic trend of the genotypes from 2016 to 2024 utilizing pBLUP of grain yield in respect of trial year indicated an annual 93.84 kg/ha genetic gain equivalent to about 2.23% increase in grain yield per year based on yield of 2016 (4.19 t/ha).

Development of heat tolerant rice (HTR). The project aims to develop high yielding varieties/lines tolerant to heat stress with quality grains in T. Aus season. Ten crosses were made using 17 parents for the development of heat tolerant rice (HTR) from Boro 2023-24 and 2,269 F₁ seeds were collected. Eight F₁s were confirmed as true crosses for heat tolerant rice development. Heat tolerant rice (HTR) breeding program consisting 14,800 progenies of 28 crosses in Boro season was advanced through modified FRGA. Out of 2700 lines of nine crosses, 275 uniform lines were selected from LST based on uniformity in heading, plant height and acceptable grain type under the field condition. Selection intensity applied for selecting LST lines was 10%. Three genotypes out of 12 from advanced yield trial (AYT#1), three advanced lines out of 12 from AYT#2; and two advanced lines out of 10 were selected from AYT#3. Two advanced lines from RYT#1 and two advanced lines from RYT#2 were selected on the basis of homogeneity with respect to plant height, phenotypic acceptability at maturity stages.

Development of salt tolerant rice (STR). This project aims to develop high-yielding, salt-tolerant rice genotypes, aligning with a defined product profile. Salinity poses a significant abiotic stress, severely limiting rice productivity in the rainfed lowland and Boro rice (dry season) ecosystems prevalent in the southern coastal zone of Bangladesh. The successful development and deployment of these genotypes are crucial for enhancing food security and agricultural sustainability in the region. The salinity breeding program employs rapid recycling as a faster product development and cyclic breeding strategy. This allows new, elite parental sources to be developed in less than three and a half years, thereby ensuring a reduced timeframe for varietal development. Regression of yield versus year of development indicated an annual gain in rice yield of 69 kg ha⁻¹ in T. Aman and 181 kg ha⁻¹ in Boro, equivalent to about 1.73% (in T. Aman) and 2.5% (in Boro) increase in yield per year based on yield of genotype of baseline year 2012. The result reflected the trends of genetic gain for the salt tolerant rice (STR) breeding program in T. Aman and Boro seasons, based on 12 years of breeding trials.

In T. Aman 2024-25, 62 crosses were made using 42 well characterized elite parents with higher genetic merit/breeding values and various alleles of interest. A total of 29 F₁s were confirmed as true hybrids through hybridity test via F₁ verification by quality check (QC) genotyping with purity SNP panel during T. Aman season. In T. Aman season, 34,172 segregating progenies derived from 153 crosses were advanced from F₂₋₅ generations using FRGA technique. Yield trials were carried out in Gazipur, Debhata, Kaliganj and BRRI Farm, Satkhira in T. Aman season. In LST, out of 4633 breeding lines derived from 21 crosses, all genotypes were damaged due to flood. Out of 745 genotypes, 266 genotypes were selected from OYT. Two PYTs (PYT-1 to PYT-2) were conducted using 141 breeding lines following alpha lattice design. Total 58 genotypes were selected from these trials depending on grain yield, salinity tolerance and phenotypic acceptability. Out of 69 genotypes, 32 genotypes were selected from AYT-1 and AYT-2. In RYT-1 and RYT-2, 23 and 24 genotypes, respectively, were evaluated. Fifteen lines were evaluated under RYT-3 (Photosensitive-STR lines), and three lines BR12465-4R-61, BR12465-4R-231, and BR12459-4R-113 were promoted to ALART in T. Aman 2025-26.

In Boro Season, 96 crosses were made using 60 elite parents. A total of 32 F₁s was confirmed as true hybrid through F₁ confirmation by quality check (QC) genotyping with purity SNP panel. In total 36,270 segregating progenies from 140 crosses of F₂₋₅ generation were harvested from FRGA nursery and grown in the subsequent generation. In LST trial, 619 lines out of 5,796 lines were selected on the basis of desirable plant type, grain quality and uniformity at flowering under field condition. Among the trial sites, the level of salinity at Kaliganj was the highest; up to 14.3 dSm⁻¹. A total of 182 genotypes selected out of 442 from OYT based on growth duration, grain yield, and homogeneity in different morpho-agronomic traits. A total of 246 genotypes were tested under three PYTs, 82 genotypes in each PYT. A total of 32, 25, 38 genotypes were selected from PYT-1, PYT-2 and PYT-3 respectively. In AYT, 44, 52, 48 genotypes were evaluated under AYT-1, AYT-2, and AYT-3 respectively. Among them 28, 32, and 27 lines were selected from three AYT's respectively. In case of RYT, five genotypes were selected out of 20 tested entries in RYT-1 and six genotypes were selected out of 15 tested entries in RYT-2. In ALART-1, two genotypes such as BR13113-4R-63 and BR13113-4R-116 (Short duration) were evaluated and in ALART-2, three test entries; BR13106-4R-184, BR13113-4R-185 and BR13122-4R-136 (Mid duration) were evaluated. A PVT trial was conducted by SCA to release as variety for the breeding line (BR11712-4R-44) having salinity tolerance (7.34 to 18.18 dSm⁻¹) at both seedling and reproductive stages during Boro 2024-25.

Development of premium quality rice. PQR for T. Aman: During the T. Aman 2024-25 season, significant efforts were made for the development of high yielding (>3.5 t/ha) national grade aromatic rice varieties (BRRI dhan34, Kalizira, Chinigura, Kataribhog, Radhunipagol, Tulshimala and Bashful type) for domestic consumption. A total of 32 crosses (30 single crosses and 2 backcrosses) were made using 17 parents. A total of 26 crosses (17 single crosses and 9 backcrosses) were confirmed as true hybrids using 10 SNP *indica* QC genotyping panel.

Overall, 13,868 progenies from 112 crosses (7704 progenies of 19 F₂ crosses, 1062 progenies of 17 F₃ crosses, 1325 progenies of 18 F₄ crosses, 3050 progenies of 47 F₅ crosses, 105 Progenies from one BC1F₄, 404 progenies from four BC2F₄, 102 progenies from one BC3F₄, 336 progenies from four BC1F₄, and 140 progenies from one BC2F₅) were harvested from FRGA. In Line Stage Testing (LST) Trial, 393 genetically fixed lines of 30 crosses were selected out of 5,753 progenies through the combination of visual phenotypic assessment and trait genotyping with 2.063 (6.38%) selection intensity.

In Observational Yield Trial (OYT), 66 genotypes out of 148 were selected based on homogeneity, phenotypic acceptance (PAcp), grain type, presence of aroma, and grain yield where yield was ranged from 1.27 t/ha to 5.43 t/ha with 67%, 88%, 78% and 72% heritability for plant height (cm), days to maturity, phenotypic acceptance (PAcp), and grain yield, respectively. In this trial, tested breeding line BR14189-5R-49 produced highest yield (5.43 t/ha) with 134 days growth duration and presence of aroma where the best performing aromatic check variety gave 3.81 t/ha grain yield with a 130-days growth duration. In T. Aman 2024-25 season, two PYT (PYT#1 and PYT#2) trials were conducted in BRRI (HQ). A total of 21 advanced lines out of 52 (17 from PYT#1 and 4 from PYT#2) were selected based on phenotypic acceptance (PAcp), grain type, presence of aroma, and grain yield. Among the selected advanced lines, BR13943-3R-64 gave 4.62 t/ha grain yield with 128 days growth duration, whereas aromatic standard check variety with similar grain type gave 4.06 t/ha grain yield with 132 days growth duration in PYT#1. In PYT#2, the highest yielding genotypes BR11811-9-2-2-P2 produced 3.74 t/ha grain yield with aroma but was not selected due to lodging tendency. The 2nd best performing genotype BR9178-7-2-4-4-P2-10 gave 3.06 t/ha grain yield with 139 days growth duration, while the highest-yielding check was BRRI dhan70 exhibiting 3.02 t/ha grain yield. Heritability estimates were 96% for plant height (cm), 96% for days to maturity, and 70% for yield in PYT#1, whereas 88% heritability for plant height (cm), 54% for days to maturity, 77% for phenotypic acceptance (PAcp), and 78% for yield in PYT#2. In Advanced Yield Trial (AYT), six advanced lines (three from AYT#1 and three from AYT#2) were selected out of 23 genotypes. Three genotypes were selected based on presence of aroma, phenotypic acceptance (PAcp) and grain yield. The advanced line BR10812-8-4-3-2-P2 gave highest grain yield (3.91 t/ha) with a 122-days growth duration and aroma in AYT#1, whereas best performing check variety BRRI dhan80 gave 3.58 t/ha grain yield with a 124 days growth duration with 93% heritability for plant height (cm), 94% for days to maturity, and 73% for grain yield. In AYT#2, the advanced line BR10824-5-6-4-1 gave 3.05 t/ha grain yield with 141 days growth duration, whereas the check variety BRRI dhan34 produced 2.21 t/ha grain yield with 136 days growth duration. Under maintenance breeding program, 442 genotypes, including 135 aromatic rice landraces, were evaluated and purified using systematic arrangement of panicle-to-row method to be maintained as nucleus stock for future use.

During Boro 2024-25, a total of 66 genotypes was selected out of 315 genotypes based on homogeneity in the population, phenotypic acceptance, plant type, grain type, presence/absence of aroma, and higher yield in OYT. The yield ranged from 2.48-8.69 t/ha with a growth duration of 115-156 days. The genotype BR14191-4R-14 produced the highest yield of 8.52 t/ha with a growth duration of 136. The heritability obtained for the plant height, growth duration and yield were 88%, 98% and 70%, respectively, indicating high level of precision in this experiment. Three Advanced Yield Trials (AYT) were conducted in Boro 2024-25 season at Parbatipur, Dinajpur and BRRI (HQ). In AYT#1, five genotypes were selected out of 17 genotypes based on phenotypic acceptance, plant type, grain type, photosensitivity, and higher yield. All the selected genotypes had aroma containing the *fgr-1* gene. The genotype BR14193-5R-87 produced significantly higher yield (6.18 t/ha) with 102 days of growth duration. The yield of the genotypes ranged from 1.98 t/ha to 6.18 t/ha. The heritability obtained for the plant height, growth duration, and yield were 77%, 76% and 76%, respectively. In AYT#2, eight genotypes were selected out of 32 genotypes based on phenotypic acceptance, plant type, grain type, photosensitivity, and higher yield. All the

selected genotypes had aroma containing the *fgr-I* gene. The genotype BR13723-3R-114 produced significantly higher yield (8.19 t/ha) with 122 days of growth. The yield of the genotypes ranged from 3.36 t/ha to 8.19 t/ha. In AYT#3_Jira type, 13 genotypes were selected out of 58 genotypes based on phenotypic acceptance, plant type, grain type, photosensitivity, aroma and higher yield. The genotype BR18-7-14B produced significantly higher yield (8.66 t/ha) with 119 days of growth. The yield of the genotypes ranged from 2.84 t/ha to 8.66 t/ha.

Development of premium quality rice (PQR) for Boro Season: The project aims to develop aromatic and non-aromatic fine quality rice with international (Basmati/ Banglamati/ SoruBalam type) standards in Boro season for domestic use and export quality. Totally 1,011 F₁ seeds were obtained from 15 crosses. Twelve F₁'s were confirmed as true hybrid using 10-SNP *indica* QC panel. In total 27,618 progenies of 86 crosses from F₂ to F₄ generations were advanced through RGA method. A total 541 genotypes were selected from 6,502 progenies of 18 crosses of LST trial. Selection intensity of LST lines was found as 8.32%. The trait marker profile of the genotypes of LST showed the genes of high amylose, aroma and high grain no. per panicle. Frequency of the lines with disease and insect tolerance genes were limited. A total of 370 genotypes were evaluated in two OYTs in Gazipur, Rajshahi and Rangpur and among them 40 genotypes were selected to forward in AYT based on the performance. From the two AYT, among the 40 tested genotypes, only eight genotypes were selected for RYT. In RYT, three genotypes were selected from fourteen lines to forward to ALART. Two genotypes in ALART were evaluated and among them none were recommended by ARD.

Development of rice varieties for favorable Boro environment: The aim of this project was to develop improved genotypes with high yield potential (≥ 8.0 t/ha), earliness (135-145 days) and acceptable grain quality for favorable irrigated ecosystem in Bangladesh. To address the objectives, a total of 53 single crosses and 19 backcrosses were made using 41 and 22 breeding lines/varieties, respectively, as parents targeting to develop high yielding breeding lines enriched with favorable alleles of key target traits, viz. disease resistance (blast and BLB), insect resistance (BPH) and acceptable grain quality (amylose, chalkiness, palatability, zinc content, etc.). Fifty-seven single crosses and eleven backcrosses were confirmed as true F₁ through a hybridity test using KASP based QC SNP genotyping. Out of 14,161 segregating progenies of 44 crosses grown in the RGA nurseries, a total of 11,498 segregating progenies comprising 7,184 F₂ progenies of 16 crosses, 2166 F₃ progenies of 20 crosses, 540 BC₁F₂ of one cross, and 1,608 BC₁F₃+PSRGA progenies of seven crosses were advanced following single seed decent method of breeding. Out of 19,901 lines of 169 crosses tested in LST, 2172 uniform lines in terms of plant height, days to flowering, grain size and shape were selected for genotyping to track the favorable alleles of key target genes for BB (*xa5*, *xa13* and *Xa21*), blast (*Pi9*, *Pita*, *Pita2* and *Pb1*) and BPH (*Bph17* and *BPH32*) resistance, and grain quality (*Wx-a*, *Wx-10*, *chalk5*, *BADH2*).

One hundred nineteen genotypes out of 1982 fixed lines tested in OYT at 12 locations following sparse testing model of genomic selection were selected based on plant height, growth durations and grain yield. The selected lines yielded 4.58 t/ha to 10.57 t/ha with growth duration of 117 – 160 days. Out of 140 breeding lines tested in an OYT under AGGRiNet trial network, 19 breeding lines showing 7.0 t/ha to 8.7 t/ha yield with 125 – 142 days growth duration across four sites (Gazipur, Cumilla, Habiganj and Rajshahi) were selected for further evaluation. Nine early maturing lines (131 -138 days) yielding 23.3 % to 50.7% higher than BRRI dhan88 (134 days, 6.35 t/ha) and two medium maturing lines (148-150 days) yielding 15.0% to 15.2% higher than BRRI dhan102 (153 days, 6.14 t/ha) were selected from 146 advanced breeding lines tested in two AYT trials. Two medium duration breeding lines (138 days, 7.12 -7.28 t/ha) showed 10.2 -12.7% yield advantage over the check variety BRRI dhan102 (145 days, 6.71 t/ha) that were selected for further advancement. Besides, five short duration breeding lines yielded 5.8-9.0 % over BRRI dhan88 and 10.9-14.3 % over BRRI dhan28 and four medium duration breeding lines were selected for further trial in RYT. Four medium maturing lines (150-151 days) and one early maturing line (147 days) yielding at least 0.5 t/ha higher yield over the contemporary check varieties (BRRI dhan28 and BRRI dhan88).

were selected from 31 breeding lines tested in four sets of RYT at 10 locations across the country for further advancement. One long duration breeding line BR11318-5R-84 (150 days) showed 12.8% yield advantage of the check variety BRRI dhan92 across 10 locations in proposed variety trial (PVT).

Development of cold tolerant rice: The major objective of the project was to develop high yielding and short duration (6.0-7.0 t/ha yield and 135-145 days growth duration for haor areas) and high yielding medium duration (6.5-7.5 t/ha yield with 145-150 days growth duration for Northern regions) rice varieties tolerant to cold stress at seedling and reproductive stage. To address the above objectives, five single crosses and 36 backcrosses were made using 24 lines/varieties including five cold tolerant donors as parents targeting to develop high yielding and cold tolerant breeding lines enriched with favorable alleles of disease resistance (blast and BLB), insect resistance (BPH) and acceptable grain quality (amylose, chalkiness, palatability, zinc content, etc.). Fifty-eight crosses were confirmed as true F₁ through a hybridity test using KASP based QC SNP genotyping. From segregating RGA nurseries, in total 16,876 individual plants were harvested from 56 cross combinations of F₂-F₄, BC₁F₂, BC₁F₃, BC₁F₄ BC₂F₃, and BC₂F₄ generations following SSD method of breeding. Out of 7,069 lines under 59 crosses tested in LST, 492 uniform lines in terms of plant height, days to flowering, grain size and shape were selected for genotyping with trait markers for cold tolerance (*SCT1*, *qPSST6*, *qPSST3*, *qPSST7* and *qPSST9*), blast resistance (*Pi9*, *Pita*, *Pita2*, *pbl1*), BB resistance (*xa5*, *xa13*, *Xa21*) and grain quality traits (*Wx-a*, *Wx-10*).

Out of 190 breeding lines tested under natural cold stress (at booting stage) and non-stress conditions at two locations in OYT-1 and OYT-2, 12 breeding lines showing 12.1 – 75.4 % yield advantage under cold stress condition and 13 breeding lines showing 6.94 – 43 % yield advantage under non-stress condition over the check varieties of contemporary growth duration were selected for further yield testing. Also, two breeding lines showing 32.0% to 33.0% higher yield over the check variety BRRI dhan88 and 5 breeding lines showing 6-29% yield advantage over the check BRRI dhan67 were selected from 60 breeding lines tested in OYT-4 at Gazipur site under cold-stress (CS2) condition. Ten advanced breeding lines comprising one short duration (144 days) showed 121% yield advantage and six medium duration lines (154-161 days) showing 61.0% to 116.0% yield advantage over the contemporary check varieties BRRI dhan28 and BRRI dhan67 under cold stress were selected and three breeding lines showing 10-20% yield advantage over check BRRI dhan28 under non stress conditions were selected from AYT-1 trials conducted at four locations (Gazipur, Nikli, Tahirpur and Habiganj). On the other hand, sixteen breeding lines were selected from AYT-2 trials conducted at four locations (Gazipur, Nikli, Tahirpur and Habiganj). Among them, eleven medium duration lines consisting (155-158 days) showing 61.0% to 152.0% yield advantage over the contemporary check BRRI dhan67 under cold stress were selected and five breeding lines including two short duration lines showing 15.6% yield advantage over the contemporary check BRRI dhan28 and three medium duration lines showing 8.1-23.2% yield advantage over the contemporary check BRRI dhan67 under non-stress conditions were selected for advancement.

A total of eight genotypes were selected from 17 tested entries from both stress and non-stress conditions in RYT-1 trial conducted at nine locations the haor areas of Nikli, Tahirpur and Habiganj. Among these, four genotypes consisting of two short duration breeding lines (151 days) showed 42-46% yield advantage over check BRRI dhan28 (152 days, 1.43 t/ha) and two medium duration breeding lines (155-157 days) showed 60-104% yield advantage over check BRRI dhan67 (158 days, 2.06 t/ha) were selected under cold stress conditions. Under non-stress conditions, four short duration breeding lines showing 15-23% yield advantage over the contemporary check BRRI dhan28 were selected for further advancement. In RYT-2, three short duration advanced breeding lines showing 10-12% yield advantage over the contemporary check BRRI dhan28 were selected from 17 tested entries under non-stress conditions conducted at nine locations in the haor areas. One cold tolerant breeding line BR11894-R-R-R-R-169 (136 days, 6.77 t/ha) showed 22.8% yield advantage over the check

variety BRRI dhan28 (133 days, 5.64 t/ha) in a proposed variety trial conducted at 10 locations in the haor areas.

Development of Pigmented Rice with Nutraceutical Properties: The main objective of this project was to develop anthocyanin-enriched, value-added rice genotypes with high yield potential for both rainfed and irrigated ecosystems in Bangladesh.

During the T. Aman 2024-25 season, a total of 14 crosses were successfully made using 16 parental lines. From these crosses, 1,236 F₁ seeds were obtained. Subsequently, from 31 crosses, 27 single crosses were selected and confirmed as true F₁ hybrids through QC SNP panel analysis. A total of 26,694 progenies were advanced through Rapid Generation Advance (RGA) from 80 crosses. This included 12,808 progenies from 28 F₂ crosses, 8,714 progenies from 22 F₃ crosses, 1,361 progenies from six F₄ crosses, and 3,819 progenies from 23 F₅ crosses. From the Line Selection Trial (LST), a total of 196 fixed lines were selected from 2,167 fixed lines originating from 10 crosses, representing 9.04% selection intensity. In the Observational Yield Trial 25 genotypes were selected out of 152 genotypes. In Preliminary Yield Trial six genotypes were selected out of 43, whereas in Advanced Yield Trial, three out of 23 genotypes were selected. In the Regional Yield Trial (RYT), two advanced breeding lines were selected out of 10. In OYT, the genotype BR13941-4R-156 produced the highest yield of 4.35 t/ha with a growth duration of 127 days, while the standard check, BRRI dhan87, yielded 3.89 t/ha with a 126-days growth duration. For PYT#1, the highest yielding genotype was BR12839-4R-153-1, producing 3.40 t/ha grain yield with a 132-days growth duration. In PYT#2, the selected genotype was BR12839-4R-175, producing 3.10 t/ha grain yield with a 101-days growth duration. In AYT#1, the highest yielding genotype was BR12838-4R-5a, which produced 3.21 t/ha grain yield with a 130-days growth duration. For AYT#2, the highest yielding genotype was BR12839-4R-1, producing 3.71 t/ha grain yield with 136-days growth duration. This was followed by the genotype BR12839-4R-95-1, which produced 3.64 t/ha grain yield with a 112-days growth duration. In RYT, the highest yielding genotype was BR12839-4R-106, producing 3.33 t/ha grain yield with a 130-days growth duration and the total antioxidant capacity (TAC) was 615.61 µM. This was followed by the genotype BR12839-4R-137, which produced 3.25 t/ha grain yield with a 123-days growth duration and a TAC of 609.05 µM. In PVT, the proposed line BR12836-4R-63, out-yielded the check in five locations but in some locations, such as Gazipur, Bhanga, Sonagazi, and Khulna, the proposed variety had a lower yield due to factors like Bacterial Leaf Blight (BLB), rat damage, submergence, and flash flooding. The overall mean yield of the proposed variety was 3.92 t/ha, whereas the yield of BRRI dhan70 was 3.86 t/ha. The C3G content of the proposed line was 492.37 ppm, while its total antioxidant capacity was 701.21 µM AAE/100g, compared to the TAC of 371.21 µM AAE/100g for the check which do not possess C3G. The tested black rice line was not included as an agenda in the NTC meeting, as most of the trials were damaged.

In Boro 2024-25, a total of 12 crosses were made using 12 parents and 400 F₁ seeds were obtained, and six single crosses among 10 crosses were confirmed and selected through QC SNP panel analysis. Panicles of 25,464 progenies from 81 crosses (5,924 progenies of 27 F₂ crosses, 10,316 progenies of 26 F₃ crosses, 8,006 progenies of 22 F₄ crosses and 1,218 progenies of six F₅ crosses) were advanced through RGA. The harvested panicles were labeled, dried and preserved properly. A total of 402 fixed lines from 3,828 fixed lines of 23 crosses were selected from LST based on phenotypic acceptance, uniformity in flowering, plant height, grain size and shape, lodging tolerance, pigmentation, higher predicted yield and presence of expected trait markers. A total of 25 genotypes were selected out of 200 genotypes in OYT. The yield ranged from 27.13-4.98 t/ha of the selected genotypes. The highest yield was found in BR14563-4R-96 which gave 7.13 t/ha yields with 134 days growth durations. The overall performances of the AYT genotypes were not good producing a yield ranging from 2.3 to 4.9t/ha. Only two genotypes were selected out of 33 genotypes to be repeated in AYT. A total of six materials in RYT were evaluated in eight locations. The genotype BR12839-4R-106 produced 5.53 t/ha yield with a growth duration of 139 days. The Cyanidin-3-Glucoside (C3G) Conc., Total Phenolic Compound (TPC) and Total Antioxidant Capacity (TAC) of this genotype are 351.12 mg/100g GAE; 44.7 mg GAE and 609.05 µM AAE/100g; which are very

good value as a high antioxidant enriched genotype. Three materials, two for medium growth duration and one for short growth duration in ALART, were also evaluated by ARD. In medium duration trial, the genotype BR12839-4R-157-2 produced 7.27 t/ha yield with a growth duration of 148 days followed by the genotype BR12839-4R-5-2 which produced 5.20 t/ha yield with a growth duration of 147 days. The non-pigmented check variety, BRRIdhan100 produced a slightly higher yield of 7.65 t/ha which is not significantly different. The Cyanidin-3-Glucoside (C3G) Conc., Total Phenolic Compound (TPC) and Total Antioxidant Capacity (TAC) of this genotype BR12839-4R-157-2 are 459.10 mg/100g GAE; 38.80mg GAE and 691.05 μ M AAE/100g; and that of for the genotype BR12839-4R-5-2 are 441.66 mg/100g GAE; 38.09mg GAE and 642.81 μ M AAE/100g; which are very good value as a high antioxidant enriched genotype. Any one of these two genotypes can be selected for Proposed variety trial (PVT) under the medium duration category in the next season. In short duration trial, the tested genotype BR12839-4R-137 produced 7.02 t/ha yield with a growth duration of 141 days, whereas the non-pigmented check variety, BRRIdhan88 produced a slightly higher yield of 7.54 t/ha which is not significantly different than the tested genotype. The Cyanidin-3-Glucoside (C3G) Conc., Total Phenolic Compound (TPC) and Total Antioxidant Capacity (TAC) of the genotype BR12839-4R-137 are 387.11 mg/100g GAE; 37.90mg GAE and 615.61 μ M AAE/100g which is a very good value as a high antioxidant enriched genotype. The genotype can be selected for Proposed variety trial (PVT) in short duration category in the next season. Heritability obtained for growth duration and yield ranged from 80-84 % and 51-90%, respectively, indicating high level of precision in the experiments.

Development of Zinc Enriched Rice (ZER): The project aims to develop high yielding rice varieties with improved nutritional quality with high zinc ($Zn \geq 24$ mg/kg) in polished grain. The project also prioritizes development of stress tolerant zinc enriched rice varieties in a combination of submergence and zinc, drought and zinc, salinity and zinc along with cold and zinc enriched rice with improved grain yield. The experiments were conducted in both T. Aman and Boro seasons. In T. Aman season, 23 single crosses were made that produced 2,218 seeds. A total of 19 crosses were selected and confirmed as true F_1 using 10-SNP *indica* QC panel. In RGA method, 29,268 segregating progenies were harvested from F_{2-5} generations of 110 crosses. A total of 372 uniform lines out of 4,494 lines were harvested based on visual observation on homogeneity in flowering, plant height and grain size and shape. Selection intensity of the genotypes of LST was 8% in T. Aman season. Trait marker profiles showed that most of the selected materials from LST contained genes/QTLs of high amylose, high zinc content and drought tolerance. From the OYT, 91 genotypes were selected from 363 genotypes. A total of eight genotypes were selected out of 56 genotypes from the AYT based on yield performances. Only one genotype out of nine genotypes was selected for re-trial in RYT.

In Boro 2024-25, 21 single crosses were made that produced 4,699 seeds. A total of 18 crosses were selected and confirmed as true F_1 . In RGA method, 22,148 segregating progenies were harvested from F_{2-4} generations from 81 crosses. From LST, a total of 963 uniform lines out of 15,046 lines were harvested based on visual observation on homogeneity in flowering, plant height and grain size and shape. Selection intensity of the genotypes of LST was 6.4%. Trait marker profile of the selected materials of LST contained genes of high amylose, high zinc content, and some lines contained genes of aroma and few lines had insect resistance genes. From two OYTs, a total of 67 were selected from 531 genotypes. Among them, 30 genotypes out of 244 from OYT#1 and 38 genotypes out of 287 from OYT#2 were selected. A total of ten genotypes were selected from two AYT#s out of 50 genotypes. From the two AYT#s, ten genotypes were selected from 50 genotypes. Out of four genotypes, two genotypes were selected and recommended for promoting to RYT.

Development of Insect Resistant Rice: The main thrust of the project was to develop varieties resistant to gall midge (GM), brown plant hopper (BPH) and white backed plant hopper (WBPH). The experiments were conducted in both T. Aman and Boro seasons. In the T. Aman 2024-25 season, 33 crosses for forward breeding, 10 crosses for pre breeding, three F_1 crosses

for line augmentation were made, and 25 crosses were confirmed as true hybrids using quality check (QC) genotyping with purity SNP panel. In total 17,286 segregating progenies from 109 crosses of F₂-F₅ generations were advanced through Field Rapid Generation Advanced (FRGA) technique. Out of 2032 F_{5:6} LST lines derived from 21 different crosses, 358 genotypes were selected based on strong plant architecture, grain type and uniformity in heading under field condition as well as the presence of the favorable alleles of key target genes for BPH (*bph9*, *bph17_1*, *bph17_2*, *bph17_3* and *bph32*), Gm (*Gm4_3* and *Gm4_4*) and grain quality (*Wx-A* and *Wx-10*). The yield trials (OYT, PYT and AYT) were conducted at three locations of BRRI Gazipur, Cumilla and Rangpur. Sixty-two genotypes were selected from 318 breeding lines in OYT. Twenty-five genotypes were selected from 81 genotypes in PYT. Ten genotypes were selected from 25 lines in AYT for further evaluation. In Boro 2024-25 season, 24 crosses for forward breeding, three crosses for pre-breeding and three F₁ crosses for line augmentation were made, and 41 crosses were confirmed as true hybrids through F₁ verification using quality check (QC) genotyping with purity SNP panel. A total of 27,128 individual segregating plants were advanced from 112 crosses in F₂-F₅ generations by FRGA technique. In LST, 778 lines having strong plant architecture, grain quality, uniformity in heading under field condition were selected from 5,167 F_{5:6} breeding lines that are the descendants of 26 crosses. Total 104 genotypes, out of 318 were selected from OYT#1 that tested at three locations of BRRI Gazipur, Cumilla and Rangpur. In OYT#2, 35 genotypes were selected from 96 genotypes at BRRI Gazipur. Thirty lines were selected from 72 lines in PYT. Out of 39 genotypes, 12 lines were selected from AYT for further evaluation. Total 765 genotypes from OYT, PYT, AYT, hybridization parents were screened at natural field condition of BPH hot spot area, Tarash, Sirajganj and ‘hopper burn’ symptom was not found due to low abundance of BPH population. Total 119 parental lines were maintained in insect resistant maintenance breeding program.

Development of disease resistant rice. Efforts were made for developing varieties resistant to bacterial blight (BB), rice tungro virus (RTV) and blast diseases. The experiments were conducted in both T. Aman and Boro seasons. Thirty-four crosses for BB and blast in T. Aman and 17 crosses for BB, blast, tungro, false smut and bakanae were made in Boro season. Fifteen crosses for BB and blast in T. Aman and 34 for BB, blast, tungro, false smut and bakanae were confirmed in Boro season as true F₁. A total of 45,150 progenies for BB and 49,950 progenies for blast were advanced from F₂₋₆ generation through field rapid generation advanced (FRGA). Five hundred seventeen uniform lines were isolated from 5,574 LST lines in T. Aman and 953 out of 5,047 lines were identified from LST in Boro season based on uniformity in heading, plant height, and grain type. Twenty genotypes were selected from observational yield trial (OYT) in T. Aman season whereas 20 entries out of 400 for BB during Boro season showed better yield potential and agronomic performance over the check varieties and tolerance to BB. From AYT, three advanced lines were promoted based on growth duration, grain yield, and BB score compared to the check varieties in T. Aman season and two genotypes out of 43 from AYT#1, five genotypes out of 48 from AYT#2 and four genotypes out of 25 from AYT#3 for BB were selected in Boro season. In the regional yield trial (RYT), two genotypes for BB were selected in T. Aman season and two genotypes for Boro performed better considering yield, growth duration, BB resistance, and grain quality characters. In total 180 parental lines were maintained in disease resistant maintenance breeding program. The genotype BR12454 (Path)-BC2-69-97-39-5-44 was released as blast resistant long duration variety BRRI dhan114 comparing the check variety BRRI dhan89 for cultivation throughout the country in Boro season. BRRI dhan114 shows highly resistant reaction to blast (Blast score-1) in artificial inoculation by blast pathogen. The results of SNP QTL fingerprinting showed that the blast resistant proposed variety obtained blast resistant dominant genes *Pi9* and *Pb1*. The average yield of BRRI dhan114 was 7.8 t/ha with 149 days growth duration, its potential yield can be attained up to 10.17 t/ha with proper management.

Development of submergence and water stagnation tolerant rice. The project aims for the development of high yielding rice varieties tolerant to submergence (flash flooding) and medium

stagnant water (MSW) stresses. During Transplanted Aman 2024, a total of 20,644 progenies from 104 crosses (3,320 from 17 F₂ crosses, 9,248 from 43 F₃, 2,472 from 10 F₄ progenies and 5,604 from 34 F₅ progenies), whereas, in Boro 2024-25, a total of 29,9987 progenies from 110 single crosses (3,940 progenies from 6 F₂ crosses, 10,418 progenies from 32 F₃ crosses, 4238 progenies from 17 F₄ progenies and 9,591 from 45 F₅ crosses and 1800 progenies from 10 F₆ crosses) have been scaled up, processed with proper labels and preserved. The mortality percentage of different RGA generations were around 29.5%. A total of 4,796 fixed breeding lines of 21 crosses were evaluated in the Line Stage Testing (LST) among which 144 lines were selected. The selection was based on visual phenotypic performance and homogeneity, presence of flash flooding tolerant *SUB1* QTLs (four diagnostic SNPs viz. snpOS0040, snpOS0041, snpOS0042 and snpOS0043 spanning the *SUB1* QTL region), presence of high amylose content SNPs viz. Wx-int, Wx-GBSS-ex10, Wx-A_group and Wx-A-NB. Along with these genes, genes for bacterial blight resistance, blast resistance were also considered.

In yield trial, a total of 426 genotypes were tested out of which, 67 genotypes were selected based on phenotypic acceptance, growth duration, survivability and higher yield performance. From OYT#1, 21 genotypes out of 246 genotypes, from OYT#2, 10 genotypes out of 76 genotypes, from AYT#1, 12 genotypes out of 53 genotypes, from AYT#2, 11 genotypes out of 16 genotypes, from AYT_Early, seven genotypes out of 18 genotypes, from AYT_Late, six genotypes out of 17 genotypes were selected. In AYT#1, The genotype BR14161-4R-21 produced the highest yield of 6.5 t/ha followed by BR12484-5R-44 (6 t/ha) and BR12950-5R-120 (6 t/ha) under controlled stress condition with the 96%, 96% and 84% survivability, respectively. In AYT#2, the genotype BR12506-5R-174 produced the highest yield of 6.47 t/ha with 94% survivability in tank followed by the genotype BR12490-5R-175 (6.2 t/ha). The yield of other selected genotypes was ranged from 5.0 t/ha to 5.9 t/ha under controlled submergence condition and 5.0 to 6.2 t/ha under rainfed conditions. In AYT_Early, the genotype BR11692-5R-345 produced the highest yield of 6.5 t/ha followed by IR16F1065 (6.4 t/ha) and BR12162-5R-350-1-P1 (5.8 t/ha) under tank condition with the 99%, 99% and 81%, survivability, respectively. In AYT_Late, the genotype IR16F1201 produced the highest yield of 5.78 t/ha with 98% survivability in tank followed by the genotype IR13F478-3 (5.58 t/ha) with 99% survivability. The yield range of other selected genotypes were 5.08 t/ha to 5.54 t/ha. In PVS, though the trial was conducted in four locations in submergence prone farmer's field in Rangpur, Kurigram and Lalmonirhat, Gaibandha district, there was no flood in any location. The trial will be repeated. The heritability obtained for plant height, growth duration, grain yield was ranged from 59% to 98%, indicating medium to high level of precision of these experiments. Moreover, two varieties were released by NSB, one for tidal submergence ecosystem and one for flash food submergence prone ecosystem of Bangladesh. The breeding line BR9158-19-9-6-50-2-HR1 was released as a tidal submergence tolerant variety BRRI dhan109 and the breeding line IR16F1148 was released as a shorter duration flash flood submergence tolerant variety namely BRRI dhan110.

Development of drought tolerant rice (DTR): The project aims to develop high yielding drought tolerant rice varieties under rainfed lowland rice ecosystem in T. Aman season. In T. Aman 2024-25, a total of 781 F₁ seeds were obtained from 24 crosses using 15 parents and 25 crosses were confirmed as true hybrids using 10-SNP *indica* QC panel. In RGA, a total of 13,380 individual progenies of 39 crosses from F₂ and F₅ generation were harvested from T. Aman and 15,465 progenies of 50 crosses from F₂ and F₃ generation were harvested from Boro season. From line stage testing (LST), 398 lines were selected from 4,243 progenies of 19 crosses. Selection intensity was recorded 9.38% for the LST derived lines. Trait marker profile showed that the selected materials from LST contained genes/QTLs of drought tolerance along with high amylose (*Wxa*), *xa5*, *BPH32* and gall midge. A total of 43 genotypes were evaluated in two AYT in Gazipur, Rajshahi and Rangpur. Among the tested genotypes, seven promising genotypes were selected and forwarded to RYT. During flowering stage, the least drought stress was observed in Rajshahi as it was rained frequently and moderate drought was recorded at Gazipur in AYT. Two genotypes were forwarded from RYT to ALART due to its yield and drought tolerance ability. Genetic trend of the genotypes from 2016 to 2024 showed the pBLUP

(grain yield) in respect of trial year yield increase of 84.77 kg/ha/year equivalent to about 2.1% increase in grain yield per year based on yield of 2016. None of the materials were recommended for PVT from ALART. In Boro 2024-25, a total of 281 F₁ seeds were obtained from 17 crosses using 14 parents and 19 crosses were confirmed as true hybrids using 10-SNP *indica* QC panel. The RGA materials were advanced in the Boro 2024-25 from T. Aman season and 15,465 progenies of 50 crosses from F₂ and F₃ generations were harvested through RGA method. Under CRCIL drought program five three-way crosses and four backcrosses were made in Boro 2024-25.

Development of water saving and aerobic rice varieties. The objective of the project was to develop short duration water-use-efficient rice genotypes with 10% higher yield than the check varieties under transplanted alternate wetting and drying (AWD) and aerobic conditions. A total of 20 crosses were made using 20 parents and 1,350 F₁ seeds were obtained, and 15 single crosses were selected and confirmed through QC SNP panel analysis. A total of 10,377 individual panicles were selected from 59 crosses (1540 progenies of 6 crosses from F₂, 5276 progenies of 26 crosses from F₃, 1596 progenies of 13 crosses from F₄, and 1965 progenies of 13 crosses from F₅) were harvested through FRGA. A total of 333 lines were selected from 1884 lines of twenty-two crosses based on uniformity and phenotypic acceptance, strong plant type and based on the key trait markers. From yield trial, 14 genotypes were selected out of 59 genotypes. In OYT, four genotypes were selected from 40 genotypes and from AYT, 10 genotypes were selected evaluating 19 genotypes. In OYT, among all selected genotypes, the line BR13400-5R-16 produced the highest yield (7.2 t/ha) having growth duration of 143 days. In AYT, the genotype IR18R1133, produced the highest yield (7.4 t/ha) with a growth duration of 143 days. Both the check varieties BRRI dhan88 and BRRI dhan58 gave almost similar yield which was 6.5 t/h and 6.6 t/ha, respectively. The heritability obtained for growth duration and grain yield of the trials conducted ranged from 84 % to 95%, and 48 % to 94%, respectively, indicating medium to high level of precision in these experiments.

Development of Transgenic High Beta-carotene Rice and High Iron & Zinc Rice (Healthier Rice): The main objective of the project was to develop high yielding transgenic rice varieties with enhanced pro-vitamin-A, iron and zinc content in polished rice grain. In T. Aman 2024-25, with a view to developing high iron and zinc enriched rice, five backcrosses were made where 137 seeds were produced in total. BC₁F₁ generation was produced utilizing BR11712-4R-93, BRRI dhan98, BRRI dhan103 and BRRI dhan107 as recipient genotypes and BC₃F₁ was produced in the background of BRRI dhan87. Eleven hemizygous plants (H-type) were found from BC₂F₁ generation (BRRI dhan87*3/ IR 135160 TR-3-B-19). After confirmation of BC₂F₁ in the background of BRRI dhan87 backcrossing was accomplished. The seeds of 54 advanced lines of contained trial (CT) and 12 advanced lines of Confined Field Trial (CFT) with the GR2E gene in different backgrounds of T. Aman varieties were multiplied.

In Boro 2024-25, a total of 688 seeds of BC₂F₁ generation were harvested from three backcrosses to develop high iron and zinc enriched rice in the background of BR11712-4R-93, BRRI dhan98 and BRRI dhan103. Plants of BC₁F₁ in the background of BRRI dhan103, BR11712-4R-93, BRRI dhan98 were genotyped and two B type (fixed lines) and 13 H type (hemizygous) plants were identified and allowed to backcross. BC₃F₁ plants in the background of BRRI dhan87 were genotyped and eight B type and 11 hemizygous plants were identified. F₁ plants were confirmed for the cross of BRRI dhan105 and IR 135160 TR-3-B-19. The seeds of 85 advanced lines of CT and 10 advanced lines of CFT with the GR2E gene in different backgrounds of Boro varieties were multiplied. Previously completed CFT of golden rice in the background of BRRI dhan28 and pure lines of GR2E BRRI dhan29 was multiplied for future use. The seeds of the BRRI dhan29 golden rice was multiplied for maintaining purity.

Development of Photosensitive Rice for Charland: During the T. Aman 2024-25 season, a total of 22 crosses were made using 21 parent lines. A total of 13 crosses were confirmed out of 16 as true hybrids using 10-SNP *indica* QC genotyping panel. In FRGA, a total of 6,869 progenies from 48 crosses (2,984 progenies of 10 F₂ crosses, 2,497 progenies of 23 F₃ crosses, 1,109 progenies of 10 F₄ crosses, 279 progenies of five F₅ crosses) were harvested for further

advancement. In the Line Stage Testing (LST) Trial, 62 genetically fixed lines out of 1749 progenies from 13 crosses were selected through the combination of visual phenotypic assessment and trait-based genotyping with 3.54% selection intensity. In Preliminary Yield Trial (PYT), four advanced lines out of 10 were selected, whereas advanced line BR11764-5R-124 gave the highest grain yield (4.56 t/ha) with 130 days growth duration, and best-performing check variety, BR23, produced 4.29 t/ha grain yield with 131days growth duration. In the Advanced Yield Trial (AYT), four advanced lines were selected out of nine genotypes. In this AYT, advanced line BR8845-21-1-10-3-3 gave the highest grain yield (4.18 t/ha) with 126 days growth duration, whereas the high-yielding check variety BR23 produced 3.82 t/ha grain yield with 127 days growth duration. The estimated heritability of AYT was 99% for plant height (cm), 92% for days to maturity, and 52% for grain yield. In ALART for photosensitive rice, out of two, one advanced breeding line, BR10212-5-5-3, was promoted in PVT due to its higher yield (4.86 t/ha) compared to best best-performing check variety, BR23 (4.32 t/ha).

TRANSFERABLE TECHNOLOGY

National Seed Board (NSB) of Bangladesh has released four promising genotypes such as BR9158-19-9-6-50-2-HR1 for tidal submergence prone environment of Barishal region, IR16F1148 as a shorter duration submergence tolerant variety for submergence prone farmers’ field of Bangladesh, BR10260-5-15-21-6B for shallow flooded condition of up to 80-100 cm water depths to be cultivated in tidal flood prone coastal region and shallow flood prone *bil* region of Bangladesh and BR11716-4R-102 as a salt-tolerant rice variety suitable for saline affected southern regions as BRRI dhan109, BRRI dhan110, BRRI dhan111 and BRRI dhan112 (11 March, 2025 and 14 May, 2025), respectively, for cultivation in T. Aman season. On the other hand, promising genotype BR11337-5R-72 was released as BRRI dhan113 as a short duration Boro variety for cultivation throughout the country in the 113th NSB meeting dated on 14 May 2025.

BRRI dhan109: National Seed Board (NSB) of Bangladesh has released one tidal-submergence tolerant genotype viz. BR9158-19-9-6-50-2-HR1 for tidal submergence prone environment of Barishal region as BRRI dhan109 to be cultivated during Transplanted Aman season. The average yield of BRRI dhan109 is 6.0 t/ha, but with standard cultivation practice, produce 6.5 t/ha yield with a growth duration of 147 days and plant height 128 cm. It has high protein content i.e. 10.6 % and high amylose content which is 25.4%. The thousand grain weight of this variety is 31 gram having medium bold grain which is mostly preferred by the farmers of Barisal region (**Table 1**).

Table 1. Yield and agronomic performance of BRRI dhan109 in the Proposed Variety Trial (PVT), T. Aman 2023-24 with its grain characteristics

Designation	PH	GD	GY	MOT	HRY	L/B	Size &	AAC	Protein	TGW (g)
				(%)	(%)	ratio	shape	(%)	(%)	
BRRI dhan109	128	147	5.49	72	61	2.4	MB	25.4	10.6	31.0
BRRI dhan44(Ck)	131	121	4.52	72	61	2.4	MB	26.7	8.9	30.0

* PH: Plant height (cm); GD: Growth duration (day); GY: Grain yield (tha⁻¹) as mean of ten locations; MOT (%): Percentage of milling outturn; HRY (%): Percentage of head rice yield; L/B ratio: Ratio of length AAC (%): Percentage of apparent amylose content; TGW (g): Thousand grain weight in gram.

BRRI dhan110: NSB released flash flood submergence tolerant genotype, IR16F1148 as a shorter duration submergence tolerant variety for submergence prone farmers’ field of Bangladesh as BRRI dhan110 to be cultivated during Transplanted Aman season. This variety having *Sub1* gene introgressed can tolerate three weeks of complete submergence and can produce 5.0 t/ha yield. Under rainfed condition, the average yield is 6.0 t/ha with a growth duration of 123 days. Depending on the flooding duration, the duration may be increased up to 140 days. With standard agronomic practices, it can produce 6.65 t/ha yield. This variety

possesses medium slender white grain having medium amylose content. The milled rice is white, soft and non-sticky which is very good to taste. The weight of 1000 grains is 19.9 grams (Table 2).



Table 2. Yield and agronomic performance of BRRI dhan110 in the Proposed Variety Trial (PVT), T. Aman 2023-24 with its grain characteristics

Designation	PH	GD	GY	MOT (%)	HRY (%)	L/B ratio	Size & shape	AAC (%)	Protein (%)	TGW (g)
BRRI dhan110	120	125	5.29	70	64	2.9	MS	24.3	8.8	19.9
BINA dhan11 (Ck)	111	121	4.39	72	63	3.1	MB	24.0	8.2	22.0

* PH: Plant height (cm); GD: Growth duration (day); GY: Grain yield (tha⁻¹) as mean of ten locations; MOT (%): Percentage of milling outturn; HRY (%): Percentage of head rice yield; L/B ratio: Ratio of length AAC (%): Percentage of apparent amylose content; TGW (g): Thousand grain weight in gram.

BRRI dhan111: NSB released BRRI dhan111 (BR10260-5-15-21-6B) for shallow flooded condition of up to 80-100 cm water depths to be cultivated in tidal flood prone coastal region and shallow flood prone bil region of Bangladesh. This variety can produce 4.7 t/ha yield under shallow flooded condition but can give 5.7 t/ha yield under non-stress condition. BRRI dhan111 is taller but stronger and photosensitive with a growth duration of 146 to 160 days depending on the seeding time. The plant height is 162 cm having a very strong culm which is tolerant to lodging and have ratooning ability. It has high amylose content with medium bold grain having thousand grain weight of 27.5 grams.

Table 3. Yield and agronomic performance of BRRI dhan111 in the Proposed Variety Trial (PVT), T. Aman 2023-24 with its grain characteristics

Designation	PH	GD	G Y	MO T (%)	HR Y (%)	L/B ratio	Size & shape	AAC (%)	Protein (%)	TGW (g)
BRRI dhan111	165	146	4.2	72	67	2.2	MB	27.5	7.9	27.5
BRRI dhan91 (Ck)	180	149	3.2	70	67	2.5	MB	26.2	8.2	26.0

* PH: Plant height (cm); GD: Growth duration (days); GY: Grain yield (tha⁻¹) as mean of ten locations; MOT (%): Percentage of milling outturn; HRY (%): Percentage of head rice yield; L/B ratio: Ratio of length to breadth; MB: Medium Bold; MS: Medium Slender; AAC (%): Percentage of apparent amylose content; TGW (g): Thousand grain weight in gram.

BRRI dhan112: A new Salt-Tolerant Rice Variety for Bangladesh. The National Seed Board (NSB) of Bangladesh has released BRRI dhan112 (BR11716-4R-102), a new salt-tolerant rice variety for the T. Aman season. With a growth duration of 120-125 days, this variety is notable for its lodging tolerance. It boasts an average yield of 5.0 ton per hectare, with a potential range of 4.14 to 6.12 tons per hectare depending on salinity stress. This represents a significant yield increase of 1.0-1.5 ton per hectare (a yield advantage of over 22%) compared to check BRRI dhan73. The key characteristic of BRRI dhan112 is its robust tolerance to 12 dS/m salinity during the critical seedling stage (up to 3 weeks). Furthermore, it can withstand 8 dS/m salinity throughout all other salt-sensitive growth phases, from the vegetative to the reproductive stage, while still producing a high yield. This makes BRRI dhan112 a valuable asset for sustainable rice production in the saline-affected coastal regions of Bangladesh. (Table 4 and Fig. 1)

Table 4. Yield and agronomic performance of BRRI dhan112 in the Proposed Variety Trial (PVT), T. Aman 2023-24 with its grain characteristics.

Designation	PH	GD	GY	MOT (%)	HRY (%)	L/B ratio	Size & shape	AAC (%)	Protein (%)	TGW (g)
BRRI dhan112	103	121	5.0	70	56	3.1	Long slender	28.1	8.4	21.5
BRRI dhan73 (Ck)	127	118	4.1	69	57	2.9	Medium bold	27	8.4	20.9

* PH: Plant height (cm); GD: Growth duration (day); GY: Grain yield (tha⁻¹) as mean of ten locations; MOT (%): Percentage of milling outturn; HRY (%): Percentage of head rice yield; L/B ratio: Ratio of length to breadth; AAC (%): Percentage of apparent amylose content; TGW (g): Thousand grain weight in gram

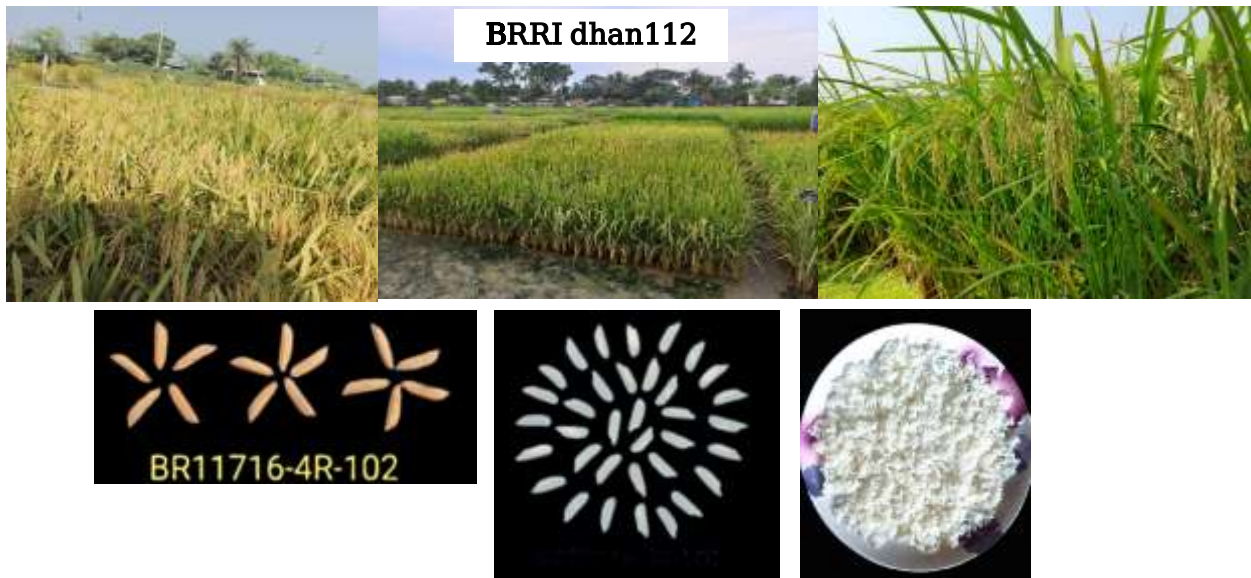


Fig. 1. Salinity tolerant variety BRRI dhan112 for the T. Aman season

BRRI dhan113: The proposed line BR11337-5R-72 was evaluated along with the check variety BRRI dhan88 under PVT at ten locations in Boro rice growing areas of Bangladesh and proposed line was recommended to release as variety BRRI dhan113 (Table 5) in 113th NSB meeting (5 September 2024). BRRI dhan113 has an average yield of 8.15 t/ha but it can produce 10.1 t/ha under optimum management with a growth duration of 143 days, producing 11.5% higher yield than BRRI dhan88 across ten locations. This new short-duration, high-yielding rice variety is characterized by an erect flag leaf, 8.4% protein content, 19.4 g thousand-grain weight, and medium-slender grain type (Fig 2).



Fig. 2. Field view and grain picture of BRRI dhan113

Table 5. Performance of BRRI dhan113 in Proposed Variety Trial

Designation	PH (cm)	GD (days)	Grain yield (t/ha)	Grain Characteristics								
				Milling outturn (%)	Head rice recovery (%)	L/B ratio	Size and shape	ER	IR	Protein (%)	Amy lose (%)	TGW (g)
BR11337-5R-72 (BRRI dhan113)	102	143	8.15	70.4	61.4	3.3	MS	1.3	3.0	8.4	28.0	19.4
BRRI dhan88 (Ck)	100	138	7.31	72.8	68.4	3.1	MS	1.5	3.9	8.2	26.3	20.3

PH=Plant height, GD=Growth duration; ER=Elongation ratio; IR=Imbibition ratio; TGW=Thousand grain weight

PROJECT 1: DEVELOPMENT OF UPLAND/DIRECT SEEDED RICE (B. AUS)

General Objectives: Development of varieties in combination of multiple traits such as quick seedling emergence and vigorous growth; short growth duration (95-100 days); tolerance to lodging, drought and pre-harvest sprouting (viviparous); medium slender to medium bold grains and good eating quality and grain yield 4.0-4.5 t/ha.

Project Leader: Md. Akhlasur Rahman

Experiment 1.1: Hybridization

Specific Objectives: To incorporate genes for earliness (90-95 days), drought and lodging tolerance into high yielding genetic background with yield target of 4.0-4.5 t/ha.

Materials and Methods: The parent materials were grown in three different sets at 7 days interval to synchronize flowering. Seeding was done starting from 15th July and three weeks old seedlings were transplanted per set in the hybridization block at BRRI, Gazipur. Fertilizers at the rate of 60 (130 kg Urea);10 (50 kg TSP); 40 (80 kg MP); 18 (100 kg Gypsum); 3.6 (10 kg Zn SO4) kg NPKSZn/ha were applied in the trial. All amounts of P, K, S and Zn were applied at the time of final land preparation and N was applied at three equal splits at 10, 25-30 and 40-45 days after transplanting (DAT). Crop management such as weeding, irrigation etc. was done in time. Insects, diseases and other pests were controlled properly.

Principal Investigator: Md. Akhlasur Rahman

Co-investigator: Nusrat Jahan, Armin Akter Setu and Ribed Farzana Disha.

Results: Twenty-four crosses were made using thirty parents (Table 1.1a).

Table 1.1a: List of parents for hybridization, Development of Upland Rice (B. Aus), 2024-25

SI No	Designation	SI No	Designation
1	BR12248-4R-22	16	BR24
2	BR12228-4R-278	17	BR12862-5R-3
3	BR13122-4R-4	18	BR12873-5R-60
4	Hasikalmi	19	Vandana
5	BR12239-5R-25	20	BR12857-5R-55
6	BRRI dhan71	21	BR12867-3R-123
7	BR10656-2B-72	22	BR10756-2B-8-72
8	BR12248-4R-122	23	BR10756-2B-72
9	BR12234-4R-93	24	Luyin-46
10	BRRI dhan83	25	BR11712-4R-218
11	Shahbagi dhan	26	BR12239-5R-5
12	BR12234-5R-93	27	BR12248-5R-22
13	BR12236-5R-6	28	BR12263-5R-75
14	BR12248-5R-122	29	BR13106-4R-438
15	BR12867-5R-123	30	BR12465-4R-231

Table 1.1b: List of Crosses made, Development of Upland Rice (B. Aus), 2024-25

SI No	Cross Combination (Elite/Elite)	No. of F1 Seeds
1	BR12248-4R-22/BR12228-4R-278	35
2	BR13122-4R-4/Hasikalmi	22
3	BR12239-5R-25/BRRI dhan71	10
4	BR10656-2B-72/BR12248-4R-122	16
5	BR12234-4R-93/BRRI dhan83	14
6	Shahbagi dhan/BRRI dhan83	20
7	BR12234-5R-93/Shahbagi dhan	28
8	BR12236-5R-6/BRRI dhan83	40
9	BR12236-5R-6/BR12248-5R-122	8
10	BR12867-5R-123/BR24	10
11	BR12862-5R-3/BR12873-5R-60	20

Sl No	Cross Combination (Elite/Elite)	No. of F1 Seeds
12	BRRI dhan83/Vandana	43
13	BR12857-5R-55/BR12867-3R-123	13
14	BR12862-5R-3/BR10756-2B-8-72	29
15	BRRI dhan71/BRRI dhan83	12
16	BR10756-2B-72/BRRI dhan71	12
17	Luyin-46/BR11712-4R-218	17
18	BR12239-5R-5/Shahbagi dhan	25
19	Vandana/BRRI dhan71	38
20	BR12248-5R-22/BR12263-5R-75	14
21	BRRI dhan71/BR13106-4R-438	41
22	BR12263-5R-75/BR12236-5R-6	15
23	BR10756-2B-72/BR12857-5R-55	45
24	BR12465-4R-231/BRRI dhan71	21

Experiment 1.2: F₁ Confirmation

Specific Objectives: Confirmation of crosses as true F₁.

Materials and Methods: The F₁ seeds along with their respective parents were germinated in the petri-dish and were seeded in earthen pots at BRRI, Gazipur. Twenty-one days old seedlings were transplanted at the rate of single seedling in a spacing of 20 cm × 15 cm in the net house along with respective parents. Fertilizer application and crop management procedure were followed as experiment 1.1.

Principal Investigator: Md. Akhlasur Rahman.

Co-investigator: Nusrat Jahan, Armin Akter Setu and Ribed Farzana Disha.

Results: Twenty crosses were confirmed (Table 1.2) by careful observation of plant characters. After confirmation, the F₂ seeds were collected and preserved. These confirmed F₁’s was registered into BRRI cross list with BR number.

Table 1.2: List of F₁ confirmation, Development of Upland Rice (B. Aus), 2024-25

Sl	Cross Combination (Elite/Elite lines)	BR No
1	BR12108-4R-232/Vandana	BR16446
2	BR11716-4R-102/BR24	BR16452
3	BR13115-4R-116/BRRI dhan83	BR16456
4	BR13122-4R-136/BRRI dhan83	BR16459
5	BRRI dhan83/BR13115-4R-116	BR16460
6	BR13106-4R-38/BRRI dhan83	BR16461
7	BRRI dhan83/BR11716-4R-102	BR16462
8	BRRI dhan83/BR13108-4R-232	BR16841
9	BR13115-4R-116/BR12239-4R-201	BR16842
10	BR13111-4R-63/BR12235-4R-10	BR16470
11	BR13111-4R-63/BRRI dhan83	BR16471
12	BR12873-5R-65/BR13113-4R-63	BR16472
13	BRRI dhan83/BR13113-4R-63	BR16473
14	BR11716-4R-102/BR12234-4R-183	BR16843
15	BR13125-4R-92/BRRI dhan83	BR16476
16	BR13113-4R-63/BR12263-4R-75	BR16477
17	BR10756-2B-8-12/BR13125-4R-92	BR16478
18	BR13115-4R-116/BR12263-4R-75	BR16479
19	BR11716-4R-102/BR12239-4R-183	BR16474
20	BR12248-4R-22/BR13113-4R-63	BR16481

Experiment 1.3: Growing of FRGA population

Specific objectives: To quickly advance progenies from segregating population

Materials and Methods: Seeds of each cross were seeded in a seedbed and twenty-one days old seedlings will be transplanted @ single seedling in a 5cm × 5cm spacing. Fertilizer dose will be applied @ one third of the normal dose. Total amount of P, K, Gypsum and ZnSO₄ will be applied at final land preparation. Table 1.3a and 1.3b shows the list of F₂ and F₃ for Upland Rice.

Principal Investigator: M A Rahman.

Co- Investigator: Nusrat Jahan, Armin Akter Setu and Ribed Farzana Disha.

Results: Six F₂ populations were advanced to F₃, six F₃ populations were advanced to F₄ and six F₄ populations were advanced to F₅. Populations were seeded directly in 5.0 m long apart from 25 cm with 25-30 lines for each cross (Table 1.3a, 1.3b and 1.3c). Fertilizer doses were same as in experiment 1.1. Weeding was done in two/three times during the period of early seedling to maximum tillering stage.

Table 1.3a: List of materials for F₂ -FRGA, Development of Upland Rice (B. Aus), 2024-25

Sl.	Cross combination	BR No	TP	HP	Traits
1	BR11863-5R-50/BR12244-5R-14	BR16822	1000	198	High yield, high amylose, drought tolerance, good taste
2	BR12248-5R-18/BRRIdhan65	BR16823	1000	202	High yield, high amylose, Kataktara type grain, drought tolerance, short duration
3	BR12239-5R-146/BR12248-5R-22	BR16824	1000	300	High yield, high amylose, Kataktara type grain, drought tolerance, short duration
4	BR11864-5R-80/BR12244-5R-210	BR16825	1000	188	High yield, high amylose, drought tolerance, fine grain
5	BR12263-5R-31/Basmati	BR16826	1000	212	High yield, high amylose, drought tolerance, fine grain
6	BR12244-5R-14/BR12248-5R-4	BR16827	1000	192	High yield, high amylose, drought tolerance, fine grain
Total			6000	1292	

Table 1.3b: List of materials for F₃ -FRGA, Development of Upland Rice (B. Aus), 2024-25

Sl.	Cross combination	BR No.	TP	HP	Traits
1	BR11864-5R-32/BR10418-32-1-58	BR15484	300	110	High yield, high amylose, drought tolerance
2	BR10409-15-2-8/BR11863-5R-271	BR15485	300	120	High yield, high amylose, drought tolerance
3	BR11863-5R-271/Dharial	BR15486	300	119	High yield, high amylose, drought tolerance, good taste
4	BR11864-5R-92/Hashikalmi	BR15487	300	120	High yield, high amylose, drought tolerance, short duration
5	BR11864-5R-32/BRRIdhan83	BR15488	300	260	High yield, high amylose, Kataktara type grain,
6	BR26/ BR11864-5R-12	BR15489	300	150	drought tolerance, short duration
Total			1800	879	

Table 1.3c: List of materials for F₄ -FRGA, Development of Upland Rice (B. Aus), 2024-25

Sl.	Cross combination	BR No.	TP	HP	Traits
1	BR11864-5R-32/BR10418-32-1-58	BR15484	110	106	High yield, high amylose, drought tolerance
2	BR10409-15-2-8/BR11863-5R-271	BR15485	120	120	High yield, high amylose, drought tolerance
3	BR11863-5R-271/Dharial	BR15486	119	119	High yield, high amylose, drought tolerance, good taste
4	BR11864-5R-92/Hashikalmi	BR15487	120	120	High yield, high amylose, drought tolerance, short duration
5	BR11864-5R-32/BRRIdhan83	BR15488	260	228	High yield, high amylose, Kataktara type grain,
6	BR26/ BR11864-5R-12	BR15489	150	144	Drought tolerance, short duration
Total			879	837	

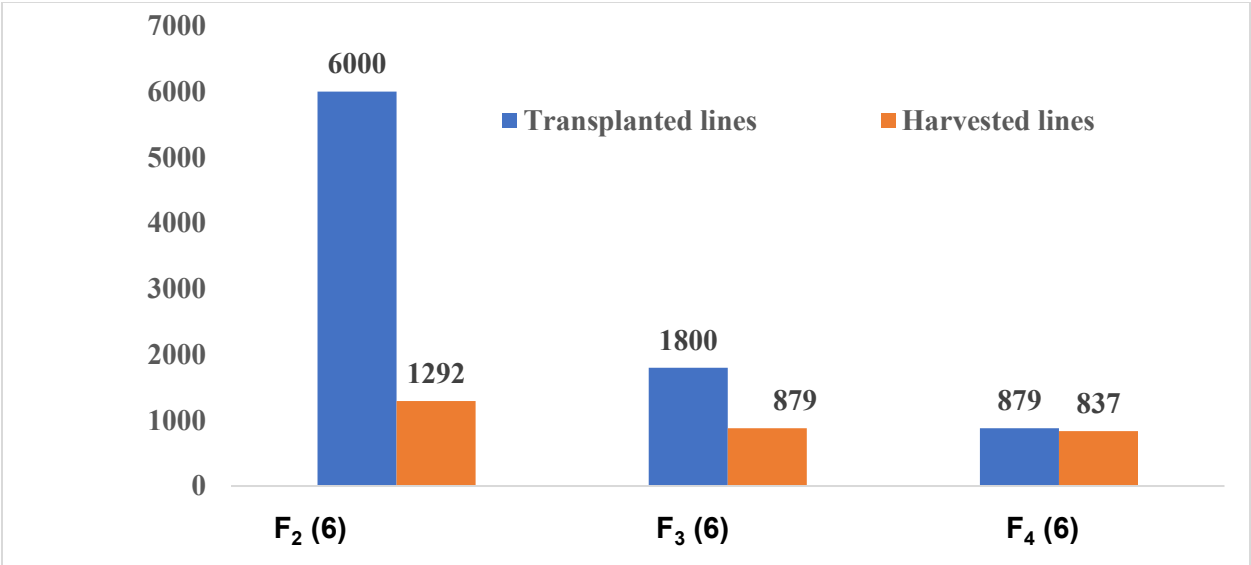


Fig. 1.1: Total number of RGA Population, Upland Rice, (B. Aus), 2024-25

Experiment 1.4: Line Stage Trial (LST), Development of Upland Rice (B. Aus), 2024-25

Principal Investigator : M A Rahman.

Co-investigators: Nusrat Jahan, Armin Akter Setu and Ribed Farzana Disha.

Specific objectives: To assess FRGA/RGA derived advanced breeding lines for uniformity at heading, other desirable agronomic traits and grain type.

Materials and Methods: A total of 1,161 progenies from 14 crosses advanced breeding lines in B. Aus season, were grown at BRRI, Gazipur. Thirty-five days old seedlings were transplanted in a 5.4 m × 1 rows plot with a spacing of 20 cm× 20 cm. Single seedling was transplanted. Fertilizer doses and time of application were the same as in Experiment no.1.1. Hand weeding was done in time. The experiment was conducted at BRRI, Gazipur.

Results: During B. Aus 2024-25 season 1161 lines from 14 crosses were transplanted in LST trial in BRRI, Gazipur. Among all genotypes 245 genotypes were selected for further breeding program based on their uniformity, phenotypic acceptability.

Table 1.4: List of LST genotypes, Development of Upland Rice (B. Aus), 2024-25

Sl No.	BR No.	Cross combination	Transplanted Lines	Selected lines
1	BR14439	BR10757-2B-9-23/ BRRI dhan65	56	22
2	BR14440	BR10757-2B-9-23/Dharial	65	13
3	BR14441	BR10757-2B-9-23/ Kataktara	107	30
4	BR14442	BR10757-2B-9-23/ Panbira	67	11
5	BR14443	BR10757-2B-9-26/Hashikalmi	41	3
6	BR14444	BR10757-2B-9-26/LalDular	62	2
7	BR14445	BR10757-2B-9-42/BRRI dhan65	106	32
8	BR14446	BR10757-2B-9-42/BRRI dhan83	85	15
9	BR14447	Mongthongno/BRRI dhan82	150	44
10	BR14448	Kopro/BRRI dhan62	77	3
11	BR14449	Kopro/BRRI dhan82	87	44
12	BR14450	Bekui/ BRRI dhan82	144	24
13	BR14451	Company/ BRRI dhan82	66	2
14	BR14452	Galong/BRRI dhan83	48	-
Total			1,161	245

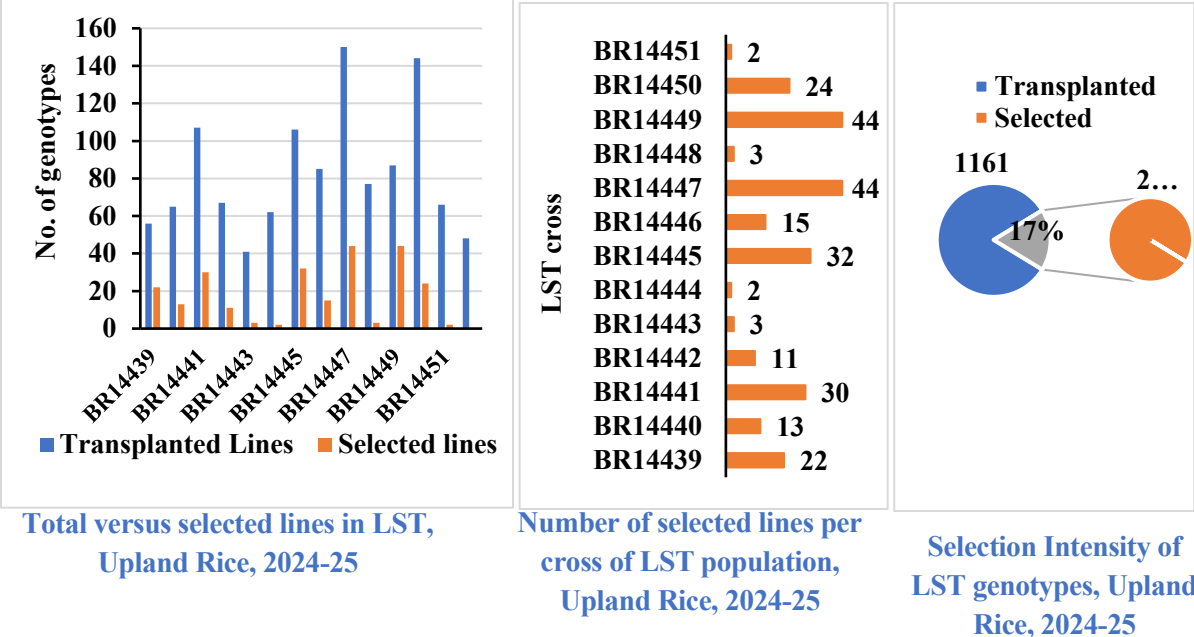


Fig.2: Summary Report for LST genotypes, Upland, 2024-25

Experiment 1.5: Observational Yield Trial (OYT), Development of Upland Rice (B. Aus), 2024-25

Specific objectives: To select lines homogeneous for morpho-agronomic characters having early seedling emergence, good seedling vigor, uniformity in heading, short growth duration and tolerance to lodging at upland field condition.

Materials and Methods: Three hundred one genotypes were seeded directly in augmented RCB design having plot size of 5.0 m × 4 rows with spacing of 25 cm between the rows with sufficient moisture in the field. Fertilizer application was done as in experiment 1.5. BRRI dhan65, BRRI dhan83 and Hasikalmi will be used as standard check after every 10th entry.

Data to be collected: Date of seeding, flowering and maturity; % emergence score, stand count at 30 days after seedling emergence; phenotypic acceptance at maturity stage; plant height, panicle/m², filled grains/panicle, sterility (%) and yield (t/ha).

Principal Investigator: M A Rahman.

Co-investigator: Nusrat Jahan, Armin Akter Setu and Ribed Farzana Disha.

Results: Most of the entries were damaged due to stemborer. Among these entries only nineteen genotypes were selected considering growth duration, yield, uniformity of morpho agronomic traits and superiority in one or more traits over the standard checks. The yield ranged from 0.51 t/ha to 4.95 t/ha and the growth duration ranged from 77 days to 116 days (Table 1.5). Performance of OYT entries shown in Fig. 1.3.

Table 1.5: List of the selected genotypes for selected OYT, Development of Upland Rice (B. Aus), 2024-25

Genotype	Designation	PH (cm)	GD (days)	Yield (t/ha)
124	BR13862-4R-23	123	107	4.28
159	BR13864-4R-1	118	108	3.61
164	BR13864-4R-11	120	106	3.60
166	BR13864-4R-14	111	111	3.50
183	BR13865-4R-43	111	104	3.30
185	BR13865-4R-57	111	103	3.59
197	BR13866-4R-23	103	108	3.68
210	BR13866-4R-64	102	114	3.67
215	BR13867-4R-38	108	103	3.34
218	BR13867-4R-49	112	108	3.05
241	BR13869-4R-12	113	109	3.80
265	BR13870-4R-14	105	107	3.37
274	BR13870-4R-27	115	108	4.85
281	BR13870-4R-75	103	106	3.57
283	BR13870-4R-78	108	114	3.69

Genotype	Designation	PH (cm)	GD (days)	Yield (t/ha)
287	BR13870-4R-98	111	106	4.95
295	BR13871-4R-24	109	107	3.76
296	BR13871-4R-25	96	99	3.50
297	BR13871-4R-28	103	105	3.04
302	BRRI dhan65	94	93	2.78
303	BRRI dhan83	110	94	4.40
304	Hasi kamli	116	96	1.16

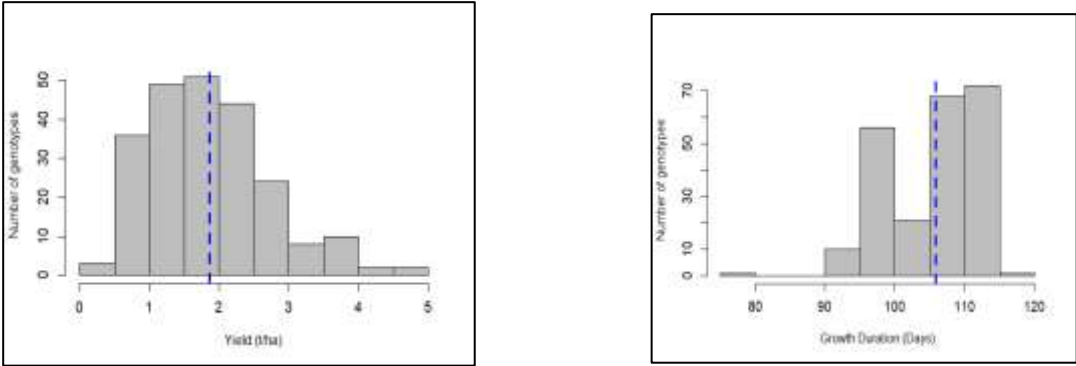


Fig. 1.3: Performance of entries for OYT, Development of Upland Rice (B. Aus), 2024-25

Experiment 1.6: Preliminary Yield Trial (PYT), Development of Upland Rice (B. Aus), 2024-25

Specific objectives: Initial evaluation of yield and other agronomic characteristics of selected materials in replicated trial.

Materials and Methods: Thirty-four genotypes were evaluated in PYT against the check varieties BRRI dhan43, BRRI dhan65, BRRI dhan83 and local check Hasikalmi. The trials will be seeded directly following randomized complete block design (RCBD) with three replications with unit plot size of 5.0 m × 10 rows and spacing of 25 cm between the rows with sufficient moisture in the field. Fertilizers @ 60:20:40:100:10 kg NPKS/ha will be used with split application of N at 15, 30, 50 days after seeding (DAT). Total amount of P K S will be applied at the time of final land preparation.

Data collection: Data were collected on plant height, days to flowering, days to maturity, PAcp, tiller per plant, panicle per plant, spikelet sterility (%), 1000 seed weight and yield per plot.

Principal investigator: M A Rahman.

Co-investigator: Nusrat Jahan, Armin Akter Setu and Ribed Farzana Disha.

Results: Fifteen entries were selected out of 34 genotypes considering growth duration, yield, uniformity of morpho-agronomic traits and superiority in one or more traits over the standard checks (Table 1.6). The grain ranged from 1.0 t/ha to 4.7 t/ha and the growth duration ranged from 93 days to 111 days (Table 1.6).

Table 1.6: Performance of the selected genotypes under PYT, Development of Upland Rice (B. Aus), 2024-25

SL	Designation	PH (cm)	GD (days)	Yield (t/ha)
2	BR11820-5R-8	102	111	4.2
4	BR11820-5R-43	98	99	3.9
5	BR11820-5R-52	125	106	3.5
9	BR11820-5R-208	124	103	3.6
10	BR13293-5R-41	106	104	4.7
11	BR13294-5R-111	96	99	3.4
12	BR13295-5R-65	97	101	3.5
13	BR13295-5R-90	99	100	4.5
14	BR13295-5R-140	104	99	4.4
16	BR13295-5R-208	127	103	3.6
21	BR13298-5R-11	97	96	3.0

SL	Designation	PH (cm)	GD (days)	Yield (t/ha)
23	BR13298-5R-41	115	111	3.9
27	BR13299-5R-183	97	101	4.6
31	BR13300-5R-70	119	105	3.0
33	BR13302-5R-8	109	102	3.7
34	BR13302-5R-36	104	99	4.0
35	BRRI dhan43	112	102	3.8
36	BRRI dhan65	95	93	2.0
37	BRRI dhan83	126	104	3.7
38	Hashikalmi	125	96	1.8
	LSD< 0.05	2.16	3.14	1.23
	H2b	0.43	0.92	0.66

Experiment 1.7: Advanced Yield Trial (AYT), Development of Upland Rice (B. Aus), 2024-25

Specific objective: Confirmatory evaluation of selected materials for yield and other agronomic traits in replicated trial.

Materials and Methods: Sixteen genotypes were tested along with four checks as same as PYT experiment 1.6. The trial will be carried out using RCBD with three replications. The unit plot size will be 5.0 m × 10 rows. Forty days old seedlings were transplanted @ 2-3 seedlings with 20 × 15 cm spacing. Fertilizers @ 60:20:40:100:10 kg N:P:K:S/ha (130: 100: 80 kg Urea-TSP-MoP/ha) will be used with split application of N at 15, 30, 50 days after transplanting (DAT). Total amount of P K S was applied at the time of final land preparation. Data were collected on plant height, days to flowering, days to maturity, PAcp, tiller per plant, panicle per plant, spikelet sterility (%), 1000 grain weight and yield per plot. List of materials for AYT are shown in Table 1.7.

Principal investigator: M A Rahman.

Co-investigator: Nusrat Jahan, Armin Akter Setu and Ribed Farzana Disha.

Results: Eight genotypes such as BR12859-5R-31, BR12860-5R-79, BR12862-5R-3, BR12867-5R-125, BR12873-5R-60, BR12880-5R-266, BR12880-5R-291 and BR12880-5R-308 were selected on the basis of yield and growth duration (earliness) for further trial (Table 1.7).

Table 1.7: Performance of the selected genotypes for AYT, Development of Upland Rice (Aus), 2024-25

SL	Genotypes	Plant Height cm)	Growth duration (days)	Yield (t/ha)
4	BR12859-5R-31	101	93	4.8
5	BR12860-5R-79	101	93	4.7
6	BR12862-5R-3	96	93	4.8
7	BR12867-5R-125	109	93	4.2
8	BR12873-5R-60	107	93	4.7
14	BR12880-5R-266	99	94	4.7
15	BR12880-5R-291	111	93	3.6
16	BR12880-5R-308	95	93	5.0
17	BRRI dhan43	100	101	4.5
18	BRRI dhan65	84	93	2.7
19	BRRI dhan83	112	102	4.8
20	Hashikalmi	111	92	1.7
	LSD< 0.05	7.9	0.83	0.63
	H2b	0.38	0.96	0.86

Experiment 1.8: Regional Yield Trial (RYT), Development of Upland Rice (B. Aus), 2024-25

Principal Investigator: M. A. Rahman.

Co-investigators: Nusrat Jahan, Armin Akter Setu and Ribed Farzana Disha.

Specific objective: To assess specific and general adaptability for selecting the suitable genotypes on station conditions.

Materials and methods: Eleven genotypes were tested along with one checks BRRI dhan83. The trial will be carried out using RCBD with three replications. The unit plot size will be 5.0 m × 10 rows. Forty days old seedlings were transplanted @ 2-3 seedlings with 20 × 15 cm spacing. Fertilizers @ 60:20:40:100:10 kg N:P:K:S/ha (130: 100: 80 kg Urea-TSP-MoP/ha) will be used with split application of N at 15, 30, 50 days after transplanting (DAT). Total amount of P K S was applied at the time of final land preparation. Data were collected on plant height, days to flowering, days to maturity, PAcp, tiller per plant, panicle per plant, spikelet sterility (%), 1000 grain weight and yield per plot. List of materials for RYT are shown in Table 1.8.

Results: Among all entries BR12248-5R-22, BR12248-5R-37, BR10756-2B-8-72 and BR12860-5R-79 were selected for further breeding prograam based on their yield quality (4.25, 4.45, 4.47 and 3.8 t/ha respectively) (Table 1.8.) which was higher than check variety BRRI dhan83(3.95 t/ha) and their growth duration 97 to 102 days which was similar to check varieties (Table 1.8).

Table 1.8: Performance of genotypes for RYT, Development of Upland Rice (Aus), 2024-25

SL	Genotype	PH (cm)	GD (days)	Cum	Gaz	Jhenida h	raj	Ran	Shibch or	BLU E	pBLU P	Amylose (%)
1	BR12236-5R-6	101	97	3.5	3.9	2.1	1.2	4.1	5	3.89	3.91	24.1
2	BR12248-5R-22	103	97	3.7	3.9	3.5	0.9	4.9	4.7	4.25	4.35	24.1
3	BR12248-5R-37	104	102	4.6	4.6	3.3	0.9	4.5	4.5	4.45	4.36	25.9
4	BR12248-5R-122	99	100	5.1	3.8	3.2	1.1	3.5	4.5	4.21	4.01	26.4
5	BR12263-5R-75	115	100	3.6	3.3	4	1.2	3.8	3.2	3.73	3.56	24.7
6	BR10756-2B-8-72	105	101	3.2	4.7	4.3	1.4	4.6	4.3	4.47	4.26	24.2
7	BR12857-5R-55	109	97	3	2.2	4.5	0.7	5.1	3.6	3.85	3.67	25.2
8	BR12859-5R-31	108	100	4.6	3.9	3.4	0.6	4.5	4.6	4.4	4.19	23.2
9	BR12860-5R-79	114	101	3.7	4.2	3.5	1	2.5	4.2	3.8	3.62	23.1
10	BR12862-5R-3	110	101	5.2	4.1	4.1	1.4	3	4.2	4.33	4.13	24.7
11	BR12867-5R-125	108	99	3.8	3.4	3.5	3.3	2.9	1.8	3.24	3.08	23.8
12	BRRI dhan83	107	101	3	4.3	4.7	1.1	3.4	3.4	3.95	3.76	25.9
	H2b	0.68	0.7	0.53	0.55	0.5	0.41	0.77	0.49	0.6	0.78	
	LSD<0.05	3.9	1.8	0.76	0.75	0.85	0.91	0.5	0.61	0.7	0.64	

PROJECT 1A: DEVELOPMENT OF JHUM RICE FOR HILLY AREAS

General Objectives: Development of high yielding rice variety with low (10-19%) to high (>25%) grain amylose content and drought tolerance along with good eating quality suitable for Jhum cultivation and acceptable to the tribals of Chattogram hill districts.

Project Leader: Md. Akhlasur Rahman

Experiment 1A.1: Hybridization

Principal Investigator: Md. Akhlasur Rahman.

Co-investigator: Nusrat Jahan, Armin Akter Setu and Ribed Farzana Disha Nusrat Jahan.

Specific Objectives: To incorporate genes for drought tolerance along with good eating quality suitable for Jhum cultivation into high yielding genetic background.

Materials and Methods: The parent materials were grown in three different sets at 7 days interval to synchronize flowering at BRRI, Gazipur. Seeding was done starting from 15th July and three weeks old seedlings were transplanted per set in the hybridization block. Fertilizers at the rate of 60 (130 kg Urea): 10 (50 kg TSP): 40 (80 kg MP): 18 (100 kg Gypsum): 3.6 (10 kg Zn SO4) kg NPKSZn/ha were applied in the trial. All amounts of P, K, S and Zn were applied at the time of final land preparation and N was applied at three equal splits at 10, 25-30 and 40-45 days after transplanting (DAT). Crop management such as weeding, irrigation etc. was done on time. Insects, diseases and other pests were controlled properly.

Results: Thirty crosses were made using twenty-four parents (Table 1A.2).

Table 1A.1: List of parents for hybridization, Development of Jhum Rice (B. Aus), 2024-25

SI No	Designation	SI No	Designation
1	BR12239-4R-20	13	Chibing shee
2	BR13106-4R-489	14	BR12239-5R-201
3	BR12239-5R-25	15	BR12236-5R-8
4	Shahbagi dhan	16	BR13113-4R-63

SI No	Designation	SI No	Designation
5	BRRRI dhan83	17	Renguin
6	N22	18	BRRRI dhan66
7	BR13106-4R-438	19	Fatema dhan
8	Hasikalmi	20	Vandana
9	BRRRI dhan71	21	BR13122-4R-4
10	GSRIRI-DQ-121-Y6-D2	22	BRRRI dhan104
11	IR83140-B-11-B	23	BR(Bio) 1396-24-1-3
12	Luyin-46	24	BR12239-5R-3

Table 1A.2: List of Crosses made, Development of Jhum Rice (B. Aus), 2024-25

Sl.	Cross combination	No. of F ₁ seeds
1	BR12239-4R-20/BR13106-4R-489	8
2	BR12239-5R-25/Shahbagi dhan	15
3	BRRRI dhan83/N22	14
4	BR13106-4R-438/Hasikalmi	24
5	BRRRI dhan83/BRRRI dhan71	7
6	GSRiri-DQ121-Y6-D2/IR83140-B-11-B	5
7	Luyin-46/Chibing shee	45
8	BR12239-5R-201/BR12236-5R-8	16
9	BR13113-4R-63/Renguin	26
10	BR12239-5R-201/Luyin-46	111
11	Renguin/BRRRI dhan66	17
12	Shahbagi dhan/BR13113-4R-63	12
13	Renguin/Luyin-46	4
14	GSRIRI-DQ-121-Y6-D2/N22	32
15	BRRRI dhan71/Shahbagi dhan	6
16	BRRRI dhan71/Fatema dhan	5
17	BRRRI dhan71/Vandana	24
18	BRRRI dhan66/Shahbagi dhan	33
19	BR13122-4R-4/BRRRI dhan83	63
20	BR12239-5R-201/BRRRI dhan83	23
21	BR13122-4R-4/BRRRI dhan104	76
22	Vandana/BRRRI dhan71	15
23	BR12236-5R-8/Shahbagi dhan	31
24	BRRRI dhan71/Renguin	39
25	BRRRI dhan66/Renguin	21
26	IR83140-B-11-B/BR(Bio) 1396-24-1-3	5
27	BR12239-5R-3/Chibing shee	5
28	Shahbagi dhan/BRRRI dhan66	25
29	Fatema dhan/GSRIRI-DQ121-46-D2	17
30	BR12239-5R-3/Renguin	13

Experiment 1A.2: F₁ Confirmation

Principal Investigator: Md. Akhlasur Rahman

Co-investigator: Nusrat Jahan, Armin Akter Setu and Ribed Farzana Disha.

Specific Objectives: Confirmation of crosses as true F₁.

Materials and Methods: The F₁ seeds along with their respective parents were germinated in the petri-dish and were seeded in earthen pots at BRRRI, Gazipur. Twenty-one-day-old seedlings were transplanted at the rate of single seedling in a spacing of 20 cm × 15 cm in the net house along with respective parents. Fertilizer application and crop management procedure were followed as experiment 1.1.

Results: Six crosses were confirmed (Table 1A.2) by careful observation of plant characters. After confirmation, the F₂ seeds were collected and preserved. These confirmed F₁’s were registered in BRRRI cross list with BR number.

Table 1A.2: List of F₁ confirmation, Development of Jhum Rice (B. Aus), 2024-25

Sl	Cross Combination (Elite/Elite lines)	BR No	Program
1	BR13125-4R-92/Kalo binni	BR16844	Jhum Rice
2	BR13111-4R-69/Gallong pure	BR16845	Jhum Rice
3	Luyin-46/BR24	BR16846	Jhum Rice
4	BR13115-4R-116/China70	BR16839	Jhum Rice

5	BR12248-4R-18/China70	BR16840	Jhum Rice
6	Luyin-46/BR12239-4R-201	BR16847	Jhum Rice

Experiment 1A.3: Growing of F₂ population

Principal Investigator: Md. Akhlasur Rahman

Co-investigator: Nusrat Jahan, Armin Akter Setu and Ribed Farzana Disha

Specific Objective: Growing of F₂ population from F₁ progenies.

Materials and Methods: Previously confirmed F₁ plants from each cross was grown in Field RGA (Rapid generation Advance) nursery at BRRI, Gazipur. Thirty days old seedlings were transplanted at a spacing of 5 cm x 5 cm. Fertilizer management was done using the half doses of all fertilizers used in Experiment 1.1. Weeding was done during the period of early seedling to maximum tillering stages. Table 1A.3a shows the list of F₂ population. Table 1A.3b and Table 1A.3c allocate the lists of F₃ -FRGA and F₄ -FRGA for Jhum rice respectively.

Results: Eleven F₂ populations were advanced to F₃ and seven F₃ populations were advanced to F₄ and seven F₄ populations were advanced to F₅. Populations were seeded directly in 5.0 m long apart from 25 cm with 25-30 lines for each cross (Table 1A.3a, 1A.3b and 1A.3c). Fertilizer doses were same as in experiment 1.1. Weeding was done in two/three times during the period of early seedling to maximum tillering stage.

Table 1A.3a: List of F₂ -FRGA, Development of Jhum Rice (B. Aus), 2024-25

SL No.	BR No	Designation	TP	HP
1	BR16828	Patri Dhan/Abhaya	1000	192
2	BR16829	GSR-IR1-DQ130-Y5-Y1/BR12239-5R-197	1000	228
3	BR16830	BR10756-28-8-72/BRRI dhan55	1000	184
4	BR16831	Mojenshi/DR-6	1000	236
5	BR16832	Ranqui/BR12448-5R-18	1000	188
6	BR16833	Mojenshi/DR-6	1000	220
7	BR16834	Mojenshi/Patri dhan	1000	240
8	BR16835	Sumodhan/BR24	1000	172
9	BR16836	BR10418-54-4-96/Chikon chakma	1000	165
10	BR16837	Gunda-1/Abhaya	1000	241
11	BR16838	BR12239-5R-93/GSR IR1-DQ130-Y5-Y1	1000	222
Total			11000	2288

Table 1A.3b: List of materials for F₃ -FRGA, Development of Jhum Rice (B. Aus), 2024-25

Sl.	BR No.	Cross combination	TP	HP	Traits
1	BR15490	BR26/ Binni (Red) (9)	280	220	High yield, intermediate amylose, good grain quality, acceptable to ethnic population
2	BR15491	Chubu 125/ BR10411-59-5-33	280	480	
3	BR15492	BR10411-59-5-5/ Monqui	280	160	
4	BR15493	Japanese black rice/ BR11864-5R-32	280	130	
5	BR15494	Japanese black rice/Gunda-1	280	165	
6	BR15495	Japanese black rice/Gunda-2	280	150	
7	BR15496	Japanese black rice/Monqui	280	180	
Total			1680	1485	

Table 1A.3c: List of materials for F₄ -FRGA, Development of Jhum Rice (B. Aus), 2024-25

Sl.	BR No.	Cross combination	TP	HP	Traits
1	BR15490	BR26/ Binni (Red) (9)	220	220	High yield, intermediate amylose, good grain quality, acceptable to ethnic population
2	BR15491	Chubu 125/ BR10411-59-5-33	480	465	
3	BR15492	BR10411-59-5-5/ Monqui	160	155	
4	BR15493	Japanese black rice/ BR11864-5R-32	130	148	
5	BR15494	Japanese black rice/Gunda-1	165	152	
6	BR15495	Japanese black rice/Gunda-2	150	144	
7	BR15496	Japanese black rice/Monqui	180	165	
Total			1485	1449	

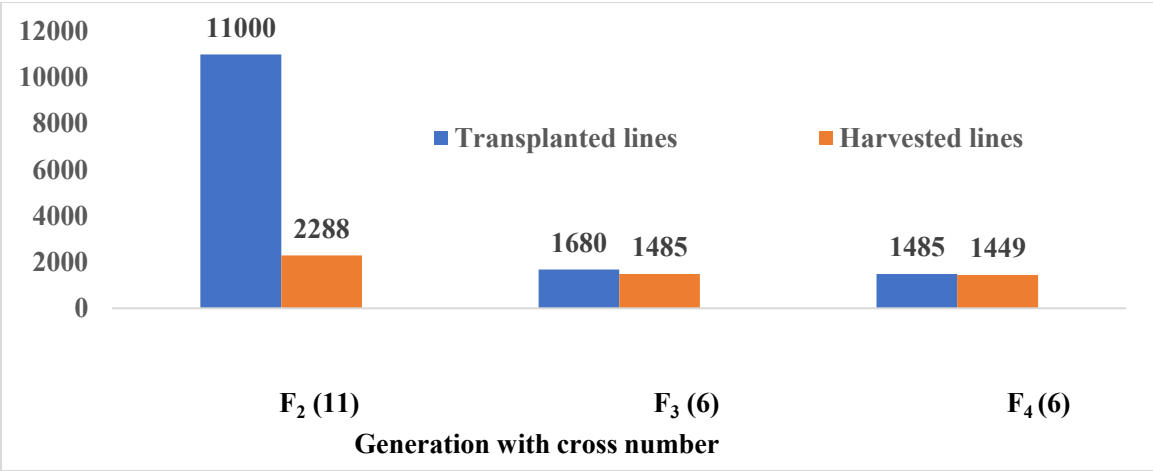


Fig. 1: Total number of RGA Population Development of Jhum Rice (B. Aus), 2024-25

Experiment 1A.4: Advanced Yield Trial (AYT-1), Development of Jhum Rice development, 2024-25

Specific objective: Confirmatory evaluation of selected materials for yield and other agronomic traits in replicated trial.

Materials and Methods: Twelve genotypes were evaluated in AYT-1 and BRRI dhan43, BRRI dhan65, BRRI dhan69 and BRRI dhan83 will be used as check varieties. The unit plot size will be 5.0 m × 10 rows. Forty days old seedlings were transplanted @ 2-3 seedlings with 20 × 15 cm spacing. Fertilizers @ 60:20:40:100:10 kg N:P:K:S/ha (130: 100: 80 kg Urea-TSP-MoP/ha) were used with split application of N at 15, 30, 50 days after transplanting (DAT). Total amount of P K S was applied at the time of final land preparation. Data were collected on plant height, days to flowering, days to maturity, PAcp, tiller per plant, panicle per plant, spikelet sterility (%), 1000 grain weight and yield per plot.

Principal investigator: M A Rahman

Co-investigator: Nusrat Jahan, Armin Akter Setu and Ribed Farzana Disha Nusrat Jahan

Results: All entries were partially damaged due to stem borer. So, no entries were selected from this experiment.

Table 1A.4: List of genotypes for AYT-1, Development of Jhum Rice development, 2024-25

SL	Genotypes	Plant Height (cm)	Growth duration (days)	Yield (t/ha)
1	BR10062-9-1-3	120	105	1.8
2	IR18R1066	116	103	3.5
3	IR18R1137	112	106	2.2
4	IR18R1145	105	103	1.8
5	IR83140-B-11-B	113	100	1.7
6	GSR IR 1-DQ121-Y6-D2	111	102	2.8
7	IR83140-B-11-B	114	100	2
8	BR(Bio)10376-AC4-1-3	97	101	1.8
9	BR12236-5R-8	122	98	1.6
10	BR12239-5R-5	116	101	1.3
11	BR12239-5R-25	121	105	0.5
12	BR12239-5R-201	113	105	2.8
13	BRRI dhan43	115	102	2.4
14	BRRI dhan65	100	100	2.1
15	BRRI dhan69	101	102	1.7
16	BRRI dhan83	119	103	3.2
LSD< 0.05		1.61	1.43	0.49
H2b		0.94	0.89	0.62

Experiment 1A.5: Advanced Yield Trial (AYT-2) of Jhum rice in Chattogram hill districts, 2024-25

Specific Objective: Advanced evaluation of promising entries in replicated trial under targeted hill condition of Chattogram hill districts.

Materials and Methods: Eight genotypes were grown in two replicated trials under targeted hill condition of three Chattogram hill districts. The method of planting was dibbling as practiced by tribal Jhum farmers. The experiment was laid out in randomized complete block (RCB) design. Unit plot size was 20m² (5m × 4m). The crop was fertilized by Urea, TSP, MoP, Gypsum and Zinc sulfate @ 20, 8, 12, 8 and 1 kg/bigha, respectively. All the fertilizers and one third of urea were applied at the time of planting in the dibbled hole. The remaining two thirds of urea were top dressed in two equal splits at different stages of crop growth.

Principal investigator: Md. Akhlasur Rahman

Co-Investigator: Nusrat Jahan, Armin Akter Setu and Ribed Farzana Disha.

Results: Three BRRI released varieties BRRI dhan66, BRRI dhan71 and BRRI dhan83 performed best among all materials evaluated. Fig. 2 shows the performance of selected breeding lines.

Table 1A.5: List of genotypes for AYT-2, Development of Jhum Rice development, 2024-25

SL	Genotype	PH (cm)	GD (days)	L1	L2	L3	L4	L5	L6	Yield (t/ha)
1	BR12239-5R-93	109	141	2.4	1.9	2	1.6	1.2	1.4	1.8
2	Luyin-46	117	89	2.9	2.7	2.2	1.7	3.4	3.2	2.7
3	BRRI dhan66	121	112	3.4	3.9	3.2	3	3.3	4.2	3.5
4	BRRI dhan71	110	111	3.4	4.1	2.5	3.3	3.3	4.1	3.5
5	BRRI dhan83	104	105	2.9	3.3	2.7	2.8	2.8	3.7	3.0
6	Local check	113	103	2.4	1.5	0.9	1.5	2.1	2.4	1.8
7	Chibingshee	108	106	2.2	3.4	2.4	1.8	2.8	2.6	2.6
8	Gallong	112	93	2.5	3.5	2	1.7	2.1	3.2	2.5
	LSD<0.05	2.32	2.9	0.21	0.32	0.22	0.33	0.45	0.44	0.19
	H2b	0.91	0.78	0.88	0.94	0.84	0.9	0.82	0.89	0.92

* PH=Plant Height(cm); GD= Growth duration (days); L1=Matiranga, Khagrachori; L2=Sadar, Khagrachori; L3= Sadar, Khagrachori; L4=Sadar, Rangamati; L5=Rowangchori, Bandarban; L6= Rowangchori, Bandarban



Fig. 1.2 Performance of BRRI dhan66, BRRI dhan71 and BRRI dhan83 at hill district

PROJECT 2: DEVELOPMENT OF PARTIALLY IRRIGATED RICE (T. Aus), 2024-2025

General Objectives: To develop short duration high yield potential genotypes having tolerance to lodging, high temperature at reproductive phase and pre-harvest sprouting tolerance including good grain quality.

Project Leader: M Khatun

Experiment 2.1: Hybridization

Principal Investigator: M Khatun

Co-Investigator: S K Debsharma, A Rahman

Specific Objectives: Introgression of earliness, pre-harvest sprouting tolerance, and quality grain traits into high yielding genotypes genetic background.

Materials and Methods: The crossing program for development of T. Aus was started from 01 July in T. Aman and 15 November in Boro for good seed setting. The experiment was conducted in BRRI Headquarters, Gazipur. Seeding was done in the hybridization block at three dates with an interval of 7 days to synchronize flowering times between male and female parents. Twenty-five-days old seedlings for T. Aman & thirty-five-days old seedlings for Boro season were transplanted in a 5.4 m × 2 rows plot with a spacing of 25 × 20 cm. Single seedling was used for transplanting. Fertilizers @108 (234 kg Urea): 17.4 (87 kg TSP): 58.5 (117 kg MP): 14 (78 kg Gypsum): 4.3 (12 kg ZnSO₄) kg NPKSZn/ha in T. Aman and @ 120 (261 kg Urea): 19 (95 kg TSP): 60 (120 kg MP): 20 (111 kg Gypsum): 4 (11 kg ZnSO₄) kg/ha NPKSZn were applied in Boro season. All amounts of P, K, S and Zn were applied at the time of final land preparation and nitrogen was applied at three equal splits at 10, 25-30 and 40-45 days after transplanting (DAT). Crop management such as weeding, irrigation etc. was done in time. Insects, diseases and other pests were controlled properly.

Results: Twenty-three crosses were made using 43 parents for development of partially irrigated rice (T. Aus) from 2024-25 season and 1353 F₁ seeds were collected (Table 2.1).

Table 2.1. List of the crosses, Development of Partially Irrigated Rice (T. Aus), 2024-25

SN	Parentage	No. of F ₁ seed	Introgression of target genes
1	BR9138-4-4-5-5-P3-HR3-HR5*2/BR13164-4R-27	05	Earliness, fine grain
2	BRRI dhan102*2/BR11607-4R-184	20	Earliness, BB res
3	BRRI dhan98*2/N22	30	Earliness, Heat tolerance
4	BRRI dhan28-EMF-4/Khato Babu	39	Earliness, fine grain
5	EMF-1/Rod minikit	13	Earliness, EMF, Fine grain
6	BR13157-4R-265/BRRI dhan28-EMF-4	39	Earliness, EMF
7	BR13169-4R-229/EMF-3	64	Earliness, EMF
8	BR13157-4R-265/BR13162-4R-232	10	Earliness, BB res
9	GSR IR1-DQ140-R2-Y1/BR13169-4R-229	26	Earliness, aromatic and fine grain
10	BR12096-4R-124/BR12895-4R-231	56	Earliness, BB resistance
11	BR12424-5R-46/BRRI dhan28-EMF-4	135	Lodging tolerance, EMF
12	BR12098-4R-127/BR12606-4R-327	38	Lodging tolerance, BB res
13	BR12895-4R-231/BR13157-4R-265	190	Lodging tolerance
14	BRRI dhan98/BR13169-4R-229	39	Earliness
15	BRRI dhan98/BRRI dhan106	45	Heat tolerance
16	BRRI dhan98/BR11869-5R-47	52	Heat tolerance
17	BR11867-5R-442/BRRI dhan98	94	Earliness, BB res
18	BRRI dhan98/BR11601-14-4-1	184	Earliness, aroma
19	BR12098-4R-71/BR9829-78-1-3-2	56	Earliness, BB res
20	BR9829-78-1-3-2/BRRI dhan108	76	Earliness, Fine grain
21	BR9829-78-1-3-2/BR13162-4R-232	69	Earliness, tungro resistance
22	BR13169-4R-229/BR12606-4R-327	40	Earliness, BB res
23	BR11867-5R-442/ BRRI dhan98	83	Earliness, BB res
24	BR12098-4R-71/ BR9829-78-1-3-2	41	Earliness, BB res
25	BR9829-78-1-3-2/BRRI dhan108	75	Earliness, zira type grain
26	BR9829-78-1-3-2/ BR13162-4R-232	110	Earliness, tungro resistance
27	BR13169-4R-229/ BR12606-4R-327	51	Earliness, tungro resistance
28	BR12442-4R-49/ BR13164-4R-27	155	Earliness, BB res
29	BR11867-5R-119/ BR12096-4R-103	169	Earliness, BB res
30	BR11110-3R-61/ BR13157-4R-265	369	Earliness, BB res
Total		1353	

Experiment 2.2: Confirmation of F1

Principal Investigator: M Khatun.

Co-Investigator: S K Debsharma, A Rahman and N Tamanna.

Specific Objective: Confirmation of F1s as true crosses and selection of promising ones.

Materials and Methods: Around 40 crosses were grown (Table 2.2). F1 seeds of each cross and their respective parents were germinated in petri dishes and then sown in earthen pots. Twenty-five-day-old seedlings were transplanted with single seedling per hill at a spacing of 25 × 15 cm in the net house. Respective parental seedlings were transplanted on both sides of each F1 population. The cross confirmation was done by careful observation of plant characters. After confirmation promising F1s were selected and used for double and multiple crosses. Complex crosses were mainly done for the F1s which use local cultivars or low yielding genotypes with valuable traits. The F2 and multiple F1 crosses were preserved carefully after drying properly in a cool place. Crop management was done as described in experiment 2.1.

Results: All F1s were confirmed successfully during T. Aus 2024-25.

Table 2.2. F1 confirmation, T. Aus 2024-25

SN	BR No.	Cross combination	Trait/Genes of interest
1	BR16552	BRR1 dhan104*2/BR13169-4R-229	<i>Fgr, Xa21</i>
2	BR16554	BR11866-5R-277*2/BR12424-5R-46	<i>Xa21</i>
3	BR16555	BR11866-5R-73*2/BR12424-5R-46	<i>Xa21</i>
4	BR16557	BR13169-4R-229*2/EMF-1	<i>Xa21</i>
5	BR16558	BRR1 dhan98*2/EMF-1	<i>EMF3</i>
6	BR16559	BRR1 dhan98*2/EMF-3	<i>EMF3</i>
7	BR16560	BRR1 dhan106*2/EMF-4	<i>EMF3,qHTSF4.1</i>
8	BR16564	BR13180-4R-202/BR13162-4R-232	<i>TSV1,Pita</i>
9	BR16565	BR12087-5R-196/BR13174-4R-396	<i>Xa21,qHTSF4.1</i>
10	BR16566	BR12438-5R-233/BR13157-4R-173	<i>Xa21,qHTSF4.1</i>
11	BR16568	BR13157-4R-173/BR13169-4R-324	<i>Xa21</i>
12	BR16569	BR13169-4R-324/BR13159-4R-96	<i>Xa21</i>
13	BR16570	BRR1 dhan98/BRR1 dhan28-EMF-6	<i>EMF3</i>
15	BR16571	BRR1 dhan108 /BR11601-14-4-1	<i>Fine grain, fgr</i>
16	BR16575	BRR1 dhan104/Rod minikit	<i>qHTSF4.1</i>
17	BR16576	BRR1 dhan98/N22	<i>qHTSF4.1</i>

Experiment 2.3: Field RGA nursery (F2-F4 generation)

Principal Investigator: M Khatun

Co-Investigator: S K Debsharma, A Rahman and N Tamanna

Specific Objectives: To maintain high yield potential progenies with good grain type, short growth duration, and disease and insect pest resistance under field conditions.

Materials and Methods: A total of 74,600 progenies from 143 crosses were grown (Table 2.3 & 2.4). Each progeny was grown in a 1.2 m single row plot. Three weeks old seedlings were transplanted @ single seedling with a spacing of 5 × 5 cm. Fertilizers were applied as per needed. Weeding, tiller cutting, and other cultural operations were done in time.

Results: In partially irrigated rice (T. Aus) program, a total of 74,600 progenies of 143 crosses in T. Aus season were advanced through modified RGA in greenhouse and FRGA.

Table 2.3. List of F2-3 population advanced through FRGA, T. Aus 2024-25

SN	BR No.	Designation	Imp. Features	Progenies
F2-3, Single cross, T. Aus (BB)				
1	BR15821	BR11864-5R-99/BR9138-4-4-5-5-P3-HR3-HR5	Line-augmentation(<i>Xa21,Wxa(-)</i>)	600
2	BR15011	BR9138-4-4-5-5-P3-HR3-HR5/BR12442-4R-49	(<i>xa5,Xa21,fgr,Wxa</i>)	600
3	BR15822	BR12442-4R-49/BR11603-4R-77	(<i>TSV1,Pb1,,Xa21,fgr,Wxa</i>)	600
4	BR15823	BR11603-4R-77/BR11603-4R-49	(<i>TSV1,Pita,Xa21,xa5,Wxa</i>)	600
5	BR15824	BR11603-4R-49/BR11607-4R-192	<i>Xa21,TSV1,Pita,Pb1,Pi9,Wxa</i>	600
6	BR15824	BR11603-4R-49/BR11607-4R-192	<i>Xa21,xa5,TSV1,Pita,Wxa</i>	600
7	BR15825	BR11603-4R-155/BR11607-4R-192	(<i>Xa21, TSV1,Wxa</i>)	600

SN	BR No.	Designation	Imp. Features	Progenies
8	BR15826	BRR1 dhan98/IR05N412	<i>Xa21, Pita,WxA</i>	600
9	BR15827	BRR dhan98/IR12N177	<i>Pita,WxA</i>	600
10	BR15828	BRR dhan98/IR64-EMF3	<i>Pita,WxA</i>	600
11	BR15829	BR12603-4R-170/BR12599-4R-14	<i>Pita,WxA</i>	600
12	BR15830	BR12603-4R-151/BR12113-5R-109	<i>TSV1,WxA</i>	600
13	BR15831	BR12109-4R-10/BR12087-5R-155	<i>Xa21, TSV1,Pb1,WxA</i>	600
14	BR15832	BR12087-5R-155/BR12090-5R-91	<i>Xa21, xa5, TSV1,Pb1,Pita, WxA</i>	600
15	BR15833	BR12090-5R-91/BR12087-5R-196	<i>Pb1,WxA</i>	600
16	BR15834	BR12091-4R-97/BR12088-5R-230	<i>Xa21, xa5, TSV1,Pb1,Pita, WxA</i>	600
17	BR15835	BRR1 dhan92/BR12101-5R-76	<i>TSV1,WxA</i>	600
18	BR15836	BR11723-4R-172/BR12091-4R-99	<i>Pita, TSV1,Pb1,WxA</i>	600
19	BR15837	BR11867-5R-442/BR12454-BC2-56-81-27-3-30	<i>Xa21,xa5,TSV1,Pi9,fgf,Pita, WxA</i>	600
20	BR15838	BRR1 dhan102/BR12454-BC2-71-91-6-23-26	<i>Xa21,TSV1,fgf,Pita, WxA</i>	600
21	BR15839	BRR dhan98/BR12454-BC2-75-32-31-39-7	<i>Xa21,Pita, WxA</i>	600
22	BR15840	BR11867-5R-442/Gota IRR1	<i>Xa21,Pita, fgf,WxA</i>	600
23	BR15841	BR11607-4R-72/BR12450-4R-24	<i>Xa21,xa5,xa13 Pb1,Pi9,Pita, WxA</i>	600
24	BR15842	BR12109-4R-10/BR12101-5R-76 (1,2)	<i>Xa21,xa5,xa13,Pb1,Pi9,Pita, WxA</i>	600
25	BR15843	7 FBR-376/ BRR1 dhan101	<i>Xa21,Pb1,Pita, WxA</i>	600
F2-3, Back cross				
26	BR15844	BR9138-4-4-5-5-P3-HR3-HR5*2/BR11607-4R-72	<i>Xa21,xa5,Pb1,,WxA (-)</i>	600
27	BR15845	BR11864-5R-99*2/IRRI154-Pi9	<i>Xa5,Pita,TSV1,qHTSF4.1,Pi9, WxA</i>	600
28	BR15846	BR11723-4R-12*3/IR12N177	<i>qHTSF4.1, WxA</i>	600
29	BR15847	BR12121-4R-53*3/ IR12N177	<i>qHTSF4.1,Pita, WxA</i>	600
30	BR15848	BRAC dhan2*3/BR12450-4R-24	<i>Pita, Pb1, Pi9 WxA</i>	600
31	BR15849	BR11723-4R-12*3/ BR12450-4R-24	<i>Pita, Pb1, qHTSF4.1, WxA</i>	600
32	BR15850	7 FBR-222*3/ IRR1154-Pi9	<i>Pita, Pb1,WxA</i>	600
33	BR15851	BR11723-4R-12*3/ IRBL9-W	<i>Pita, qHTSF4.1, WxA</i>	600
34	BR15852-	BR12442-4R-49*3/ IR64-EMF3	<i>Xa21,xa5,xa13,fgf,qHTSF4.1,Pita,Wx A</i>	600
Total				21600

Table 2.4. List of F3-6 population advanced through FRGA, T. Aus2024-25

SL	BR No	Parentage	Plant Number	Progenies
F3, T. Aus (BB)				
1	BR15497-R	BR11596-5R-39/ BR12087-5R-196	P#3-5	500
2	BR15498-R	BR12091-4R-99 / BR11866-5R-312	P#3,5,7	500
3	BR15499-R	BR11601-14-4-1/ BR11596-5R-39	P#1,2,5-7	500
4	BR15500-R	BR9829-30-3-2-1-4/ BR11596-5R-39	P#5,6	500
5	BR15501-R	7 FBR-189 / BR11866-5R-312	P#1,8	500
6	BR15502-R	7 FBR-190 / BR12087-5R-196	P#1,2	500
7	BR15503-R	7 FBR-376/ BR11596-5R-39	P#1,2,8	500
8	BR15504-R	7 FBR-336/ BRR1 dhan98	P#1-3.8	500
9	BR15505-R	BR11866-5R-312 / IR64-EMF	P#2-8	500
10	BR15506-R	BRR1 dhan98 / BR11601-14-4-1	P#1,2,4,7,8	500
11	BR15507-R	BRR1 dhan99 / BR11867-5R-103	P#1,3,6-8	500
12	BR15508-R	BR11723-4R-12/BRR1 dhan101	P#1,2,4,6-8	500
13	BR15509-R	BR9138-4-4-5-5-P3-HR3-HR5/BR11607-4R-72	P#1,3,6,8	500
14	BR15510-R	BR11864-5R-99 / IRR1154-Pi9	P#1,2,3, 4,6	500
15	BR15511-R	Bangabandhu dhan100 / BR8781-16-1-3-P2	P#1-7	500
16	BR15512-R	BRR1 dhan87/ BR8781-16-1-3-P2	P#1,3,4,6-8	500
17	BR15513-R	BR9006-40-2-3-1*3/ BR11607-4R-72	P#2	500
18	BR15513-R	BR9006-40-2-3-1*3/ BR11607-4R-72	P#10	500
19	BR15513-R	BR9006-40-2-3-1*3/ BR11607-4R-72	P#16	500
20	BR15514-R	BR9830-53-3-5-2*3/ BR11607-4R-72	P#1-2,4,6-9,10-12	500
21	BR15515-R	BR11723-4R-12*3/N22	P#1-5,9,10,23-25	500
22	BR15516-R	BR11867-4R-371*3/ IR64-EMF3	P#1-7,13,16,18	500
23	BR15517-R	BR9006-40-2-3-1*3/ IRR1154-Pi9	P#1-9,22,28,31,32	500
24	BR15518-R	BR8781-16-1-3-P2*3/ IRR1154-Pi9	P#4,5,21,28,41	500
25	BR15518-R	BR8781-16-1-3-P2*3/ IRR1154-Pi9	P#9,10,20,37	500
26	BR15519-R	BR11723-4R-12*3/ IR64-Pi9	P#2,10,14,16, 18-20,31,35,39	500
27	BR15521-R	7 FBR-222*3/ IRBLta2-Pi(RL)-T(RL)	P#2	400
28	BR15521-R	7 FBR-222*3/ IRBLta2-Pi(RL)-T(RL)	P#6	400
29	BR15522-R	BR11723-4R-12*2/IR12N177	P#1,2,5,7-9,11,14,20,21	500
30	BR15523-R	BR12121-4R-53*2/ IR12N177	P#1,4,5	500
31	BR15523-R	BR12121-4R-53*2/ IR12N177	P#11,13,15	500
32	BR15523-R	BR12121-4R-53*2/ IR12N177	P#18,22,23	500
33	BR15525-R	BRAC dhan2 *2/ IRR1154-Pi9	P#1-5,7-11	500
34	BR15525-R	BRAC dhan2 *2/ IRR1154-Pi9	P#6	400
35	BR15526-R	BRAC dhan2*2/BR12450-4R-24-1	P#4	400
36	BR15526-R	BRAC dhan2*2/BR12450-4R-24-1	P#5,9,12	500
37	BR15527-R	BR11723-4R-12*2/ BR12450-4R-24-1	P#1-3,5,8,9-14,16	500
38	BR15528-R	7 FBR-222*2/ IRR1154-Pi9	P#2,4,7,11,17,18,22, 26,27,30-32,34,35	500
39	BR15528-R	7 FBR-222*2/ IRR1154-Pi9	P#28,29	500
40	BR15529-R	BR11723-4R-12*2/ IRBL9-W (Pi9)	P#1,3,5,8,12,13,18, 22,26,31	500
41	BR15529-R	BR11723-4R-12*2/ IRBL9-W (Pi9)	P#6,14	500
42	BR15530-R	BR11607-4R-72 //BRR1 dhan70*2 / IRR1154-Pi9	P#3,11,14,16,20,21, 25,29-34,36	500

SL	BR No	Parentage	Plant Number	Progenies
43	BR15530-R	BR11607-4R-72 //BRRI dhan70*2/IRRI154-Pi9	P#7,19,27	500
44	BR15531-R	BR11607-4R-72// BRAC dhan2/ IRR1154-Pi9	P#2,3,5-11,13,14, 16-18, 20-23,25-30	500
45	BR15531-R	BR11607-4R-72// BRAC dhan2/ IRR1154-Pi9	P#6	400
46	BR15532-R	BR11723-4R-172*3/IR64-EMF3	P#1,2,4	500
47	BR15533-R	BRRI dhan80*3/ IRR1154-Pi9	P#1, 3-7,9-11,13, 15,18,19,23	500
48	BR15534-R	BR11723-4R-12*3/ IRR1154-Pi9	P#1-10	500
49	BR15535-R	BRRI dhan70*3/ IRR1154-Pi9	P#1,3-20	500
50	BR15536-R	BR11607-4R-72//BR11723-4R-12*2 /IRRI154-Pi9	P#1-20	500
51	BR15537-R	BR12442-4R-49*2/ IR64-EMF3	P#1-6	500
Total				25,000
F ₄ , T Aus (BB)				Trans
1	BR14994-2R (3BB+Pi9)	BR9006-40-2-3-1*2/ BR11607-4R-72 (3 BB genes, Pita, Pi9, TSV1)	P#1	All seed
2	BR14994-2R (3BB)	BR9006-40-2-3-1*2/ BR11607-4R-72 (3 BB genes)	P#2, 3, 4	600
3	BR14994-2R (Xa21+xa13)	BR9006-40-2-3-1*2/ BR11607-4R-72 (<i>Xa21</i> , <i>xa13</i>)	P#9,10,12,14,24,28	600
4	BR14994-2R (Xa21+xa5)	BR9006-40-2-3-1*2/ BR11607-4R-72 (<i>Xa21</i> , <i>xa5</i>)	P#23, 25,26	600
5	BR14994-2R (xa5+xa13+Pi9)	BR9006-40-2-3-1*2/ BR11607-4R-72 (<i>xa5</i> , <i>xa13</i> , <i>Pi9</i> , <i>TSV1</i>)	P#19	600
6	BR14994-2R (Pi9+Pita)	BR9006-40-2-3-1*2/ BR11607-4R-72 (<i>Pi9</i> , <i>Pita</i>)	P#17	600
7	BR14995-2R	BR9830-53-3-5-2*2/ BR11607-4R-72(<i>Xa21</i> , <i>xa13</i>)	P#1	All seed
8	BR14679-2R	BR11723-4R-172/IR64-EMF3 (<i>qHTSF4.1</i>)	P#2, 4, 5, 7	600
9	BR14681-2R	BR11723-4R-12/N22 (<i>qHTSF4.1</i>)	P#1,2,4,7,9,10,11	600
10	BR14996-2R	BR11867-4R-371*2/ IR64-EMF3 (<i>Xa21</i>)	P#1-7,9-11, 15,16,19-21	600
11	BR14997-2R (Xa21+xa5)	BR9006-40-2-3-1*3/ BR11868-5R-23 (<i>Xa21</i> , <i>xa5</i>)	P#3,4,8,17, 18,21	600
12	BR14997-2R (3BB)	BR9006-40-2-3-1*3/ BR11868-5R-23 (BB 3 genes)	P#14,15,19	600
13	BR14997-2R (Xa21+xa5+frg)	BR9006-40-2-3-1*3/ BR11868-5R-23 (<i>Xa21</i> , <i>xa5</i> , <i>fgr</i>)	P#6	600
14	BR14997-2R (Xa21+qHTSF4.1)	BR9006-40-2-3-1*3/ BR11868-5R-23 (<i>Xa21</i> , <i>qHTSF4.1</i>)	P#1, 16	600
15	BR14998-2R (3BB+frg)	BR9829-78-1-2-1*3/ BR11607-4R-192 (3 BB genes, <i>fgr</i>)	P#27,40,72	All seed
16	BR14998-2R (3BB+Pi9)	BR9829-78-1-2-1*3/ BR11607-4R-192 (3 genes, <i>Pi9</i> , <i>Pita</i> , <i>Pb1</i>)	P#29,32,41,45	All seed
17	BR14998-2R (3BB)	BR9829-78-1-2-1*3/ BR11607-4R-192 (3 BB genes)	P#30,39,44,47	All seed
18	BR14998-2R (Xa21+xa13)	BR9829-78-1-2-1*3/ BR11607-4R-192 (<i>Xa21</i> , <i>xa13</i>)	P#36,37,50,53,54,62- 66	600
19	BR14998-2R (Xa21+xa5)	BR9829-78-1-2-1*3/ BR11607-4R-192 (<i>Xa21</i> , <i>xa5</i>)	P#55-57,61	600
20	BR14998-2R (3BBF2)	BR9829-78-1-2-1*3/ BR11607-4R-192 (3 genes homozygous))	P#28,33,42,46	600
21	BR15008-2R	BR12121-4R-53/ BR9138-4-4-5-5-P3-HR3- HR5(<i>xa5</i> , <i>Xa21</i> , <i>qHTSF4.1</i>)	P#4-12	600
22	BR15009-2R	BR11723-4R-12/IR12N177 (<i>xa5</i> , <i>Pita</i> , <i>qHTSF4.1</i>)	P#2,5,6,8,10,12	600
23	BR15010-2R	7 FBR-222/ BR11603-4R-49 (<i>xa5</i> , <i>Xa21</i> , <i>fgr</i>)	P#8,9,11,12	600
24	BR15011-2R	BR9138-4-4-5-5-P3-HR3-HR5/BR12442-4R- 49 (<i>Xa21</i>)	P#4,5,7,9,10	600
25	BR15012-2R	BR11723-4R-12/ BR12442-4R-49 (<i>Xa21</i> , <i>qHTSF4.1</i> , <i>fgr</i>)	P#4,5,6,8,9,10	600
26	BR15013-2R (3BB + qHTSF4.1+frg)	BR12442-4R-49/ IR64-EMF3(3 genes, <i>qHTSF4.1</i> , <i>fgr</i>)	P#5	600
27	BR15013-2R (Xa21+ qHTSF4.1+frg)	BR12442-4R-49/ IR64- EMF3(<i>Xa21</i> , <i>qHTSF4.1</i> , <i>fgr</i>)	P#2,8,9,10,12	600
28	BR15014-2R	BR12121-4R-53/ IR12N177 (<i>xa5</i> , <i>Pita</i> , <i>qHTSF4.1</i>)	P#1,2,3,10	600
29	BR15015-2R (3BB+Pi9)	BR11723-4R-12/N22// BR11867-4R-371/ IR64-EMF3 (3 genes, Pi9)	P#1	All seed
30	BR15015-2R (Xa21+qHTSF4.1)	<i>Xa21</i> , <i>xa5</i> , <i>qHTSF4.1</i>	P#3	All seed
31	BR15015-2R (Xa21+Pi9)	<i>Xa21</i> , <i>xa5</i> , <i>Pita</i> , <i>Pi9</i>	P#15,20,22,24,28	
32	BR15016-2R	BR8781-16-1-3-P2/ BR12442-4R-49 (<i>Xa21</i> , <i>qHTSF4.1</i> , <i>fgr</i>)	P#5,9,12	600

SL	BR No	Parentage	Plant Number	Progenies
33	BR15023-2R (3BB)	BRRI dhan71*3/ IR127152-3-22-2-1-B (BB 3 genes)	P#32	All seed
34	BR15023-2R (Xa21+xa5)	BRRI dhan71*3/ IR127152-3-22-2-1-B (<i>Xa21</i> , <i>xa5</i>)	P#3,10-12,19-23, 28,35,39,41,42	
35	BR15024-2R	BR9829-78-1-2-1*3/ IR127152-3-22-2-1-B (<i>Xa21</i> , <i>xa13</i>)	P#2,5,8,13,18,19,20	600
36	BR15025-2R (3BB)	BRRI dhan99*3/ IR127152-3-22-2-1-B	P#6	All seed
37	BR15025-2R (Xa21+xa5)	BRRI dhan99*3/ IR127152-3-22-2-1-B	P#3, 7-13, 16	600
Total				18500
F ₅ , T Aus (BB)				Trans
1	BR14674-3R	BR9006-40-2-3-1/ BR11607-4R-72	BB resistance	500
2	BR14675-3R	BR9830-53-3-5-2/ BR11607-4R-72	BB resistance	500
3	BR14676-3R	BR9011-25-4-1-3/ BR11723-4R-172	BB resistance	500
4	BR14677-3R	BR9830-53-3-5-2/ BR11723-4R-172	BB resistance	500
5	BR14678-3R	BR9829-78-1-2-1/ BR11723-4R-12	BB resistance	500
6	BR14679-3R	BR11723-4R-172/IR64-EMF ₃	BB resistance	500
7	BR14680-3R	7 FBR-376/ BR11723-4R-172	BB resistance	500
8	BR14681-3R	BR11723-4R-12/N22	BB resistance	500
9	BR14682-3R	7 FBR-222/ BR11723-4R-12	BB resistance	500
10	BR14683-3R	BR11868-5R-2/BRBa-1-4-9	BB resistance	500
11	BR14684-3R	BR11868-5R-2/7 FBR-376	BB resistance	500
12	BR14685-3R	BR11867-4R-371/ IR64-EMF ₃	BB resistance	500
13	BR14686-3R	BR9006-40-2-3-1*2/ BR11868-5R-23	BB resistance	500
14	BR14687-3R	BR9006-40-2-3-1/ BR11868-5R-23// BR11723-4R-172	BB resistance	500
15	BR14688-3R	BR9829-78-1-2-1*2/ BR11607-4R-192	BB resistance	500
16	BR14689-3R	BR9829-78-1-3-2*2/ BR11868-5R-23	BB resistance	500
17	BR14690-3R	BR9829-78-1-3-2/ BR11868-5R-23// BR11723-4R-12	BB resistance	500
18	BR14691-3R	BR11600-4R-230/N22//BR11723-4R-172	BB resistance	500
19	BR14692-3R	BR11868-5R-23/N22// BR11723-4R-172	BB resistance	500
Total				9500

Experiment 2.4: Line Stage Testing (LST)

Principal Investigator: M Khatun

Co-Investigator: S K Debsharma, A Rahman and N Tamanna.

Specific Objective: Isolation of homogeneous breeding lines with improved plant type, disease free, and short duration.

Materials and Methods: Line Stage Testing consisting of 5200 genotypes were evaluated in T. Aus2024-25 season (Table 2.5). The unit plot size was 2.4 m × 1 row (12 hills). The spacing for transplanting was 20 cm × 20 cm and twenty-five-day-old seedlings were transplanted @ single seedling per hill. Application of fertilizer and crop management was done as described in experiment 2.1.

Results: In total, 5200 breeding lines of 17 crosses were evaluated in the Line Stage Testing (LST) in T. Aus2024-25 season. Among the evaluated lines, 312 lines were selected based on homogeneity, plant type, days to flowering, disease reaction at the field level and presence of favorable trait marker alleles which were confirmed by trait-based SNP genotyping. Selection intensity applied for selecting LST lines was 6.0% (Fig. 2.1). Considering the trait genotyping of selected 312 LST materials the frequency (%) of BB resistance gene was (*Xa21*-14.0, *xa13*-4.0 and *xa5*-12.0) and frequency (%) of Blast resistance gene was (*Pb1*-30.0, *Pita*-59.0 and *Pi9*-1.0) and frequency (%) of Rice Tungro Virus (RTV) resistance gene was (*TSV1*-12.0) (Fig. 2.2). Favorable allele of high amylose (*Wx-A*) was 77.0% and high temperature spikelet fertility (*qHTSF4.1*) was 15.0%.

Table 2.5. List of materials for Line Stage Testing (LST), Development of Partially Irrigated Rice, T. Aus2024-25

SN	BR No.	Designation	Imp. Features	Progenies
F ₆ , Bacterial blight (BB)				
1	BR13958-4R	BR9829-30-3-2-1*2/ BR9651-15-4-3-2	Earliness, BB resistance	350
2	BR13967-4R	BR9006-40-2-3-1/ BR10397-3-2-1-1-8	"	300
3	BR14304-4R	BR9006-40-2-3-1 / HHZ12-Y4-Y1-DT1	Earliness	300
4	BR14305-4R	BR9006-40-2-3-1 / BR11600-4R-230	Earliness	300
5	BR14307-3R	BR8781-16-1-3-P2/ HHZ12-Y4-DT1-Y3	Earliness	300

SN	BR No.	Designation	Imp. Features	Progenies
6	BR14306-3R	BR9006-40-2-3-1/ BR11868-5R-23	BB, High temp. tol	300
7	BR14308-3R	BR9829-78-1-2-1/ BR11607-4R-192	BB, High temp. tol	350
8	BR14309-3R	BR9829-78-1-3-2/ BR11868-5R-23	BB, High temp. tol	300
9	BR14310-3R	BR11600-4R-230/N22	BB, High temp. tol	300
10	BR14311-3R	BR11868-5R-23/N22	BB, High temp. tol	300
11	BR14312-3R	BR9029-37-2-1-3-P1/ HHZ15-DT7-SAL4-SAL1	Earliness	300
12	BR14313-3R	7 FBR-400/ IR99853-B-B-B-460	BB, High temp. tol	300
13	BR14314-3R	BR9830-53-3-5-2/ BR11600-4R-43	BB res	300
14	BR14315-3R	BR11600-4R-230/ BRRi dhan43	BB, Earliness	300
15	BR14316-3R	BRRi dhan98/ BR11600-4R-230	BB res	300
16	BR14327-3R	BRRi dhan98/ BR11102-4R-247	Earliness	300
17	BR14332-3R	BRRi dhan43/ BR11102-4R-247	Earliness	300
Total				5200

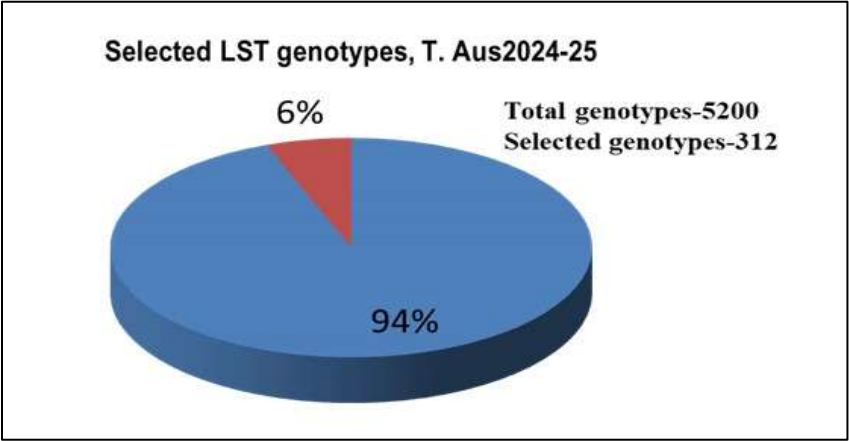


Fig. 2.1 Frequency distribution of LST lines in the T. Aus 2024–25.

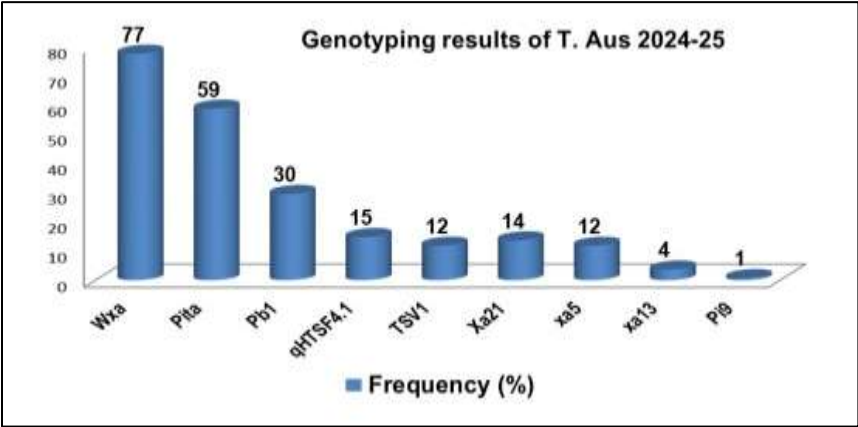


Fig. 2.2 Trait marker profiles showing the frequency of favorable alleles for key target traits in the selected LST lines from the T. Aus 2024–25

Experiment 2.5: Observational Yield Trial (OYT)

Principal Investigator: M Khatun

Co-Investigator: S K Debsharma, A Rahman, N Tamanna (Plant Breeding), M Salahuddin & M R Islam (Cumilla), M Anisar & M R Hasan (Rangpur), S Abedin, R Islam & M F Islam (Rajshahi)

Specific Objectives: To select materials with higher yield potential and shorter growth duration than the standard checks to initiate preliminary yield trial.

Location: BRRI, Gazipur, Cumilla, Rangpur, and Rajshahi.

Materials and Methods: A total of 256 advanced breeding lines in OYT#1 along with the standard check BRRI dhan48 and BRRI dhan98 were evaluated in a non-replicated trial (Table 2.6). The field layout was augmented RCBD. Three weeks old seedlings were transplanted with single seedling per hill at a spacing of 20 × 15 cm in a 5.4 m × 4 rows plot. Importantly,

checks were repeated every 15-20 lines. Application of fertilizer and crop management was done as described in experiment 2.1.

Results: In T. Aus program for 2024–25, a total of 256 breeding lines were evaluated in the observational yield trial (OYT) across four locations: Gazipur, Cumilla, Kushtia, and Rajshahi. The lines demonstrated variable yield performance across the sites. The advanced breeding lines showed a wide range of variation in agronomic traits: plant height ranged from 95 to 147 cm, growth duration from 105 to 133 days, and grain yield from 2.23 to 5.10 t/ha (Fig. 2.3). The top ten performing genotypes, selected based on superior yield performance along with uniform flowering and good grain quality, are presented in Table 2.6.

These top ten lines showed an average yield of 4.6-5.1 t/ha, advantage was 10% compared to the popular check variety BRRI dhan48. Growth duration of both of the check varieties BRRI dhan48 and BRRI dhan98 was 109 days. Three promising lines BR13616-5R-262, BR13966-4R-110 and BR13966-4R-139 produced 10% yield advantage over the high-yielding check variety BRRI dhan98 with similar growth duration (Table 2.6).

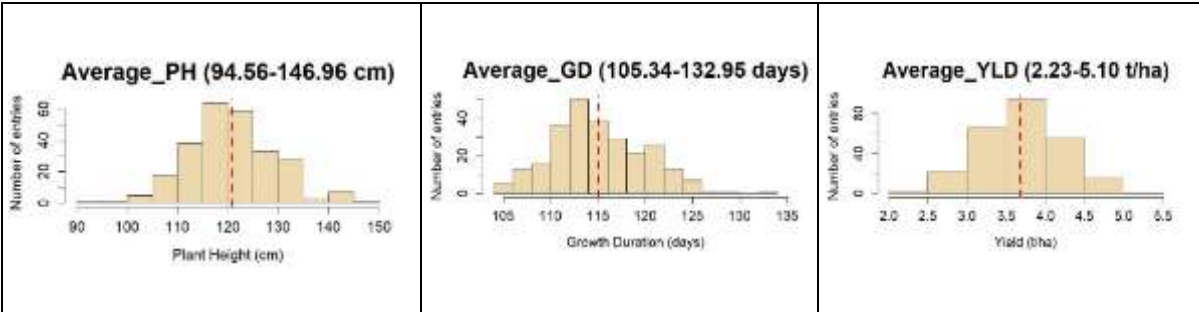


Fig. 2.3 Histogram showing the distribution of growth duration, plant height, and yield performance of 256 entries evaluated in the observational yield trial (OYT) across four locations during the T. Aus2024–25

Table 2.6. Agronomic performance of the top-yielding selected lines from the observational yield trial (OYT) under favorable conditions during the T. Aus2024–25

SN	Designation	PH (cm)	DM (day)	Yield (t/ha)				
				Cumilla	Gazipur	Kushtia	Rajshahi	Pooled
1	BR13615-5R-55	120	115	4.7	3.7	5.7	6.3	5.1
*2	BR13616-5R-262	127	112	4.5	3.2	5.6	6.9	5.0
*3	BR13966-4R-110	128	110	NA	3.9	6.1	6.1	4.9
*4	BR13966-4R-139	133	112	3.1	4.4	5.6	6.3	4.9
5	BR13968-4R-202	130	121	2.6	6.4	4.0	6.2	4.8
6	BR13964-4R-123	123	115	4.2	4.6	5.4	5.0	4.8
7	BR13615-5R-299	116	108	3.5	4.5	NA	5.6	4.7
8	BR13616-5R-119	120	112	4.3	5.9	5.4	3.1	4.7
9	BR13658-4R-48	121	116	2.5	4.2	5.6	6.3	4.6
10	BR13964-4R-13	119	120	4.5	5.3	3.0	5.8	4.6
11	BRRI dhan98	107	109	3.5	3.3	5.8	5.3	4.5
12	BRRI dhan48	106	109	2.9	3.5	5.4	4.4	4.1
LSD		6.64	12.87	1.92	1.37	1.27	1.61	1.19
H ₂ b		0.27	0.24	0.71	0.63	0.62	0.49	0.14
D/S: 12/05/24 (Gazipur)		D/S: 09/05/24 (Cumilla)		D/S: 20/04/24 (Kushtia)		D/S: 20/04/24(Rajshahi)		
D/T: 05/06/24		D/T: 30/05/24		D/T: 10/05/24		D/T: 08/05/24		

A genetic trend analysis was performed using data from 1,794 advanced breeding lines of transplanted Aus rice evaluated across six locations (Gazipur, Rajshahi, Cumilla, Sonagazi, Kushtia, and Rangpur) between 2020 and 2024. The results indicated a genetic gain of 1.67% per year, corresponding to a yield increase of 56.0 kg/ha/year, demonstrating promising progress in breeding high-yielding transplanted Aus rice genotypes (Fig. 2.4).

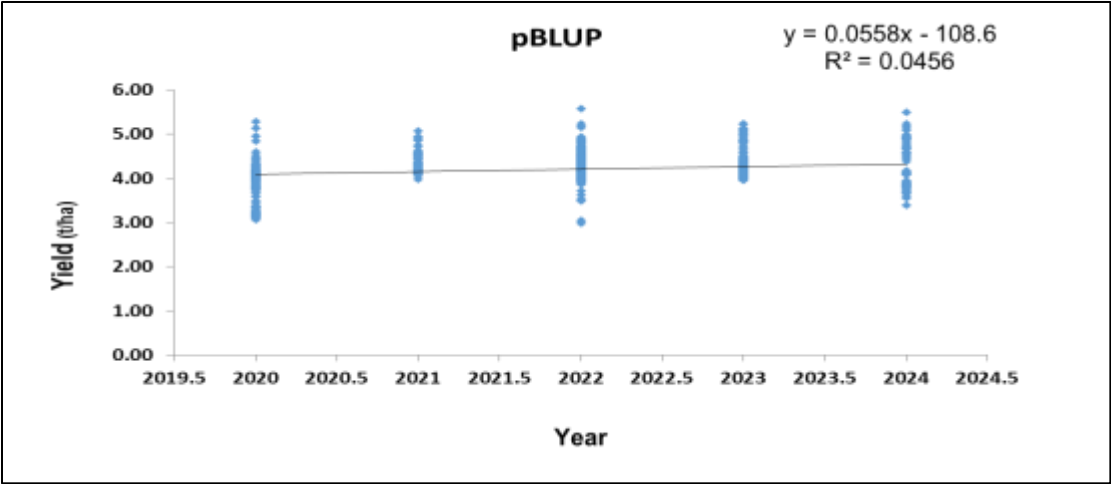


Fig. 2.4. Line graph is showing the genetic gain of BRRI-developed RGA derived transplanted Aus (T. Aus) rice advanced lines

Experiment 2.6: Advanced Yield Trial (AYT)

Principal Investigator: M Khatun

Co-Investigator: S K Debsharma, A Rahman, N Tamanna (Plant Breeding), M Salahuddin & M R Islam (Cumilla), M Anisar & M R Hasan (Rangpur), S Abedin, M R Islam & M F Islam (Rajshahi)

Specific Objective: Initial yield evaluation and selection of desirable lines compared to standard checks.

Location: BRRI, Gazipur, Rajshahi, Cumilla & Rangpur.

Materials and Methods: Advanced yield trial consisting of 38 genotypes for AYT#1, 20 genotypes for AYT#2, and 18 genotypes for AYT#3 along with the standard checks BRRI dhan98, Binadhan-14, and N22 for AYT#1, BRRI dhan48, BRRI dhan82, BRRI dhan83, and BRRI dhan98 for AYT#2, BRRI dhan27, BRRI dhan106, and Gota IRRI for AYT#3 were evaluated for high yield performance in T. Aus growing areas (Table 2.7, Table 2.8, & 2.9). Three weeks old seedlings were transplanted with single seedling per hill at a spacing of 20 × 15 cm in a 5.4 m × 10 rows plot. The field layout was RCBD with three replications. Application of fertilizer and crop management was done as described in experiment 2.1.

Results: Four advanced lines out of 38 from AYT#1 for heat tolerant rice were selected on the basis of homogeneity with respect to plant height, phenotypic acceptability at vegetative and maturity stages and physicochemical properties. The selected breeding lines showed 5.4-5.8 t/ha yield with 94-130 cm plant height and 105-115 days growth duration. Considering average yield performance, the selected three entries (5.4-5.8 t/ha) showed higher yield than the check varieties BRRI dhan98 (4.7 t/ha), Binadhan14 (3.4 t/ha), and N22 (1.2 t/ha) (Table 2.7).

Table 2.7. Agronomic performance of the top yielder materials from Advanced Yield Trial (AYT#1), Heat Tolerant Rice, T. Aus 2024-25

SN	Designation	PH (cm)	DM (days)	Yield (t/ha)	Contributing QTL
1	BR13169-4R-233	130	115	5.8	<i>qHTSF4.1</i>
2	BR12890-5R-31	124	105	5.7	<i>qHTSF4.1</i>
3	IR 99853-B-B-B-509	94	106	5.4	<i>qHTSF4.1</i>
5	BRRI dhan98 (Ck.)	108	115	4.7	
6	Binadhan-14 (Ck.)	106	109	3.4	
7	N22 (Tol. Ck.)	101	99	1.2	
LSD		9.90	8.82	1.02	
H ₂ b		0.54	0.29	0.69	

D/S: 15/05/2024 (Gazipur)

D/T: 04/06/2024

Twenty advanced lines were evaluated in four locations (Cumilla, Gazipur, Kushtia, and Rajshahi) under AYT#2 (favorable condition). Nine advanced breeding lines out of twenty presents in the table and the advanced lines produced 4.02-4.88 t/ha with 108-116 days growth

duration. Considering average yield performance, the highest yield (4.88 t/ha) was observed in the line BR13162-4R-351 that was 31% higher yield than the check variety BRRI dhan48 (3.72 t/ha) and 10% than the check variety BRRI dhan98 (4.43 t/ha) with similar growth duration (Table 2.8). The genotypes BR13162-4R-351 and BR13165-4R-95 were selected to promote in further trial (Table 2.8).

Table 2.8. Agronomic performance of the top yielder materials from Advanced Yield Trial (AYT#2), Favorable condition, T. Aus 2024-25

SN	Designation	PH (cm)	DM (day)	Yield (t/ha)					Contributing Trait
				Cum	Gaz	Kush	Raj	Mean	
1	BR13159-4R-93	112	110	4.05	3.24	5.28	3.49	4.02	<i>Wxa,Chalk5,Pi33</i>
2	BR13160-4R-37	121	116	4.67	3.85	5.86	3.86	4.56	<i>Wxa,Chalk5,DTY12.1, Saltol,Pi33</i>
*3	BR13162-4R-351	108	111	4.46	5.36	5.60	4.10	4.88	<i>Wxa,Chalk5,Pita,Pb1</i>
4	BR13164-4R-132	118	112	4.42	3.54	5.72	3.19	4.22	<i>Wxa,DTY12.1,RF4,Chalk5</i>
5	BR13164-4R-27	114	108	3.96	3.11	5.81	-	4.28	<i>Wxa,DTY12.1,RF4,Chalk5</i>
6	BR13165-4R-123	119	108	4.40	3.44	5.32	4.44	4.40	<i>RF4,Wxa,Chalk5</i>
*7	BR13165-4R-95	113	110	5.01	2.44	5.41	5.11	4.49	<i>RF4,Wxa,Chalk5,TSV1</i>
8	BR13169-4R-202	118	107	4.39	3.45	5.21	4.15	4.30	<i>Wxa,xa5,Pi33</i>
9	BR13169-4R-83	121	107	4.97	3.52	5.14	3.77	4.35	<i>Wxa,xa5,Pi33</i>
10	BRRI dhan48	109	110	4.17	2.53	4.51	-	3.72	
11	BRRI dhan82	121	108	4.06	2.55	4.73	4.50	3.96	
12	BRRI dhan83	107	107	3.54	2.43	4.99	3.30	3.56	
13	BRRI dhan98	107	111	4.49	2.88	5.07	5.31	4.43	
	LSD	11.6	9.87	0.67	0.70	2.71	0.32	1.11	
	H ₂ b	0.34	0.23	0.28	0.71	0.09	0.48	0.21	
D/S: 07/05/2024 (Gazipur)		D/S: 12/05/2024 (Cumilla)		D/S: 20/04/2024 (Kushtia)		D/S: 20/04/2024 (Rajshahi)			
D/T: 31/05/2024		D/T: 01/06/2024		D/T:10/05/2024		D/T:08/05/2024			

In AYT#3, which focused on Aus-based cropping patterns in non-saline tidal areas, eight entries were selected from 18 tested lines alongside check varieties BRRI dhan27, BRRI dhan106, and Gota IRRI. The advanced lines, BR12890-5R-271, BR13166-4R-63, BR13165-4R-66 and BR12889-5R-127 produced higher yield ranging from 4.8-4.9 t/ha with growth duration ranging from 108-132 days. The selected lines produced higher yield and similar growth duration compared to all three check varieties under AYT#3 (Table 2.8). These four genotypes were selected to proceed for further trial.

Table 2.9. Agronomic Performance of the selected materials from Advanced Yield Trial (AYT#3), Non-Saline Tidal Rice, T. Aus 2024-25

SN	Designation	PH (cm)	DM (days)	Yield (t/ha)
1	BR12889-5R-42	152	132	5.1
*2	BR12890-5R-271	139	108	4.9
*3	BR13166-4R-63	146	115	4.9
*4	BR13165-4R-66	133	110	4.8
*5	BR12889-5R-127	154	112	4.8
6	BR13157-4R-177	129	115	4.7
7	BR13166-4R-24	151	121	4.5
8	BR13165-4R-107	158	114	4.3
9	BRRI dhan27 (Ck.)	167	113	4.2
10	BRRI dhan106 (Ck.)	146	117	4.5
11	Gota IRRI (Ck.)	129	119	3.1
	LSD	2.94	13.33	1.04
	H ₂ b	0.29	0.15	0.71

D/S: 07/05/2024 D/T: 31/0520/24

Experiment 2.7: Regional Yield Trial (RYT)

Principal Investigator: M Khatun

Co-Investigator: S K Debsharma, A Rahman, N Tamanna and scientists from regional station.

Specific Objective: To evaluate specific and general adaptability of the advanced breeding lines as compared with standard checks in on-station condition.

Materials and Methods: Regional yield trial consisting of 10 genotypes for RYT#1 along with the standard check BRRI dhan48 and BRRI dhan98 evaluated for high yield performance in T. Aus growing areas (**Table 2.10**). RYT#2 comprises nine genotypes along with the check BRRI dhna48, BRRI dhan85 and BRRI dhan98 in T. Aus growing areas for performing high

yield with RTV resistance (Table 2.11). Three weeks old seedlings were transplanted with single seedling per hill at a spacing of 20 × 15 cm in a 5.4 m × 10 rows plot. The field layout was RCBD with three replications. Application of fertilizer and crop management was done as described in experiment 2.1.

Results: Ten advanced lines were evaluated in six locations viz. Cumilla, Gazipur, Kushtia, Rajshahi, Rangpur, and Sonagazi under RYT#1 (favorable condition). Sonagazi data was not considered due to most of the entries being affected by flood, bird and rat damage. The advanced breeding lines produced 3.43-4.50 t/ha with 106-117 cm plant height and 107-117 days growth duration. Considering average yield performance, the highest yield (4.50 t/ha) was observed in the line BR12616-4 R-104 that was 3.7% higher yield than the check variety BRRI dhan98 (4.34 t/ha) with 6 days longer growth duration (Table 2.10). On the other hand, the genotype BR12592-4 R-190 produced similar yield (4.31 t/ha) with similar growth duration. Therefore, the genotypes BR12616-4 R-104 and BR12592-4 R-190 were selected for retrial in RYT (Table 2.10).

Table 2.10. Agronomic performance of the selected materials from Regional Yield Trial (RYT), T. Aus2024-25

SN	Designation	PH (cm)	DM (days)	Yield (t/ha)					
				Cumilla	Gazipur	Kushtia	Rajshahi	Rangpur	Mean
1	BR12589-4 R-257	111	115	3.51	3.59	5.64	3.35	3.38	3.98
2	BR12589-4 R-259	116	121	2.47	2.55	5.41	2.60	3.53	3.69
3	BR12589-4 R-332	106	107	2.64	3.36	5.44	3.47	3.54	3.69
*4	BR12592-4 R-190	106	108	3.49	3.54	6.29	4.10	4.19	4.31
5	BR12598-4 R-62	110	115	2.44	3.61	5.47	4.26	2.84	3.91
6	BR12603-4 R-185	114	119	1.54	3.88	5.18	3.28	2.62	3.43
7	BR12603-4 R-393	112	117	1.33	3.01	5.34	4.24	2.36	3.44
*8	BR12616-4 R-104	108	113	2.13	3.14	5.32	3.48	4.34	4.50
9	BR12616-4 R-132	117	117	2.60	2.65	5.72	3.91	3.04	3.68
10	BR12616-4 R-183	113	121	2.46	3.03	5.34	3.51	3.71	3.87
11	BRRI dhan48(Ck.)	106	106	2.19	3.47	5.80	4.07	2.86	3.68
12	BRRI dhan98(Ck.)	106	107	3.14	2.97	5.99	4.80	4.81	4.34
LSD		6.87	11.76	0.60	1.68	1.89	0.42	0.72	1.21
H ₂ b		0.53	0.34	0.08	0.15	0.32	0.04	0.69	0.30
D/S: 04/05/24 (Gazipur)		D/S: 29/04/24 (Rangpur)		D/S: 20/04/24 (Kushtia)		D/S: 20/04/24 (Rajshahi)		D/S: 12/04/24 (Cumilla)	
D/T: 24/05/24		D/T: 20/05/24		D/T: 10/05/24		D/T: 10/05/24		D/T: 03/06/24	

Nine advanced lines were evaluated in four locations viz. regional station Cumilla, Debider, Cumilla, Gazipur, and Rangpur under RYT#2 (tungro resistance). The advanced breeding lines produced 2.05-3.17 t/ha with 104-116 days growth duration. Considering average yield performance, the highest yield (3.17 t/ha) was observed in the line BR(Path)16115-BC -5HR-21 that was potential yield compared to the check variety BRRI dhan48 (2.82 t/ha), BRRI dhan85 (3.30 t/ha), and BRRI dhan98 (3.34 t/ha) with similar growth duration (Table 2.11). According to *SNP* genotyping, only the genotype BR12603-4 R-170 obtained *TSVI* gene, therefore the genotype will be used as donor for tungro resistance (Table 2.11).

Table 2.11. Agronomic performance of the selected materials from Regional Yield Trial (RYT#2_RTV), T. Aus 2024-25

SN	Designation	PH (cm)	DM (day)	Yield (t/ha)					Contributing Genes
				Cum	Debider	Gaz	Rang	Mean	
1	BR(Path)16114-BC -5HR-5	119	116	2.13	2.27	2.45	3.23	2.52	<i>Wxa</i> , <i>TSVI</i>
2	BR(Path)16114-BC -5HR-6	117	115	1.93	2.88	2.47	2.86	2.53	
3	BR(Path)16114-BC -5HR-7	119	114	1.60	1.98	2.64	3.09	2.33	
4	BR(Path)16114-BC -5HR-8	116	111	2.41	2.98	3.05	2.71	2.79	
5	BR(Path)16115-BC -5HR-18	117	112	0.78	2.27	2.12	3.03	2.05	
*6	BR(Path)16115-BC -5HR-21	107	104	3.91	3.07	2.94	2.75	3.17	
7	BR12426-5R-171	105	107	2.77	2.95	3.09	3.06	2.97	
8	BR12603-4 R-170	108	106	1.85	1.35	2.37	2.55	2.08	
9	BR12603-4R-263	108	105	2.01	2.57	3.19	3.41	2.79	
10	BRRI dhan48 (Ck.)	107	107	2.93	2.25	3.11	3.02	2.82	
11	BRRI dhan85 (Ck.)	105	106	3.41	2.60	2.92	4.27	3.30	
12	BRRI dhan98 (Ck.)	108	105	3.32	2.53	3.33	4.18	3.34	
LSD		4.93	9.92	0.90	1.26	0.64	1.79	0.57	
H ₂		0.59	0.04	0.05	0.08	0.77	0.10	0.37	

**Low yield due to establishment of the crop just after harvesting of Boro rice.

Experiment 2.8: Advanced Line Adaptive Research Trial (ALART)

Principal Investigator: Scientists of ARD

Co-Investigator: M Khatun and S K Debsharma (Plant Breeding Division).

Specific Objective: On-farm evaluation of advanced breeding lines compared to standard checks for testing their specific and general adaptability.

Materials and Methods: Three genotypes were evaluated with standard checks BRRI dhan48 and BRRI dhan98 in eight locations at on-farm condition during Transplanted Aus2024-25 under ALART (Table 2.12). Two-Three weeks old seedlings were transplanted at a spacing of 20 × 15 cm with 2-3 seedlings per hill. The unit plot size was 5.0 m × 4.0 m. The field layout was RCB design with three replications. Application of fertilizer and crop management was done as described in experiment 2.1.

Results: An advanced line adaptive research trial (ALART) for BB was conducted at eight BB hotspot areas using three breeding lines viz. BR11866-5R-147, BR11867-5R-103 and BR11867-5R-442 (Table 2.12). The breeding lines showed similar yield with the standard check varieties. Therefore, the genotypes were not recommended for further trial. In addition, another ALART trial was conducted at seven BB hotspot locations using three breeding lines viz. BR(path)13784-BC3-34-9-10-HR9, BR(path)13784-BC3-5-3-4-HR15, and BR(path)13784-BC3-61-1-6-HR3 and standard checks BRRI dhan82 and BRRI dhan98 (Table 2.13). However, no breeding lines outperformed than the standard check varieties in this trial.

Table 2.12. Materials under Advanced Line Adaptive Research Trial (ALART#BB_1), T. Aus 2024–25

SN	Designation	PH (cm)	DM (day)	Yield (t/ha)									BB score (art)	Trait of Interest
				1	2	3	4	5	6	7	8	Mean		
1	BR11866-5R-147	97	110	4.78	3.45	5.45	4.13	3.70	3.36	3.46	3.63	4.0	3	<i>Xa21, Wxa</i>
2	BR 11867-5R-103	100	110	5.73	3.95	5.64	5.14	3.64	3.23	3.47	3.31	4.3	1	<i>Xa21, Pbl, Wxa, BADH2</i>
3	BR 11867-5R-442	102	112	4.61	4.11	5.75	5.25	3.54	4.06	3.54	3.45	4.3	3	<i>Xa21, Pbl, Wxa</i>
	BRRI dhan48 (Ck)	107	109	4.51	4.28	6.01	4.27	4.17	3.40	3.47	3.31	4.2	9	
	BRRI dhan98 (Ck)	100	110	5.51	3.79	5.85	4.66	3.82	4.38	4.76	3.46	4.5	7	
LSD (0.05)				0.57									0.20	

Note: Locations – 1: Dev, Cumilla; 2: Habiganj; 3: Khoksha, Kushtia; 4: Pabna, Rajshahi; 5: Mithapukur; 6: Satkhira; 7: BRRI, Gazipur; 8: Bhola, Barishal.



Fig. 2.5 Pictorial view of the advanced lines under ALART_BB#1, T. Aus2024-25

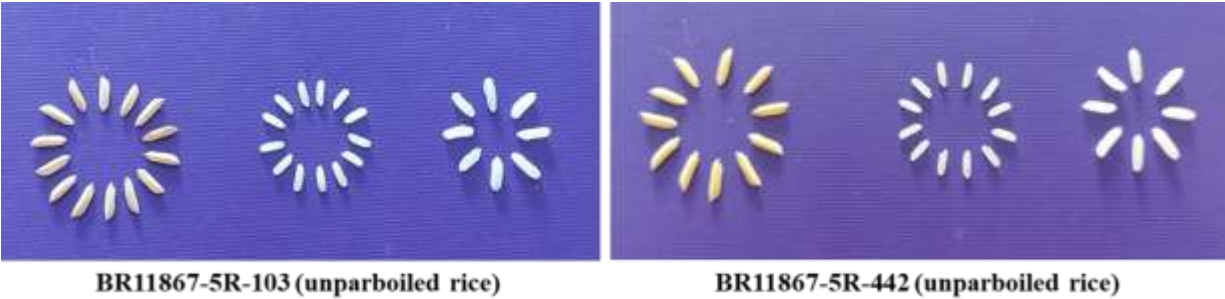


Fig. 2.6 Pictorial view of grain quality of the selected advanced lines under ALART_BB#1, T. Aus 2024-25

Table 2.13. Materials under Advanced Line Adaptive Research Trial (ALART# BB_2), T. Aus 2024–25

SN	Designation	PH (cm)	DM (day)	Yield (t/ha)							Mean
				1	2	3	4	5	6	7	
1	BR(path)13784-BC3-34-9-10-HR9	102	111	3.54	5.38	3.43	4.95	4.55	3.13	4.36	4.19
2	BR(path)13784-BC3-5-3-4-HR15	104	109	3.45	4.75	3.48	5.58	4.59	3.57	4.30	4.24
3	BR(path)13784-BC3-61-1-6-HR3	106	112	3.53	4.68	2.66	4.89	3.72	4.30	2.92	3.81
	BRRI dhan82 (Std. Ck)	107	106	3.37	4.48	2.33	4.92	4.29	3.95	2.73	3.72
	BRRI dhan98 (Std. Ck)	103	111	3.74	5.61	2.73	5.26	4.53	3.95	5.79	4.52
LSD (0.05)				0.66							0.29

Note: Locations – 1: Bhola, Barishal; 2: Cumilla; 3: Habiganj; 4: Khoksha, Kushtia; 5: Rajshahi; 6: Mithapukur; 7: BRRI, Gazipur.

Experiment 2.9: Maintenance of nucleus seed stock

Principal Investigator: M Khatun

Co-Investigator: S K Debsharma and N Tamanna.

Specific Objective: To maintain genetic purity of T. Aus rice varieties.

Materials and Methods: The varieties included in this experiment are BR15, BR16, BRRI Dhan27, BRRI Dhan48 and BRRI dhan55 and some local germplasm (Table 2.14). Panicle seeding was done and twenty-five-days old single seedling used for transplanting. Fertilizers and other management practices were same as Experiment 2.1. Roughing of off-type plants done throughout the crop growth stages.

Results: In total 160 parental lines were maintained in T. Aus program for using parents and check in LST program.

Table 2.14. List of the entries to maintenance of nucleus seed stock, local germplasm, T. Aus 2024-25

SN	Designation	SN	Designation	SN	Designation
1	BR7566-4-4-2	20	BR9029-51-3-8-2-P2	39	HHZ12-Y4-DT1-Y3
2	BR7577-9-1-2	21	BR9039-9-1-3	40	HHZ15-DT7-SAL4-SAL1
3	BR8348-28-4-6-2	22	BR9039-28-3-2	41	GSR-IR1-DQ-142-Y1-Y1
4	BR8384-49-3-4-3	23	BR9829-30-3-2-1-4	42	GSR-IR1-12-D10-S1-D1
5	BR8773-2-2-2-2	24	BR9829-78-1-2-1 (HTR)	43	HHZ23-DT16-DT1-DT1
6	BR8774-4-1-2-2-3	25	BR9829-80-2-2-1	44	IR 99853-B-B-B-310
7	BR8774-18-3-2-2-5	26	BR9830-5-2-2-3	45	N22
8	BR8776-17-4-2	27	BR9830-44-1-8-2	46	Parija
9	BR8781-16-10-3B	28	BR9830-53-3-5-2	47	7 FBR-29
10	BR8781-16-1-3-P2	29	BR9830-74-4-3-1	48	7 FBR-189
11	BR8784-4-1-2-P2	30	BR8235-2B-4-4	49	7 FBR-190
12	BR9006-40-2-3-1	31	BR8235-2B-13-3	50	7 FBR-218
13	BR9006-54-1-3-2	32	BR9101-2B-1-2-1	51	7 FBR-222
14	BR9006-62-2-2-2	33	BR9640-2B-14-2	52	7 FBR-336
15	BR9011-12-2-1	34	BR9643-2B-19-1	53	7 FBR-336
16	BR9011-25-4-1-3	35	HHZ3-SAL4-Y1-Y1	54	7 FBR-363
17	BR9011-48-4-3-P3-HR3	36	HHZ5-DT20-DT20-DT1	55	7 FBR-373
18	BR9013-28-2-3	37	HHZ8-SAL12-Y2-DT1	56	7 FBR-376
19	BR9022-19-5-2	38	HHZ12-Y4-Y1-DT1	57	7 FBR-400

SN	Designation	SN	Designation	SN	Designation
58	7 FBR-416	100	BR12101-5R-75-1	142	BRRi dhan69
59	7 FBR-350	101	BR12101-5R-158-1	143	BRRi dhan82
60	7 FBR-355	102	BR12105-4R-130-1	144	BRRi dhan83
61	7 FBR-355	103	BR12105-4R-170-1	145	BRRi dhan85
62	SA15-P5-E	104	BR12105-4R-3-1	146	BRRi dhan98
63	BR9945-2-2-P1-HR2	105	BR12106-4R-46-1	147	BRRi dhan99
64	BR9943-26-3-2-1-P2	106	BR11596-5R-64	148	Binadhan17
65	BR9943-26-2-3-6	107	BR11852-4 R-56	149	Binadhan19
66	BR9650-35-4-3-P1-HR2	108	BR12424-5R-46	150	HRB224-23-11-2-1R
67	BR9651-15-2-1-3	109	BR12426-5 R-51	151	HRB245-17-7-B-1R
68	BR9651-15-2-1-4-P1	110	BR12428-5R-41	152	BR11609-4R-9-1
69	BR11607-4R-243	111	BR12596-4R-182	153	BR11866-5R-68
70	BR11604-4R-35	112	BR12596-4R-232	154	BR11866-5R-272
71	BR11990-4R-38	113	BR12603-4R-263	155	BR11867-5R-162
72	BR11609-4R-16-1	114	BR12603-4R-366	156	BR11867-5R-331
73	BR11609-4R-168-1	115	BR12604-4R-85	157	BR11867-5R-339
74	BR11609-4R-220-1	116	BR12606-4R-327	158	BR11867-5R-336
75	BR11609-4R-261-1	117	BR12606-4R-328	159	BR11868-5R-95
76	BR10970-B-3R-11-1	118	BR12616-4R-31	160	BR11869-5R-34
77	BR10970-B-3R-38-1	119	BR12616-4R-186	161	BR11872-5R-14
78	BR11862-4R-102-1	120	BR12087-5R-132	162	BR11867-5R-294
79	BR11870-4R-4-1	121	BR12091-4R-9	163	BR13157-4R-177
80	BR12086-5R-22-1	122	BR12091-4R-97	164	BR13166-4R-63
81	BR12086-5R-92-1	123	BR11863-5R-82	152	BR13157-4R-43
82	BR12087-5R-102-1	124	BR11864-5R-31 (G)	153	HHZ15-DT7-SAL4-SAL1
83	BR12087-5R-4-1	125	BR11864-5R-31 (K)	154	China IRRI (Laxmipur)
84	BR12088-5R-157-1	126	BR11866-5R-312	155	Gota IRRI (Barishal)
85	BR12088-5R-46-1	127	BR11867-5R-188	156	Dharial
86	BR12089-5R-201-1	128	BR12096-4R-25	157	Shurjomukhi
87	BR12089-5R-214-1	129	BR11868-5R-2	158	Dharial
88	BR12090-5R-156-1	130	BR12096-4R-127	159	Panbira
89	BR12090-5R-222-1	131	BR15	160	Kumari
90	BR12094-4R-149-1	132	BR16	161	Pashur
91	BR12094-4R-70-1	133	BR20	162	Miniket
92	BR12095-4R-133-1	134	BR26	163	Zira Miniket
93	BR12095-4R-172-1	135	BRRi dhan27	164	Saitta
94	BR12096-4R-25-1	136	BRRi dhan42	165	Habataki
95	BR12096-4R-55-1	137	BRRi dhan43	166	BRRi dhan48(Ck)
96	BR12096-4R-82-1	138	BRRi dhan48 (Code-3;)	167	BRRi dhan82(Ck)
97	BR12096-4R-103-1	139	BRRi dhan48	168	BRRi dhan98(Ck)
98	BR12096-4R-120-1	140	BRRi dhan55		
99	BR12096-4R-124-1	141	BRRi dhan65		

PROJECT 3: DEVELOPMENT OF RICE FOR SHALLOW FLOODED AND SEMI-DEEP-WATER ENVIRONMENT

General objective: Development of high yielding (4.0-5.0 t/ha) rice varieties for shallow flooded ecosystem (up to 1.0 m depth), shallow deep area (30 cm water) and medium deep area (50-60 cm water) along with submergence, facultative elongation and hypoxia tolerance.

Project Leader: Khandakar Md. Iftekharuddaula

Experiment 3.1: Hybridization

Principal Investigator: S Maniruzzaman

Co-investigators: M Rafiqul Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula.

Specific objective: Introgression of submergence tolerant and facultative elongation traits into modern genetic background with short/long growth duration, weakly/strongly photoperiod sensitivity and acceptable grain quality.

Materials and Methods: Fourteen parents (Table 3.1) were grown in the hybridization block of Plant Breeding Division at three staggers with an interval of seven days to synchronize

flowering among male and female parents. Around 30 days old seedlings were transplanted in a 5.4 m × 2 rows plot with a spacing of 25 × 15 cm. Single seedling was used for transplanting. Fertilizers were applied at the rate of 200 kg urea, 70 kg TSP, 100 kg MoP, 70 kg gypsum and 6 kg zinc sulfate. Total amount of TSP, gypsum and two-third MoP were applied at the time of final land preparation. Total amount of zinc sulfate was applied at first top dressing. Urea was applied in equal three splits at 10, 25 and 40 days after transplanting. Rest of the one-third MoP was applied during second top-dressing of urea. Other cultural and pest management practices were carried out as and when necessary. Leaf samples were collected from previously labeled four healthy plants of each parent for QC genotyping with 10 SNP panel. The plants showing unique profiles of each parent were used to make crosses. At flowering, emasculation was done on the day before anthesis using vacuum emasculator and emasculated panicles were bagged with glassine bag. Pollination was performed with just anthesized panicles of the male parent by dusting pollens on the emasculated panicle of the female parent.

Results: A total of 630 F₁ seeds were obtained from 14 crosses (Table 3.1b). These were recorded and labeled properly. The F₁ seeds were sun-dried and stored in a cool and dry place.

Table 3.1a: List of Parents for hybridization, Shallow Flooded Rice Breeding, T. Aman 2024-25

SL	Designation	PH (cm)	GD (days)	GY (t/ha)	Traits
1	BR11690-5R-98-P6	140	125	5.5	Sub
2	BR11186-5R-119	147	138	4.5	Sub
3	BR11686-5R-1	166	139	4.7	Sub
4	PCR-97003-2B	-	-	-	SFR
5	BR10260-5-15-21-6B	-	-	-	DWR
6	BR11315-5R-17	-	-	-	Tall
7	BR9241-5R-5	150	136	4.8	Sub
8	BR11186-5R-549	159	135	4.5	Sub
9	BR10211-22-9-2_PS4	147	137	4.7	Tall
10	BR11186-5R-377	156	136	4.4	Sub
11	BR11607-4R-72	-	-	7.0	Xa5+Xa13+Xa21
12	BR11607-4R-192	-	-	7.0	Xa5+Xa13+Xa21
13	BR11196-5R-38			5.2	Sub
14	BR12154-5R-219-PS1			5.1	Sub

Table 3.1b: List of cross combinations, Shallow Flooded Rice Breeding, T. Aman 2024-25

SN	Cross combination	No. of seeds	Objectives of crossing
1	BR11607-4R-192/BR14161-4R-22	30	Sub+Shallow deep
2	11690-5R-98-P6/BRRI dhan110	10	Sub+Shallow deep
3	BR12154-5R-219-PS1/IR22LT1291	15	Sub+Shallow deep
4	BR12154-5R-219-PS1/Bashiraj-1	30	Sub+Shallow deep
5	Swarna Samriddhi/BR11186-5R-672	80	Sub+Shallow deep
6	Chamara/BRRI dhan110	70	Sub+Shallow deep
7	BR11196-5R-38/Chamara	120	Sub+Shallow deep
8	BR11186-5R-672/BR13942-3R-181	45	Sub+Shallow deep
9	Potol Pari/BR13942-3R-181	16	Sub+Shallow deep
10	BR12950-5R-134/Hijol Digha-4	40	Sub+Shallow deep
11	BRRI dhan49/Sorsoria	30	Sub+Shallow deep
12	BR9241-5R-5/BR11186-5R-119	90	Sub+Shallow deep
13	BR9241-5R-5/BR11186-5R-377	40	Sub+Shallow deep
14	FR 13A/BRRI dhan111	14	Sub+Shallow deep
Total		630	

Experiment 3.2: Confirmation of F₁

Principal Investigator: S Maniruzzaman

Co-investigators: M Rafiqul Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Confirmation of F₁s as true crosses and selection of promising ones.

Materials and Methods: A total of seven crosses were grown to be confirmed as true crosses. F₁ seeds of each cross and their respective parents were germinated in Petri dishes and then

sown in earthen pots. Twenty-five days old seedlings were transplanted @ single seedling at a spacing of 20 × 15 cm in the net house. Respective parental seedlings were transplanted on both sides of each F₁ population, leaf samples were collected from each of the plants from F₁ and parents for QC genotyping to determine true F₁. QC genotyping was performed using 10 QC SNPs at Intertek, Australia. Genotyping results were analyzed using a genotyping data analytical tool called Flapjack. After confirmation, promising F₁s were selected.

Results: Based on QC profile of the F₁s, five crosses were confirmed as true F₁. The F₁ plants were selfed to produce F₂ seeds. At maturity, F₂ seeds of all confirmed plants were harvested individually, dried, cleaned and preserved in cold room (Table 3.2).

Table 3.2: List of confirmed F₁s, Shallow Flooded Rice Breeding, T. Aman 2024-25

SL#	BR#	Cross combinations	Ave predicted Yield(t/ha)
1	BR16242	BR11690-5R-98-P6/BR9390-6-2-1B	4.5
2	BR16244	BR12494-5R-69/BR9390-6-2-1B	4.7
3	BR16246	PCR-97003-2B/BR9390-6-2-1B	4.4
4	BR16247	PCR-97003-2B/BR9163-1-30-1-25	4.0
5	BR16248	BR11315-5R-17/BR9163-1-30-1-25	4.0

DS: 21/07/2024

DT: 14/08/2024

Experiment 3.3: Rapid Generation Advance (RGA)

Principal Investigator: S Maniruzzaman

Co-investigators: M Rafiqul Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Rapid advancement of segregating population for shortening breeding cycle.

Materials and Methods: A total sixty-one crosses comprising of 22 F₂, 7 F₃, 15 F₄ and 19 F₅ populations were grown in Aman season. Single seed progenies from single panicle of one plant were grown in the RGA nursery. Part of the panicle was sown directly on the soil. No thinning or pruning was done. Fertilizers were applied @80 kg urea, 60 kg TSP, 70 kg MoP, 50 kg gypsum and 5 kg zinc sulfate/ha. All fertilizers were applied during final land preparation. During harvesting at maturity, one panicle was collected from each plant of all the crosses at different times and the plant was uprooted. Harvested seeds remaining in the panicles were dried and subjected for dormancy breaking to initiate next cycle of RGA immediately. For dormancy breaking, at first, sun-drying was done for three days followed by oven drying at 50°C temperature for 72 hours.

Results: A total of 12,743 progenies from 16,111 progenies of 61 crosses (8,376 progenies of 22 F₂ crosses, 2,128 progenies of 7 F₃ crosses, 1,075 progenies of 15 F₄ crosses, 1,164 progenies of 19 F₅ crosses) were advanced through RGA (Table 3.3a and Table 3.3b).

Table 3.3a RGA Summary, SFR breeding, T. Aman 2024-25

Generation	No. of crosses	Progenies grown	Progenies harvested
F ₂	22	11000	8376
F ₃	7	2465	2128
F ₄	15	1268	1075
F ₅	19	1378	1164
Total	61	16,111	12,743

Table 3.3b: List of F₂, F₃, F₄ and F₅ populations advanced through RGA, SFR breeding, T. Aman 2024-25

SN	BR Number	Parentages	Progenies grown	Progenies harvested	% Recovery
F₂ population					
1	BR15275	BR9789-2-2-1/BR7730-1-1-2B	500	410	82
2	BR15276	BRRI dhan92/Vobani	500	411	82
3	BR15277	IR16F1097-P1/BR7730-1-1-2B	500	416	83
4	BR15278	IR15F1709/BR7919-1-1-3B	500	318	64
5	BR15279	IR16F1243/Vobani	500	394	79

SN	BR Number	Parentages	Progenies grown	Progenies harvested	% Recovery
6	BR15280	IR13F450-4/Khoiya motor	500	380	76
7	BR15281	IR108042-B-B-B-4-B-B-1/Khoiya motor	500	340	68
8	BR15282	IR16F1097-P1/Vobani	500	398	80
9	BR15283	IR15F1709/BR7730-1-1-2B	500	311	62
10	BR15284	BR9789-2-2-1/BR7919-1-1-3B	500	352	70
11	BR15285	IR16F1097-P1/Khoiya motor	500	410	82
12	BR15286	IR15F1709/Vobani	500	416	83
13	BR15287	BR9789-2-2-1/Khoiya motor	500	398	80
14	BR15288	IR13F450-4/BR7919-1-1-3B	500	322	64
15	BR15289	IRRI 154/BR10260-7-19-2B	500	366	73
16	BR15290	IRRI 176/BR10260-7-19-2B	500	416	83
17	BR15291	Fatema dhan/BR11186-5R-1	500	318	64
18	BR15292	IR16T1356/BR10260-7-19-2B	500	394	79
19	BR15293	IR14L545/BR10260-7-19-2B	500	398	80
20	BR15294	IR 126998-B-10-5-1-3/Khoiya motor	500	340	68
21	BR15295	BRRI dhan92/BR11186-5R-1	500	398	80
22	BR15297	BR11186-5R-1/IRRI 154	500	418	84
Sub Total			11,000	8,324	76
F₃ Progenies					
1	BR14486	IRRI 119/Khoiya motor	240	211	88
2	BR14487	BR11186-5R-1/Vobani	500	385	77
3	BR14488	BR11186-5R-549/BR7730-1-1-2B	360	312	87
4	BR14489	BRRI dhan91/Khoiya motor	350	302	86
5	BR14490	BRRI dhan91/Vobani	350	312	89
6	BR14491	BRRI dhan91/CN6	325	295	91
7	BR14492	BRRI dhan91/ BR7919-1-1-3B	340	311	91
Sub Total			2,465	2,128	86
F₄ Progenies					
1	BR13908	BR11186-5R-377/LalMohon	122	110	90
2	BR13909	BR11186-5R-377/Dud Laki	130	98	75
3	BR13911	BR11186-5R-377/Bashiraj	75	66	88
4	BR13915	BR11186-5R-672/ Dud Laki	195	169	87
5	BR13917	BR11186-5R-1/LalMohon	100	88	88
6	BR13918	BR11186-5R-1/Dud Laki	70	65	93
7	BR13922	BRRI dhan87/BRRI dhan91	48	38	79
8	BR13923	BRRI dhan77/BRRI dhan91	104	98	94
9	BR13924	BRRI dhan87/BR10260-7-19-2B	85	70	82
10	BR13926	BRRI dhan76/LalMohon	66	52	79
13	BR13933	BRRI dhan87/Dud Laki	78	65	83
14	BR13934	BRRI dhan87/Jalkumari	70	54	77
15	BR13921*	BRRI dhan94/BRRI dhan91	125	102	82
Sub Total			1,268	1,075	85
F₅ Progenies					
1	BR13379	BR7932-17-2-1-2-1-1-1-12/Laxmi Digha	25	20	80
2	BR13380	BR9175-9-1-3-20-3 /Laxmi Digha	80	78	98
3	BR13381	BR9175-9-2-1-12-5 /Jal Kumari	80	64	80
4	BR13382	BRRI dhan77/BR10230-15-27-7B	150	138	92
5	BR13383	BRRI dhan76/BR10230-15-27-7B	60	52	87
6	BR13384	BRRI dhan76/BR10260-7-19-2B	150	123	82
7	BR13385	BRRI dhan77/BR10260-7-19-2B	120	103	86
8	BR13386	BR9175-9-1-3-20-3/BR10230-15-27-7B	60	53	88
9	BR13388	BR9175-9-2-1-12-5 /Laxmi Digha	42	32	76
10	BR13389	IR13F441/Jal Kumari	51	42	82
11	BR13390	BRRI dhan 76/ Dud Laki	58	47	81
12	BR13391	BRRI dhan 77/Dud Laki	45	32	71
13	BR13392	BR7932-17-2-1-2-1-1-1-12/Dud Laki	20	12	60
14	BR13393	BR8146-5-2-2-1-1-1-2/Dud Laki	35	31	89
15	BR13394	Bashiraj/BR10260-7-19-2B	95	86	91
16	BR13395	IR13F441/Dud Laki	75	65	87
17	BR13396	IR13F441/Hizal Digha	85	72	85
18	BR13397	BRRI dhan 76/Jal Kumari	80	65	81
19	BR13398	BRRI dhan 77/Jal Kumari	60	49	82
Sub Total			1,371	1,164	85
Grand Total			16,111	12,743	83

DS: 7/7/2024

Experiment 3.4: Line Stage Testing (LST)

Principal Investigator: S Maniruzzaman

Co-investigators: M Rafiqul Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula.

Specific objectives: Selection of uniform genotypes in terms of uniformity in flowering, plant height, amylose content with key target traits especially submergence tolerance.

Materials and Methods: In total 1,122 lines from 20 crosses were transplanted in 12-hills single-row plots using systematic arrangement with respective parents and check varieties. Thirty days old single seedling was transplanted at 20 cm × 20 cm spacing. Fertilizers were applied following the rate given in experiment 3.1. Crop management was done as recommended for modern rice cultivation for Boro season. Weeding and other cultural operations were done in time. Leaf samples were collected from single plant of phenotypically selected plants for genotyping with trait markers using trait-based SNP markers. At maturity, line selection was done considering uniformity in flowering and plant height, grain size and shape, lodging tolerance and tolerance to major disease and insect over check varieties under field conditionss and presence of target major traits.

Results: A total of 232 lines were selected from 1,122 progenies of 20 crosses based on the key trait marker (*Sub1*), especial trait markers (e.g. *Wx-A*, *Wx-10*, *Wx-NB*), acceptable growth duration, plant height and uniformity in flowering for promoting in the observational yield trial. The list of progenies and the list of selected better lines are given in Table 3.4.

Table 3.4. List of superior fixed lines selected from LST populations, SFR breeding, T. Aman 2024-25

SN	Designation	Parentage	Lines grown	Lines selected
1	BR12968-4R	BR8157-50-1-6-2-1-27/ Fulkari	57	18
2	BR12969-4R	BR8157-50-1-6-2-1-27/ Laxmi Dhigha	51	15
3	BR12970-4R	BR8157-50-1-6-2-1-27/ Bajail 65	53	16
4	BR12971-4R	IR90082-SUB-35-3-2-2/ Lal Khama	172	37
5	BR12972-4R	IR90082-SUB-35-3-2-2/ Hbj. A. II	99	15
6	BR12973-4R	IR90082-SUB-35-3-2-2/ Lal Dhigha	53	8
7	BR12974-4R	IR90082-SUB-35-3-2-2/ Gour Kajol	35	7
8	BR12975-4R	BR9163-1-30-1-25/ Lal Khama	15	0
9	BR12976-4R	BR9163-1-30-1-25/ IR13F582	89	26
10	BR12977-4R	BR9163-1-30-1-25/ Til Bajal	54	16
11	BR12978-4R	BR9163-1-30-1-25/ Bajail 65	30	11
12	BR12979-4R	IR92689-SUB-SUB-92-1-B/ Fulkari	23	3
15	BR12982-4R	IR85261-18-158-Gaz-3B-62/ Gour Kajol	36	3
16	BR12983-4R	IR85261-18-158-Gaz-3B-62/ Til Bajal	36	1
17	BR12984-4R	IR13F458/ Til Bajal	95	13
19	BR12986-4R	BRRI dhan79/ Dud Laki	40	10
20	BR12987-4R	BRRI dhan79/ Hbj. A. IV	184	33
Grand Total			1,122	232

DS: 13/7/2024

DT: 3/8/2024

Experiment 3.5: Observational Yield Trial (OYT)

Principal Investigator: S Maniruzzaman

Co-investigators: M Rafiqul Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Advanced evaluation of promising breeding lines in replicated trial under shallow flooded and rainfed conditions.

Materials and Methods: A total of 360 entries with two check varieties were evaluated following augmented RCB design with two replications. Around 30 days old seedlings were transplanted at a spacing of 20 x 20 cm with single seedling per hill. The unit plot size was 5.4 m x 6 rows. Fertilizers were applied @ 100kg urea, 60kg TSP, 50kg MoP, 50kg gypsum and 5kg zinc sulfate/ha. Urea was applied in equal three splits at 10, 30 and 45 days after transplanting. The fertilizers other than urea were applied as basal during final land preparation. Other cultural and pest management practices were carried out as and when necessary.

Results: Among all the tested entries 40 lines were selected based on agronomic performance and phenotypic acceptability. The genotype BR12950-5R-134 gave significantly higher yield (3.6 t/ha) followed by BR12956-5R-38 (3.3 t/ha) and BR12926-5R-73 (3.1 t/ha) (Table 3.7)

than the check variety BRRI dhan91 (1.9 t/ha). The tested entries were lodged due to heavy storm during flowering stage, which caused poor grain yield. The heritability obtained from plant height, growth duration, and grain yield were 74%, 77%, and 60%, respectively, indicating a high level of precision of the experiment (Table 3.5).

Table 3.5. Performance of the top 10 selected entries of OYT, SFR breeding, T. Aman, 2024-25

SL No	Designation	PH (cm)	TN	PAcp	GD (Days)	Yield (t/ha)
1	BR12485-5R-42	150	10	5	138	2.9
2	BR12950-5R-134	140	8	5	137	3.6
3	BR12956-5R-38	144	9	5	136	3.3
4	BR12960-5R-69	139	7	5	140	2.7
5	BR12917-5R-11	180	7	5	135	2.8
6	BR12926-5R-73	147	9	5	139	3.1
7	BR12966-5R-13	140	7	5	134	2.9
8	BR12966-5R-95	144	8	5	138	2.5
9	BR9390-6-2-1B (Ck)	130	9	5	140	2.5
10	BRRI dhan91 (Ck)	140	8	7	139	1.9
	P-value	**	ns	*	**	*
	LSD (0.05)	5.6		1.2	5.1	0.5
	H ₂ B	74		65	77	60

Rainfed, Gazipur: DS: 21/7/2024 DT: 15/8/2024

Deep-Water Tank, Shabari: DS: 21/5/2024 DT: 27/6/2024

BRRI R/S, Gopalganj: DS: 21/5/2024 DT: 29/6/2024

Experiment 3.6: Preliminary Yield Trial (PYT)

Principal Investigator: S Maniruzzaman

Co-investigators: M Rafiqul Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Preliminary evaluation of promising breeding lines in replicated trial under shallow flooded and rainfed conditions.

Materials and Methods: In total, eight entries with two checks were evaluated following RCB design with two replications. Around 30 days old seedlings were transplanted at a spacing of 20 x 20 cm with single seedling per hill. The unit plot size was 5.4 m x 6 rows. Fertilizers were applied @ 100kg urea, 60kg TSP, 50kg MoP, 50kg gypsum and 5kg zinc sulfate/ha. Urea was applied in equal three splits at 10 and 30 days after transplanting. The fertilizers other than urea were applied as basal during final land preparation. Other cultural and pest management practices were carried out as and when necessary.

Results: Among all tested entries two lines were selected based on agronomic performance and phenotypic acceptability. The genotype BR12960-5R-69 gave the highest yield (2.89 t/ha) followed by BR12485-5R-42 (2.58 t/ha), whereas check variety BRRI dhan91 yielded 1.15 t/ha. The heritability obtained from plant height, growth duration and grain yield were 89%, 88% and 93% respectively, indicating high level of precision in this experiment (Table 3.6).

Table 3.6. Performance of the entries of PYT, SFR breeding, T. Aman 2024-25

SN	Genotype	PH (cm)	DM (days)	Yield (t/ha)		
				Gazi	Gopal	Shibbari
1	BR12485-5R-42	175	128	3.28	2.88	2.58
2	BR12917-5R-11	153	128	2.94	1.94	2.24
3	BR12926-5R-73	168	125	4.19	2.01	1.19
4	BR12950-5R-134	172	122	3.18	2.18	2.19
5	BR12956-5R-38	172	132	2.60	1.60	1.90
6	BR12960-5R-69	169	135	2.96	2.96	2.89
7	BR12966-5R-13	169	127	3.55	2.11	2.07
8	BR12966-5R-95	164	127	3.38	2.02	2.38
9	BR9390-6-2-1B (Ck)	130	128	3.70	2.70	3.12
10	BRRI dhan91 (Ck)	166	133	1.85	0.85	1.15
LSD		5.65	3.51	0.34	0.29	0.38

SN	Genotype	PH (cm)	DM (days)	Yield (t/ha)		
				Gazi	Gopal	Shibbari
H2b		0.89	0.88	0.87	0.91	0.93
P-value		****	***	****	**	***
Rainfed, Gazipur: DS: 21/7/2024			DT: 15/8/2024			
Deep-Water Tank, Shabari: DS: 21/5/2024			DT: 27/6/2024			
BRRI R/S, Gopalganj: DS: 21/5/2024			DT: 29/6/2024			

Experiment 3.7: Advanced Yield Trial (AYT#1)

Principal Investigator: S Maniruzzaman

Co-investigators: M Rafiqul Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Advanced evaluation of promising breeding lines in replicated trial under shallow flooded and rainfed conditions.

Materials and Methods: In total, seven entries with two checks were evaluated following RCB design with two replications. Around 30 days old seedlings were transplanted at a spacing of 20 x 20 cm with single seedling per hill. The unit plot size was 5.4 m x 6 rows. Fertilizers were applied @100kg urea, 60kg TSP, 50kg MoP, 50kg gypsum and 5kg zinc sulfate/ha. Urea was applied in equal three splits at 10, 30 and 45 days after transplanting. The fertilizers other than urea were applied as basal during final land preparation. Other cultural and pest management practices were carried out as and when necessary.

Results: Among all tested entries three lines were selected based on agronomic performance and phenotypic acceptability. The genotype BR10260-7-19-2B gave highest yield (3.22 t/ha) followed by BR11686-5R-1 (2.93 t/ha), whereas check variety BRRI dhan91 yielded 2.08 t/ha. The heritability obtained from plant height, growth duration and grain yield were 89%, 87% and 97% respectively, indicating high level of precision in this experiment (Table 3.7).

Table 3.7. Performance of the selected entries of AYT#1, SFR breeding, T. Aman 2024-25

SN	Genotype	PH (cm)	DM (Days)	Yield (t/ha)		
				Gazi	Gopal	Shibbari
1	BR10212-12-1-2-6	158	130	3.49	2.09	2.32
2	BR10260-7-19-2B	156	132	3.73	2.98	3.22
3	BR11686-5R-1	178	134	2.44	2.39	2.93
4	BR12489-5R-40	174	135	2.60	1.50	2.09
5	BR12490-5R-134	183	132	3.29	2.19	2.06
6	BR9241-5R-5	175	140	2.95	2.97	2.44
7	BR9789-3-1-1	149	132	3.27	2.17	2.32
8	BRRI dhan44 (Ck)	138	130	4.45	1.01	1.56
9	BRRI dhan91 (Ck)	173	139	2.59	1.49	2.08
LSD (0.05)		4.43	2.34	0.19	0.48	0.67
H2b		89	87	88	90	91
P-value		****	***	****	**	*
Rainfed, Gazipur: DS: 21/7/2024			DT: 15/8/2024			
Deep-Water Tank, Shabari: DS: 21/5/2024			DT: 27/6/2024			
BRRI R/S, Gopalganj: DS: 21/5/2024			DT: 29/6/2024			

Experiment 3.7: Advanced Yield Trial (AYT#2)

Principal Investigator: S Maniruzzaman

Co-investigators: M Rafiqul Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Advanced evaluation of promising breeding lines in replicated trial under shallow flooded and rainfed conditions.

Materials and Methods: In total, five entries with two checks were evaluated following RCB design with two replications. Around 30 days old seedlings were transplanted at a spacing of 20 x 20 cm with single seedling per hill. The unit plot size was 5.4 m x 6 rows. Fertilizers were

applied @ 100kg urea, 60kg TSP, 50kg MoP, 50kg gypsum and 5kg zinc sulfate/ha. Urea was applied in equal three splits at 10 and 30 days after transplanting. The fertilizers other than urea were applied as basal during final land preparation. Other cultural and pest management practices were carried out as and when necessary.

Results: Among all tested entries two lines were selected based on agronomic performance and phenotypic acceptability. The genotype BR11186-5R-119 gave highest yield (2.94 t/ha) followed by BR10211-22-9-2_PS4 (2.87 t/ha), whereas check variety BRRI dhan91 yielded only 1.5 t/ha. The heritability obtained from plant height, growth duration and grain yield were 89%, 83% and 92% respectively, indicating high level of precision in this experiment (Table 3.7).

Table 3.7. Performance of the selected entries of AYT#2, SFR breeding, T. Aman 2024-25

SN	Genotype	PH (cm)	DM (Days)	Yield (t/ha)		
				Gazipur	Gopalganj	Shibbari
1	BR10211-22-9-2_PS4	162	133	2.25	2.79	2.87
2	BR11186-5R-119	155	127	2.25	2.85	2.94
3	BR11186-5R-377	165	124	2.90	1.92	2.31
4	BR11186-5R-549	162	129	3.13	2.15	2.32
5	BR11186-5R-672	166	130	3.09	2.11	2.29
6	BRRI dhan44 (Ck)	127	131	4.14	1.34	1.98
7	BRRI dhan91 (Ck)	164	135	2.09	1.11	1.50
LSD		4.06	4.16	0.2	0.45	0.34
H2b		0.89	0.83	0.88	0.92	0.89
P-value		****	*	****	*	**

Rainfed, Gazipur: DS: 21/7/2024

DT: 15/8/2024

Deep-Water Tank, Shibbari: DS: 21/5/2024

DT: 27/6/2024

BRRI R/S, Gopalganj: DS: 21/5/2024

DT: 29/6/2024

PROJECT 4: DEVELOPMENT OF RAINFED LOWLAND RICE

General objective: Development of genotypes superior to standard varieties and adaptable to rainfed lowland environment in T. Aman season.

Project Leader: Dr. Md Ruhul Amin Sarker

Experiment 4.1: Hybridization

Principal investigator: Md. Ruhul Amin Sarker

Co-Investigators: M Adil and R R Majumder

Specific objectives: Introgression of genes from diverged genetic background into rice varieties/lines for the improvement of standard T. Aman varieties.

Materials and Method: Twenty-seven varieties/lines (Table 4.1a) were grown in the hybridization block of plant breeding division at three staggers with an interval of seven days to synchronize flowering among male and female parents. Twenty-five to thirty days old seedlings were transplanted in a 5.4 m × 2 rows plot with a spacing of 20 cm × 15 cm. Single seedling were used for transplanting. Fertilizers@108 (234 Kg Urea): 17.4 (87 Kg TSP): 58.5 (117 Kg MP): 14 (78 Kg Gypsum): 4.3 (12 Kg Zn SO₄) Kg NPKSZn/ha were applied in the trial. All amounts of P, K, S and Zn were applied at the time of final land preparation and nitrogen were applied at three equal splits at 5-10, 20-25 and 35-40 days after transplanting (DAT). Crop management such as weeding, irrigation etc. was done on time. Insects, diseases and other pests were controlled properly. For parental purification, leaf samples were collected from all plants of each parent for QC genotyping with 10 SNP panel. The plants showing unique genomic profiles of each parent were used to make crosses. To make the desired cross combination, emasculation was done on the day before anthesis using vacuum emasculator and emasculated panicles were bagged with glassine paper bags. Pollination was performed with just anthesized panicles of the male parent by dusting pollen on the emasculated panicles of the female parent.

Results: Thirty-nine and 47 crosses were made with the desired parents (Table 4.1b) during T. Aman and Boro, respectively. Mature F₁ seeds were harvested, sun dried and stored separately in paper bags with proper labeling and packaging.

Table 4.1a: List of the parents used in hybridization, Development of Rainfed Lowland Rice, T. Aman and Boro 2024-25

SN	Designation	PH (cm)	GD (days)	GY_ BLUP	Genotypic information
T. Aman 2024-25					
1	BR12989-4R-199	138	140	5.67	qDTY3.1_2+ Waxy_A + Waxy_10
2	BR12993-4R-123	133	135	5.44	qDTY2.1_1+qDTY2.1_2+ qDTY2.1_3+ qDTY2.1_4+ qDTY3.1_1+ qDTY3.1_3+ qDTY3.1_4+ qDTY3.2+ qDTY12.1+ Waxy_A + Waxy_10
3	BR13519-4R-310	142	132	5.36	qDTY3.1_2+ qDTY3.2+ qDTY12.1+ Waxy_A + Waxy_10
4	BR13519-4R-268	132	135	5.34	qDTY3.1_1+ qDTY3.1_2 qDTY3.2+ Waxy_A
5	BR13049-4R-271	146	133	5.29	qDTY2.2-1+ qDTY2.2-2+ qDTY3.1_1+ qDTY3.1_2 qDTY3.2+ Pita + Waxy_A + Waxy_10
6	BR13519-4R-686	141	133	5.27	qDTY2.1_1+ qDTY2.1_2+ qDTY2.1_3+ qDTY2.1_4+ qDTY2.1_5+ qDTY3.1_1+ qDTY3.1_2 qDTY3.2+ xa5+ Pita Waxy_A
7	BR13519-4R-683	133	148	5.25	qDTY2.1_1+ qDTY3.1_2 qDTY3.2+ Pita
8	BR13519-4R-985	142	128	5.23	qDTY2.1_1+ qDTY3.2+ qDTY12.1+ Pita + Waxy_A + Waxy_10
9	BR12997-4R-38	145	133	5.23	qDTY2.1_1+ qDTY2.1_2+ qDTY2.1_3+ qDTY2.1_4+ qDTY2.1_5+ qDTY3.2+ Waxy_A
10	BR13049-4R-85	143	134	5.2	qDTY2.1_1+ qDTY2.1_2+ qDTY2.1_3+ qDTY2.1_4+ qDTY2.1_5+ qDTY2.2-1+ qDTY3.1_1+ qDTY3.1_2 qDTY3.2+ Pita + Waxy_A + Waxy_10
11	BR13050-4R-6	126	137	5.2	qDTY2.1_1+ qDTY2.1_2+ qDTY2.1_3+ qDTY2.1_4+ qDTY2.1_5+ qDTY3.1_1+ qDTY3.1_2 qDTY3.2+ xa5+ Pita Waxy_A
12	BR13050-4R-29	129	132	5.19	qDTY3.1_1+ qDTY3.2+ Pita Waxy_A
13	BR12996-4R-225	117	130	5.18	qDTY2.1_1+ qDTY2.1_2+ qDTY2.1_3+ qDTY2.1_4+ qDTY2.1_5+ qDTY2.2-1+ qDTY2.2-2+ qDTY3.1_1+ qDTY3.1_2 qDTY3.2+ qDTY12.1+ Waxy_A + Waxy_10
14	BR12988-4R-195	141	131	5.17	qDTY1.1_2+ qDTY2.2-1+ qDTY3.2+ qDTY12.1+ Waxy_A
15	BR12997-4R-36	127	130	5.17	qDTY2.1_1+ qDTY2.1_2+ qDTY2.1_3+ qDTY2.1_4+ qDTY2.1_5+ qDTY3.1_1+ qDTY3.1_2 qDTY3.2+ Waxy_A + Waxy_10
16	BR12005-6R-14	137	127	4.92	
17	BR11333-6R-84	112	119	4.85	
18	BR11343-6R-51	110	125	4.81	
19	BR12997-4R-113	125	125	4.92	qDTY1.1_2+ qDTY2.1_1+ qDTY2.1_2+ qDTY2.1_3+ qDTY2.1_4+ qDTY2.1_5+ qDTY2.2-1+ qDTY2.2-2+ qDTY3.1_1+ qDTY3.1_2+ qDTY3.2+ Waxy_A + Waxy_10
20	BR10797-6R-24	131	128	4.84	
21	BR12990-4R-156	124	128	4.82	qDTY3.1_2+ Waxy_A
22	BR11607-4R-72	-	-	-	xa5, xa13, Xa21
23	BRRI dhan71	108	115	5.5	-
24	BRRI dhan75	110	115	5.5	-
25	BRRI dhan103	125	133	6.2	-
26	BRRI dhan104	92	147	7.3	-
27	BRRI dhan107	100	150	8.19	-
Boro 2024-25					
1	BR12993-4R-123		135	5.44	qDTY2.1_4+ qDTY3.1+ qDTY3.2+ qDTY12.1+ Waxy_A + Waxy_10
2	BR13519-4R-268		135	5.34	qDTY3.1+qDTY3.2+ Waxy_A
3	BR13050-4R-6		137	5.2	qDTY2.1+ qDTY2.1_5+ qDTY3.1+qDTY3.2+ xa5+ Pita Waxy_A
4	BR12419-6R-102		151	8.91	Wx-A, Wx.10
5	BR12524-5R-56		146	8.04	Wx-A, Wx.10, SCT1, Pbl, BPH32, Pita
6	BR12894-5R-240				-
7	BR13201-4R-186		148	8.6	Wx-a, Wx-10
8	BR11420-4R-30		157	8.43	HZn (31.5 mg/kg)
9	BR 13219-4 R-382		151	7.4	bph17, bph32, Wx_A group
10	BR13466-4R-61		153	8.6	Bph32, Gm4
11	BR11867-5R-27		133	6.54	Xa21, qHTSF4.1
12	BR11607-4R-72		124	6	xa5, xa13, Xa21
13	IRRI 154-Pi9				xa5, TSV1, Pi9
14	BR12266-BC3-23-1				Heat (Phy. D)
15	BR12429-BC3-50-8				Heat (Phy. D)
16	BR13157-4R-173				Heat tolerant
17	IR12N177				Heat tolerant
18	BR28(T)-qEMF3-late DTH		160	5.1	Early morning flowering
19	BR28(T)-qEMF3-6		160	5	Early morning flowering
20	N22				Heat (Phy. D)
21	Kasalath				Heat + Drought

Table 4.1b: List of the crosses, Development of Rainfed Lowland Rice, T. Aman and Boro
2024-25

SN	Cross combinations	Characteristics	No of F ₁ seed	Average_ BLUP
T. Aman (Forward breeding)				
1	BR12989-4R-199/BR12996-4R-225	High yielding HYV	13	5.43
2	BR12993-4R-123/BR12988-4R-195	High yielding HYV	32	5.31
3	BR13519-4R-310/BR12997-4R-36	High yielding HYV	17	5.27
4	BR13049-4R-271/BR11333-6R-84	High yielding HYV	87	5.07
5	BR13519-4R-686/BR11343-6R-51	High yielding HYV	130	5.04
6	BR13519-4R-683/BR12997-4R-113	High yielding HYV	44	5.09
7	BR12997-4R-38/BR12990-4R-156	High yielding HYV	9	5.03
8	BR13049-4R-85/BR13519-4R-10	High yielding HYV	10	5.01
9	BR13050-4R-6/BR10799-6R-31	High yielding HYV	70	4.98
10	BRRRI dhan107/BR13519-4R-10	High yielding HYV	15	6.50
11	BR12208-4R-343/BR11318-4R-84	High yielding HYV	130	5.26
12	BR13108-4R-438/BR113184-4R-84	High yielding HYV	3	5.17
13	BR13108-4R-214/IR8A1398	High yielding HYV	5	5.16
14	BR13122-4R-14/BR12520-5R-75	High yielding HYV	68	5.15
15	Fatema dhan/BRRRI dhan66	High yielding HYV	18	5.13
16	BR13122-4R-44/BR12208-5R-278	High yielding HYV	64	5.12
17	BR13113-4R-63/BR13122-4R-14	High yielding HYV	30	5.25
18	BR13050-4R-29/BR11336-6R-10	High yielding HYV	3	5.16
19	BR11343-6R-51/BR11607-4R-72	High yielding HYV	11	5.15
20	BR13519-4R-686/IR12N177	High yielding HYV	40	5.14
21	BRRRI dhan71/ BR12314-5R-180	High yielding HYV	9	5.16
22	BR13113-4R-63/BR13023-4R-33	High yielding HYV	3	5.15
23	IR126952-41-148-83-9-60-B/N22	High yielding HYV	11	5.14
24	BR12005-6R-14/BR11607-4R-72	<i>xa5, xa13, Xa21</i>	12	5.13
25	BR10797-6R-24/BR11607-4R-72	<i>xa5, xa13, Xa21</i>	7	-
26	Fatema dhan/ Nizersail	HYV, photosynsitive	5	-
Photosynsitive				
1	BR12993-4R-123/BR22	HYV, photosynsitive	4	
2	BR12989-4R-199/BR22	HYV, photosynsitive	37	
3	BR22/BR12993-4R-123	HYV, photosynsitive	43	
4	BR12989-4R-199/BRRRI dhan46	HYV, photosynsitive	113	
5	BR12993-4R-123/BR23	HYV, photosynsitive	9	
6	BR13519-4R-683/BRRRI dhan46	HYV, photosynsitive	36	
7	BR13050-4R-29/BR23	HYV, photosynsitive	21	
8	BR13103-4R-37/Gainza	HYV, photosynsitive	27	
9	BR13122-4R-4/Gainza	HYV, photosynsitive	5	
Backcross				
1	BR11745-5R-76/ Gigoj//BR11745-5R-76			
2	BR11745-5R-76/ Nakuchimota//BR11745-5R-76			
3	BR12631-5R-51/ Gigoj//BR12631-5R-51			
4	BR12631-5R-51/ Nakuchimota//BR12631-5R-51			
Boro 2024-25				
1	BR12679-4R-6/BR13106-4R-438	<i>xa5, xa13, Xa21, bph17, bph32, Wx_A</i>	7	
2	BR 13219-4 R-382/BR11607-4R-72	<i>Bph32, Wx-A, Wx.10</i>	34	
3	BR12419-6R-102/BR13466-4R-61	<i>qDTY2.1_4+ qDTY3.1+ qDTY3.2+ qDTY12.1+ Waxy_A + Waxy_10</i>	3	
4	BR12993-4R-123/BR12419-6R-102		27	
5	BR13111-4R-191/BR12671-4R-312	<i>qDTY2.1_4+ qDTY3.1+ qDTY3.2+ qDTY12.1+ Waxy_A + Waxy_10</i>	58	
6	BR12993-4R-123/BR12894-5R-240	<i>Bph32, Gm4, Wx-a, Wx-10</i>	50	
7	BR13201-4R-186/BR13466-4R-61	<i>qDTY3.1+qDTY3.2+Bph32 +Waxy_A</i>	8	
8	BR13519-4R-268/BR13466-4R-61		12	
9	BR13472-4R-124/BR12640-4R-250	<i>qDTY2.1+ qDTY3.1+qDTY3.2+ xa5+ Pita+TSV1+Pi9+Waxy_A</i>	14	
10	BR13050-4R-6/IRRI 154-Pi9	<i>Wx-A, Wx.10, SCT1, Pb1, BPH32, Gm4, Pita</i>	26	
11	BR12524-5R-56/BR13466-4R-61	<i>Xa21, qHTSF4.1</i>	14	
12	BR11867-5R-27/BR13157-4R-173	<i>xa5, xa13, xa21, Bph32, Gm4</i>	30	
13	BR13466-4R-61/BR11607-4R-72	<i>Wx-A, Wx.10, SCT1, Pb1, BPH32, Pita</i>	25	
14	BR13201-4R-219/BR12524-5R-56	<i>Bph17, Bph32, Wx-a, Wx-10</i>	5	
15	BR13201-4R-186/BR 13219-4 R-382	<i>HZn, Wx-a, Wx-10</i>	7	
16	BR13201-4R-186/BR11420-4R-30	<i>Wx-A, Wx.10, SCT1, Pb1, BPH32, Pita</i>	5	

SN	Cross combinations	Characteristics	No of F ₁ seed	Average_ BLUP
17	BR12524-5R-56/BR11607-4R-72	<i>Heat tolerant</i>	16	
18	BR12894-5R-240/BR13157-4R-173	<i>qDTY3.1+qDTY3.2+ Waxy_A</i>	31	
19	BR13519-4R-268/BR12419-6R-102	<i>qDTY3.1+qDTY3.2+ Waxy_A</i>	33	
20	BR13519-4R-268/BR13201-4R-186		15	
21	BR13219-4R-382/BR13466-4R-61	<i>Bph17, Bph32, Wx-A, Wx.10</i>	28	
22	BR12419-6R-102/BR 13219-4 R-382	<i>qDTY3.1+qDTY3.2+xa5+T SV1+Pi9+Waxy_A</i>	10	
23	BR13519-4R-268/IRRI 154-Pi9		31	
24	BR13519-4R-686/BR11343-6R- 51/BR13106-4R-438		70	
25	BR13202-4R-141/BR12419-6R-102	<i>xa5, TSV1, Pi9, Bph32, Gm4</i>	24	
26	BR13466-4R-61/IRRI 154-Pi9	<i>Bph32, Gm4</i>	65	
27	BR13466-4R-61/BR12419-6R-102	<i>qDTY2.1_4+ qDTY3.1+ qDTY3.2+ qDTY12.1+ Waxy_A + Waxy_10</i>	30	
28	BR12993-4R-123/BR12524-5R-56	<i>Wx-A, Wx.10, SCT1, Pb1, BPH32, Pita, HZn</i>	9	
29	BR12524-5R-56/BR11420-4R-30	<i>qDTY2.1_4+ qDTY3.1+ qDTY3.2+ qDTY12.1+ Waxy_A + Waxy_10</i>	13	
30	BR12993-4R-123/BR13201-4R-186	<i>qDTY2.1_4+ qDTY3.1+ qDTY3.2+ qDTY12.1+Bph17+Bph32+ Waxy_A + Waxy_10</i>	13	
31	BR12993-4R-123/BR13219-4R-382	<i>Wx-a, Wx-10, Heat tolerance</i>	10	
32	BR13201-4R-186/BR13157-4R-173		40	
33	BR14018-4R-171/BR13219-4R-382	<i>xa5, xa13, Xa21, bph17, bph32, Wx_A group</i>	57	
Heat tolerance				
1	BR12993-4R-123/BR12266-BC3-23-1	<i>qDTY2.1_4+ qDTY3.1+ qDTY3.2+ qDTY12.1+ Waxy_A + Waxy_10</i>	19	
2	BR13050-4R-6/BR28(T)-qEMF3-6	<i>qDTY2.1+ qDTY2.1_5+ qDTY3.1+qDTY3.2+ xa5+ Pita Waxy_A</i>	4	
3	BR11867-5R-27/BR28(T)-qEMF3-6	<i>Xa21, qHTSF4.1, Early morning flowering</i>	109	
4	BR12419-6R-102/Kasalath	<i>Wx-A, Wx.10</i>	5	
5	BR11420-4R-30/BR12266-BC3-23-1	<i>HZn, Heat tolerance</i>	3	
6	BR13050-4R-6/BR28(T)-qEMF3-late DTH	<i>qDTY2.1+ qDTY2.1_5+ qDTY3.1+qDTY3.2+ xa5+ Pita Waxy_A</i>	16	
7	BR13466-4R-61/N22	<i>Bph32, Gm4, Heat</i>	8	
8	BR13201-4R-186/IR12N177	<i>Heat tolerance, Wx-a, Wx- 10</i>	8	
9	BR13050-4R-6/IR12N177	<i>qDTY2.1+ qDTY2.1_5+ qDTY3.1+qDTY3.2+ xa5+ Pita Waxy_A</i>	126	
10	BR12894-5R-240/Kasalath	<i>Heat + Drought</i>	7	
11	BR13467-4R-388/N22	<i>Heat tolerance</i>	26	
12	BR12208-4R-403/N22	<i>Heat tolerance</i>	150	
13	BR13519-4R-268/BR28(T)-qEMF3-6	<i>qDTY3.1+qDTY3.2+ Waxy_A</i>	30	
14	BR12419-6R-102/BR28(T)-qEMF3-late DTH	<i>Wx-A, Wx.10</i>	3	

Experiment 4.2: Hybridity test and confirmation of F1

Principal investigator: M R A Sarker

Co-Investigators: M Adil, R R Majumder

Specific objectives: To confirm the crosses as true F1s and use of the selected F1s to produce F2 seeds and use in making different types of crosses.

Materials and Methods: A total of 30 crosses in T. Aman and 26 crosses in Boro season were grown along with their parents in the crossing blocks at BRRI Gazipur using single seedling/hill at 20 cm × 20 cm spacing in 12-hill three/four row plots. Fertilizers and crop management were done following the protocol described in Experiment 4.1. Leaf samples were collected from each of the plants of F1 and parents for QC genotyping to determine true F1s. QC genotyping was performed using 10 QC SNPs at Intertek, Australia. All genotyping results were analyzed using Flapjack.

Results: The plants with heterozygous alleles at two or more SNP loci were declared as true F₁. All the 30 crosses in T. Aman and 25 out of 26 crosses in Boro season were identified as true F₁. Seeds of these F₁ plants were selfed to produce F₂ seeds. At maturity stage, F₂ seeds of all selected plants were harvested individually. Then they were dried, cleaned and preserved in cold rooms for proper storage (Table 4.2).

Table 4.2: The list of F₁s confirmed, Development of Rainfed Lowland Rice, T. Aman and Boro 2024-25

SN	BR Reg. No.	Cross combinations	Characteristics
T. Aman			
1	BR16639	BR11745-5R-76/BR12631-5R-51	High yielding HYV
2	BR16640	BR12631-5R-51/BR11732-5R-11	High yielding HYV
3	BR16641	BR11748-5R-16/BR11732-5R-11	High yielding HYV
4	BR16642	BR11748-5R-2/BR11745-5R-76	High yielding HYV
5	BR16643	BR11728 -5R-170/BR11732-5R-11	High yielding HYV
6	BR16644	BR11739-5R-53/BR11731-5R-135	High yielding HYV
7	BR16645	BR11752-5R-105/BR11745-5R-76	High yielding HYV
8	BR16646	BR11736-5R-64/BR11743-5R-98	High yielding HYV
9	BR16647	BR12293-5R-47/BR11745-5R-76	High yielding HYV
10	BR16648	BR11745-5R-76/BR11731-5R-135	High yielding HYV
11	BR16649	BR12631-5R-51/BR11743-5R-87	High yielding HYV
12	BR16650	BR11732-5R-11/BR11752-5R-105	High yielding HYV
13	BR16651	BR11748-5R-16/BR11736-5R-64	High yielding HYV
14	BR16652	BR11748-5R-2/BR11743-5R-98	High yielding HYV
15	BR16653	BR11728 -5R-170/BR11755-5R-5	High yielding HYV
16	BR16654	BR11739-5R-53/BR11739-5R-33	High yielding HYV
17	BR16655	BR12631-5R-51/BR11739-5R-33	High yielding HYV
18	BR16656	BR11732-5R-11/BR11753-5R-157	High yielding HYV
19	BR16657	BR11748-5R-16/BR11743-5R-76	High yielding HYV
20	BR16658	BR11748-5R-2/BR12294-5R-187	High yielding HYV
21	BR16659	BR11732-5R-11/BR12294-5R-187	High yielding HYV
22	BR16660	BR11748-5R-16/BR12635-5R-131	High yielding HYV
23	BR16661	BR11748-5R-2/BR12296-5R-100	High yielding HYV
24	BR16662	BR11728 -5R-170/BR11743-5R-76	High yielding HYV
25	BR16663	IR 126952-41-58-26-4-12-1-9/ BR11743-5R-76	HYV, Drought tol.
26	BR16664	BR12631-5R-51/IR 126952-41-58-26-4- 12-1-9	HYV, Drought tol.
27	BR16665	BR11745-5R-76/ Gigoj	HYV, Gigoj type grain
28	BR16666	BR11745-5R-76/ Nakuchimota	HYV, Good for puffed rice
29	BR16667	BR12631-5R-51/ Gigoj	HYV, Gigoj type grain
30	BR16668	BR12631-5R-51/ Nakuchimota	HYV, Good for puffed rice
Boro 2024-25			
1	BR16980	BR12989-4R-199/BR12996-4R-225	High yielding HYV
2	BR16981	BR12993-4R-123/BR12988-4R-195	High yielding HYV
3	BR16982	BR13519-4R-310/BR12997-4R-36	High yielding HYV
4	BR16983	BR13049-4R-271/BR11333-6R-84	High yielding HYV
5	BR16985	BR13519-4R-683/BR12997-4R-113	High yielding HYV
6	BR16986	BR12997-4R-38/BR12990-4R-156	High yielding HYV
7	BR16987	BR13049-4R-85/BR13519-4R-10	High yielding HYV
8	BR16988	BR13050-4R-6/BR10799-6R-31	High yielding HYV
9	BR16989	BRR1 dhan107/BR13519-4R-10	High yielding HYV
10	BR16990	BR12208-4R-343/BR11318-4R-84	High yielding HYV
11	BR16991	BR13108-4R-438/BR113184-4R-84	High yielding HYV
12	BR16992	BR13108-4R-214/IR8A1398	High yielding HYV
13	BR16993	BR13122-4R-14/BR12520-5R-75	High yielding HYV
14	BR16994	Fatema dhan/BRR1 dhan66	High yielding HYV
15	BR16995	BR13122-4R-44/BR12208-5R-278	High yielding HYV
16	BR16996	BR13113-4R-63/BR13122-4R-14	High yielding HYV
17	BR16997	BR13050-4R-29/BR11336-6R-10	High yielding HYV
18	BR16998	BR11343-6R-51/BR11607-4R-72	High yielding HYV
19	BR16999	BR13519-4R-686/IR12N177	High yielding HYV
20	BR17000	BRR1 dhan71/ BR12314-5R-180	High yielding HYV
21	BR17001	BR13113-4R-63/BR13023-4R-33	High yielding HYV
22	BR17002	IR126952-41-148-83-9-60-B/N22	High yielding HYV

23	BR17003	BR12005-6R-14/BR11607-4R-72	High yielding HYV
24	BR17004	BR10797-6R-24/BR11607-4R-72	High yielding HYV
25	BR17005	Fatema dhan/ Nizersail	High yielding HYV, Photosynsitive

Experiment 4.3: Advancing segregating progenies in RGA/FRGA nurseries

Principal investigator: M R A Sarker

Co-Investigators: M Adil, R R Majumder, M A Kader

Specific objectives: Rapid advancement of segregating population for shortening breeding cycle.

Materials and Method: A total of 23,710 individual segregating progenies of 66 crosses of F₂ and F₅ generations were grown during T. Aman 2024-25. Total 14,712 progenies of 55 crosses from F₂ and F₃ generations were grown in Boro season at Gazipur under field RGA condition. In case of field RGA, panicles were directly seeded on the raised bed at 5 cm × 5 cm spacing. A wooden frame was used to make single-row plots on the beds. Half doses of the fertilizers that were used in experiment 4.1 were applied in the experiment. At maturity stage, a single panicle was harvested from each bunch of hills. Harvested panicles were dried and subjected to keep in the oven at 50°C for breaking dormancy and repeat the same method to initiate next cycle of RGA immediately.

Results: A total of 13,657 individual segregating progenies of 66 crosses of F₂ and F₅ generations were harvested during during T. Aman 2024-25 under field RGA condition. Total 14,712 progenies of 55 crosses from F₂ and F₃ generations were grown during Boro 2024-25 at Gazipur under field RGA condition and now at flowering stage (Table 4.3a and Table 4.3b).

Table 4.3a: List of segregating progenies harvested from field RGA nurseries, Development of Rainfed Lowland Rice, T. Aman 2024-25

SN	BR Reg. No.	Cross combinations	Progenies transplanted	Progenies harvested
F₂ generation				
1	BR15538	Bangabandhu dhan100/ BR10799-6R-151	400	150
2	BR15539	Bangabandhu dhan100/ BR10800-6R-1	400	96
3	BR15540	Bangabandhu dhan100/ BR10800-6R-54	400	159
4	BR15541	Bangabandhu dhan100/ BR10802-6R-242	400	162
5	BR15542	Bangabandhu dhan100/ BR10802-6R-66	400	243
6	BR15543	Bangabandhu dhan100/ BR11222-6R-64	400	183
7	BR15545	Bangabandhu dhan100/ BR11334-6R-35	400	204
8	BR15546	Bangabandhu dhan100/ BR11910-4R-127	400	390
9	BR15547	Bangabandhu dhan100/ BR12007-6R-61	400	240
10	BR15548	BR10458-20-2-3-1-3/ BR 10795-6R-46	400	141
11	BR15549	BR10475-1-2-3-5-5/ BR 10795-6R-46	400	276
12	BR15550	BR10475-1-2-3-5-5/ BR10800-6R-1	400	252
13	BR15551	BR10475-1-2-3-5-5/ BR11334-6R-35	400	300
14	BR15552	BR10482-1-2-3-1-3/ BR 10795-6R-46	400	231
15	BR15553	BR11716-4R-102/ BR 10795-6R-46	400	228
16	BR15554	BR11716-4R-102/ BR10800-6R-1	400	78
17	BR15555	BR11716-4R-102/ BR10800-6R-54	400	207
18	BR15556	BR11716-4R-102/ BR11334-6R-35	400	240
19	BR15557	BRRI dhan101/ BR10800-6R-1	400	261
20	BR15558	BRRI dhan101/ BR11334-6R-35	400	162
21	BR15559	BRRI dhan102/ BR 10795-6R-46	400	132
22	BR15561	BRRI dhan102/ BR10800-6R-54	400	213
23	BR15562	BRRI dhan102/ BR11334-6R-35	400	204
24	BR15563	BRRI dhan87/ BR10800-6R-54	400	255
25	BR15564	BRRI dhan87/ BR10802-6R-66	400	240
26	BR15565	BRRI dhan87/ BR12007-6R-61	400	333
27	BR15566	SVIN297/ BR 10795-6R-46	400	249
28	BR15567	BRRI dhan87/ Beroi (Backcross)	400	108
29	BR15568	BR23/BRRI dhan46	400	276
30	BR15569	BRRI dhan46/BR23	400	258
Sub-total			12,000	6,471
F₅ generation				
1	BR14935	SVIN139/ IR98377-B-B-B-B-24	320	118

SN	BR Reg. No.	Cross combinations	Progenies transplanted	Progenies harvested
2	BR14936	SVIN139/ SVIN297	350	377
3	BR14937	SVIN139/ SVIN405	330	337
4	BR14938	SVIN297/ BR8492-9-5-3-2-HR1	350	224
5	BR14939	SVIN297/ SVMET302	350	183
6	BR14940	BR9574-9-5-3-1-1/ Bangabandhudhan100	350	171
7	BR14941	Bangabandhudhan100/ BR9574-9-5-3-1-1	350	267
8	BR14942	Bangabandhudhan100/ SVIN352	355	202
9	BR14943	Bangabandhudhan100/ SVIN405	360	273
10	BR14944	Bangabandhudhan100/ SVMET302	350	242
11	BR14945	Bangabandhudhan100/ SVMET306	365	310
12	BR14946	IR98377-B-B-B-B-24/ Bangabandhudhan100	350	227
13	BR14947	SVIN297/ Bangabandhudhan100	320	209
14	BR14948	SVMET302/ Bangabandhudhan100	360	238
15	BR14949	SVMET306/ Bangabandhudhan100	320	158
16	BR14950	Bangabandhudhan100/IR83484-3-B-7-1-1-1	350	306
17	BR14951	BR9571-13-1-9-1-1/ BR8548-8-22-5-15	360	97
18	BR14952	BR9571-13-1-9-1-1/ BR9140-5-22-5-1	360	21
19	BR14953	SVIN139/ BR9140-5-22-5-1	320	201
20	BR14954	SVIN139/ BR9840-52-1-2-1	320	187
21	BR14955	BRH14-9-13-16B/ IR101791-10-1-4-3-24	300	93
22	BR14956	SVIN139/ BRH14-9-13-16B	375	99
23	BR14957	SVIN139/ BRH15-24-7-B	380	125
24	BR14958	SVIN139/ BR10490-1-2-3-8-7	375	158
25	BR14959	BR11604-4R-84/ Bangabandhudhan100	350	142
26	BR14960	Bangabandhudhan100/ BR11604-4R-84	350	166
27	BR14961	BR9571-13-1-9-1-1/ Gainja	360	233
28	BR14962	BR9571-13-1-9-1-1/ Malshira	150	186
29	BR14963	BR9574-9-5-3-1-1/ Gainja	110	107
30	BR14964	BR9574-9-5-3-1-1/ Malshira	180	134
31	BR14965	BR9840-52-1-2-1/ Mele (Aus)_1671	350	175
32	BR14966	BR8492-9-5-3-2-HR1/ Mele (Aus)_1671	320	149
33	BR14967	BR9574-9-5-3-1-1/ Mele (Aus)_1671	360	449
34	BR14968	BR9840-52-1-2-1/ Duksail (TA)_2022	360	270
35	BR14969	BR9571-13-1-9-1-1/ Duksail (TA)_2022	330	202
36	BR14970	BR9574-9-5-3-1-1/ Duksail (TA)_2022	170	150
Sub-total			11,710	7,186
Grand Total			23,710	13,657

Table 4.3b: List of segregating progenies harvested from greenhouse and field RGA nurseries, Development of Rainfed Lowland Rice, Boro 2024-25

SN	BR Reg. No.	Cross combinations	Progenies transplanted	Progenies harvested
F₂ generation				
1	BR16640	BR12631-5R-51/BR11732-5R-11	196	192
2	BR16641	BR11748-5R-16/BR11732-5R-11	231	156
3	BR16642	BR11748-5R-2/BR11745-5R-76	342	244
4	BR16643	BR11728 -5R-170/BR11732-5R-11	306	268
5	BR16644	BR11739-5R-53/BR11731-5R-135	270	228
6	BR16645	BR11752-5R-105/BR11745-5R-76	386	384
7	BR16646	BR11736-5R-64/BR11743-5R-98	318	252
8	BR16647	BR12293-5R-47/BR11745-5R-76	333	288
9	BR16648	BR11745-5R-76/BR11731-5R-135	345	312
10	BR16649	BR12631-5R-51/BR11743-5R-87	346	328
11	BR16650	BR11732-5R-11/BR11752-5R-105	386	340
12	BR16651	BR11748-5R-16/BR11736-5R-64	346	260
13	BR16652	BR11748-5R-2/BR11743-5R-98	388	248
14	BR16653	BR11728 -5R-170/BR11755-5R-5	328	268
15	BR16654	BR11739-5R-53/BR11739-5R-33	396	252
16	BR16655	BR12631-5R-51/BR11739-5R-33	364	280
17	BR16656	BR11732-5R-11/BR11753-5R-157	412	324
18	BR16657	BR11748-5R-16/BR11743-5R-76	386	316
19	BR16658	BR11748-5R-2/BR12294-5R-187	400	264
20	BR16659	BR11732-5R-11/BR12294-5R-187	364	272
21	BR16660	BR11748-5R-16/BR12635-5R-131	368	352
22	BR16661	BR11748-5R-2/BR12296-5R-100	264	248

SN	BR Reg. No.	Cross combinations	Progenies transplanted	Progenies harvested
23	BR16662	BR11728 -5R-170/BR11743-5R-76	384	324
24	BR16663	IR 126952-41-58-26-4-12-1-9/ BR11743-5R-76	376	304
25	BR16664	BR12631-5R-51/IR 126952-41-58-26-4-12-1-9	246	208
Sub-total			8241	6912
F₃ generation				
1	BR15538	Bangabandhu dhan100/ BR10799-6R-151	150	120
2	BR15539	Bangabandhu dhan100/ BR10800-6R-1	296	240
3	BR15540	Bangabandhu dhan100/ BR10800-6R-54	199	184
4	BR15541	Bangabandhu dhan100/ BR10802-6R-242	262	200
5	BR15542	Bangabandhu dhan100/ BR10802-6R-66	273	252
6	BR15543	Bangabandhu dhan100/ BR11222-6R-64	383	304
7	BR15545	Bangabandhu dhan100/ BR11334-6R-35	264	252
8	BR15546	Bangabandhu dhan100/ BR11910-4R-127	390	388
9	BR15547	Bangabandhu dhan100/ BR12007-6R-61	390	380
10	BR15548	BR10458-20-2-3-1-3/ BR 10795-6R-46	251	244
11	BR15549	BR10475-1-2-3-5-5/ BR 10795-6R-46	276	240
12	BR15550	BR10475-1-2-3-5-5/ BR10800-6R-1	252	240
13	BR15551	BR10475-1-2-3-5-5/ BR11334-6R-35	400	386
14	BR15552	BR10482-1-2-3-1-3/ BR 10795-6R-46	381	360
15	BR15553	BR11716-4R-102/ BR 10795-6R-46	248	240
16	BR15554	BR11716-4R-102/ BR10800-6R-1	278	200
17	BR15555	BR11716-4R-102/ BR10800-6R-54	277	244
18	BR15556	BR11716-4R-102/ BR11334-6R-35	240	232
19	BR15557	BRRI dhan101/ BR10800-6R-1	261	261
20	BR15558	BRRI dhan101/ BR11334-6R-35	162	144
21	BR15559	BRRI dhan102/ BR 10795-6R-46	132	132
22	BR15561	BRRI dhan102/ BR10800-6R-54	273	248
23	BR15562	BRRI dhan102/ BR11334-6R-35	204	164
24	BR15563	BRRI dhan87/ BR10800-6R-54	255	224
25	BR15564	BRRI dhan87/ BR10802-6R-66	260	248
26	BR15565	BRRI dhan87/ BR12007-6R-61	333	244
27	BR15566	SVIN297/ BR 10795-6R-46	249	212
28	BR15567	BRRI dhan87/ Beroi (Backcross)	108	100
29	BR15568	BR23/BRRI dhan46	276	216
30	BR15569	BRRI dhan46/BR23	258	252
Sub-total			7471	7031
Grand Total			14,712	13,943

Experiment 4.4: Line Stage Testing (LST)

Principal investigator: M R A Sarker

Co-Investigators: M Adil, R R Majumder and M A Kader

Specific objectives: To select uniform genotypes in terms of plant height and days to 50% flowering with key target traits.

Materials and Method: Total 7,210 progenies from 23 crosses were grown in T. Aman season in a 2.6 m single-row plot with a spacing of 20 cm × 20 cm in the field using systematic arrangement pattern. Thirty-day-old single seedling was transplanted. Fertilizer and crop management was done following the protocol described in experiment 4.1. Leaf samples were collected from single plant of selected entries for genotyping with trait markers using trait-based SNP markers. Selection was done considering uniformity in plant height, days to flowering, grain size and shape, lodging tolerance and tolerance to major disease and insect over check varieties under field conditions and presence of target key traits. Additionally, five plants were harvested from selected LST lines to compare the grain weight among selected progenies of same cross combination.

Results: A total of 1,028 genotypes were selected from 7,210 progenies of LST trial based on visual observation on homogeneity in flowering, plant height and grain size and shape (Table 4.4). The initially selected lines showed a wide range of variations in plant height and growth duration starting from 87-128 days and the selection intensity was found 14.30% (Fig. 4.4a). The trait marker profile of the genotypes of LST is presented in Fig. 4.4b. Most of the selected

materials from LST contained genes of high amylose and high zinc and some of the materials also showed drought tolerance QTLs. All the RGA derived fixed lines of the cross families were selected for initial yield evaluation.

Table 4.4: List of selected genotypes Line Stage Testing (LST) Trial, Development of Rainfed Lowland Rice, T. Aman 2024-25

SN	BR Cross	Parentage	No. of progenies transplanted	No. of selected lines
1	BR14348	SVIN197/ IR17A1080	350	25
2	BR14349	SVIN197/ IR17A1211	280	40
3	BR14350	SVIN096/ BR8442-12-1-3-1-B5	240	93
4	BR14351	SVIN085/ IR17A1779	350	88
5	BR14352	SVIN096/ IR66946-3R-116-1-1	220	98
6	BR14353	IR83484-3-B-7-1-1-1/ BR10001-94-2-B	230	39
7	BR14354	IR83484-3-B-7-1-1-1/ BR8442-12-1-3-1-B5	160	12
8	BR14355	IR83484-3-B-7-1-1-1/ HHZ5-DT20-DT2-DT1	250	27
9	BR14356	IR83484-3-B-7-1-1-1/ HHZ12-SAL2-Y3-Y2	230	67
10	BR14357	HHZ5-DT20-DT2-DT1/ IR17A1080	320	60
11	BR14358	HHZ5-DT20-DT2-DT1/ IR17A1211	420	40
12	BR14359	HHZ5-DT20-DT2-DT1/ BR9574-9-5-3-1-1	410	61
13	BR14360	SVIN085/ HHZ5-DT20-DT2-DT1	400	22
14	BR14361	HHZ5-DT20-DT2-DT1/ BR8548-8-22-5-15	320	31
15	BR14362	SVIN197/ BR8548-8-22-5-15	480	47
16	BR14363	SVIN085/ BR8548-8-22-5-15	420	25
17	BR14364	SVIN096/ BR9140-5-22-5-1	480	80
18	BR14365	HHZ5-DT20-DT2-DT1/ Malshira	475	74
19	BR14366	HHZ12-SAL2-Y3-Y2/ Nizersail	465	42
20	BR14367	IR83484-3-B-7-1-1-1/ Rosulbhog	100	8
21	BR14368	SVIN197/ Malshira	150	18
22	BR14369	SVIN085/ Rosulbhog	140	10
23	BR14370	SVIN096/ Gainja	320	21
Total			7210	1028

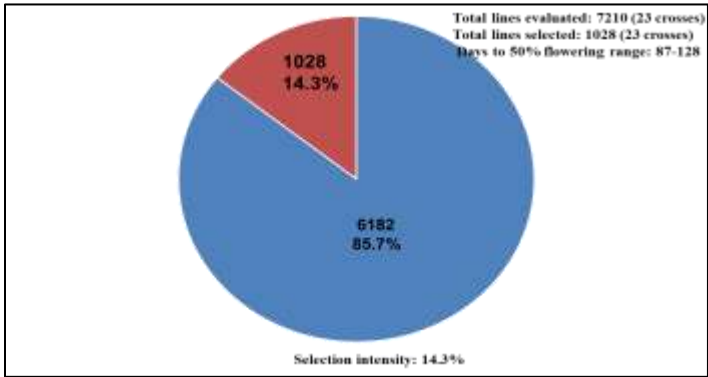


Fig. 4.4a: Selection intensity genotypes of LST, RLR, T. Aman 2024-25

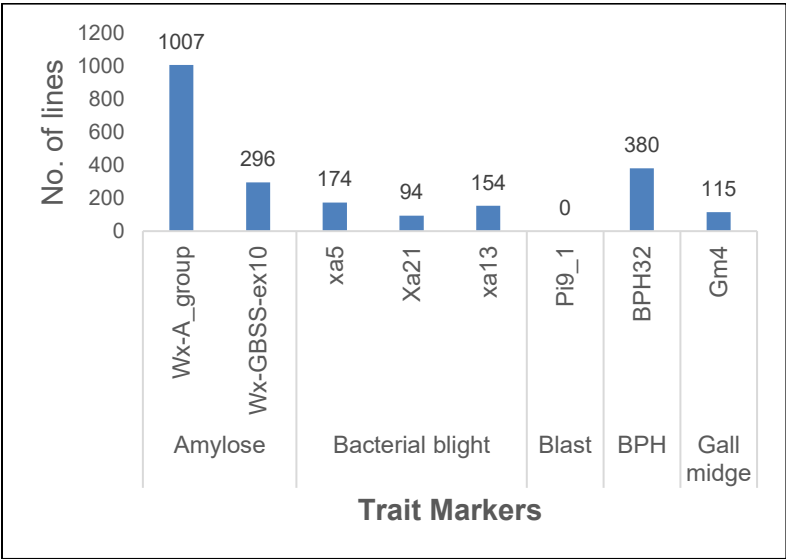


Fig. 4.4b: Trait marker profile of genotypes of LST, RLR, T. Aman 2024-25

Experiment 4.5: Observational Yield Trial (OYT)

Principal investigator: M R A Sarker

Co-Investigators: M. Adil, R R Majumder, M A Kader

Specific objective: Selection of homogeneous breeding lines with fine grain properties having high yield with good plant type.

Materials and Methods: Sixty-four genotypes along with standard checks BRRI dhan71, BRRI dhan75, BRRI dhan49 and BRRI dhan87 were evaluated at three locations of BRRI Gazipur, Cumilla and Rangpur. Twenty-five days old seedlings were transplanted in a 5.4 m × 3 rows at spacing of 20 cm × 15 cm in the field in Augmented RCB design. Single seedling was used for transplanting. Fertilizers doses and crop management were done as experiment no. 4.1.

Location: BRRI, Gazipur; Cumilla and Rangpur.

Results: Yield of the advanced breeding lines ranged from 3.1-8.4 t/ha at Gazipur and 2.9-7.3 t/ha at Rangpur. The average yield ranged from 3.6-7.7 t/ha with the average of 112-140 days growth duration. The experiment at BRRI Cumilla was damaged due to high rainfall and sudden flooding. Twenty-four genotypes from 64 genotypes were selected for further evaluation, as they showed higher yield over the respective check varieties (Table 4.5).

Table 4.5: List of selected materials of Observational Yield Trial (OYT), Development of Rainfed Lowland Rice, T. Aman 2024-25

Sl#	Designation	GD (days)	PH (cm)	Yield (t/ha)		
				Gazipur	Rangpur	BLUE
1	BR13875-4R-89	133	121	8.3	7.0	7.7
2	BR13875-4R-159	124	131	8.1	6.9	7.5
3	BR13873-4R-76	121	132	8.2	6.4	7.3
4	BR13875-4R-95	126	131	8.1	6.4	7.3
5	BR13875-4R-190	130	121	8.2	6.3	7.3
6	BR13875-4R-27	124	146	7.7	6.2	6.9
7	BR13872-4R-104	124	130	7.1	6.4	6.8
8	BR13873-4R-5	122	127	7.4	6.2	6.8
9	BR13873-4R-19	123	125	6.4	7.2	6.8
10	BR13872-4R-99	120	137	7.6	5.8	6.7
11	BR13873-4R-82	120	126	7.4	6.1	6.7
12	BR13875-4R-9	137	121	7.5	5.9	6.7
13	BR13872-4R-87	130	133	6.6	6.3	6.4
14	BR13872-4R-105	123	136	7.2	5.5	6.4
15	BR13872-4R-141	120	120	5.1	7.3	6.2
16	BR13872-4R-142	120	140	7.2	5.2	6.2
17	BR13873-4R-26	126	126	8.3	4.9	6.6
18	BR13873-4R-62	120	127	6.9	5.7	6.3
19	BR13873-4R-64	123	125	6.8	6.4	6.6
20	BR13873-4R-86	120	124	6.6	5.7	6.2
21	BR13875-4R-160	125	132	7.4	5.5	6.5
22	BR13875-4R-164	123	135	6.0	6.8	6.4
23	BR13875-4R-193	121	135	8.4	4.9	6.6
24	BR13875-4R-210	122	134	6.2	5.7	6.0
	BRRI dhan49 (Ck)	131	110	7.3	4.9	6.1
	BRRI dhan71 (Ck)	115	125	6.1	5.0	5.5
	BRRI dhan75 (Ck)	112	112	4.2	6.5	5.3
	BRRI dhan87 (Ck)	124	129	6.1	5.9	6.0
	Range (N=64)	112-140	110-146	3.1-8.4	2.9-7.3	3.6-7.7
	LSD (0.05)	14.3	12.54	1.4	1.4	1.5
	Heritability (%)	32	56	93	57	11

Gaz: D/S- 30.06.24 D/T- 25.07.24, Rang: D/S- 05.07.24 D/T- 29.07.24

Experiment 4.6: Advanced Yield Trial (AYT)

Principal investigator: M R A Sarker

Co-Investigators: M Adil, R R Majumder, M A Kader

Specific objective: Selection of homogeneous breeding lines with fine grain properties having high yield with good plant type.

Materials and Methods: Twenty genotypes along with BRRI dhan71, BRRI dhan75 and BRRI dhan87 as standard checks in AYT#1, and 20 genotypes in AYT#2 along with BRRI dhan49 and BRRI dhan87 as standard checks were evaluated in the trial. Thirty-day old seedlings were transplanted in a 5.4 m × 4 rows at spacing of 20 cm × 15 cm in the field following RCB design with three replications. Single seedling was used for transplanting. Fertilizers doses and crop management were done as experiment no. 4.1.

Location: BRRI, Gazipur; Cumilla and Rangpur.

Results: Six genotypes from the trial AYT#1, and seven genotypes from AYT#2 were selected based on grain yield and phenotypic performance (Table 4.6). Grain yield was ranged from 4.1-5.2 t/ha in AYT#1 and 3.6-6.2 t/ha in AYT#2.

Table 4.6: List of selected materials of Advanced Yield Trial (AYT), Development of Rainfed Lowland Rice, T. Aman 2024-25

Sl#	Designation	GD (days)	PH (cm)	Yield (t/ha)			Trait of Interest (ToI)
				Gaz	Ran	BLUE	
AYT#1							
1	BR12990-4R-170	122	141	3.94	6.12	5.03	<i>qDTY3.1_2+Waxy_A</i>
2	BR12996-4R-225	129	128	4.08	5.09	4.58	<i>qDTY2.1+ qDTY2.2+ qDTY3.1+ qDTY3.2+ qDTY12.1+ Waxy_A + Waxy_10</i>
3	IR 144478-1-1-1-B	120	131	4.59	5.66	5.13	<i>TSV1</i>
4	IR 144484-1-2-5-B	117	132	4.62	4.89	4.75	<i>TSV1</i>
5	IR 144485-1-3-1-B	117	127	3.69	6.01	4.85	<i>TSV1</i>
6	IR 144490-1-1-3-B	119	127	4.53	5.04	4.78	<i>TSV1</i>
	BRRI dhan71 (Ck)	119	132	3.88	6.02	4.95	
	BRRI dhan75 (Ck)	116	119	3.25	5.03	4.14	
	BRRI dhan87 (Ck)	126	135	3.56	5.60	4.58	
	Range (N=20)	115-135	119-146	3.4-4.6	4.4-6.2	4.1-5.2	
	LSD (0.05)	5.5	15.8	0.7	0.6	1.5	
	Heritability (%)	91	81	65	84		
AYT#2							
1	BR13519-4R-629	134	142	6.4	6.1	6.2	
2	BR13519-4R-683	134	140	4.4	5.5	5.0	<i>qDTY2.1+ qDTY3.1_2+ qDTY3.2+ Pita</i>
3	BR13519-4R-310	131	145	4.3	6.3	5.3	<i>qDTY3.1+ qDTY3.2+ qDTY12.1+ Waxy_A + Waxy_10</i>
4	BR13519-4R-686	133	141	4.4	5.9	5.2	
5	BR12989-4R-199	134	138	4.1	5.9	5.0	<i>qDTY3.1+ Waxy_A + Waxy_10</i>
6	BR13050-4R-6	135	141	3.8	5.4	4.6	<i>qDTY2.1+ qDTY3.1+ qDTY3.2+ xa5+ Pita+ Waxy_A</i>
7	BR13050-4R-29	131	144	3.8	6.0	4.9	<i>qDTY3.1+ qDTY3.2+ Pita+ Waxy_A</i>
	BRRI dhan49 (Ck)	135	113	3.2	5.5	4.4	
	BRRI dhan87 (Ck)	126	132	3.7	6.0	4.8	
	Range (N=20)	126-139	113-149	3.2-6.4	3.6-6.3	3.6-6.2	
	LSD (0.05)	5.2	14.8	7.1	10.2	1.5	
	Heritability (0.05)	18	32	71	70	27	

AYT#1 Gaz: D/S- 29.06.24 D/T- 27.07.24 Rang: D/S- 04.07.24 D/T- 28.07.24

AYT#2 Gaz: D/S- 30.06.24 D/T- 28.07.24 Rang: D/S- 04.07.24 D/T- 28.07.24

Experiment 4.7: Regional Yield Trial (RYT)

Principal investigator: M R A Sarker

Co-Investigators: M Adil, R R Majumder and M A Kader

Specific objectives: To evaluate specific and general adaptability of the advanced breeding lines as compared with standard checks in on-station condition.

Materials and Methods: Seven genotypes from RYT#1 along with BRRI dhan71, BRRI dhan75 and BRRI dhan87 as standard checks, 12 genotypes from RYT#2 along with BRRI dhan71, BRRI dhan75 and BRRI dhan87 as standard checks, four genotypes from RYT#3 along with BRRI dhan71, BRRI dhan75 and BRRI dhan87 as standard checks and 12

genotypes from RYT#4 along with BRRI dhan49, BRRI dhan75 and BRRI dhan87 were evaluated at nine locations of Bangladesh. Twenty-five to thirty-day-old seedlings were transplanted at a spacing of 20 cm × 15 cm in different locations. The plot size was 5.4 m × 12 rows. The design was RCB with three replications. Fertilizers doses and crop management were done as experiment no. 4.1. Fertilizer doses were changed based on AEZ, location and soil fertility status.

Location: Gazipur, Cumilla, Kushtia, Rajshahi, Rangpur, Barishal, Satkhira, Sirajganj and Sonagazi.

Results: None of the genotypes were selected for ALART due to not significant higher yield performances over than check varieties. Three genotypes from RYT#4 were selected for re-trial (Table 4.7a). The physicochemical properties of the genotypes of RYT are shown in Table 4.7b. The pBLUP (grain yield) value of the genotypes of RLR was analysed from the year 2019 to 2024. Genetic trend of the genotypes from 2016 to 2024 showed the pBLUP (grain yield) in respect of trial year indicated an annual 93.84 kg/ha equivalent to about 2.23% increase in grain yield per year based on yield of 2016 (4.19 t/ha) (Fig 4.7c).

Table 4.7a: Performance of genotypes in Regional Yield Trials (RYTs), Development of Rainfed Lowland Rice, T. Aman 2024-25

SL #	Designation	PH (cm)	GD (days)	Yield (t/ha)						
				Gazipur	Kustia	Rajshahi	Rangpur	Barishal	Sirajganj	BLUE
RYT#1										
1	BR12631-5R-28	127	117	3.8	5.3	6.2	3.8	4.1	5.2	4.7
2	BR12631-5R-146	138	117	3.8	4.7	3.7	4.5	4.3	4.6	4.3
3	BR12631-5R-51	131	114	3.8	5.1	6.2	4.7	4.4	6.0	5.0
4	BR12294-5R-187	139	118	2.8	5.0	4.4	4.3	3.4	4.5	4.1
5	BR12303-5R-49	125	120	3.8	4.3	5.6	4.9	4.0	5.2	4.6
6	BR12293-5R-47	1234	118	3.4	4.8	3.6	4.8	3.8	5.7	4.3
7	BR12631-5R-35	127	117	4.5	5.2	6.4	4.5	4.3	5.6	5.1
	BRRI dhan71 (Ck)	124	119	3.7	5.2	5.2	4.2	4.4	5.5	4.7
	BRRI dhan75 (Ck)	113	113	3.5	4.9	5.0	3.6	2.9	5.2	4.2
	BRRI dhan87 (Ck)	129	127	3.3	5.3	5.9	3.5	5.0	6.4	4.9
	LSD (0.05)	7.4	4.3	0.7	0.5	0.6	0.7	0.2	0.5	0.7
	Heritability (%)	93	92	69	73	96	76	98	73	52
RYT#2										
1	BR12303-5R-341	143	135	2.5	4.8	5.1	4.6	4.9	5.4	4.5
2	BR11752-5R-22	136	129	3.6	5.3	4.9	4.0	4.8	6.4	4.8
3	BR11754-5R-97	123	130	3.0	5.3	5.7	3.9	4.9	4.9	4.6
4	BR11752-5R-105	138	129	3.0	4.5	4.1	3.4	4.6	6.2	4.3
5	BR11747-5R-6	118	130	2.7	4.7	4.8	4.8	3.7	5.1	4.3
6	BR11732-5R-107	126	132	2.5	4.9	4.9	5.1	4.6	4.7	4.5
7	BR11747-5R-67	133	135	3.3	5.0	4.5	4.2	4.3	5.2	4.4
8	BR11748-5R-16	132	134	2.9	5.3	5.8	3.6	4.1	5.2	4.5
9	BR11731-5R-183	131	132	3.5	5.3	4.9	3.5	4.1	5.3	4.4
10	BR 11730-5R-32	134	130	3.3	4.2	4.2	3.2	3.5	4.2	3.8
11	BR 11135-20-1-3-3	128	125	3.4	3.9	5.2	3.6	3.9	4.2	4.0
12	BR 11139-3-5-2-4	141	127	2.6	4.7	5.1	4.1	3.9	4.1	4.1
	BRRI dhan71 (Ck)	122	118	3.7	5.3	5.1	3.8	4.5	4.7	4.5
	BRRI dhan75 (Ck)	113	114	2.8	4.7	5.1	4.1	2.7	4.0	3.9
	BRRI dhan87 (Ck)	130	124	3.5	5.4	5.5	5.1	5.3	6.9	5.3
	LSD (0.05)	4.5	5.9	0.3	0.5	0.5	0.4	0.3	0.9	0.8
	Heritability (%)	95	96	93	81	85	96	98	87	63
RYT#3										
1	IR 132084-B-1191-1-2-B-9	118	124	3.55	4.90	4.88	3.98	4.34	5.97	4.60
2	IR 132084-B-26-1-5-B-2	111	117	NA	3.95	2.67	3.27	NA	3.00	2.95
3	IR 97184-84-1-2-3	121	122	3.26	5.28	4.60	4.75	4.28	4.64	4.47
4	IR 17A2932	115	122	3.53	4.39	4.16	4.15	4.24	6.08	4.43
	BRRI dhan71 (Ck)	121	120	4.17	5.48	5.16	4.77	4.57	5.47	4.94
	BRRI dhan75 (Ck)	111	113	3.23	4.79	5.32	3.25	4.03	3.59	4.03
	BRRI dhan87 (Ck)	130	126	3.52	5.31	5.96	4.78	5.17	6.88	5.27
	LSD (0.05)	6.2	5.8	0.3	0.5	0.5	0.3	0.6	1.1	0.7

SL #	Designation	PH (cm)	GD (days)	Yield (t/ha)					
				Gazipur	Kustia	Rajshahi	Rangpur	Barishal	Sirajganj BLUE
	Heritability (%)	86	69	92	86	97	97	73	88
RYT#4									
1	IR 19A7513	136	123	4.18	5.04	5.28	4.13	4.65	4.66
2	IR 19A7523	134	122	4.07	5.00	4.99	3.73	4.60	4.61
3	IR 19A7534	131	123	4.27	5.26	5.24	4.57	4.65	4.92
4	IR 19A7535	134	122	4.34	5.24	5.33	4.82	4.79	4.99
5	IR 19A7536	111	123	4.01	4.76	5.83	3.81	4.20	4.72
6	IR 19A7560	120	123	4.15	4.85	6.45	4.29	4.34	5.04
7	IR 19A7569	119	122	4.66	5.27	5.95	3.41	4.45	4.93
8	IR 19A7635	113	121	4.62	4.67	6.03	4.60	4.40	5.04
9	IR 19A8062	143	121	3.03	4.49	3.81	2.69	4.20	3.71
10	IR 19A8066	138	122	3.77	4.35	4.38	2.75	3.97	3.89
11	IR 19A8397	125	120	3.60	4.40	5.06	3.58	4.06	4.30
12	IR 19A9027	122	122	3.98	4.68	4.87	4.25	4.17	4.52
	BRRi dhan49 (Ck)	107	132	4.03	5.19	5.17	4.54	4.64	4.78
	BRRi dhan75 (Ck)	110	114	3.61	4.76	5.06	3.40	2.34	3.92
	BRRi dhan87 (Ck)	130	127	3.42	5.25	5.96	4.32	5.08	5.00
	LSD (0.05)	4.0	4.6	0.5	0.5	1.1	0.3	0.2	0.6
	Heritability (%)	98	94	84	65	85	97	99	82

Table 4.7b: Physicochemical properties of genotypes in Regional Yield Trial (RYT), Development of Rainfed Lowland Rice, T. Aman 2024-25

Variety/Line	Milling outturn (%)	Head rice recovery (%)	Milled rice length (mm)	Milled rice breadth (mm)	L-B ratio	Size & Shape	1000 grain wt. (g)	Amylose (%)	Protein content (%)	ER	IR
RYT#1											
BR12631-5R-146	68.6	57.0	6.1	2.1	2.9	LB	22.8	22.0	8.2	1.4	4.1
BR12631-5R-51	67.8	40.1	6.6	2.1	3.1	LS	24.7	21.3	9.2	1.4	4.0
BR12294-5R-187	69.5	42.6	6.4	2.1	3.1	LS	19.1	19.4	8.3	1.3	4.1
BR12303-5R-49	69.4	61.6	6.3	2.1	3.0	LB	21.5	22.0	10.4	1.4	3.9
BR12293-5R-47	65.9	53.8	5.9	2.0	2.9	LB	19.2	20.3	8.1	1.2	4.6
BR12631-5R-35	68.4	60.2	6.4	2.1	3.0	LB	24.2	19.2	10.3	1.4	4.3
BRRi dhan71 (Ck)	68.8	59.6	5.9	2.1	2.8	LB	24.3	22.0	7.2	1.5	3.0
BRRi dhan75 (Ck)	69.4	62.0	6.2	2.3	2.6	LB	20.5	20.0	9.2	1.2	3.0
BRRi dhan87 (Ck)	69.2	60.2	6.3	2.0	3.1	LS	24.5	26.7	7.3	1.3	3.2
RYT#2											
BR12303-5R-341	68.6	54.3	6.2	2.1	3.0	LB	21.5	24.0	8.7	1.4	4.0
BR11752-5R-22	68.8	47.2	6.6	2.1	3.1	LS	22.2	21.0	9.4	1.6	4.6
BR11754-5R-97	69.3	60.4	6.3	2.1	3.0	LB	19.3	23.9	8.8	1.5	4.3
BR11752-5R-105	70.2	58.7	6.8	2.1	3.2	LS	27.7	24.6	8.0	1.6	4.0
BR11747-5R-6	68.9	60.1	6.7	2.1	3.2	LS	22.0	23.9	8.7	1.3	4.7
BR11732-5R-107	70.8	57.9	6.2	2.1	3.0	LB	24.0	25.0	9.3	1.4	4.4
BR11747-5R-67	70.6	62.3	6.2	2.1	2.9	LB	17.9	24.2	8.3	1.3	4.3
BR11748-5R-16	70.6	64.0	5.7	1.8	3.1	MS	20.1	26.2	7.4	1.4	5.3
BR11731-5R-183	70.2	64.9	6.4	2.1	3.0	LB	20.4	25.0	8.1	1.3	4.0
BR 11730-5R-32	71.3	44.3	5.8	2.1	2.7	MB	26.8	23.5	8.7	1.6	4.3
BR 11135-20-1-3-3	68.8	49.3	6.6	2.1	3.1	LS	21.4	23.3	8.7	1.3	4.1
BR 11139-3-5-2-4	68.1	60.5	6.0	2.0	3.0	MB	20.4	23.7	8.5	1.3	3.9
BRRi dhan71 (Ck)	70.1	61.2	5.9	2.0	2.9	MB	24.5	21.5	7.0	1.5	3.0
BRRi dhan75 (Ck)	69.4	61.0	6.3	2.3	2.7	LB	20.5	20.5	9.2	1.2	3.0
BRRi dhan87 (Ck)	69.1	58.4	6.3	2.0	3.1	LS	24.3	26.5	7.3	1.3	3.2

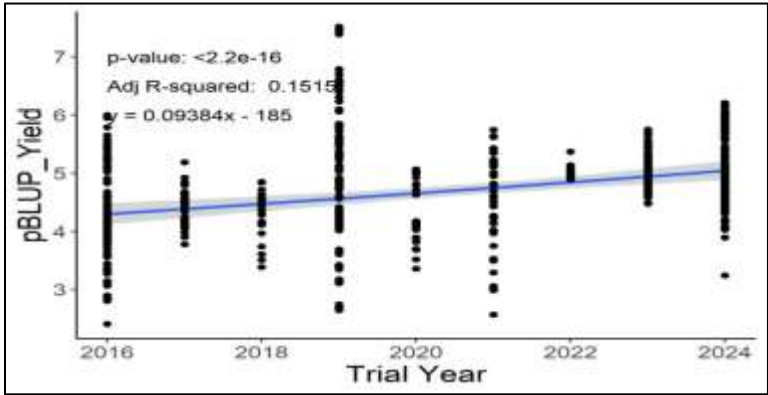


Fig 4.7c. Genetic trend of pBLUP (grain yield) in respect of trial year indicated an annual 93.84 kg/ha equivalent to about 2.23% increase in grain yield per year based on yield of 2016 in RLR

PROJECT 5. DEVELOPMENT OF HEAT TOLERANT RICE (HTR)

General objectives: Development of varieties/lines tolerant to heat stress quality grains into high yielding genotypes in T. Aus season

Experiment 5.1: Hybridization

Principal Investigator: M Khatun.

Co-investigator: A Rahman and H A Mashuk.

Materials and Methods: The crossing program for developing heat-tolerant rice was followed in both T. Aman and Boro seasons for good seed setting. T. Aman season started on 01 July and Boro season started on 15 November. The experiment was conducted in BRRI headquarters, Gazipur. Seeding was done in the hybridization block at three dates with an interval of 7 days to synchronize flowering times between male and female parents. Twenty-five-days old seedlings for T. Aman & thirty-five-days old seedlings for Boro season were transplanted in a 5.4 m × 2 rows plot with a 25 × 20 cm spacing. Single seedling was used for transplanting. Fertilizers @108 (234 kg Urea): 17.4 (87 kg TSP): 58.5 (117 kg MP): 14 (78 kg Gypsum): 4.3 (12 kg ZnSO4) kg NPKSZn/ha in T. Aman and @ 120 (261 kg Urea): 19 (95 kg TSP): 60 (120 kg MP): 20 (111 kg Gypsum): 4 (11 kg ZnSO4) kg/ha NPKSZn were applied in Boro season. Single seedling was used for transplanting. All amounts of P, K, S and Zn were applied at the time of final land preparation and nitrogen was applied at three equal splits at 10, 25-30 and 40-45 days after transplanting (DAT). Crop management such as weeding, irrigation etc. was done in time. Insects, diseases and other pests were controlled properly.

Results: Ten crosses were made using 17 parents for the development of heat-tolerant rice (HTR) in Boro 2024-25 and 2,269 F₁ seeds were collected (Table 5.1).

Table 5.1. List of the crosses, Development of heat tolerant rice (HTR), Boro 2024-25

SN	Parentage	No of seeds	Trait/ Genes of interest
1	BR11601-14-4-1/ BR11607-4R-192	24	<i>qHTSF4.1, Xa21, xa5, xa13</i>
2	BR11723-4R-12/BR12442-4R-49	122	<i>qHTSF4.1, Xa21, xa5</i>
3	BR13157-4R-265/ BRRI dhan28-EMF-4	114	<i>Xa21, EMF3</i>
4	R13169-4R-229/ EMF-3	97	<i>Xa21, EMF3</i>
5	BR12424-5R-46/ BRRI dhan28-EMF-4	52	<i>qHTSF4.1, EMF3</i>
6	BRRI dhan28-EMF-4/ Khato Babu	192	<i>qHTSF4.1, EMF3</i>
7	EMF-3/18C1005	343	<i>qHTSF4.1, EMF3</i>
8	BR12895-4R-231/ BR13157-4R-265	44	<i>qHTSF4.1</i>
9	BRRI dhan98/ BRRI dhan106	259	<i>qHTSF4.1</i>
10	BR12098-4R-127/ BR12606-4R-327	120	<i>qHTSF4.1, Xa21</i>
Total		2,269	

Experiment 5.2: Confirmation of F₁

Principal Investigator: Mahmuda Khatun

Co-investigator: A Rahman, H A Mashuk

Specific objective: Confirmation of F₁s as true crosses and selection of promising ones.

Materials and Methods: Eight crosses were grown (Table 5.2). F₁ seeds of each cross and their respective parents were germinated in Petri dishes and then sown in earthen pots. Twenty-five-day-old seedlings were transplanted with single seedlings at a spacing of 25 × 15 cm in the net house. Respective parental seedlings were transplanted on both sides of each F₁ population. F₁'s confirmation was done by both quality check (QC) genotyping and observation techniques. After confirmation promising F₁s were selected and used for double and multiple crosses. Complex crosses were mainly done for the F₁s which use local cultivars or low yielding genotypes with valuable traits. The F₂ and multiple F₁ crosses were preserved carefully after drying properly in a cool place. Crop management was done as described in experiment 5.1.

Results: All F₁s of eight crosses were confirmed successfully during Boro 2024-25.

Table 5.2. F₁ confirmation, Development of heat tolerant rice (HTR), Boro 2024-25

SN	BR No.	Parentage	Trait/ Genes of interest
1	BR17059	BRRi dhan98*2/ N22	<i>qHTSF4.1</i>
2	BR17060	BR (Path)13800-BC3-8-6*2/ BRRi dhan28-EMF-4	<i>EMF3</i>
3	BR17061	BRRi dhan28-EMF-4/ Khato Babu	<i>qHTSF4.1, EMF3</i>
4	BR17062	EMF-1/ Rod minikit	<i>qHTSF4.1, EMF3</i>
5	BR17064	BR13157-4R-265/ BRRi dhan28-EMF-4	<i>qHTSF4.1, EMF3</i>
6	BR17065	BR13169-4R-229/ EMF-3	<i>qHTSF4.1, EMF3</i>
7	BR17106	BRRi dhan98/BR11607-4R-192	<i>qHTSF4.1</i>
8	BR17069	BR12424-5R-46/ BRRi dhan28-EMF-4	<i>qHTSF4.1, EMF3</i>

Experiment 5.3: Field RGA nursery (F₂-F₅ Generation)

Principal Investigator: Mahmuda Khatun

Co-investigator: A Rahman, H A Mashuk

Specific objectives: To maintain high-yield potential progenies with good grain type, short growth duration and disease and insect pest resistance under field conditionss.

Materials and Methods: A total of 14,800 progenies from 28 crosses were grown (Table 5.3). Each progeny was grown in a 1.2 m single-row plot. Thirty-day-old seedlings were transplanted @ single seedling with a spacing of 5 × 5 cm. Application of fertilizer and crop management was done as described in experiment 5.1

Results: The development of heat-tolerant rice (HTR) program consists of 14,800 progenies of 20 crosses in the Boro season that were advanced through modified FRGA.

Table 5.3. Field RGA Nursery, Development of heat tolerant rice (HTR), 2024-25

SN	BR No.	Parentage	Trait/ Genes of interest	Progenies
F ₂₋₃ , T. Aus (HTR)				
1	BR15990	BRR dhan98*2/IR05N412	<i>qHTSF4.1</i>	500
2	BR15991	BRR dhan98*2/IR12N177	<i>qHTSF4.1</i>	500
3	BR15992	BRR dhan98*2/IR64-EMF3	<i>EMF3</i>	500
4	BR16015	BR13169-4R-229 /EMF-1	<i>EMF3</i>	500
5	BR16017	BR9829-78-1-3-2/EMF-1	<i>EMF3</i>	500
6	BR16018	BRRi dhan98/EMF-1	<i>EMF3</i>	500
7	BR16019	BRRi dhan98/EMF-3	<i>EMF3</i>	500
8	BR16020	BRRi dhan106 /EMF-4	<i>qHTSF4.1, EMF3</i>	500
Total				4000
F ₄₋₅ , T. Aus (HTR)				
1	BR15505-R	BR11866-5R-312 / IR64-EMF	P#2-8	500
2	BR15515-R	BR11723-4R-12*3/N22	P#1-5,9,10,23-25	500
3	BR15516-R	BR11867-4R-371*3/ IR64-EMF3	P#1-7,13,16,18	500
4	BR15522-R	BR11723-4R-12*2/IR12N177	P#1-8	500
5	BR15523-R	BR12121-4R-53*2/ IR12N177	P#1-8	500
6	BR14679-2R	BR11723-4R-172/IR64-EMF3 (<i>qHTSF4.1</i>)	P#2, 4, 5, 7	500
7	BR14681-2R	BR11723-4R-12/N22 (<i>qHTSF4.1</i>)	P#1,2,4,7,9,10,11	500
8	BR14997-2R	BR9006-40-2-3-1*3/ BR11868-5R-23 (<i>Xa21, qHTSF4.1</i>)	P#1, 16	500
9	BR15008-2R	BR12121-4R-53/ BR9138-4-4-5-5-P3- HR3-HR5(<i>xa5, Xa21, qHTSF4.1</i>)	P#4-12	500
10	BR15009-2R	BR11723-4R-12/IR12N177 (<i>xa5, Pita, qHTSF4.1</i>)	P#2,5,6,8,10,12	500
11	BR15012-2R	BR11723-4R-12/ BR12442-4R-49 (<i>Xa21, qHTSF4.1, fgr</i>)	P#4,5,6,8,9,10	500
12	BR15013-2R	BR12442-4R-49/ IR64-EMF3(<i>xa5, xa13, Xa21, qHTSF4.1, fgr</i>)	P#5	500
13	BR15013-2R	BR12442-4R-49/ IR64-EMF3(<i>Xa21, qHTSF4.1, fgr</i>)	P#2,8,9,10,12	500
14	BR15014-2R	BR12121-4R-53/ IR12N177 (<i>Xa5, Pita, qHTSF4.1</i>)	P#1,2,3,10	500
15	BR15016-2R	BR8781-16-1-3-P2/ BR12442-4R-49 (<i>Xa21, qHTSF4.1, fgr</i>)	P#5,9,12	500
Total				7500
F ₅₋₆ , T Aus (HTR)				

SN	BR No.	Parentage	Trait/ Genes of interest	Progenies
1	BR14679-3R	BR11723-4R-172/IR64-EMF3	P#1-8	500
2	BR14681-3R	BR11723-4R-12/N22	P#1-8	500
3	BR14685-3R	BR11867-4R-371/ IR64-EMF3	P#1-8	500
4	BR15000-3R	BR9006-40-2-3-1*2/ IRRI154-Pi9 (<i>Xa21</i> , <i>qHTSF4.1</i>)	P#4,9,11	500
5	BR15001-3R	BR8781-16-1-3-P2*2/ IRRI154-Pi9 (<i>Pi9</i> , <i>frg</i> , <i>qHTSF4.1</i> , <i>TSV1</i>)	P#9,16,18	500
Total				2,500
Grand total				14,000

Experiment 5.4: Line Stage Testing (LST)

Principal Investigator: M Khatun

Co-investigator: A Rahman, H A Mashuk

Specific objective: Isolation of homogeneous breeding lines with improved plant type, disease free and short duration.

Materials and Methods: Line Stage Testing consisting of 2700 lines (Table 5.4) was evaluated in Boro2024-25. The unit plot size was 2.4 m × 1 row (12 hills). The spacing for transplanting was 20 cm × 20 cm and twenty-five-day-old seedlings were transplanted single seedling per hill. Application of fertilizer & crop management was done as described in experiment 5.1.

Results: Out of 2,700 lines of nine crosses, 275 uniform lines were selected from LST based on uniformity in heading, plant height and acceptable grain type in the field condition. Selection applied for selecting LST lines was 10% (Fig 5.1). Final selection will be made based on trait marker profiles BB resistance, heat tolerate, early morning flowering (EMF) and different grain quality traits.

Table 5.1. List of materials for Line Stage Testing (LST), Development of heat tolerant rice (HTR), Boro, 2024-25

SN	BR No.	Designation	Trait/ Genes of interest	Progenies
1	BR15847-4R	BR12121-4R-53*3/ IR12N177	<i>qHTSF4.1</i>	300
2	BR15505-4R	BR11866-5R-312 / IR64-EMF	<i>qHTSF4.1</i> , <i>EMF3</i>	300
3	BR15522-4R	BR11723-4R-12*2/IR12N177	<i>qHTSF4.1</i>	300
4	BR14679-3R	BR11723-4R-172/IR64-EMF ₃	<i>qHTSF4.1</i> , <i>EMF3</i>	300
5	BR14680-3R	7 FBR-376/ BR11723-4R-172	<i>qHTSF4.1</i>	300
6	BR14681-3R	BR11723-4R-12/N22	<i>qHTSF4.1</i>	300
7	BR14685-3R	BR11867-4R-371/ IR64-EMF ₃	<i>qHTSF4.1</i> , <i>EMF3</i>	300
8	BR14691-3R	BR11600-4R-230/N22//BR11723-4R-172	<i>qHTSF4.1</i>	300
9	BR14692-3R	BR11868-5R-23/N22//BR11723-4R-172	<i>qHTSF4.1</i>	300
Total				2,700

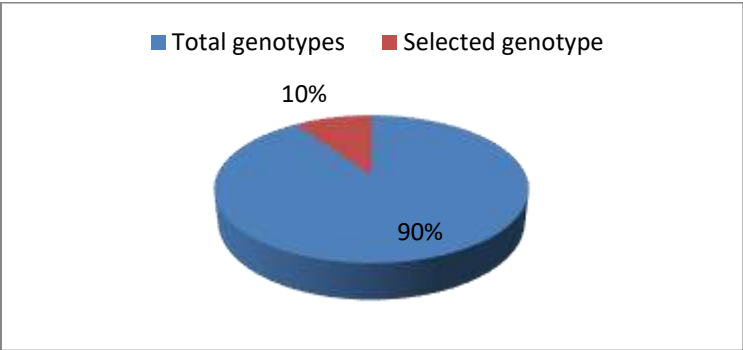


Fig 5.1. Frequency distribution of LST lines of heat tolerant rice lines in Boro 2024-2025

Experiment 5.5: Advanced Yield Trial (AYT)

Principal Investigator: Mahmuda Khatun

Co-investigator: A Rahman, H A Mashuk (Plant Breeding), M R Hasan (Rangpur), S Abedin, T K Hore (Rajshahi), M M Dewan (Kushtia)

Specific objective: Initial yield evaluation and selection of desirable lines compared to standard checks.

Location: BRRI, Gazipur, Rajshahi, Lalpur, Kushtia, Birampur and Rangpur

Materials and Methods: Advanced yield trial consisting of sixteen genotypes for AYT#1_SD, fifteen for AYT#2_LD and thirteen for AYT#3 were evaluated. The check varieties Binadhan14, BRRI dhan28, BRRI dhan98 and N22 were used for AYT#1_SD, BRRI dhan58, BRRI dhan89 and BRRI dhan98 were used for AYT#2_LD and BRRI dhan98, BRRI dhan28 and Binadhan14 were used for AYT#3. Three-four weeks old seedlings were transplanted with single seedling per hill at a spacing of 20 × 15 cm in a 5.4 m × 5 rows plot. The field layout was Latinized Row Column with three replications. Application of fertilizer and crop management was done as described in experiment 5.1

Result: In Gazipur, it has observed that the maximum temperature status was more than 35°C and minimum temperature was more than 15°C during flowering to maturity stage that was drastically affected the pollen viability, spikelet fertility and as well as grain yield (Fig.5.2). In Rajshahi, the maximum temperature was around 35°C and minimum temperature was not exceeding 25°C during flowering to maturity stage of the heat tolerant genotypes caused better yield and increased spikelet fertility% (Fig. 5.3). In Rangpur, the maximum temperature was exceeded 35°C frequently and minimum temperature was not exceeding 25°C during flowering to maturity stage that was the most favourable condition when across the reproductive stage of the heat tolerant genotypes and produced better yield as well as lower spikelet fertility% (Fig. 5.4).

In AYT#1_SD, the genotype BR12894-5R-150 was the highest yield performer in all locations i.e. Gazipur and Rajshahi except Rangpur where the genotypes BR13963-4R-228 perform better than any other line. This suggests a strong ability for successful pollination and grain filling, which is essential for high yield potential. Combined growth duration and yield of AYT#1_SD are presented in the Table 5.5. Average growth duration of the heat tolerant genotypes was 104-108 days. Considering yield, range was 2.71-5.07 t/ha, 3.40-5.65 t/ha, 3.13-6.5 t/ha in Gazipur, Rajshahi and Rangpur, respectively. Average yield of the heat tolerant genotypes was 3.36-5.19 t/ha (Table 5.5). Among the 12 heat tolerant rice genotypes three genotypes were selected considering yield and growth duration compared to the check varieties. The genotypes were BR12894-5R-150(5.19 t/ha), BR13963-4R-228(5.10 t/ha) and BR13970-4R-147 (5.05 t/ha). These heat tolerant genotypes produced 3.0-6.0% higher yield than the highest yielding check variety BRRI dhan98 (4.89 t/ha). Growth duration (GD) was ranged from 105-107 days where growth duration of the high yielding tolerant check variety Binadhan14 (105 day), sensitive check variety BRRI dhan28 (104 day), standard check variety BRRI dhan98 (106 day) and local Indian improved tolerant check variety N22 (106 day). From the study, the genotypes BR12894-5R-150, BR13963-4R-228 and BR13970-4R-147 can be identified to use as heat tolerant genetic resource and promoted as heat resilient varieties for cultivation in heat stress (HS) areas of Bangladesh.

In AYT#2_LD, the genotype BR12605-4R-81 was the highest yield performer in all locations i.e. Gazipur and Rajshahi except Rangpur where BRRI dhan98 (Ck) perform better than any other line. This suggests a strong ability for successful pollination and grain filling, which is essential for high yield potential. Combined growth duration and yield of AYT#2_LD are presented in the Table 5.6. Average growth duration of heat tolerant genotypes was 109-121 days. Considering yield, range was 3.24-5.56 t/ha, 2.91-5.80 t/ha, 4.02-5.92 t/ha in Gazipur, Rajshahi and Rangpur, respectively. Average yield range of heat tolerant genotypes was 4.05-5.22 t/ha (Table 5.6). Among the 12 heat tolerant rice genotypes three genotypes were selected considering yield and growth duration compared to the check varieties. The genotypes were BR13970-4R-64(5.22 t/ha), BR12605-4R-81(5.19 t/ha) and BR13970-4R-192(4.97 t/ha). These heat tolerant genotypes produced 2.0-7.0% higher yield than the highest yielding check variety BRRI dhan98 (4.86 t/ha). Growth duration (GD) was ranged from 112-116 days where growth duration of the high yielding check variety BRRI dhan58 (109 day), sensitive check variety BRRI dhan89 (113 day), standard check variety BRRI dhan98 (109 day). From the study, the genotypes BR13970-4R-64, BR12605-4R-81 and BR13970-4R-192 can be

identified to use as heat tolerant genetic resource and promoted as heat resilient varieties for cultivation in heat stress (HS) areas of Bangladesh.

In AYT#3, the genotype IR18C1007 was the highest yield performer in two locations i.e. Lalpur and Rajshahi. On the other hand, the genotypes IR15C1015 and BRRI dhan98 performed better in Rangpur and Gazipur respectively. This suggests that's these three genotypes have a strong ability for successful pollination and grain filling, which is essential for high yield potential. Combined growth duration and yield of AYT#3 are presented in the Table 5.7. Average growth duration of the heat tolerant genotypes was 105-123 days. Considering yield, ranges were 3.91-5.21 t/ha, 2.73-5.47 t/ha, 2.66-6.21 t/ha, 3.10-5.60 t/ha in Gazipur, Lalpur, Rajshahi and Birampur, respectively. Average yield range of the heat tolerant genotypes was 3.58-5.00 t/ha and percent fertility ranges from 58.03 to 73.66% (Table 5.7). Among the 10 heat tolerant rice genotypes none of the genotypes were selected considering yield and growth duration compared to the check variety BRRI dhan98.

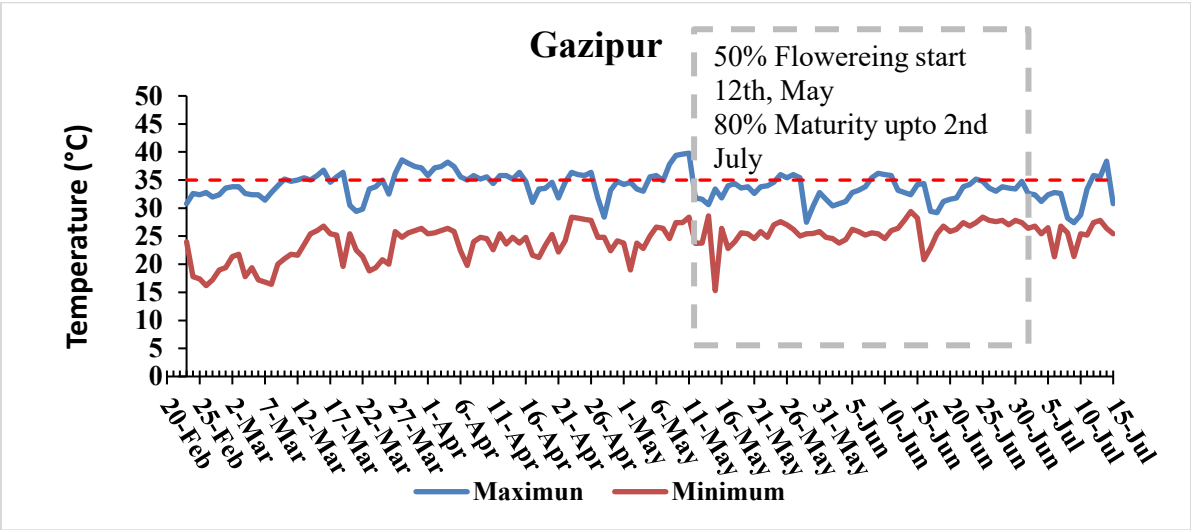


Fig 5.2. The line graph shows maximum and minimum temperature of Gazipur in Late Boro 2025

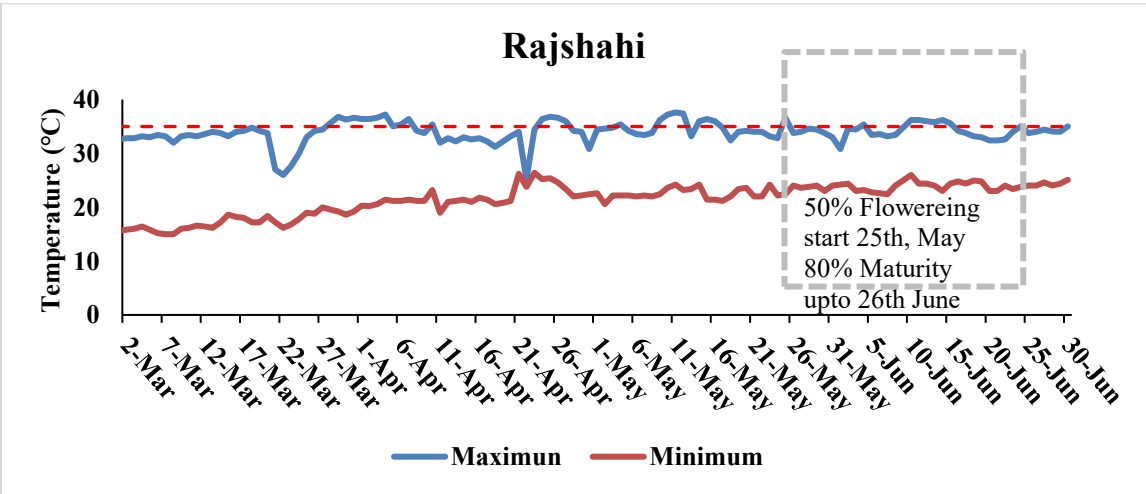


Fig 5.3. The line graph shows maximum and minimum temperature of Rajshahi in Late Boro 2025

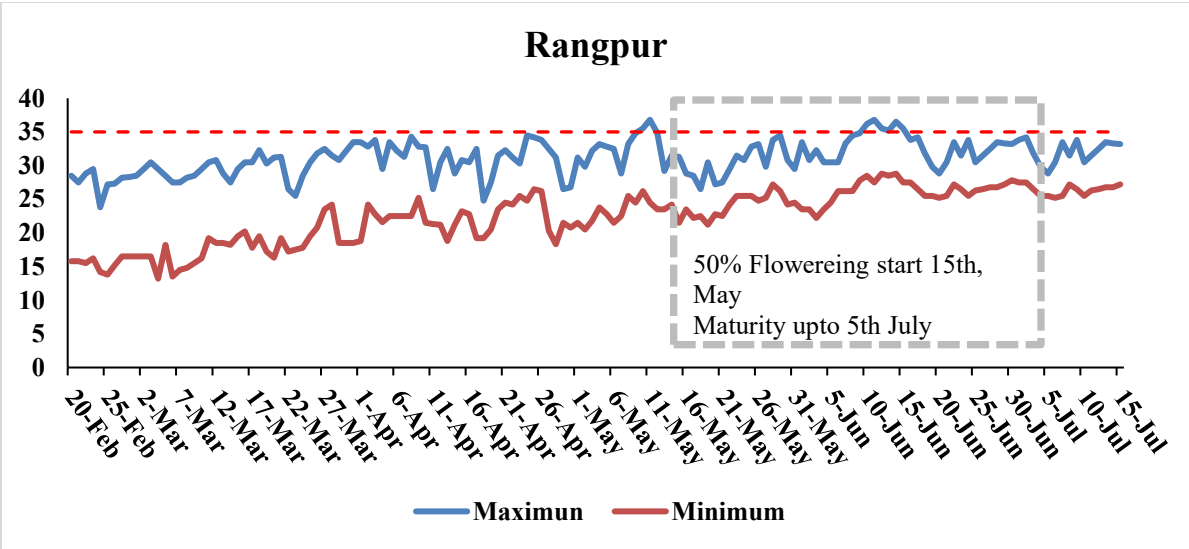


Fig 5.4. The line graph shows maximum and minimum temperature of Rangpur in Late Boro 2025

Table 5.5. Agronomic Performance of the materials from Advanced yield trial (AYT#1_SD), Heat Tolerant Rice, Rangpur, Late Boro2025

SL	Designation	PH (cm)	GD (days)	Yield (t/ha)				Target genes
				Gazipur	Rajshahi	Rangpur	Mean	
*1	BR12894-5R-150	101	105	5.07	4.80	5.71	5.19	
2	BR12894-5R-281	92	104	4.32	4.05	4.70	4.36	
3	BR12894-5R-71	107	105	3.61	3.75	6.17	4.51	
4	BR13169-4R-324	106	106	2.89	3.40	6.31	4.20	<i>Wxa, qHTSF4.1</i>
5	BR13640-4R-39	122	107	2.90	3.85	5.39	4.05	<i>Wxa, qHTSF4.1</i>
6	BR13641-4R-130	112	108	3.46	4.00	4.45	3.97	<i>Wxa, qHTSF4.1</i>
7	BR13963-4R-111	99	107	4.18	5.65	4.41	4.74	<i>Wxa, qHTSF4.1</i>
*8	BR13963-4R-228	107	107	4.44	4.35	6.50	5.10	<i>Wxa, qHTSF4.1</i>
9	BR13963-4R-24	120	108	2.44	3.80	5.50	3.91	<i>Wxa, qHTSF4.1</i>
*10	BR13970-4R-147	104	106	4.00	4.75	6.41	5.05	<i>Wxa, qHTSF4.1</i>
11	BR13970-4R-239	109	108	3.73	4.25	5.67	4.55	<i>Wxa, qHTSF4.1</i>
12	IR99853-B-B-B-322	93	104	3.31	3.60	4.57	3.83	<i>Wxa, qHTSF4.1</i>
13	BRRI dhan28(Ck)	109	104	3.96	3.65	4.13	3.91	
14	BRRI dhan98(Ck)	109	106	4.15	4.05	6.49	4.89	
15	Binadhan14(Ck)	102	105	3.42	4.05	5.82	4.43	
16	N22(Tol Ck)	117	106	2.71	4.25	3.13	3.36	
	h2b	0.69	0.44	0.64	0.45	0.98	0.15	
	LSD (0.05)	7.51	2.27	0.80	0.80	0.27	1.18	

Table 5.6. Agronomic Performance of the materials from Advanced Yield Trial (AYT#2_LD), Heat Tolerant Rice, Late Boro2025

SN	Designation	PH (cm)	GD (days)	Yield (t/ha)				Target genes
				Gazipur	Rajshahi	Rangpur	Mean	
1	BR11845-4R-42	102	113	3.94	4.09	5.80	4.61	
2	BR12432-5R-36	123	117	4.22	3.54	4.86	4.21	
*3	BR12605-4R-81	109	116	5.56	5.80	4.02	5.19	
4	BR12890-5R-31	113	110	5.30	2.91	5.64	4.62	<i>Wxa, qHTSF4.1</i>
5	BR13169-4R-185	113	110	3.42	3.66	5.38	4.05	
6	BR13169-4R-42	114	121	3.10	5.15	4.41	4.29	
7	BR13640-4R-84	109	113	3.24	3.79	5.14	4.17	<i>Wxa, qHTSF4.1</i>
8	BR13970-4R-145	106	114	3.37	3.93	5.58	4.29	<i>Wxa, qHTSF4.1</i>
*9	BR13970-4R-192	105	112	3.56	5.28	5.72	4.97	<i>Wxa, qHTSF4.1</i>
10	BR13970-4R-237	103	113	3.42	4.42	5.64	4.49	
11	BR13970-4R-238	105	113	4.44	4.17	5.29	4.64	<i>Wxa, qHTSF4.1</i>
*12	BR13970-4R-64	106	114	4.18	5.17	6.07	5.22	<i>Wxa, qHTSF4.1</i>
13	BRRI dhan58 (Ck)	105	109	4.13	3.91	4.74	4.26	
14	BRRI dhan89 (Ck)	113	116	4.19	4.81	5.07	4.69	
15	BRRI dhan98 (Ck)	104	109	4.13	4.53	5.92	4.86	
	h2b	0.45	0.46	0.82	0.79	0.92	0.12	

SN	Designation	PH (cm)	GD (days)	Yield (t/ha)				Target genes	
				Gazipur	Rajshahi	Rangpur	Mean		
	LSD (0.05)	8.49	2.77	0.55	0.80	0.31	1.14		

Table 5.7. Agronomic Performance of the materials from Advanced Yield Trial (AYT#3), Heat Tolerant Rice, Late Boro2025

SN	Designation	PH (cm)	GD (days)	Yield (t/ha)					%Fertility
				Gazipur	Lalpur	Rajshahi	Birampur	Mean	
*1	IR15C1015	102	110	4.37	4.16	5.45	5.60	4.90	73.66
2	IR15C1020	105	123	4.19	5.92	3.99	3.10	4.30	70.02
3	IR16C1002	107	123	5.13	4.71	4.91	3.29	4.51	59.19
*4	IR18C1002	100	113	4.69	5.02	4.37	5.40	4.87	65.87
5	IR18C1004	98	116	3.94	2.73	5.15	5.14	4.24	64.04
6	IR18C1005	105	116	5.01	5.44	4.26	3.62	4.58	58.03
7	IR18C1007	106	110	3.91	5.47	6.21	3.83	4.85	63.32
8	IR99853-B-B-B-408	107	119	4.07	4.19	2.66	3.42	3.58	61.56
9	IR99853-B-B-B-51	106	123	5.20	5.52	3.91	3.67	4.57	62.79
10	IR99853-B-B-B-646	103	122	5.27	5.05	4.25	3.93	4.62	62.70
11	Binadhan14 (ck)	100	105	4.57	3.88	4.48	4.42	4.34	70.99
12	BRRI dhan28 (ck)	107	105	4.31	4.85	4.17	4.22	4.39	71.38
13	BRRI dhan98 (ck)	102	108	5.21	4.94	4.74	5.13	5.00	72.71
	h2b	0.27	0.81	0.49	0.85	0.83	0.96	0.13	0.33
	LSD (0.05)	4.74	5.41	0.82	0.45	0.47	0.25	0.57	12.03

Experiment 5.6: Regional Yield Trial (RYT)

Principal Investigator: Mahmuda Khatun

Co-investigator: A Rahman, H A Mashuk, S Das (Plant Breeding), M R Hasan, R Jahan (Rangpur), S Abedin, T K Hore (Rajshahi), and M M Dewan (Kushtia)

Specific objective: Initial yield evaluation and selection of desirable lines compared to standard checks.

Location: BRRI, Gazipur, Rajshahi, Kushtia and Rangpur.

Materials and Methods: In RYT#1, 10 genotypes and RYT#2, 12 genotypes were evaluated including check varieties. The check varieties Bina dhan14, BRRI dhan28, BRRI dhan98 included in RYT#1 and BRRI dhan58 and BRRI dhan92 included in RYT#2. Three-four weeks old seedlings were transplanted with single seedling per hill at a spacing of 20 × 15 cm in a 5.4 m × 10 rows plot. The field layout was RCBD with three replications. Application of fertilizer and crop management was done as described in experiment 5.1

Result: In RYT#1, The genotype BR11847-4R-105 was produced higher yield (5.20 t/ha) than the check variety BRRI than28 and Binadhan14 and BRRI dhan98. On the other hand, BR12894-5R-240 produced higher yield (4.65 t/ha) than the check variety BRRI than28 and Binadhan14 but produced similar yield to the highest yield producing check variety BRRI dhan98. However, some lines were chosen for use as parents in a subsequent heat-tolerant breeding effort (Table 5.8).

In RYT#2, The genotype BR13169-4R-68 (5.16 t/ha) and BR13169-4R-202 (5.08 t/ha) was produced higher yield than the check variety BRRI dhan58 and BRRI dhan92. On the other hand, BR12894-5R-221 produced higher yield (4.65 t/ha) than the check variety BRRI than92 but produced similar yield to the highest yield producing check variety BRRI dhan98. However, some lines were chosen for use as parents in a subsequent heat-tolerant breeding effort (Table 5.9).

Table 5.8: Grain yield and agronomic parameters of RYT#1 trial, Late Boro 2025

SN	Designation	PH (cm)	GD (days)	Yield (t/ha)					Target genes
				Gazipur	Rangpur#2	Kushtia	Rajshahi	Rangpur#1	Mean
1	BR11845-4R-180	103	111	2.92	6.14	3.40	5.46	3.58	4.30
2	BR11847-4R-105	103	109	5.40	6.01	4.22	5.27	5.09	5.20

3	BR12605-4R-298	111	109	2.48	5.81	3.06	5.40	5.39	4.43	
4	BR12894-5R-239	101	108	3.26	5.90	3.75	4.32	5.20	4.59	
5	BR12894-5R-240	98	108	4.44	6.02	3.59	3.93	4.29	4.65	<i>Wxa,qHTSF4.1</i>
6	BR13169-4R-233	122	110	4.15	4.48	2.87	3.61	4.87	4.00	<i>Wxa,qHTSF4.1</i>
7	IR 99853-B-B-B-509	95	110	3.10	5.51	2.91	5.62	4.72	4.37	
8	BRRI dhan28 (Ck)	107	109	2.52	3.42	N/A	4.45	4.81	3.60	
9	BRRI dhan98 (Ck)	101	112	2.82	6.14	3.13	5.88	4.69	4.43	
10	Binadhan14 (Ck)	95	106	2.60	5.13	2.95	4.48	4.64	3.86	
	h2b	0.76	0.67	0.78	0.94	0.76	0.84	0.67	0.20	
	LSD (0.05)	4.72	4.21	0.47	0.31	0.61	0.43	0.43	1.04	

Table 5.9: Grain yield and agronomic parameters of RYT#2 trial, Late Boro 2025

SN	Designation	PH (cm)	GD (day)	Yield (t/ha)				Target genes
				Rang#2	Gazipur	Rajshahi	Rang#1	
1	BR12605-4R-125	112	112	6.08	5.00	5.34	4.25	
2	BR12605-4R-200	112	114	5.54	3.89	5.23	3.94	4.75
3	BR12894-5R-221	103	107	5.96	4.32	4.02	4.96	4.88
4	BR12894-5R-46	107	108	5.41	4.21	4.38	3.60	4.40
5	BR13157-4R-173	113	109	5.90	3.75	5.01	4.74	4.85
6	BR13157-4R-174	115	114	6.14	4.14	4.04	3.63	4.49
7	BR13169-4R-194	115	111	5.12	5.84	3.20	3.80	4.49
8	BR13169-4R-202	108	113	5.49	4.09	5.19	NA	5.08
9	BR13169-4R-68	106	110	6.19	4.00	5.07	4.99	5.16
10	BR13173-4R-154	127	113	6.06	3.93	4.55	4.10	4.66
11	BRRI dhan58 (Ck)	105	111	6.01	3.49	4.59	5.03	4.78
12	BRRI dhan92 (Ck)	115	122	4.39	2.94	4.44	3.29	3.76
	h2b	0.49	0.41	0.72	0.68	0.60	0.87	0.15
	LSD (0.05)	6.06	4.68	0.45	0.78	0.59	0.55	0.84

PROJECT 6: DEVELOPMENT OF SALT-TOLERANT RICE (STR) FOR SOUTHERN COASTAL BANGLADESH

General objective: Development of improved genotypes with high yield potential (4.5 t/ha under salt-stress and ≥8.0 t/ha under non-stress conditions), earliness and acceptable grain quality to achieve climate change adaptation (reduce the risk of harmful effects due to climate change) for southern coastal ecosystem in Bangladesh during T. Aman season

Project Leader: M. Akhlasur Rahman

Experiment 6.1: Hybridization

Principal investigator: M. Akhlasur Rahman

Co-investigator: Nusrat Jahan, RF Disha and Armin Akter Setu

Specific objective: To introgress high yielding and salt-tolerance traits into elite genetic background considering product profile for target region during T. Aman season.

Materials and Methods: Fifty detailed-characterized parents were grown in five different dates from July 2024 for T. Aman season, respectively, with an interval of seven days for flowering synchronization to achieve desired cross combinations. Thirty-five -day-old seedlings in T. Aman were transplanted @ single seedling with a spacing of 20 cm × 15 cm in a 5.4 m × 2 rows plot in the plant breeding net house, Gazipur. Fertilizers @ 100:60:40:20 kg N, P₂O₅, K₂O, S/ha were used with split application of N at 15, 40, 60 DAT in T. Aman season. Total amount of P, K, S were applied at the time of final land preparation. The experiment was conducted at BRRI, Gazipur.

Results: Sixty crosses were made using forty-two elite parents in T. Aman 2024-25 season and ninety-three crosses were made using sixty well characterized elite parents in Boro 2024-25 (Table 6.1). These crosses were made to develop desirable F₁s having salinity tolerance with other useful traits. Parent selection for crossing was done on the basis of the following criteria such as i) phenotypic value that improves breeding value, ii) genetic distance, iii) no sister lines used for making cross, iv) the most of the OYT and PYT lines used that are well characterized

using trait markers for high amylose+high yield+*Saltol*+Tr(*Chalk5*) + Grain size shape + Pi54;Pi9 (Blast)+*BPH17*+*Xa21*+*xa13*), previous mega varieties (BR11, BRR1 dhan28 and 29) excluded; and vi) specific line(s) used not more than 3 to 5 times in the crossing program. For line augmentation, 4 BC₂F₁, 2 BC₂ F₁ and 2BC₂F₂ cross are confirmed for desirable traits (Table 6.1)

Table 6. 1: List of crosses made for generating F₁s, Salt-Tolerant Rice (STR) Breeding, T. Aman 2024-25 and Boro 2024-25

Sl No	Cross Combination (Elite/Elite)	F ₁ Seeds	Traits
T. Aman2024-25			
1	BR12466-4R-317/N22	30	+qSES1.2-2+qSES1.2-3+qSES1.2-4
2	BR13108-4R-232/BR13104-4R-80	9	+qSES1.2-2+qSES1.2-3+qSES1.2-4
3	BR13115-4R-63/BR13108-4R-133	32	
4	BR13105-4R-32/BR13103-4R-95	13	
5	BR12465-4R-59/BR13123-4R-118	6	
6	BR12459-4R-106/BR13105-4R-28	152	Saltol+qSES1.2-2+qSES1.2-3+qSES1.2-4
7	BR13460-4R-131/BR13122-4R-4	73	
8	BR13105-4R-81/BR12459-4R-106	111	
9	BR13105-4R-81/BR13105-4R-32	33	+qSES1.2-2+qSES1.2-3+qSES1.2-4
10	BR12504-4R-69/BR12465-4R-132	77	+qSES1.2-4
11	BR13460-4R-131/BR12465-4R-132	63	
12	BR13105-4R-37/BRR1 dhan110	24	
13	BR13459-4R-28/BR13105-4R-108	65	+qSES1.2-4
14	BR13105-4R-72/BR13105-4R-95	11	Saltol+qSES1.2-2+qSES1.2-3+qSES1.2-4
15	BR131.5-4R-122/BRR1 dhan110	65	
16	BR13122-4R-4/A69-1	60	
17	BR13459-4R-241/BR13115-4R-60	29	
18	BR13115-4R-60/BR13122-4R-44	66	
19	BR12465-4R-231/BR12460-4R-131	12	+qSES1.2-4
20	BR13105-4R-32/A69-1	1	+qSES1.2-4
21	BR13118-4R-76/A-69	23	Saltol+qSES1.2-3+qSES1.2-4
22	BR13105-4R-93/11-1763 (Paikjota-1)	75	+qSES1.2-4
23	BR12465-4R-231/BR13123-4R-118	7	+qSES1.2-3+qSES1.2-4
24	BR13104-4R-21/BR12459-4R-265	28	
25	BR13105-4R-108/BR13108-4R-214	12	+qSES1.2-4
26	BR13122-4R-44/A69-1	70	+qSES1.2-4
27	BRR1 dhan108/A69-1	10	
29	BR12477-4R-186/BR13122-4R-14	13	Saltol+qSES1.2-2+qSES1.2-4
30	BR13104-4R-21/BR12459-4R-255	38	+qSES1.2-4
31	BR13115-4R-60/BR12459-4R-106	109	
32	BR13122-4R-4/BR12466-4R-317	207	
33	BR13105-4R-72/BR13122-4R-4	9	
34	BR13113-4R-60/Fatema dhan	80	
35	BR13118-4R-76/BR12466-4R-317	61	
36	BR13118-4R-76/BRR1 dhan34	31	
37	BR13104-4R-21/BR12460-4R-131	80	+qSES1.2-4
38	IR83140-B-11-B/BR13108-4R-214	25	+qSES1.2-4
39	BR13123-4R-229/BR13106-4R-489	83	
40	BR13122-4R-4/BR13123-4R-229	13	
41	BR12466-4R-317/BR13118-4R-76	53	
42	BR13122-4R-4/BD75	52	
43	BR13122-4R-4/BR13113-4R-63	40	Saliniy+Alkalinity+Fe Toxicity
44	BR13122-4R-44/BR13113-4R-14	9	Saliniy+Alkalinity+Fe Toxicity
45	BR11715-4R-105/BR13123-4R-229	8	
46	BR13122-4R-44/BR12466-4R-317	34	Saltol+qSES1.2-2+qSES1.2-3+qSES1.2-4
47	BR13103-4R-95/BR13122-4R-44	18	+qSES1.2-4
48	BR13113-4R-14/BR12459-4R-265	82	+qSES1.2-4
49	BR13122-4R-4/BRR1 dhan34	1	
50	BR13115-4R-63/BR13118-4R-76	73	
51	BR12459-4R-265/BR13113-4R-63	17	
52	BR13122-4R-4/BR12466-4R-317	40	qSES1.2-2+qSES1.2-3+qSES1.2-4
53	BR13108-4R-133/BR13113-4R-14	45	
54	BR13108-4R-214/BR13122-4R-14	153	
55	BR13123-4R-118/BR13113-4R-14	1	
56	BR13106-4R-438/BR13108-4R-214	30	Saltol+qSES1.2-2+qSES1.2-3+qSES1.2-4
57	BR13115-4R-136/BR13106-4R-438	36	
58	BR22/BR13460-4R-131	67	
59	BR12465-4R-91/BR12459-4R-265		
60	BR13113-4R-14/Khato babu	66	
Boro 2024-25			

Sl	Cross Combination (Elite/Elite)	No. of F ₁ seed
1	BR13111-4R-191/BR11718-4R-379	11
2	BR13113-4R-63/IR145386-B-B-314-B	7
3	BR13113-4R-63/IR145386-5-75-B	178
4	BR13207-4R-1/BR13106-4R-438	40
5	BR13202-4R-141/BRRI dhan97	16
6	BR12274-4R-310/BRRI dhan99	17
7	BR12650-4R-55/BR13106-4R-184	49
8	BR13125-4R-92/BR13207-4R-1	102
9	BR12658-4R-255/BR12274-4R-188	6
10	BR11712-4R-44/BR13111-4R-63	5
11	BR11718-4R-230/BR13201-4R-268	28
12	BR11276-4R-196/IR145386-B-B-28-B	92
13	BR13201-4R-98/BR13122-4R-136	12
14	BR13210-4R-218/10260-5-15-21-6-B	20
15	BR13122-4R-136/BR13208-4R-76	9
16	BR13802-BC3-54/BR13113-4R-63	220
17	BR13802-BC3-54-12/BRRI dhan99	260
18	BR13802-BC3-73-13/BR13106-4R-184	218
19	BR12645-4R-71/BRRI dhan99	6
20	BR13113-4R-63/BR13138-4R-76	8
21	BR13113-4R-116/BR145386-5-B-75-B	32
22	IR145386-5-B-75-B-4R/BR12640-4R-250	25
23	BR13113-4R-63/IR145386-5-B-396-B	151
24	BR11718-4R-10/BRRI dhan99	32
25	BR13111-4R-63/IR145386-5-B-396-B	68
26	BR13197-4R-181/IR145386-5-B-396-B	52
27	BR13210-4R-218/BR13206-4R-147	40
28	BR11276-4R-19/BR13201-4R-196	65
29	BRRI dhan99/BR13201-4R-16	2
30	BR11720-4R-89/IR145386-5-B-396-B	5
31	BR13802-BC3-73-13/BR13113-4R-63	220
32	IR145388-B-B-314-B/BR13122-4R-136	3
33	BR13113-4R-185/BR145386-5-B-396-B	124
34	BR13206-4R-50/IR13201-4R-268	28
35	BR13207-4R-28/BR13197-4R-181	14
36	BR12276-4R-156/BR11276-4R-104	26
37	BR11718-4R-110/BR13207-4R-28	22
38	BR13106-4R-184/IR145386-5-B-396-B	6
39	BR12650-4R-24/BR13201-4R-61	52
40	BR11712-4R-44/BR13106-4R-438	5
41	BR13197-4R-181/BR13201-4R-61	74
42	BR13111-4R-63/BR13205-4R-190	3
43	BR13108-4R-232/IR145386-5-B-396-B	83
44	BR131065-4R-469/BRRI dhan99	5
45	BRRI dhan99/BR13207-4R-1	23
46	BR13106-4R-184/IR145398-B-B-28-B	5
47	BR12650-4R-55/IR145398-B-B-28-B	105
48	BRRI dhan99/IR145398-B-B-28-B	10
49	BR13201-4R-16/IR145398-B-B-75-B	12
50	BR12274-4R-255/BR13205-4R-190	7
51	BR13108-4R-232/BR11718-4R-379	25
52	BR13201-4R-16/BR11718-4R-379	5
53	BR13138-4R-76/BR13106-4R-184	20
54	BR13113-4R-185/BR11720-4R-89	44
55	BR12640-4R-250/BR13202-4R-141	14
56	BR11712-4R-44/BR13122-4R-136	13
57	BR13201-4R-796/BRRI dhan99	6
58	BR145398-4R-/BR11276-4R-152	3
59	BR13205-4R-245/BR11276-4R-152	6
60	BR13113-4R-116/IR145386-5-B-396-B	126
61	BR13201-4R-186/BR11718-4R-110	40
62	BR12645-4R-71/IR16F1148	93
63	BR13201-4R-268/IR145386-B-B-28-B	156
64	BR13111-4R-191/BR13138-4R-76	12
65	BR13197-4R-186/BR13201-4R-186	5
66	BR11712-4R-44/BR13201-4R-252	38
67	BR12274-4R-193/BR13113-4R-116	3
68	BR145386-4R-314/BR13113-4R-116	23
69	BR13201-4R-252/BR12650-4R-24	41
70	BR13122-4R-136/BR13208-4R-76	7
71	BR12645-4R-71/BR145398-4R-B-B-28-B	30
72	BR11276-4R-139/BR13206-4R-50	3
73	BR12274-4R-310/BR13207-4R-28	21
74	BR13201-4R-249/BR11276-4R-100	8

Sl	Cross Combination (Elite/Elite)	No. of F ₁ seed
75	BR11276-4R-67/BR13206-4R-50	16
76	BR11276-4R-105/IR145388-B-B314-B	9
77	BRRI dhan99/BR13122-4R-136	4
78	BR13208-4R-76/BR11718-4R-379	24
79	BR13113-4R-63/IR145386-B-B314-B	38
80	BR12661-4R-33/BR13113-4R-63	33
81	BR13125-4R-92/BR13201-4R-268	92
82	BR13106-4R-469/BR13113-4R-185	16
83	BR12274-4R-310/IR145398-4R-B-B-28-B	5
84	BR13201-4R-219/IR161148	13
85	BR13201-4R-196/BR13106-4R-184	52
86	BR13113-4R-63/BR11720-4R-89	60
87	BR12650-4R-55/BR13201-4R-219	4
88	BR13108-4R-232/BR13111-4R-63	3
89	IR13201-4R-61/BRRI dhan99	36
90	IR16F1148-4R/BRRI dhan99	10
91	BR58443-4R/BR13106-4R-469	17
92	BR13201-4R-16/BR13201-4R-98	21
93	BR13207-4R-250/BR12274-4R-255	14

Experiment 6.2: Hybridity test for confirming F₁s

Principal investigator: M A Rahman

Co-investigator: Nusrat Jahan, RF Disha and Armin Akter Setu.

Specific objective: To confirm F₁s as true hybrid and confirmed F₁s registered into BRRI cross list and database.

Materials and Methods: Twenty-nine F₁s were grown along with their respective parents in the hybridization block at Gazipur during T. Aman season. Forty-day-old seedlings in T. Aman season was transplanted @ single seedling with a spacing of 20 cm × 15 cm. Fertilizers @ 120:60:40:20 kg N, P₂O₅, K₂O, S/ha were used with split application of N at 15, 40, 60 DAT in T. Aman season. Total amount of P, K, S were applied at the time of final land preparation. The experiment was conducted at BRRI, Gazipur.

Results: A total of 29 F₁s and 59 F₁s were confirmed as true hybrid through F₁ verification by visual comparison of all the crosses with respective parents and quality check (QC) genotyping with purity SNP panel both in T. Aman and Boro season respectively (Table 6.2). The F₁ plants with heterozygous alleles at least two or more SNP loci were declared as true F₁s (hybrids). After confirmation, the F₂ seeds were collected and preserved. These confirmed F₁s were registered into BRRI cross list with BR number in T. Aman season.

Table 6.2: List of confirmed F₁s, Salt-Tolerant Rice (STR) Breeding, T. Aman 2024-25 and Boro 2024-25

SI No	Cross combinations (Elite/Elite)	BR Number	Traits
T. Aman2024-25			
1	BR13108-4R-184/IR1154	BR16482	<i>qSES1.2-2, qSES1.2-3, qSES1.2-4</i>
2	BR13104-4R-148-P2/BR13111-4R-63	BR16483	
3	BR13104-4R-80-P3/IR58443-6B-10-3	BR13484	
4	BR13125-4R-92/BR13104-4R-80-P2	BR16485	<i>Saltol, qSES1.2-2, qSES1.2-3, qSES1.2-4</i>
5	BR13108-4R-232/BR13104-4R-80-P1	BR16486	
6	BR13104-4R-80-P3/BR13108-4R-232	BR16487	
7	BR13104-4R-148-P1/BR13113-4R-63	BR16488	<i>qSES1.2-2, qSES13, qSES1.2-4</i>
8	BR11714-4R-112/Fatema dhan	BR16489	
9	BR13113-4R-63/BR12177-4R-1	BR16490	
10	BR13203-4R-76/BR13104-4R-81-P1	BR16491	<i>qSES1.2-4</i>
11	BR13198-4R-35/BR13104-4R-102	BR16492	
12	BR13113-4R-63/BR13104-4R-80-P2	BR16493	
13	BR13198-4R-35/BR13104-4R-80-P2	BR16494	<i>qSES1.2-4</i>
14	BR11714-4R-148/BR13122-4R-136	BR16495	
15	BR13201-4R-268/BR13113-4R-63	BR16496	
16	BR13122-4R-136/BR13106-4R-438	BR16497	<i>Saltol, qSES1.2-2, qSES1.2-3, qSES1.2-4</i>
17	BR13108-4R-232/BR13104-4R-81-P2	BR16498	
18	BR13106-4R-438/A-69	BR16499	
19	BR11715-4R-186/BR13201-4R-27	BR16500	<i>qSES1.2-4</i>
20	BRRI dhan104/A-69	BR16501	<i>Saltol+qSES1.2-3+qSES1.2-4</i>
21	BR11712-4R-227/BR13113-4R-185	BR16502	<i>qSES1.2-4</i>

SI No	Cross combinations (Elite/Elite)	BR Number	Traits
22	BR13199-4R-136/BR13104-4R-155-P2	BR16503	qSES1.2-3+qSES1.2-4
23	A-69/BR13104-4R-81-P1	BR16504	
24	BR11712-4R-27/BR13106-4R-438	BR16505	qSES1.2-4
25	BR13108-4R-438/BR13104-4R-80-P2	BR16506	qSES1.2-4
26	BR13104-4R-80-P3/BR13111-4R-191	BR16507	
27	BR13106-4R-438/BR13201-4R-250	BR16508	
28	BR9891-18-5-2-71/Fatema dhan	BR16509	Saltol+qSES1.2-2+qSES1.2-4 + Zn
29	BR11723-4R-27/Fatema dhan	BR16510	qSES1.2-4

Boro 2024-25		
SI No.	Parentage	BR number
1	BR12466-4R-317/N22	BR17130
2	BR13108-4R-232/BR13104-4R-80-P1//BR13105-4R-108	BR17131
3	BR13115-4R-63/BR13108-4R-133	BR17132
4	BR13105-4R-32/BR13103-4R-95	BR17133
5	BR12465-4R-59/BR13123-4R-118	BR17134
6	BR12459-4R-106/BR13105-4R-28	BR17135
7	BR13460-4R-131/BR13122-4R-4	BR17136
8	BR13105-4R-81/BR12459-4R-106	BR17137
9	BR13105-4R-81/BR13105-4R-32	BR17138
10	BR12504-4R-69/BR12465-4R-132	BR17139
11	BR13460-4R-131/BR12465-4R-132	BR17140
12	BR13105-4R-37/BRR1 dhan110 (IR16F1148)	BR17141
13	BR13459-4R-28/BR13105-4R-108	BR17142
14	BR13105-4R-72/BR13103-4R-95	BR17143
15	BR13105-4R-122/BRR1 dhan110 (IR16F1148)	BR17144
16	BR13122-4R-4/A-69	BR17145
17	BR13459-4R-241/BR13115-4R-60	BR17146
18	BR13115-4R-60/BR13122-4R-44	BR17147
19	BR12465-4R-231/BR12460-4R-131	BR17148
20	BR13105-4R-32/A-69	BR17149
21	BR13118-4R-76/A-69	BR17150
22	BR13105-4R-93/11-1763(Paikjota-1)	BR17151
23	BR12465-4R-231/BR13123-4R-118	BR17152
24	BR13104-4R-21/BR12459-4R-265	BR17153
25	BR13105-4R-108/BR13108-4R-214	BR17154
26	BR13122-4R-44/A-69	BR17155
27	BRR1 dhan 108-/A-69	BR17156
28	BR12105-4R-241/51-1959-Mohislama-6	BR17157
29	BR12477-4R-186/BR13122-4R-14	BR17158
30	BR13104-4R-21/BR12459-4R-255	BR17159
31	BR13115-4R-60/BR12459-4R-106	BR17160
32	BR13122-4R-4/BR12466-4R-317	BR17161
33	BR13105-4R-72/BR13122-4R-4	BR17162
34	BR13113-4R-60/Fatema dhan	BR17163
35	BR13118-4R-76/BR12466-4R-317	BR17164
36	BR13118-4R-76/BRR1 dhan34	BR17165
37	BR13104-4R-21/BR12460-4R-131	BR17166
38	IR83140-B-11-B/BR13108-4R-214	BR17167
39	BR13123-4R-229/BR13106-4R-489	BR17168
40	BR13122-4R-4/BR13123-4R-229	BR17169
41	BR12466-4R-317/BR13118-4R-76	BR17170
42	BR13122-4R-4/BD75	BR17171
43	BR13122-4R-4/BR13113-4R-63	BR17172
44	BR13122-4R-44/BR13113-4R-14	BR17173
45	BR11715-4R-105/BR13123-4R-229	BR17174
46	BR13122-4R-44/BR12466-4R-317	BR17175
47	BR13103-4R-95/BR13122-4R-44	BR17176
48	BR13113-4R-14/BR12459-4R-265	BR17177
49	BR13122-4R-4/BRR1 dhan34	BR17178
50	BR13115-4R-63/BR13118-4R-76	BR17179
51	BR12459-4R-265/BR13113-4R-63	BR17180
52	BR13108-4R-133/BR13113-4R-14	BR17181
53	BR13108-4R-214/BR13122-4R-14	BR17182
54	BR13123-4R-118/BR13113-4R-14	BR17183
55	BR13106-4R-438/BR13108-4R-214	BR17184
56	BR13115-4R-136/BR13106-4R-438	BR17185
57	BR22/BR13460-4R-131	BR17186
58	BR12465-4R-91/BR12459-4R-265	BR17187
59	BR13113-4R-14/Khato babu	BR17188

Experiment 6.3: Growing of FRGA population

Principal investigator: M A Rahman

Co-investigator: Nusrat Jahan, Armin Akter Setu and R F Disha

Specific objectives: To quickly advance progenies from segregating population

Materials and Methods: Seeds of each cross were seeded in a seedbed and twenty-one days old seedlings were transplanted @ single seedling in 5cm × 5cm spacing. Fertilizer dose was applied @ one third of the normal dose. Total amount of P, K, Gypsum and ZnSO₄ was applied at final land preparation.

Results: Segregating progenies from F₂ to F₅ generation were rapidly advanced in the field condition in T. Aman and Boro season. In total 34,172 progenies in T. Aman (Fig. 6.3.1) and 36,182 segregating progenies in Boro season (Fig. 6.3.2) were harvested from F₂-F₅ generations using FRGA technique.

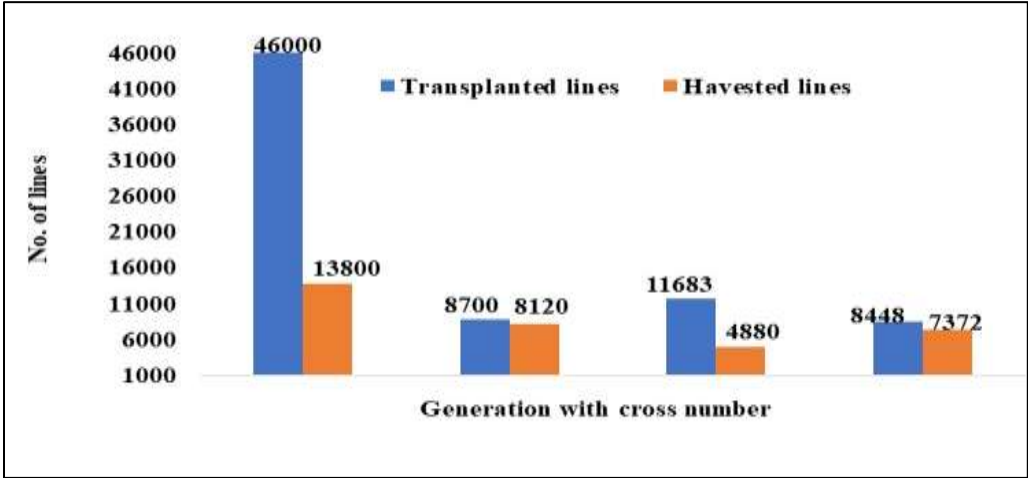


Fig. 6.3.1: Total number of RGA Population STR, T. Aman 2024-25

Table 6.3.1: List of RGA population from F₂ to F₅ grneration, Development of Salt Tolerant Rice, Boro 2024-25

Sl. No.	Cross Combination	BR No	TP	HP
F ₂ generation				
1	BR13115-4R-93/BR13103-4R-37	16511	330	312
2	BR13115-4R-93/BR11716-4R-102	16512	400	368
3	BR11715-4R-186/BR13486-4R-94	16514	350	332
4	BR13103-4R-7/BR11391-4R-335	16515	330	324
5	BR12459-4R-113/BR13115-4R-93	16516	400	380
6	BR12459-4R-113/BR11716-4R-102	16534	325	312
7	BR11391-4R-335/BR12477-4R-371	16517	240	220
8	BR13106-4R-38/BR11716-4R-102	1618	300	284
9	BR13106-4R-38/BR13117-4R-95	16519	470	460
10	BR13115-4R-116/BR11715-4R-277	16522	280	276
11	BR12477-4R-371/BR13103-4R-7	16523	300	292
12	BR11388-4R-6/BR13111-4R-63	16524	350	332
13	BR11716-4R-102/BR13113-4R-63	16525	370	360
14	BR13115-4R-117/BR13103-4R-37	16526	300	280
15	BR12459-4R-16/BR13106-4R-38	16527	250	224
16	BR11716-4R-102/BR13122-4R-136	16528	380	364
17	BR11716-4R-102/BR13125-4R-92	16529	400	392
18	BR11716-4R-102/BR13111-4R-63	16530	380	372
19	BR11716-4R-102/BR13108-4R-232	16531	450	440
20	BR11716-4R-102/IR58443-6B-10-3	16532	350	344
21	BR11716-4R-102/BR13106-4R-38	16533	300	300
22	BR12459-4R-113/BR11716-4R-102	16534	420	420
23	IR58443-6B-10-3/BR11716-4R-102	16535	400	396
24	BRR1 dhan87/BR13486-4R-94	16137	360	348
25	BR13201-4R-284/BR13210-4R-39	16152	400	396
26	BR13201-4R-285/BR13204-4R-195	16153	320	312
27	BR13208-4R-2/BR13204-4R-195	16154	350	330
28	BR13207-4R-28/BR13205-4R-203	16155	170	156
29	BR12459-4R-16/A69-1	16543	370	364
30	BR13106-4R-106/Khato Babu	16545	300	296
31	BR13115-4R-117/Khato Babu	16546	360	356
32	BR13122-4R-136/Khato Babu	16547	400	388
33	BR13115-4R-159/Khato Babu	16548	390	380
34	BR12477-4R-371/Rodminiket	16550	390	384
35	BR13103-4R-7/BR13115-4R-93	16551	300	276

Sl. No.	Cross Combination	BR No	TP	HP
36	BR10440-4-1-2-5/BR11716-4R-102	-	180	180
37	BR13115-4R-32/BR23	16538	250	240
38	BR13106-4R-38/Rodminiket	16549	310	304
Total			12925	12494
F₃ generation				
1	BRRI dhan29-Backcross-4R-3/BRAC dhan-2	BR16105	200	192
2	BR23/BRRI dhan36	BR15439	300	296
3	BR12276-4R-183/IR58443-6B-10-3	BR15804	270	264
4	BRRI dhan92/BR22	BR15432	180	176
5	BR11271-4R-196/BR11712-4R-93	BR15800	300	300
6	BR12477-4R-13/BR22	BR15437	300	288
7	BR12656-4R-138/BR12646-4R-123	BR15793	300	272
8	BR12276-4R-104/BR11720-4R-89	BR15799	250	244
9	BR11712-4R-6/BR12646-4R-123	BR15802	160	144
10	BRAC dhan-2/IR58443-6B-10-3	BR15797	200	200
11	BR12655-4R-239/BRAC dhan-2	BR15811	250	224
12	BR12656-4R-138/BR12645-4R-71	BR15805	230	212
13	IR58443-6B-10-3/BR12839-4R-157-2	BR15813	120	116
14	BR11728-4R-89/BD29-Backcross-4R-3	BR16104	180	276
15	BRAC dhan-2/D (R)-6	BR15814	220	220
16	IR58443-6B-10-3/BRAC dhan-2	BR15810	150	148
17	BD29-Back-4R-3/BR12839-4R-51	BR15205	100	80
18	BR12657-4R-178/BR12650-4R-77	BR14897	180	156
19	BR22/D (R)-6	BR15213	280	280
20	BR12650-4R-72/BR11723-4R-107	BR14890	220	204
21	BRAC dhan-2/BRRI dhan28	BR14917	350	336
22	BD29-Back-4R-3/IRRI 154 (Pi9)	BR15208	250	236
23	BD29-Back cross-4R-3/BR12650-4R-77	BR15209	280	276
24	BR11276-4R-132/IRRI 154 (Pi9)	BR14910	200	200
25	BR12671-4R-73/IR126952-29-82-206-12-3	BR15036	216	216
26	BRRI dhan92/BR23	BR15210	260	260
27	BRRI dhan92/BR22	BR14534	240	236
28	BRAC dhan-2/BRRI dhan29	BR14918	280	276
29	BR12273-4R-202/BR12658-4R-159	BR14888	150	140
30	BR12646-4R-123/Black rice (Vietnam)	BR14908	250	236
31	BR11720-4R-89/BRAC dhan-2	BR14893	260	256
32	BR11712-4R-93/BRRI dhan29	BR14898	220	216
33	BR23/IRRI 154	BR15211	400	396
34	BR12274-4R-339/IR126952-3-22-2-1-B	BR15203	230	220
35	BR22/IRRI 154	BR15212	260	260
36	BR12650-4R-77/IR58443-6B-10-3	BR14900	350	324
37	BR23/BR13104-4R-80-P1	BR14542	300	248
38	BR11712-4R-93/BR12650-4R-55	BR15204	220	204
39	BR12276-4R-104/IR126952-22-2-1-B	BR14896	220	204
40	BR12650-4R-55/BR12646-4R-78	BR14892	200	184
41	BR11723-4R-236/BR12646-4R-123	BR14905	200	172
42	BR12661-4R-21/BR12655-4R-239	BR14891	250	144
43	BR11723-4R-107/BR12650-4R-72	BR14909	200	188
44	BD29-Back-4R-3/BR12839-4R-157-2	BR15202	180	152
45	BR11715-4R-186/BRAC dhan-2	BR14903	320	304
46	BR12661-4R-21/BR12273-4R-202	BR14911	220	212
Total			10896	10388
F₄ generation				
1	BR11723-4R-172/BR11607-4R-72	BR15411	280	260
2	BR13711-4R-190/IR58443-6B-10-3	BR15415	250	224
3	BR11716-4R-123/BR11386-5R-5	BR15422	300	280
4	BR12460-4R-58/BR12477-4R-13	BR15412	300	288
5	BR12466-4R-275/BR12460-4R-156	BR15399	220	208
6	BR12465-4R-309/BR12465-4R-223	BR15409	280	256
7	BR12459-4R-183/BR12477-4R-13	BR15404	200	188
8	BR11715-4R-186/IR127152-3-22-2-1-2	BR15416	430	420
9	BR12459-4R-103/BR12461-4R-6	BR15410	620	608
10	BR11712-4R-218/IR58443-6B-10-3	BR15408	320	320
11	BR11723-4R-172/BR12465-4R-27	BR15417	220	220
12	BR12465-4R-47/BR12459-4R-209	BR15400	400	376
13	BRRI dhan92/IR58443-6B-10-3	BR15424	600	580
14	BR12460-4R-102/BR12459-4R-39	BR15402	500	492
15	BR11716-4R-105/IR58443-6B-10-3	BR13679	530	512
16	BR11712-4R-218/IRRI154Pi9	BR15419	200	176
17	BR11712-4R-218/BRRI dhan99	BR14719	350	328
18	BR12459-4R-49/BR12461-4R-70	BR15405	220	204
19	BR12462-4R-6/BR12477-4R-358	BR15420	150	148
20	BR12466-4R-169/BR12477-4R-64	BR15418	250	248

Sl. No.	Cross Combination	BR No	TP	HP
21	BRRI dhan89/BRRI dhan99	BR15429	250	236
22	BR12465-4R-18/BR12466-4R-159	BR15401	320	304
23	BR13104-4R-75/IRRI154Pi9	BR15403	300	280
24	BR11388-4R-11/BR12459-4R-18	BR15421	250	224
25	BR12459-4R-14/BR12477-4R-305	BR15407	400	384
26	BR12459-4R-286/BR12459-4R-214	BR15414	300	284
27	BRRI dhan92/BR12459-4R-103	BR15425	400	324
Total			8840	8372
F₅ generation				
1	BR11723-4R-48/IR96184-24-1-1-AJY2	BR15469	108	108
2	BR11716-4R-123/BR11714-4R-322	BR15475	80	68
3	BR11723-4R-12/IR127152-3-22-2-1-B	BR14729	200	192
4	BR12274-4R-46/BR11716-4R-105	BR15449	120	110
5	BR11714-4R-74/BR11723-4R-172	BR15448	232	230
6	BR11714-4R-74/BR11714-4R-322	BR15464	108	102
7	BR11714-4R-148/BR11718-4R-8	BR15470	150	142
8	BR11716-4R-123/BR11714-4R-74	BR15477	120	112
9	BR11716-4R-102/BR11714-4R-69	BR15458	242	242
10	BR11716-4R-123/BR11714-4R-184	BR15476	250	248
11	BR11716-4R-123/BR11714-4R-182	BR15474	50	50
12	BR11716-4R-102/BR11714-4R-418	BR15463	110	106
13	BR11716-4R-123/BR11718-4R-8	BR15467	140	132
14	BR11723-4R-48/BR11714-4R-74	BR15468	262	262
15	BR11714-4R-74/BR11714-4R-112	BR15479	100	96
16	BR11714-4R-362/BR11715-4R-13	BR15453	96	96
17	BR11714-4R-74/BR11714-4R-148	BR15457	392	392
18	BR11723-4R-48/BR11714-4R-74	BR15468	88	88
19	BR11714-4R-418/BR12275-4R-13	BR15445	120	120
20	BR11723-4R-48/BR11714-4R-322	BR15456	78	78
21	BR11716-4R-123/BR11714-4R-228	BR15454	62	62
22	BR11716-4R-123/BR11714-4R-418	BR15452	74	74
23	BR12274-4R-362/BR11714-4R-179	BR15451	90	90
24	BR11723-4R-48/BR11714-4R-418	BR15478	30	30
25	BR11723-4R-27/BR11714-4R-74	BR15460	74	74
26	BR11716-4R-123/BR11715-4R-24	BR15459	36	36
27	BR11714-4R-74/IR96184-24-1-1-AJY2	BR15450	80	80
28	BR11716-4R-102/BR11723-4R-322	BR15446	120	120
29	BR11716-4R-123/BR11714-4R-69	BR15455	122	122
30	BR11723-4R-48/BR11714-4R-69	BR15472	82	82
31	BR11716-4R-105/IR96184-24-1-1-AJY2	BR15461	66	66
32	BR11714-4R-179/BR11716-4R-105	BR15473	110	110
33	BR11716-4R-102/BR11714-4R-74	BR15481	92	92
34	IR108007-B-BRLA-BRLA-25-1/IR87870-6-1-1-1-1-B	BR15471	170	170
35	BR11716-4R-105/BR11714-4R-418	BR15480	120	120
36	BR11716-4R-105/TP20532	BR15466	162	162
37	BR11723-4R-172/IRRI154-Pi9	BR14732	116	116
38	BR11723-4R-12/IRRI154-Pi9	BR14730	166	166
39	BR11723-4R-12/IR127152-3-22-2-1-B	BR14729	112	112
40	BR11593-5R-54/BR11386-4R-325	BR14741	70	70
Total			5000	4928

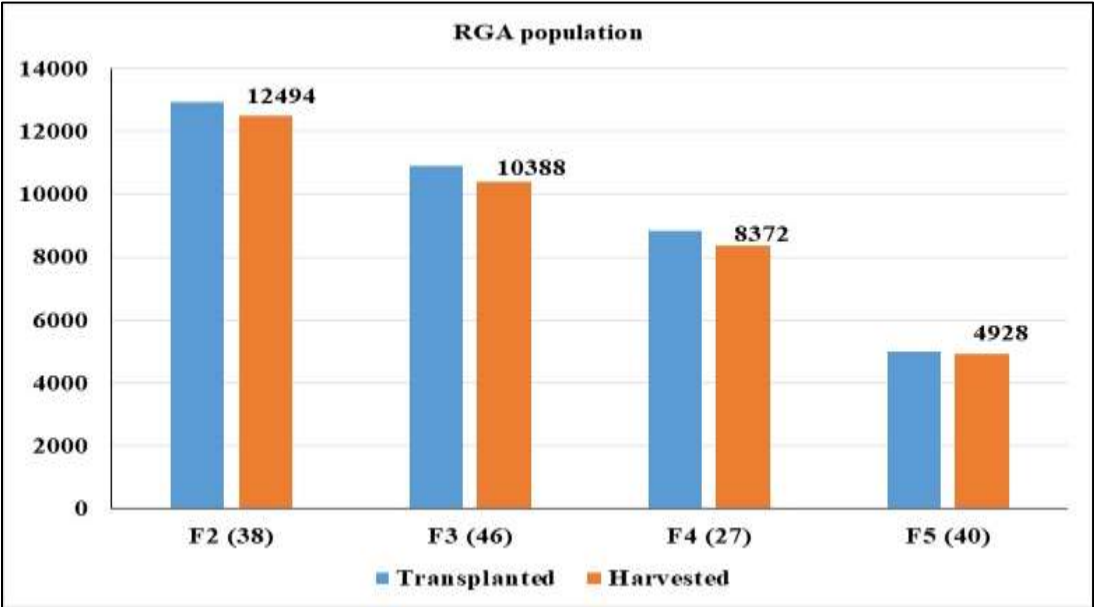


Fig. 6.3.2: Total number of RGA Population STR, Boro 2024-25

Experiment 6.4: Line Stage Trial (LST)

Principal Investigator : M A Rahman

Co-investigators: Nusrat Jahan, Armin Akter Setu and Ribed Farzana Disha

Specific objectives: To assess FRGA/RGA derived advanced breeding lines for uniformity at heading, other desirable agronomic traits and grain type.

Materials and Methods: A total of 4633 from 21 crosses advanced breeding lines and 5796 from 34 crosses advanced breeding line in T. Aman and Boro season, respectively were grown at BRRI R/S Satkhira. Thirty-five- and 40-days old seedlings were transplanted in a 5.4 m × 1 rows plot with a spacing of 20 cm× 20 cm. Single seedling was transplanted. Fertilizer doses and time of application were the same as in Experiment no.6.1. Hand weeding was done in time. The experiment was conducted at BRRI Farm, Satkhira.

Results: During T. Aman 2024-25 season, 4633 lines from 21 crosses were transplanted in LST trial in BRRI farm, Satkhira based on their uniformity, Phenotypic acceptance and Salinity tolerance ability. All entries were damaged due to flood. So, none of the entries was selected in this season. The field condition of LST at BRRI, Satkhira was shown in Fig. 6.4.1a. On the other hand, out of 5796 lines, 619 lines were selected that derived from 34 crosses in LST trial during Boro 2024-25 based on identical flowering, grain type traits and phenotypic acceptability under field conditions (Table 6.4.1). The frequency distribution of selected LST was shown in Figure 6.4.1b. The highest number (63 lines) of LST lines from the cross BR14716-4R and the lowest number of lines (1 line) was selected from the cross BR15443-4R respectively (Table 6.4.1). High selection intensity (10%) was applied in LST in Boro 2024-25 (Fig. 6.4.2b).

Table: 6.4.1: List of Line Stage Testing Trial (LST), STR breeding in Boro 2024-25

Sl	Designation	Transplanted	Selected
1	BR 14733	148	58
2	BR 14735	120	18
3	BR 14737	93	24
4	BR 14706	200	46
5	BR 14708	238	31
6	BR 14738	174	37
7	BR 14710	121	18
8	BR 14712	168	31
9	BR 14713	192	6
10	BR 14715	194	35
11	BR14716	198	63
12	BR 14718	218	12
13	BR 14721	114	16
14	BR 14714	108	4
15	BR 14725	156	32
16	BR 14724	132	9
17	BR 14704	204	4
18	BR 14717	172	13
19	BR 14719	151	8
20	BR 14705	158	9
21	BR 14720	162	14
22	BR 14722	64	25
23	BR 14723	148	2
24	BR 14726	221	8
25	BR 14728	160	3
26	BR 14736	212	5
27	BR 14730	192	29
28	BR14709	116	2
29	BR14720	112	3
30	BR 14702	212	12
31	BR 15442	244	2
32	BR 15443	328	1
33	BR 15444	216	13
34	BR 14734	150	26
Total		5796	619



Fig. 6.4.1a: Field view of LST in T. Aman 2024-25 at Satkhira

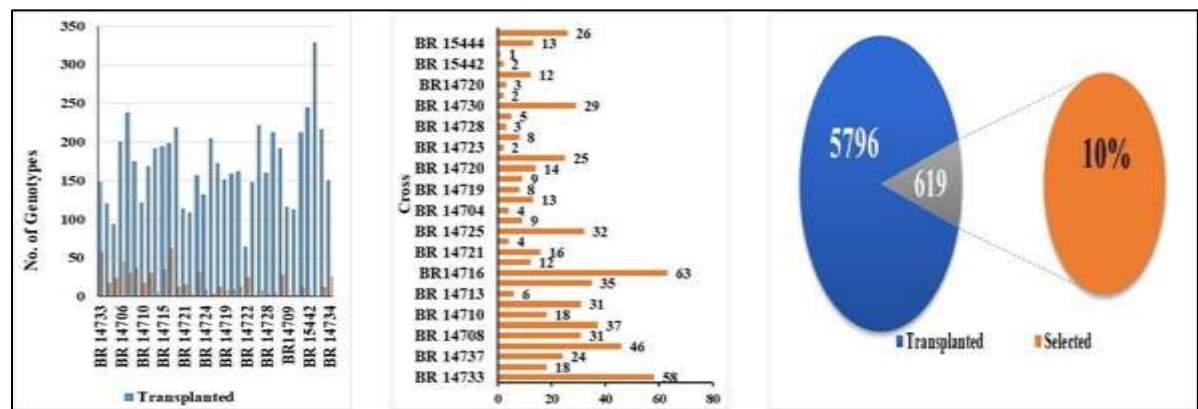


Fig. 6.4.1b: Summary Report for LST genotypes, STR, Boro 2024-25

Table 6.5: Line augmentation report

Deployment of blast resistant genes (*Pi9*), BB resistant genes (*xa5*, *xa13* and *Xa21*), through line augmentation approach using elite recipient and elite donor.

BR No.	Parentage	QTLs / genes	Traits	Aman 2024-25
BR14730	BR11723-4R-12*2/IRRI154-Pi9	Pi9	Blast	LST (32)
BR14729	BR11723-4R-12*1/IR127152-3-22-2-1-B	Xa5+Xa21+Xa13	BLB	OYT (37)
BR14731	BR11723-4R-172*1/IR127152-3-22-2-1-B	Xa5+Xa21+Xa13	BLB	OYT (11)
BR14730	BR11723-4R-12*2/IR127152-3-22-2-1-B	Xa5+Xa21+Xa13	BLB	OYT (18)
BR14732	BR11723-4R-172*2/IRRI154-Pi9	Pi9	Blast	OYT (24)

Experiment 6.6: Observational Yield Trial (OYT)

Principal Investigator: M. A. Rahman

Co-investigators: Nusrat Jahan, Armin Akter Setu and Ribed Farzana Disha

Specific objectives: Identification of genetically fixed (homozygous) lines which are uniform in flowering and other agronomic traits.

Materials and Methods: A total of 745 genotypes were evaluated at two locations in OYT (Satkhira, and Gazipur) using BR10, BR23, BRRI dhan30, BRRI dhan73 and BRRI dhan87 as checks. In Boro season, 442 genotypes were evaluated in OYT. BRRI dhan67 BRRI dhan89, BRRI dhan97 and BRRI dhan99 were used as check varieties. These trials were carried out following augmented randomized complete block design with 4 replicaation. The unit plot size was 5.4 m × 4 rows following augmented RCBD with 4 replications. Thirty-day-old seedlings in T. Aman and forty-day-old seedlings in Boro season were transplanted @ single seedling with a spacing of 20 cm × 20 cm. Fertilizers and crop management followed were the same as Experiment 6.1. Data were collected on plant height, days to flowering, days to maturity, PAcp and yield per plot.

Results: Out of 745 genotypes, a total of 266 genotypes were selected from Gazipur and Satkhira based on growth duration, plant height, phenotypic acceptability at maturity (PAcp) and grain yield and the genotypes were shown in (Table 6.6.1a). Their yield ranged from 1.00 t/ha to 9.50 t/ha in Gazipur and 2.24 t/ha to 8.56 t/ha in Kaliganj Satkhira. One the other hand, the growth duration ranged from 122 days to 141 days which was shorter than check varieties (Table 6.6.1a). The performance of OYT entries shown in Fig. 6.6.2. Considering yield and growth

duration, phenotypic acceptability at maturity (PAcp) compared to check varieties, out of 442 genotypes, 182 entries were selected in Boro season. The yield range was from 3.47 to 11.91 t/ha and 2.54-12.68 t/ha at Gazipur and Satkhira respectively (Table 6.6.1b). Their growth duration range was 134 days to 155 days and 123 days to 150 days at Gazipur and Satkhira respectively (Table 6.6.1b).

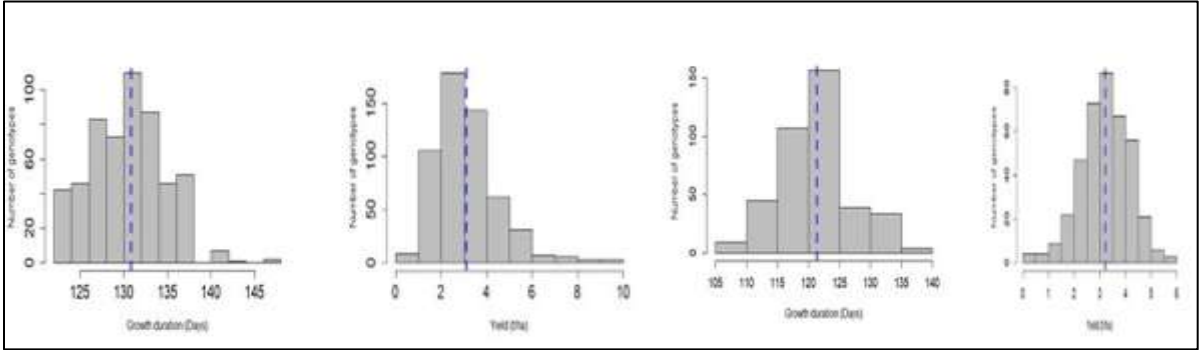
Table 6.6.1a: Yield and agronomic characters of the genotypes from OYT, Salt-Tolerant Rice (STR) Breeding, T. Aman 2024-25, Gazipur and Satkhira

SN	Designation	GD (days)	PH (cm)	Yield t/ha	
				Gazipur	Kaliganj
11	BR13666-4R-29	127	116	2.00	3.30
13	BR13666-4R-43	130	109	3.39	-
14	BR13666-4R-47	129	140	2.87	-
33	BR13668-4R-44	122	110	-	3.48
37	BR13668-4R-69	128	98	2.16	2.75
45	BR13669-4R-2	132	117	4.04	4.68
54	BR13669-4R-111	129	130	3.52	-
55	BR13669-4R-112	132	115	1.43	4.24
61	BR13669-4R-179	129	129	3.31	4.24
63	BR13670-4R-1	127	118	2.33	-
70	BR13670-4R-67	136	116	0.00	5.11
71	BR13670-4R-68	133	134	2.33	3.30
75	BR13670-4R-89	131	120	2.97	5.70
76	BR13670-4R-90	133	117	2.77	5.02
78	BR13670-4R-107	127	127	5.04	-
82	BR13670-4R-153	129	98	2.22	3.21
84	BR13670-4R-158	135	125	1.97	4.54
87	BR13670-165	131	123	4.36	5.03
88	BR13670-4R-192	132	121	2.92	3.63
91	BR13670-4R-203	127	117	1.77	3.57
92	BR13670-4R-207	137	100	3.10	-
93	BR13670-4R-208	132	120	3.55	4.41
98	BR13670-4R-215	132	120	1.61	4.23
102	BR13672-4R-34	131	123	2.20	-
113	BR13672-4R-108	138	107	2.53	2.35
114	BR13672-4R-121	130	119	4.33	4.14
115	BR13672-4R-124	131	118	2.58	-
116	BR13672-4R-148	131	114	4.07	3.09
119	BR13673-4R-4	132	114	1.91	-
120	BR13673-4R-8	131	109	2.35	-
122	BR13673-4R-12	137	107	3.20	-
123	BR13673-4R-14	133	117	2.36	2.78
126	BR13673-4R-26	135	116	2.65	4.23
127	BR13673-4R-27	131	117	1.61	4.57
129	BR13673-4R-39	129	128	2.90	-
131	BR13673-4R-47	129	120	2.26	3.73
132	BR13673-4R-50	130	109	-	4.38
134	BR13673-4R-52	127	123	2.91	4.25
135	BR13673-4R-57	135	99	1.26	-
136	BR13673-4R-63	133	109	1.92	-
139	BR13673-4R-70	131	142	2.29	3.88
140	BR13673-4R-72	128	117	2.71	-
141	BR13673-4R-75	132	119	3.72	-
142	BR13673-4R-88	129	126	1.97	-
144	BR13673-4R-90	132	119	4.84	-
145	BR13673-4R-92	136	106	2.08	-
146	BR13673-4R-95	132	98	3.20	3.80
147	BR13673-4R-102	137	111	1.43	-
148	BR13673-4R-105	133	107	1.55	-
149	BR13673-4R-106	126	123	2.26	-
151	BR13673-4R-111	133	104	1.65	-
154	BR13673-4R-129	134	116	3.13	-
157	BR13676-4R-12	131	122	2.19	3.04
158	BR13676-4R-20	133	125	5.48	4.23
159	BR13676-4R-22	128	110	1.68	-
163	BR13676-4R-47	130	112	2.69	3.43
164	BR13676-4R-53	132	132	2.97	-
165	BR13676-4R-59	133	119	1.68	3.52
169	BR13676-4R-83	133	128	1.97	-
173	BR13676-4R-102	132	110	2.63	-
174	BR13676-4R-109	132	105	4.18	-
175	BR13676-4R-114	132	119	5.43	4.39

SN	Designation	GD (days)	PH (cm)	Yield t/ha	
				Gazipur	Kaliganj
176	BR13676-4R-123	131	127	4.74	-
177	BR13676-4R-131	134	115	6.28	-
178	BR13676-4R-140	127	112	5.43	-
192	BR13677-4R-118	130	97	2.55	-
194	BR13677-4R-127	127	111	2.62	-
197	BR13677-4R-148	138	118	4.94	-
198	BR13677-4R-150	135	115	6.30	-
204	BR13678-4R-56	129	122	3.97	-
209	BR13678-4R-104	137	102	8.26	-
211	BR13678-4R-180	138	94	4.07	-
220	BR13679-4R-60	141	108	3.13	2.80
224	BR13680-4R-7	133	133	3.17	-
227	BR13680-4R-26	132	122	1.23	-
229	BR13680-4R-49	132	127	5.74	3.98
239	BR13680-4R-130	136	96	9.50	-
245	BR13682-4R-4	124	130	1.54	2.98
254	BR13682-4R-31	129	121	3.55	3.83
255	BR13682-4R-32	138	118	2.11	4.65
257	BR13682-4R-36	127	124	4.36	-
262	BR13682-4R-49	127	111	2.04	3.31
264	BR13682-4R-52	128	106	3.34	3.01
268	BR13682-4R-60	134	102	2.75	2.88
272	BR13682-4R-70	125	99	3.47	-
273	BR13682-4R-71	133	107	2.03	-
278	BR13683-4R-3	129	110	2.06	2.48
280	BR13683-4R-6	129	97	1.71	-
283	BR13683-4R-10	129	108	2.28	-
285	BR13683-4R-16	130	105	3.62	-
286	BR13683-4R-17	127	98	2.55	4.77
287	BR13683-4R-18	133	101	3.28	4.29
288	BR13683-4R-20	129	109	2.72	3.07
291	BR13683-4R-26	126	117	2.94	-
292	BR13683-4R-27	133	129	2.49	-
294	BR13683-4R-31	125	123	1.90	2.46
297	BR13683-4R-47	126	114	4.61	-
305	BR13683-4R-70	124	134	3.88	-
306	BR13683-4R-72	124	117	3.75	-
307	BR13684-4R-15	127	109	5.41	-
314	BR13684-4R-75	128	104	3.63	4.34
315	BR13684-4R-79	131	121	1.16	-
328	BR13685-4R-70	131	114	3.11	-
337	BR13686-4R-28	128	109	2.78	4.35
338	BR13686-4R-30	131	125	3.87	-
347	BR13686-4R-190	131	105	3.62	2.64
348	BR13686-4R-193	133	132	4.16	-
350	BR13686-4R-221	130	119	3.10	-
351	BR13687-4R-2	135	105	1.78	2.88
353	BR13687-4R-16	129	124	3.81	-
356	BR13687-4R-40	137	109	5.17	-
358	BR13687-4R-80	128	114	8.15	-
365	BR13687-4R-140	127	95	1.10	4.83
367	BR13687-4R-148	134	122	2.75	-
382	BR13689-4R-26	133	123	3.68	-
384	BR13689-4R-41	137	117	2.76	4.25
386	BR13689-4R-49	131	107	2.26	-
395	BR13690-4R-9	128	99	1.45	-
398	BR13691-4R-29	130	127	1.63	2.79
399	BR13692-4R-42	135	114	8.37	-
403	BR13692-4R-60	133	148	3.57	3.56
405	BR13692-4R-86	130	111	3.73	2.95
406	BR13692-4R-92	135	117	2.18	2.65
408	BR13693-4R-5	135	114	2.36	4.14
413	BR13693-4R-41	138	99	3.15	-
417	BR13693-4R-60	134	110	3.63	4.04
418	BR13693-4R-63	126	125	3.40	-
424	BR13694-4R-5	135	95	2.10	2.33
425	BR13694-4R-7	138	109	2.00	-
428	BR13694-4R-16	135	97	2.42	-
430	BR13694-4R-25	128	116	5.33	5.12
433	BR13694-4R-90	132	107	3.04	-
434	BR13694-4R-93	138	92	3.49	-
435	BR13694-4R-101	129	96	1.78	-
436	BR13694-4R-109	138	99	4.55	-

SN	Designation	GD (days)	PH (cm)	Yield t/ha	
				Gazipur	Kaliganj
437	BR13694-4R-117	127	114	3.61	2.72
440	BR13694-4R-126	133	116	1.20	-
442	BR13694-4R-128	135	107	1.97	-
444	BR13694-4R-133	126	117	4.52	4.14
450	BR13694-4R-144	125	112	1.00	-
451	BR13694-4R-147	138	98	4.42	-
452	BR13694-4R-150	138	111	4.84	-
454	BR13695-4R-2	138	117	4.07	-
457	BR13695-4R-27	131	108	3.59	-
470	BR13695-4R-92	131	114	3.92	
471	BR13695-4R-99	128	127	5.49	
474	BR13695-4R-106	127	114	1.80	2.66
475	BR13695-4R-118	127	116	2.18	-
477	BR13695-4R-137	127	115	2.48	-
480	BR13695-4R-145	126	103	2.55	-
482	BR13695-4R-162	131	98	6.77	-
483	BR13696-4R-2	129	120	3.61	-
484	BR13696-4R-6	125	124	3.56	3.52
485	BR13696-4R-7	133	129	5.04	-
486	BR13696-4R-15	124	97	3.04	4.97
487	BR13696-4R-22	128	118	3.42	-
489	BR13696-4R-24	131	122	4.07	-
490	BR13696-4R-26	138	118	1.74	-
491	BR13696-4R-28	133	130	2.33	5.30
493	BR13696-4R-52	131	124	2.92	3.26
494	BR13696-4R-56	128	113	3.10	-
497	BR13696-4R-72	129	121	3.75	-
498	BR13696-4R-74	132	110	2.49	-
499	BR13696-4R-86	132	111	4.25	4.16
501	BR13696-4R-101	133	124	2.39	3.63
503	BR13696-4R-121	131	114	7.07	3.64
504	BR13696-4R-123	135	125	4.49	-
505	BR13696-4R-133	138	118	2.13	-
506	BR13696-4R-134	133	116	2.09	3.40
507	BR13696-4R-162	138	115	3.12	4.63
508	BR13696-4R-164	-	-	-	4.01
509	BR13696-4R-175	126	119	3.44	4.76
510	BR13697-4R-68	129	130	1.12	3.62
511	BR13697-4R-87	127	136	2.20	3.31
513	BR13697-4R-105	130	110	4.75	5.05
521	BR13698-4R-36	132	117	0.47	-
522	BR13698-4R-65	128	109	1.16	-
523	BR13698-4R-66	124	125	2.52	3.05
532	BR13699-4R-37	131	115	4.65	-
533	BR13699-4R-40	127	114	1.42	-
538	BR13699-4R-62	129	119	4.68	4.02
539	BR13699-4R-88	132	126	4.06	3.98
543	BR13699-4R-111	126	108	1.75	3.36
547	BR13699-4R-129	135	121	1.87	-
549	BR13699-4R-141	126	117	3.11	-
555	BR13700-4R-2	124	120	2.41	3.02
557	BR13700-4R-23	127	115	2.93	-
561	BR13700-4R-41	131	118	5.48	8.56
565	BR13700-4R-55	131	112	4.13	-
571	BR13700-4R-90	127	105	2.58	-
574	BR13700-4R-95	128	111	2.20	3.01
576	BR13700-4R-133	124	111	3.17	5.50
590	BR13701-4R-118	129	108	2.39	-
593	BR13701-4R-165	131	98	1.74	-
597	BR13701-4R-187	134	120	2.26	-
599	BR13701-4R-196	130	116	4.20	-
600	BR13701-4R-199	129	107	3.42	-
602	BR13701-4R-205	127	115	2.52	-
603	BR13701-4R-207	137	103	1.94	-
604	BR13701-4R-213	134	114	3.71	-
610	BR13702-4R-74	138	105	1.78	-
611	BR13702-4R-79	135	134	3.52	-
615	BR13702-4R-113	133	128	4.26	4.85
617	BR13702-4R-139	132	115	2.64	2.74
618	BR13702-4R-151	138	115	3.59	-
621	BR13703-4R-75	135	117	1.74	-
623	BR13703-4R-100	133	106	2.69	2.50
624	BR13703-4R-103	133	122	4.01	-

SN	Designation	GD (days)	PH (cm)	Yield t/ha	
				Gazipur	Kaliganj
628	BR13704-4R-1	130	117	3.59	-
629	BR13704-4R-4	131	116	2.29	-
630	BR13704-4R-46	131	98	3.53	-
634	BR13704-4R-80	136	107	2.28	-
635	BR13705-4R-16	124	119	5.10	3.81
640	BR13705-4R-58	124	113	5.52	3.02
644	BR13705-4R-90	133	111	9.46	3.94
645	BR13705-4R-102	125	109	5.19	2.74
647	BR13705-4R-106	133	102	1.78	-
648	BR13705-4R-107	131	120	3.52	3.77
650	BR13705-4R-150	128	112	1.84	2.77
652	BR13705-4R-156	133	103	3.68	4.42
653	BR13705-4R-167	127	107	3.16	-
655	BR13705-4R-174	124	94	2.26	3.43
659	BR13705-4R-259	126	98	3.75	3.48
666	BR13707-4R-79	123	106	1.29	3.02
668	BR13707-4R-83	123	120	1.19	-
670	BR13707-4R-98	133	116	2.68	4.48
673	BR13707-4R-128	131	128	5.14	-
676	BR13707-4R-143	124	112	2.29	2.52
679	BR13708-4R-7	133	120	5.58	3.87
681	BR13708-4R-10	138	116	3.77	3.13
682	BR13708-4R-11	125	117	3.81	3.45
684	BR13708-4R-30	134	118	5.01	-
685	BR13708-4R-35	127	115	1.48	3.66
687	BR13708-4R-44	125	110	2.97	3.41
689	BR13708-4R-52	133	118	3.19	-
691	BR13708-4R-63	141	117	3.77	3.30
695	BR13708-4R-79	133	101	3.70	2.70
696	BR13708-4R-80	133	122	2.81	-
699	BR13708-4R-91	141	114	3.78	-
702	BR13708-4R-95	125	108	4.74	3.01
703	BR13708-4R-99	136	121	2.73	3.84
705	BR13708-4R-104	133	119	3.87	-
708	BR13708-4R-113	133	118	2.19	2.53
715	BR13708-4R-127	138	117	1.58	3.76
716	BR13708-4R-130	131	126	3.27	-
717	BR13708-4R-131	124	118	5.48	3.12
718	BR13708-4R-133	133	117	3.26	-
720	BR13708-4R-139	131	116	3.61	2.97
723	BR13708-4R-143	134	138	4.26	3.41
725	BR13489-4R-10	141	104	1.72	2.58
727	BR13489-4R-21	127	117	1.23	-
734	BR13491-4R-50	138	125	2.45	-
736	BR13491-4R-64	131	131	1.65	-
743	BR13493-4R-21	126	132	2.45	3.03
744	BR13493-4R-95	129	122	4.71	-
check1	BR10	148	117	3.23	2.51
check2	BR23	147	121	3.78	3.26
check3	BRR1 dhan30	143	118	3.43	3.19
check4	BRR1 dhan73	126	118	2.90	3.95
check5	BRR1 dhan87	128	121	5.55	4.67



Location: Gazipur **Location: Kaliganj**

Fig. 6.6.1a: Performance of OYT, Development of Salt Tolerance Rice (STR) Breeding, T. Aman 2024-25 at Gazipur and Satkhira

Table 6.6.1b: Yield and agronomic characters of the genotypes from OYT, Salt-Tolerant Rice (STR) Breeding, Boro 2024-25, Gazipur and Satkhira

SL	Designation	PH (cm)	GD (days)	Yield (t/ha)	
				Gazipur	Satkhira
1	BR14030-4R-3	106	155	8.62	8.68
2	BR14030-4R-5	103	148	7.68	10.75
4	BR14030-4R-18	107	134	8.27	6.41
16	BR14030-4R-56	106	149	7.54	10.86
18	BR14030-4R-60	95	154	9.21	8.80
23	BR14030-4R-78	88	148	7.69	10.39
27	BR14030-4R-91	145	134	8.63	11.6
28	BR14030-4R-93	87	144	7.17	7.32
29	BR14030-4R-97	131	155	8.93	8.62
31	BR14030-4R-102	93	134	7.08	10.39
36	BR14030-4R-126	93	147	7.01	8.01
38	BR14030-4R-156	100	148	6.90	7.29
39	BR14030-4R-165	108	148	11.26	8.07
40	BR14030-4R-167	95	148	7.04	8.92
47	BR14030-4R-197	95	154	5.95	9.62
50	BR14031-4R-9	92	145	6.59	3.35
54	BR14031-4R-21	124	146	7.95	6.47
58	BR14031-4R-54	127	134	8.42	12.17
60	BR14031-4R-65	94	148	0.00	7.53
61	BR14031-4R-73	90	149	7.35	6.83
63	BR14031-4R-89	122	146	8.88	7.98
64	BR14031-4R-98	110	145	8.10	7.94
65	BR14031-4R-106	105	155	8.74	9.40
66	BR14031-4R-148	90	145	7.61	7.86
68	BR14032-4R-4	108	146	7.09	5.08
71	BR14032-4R-8	90	145	8.39	6.72
78	BR14032-4R-29	114	147	8.02	7.91
82	BR14032-4R-41	101	145	8.02	-
84	BR14032-4R-47	119	155	7.85	7.69
85	BR14032-4R-50	128	153	8.86	9.03
87	BR14032-4R-52	114	148	6.07	5.97
90	BR14032-4R-60	108	146	8.90	5.95
91	BR14032-4R-63	115	149	9.01	8.74
92	BR14032-4R-66	108	147	9.85	6.20
98	BR14032-4R-81	104	146	8.43	6.41
102	BR14032-4R-93	116	148	7.96	8.98
107	BR14033-4R-39	130	148	8.56	8.79
109	BR14033-4R-53	128	145	7.15	6.95
111	BR14033-4R-84	110	144	7.60	9.42
112	BR14033-4R-90	112	145	10.43	8.64
113	BR14033-4R-101	109	153	7.26	10.36
116	BR14034-4R-7	137	150	10.36	7.30
117	BR14034-4R-8	115	149	8.27	3.64
118	BR14034-4R-12	106	147	11.91	8.56
121	BR14034-4R-20	106	145	9.06	8.51
123	BR14034-4R-22	92	146	6.62	-
126	BR14034-4R-28	101	145	5.33	7.44
127	BR14034-4R-29	97	148	7.15	10.71
128	BR14034-4R-38	105	144	0.00	8.82
130	BR14034-4R-42	105	150	7.43	8.49
134	BR14034-4R-62	95	147	7.67	8.96
137	BR14034-4R-79	109	144	9.14	10.3
138	BR14034-4R-82	109	146	5.92	8.28
144	BR14034-4R-102	94	145	7.14	8.17
145	BR14034-4R-110	104	149	7.56	5.42
146	BR14034-4R-112	115	152	7.90	9.64
147	BR14034-4R-116	104	149	8.39	9.24
155	BR14034-4R-136	102	145	6.74	8.92
158	BR14034-4R-145	110	146	4.05	3.83
159	BR14034-4R-147	96	144	9.08	8.06
161	BR14034-4R-162	114	146	9.09	10.09
164	BR14034-4R-171	106	134	3.69	8.42
166	BR14034-4R-188	112	150	9.74	12.68
172	BR14034-4R-205	125	145	9.29	7.61
173	BR14034-4R-215	98	145	7.93	6.45
177	BR14034-4R-252	111	148	10.48	11.05
178	BR14034-4R-256	116	145	7.32	8.46
186	BR14035-4R-50	106	146	6.82	8.53
188	BR14035-4R-57	119	153	6.66	6.67

SL	Designation	PH (cm)	GD (days)	Yield (t/ha)	
				Gazipur	Satkhira
189	BR14035-4R-60	128	146	6.50	9.46
190	BR14035-4R-70	122	148	7.65	8.35
192	BR14035-4R-75	99	148	7.33	6.22
194	BR14035-4R-80	111	134	7.22	10.12
195	BR14035-4R-83	126	150	8.88	11.3
197	BR14035-4R-92	103	145	5.71	7.01
200	BR14035-4R-99	109	155	7.21	8.3
201	BR14035-4R-100	127	153	9.42	7.23
202	BR14035-4R-105	106	154	7.51	8.06
203	BR14035-4R-108	115	154	7.27	7.6
204	BR14035-4R-115	108	148	7.04	8.44
205	BR14035-4R-130	105	147	6.68	8.96
212	BR14037-4R-97	105	145	8.55	8.89
216	BR14038-4R-56	116	150	8.65	7.36
218	BR14038-4R-65	109	153	8.73	9.02
219	BR14038-4R-75	102	147	9.28	7.33
220	BR14038-4R-77	107	147	7.55	8.19
221	BR14038-4R-78	111	146	11.88	7.91
222	BR14038-4R-79	105	134	6.96	8.05
223	BR14038-4R-88	114	153	8.69	7.16
225	BR14038-4R-90	123	153	8.83	8.62
228	BR14038-4R-112	125	153	4.22	9.60
229	BR14038-4R-115	109	154	8.94	8.84
230	BR14038-4R-118	107	134	5.87	8.92
231	BR14038-4R-136	136	147	10.03	8.57
232	BR14038-4R-149	112	134	10.38	10.02
233	BR14038-4R-152	110	153	10.17	9.54
234	BR14038-4R-155	121	145	6.89	11.97
236	BR14038-4R-171	86	149	6.81	3.75
237	BR14038-4R-194	112	154	8.94	9.66
238	BR14038-4R-198	105	155	7.42	8.3
239	BR14038-4R-210	105	134	8.71	7.72
240	BR14039-4R-7	94	150	6.82	7.98
241	BR14039-4R-8	124	146	8.97	6.82
244	BR14039-4R-97	116	145	8.80	7.28
245	BR14039-4R-98	106	147	7.85	8.6
252	BR14040-4R-65	111	149	9.50	8.43
254	BR14040-4R-98	115	144	8.68	4.92
255	BR14041-4R-4	120	147	7.40	7.44
260	BR14041-4R-26	113	149	7.90	7.90
261	BR14041-4R-27	88	144	5.13	6.94
265	BR14041-4R-45	131	148	10.41	9.52
274	BR14041-4R-74	122	147	7.21	7.17
275	BR14041-4R-76	122	153	8.61	7.50
278	BR14041-4R-88	104	152	0.00	10.01
282	BR14042-4R-5	103	134	7.92	7.72
285	BR14042-4R-24	109	146	9.83	8.06
287	BR14042-4R-28	113	134	8.85	9.88
289	BR14042-4R-52	93	150	8.36	8.23
290	BR14042-4R-70	106	134	8.14	11.65
291	BR14042-4R-72	122	154	7.93	8.07
294	BR14042-4R-92	112	144	6.67	8.71
297	BR14042-4R-115	105	146	6.78	7.65
299	BR14042-4R-121	104	146	7.22	8.49
300	BR14042-4R-122	94	146	8.36	8.91
303	BR14042-4R-131	115	147	6.71	8.29
307	BR14042-4R-146	104	148	7.63	7.56
308	BR14043-4R-23	103	154	6.88	9.9
311	BR14043-4R-61	114	134	9.04	9.43
313	BR14043-4R-94	99	153	8.33	7.14
314	BR14043-4R-96	114	149	8.27	9.10
315	BR14043-4R-97	119	134	11.65	8.03
316	BR14043-4R-99	107	146	11.52	8.35
317	BR14043-4R-100	103	134	7.18	9.20
319	BR14043-4R-115	97	153	10.50	11.68
320	BR14043-4R-123	93	155	7.82	7.36
322	BR14043-4R-129	97	134	7.08	5.63
324	BR14043-4R-140	97	153	7.78	9.42
326	BR14043-4R-155	102	134	8.88	9.65
327	BR14043-4R-161	109	134	9.57	9.00
328	BR14043-4R-181	125	148	6.99	9.14
330	BR14043-4R-190	103	149	7.85	8.37
332	BR14043-4R-194	97	154	8.11	9.7

SL	Designation	PH (cm)	GD (days)	Yield (t/ha)	
				Gazipur	Satkhira
335	BR14043-4R-199	106	154	9.25	8.88
337	BR14043-4R-207	110	153	8.75	11.2
338	BR14043-4R-211	97	149	10.49	7.71
339	BR14043-4R-217	107	151	8.81	7.62
340	BR14043-4R-219	107	154	6.64	7.43
341	BR14043-4R-220	108	148	7.97	8.59
343	BR14044-4R-10	100	153	8.60	8.06
345	BR14044-4R-18	113	147	8.35	7.93
346	BR14044-4R-19	107	146	6.69	7.08
351	BR14044-4R-65	110	148	6.94	6.45
352	BR14044-4R-72	153	153	5.60	8.02
353	BR14044-4R-81	107	146	7.72	7.92
355	BR14044-4R-84	132	146	10.43	4.82
357	BR14044-4R-112	116	145	8.72	8.84
360	BR14044-4R-142	127	146	10.93	9.04
361	BR14044-4R-161	129	149	8.64	8.44
366	BR14044-4R-207	132	134	0.00	7.89
369	BR14044-4R-223	131	134	11.42	8.16
371	BR14045-4R-4	122	134	9.95	9.01
372	BR14045-4R-6	117	149	10.75	7.94
373	BR14045-4R-7	114	134	11.66	12.25
375	BR14045-4R-20	116	153	10.11	9.07
376	BR14045-4R-22	119	134	6.51	9.58
378	BR14045-4R-37	116	153	8.48	9.52
381	BR14045-4R-47	120	154	10.94	11.24
382	BR14045-4R-48	125	145	10.11	7.55
383	BR14045-4R-49	120	155	0.00	12.24
384	BR14045-4R-50	113	150	9.72	9.94
385	BR14045-4R-55	104	146	6.48	9.29
387	BR14045-4R-63	108	155	7.05	9.07
388	BR14045-4R-72	116	134	9.53	9.8
391	BR14045-4R-99	121	134	7.29	8.82
392	BR14045-4R-104	123	150	10.79	8.18
393	BR14045-4R-110	113	134	7.84	9.1
394	BR14045-4R-131	115	148	9.18	7.8
395	BR14045-4R-143	96	148	8.06	7.83
396	BR14045-4R-148	117	146	7.93	6.75
398	BR14045-4R-182	129	153	8.51	9.32
400	BR14045-4R-190	110	144	7.87	11.33
401	BR14045-4R-201	120	145	10.73	9.74
403	BR14046-4R-3	112	147	9.18	11.7
404	BR14046-4R-19	98	146	7.31	
407	BR14046-4R-31	95	146	8.28	8.84
411	BR14046-4R-52	120	153	8.75	7.6
412	BR14046-4R-53	110	154	9.36	8.13
413	BR14046-4R-54	106	153	6.02	
419	BR14046-4R-83	107	145	8.35	9.41
420	BR14047-4R-4	108	148	0.00	7.51
422	BR14047-4R-26	119	134	9.17	9.63
425	BR14047-4R-50	132	145	10.92	9.24
428	BR14047-4R-64	107	146	8.84	7.52
429	BR14047-4R-66	127	146	10.17	5.22
433	BR14047-4R-81	115	148	6.95	7.25
435	BR14047-4R-99	109	146	8.62	8.51
436	BR14048-4R-2	114	145	7.91	7.95
437	BR14048-4R-21	94	146	6.95	8.44
439	BR14048-4R-97	106	148	10.79	8.1
440	BR14048-4R-105	109	154	8.41	9.23
441	BR14048-4R-190	97	134	7.19	9.23
442	BR14048-4R-214	130	149	7.72	6.92
check1	BRR1 dhan67	97	145	6.93	8.55
check2	BRR1 dhan89	107	144	7.54	7.15
check3	BRR1 dhan97	107	152	7.83	7.96
check4	BRR1 dhan99	98	148	8.06	6.95

Experiment 6.7: Preliminary Yield Trial (PYT)

Principal Investigator: M. A. Rahman

Co-investigators: Nusrat Jahan, Armin Akter Setu, Ribed Farzana Disha, Md. Sazzadur Rahman and Mst. Salma Pervin

Specific objectives: Initial evaluation of breeding lines for yield and other agronomic characteristics in replicated trial.

Materials and Methods: A total of one hundred forty-one genotypes were tested in two PYTs trials along with BR23, BRRI dhan30, BRRI dhan73 as tolerant checks and BRRI dhan87 as sensitive check at Gazipur and Satkhira in T. Aman season. In Boro season, A total of 246 breeding lines was evaluated in three PYTs, in Satkhira, and Gazipur. BRRI dhan67, BRRI dhan97 and BRRI dhan99 were used as tolerant checks and BRRI dhan89, BRRI dhan102 and BRRI dhan108 as susceptible check. The unit plot size was 5.4 × 5 rows. The field layout was Alpha lattice design with two replications. Twenty-five and forty-day-old-seedlings were transplanted @ 1-2 seedlings with the spacing of 20 cm × 20 cm in T. Aman and Boro season, respectively. Fertilizers and crop management followed were the same as Experiment 6.1. Data were collected on plant height, days to flowering, days to maturity, PAcp, panicle per plant, and yield per plot.

Results: In T. Aman, considering yield, grain quality, earliness, out of 141 genotypes, a total of 58 genotypes were selected from PYT-1 and PYT-2 (Table 6.7.1 and Table 6.7.2). In PYT-1, thirty-one genotypes were selected and the grain yield ranged from 1.1 t/ha to 4.2 t/ha at Gazipur and 2.3t/ha to 4.6 t/ha at Satkhira. The growth duration of the genotypes over the locations ranged from 117 days to 135 days. The average yield of genotypes over the locations ranged from 1.1 t/ha to 4.6 t/ha (Table 6.6.1). In PYT-2, thirty-three genotypes were selected from sixty-nine tested genotypes and the grain yield ranged from 1.4 t/ha to 5.9 t/ha at Gazipur and 2.0 t/ha to 4.8 t/ha at Satkhira. The average yield range was from 1.4 t/ha to 5.9 t/ha and growth duration of the genotypes over the locations ranged from 118 days to 135 days (Table 6.6.2). In Boro season, out of 246 genotypes, 95 genotypes were selected considering yield, grain quality, earliness from PYT-1, PYT-2 and PYT-3 (Table 6.7.3 to 6.7.5). The genotypes revealed a wide range of variations in yield in different locations. In PYT-1, thirty-two genotypes were selected out of 82 genotypes. The grain yield ranged from 1.66-6.35 t/ha at Gazipur and 4.7-11.77 t/ha at Satkhira farm and the average growth duration of the genotypes ranged from 125 days to 139 days (Table 6.7.3). In PYT-2, the grain yield ranged from 1.83-8.73 t/ha at Gazipur and 5.43-10.88 t/ha at Satkhira farm and the growth duration ranged from 121 days to 148 days (Table 6.7.4). In PYT-3 38 genotypes were selected from 82 genotypes. The grain yield ranged from 1.55 to 5.43 at Gazipur and 5.29 to 10.35 at Satkhira farm (Table 6.7.5).

Table 6.7.1: Yield and agronomic traits of selected genotypes from PYT-1, Salt-Tolerant Rice (STR) Breeding, T. Aman 2024-25

SL	Designation	PH (cm)	GD (days)	Gazipur	Satkhira	BLUE	PBLUP
2	BR13331-4R-82	129	126	4	3	3.5	3.2
3	BR13331-4R-88	129	125	3.2	4.1	3.6	3.1
5	BR13331-4R-120	131	123	2.3	4.1	3.2	3.4
6	BR13331-4R-170	130	131	4.2	3.8	4	3.5
8	BR13331-4R-280	122	122	2.2	4.1	3.1	3.4
10	BR13331-4R-288	130	122	2.7	3.7	3.2	3.3
11	BR13332-4R-9	124	130	3.2	2.7	3	3.5
14	BR13332-4R-33	134	129	3.6	3.9	3.7	3.2
15	BR13332-4R-40	139	128	3.2	4.5	3.9	3.3
16	BR13332-4R-49	129	129	3.1	3.9	3.5	3.5
17	BR13332-4R-76	141	132	3.2	3.6	3.4	3.5
21	BR13332-4R-146	129	128	2.8	3.5	3.2	2.9
24	BR13332-4R-165	118	126	3	4.3	3.6	3.1
26	BR13332-4R-202	135	126	2.5	4	3.2	3.1
29	BR13332-4R-244	131	129	2.2	4.1	3.1	3.6
47	BR13336-4R-163	120	127	3.4	4.4	3.9	3.3
48	BR13336-4R-179	132	127	4.2	4.6	4.4	3.6
50	BR13336-4R-231	138	127	3.4	4	3.7	3.4
51	BR13336-4R-234	117	124	3.1	3.3	3.2	3.2
52	BR13336-4R-246	125	129	3.3	4.3	3.8	3.2
53	BR13336-4R-254	128	127	3.3	4.4	3.9	3.2
54	BR13336-4R-257	137	131	2.8	4.2	3.5	3.2
58	BR13337-4R-141	138	129	3.4	2.8	3.1	3.1
59	BR13337-4R-146	137	132	3.4	3.6	3.5	2.7

SL	Designation	PH (cm)	GD (days)	Gazipur	Satkhira	BLUE	PBLUP
60	BR13337-4R-173	131	130	2.9	3.4	3.2	2.7
66	BR13339-4R-90	138	128	3.2	3.9	3.5	3.2
	BRRI dhan30	121	135	3.5	3.2	3.4	3.5
	BRRI dhan73	128	124	3.6	3.7	3.6	3.2
	BRRI dhan87	126	128	3.6	3.6	3.6	3.1
	LSD<0.05	7.84	2.81	0.54	0.41	0.49	
	H2b	0.61	0.76	0.58	0.66	0.4	

Table 6.7.2: Yield and agronomic traits of selected genotypes from PYT-2, Salt-Tolerant Rice (STR) Breeding, T. Aman 2024-25

SL	Designation	PH (cm)	GD (days)	Gazipur	Satkhira	BLUE	pBLUP
3	BR13339-4R-203	127	124	3.4	4	3.71	3.7
11	BR13339-4R-280	134	120	3.9	3.8	3.81	3.57
12	BR13339-4R-286	137	120	3.9	4.4	4.17	3.26
13	BR13339-4R-287	117	132	5.9	3.5	4.71	3.67
16	BR13340-4R-88	122	125	3.4	4.6	4.01	3.6
19	BR13340-4R-226	121	127	4	3.7	3.86	3.17
20	BR13341-4R-16	128	125	2.5	3.4	2.94	3.49
21	BR13341-4R-26	127	128	5.8	3.8	4.81	3.38
23	BR13341-4R-73	137	135	4.6	3.5	4.07	3.67
25	BR13341-4R-123	128	130	3.3	3.5	3.37	3.77
35	BR13345-4R-39	128	125	3.5	4.1	3.8	3.34
36	BR13345-4R-124	123	133	2.8	3.9	3.34	3.3
37	BR13345-4R-138	116	127	3.3	4.6	3.96	3.8
39	BR13347-4R-78	126	129	2.5	3.9	3.17	2.6
40	BR13347-4R-144	126	127	3	4.1	3.53	3.37
42	BR13347-4R-210	122	127	2.5	3.8	3.16	3.31
44	BR13349-4R-10	127	126	2.6	4.2	3.41	3.45
48	BR13349-4R-156	152	130	3.1	4.4	3.73	3.09
51	BR13497(5)-4R-108	124	132	2.9	3.6	3.29	3.07
54	BR13497(5)-4R-227	117	131	3.3	3.9	3.62	3.31
60	BR13497(6)-4R-233	116	128	2.4	3.5	2.93	3.09
61	BR13498-4R-23	126	135	2.8	3.8	3.3	3.04
65	BR13499-4R-3	110	126	2.8	2.9	2.87	3.09
	BR23	121	135	2.5	3.5	2.98	3.78
	BRRI dhan30	119	131	3.8	3.7	3.73	3.59
	BRRI dhan73	117	128	2.5	3	2.76	3.81
	BRRI dhan87	123	124	2.9	3.1	3.02	3.35
	LSD<0.05	0.67	0.61	0.83	0.44	0.54	
	H2b	3.85	10.17	0.54	0.41	0.59	

Table 6.7.3: Yield and agronomic performance of the genotypes tested in PYT-1, Salt Tolerant Rice (STR) Breeding, Boro 2024-25

SI	Designation	PH (cm)	GD (days)	Yield (t/ha)	
				Satkhira	Gazipur
2	BR13439-4R-161	111	127	8.75	3.88
6	BR13439-4R-214	110	132	8.31	5.98
18	BR13440-4R-107	110	130	8.59	2.45
21	BR13440-4R-12	102	133	8.62	3.91
22	BR13440-4R-135	124	136	6.63	2.78
23	BR13440-4R-18	116	135	9.81	3.39
24	BR13440-4R-209	113	138	7.85	5.02
26	BR13440-4R-212	109	136	7.67	4.07
27	BR13440-4R-264	117	130	8.86	3.33
28	BR13440-4R-297	116	136	8.91	3.56
30	BR13440-4R-310	115	137	8.68	2.97
31	BR13440-4R-326	116	137	8.19	4.05
32	BR13440-4R-334	113	137	7.79	5.10
33	BR13440-4R-341	112	134	8.80	3.75
35	BR13440-4R-37	107	128	7.91	2.71
36	BR13440-4R-38	117	137	8.50	3.18
37	BR13440-4R-45	106	132	8.60	3.16
38	BR13440-4R-5	115	137	8.24	3.83
39	BR13440-4R-50	111	138	9.31	4.22
40	BR13440-4R-57	105	128	7.96	4.03
44	BR13441-4R-118	118	132	9.24	3.97
46	BR13441-4R-189	119	131	9.43	3.94
47	BR13441-4R-190	140	132	8.92	3.24
50	BR13441-4R-240	112	136	8.17	4.19
51	BR13441-4R-254	130	127	9.07	5.52
54	BR13441-4R-31	130	130	8.62	3.80

SI	Designation	PH (cm)	GD (days)	Yield (t/ha)	
				Satkhira	Gazipur
55	BR13442-4R-10	106	133	8.48	3.16
62	BR13442-4R-46	110	129	8.50	3.99
66	BR13442-4R-80	119	134	7.76	4.17
72	BR13443-4R-43	108	127	9.15	3.00
75	BR13443-4R-96	103	129	8.84	4.24
83	BRR1 dhan67	113	130	9.32	4.01
84	BRR1 dhan89	109	127	8.48	3.69
85	BRR1 dhan97	118	133	8.29	4.79
86	BRR1 dhan99	106	138	8.74	3.03
87	BRR1 dhan102	103	138	7.84	3.08
88	BRR1 dhan108	112	130	9.40	3.20
LSD<0.05		3.43	3.58	1.71	1.64
H2b		0.98	0.89	0.67	0.56

Table 6.7.4 Yield and agronomic performance of the genotypes tested in PYT-2, Salt-Tolerant Rice (STR) Breeding, Boro 2024-25

SI	Designation	PH (cm)	GD (days)	Yield (t/ha)	
				Satkhira	Gazipur
2	BR13446-4R-84	127	134	8.21	7.08
3	BR13447-4R-11	114	133	8.24	6.84
21	BR13455-4R-22	118	145	7.38	5.41
25	BR13455-4R-84	101	140	7.30	7.94
26	BR13456-4R-104	105	131	7.74	6.27
30	BR13456-4R-143	121	130	7.36	7.13
37	BR13456-4R-185	100	133	7.22	4.92
39	BR13456-4R-193	106	135	7.87	6.65
50	BR13456-4R-94	117	129	7.51	6.38
51	BR13457-4R-100	127	136	8.17	8.36
54	BR13457-4R-122	118	139	8.35	6.86
55	BR13457-4R-13	104	134	7.65	5.03
56	BR13457-4R-141	104	127	7.70	5.64
60	BR13457-4R-2	103	136	7.95	5.89
62	BR13457-4R-23	122	132	8.60	7.04
63	BR13457-4R-27	138	126	6.90	6.32
64	BR13457-4R-29	125	138	8.01	6.14
65	BR13457-4R-37	108	132	8.05	2.39
68	BR13457-4R-98	100	124	7.58	4.01
69	BR13459-4R-121	129	132	7.72	5.76
70	BR13459-4R-140	128	136	8.46	7.61
72	BR13459-4R-164	112	138	8.95	7.12
73	BR13459-4R-177	102	129	8.96	6.76
75	BR13459-4R-212	104	128	8.01	6.79
78	BR13460-4R-10	117	135	7.73	7.23
83	BRR1 dhan67	114	131	7.92	6.73
84	BRR1 dhan89	115	131	8.12	6.91
85	BRR1 dhan97	118	133	7.89	6.91
86	BRR1 dhan99	114	137	7.89	4.93
87	BRR1 dhan102	97	138	7.94	6.30
88	BRR1 dhan108	103	127	7.88	4.21
LSD<0.05		7.11	3.11	1.66	1.71
H2b		0.93	0.94	0.58	0.67

Table 6.7.5 Yield and agronomic performance of the genotypes tested in PYT-3, Salt-Tolerant Rice (STR) Breeding, Boro 2024-25

SI	Designation	PH (cm)	GD (days)	Yield (t/ha)	
				Satkhira	Gazipur
2	BR13460-4R-203	122	131	8.02	2.63
3	BR13460-4R-214	108	131	8.24	2.45
7	BR13460-4R-48	102	129	7.55	3.14
10	BR13460-4R-85	119	131	8.47	3.48
11	BR13461-4R-58	131	134	7.07	2.71
15	BR13462-4R-154	102	132	7.46	3.17
16	BR13462-4R-215	109	133	8.03	2.68
17	BR13462-4R-23	104	131	8.18	2.68
19	BR13462-4R-266	117	128	7.64	2.62
20	BR13462-4R-42	111	135	7.95	3.12
22	BR13463-4R-100	124	134	8.25	3.48
25	BR13463-4R-126	100	135	7.85	3.95
26	BR13463-4R-131	129	133	8.04	3.63

SI	Designation	PH (cm)	GD (days)	Yield (t/ha)	
				Satkhira	Gazipur
27	BR13463-4R-137	112	135	8.22	3.65
29	BR13463-4R-152	116	136	7.68	2.64
31	BR13463-4R-37	130	134	8.11	3.17
32	BR13463-4R-45	116	133	8.44	2.30
33	BR13463-4R-61	119	133	7.98	2.59
35	BR13464-4R-11	115	138	7.63	2.73
37	BR13464-4R-132	114	134	8.27	4.09
38	BR13464-4R-137	125	139	8.04	2.92
40	BR13464-4R-224	119	137	8.16	3.41
45	BR13465-4R-158	100	139	8.10	3.57
48	BR13465-4R-187	123	133	8.12	3.89
50	BR13465-4R-201	108	130	8.04	3.59
51	BR13465-4R-21	113	134	7.93	2.99
54	BR13465-4R-73	103	126	8.28	4.30
55	BR13465-4R-83	117	133	8.14	4.93
56	BR13465-4R-85	112	133	7.51	4.20
65	BR13495-4R-114	112	134	8.58	3.05
72	BR13495-4R-275	116	139	7.98	2.94
74	BR13495-4R-304	113	128	8.09	2.95
78	BR13495-4R-51	91	140	8.17	3.61
79	BR13495-4R-59	138	136	7.83	3.14
81	BR13495-4R-77	112	135	8.39	2.88
83	BRRRI dhan67	117	131	7.65	3.29
84	BRRRI dhan89	108	133	7.85	3.56
85	BRRRI dhan97	116	133	8.66	4.05
86	BRRRI dhan99	103	140	7.42	4.94
87	BRRRI dhan102	117	135	7.36	1.87
88	BRRRI dhan108	119	130	7.82	3.50
LSD<0.05		3.05	2.86	1.52	1.64
H2b		0.99	0.93	0.45	0.56

Experiment 6.8: Advanced Yield Trial (AYT)

Principal Investigator: M. A. Rahman

Co-investigators: Nusrat Jahan, Armin Akter Setu, Ribed Farzana Disha, Md. Sazzadur Rahman and Mst. Salma Pervin

Specific objective: Confirmatory evaluation of selected genotypes from PYT for yield and other agronomic traits in replicated trial

Materials and Methods: A total of sixty-nine genotypes was tested in two AYT trials along with BR23, BRRRI dhan73 as tolerant checks and BRRRI dhan87 as sensitive check and three AYT trials in Boro season, respectively at BRRRI Gazipur and Satkhira farm. BR23, BRRRI dhan73 and BRRRI dhan87 were used as standard checks in T. Aman season whereas BRRRI dhan99, BRRRI dhan97, BRRRI dhan67 and BRRRI dhan89 were used as checks in Boro season. The unit plot size was 5.4 m × 8 rows. The trial layout was done using Alpha lattice design with two replications. Twenty-five and forty-day-old-seedlings were transplanted @ 2-3 seedlings with the spacing of 20 cm × 20 cm in T. Aman and Boro season, respectively. Fertilizers and crop management followed were the same as Experiment 6.1. Data were collected on plant height, days to flowering, days to maturity, PAcp, panicle per plant, and yield per plot.

Results: In T. Aman season, 32 genotypes were selected from AYT-1 and AYT-2 based on phenotypic acceptance, grain yield and grain type. In T. Aman, the genotypes showed a wide range of variations in yield in different locations. In AYT-1, the grain yield ranged from 1.07 t/ha to 5.50 t/ha at Gazipur and 2.50 t/ha to 4.44 t/ha at Satkhira. The average growth duration of the genotypes over the locations ranged from 91 days to 143 days (Table 6.8.1).

In AYT-2, the grain yield ranged from 1.3 t/ha to 4.00 t/ha at Gazipur and 1.2 t/ha to 5.7 t/ha at Satkhira. In Gazipur most of the entries were damaged due to tugro disease. The average yield of the genotypes over the locations ranged from 1.2 t/ha to 5.7 t/ha and growth duration ranging from 108 days to 142 days (BR23) (Table 6.7.2). On the other hand the check variety,

BRRI dhan73 yielded 3.1t/ha with 123 days’ growth duration and BRRI dhan87 yielded 3.0t/ha with 132 days growth duration (Table.6.8.2).

In Boro, 87 genotypes were selected considering yield, earliness and phenotypic acceptability, and yield of the selected genotypes were shown in (Table 6.8.3 to 6.8.5). The genotypes showed wide range of variations in yield in different locations. In AYT-1, the grain yield ranged from 3.9-6.5 t/ha at Gazipur and 1.7-9.1 t/ha at Satkhira farm (Table 6.8.3). The average yield of the genotypes over the locations ranged from 2.5 t/ha to 8.0 t/ha (BLUE) with average growth duration ranging from 132 days to 155 days (Table 6.8.3). The check variety, BRRI dhan89 yielded 6.3 t/ha with 139 days’ growth duration, BRRI dhan67 yielded 6.1 t/ha with 135 days growth duration, BRRI dhan97 and BRRI dhan99 yielded 6.4 t/ha with 143 days and 145 days growth duration (Table.6.8.3).

In AYT-2, the grain yield ranged from 4.6-5.7 t/ha at Gazipur and 5.6-10.6 t/ha at Satkhira farm (Table 6.8.4). The average growth duration ranging from 135 days to 153 days (Table 6.7.4). One the other hand the check variety, BRRI dhan89 yielded average 5.6 t/ha with 138 days’ growth duration, BRRI dhan67 yielded average 5.8 t/ha with 136 days growth duration, BRRI dhan97 yielded average 6.1 t/ha with 141 days growth duration and BRRI dhan99 yielded average 6.2 t/ha with 143 days growth duration in both locations (Table.6.8.4).

In AYT-3, the grain yield ranged from 4.9-6.3t/ha at Gazipur and 1.3-9.8 t/ha at Satkhira farm (Table 6.7.5). The average growth duration ranging from 135 days to 154 days (Table 6.8.5) which was longer than all check varieties.

Table 6.8.1: Yield and agronomic performance of the genotypes tested in AYT-1, Salt-Tolerant Rice (STR) Breeding, T. Aman 2024-25

SL	Designation	PH (cm)	GD (days)	Gazipur	Satkhira	BLUE	BLUP
1	BR13104-4R-21	137	105	2.16	3.78	2.97	3.01
2	BR13103-4R-95	130	142	1.76	2.77	2.26	2.98
3	BR13105-4R-81	135	113	1.43	3.41	2.42	2.99
4	BR13105-4R-28	136	108	4.18	3.5	3.84	3.06
5	BR13105-4R-72	135	112	3.56	3.74	3.65	3.05
6	BR13105-4R-108	135	112	5.5	3	4.25	3.08
7	BR13105-4R-93	136	113	1.87	3.69	2.78	3
8	BR13105-4R-10	136	143	2.65	4.03	3.34	3.03
9	BR13105-4R-32	136	111	3.26	3.9	3.58	3.04
10	BR13131-4R-62	119	98	1.69	3.91	2.8	3
11	BR13106-4R-253	117	101	2.13	3.04	2.59	2.99
12	BR13125-4R-63	114	124	1.69	3.96	2.82	3.01
13	BR13123-4R-118	123	108	2.58	3.74	3.16	3.02
14	BR13106-4R-241	118	98	2.49	3.97	3.23	3.03
15	BR13108-4R-214	119	98	1.51	4.44	2.97	3.01
16	BR13115-4R-136	115	100	2.84	3.75	3.3	3.03
17	BR13113-4R-14	121	107	3.2	4.21	3.7	3.05
18	BR13122-4R-14	122	107	3.76	3.93	3.84	3.06
19	BR13122-4R-4	124	110	2.13	3.48	2.8	3.01
20	BR13116-4R-213	126	99	2.22	2.5	2.36	2.98
21	BR13125-4R-107	118	91	1.07	3.39	2.23	2.98
22	BR13104-4R-258	116	103	2.13	3.79	2.96	3.01
23	BR13122-4R-56	118	107	2.31	3.34	2.82	3.01
24	BR13107-4R-34	122	101	2.31	3.76	3.03	3.02
25	BR13108-4R-320	122	105	1.46	4.17	2.81	3.01
26	BR13108-4R-41	115	110	1.6	3.37	2.48	2.99
27	BR13122-4R-44	122	102	2.23	3.86	3.04	3.02
28	BR13111-4R-109	113	109	3.44	3.85	3.64	3.05
29	BR13107-4R-143	134	102	3.65	3.96	3.8	3.05
30	BR13123-4R-229	121	104	2.36	4.31	3.34	3.03
31	BR13106-4R-422	118	104	1.64	4.12	2.88	3.01
32	BR13128-4R-46	129	100	1.5	4.23	2.86	3.01
33	BR13106-4R-489	113	110	1.42	3.57	2.49	2.99
34	BR13111-4R-104	118	108	3.05	4.27	3.66	3.05
	BR23	135	112	2.05	3.23	2.64	3
	BRRI dhan30	138	112	1.2	2.93	2.06	2.97
	BRRI dhan73	123	119	1.69	4.19	2.94	3.01
	BRRI dhan87	132	111	1.84	2.72	2.28	2.98
	LSD<0.05	10.4	3.67	0.49	0.5	0.73	
	H2b	0.54	0.91	0.86	0.45	0.26	

Table 6.8.2: Yield and agronomic performance of the genotypes tested in AYT-2, Salt-Tolerant Rice (STR) Breeding, at T. Aman 2024-25

SL	Designation	PH (cm)	GD (days)	Gazipur	Satkhira	BLUE	BLUP
1	BR13108-4R-133	114	123	2.6	4.8	3.7	3.3
2	BR13111-4R-83	110	122	1.6	5.7	3.7	3.3
3	BR13120-4R-43	105	117	1.6	2.4	2	2.7
4	BR13115-4R-171	95	108	1.4	1.5	1.5	2.5
5	BR11936-4R-11	99	118	1.9	4.4	3.1	3.1
6	BR13111-4R-156	144	127	1.7	3.8	2.8	2.9
7	BR13115-4R-20	102	138	3	3.1	3	3
8	BR13113-4R-121	105	124	3.7	4.6	4.1	3.4
9	BR13115-4R-180	88	141	3.1	4.1	3.6	3.2
10	BR13113-4R-176	114	127	4	4.9	4.5	3.5
11	BR13105-4R-200	109	137	3.1	4.3	3.7	3.3
12	BR13105-4R-27	110	137	2.9	4.3	3.6	3.2
13	BR13105-4R-212	109	137	1.9	4	2.9	3
14	BR13105-4R-26	110	138	2.8	3.2	3	3
15	BR13121-4R-2	91	131	2.6	3.5	3	3
16	BR13105-4R-173	114	137	3.3	3.9	3.6	3.2
17	BR13127-4R-54	100	138	1.8	4.7	3.3	3.1
18	BR13104-4R-125	104	127	1.7	3.3	2.5	2.8
19	BR13105-4R-11	118	131	2.8	2.7	2.8	2.9
20	BR13106-4R-168	104	118	2.1	4.2	3.1	3.1
21	BR13108-4R-275	115	118	2	4.9	3.4	3.2
22	BR13111-4R-38	112	131	3.1	1.5	2.3	2.8
23	BR13105-4R-187	97	127	1.3	1.2	1.3	2.4
24	BR13105-4R-107	120	133	3.5	3.9	3.7	3.3
25	BR13115-4R-117	95	142	1.9	3.1	2.5	2.8
26	BR13128-4R-14	96	136	3.3	4	3.7	3.2
27	BR13111-4R-24	109	121	1.6	3.4	2.5	2.8
28	BR13104-4R-162	100	126	2.1	3.2	2.7	2.9
29	BR13107-4R-170	103	134	3.1	4	3.5	3.2
30	BR13123-4R-132	104	115	1.7	3.7	2.7	2.9
31	BR13111-4R-143	99	128	2.3	4	3.1	3.1
32	BR13105-4R-46	107	127	2.7	4.1	3.4	3.2
33	BR13122-4R-106	110	121	1.5	3	2.2	2.7
34	BR13103-4R-57	124	130	1.9	3.6	2.8	2.9
35	BR13128-4R-64	111	126	3.5	2.7	3.1	3
	BR23	115	142	2.5	3.3	2.9	3
	BRRRI dhan30	111	138	2.4	3.2	2.8	2.9
	BRRRI dhan73	117	123	2	4.1	3.1	3
	BRRRI dhan87	114	132	2.4	3.6	3	3
	LSD<0.05	6	11.1	0.41	0.39	0.74	
	H2b	0.43	0.74	0.83	0.91	0.37	



Fig.6.8.1: AYT-1 and AYT-2 in Gazipur

Table 6.8.3: Yield and agronomic performance of genotypes tested in AYT-1, Salt-Tolerant Rice (STR) Breeding, Boro 2024-25

SL	Designation	PH (cm)	GD (days)	Gazipur		Satkhira		Combined Location	
				BLUE	BLUP	BLUE	BLUP	BLUE	pBLUP
1	BR13201-4R-260	119	141	6	5.7	8.7	8.5	7.3	6.9
2	BR13197-4R-24	100	155	4	4.6	1	1.7	2.5	4.1
3	BR13197-4R-150	105	146	4.8	5.1	4.4	4.7	4.6	5.3
4	BR13201-4R-12	105	141	5.9	5.7	6.7	6.8	6.3	6.3

SL	Designation	PH (cm)	GD (days)	Gazipur		Satkhira		Combined Location	
				BLUE	BLUP	BLUE	BLUP	BLUE	pBLUP
5	BR13210-4R-38	117	138	6.5	6.1	7.1	7.1	6.8	6.6
6	BR13197-4R-41	103	141	6.2	5.9	7.4	7.4	6.8	6.6
7	BR13208-4R-2	112	143	5.9	5.7	7.5	7.4	6.7	6.5
8	BR13197-4R-181	118	144	7.3	6.5	8.1	8	7.7	7.1
9	BR13218-4R-58	117	134	5.4	5.4	6.1	6.2	5.8	6
10	BR13197-4R-70	109	143	5.8	5.6	6.8	6.8	6.3	6.3
11	BR13201-4R-114	101	143	6.4	6	5.8	5.9	6.1	6.2
12	BR13197-4R-186	115	140	3.5	4.3	8.1	7.9	5.8	6
13	BR13201-4R-98	106	143	6.6	6.1	7.9	7.8	7.3	6.8
14	BR13197-4R-181	113	145	6.2	5.9	7.7	7.6	6.9	6.7
15	BR13201-4R-16	112	141	6.6	6.1	9.4	9.1	8	7.2
16	BR13205-4R-245	109	142	2.7	3.9	7.6	7.6	5.1	5.6
17	BR13218-4R-3	119	135	4.8	5.1	6.9	6.9	5.8	6
18	BR13205-4R-201	111	148	6.8	6.2	5.9	6.1	6.4	6.3
19	BR13197-4R-111	118	143	5.2	5.3	8.9	8.7	7	6.7
20	BR13205-4R-179	104	148	5.6	5.5	7.6	7.5	6.6	6.4
21	BR13201-4R-61	109	137	6.7	6.2	7.7	7.6	7.2	6.8
22	BR13208-4R-16	117	142	5.3	5.4	8.4	8.3	6.8	6.6
23	BR13207-4R-1	93	137	5.9	5.7	6.6	6.6	6.2	6.3
24	BR13210-4R-218	114	140	5.2	5.3	6.6	6.6	5.9	6.1
25	BR13209-4R-179	117	140	6.7	6.2	6.8	6.8	6.8	6.6
26	BR13201-4R-252	107	144	3.8	4.5	9	8.7	6.4	6.3
27	BR13197-4R-30	99	143	6.3	5.9	6.7	6.7	6.5	6.4
28	BR13201-4R-186	120	142	6.8	6.2	8	7.9	7.4	6.9
29	BR13202-4R-141	124	149	6.6	6.1	6.1	6.2	6.3	6.3
30	BR13201-4R-72	115	137	5.7	5.6	7.4	7.4	6.5	6.4
31	BR13201-4R-181	112	146	3.5	4.3	6.9	6.9	5.2	5.7
32	BR13206-4R-147	108	140	5.7	5.6	7.5	7.5	6.6	6.5
33	BR13197-4R-148	110	140	3	4.1	8.3	8.1	5.6	5.9
34	BR13201-4R-70	105	136	7.2	6.4	6.1	6.2	6.7	6.5
35	BR13209-4R-11	108	135	5.9	5.7	6.6	6.7	6.3	6.3
36	BR13215-4R-159	108	135	2.9	4	6.3	6.4	4.6	5.3
37	BR13208-4R-45	139	139	4.9	5.1	7.1	7.1	6	6.1
38	BR13197-4R-131	98	141	5.7	5.6	6.5	6.5	6.1	6.2
39	BR13197-4R-19	94	141	5.3	5.4	7.4	7.3	6.3	6.3
40	BR13209-4R-214	122	135	5.8	5.7	7.8	7.7	6.8	6.6
41	BR13197-4R-12	104	142	5.5	5.5	7.6	7.6	6.5	6.4
42	BR13215-4R-40	98	142	5.5	5.5	6.2	6.3	5.8	6
43	BR13215-4R-166	102	139	5.9	5.7	8.1	8	7	6.7
44	BR13210-4R-98	99	132	4.6	5	7.1	7.1	5.8	6
	BRR1 dhan 67	115	135	5.5	5.5	6.5	6.6	6	6.1
	BRR1 dhan 89	108	139	5.3	5.4	7.3	7.3	6.3	6.3
	BRR1 dhan 97	115	143	5.5	5.5	7.5	7.4	6.5	6.4
	BRR1 dhan 99	106	145	6	5.8	7.1	7.1	6.6	6.4
	h2b	7.5	2.5		1.3		0.8		1
	LSD (5%)	0.61	0.81		0.56		0.89		0.39

Table 6.8.4: Yield and agronomic performance of genotypes of AYT2, Salt-Tolerant Rice (STR) Breeding, Boro 2024-25

SL	Designation	PH (cm)	GD (days)	Gazipur		Satkhira		Combined	
				BLUE	BLUP	BLUE	BLUP	BLUE	pBLUP
1	BR13201-4R-285	118	138	5.6	5.3	7.5	7.6	6.6	6.5
2	BR13201-4R-90	104	143	5.5	5.3	7.8	7.8	6.8	6.6
3	BR13208-4R-75	119	144	4.9	5	7.8	7.8	6.4	6.4
4	BR13201-4R-62	98	137	5	5.1	9.2	8.9	7.2	6.9
5	BR13218-4R-20	112	142	5.2	5.2	8.4	8.3	6.9	6.7
6	BR13207-4R-48	100	137	6.5	5.7	8.5	8.4	7.6	7.1
7	BR13206-4R-104	111	140	5.3	5.2	7.9	7.9	6.7	6.6
8	BR13215-4R-92	110	139	5.3	5.2	8	8	6.7	6.6
9	BR13197-4R-143	114	139	4.9	5	9.1	8.9	7.1	6.8
10	BR12655-4R-32	99	142	5.3	5.2	8.8	8.6	7.2	6.8
11	BR13201-4R-91	104	137	5.9	5.5	8.7	8.6	7.4	7
12	BR13205-4R-1	102	137	5.4	5.2	8.6	8.5	7.1	6.8
13	BR13201-4R-215	113	138	4.8	5	7.2	7.4	6.1	6.3
14	BR12650-4R-49	117	137	4.5	4.8	9	8.8	6.8	6.7
15	BR 12639-4R-216	104	140	5.4	5.2	8.8	8.7	7.2	6.9
16	BR12655-4R-143	107	145	4.8	5	8.2	8.1	6.6	6.5
17	BR12661-4R-21	111	135	4.9	5	8.7	8.6	6.9	6.7
18	BR13201-4R-250	107	142	4.9	5	9.4	9.2	7.3	6.9
19	BR12639-4R-155	127	142	5.4	5.2	8.7	8.6	7.2	6.8
20	BR12646-4R-123	116	143	4.3	4.8	8.2	8.2	6.3	6.4

SL	Designation	PH (cm)	GD (days)	Gazipur		Satkhira		Combined	
21	BR13198-4R-35	120	137	5.5	5.3	8.1	8.1	6.9	6.7
22	BR13208-4R-89	112	145	5.8	5.4	8.6	8.5	7.3	6.9
23	BR13204-4R-96	104	137	4.6	4.9	7.9	7.9	6.4	6.4
24	BR13206-4R-120	108	135	4	4.6	7.8	7.8	6	6.2
25	BR12660-4R-21	116	141	4.8	5	7.3	7.5	6.2	6.3
26	BR12650-4R-123	113	136	4	4.6	7	7.2	5.6	6
27	BR12649-4R-121	122	145	5.4	5.2	8.4	8.3	7	6.7
28	BR13208-4R-76	112	143	5.5	5.3	8	8	6.8	6.7
29	BR12650-4R-24	113	138	5.4	5.2	10.3	9.8	8	7.3
30	BR12650-4R-72	115	138	4.9	5	8.1	8.1	6.6	6.5
31	BR12274-4R-138	97	144	5.1	5.1	6.3	6.7	5.8	6.1
32	BR11276-4R-100	126	138	5.2	5.2	7.1	7.3	6.3	6.4
33	BR12275-4R-215	109	143	5.2	5.2	8.7	8.6	7.1	6.8
34	BR11276-4R-212	125	140	4.8	4.9	11.2	10.6	8.1	7.3
35	BR11276-4R-150	94	145	5.2	5.2	5	5.6	5.2	5.8
36	BR11276-4R-19	115	136	5	5.1	8	8	6.6	6.5
37	BR11718-4R-10	112	142	5.1	5.1	8.6	8.5	7	6.7
38	BR11276-4R-8	123	143	4.9	5	8.1	8.1	6.6	6.5
39	BR11718-4R-110	97	138	5.1	5.1	7.4	7.5	6.4	6.4
40	BR11718-4R-230	117	138	4.9	5	7.5	7.6	6.3	6.4
41	BR11718-4R-125	124	141	5.3	5.2	6.3	6.7	5.9	6.2
42	BR11718-4R-268	102	140	5.1	5.1	9.8	9.4	7.5	7
43	BR12274-4R-255	104	144	5.4	5.2	8.5	8.4	7.1	6.8
44	BR11718-4R-379	113	143	4.9	5	8.4	8.3	6.7	6.6
45	BR11276-4R-152	101	139	5.2	5.1	7.5	7.6	6.4	6.4
46	BR11276-4R-221	122	139	5.4	5.2	7.9	7.9	6.7	6.6
47	BR12276-4R-156	125	139	4.8	4.9	7.4	7.5	6.2	6.3
48	BR12274-4R-188	103	139	5	5.1	7.2	7.4	6.2	6.3
49	BR11718-4R-46	124	138	5.3	5.2	6.8	7.1	6.2	6.3
50	BR11276-4R-132	99	139	4.4	4.8	8.6	8.5	6.6	6.5
51	BR11276-4R-228	129	141	5.2	5.2	7.6	7.7	6.5	6.5
52	BR13449-4R-7	119	153	4.7	4.9	5	5.6	4.9	5.6
	BRRI dhan 67	121	138	4.9	5	6.8	6.8	5.8	5.9
	BRRI dhan 89	103	136	5.1	5.1	6.1	6.3	5.6	5.8
	BRRI dhan 97	117	141	5.6	5.3	6.6	6.7	6.1	6.1
	BRRI dhan 99	101	143	4.9	5	7.5	7.4	6.2	6.2
	h2b	0.72	0.46	0.44		0.8		0.37	
	LSD (5%)	9.7512	4.7872	0.6256		0.9112		0.7616	

Table 6.8.5: Yield and agronomic performance of genotypes of AYT3, Salt-Tolerant Rice (STR) Breeding, Boro 2024-25

SL	Designation	PH (cm)	GD (days)	Gazipur		Satkhira		Combined Location	
				BLUE	BLUP	BLUE	BLUP	BLUE	pBLUP
1	BR13439-4R-135	99	136	5.6	5.7	7.5	7.5	6.5	6.7
2	BR13439-4R-31	111	136	6.8	6.1	7.9	7.9	7.4	7.1
3	BR13440-4R-46	110	137	6	5.9	7.2	7.2	6.6	6.7
4	BR13440-4R-60	110	137	5.6	5.7	7.2	7.2	6.4	6.6
5	BR13440-4R-69	105	144	6.5	6.1	7.3	7.3	6.9	6.9
6	BR13440-4R-76	119	138	6.1	5.9	8.6	8.6	7.4	7.1
7	BR13441-4R-51	111	137	5.8	5.8	7.1	7.1	6.4	6.6
8	BR13443-4R-131	115	141	5.8	5.8	8.3	8.3	7.1	6.9
9	BR13443-4R-24	113	138	5.9	5.8	9.7	9.6	7.8	7.3
10	BR13445-4R-13	129	136	5.8	5.8	8.7	8.7	7.3	7
11	BR13445-4R-132	119	141	5.6	5.7	8.7	8.7	7.1	7
12	BR13445-4R-160	122	140	6.8	6.1	8.7	8.6	7.7	7.3
13	BR13445-4R-91	126	140	4.1	5.2	9.5	9.4	6.8	6.8
14	BR13456-4R-179	112	141	6	5.9	8.8	8.8	7.4	7.1
15	BR13456-4R-235	113	138	6.2	5.9	9.4	9.4	7.8	7.3
16	BR13456-4R-68	109	140	6.2	5.9	8.6	8.6	7.4	7.1
17	BR13459-4R-225	119	140	6.1	5.9	7	7	6.6	6.7
18	BR13460-4R-101	120	135	3.7	5	8.4	8.4	6	6.4
19	BR13461-4R-51	110	149	5.5	5.7	7.2	7.3	6.4	6.6
20	BR13462-4R-274	110	136	5.4	5.7	8.8	8.7	7.1	7
21	BR13462-4R-31	112	138	5.4	5.7	6.4	6.5	5.9	6.4
22	BR13464-4R-164	126	139	6.1	5.9	8.3	8.2	7.2	7
23	BR13464-4R-27	117	139	5.9	5.8	8.2	8.1	7	6.9
24	BR13465-4R-136	107	138	6.3	6	9.1	9.1	7.7	7.3
25	BR13465-4R-14	104	147	5.5	5.7	8.7	8.7	7.1	7
26	BR13465-4R-186	107	149	5.6	5.7	8.6	8.5	7.1	6.9
27	BR13465-4R-188	116	144	6.3	6	6.3	6.3	6.3	6.5
28	BR13495-4R-136	115	144	6.3	6	7.2	7.2	6.7	6.8
29	BR13495-4R-150	123	141	5.6	5.7	7.1	7.2	6.3	6.6

SL	Designation	PH (cm)	GD (days)	Gazipur		Satkhira		Combined Location	
				BLUE	BLUP	BLUE	BLUP	BLUE	pBLUP
30	BR13495-4R-61	122	137	3.2	4.9	9.6	9.5	6.4	6.6
31	BR13496-4R-128	114	135	5.7	5.7	9.6	9.5	7.6	7.2
32	BR13441-4R-119	111	146	5.8	5.8	1	1.3	3.4	5.1
33	BR13441-4R-57	115	139	6.4	6	7.7	7.7	7.1	6.9
34	BR13445-4R-71	118	139	5.2	5.6	8.3	8.2	6.7	6.8
35	BR13457-4R-8	101	142	6.1	5.9	1	1.3	3.5	5.2
36	BR13460-4R-23	121	138	5.8	5.8	9.8	9.7	7.8	7.3
37	BR13463-4R-55	122	139	5.5	5.7	7.1	7.1	6.3	6.6
38	BR13465-4R-183	113	141	5.2	5.6	9.3	9.2	7.3	7
39	BR13465-4R-193	119	137	5.6	5.7	9.4	9.4	7.5	7.2
40	BR13465-4R-33	102	154	6.3	6	1	1.3	3.6	5.2
41	BR13465-4R-8	110	138	6.1	5.9	8.1	8	7.1	6.9
42	BR13495-4R-208	118	138	5.7	5.8	7.7	7.7	6.7	6.8
43	BR13495-4R-243	115	140	4.8	5.4	9.1	9	7	6.9
44	BR13495-4R-28	127	140	6.1	5.9	8.3	8.2	7.2	7
45	BR13496-4R-147	125	142	5.4	5.7	9.5	9.5	7.5	7.1
46	BR13207-4R-48	120	135	5.8	5.8	6.6	6.6	6.2	6.5
47	BR13203-4R-102	119	139	7.2	6.3	9.9	9.8	8.5	7.7
48	BR13197-4R-111	116	139	5.6	5.7	8.3	8.2	6.9	6.9
	BRRI dhan67	115	137	6.1	5.9	8.3	8.3	7.2	7
	BRRI dhan89	110	137	6	5.8	7.1	7.1	6.5	6.7
	BRRI dhan97	119	140	6.4	6	8.3	8.2	7.3	7.1
	BRRI dhan99	107	142	6.7	6.1	8.8	8.7	7.7	7.3
	h2b	0.72	0.61		0.46			0.76	0.44
	LSD (5%)	4.89	3.4		1.2			0.68	0.96

Experiment 6.9: Regional Yield Trial (RYT)

Principal Investigator: M. A. Rahman

Co-investigators: Nusrat Jahan, Armin Akter Setu, Ribed Farzana Disha, Md. Sazzadur Rahman and Mst. Salma Pervin

Specific objective: To assess specific and general adaptability for selecting the suitable genotypes on station and on farm conditions (by participating farmers’ preferences) in saline prone areas

Materials and Methods: Sixty-two most promising in RYT-1, RYT-2 and RYT-3 in T. Aman season were evaluated at four locations and total 35 genotypes were evaluated, at nine locations in RYT1 and RYT2 in Boro season. Twenty-five days-old seedling and 40 days old seedling were transplanted @ 2-3 seedlings with a spacing of 20 x 20 cm in T. Aman and Boro season respectively. The unit plot size was 5.4 m x 8 rows with two replications. In T. Aman, BRRI dhan89 and BRRI dhan73 were used as checks in T. Aman and BRRI dhan67, BRRI dhan89 and BRRI dhan99 were used as tolerant and sensitive checks in Boro, respectively. Fertilizer doses and time of application were the same as in Experiment no. 6.1. Crop management such as weeding and controlling disease was done in time.

Results: Out of 23 genotypes, four genotypes such as BR12462-4R-227, BR12459-4R-39, BR12471-4R- 98 and BR12461-4R-51 were selected based on their yield quality (4.1, 3.7, 3.8 and 4.0 t/ha respectively) (Table 6.9.1) and their growth duration 127 to 135 days which was similar to check varieties. In RYT-2, 24 genotypes were evaluated and four genotypes as BR12465-4R-85, BR12465-4R-91, BR12466-4R-14 and BR12459-4R-118, were selected for Re-RYT based on grain yield and grain quality (Table 6.9.2). From RYT-3 BR12465-4R-61, BR12465-4R-231 and BR12459-4R-113 were selected for ALART. These entries produced higher yield such as 5.1 t/ha, 4.8 t/ha and 4.5 t/ha respectively which was higher than check varieties (Table 6.9.3).

In Boro, out of 35 genotypes, 15 genotypes were selected from RYT1 and RYT2. In RYT1 BR13205-4R-190, BRI13201-4R-15, BR13201-4R-298, BR13201-4R-225, BR13207-4R-28, BR11718-4R-92, BR13201-4R-219 and BR13201-4R-103 were selected which yielded 7.8, 8.0, 7.7, 7.9, 7.6, 7.1, 7.7 and 7.4 t/ha respectively higher than check varieties (Table 6.9.4). Their growth duration ranged from 143 days to 150 days (Table 6.9.4).

In RYT2 BR13201-4R-30, BR13201-4R-249, BR13201-4R-196, BR13206-4R-50, BR13113-4R-121, BR13106-4R-168 and BR11718-4R-230 were selected which yielded 7.9, 7.8, 7.7, 6.6, 7.4, 7.3 and 6.8 t/ha respectively. Among them most of the entries yielded higher than check varieties (Table 6.9.5). Their growth duration ranged from 139 days to 148 days (Table 6.9.5).

Table 6.9.1: Yield and agronomic performance of genotypes in RYT-1, Salt tolerant Rice, T. Aman 2024-25

SL	Designation	PH (cm)	GD (days)	Gazi	Gopal	Kus	SAT	BLUE	PBLUB
1	BR12462-4R-227	119	135	7.2	4.7	3.6	4.9	5.1	4.1
2	BR12459-4R-283	97	139	5	3.2	2.9	3.2	3.6	3.7
3	BR12459-4R-40	102	133	1.8	3.9	3.6	3.4	3.2	3.7
4	BR12459-4R-113	132	132	4.7	3.1	4	4.7	4.1	3.8
5	BR12459-4R-37	107	132	1	4.2	3.5	3.4	3	3.6
6	BR12459-4R-39	103	131	1.2	4.1	3.9	4	3.3	3.7
7	BR12468-4R-231	106	128	4	4.4	3.9	3.5	4	3.8
8	BR12460-4R-44	114	134	4.6	5.1	3.4	3.4	4.1	3.8
9	BR12471-4R-98	120	127	4.2	3.4	3	4.2	3.7	3.8
10	BR13711-4R-190	120	129	4.8	3.2	4.1	3.7	4	3.8
11	BR12468-4R-337	118	129	2.2	3	4.5	4.1	3.5	3.7
12	BR12459-4R-33	97	137	1.5	3.3	3.7	3.1	2.9	3.6
13	BR12459-4R-16	112	130	5.3	3.6	3	5.1	4.2	3.9
14	BR12461-4R-51	127	131	5.8	4.9	3.3	4.8	4.7	4
15	BR12459-4R-286	121	133	5.2	3	2.3	4.3	3.7	3.8
16	BR12459-4R-80	117	133	3.1	3.7	2.7	3.1	3.1	3.6
17	BR12459-4R-172	132	129	2.6	3.1	3.1	4.6	3.3	3.7
18	BR12459-4R-265	130	131	3.4	3.1	3.4	4.9	3.7	3.8
19	BR12459-4R-54	107	134	2.8	4.1	3.3	4	3.5	3.7
20	BR12465-4R-321	112	131	5.3	4.7	3.7	4	4.4	3.9
21	BR12460-4R-102	123	132	6.5	3.8	3.7	3.7	4.4	3.9
22	BR13122-4R-46	120	124	3.9	3.3	3.7	4.8	3.9	3.8
23	BR12459-4R-140	120	131	3	4.7	3.1	3.7	3.6	3.7
	BRRi dhan73	115	127	2.8	3.4	3.4	4.3	3.5	3.7
	BRRi dhan87	119	134	3	5.2	3.7	3.4	3.8	3.8
	LSD<0.05	5.3	5.1	0.82	0.41	0.73	0.71	1.31	
	H2b	0.87	0.68	0.86	0.95	0.7	0.84	0.22	

Table 6.9.2: Yield and agronomic performance of genotypes in RYT-2, Salt tolerant Rice, T. Aman 2024-25

SL	Designation	PH (cm)	GD (days)	Yield (t/ha)							
				Gazi	Kus	Raj	Rang	Sat	Son	BLUE	PBLUP
1	BR12464-4R-298	109	127	1.1	3.4	3.3	4	2.9	3.1	3	3.5
2	BR12459-4R-103	113	130	2.2	2.7	4.9	3.9	4.6	3.9	3.7	3.6
3	BR12460-4R-24	117	129	3.4	3.2	4.3	4.9	3.2	3	3.7	3.6
4	BR12465-4R-201	127	127	3.7	3.6	4.2	3.4	3.1	3.8	3.6	3.6
5	BR12465-4R-85	112	126	3.5	3.6	5.6	4.5	2.9	2.7	3.8	3.6
6	BR12466-4R-180	119	131	2.9	3.6	3.9	5.2	4	2.6	3.7	3.6
7	BR12462-4R-82	136	128	2.1	3.3	3.1	3.6	4.6	3	3.3	3.5
8	BR12460-4R-145	109	131	1.5	4.1	4.8	5	3.4	3.7	3.7	3.6
9	BR12459-4R-106	118	132	1.7	2	5.4	5.3	3.8	3.8	3.7	3.6
10	BR12466-4R-98	116	127	1.6	4.1	4.2	4.1	3.2	2.7	3.3	3.5
11	BR12462-4R-283	120	133	1.6	2.8	4	4.2	3.6	3.7	3.3	3.5
12	BR12465-4R-91	120	130	3.7	3.9	4.3	4.1	3.7	3.7	3.9	3.7
13	BR12466-4R-275	117	120	3	4.1	2.7	3.4	2.9	1.5	2.9	3.5
14	BR12466-4R-14	113	129	3.7	2.8	5.2	5.1	4.8	3.5	4.2	3.7
15	BR12459-4R-114	127	131	4.1	3	4.8	3.1	3.4	3.3	3.6	3.6
16	BR12459-4R-118	127	129	5.1	2.5	4.7	4.3	4.5	2.7	4	3.7
17	BR12459-4R-120	121	130	3	3.4	5	5.3	3.2	3	3.8	3.7
18	BR12459-4R-26	126	132	4.2	3	5.9	5.2	4.5	3.5	4.4	3.8
19	BR12462-4R-147	116	133	1.6	3.5	5.4	6.2	3.6	3.5	4	3.7
20	BR12465-4R-59	109	126	1.3	4.5	5	4.6	3.1	3.3	3.6	3.6
21	BR12466-4R-159	117	130	2.5	3.3	3.9	4.1	2.6	4	3.4	3.6
22	BR12465-4R-312	112	134	2.3	2.6	4.6	5.1	3.1	3.6	3.6	3.6
23	BR12466-4R-106	122	127	2	2.7	5.3	4.6	4.5	3.8	3.8	3.7
24	BR12469-4R-204	130	125	1.4	3.2	4.4	4.2	3.1	2.4	3.1	3.5
	BRRi dhan73	123	124	2.8	3.5	2.4	3.7	3.7	2.3	3.1	3.5
	BRRi dhan87	119	130	1.8	3.7	5.7	5.3	3.2	2.3	3.7	3.6
	BRRi dhan 103	123	130	2.3	3.2	4.2	4.4	4.2	3.1	3.6	3.6
	LSD<0.05	0.8	0.61	0.86	81	0.9	0.95	0.89	0.73	0.24	
	H2b	4.02	4.29	1.08	0.69	0.78	0.45	0.59	0.88	0.84	

Table 6.9.3: Yield and agronomic performance of genotypes in RYT-3, Salt tolerant Rice, T. Aman 2024-25

SL	Designation	PH (cm)	GD (days)	L1	L2	L3	L4	L5	BLUE	pBLUP	Survival (%)
1	BR12465-4R-61	119	132	5.2	5.7	6.4	3.9	5.2	5.3	5.1	
2	BR12465-4R-132	116	137	1.7	4.9	4.1	3.3	1.9	3.2	3.3	
3	BR12465-4R-26	111	132	3.9	4.4	4.9	3.4	3.9	4.1	4.1	
4	BR12465-4R-100	121	129	5.1	5.1	5.4	4.5	5.1	5	4.9	55
5	BR12465-4R-130	108	140	3.3	4.1	5.1	3.4	2.8	3.8	3.8	
6	BR12465-4R-231	117	128	4.1	6	5.8	4.7	4.1	4.9	4.8	
7	BR12477-4R-186	126	131	1.2	5	5.5	3.4	1.2	3.2	3.4	65
8	BR12466-4R-167	126	131	3.5	5.5	7.0	3.4	3.5	4.6	4.5	82
9	BR12466-4R-317	109	123	3.4	3.6	5.3	4.5	3.4	4.0	4.1	50
10	BR12459-4R-277	126	130	2.7	6.2	6.6	5	2.5	4.6	4.5	73
11	BR12459-4R-113	118	130	4.2	5.2	5.9	4.5	3.2	4.6	4.5	55
12	BR12459-4R-241	125	128	2.6	3.5	6	4.6	2.6	3.9	3.9	94
13	BR12459-4R-117	131	131	2.2	5	6.2	3.9	2.2	3.9	3.9	65
14	BR12465-4R-223	110	131	3	5.1	5.3	4	3	4.1	4.1	48
15	BR12477-4R-371	122	128	2.5	3.4	6.2	5.1	2.5	3.9	4	34
16	BR23 (Ck)	129	146	2.1	4.1	2.3	4.5	2.1	3.0	3.2	
17	BRRI dhan30 (Ck)	124	137	2.4	5.7	5.9	4.7	2.4	4.2	4.2	
LSD<0.05		7.4	3.5	0.96	0.37	1.45	0.31	1.02	1		
H2b		0.89	0.94	0.91	0.7	0.76	0.8	0.88	0.71		

*L1= Gazipur, L2=Gopalganj, L3=Rajshahi, L4=Rangpur, L5=Satkhira



Fig. 6.8.2: Pictorial view of genotypes in RYT-2 Salinity Breeding, T. Aman 2024-25

Table 6.9.4: Yield and agronomic performance of genotypes in RYT-1, Salt tolerant Rice, Boro 2024-25

SN	Designation	PH (cm)	GD (days)	L1	L2	L3	L4	L5	L6	L7	L8	L9	BLUE	BLUP
1	BR13205-4R-190	98.8	150	9.1	9.3	6.9	8.8	8.1	6.3	6	9.4	6.4	7.8	7.7
2	BR12274-4R-193	109.5	148	8.4	7.8	6.8	8.5	7.2	6.1	6.5	9.2	5.5	7.3	7
3	BRI11276-4R-139	122.8	152	8.2	7.8	4.6	9.2	6.8	7.2	8.2	8.6	4.4	7.2	6.6
4	BRI13201-4R-15	104.6	148	9.6	8.9	7.3	8.3	8.1	6	7.2	8.9	7.6	8	7.5
5	BR11276-4R-196	117.4	148	7.2	8.1	7.5	8.9	6.2	5.4	5.2	9.2	6.6	7.1	7
6	BR13201-4R-298	105.9	147	9.1	9	6.8	9.2	7.7	6	5.9	8.7	7.2	7.7	7.5
7	BR13201-4R-225	99.9	149	8.9	8.9	8.1	9.6	7.5	6	5.6	9.1	7.9	7.9	7.1
8	BR11276-4R-104	127.2	152	8.3	6.5	7.5	8.9	6	6.5	6.6	8.7	4.5	7	7.6
9	BRI11720-4R-89	120.4	149	8.3	8.7	7.6	7.8	6	5.4	7.2	9.4	7	7.5	6.9
10	BR12650-4R-77	119.8	146	8.4	8.2	6.8	7.6	5.9	5.7	5.8	9.1	5.1	6.9	7.2
11	BR12265-4R-71	117.3	145	7.8	7.4	6.6	7.2	5.6	2.8	5.8	8.2	5.8	6.4	7.3
12	BR13207-4R-28	116	148	7.5	8.7	7	7.3	6.8	6.4	6.9	10.3	7.4	7.6	7.3
13	BR13201-4R-268	105.3	145	8.4	6.7	7	7.1	7.1	5.3	6.1	8.2	6.5	6.9	7.4
14	BR13201-4R-299	100.5	146	9.1	8	7	7.9	7.5	5.7	6.4	9.5	7.2	7.6	6.8
15	BR11718-4R-92	123.1	150	8.5	8.3	5.9	8.3	6.8	6	6	9.3	4.6	7.1	7
16	BR13201-4R-219	110	148	9.1	9.2	7.7	7.6	7.3	5.4	6.3	9.1	7.6	7.7	7.1
17	BR12640-4R-250	118.8	149	9	6.9	7.2	7.2	6.6	4	6.8	9.3	4.1	6.8	7.1
18	BR11276-4R-67	124.8	149	8.8	7.4	6.7	7.9	6.4	6.2	6.8	9.4	4.6	7.1	7.2
19	BR12661-4R-33	107.2	144	8.9	8.9	7.7	6.4	6.1	5.9	6.7	8.5	6.2	7.3	7.8
20	BR13201-4R-103	105.4	143	9.1	8.4	7.4	6.7	5.7	6.5	5.9	9.8	7.4	7.4	7.2
	BRRI dhan67 (Ck)	108.8	141	6.5	6.5	6.5	6.9	6	6	5.7	8.3	6.9	6.6	7.6
	BRRI dhan89 (Ck)	106.1	144	8.3	8.3	6.1	7.9	6.1	6.1	5.8	8.4	5	6.9	7.8
	BRRI dhan97 (Ck)	109.8	144	7.4	7.2	7	7.3	6.9	5.6	7.5	9.3	5.3	7	7.1
	BRRI dhan99 (Ck)	105.2	146	6.3	7.2	6.5	8.3	6.9	6.8	6.1	9.8	5.8	7.1	7.4

LSD<0.05	2.79	2.1	0.41	0.62	1.2	0.77	0.54	0.41	0.35	0.4	0.98	0.3
H2b	0.9	0.58	0.88	0.74	0.66	0.59	0.73	0.7	0.87	0.73	0.66	0.59

Table 6.9.5: Yield and agronomic performance of genotypes in RYT-2, Salt tolerant Rice, Boro 2024-25

SN	Designation	PH (cm)	GD (days)	L1	L2	L3	L4	L5	L6	L7	L8	L9	BLUE	BLUP
1	BR13197-4R-24	112.9	144	9.3	7.8	6.9	10.1	6.3	6	7.6	8.4	5.7	7.6	7.4
2	BR13201-4R-30	104	140	8.1	8.4	6.4	9.6	6.7	5.9	9.7	9.3	6.8	7.9	7.6
3	BR13201-4R-249	114.9	144	8.1	9.4	6.3	10	6.9	7.1	7.6	9.5	5.3	7.8	7.6
4	BR12650-4R-55	115.6	140	8.0	6.4	6.8	10	4.7	6.2	5.9	9	5.2	6.9	7.0
5	BR13201-4R-196	102.9	142	9.5	7.5	7.6	10	6.1	6.8	6.3	8.7	6.9	7.7	7.5
6	BR12658-4R-255	115	140	7.0	5.7	7.1	10.2	5.0	5.6	5.4	8.5	5.4	6.7	6.8
7	BR13206-4R-50	110.6	145	8.8	6.9	6.5	9.1	4.7	5.1	4.5	8.3	5.4	6.6	6.8
8	BR12274-4R-310	115.2	142	9.0	8.5	6.3	8.9	6.4	6.7	8	7.5	3.8	7.2	7.2
9	BR11276-4R-150	106.5	147	6.6	7.2	6.5	8.8	5.9	5.0	7.4	8.5	3.4	6.6	6.8
10	BR11718-4R-110	102.7	141	6.2	7.2	5.3	8.0	5.4	5.4	6.6	9	4.4	6.4	6.6
11	BR11718-4R-125	127.8	149	8.0	8.2	4.7	10	6.3	6.7	7.7	7.5	3.4	6.9	7.0
12	BR12274-4R-255	104.1	143	6.6	8.4	5.7	10	6.4	6.6	8.3	9.9	4.6	7.4	7.3
13	BR13113-4R-121	107.8	141	7.6	8.6	6.1	10.3	6.7	6.6	7.3	7.8	5.5	7.4	7.3
14	BR13106-4R-168	98.6	139	8.5	8.9	5.1	9.7	6.0	6.2	7.7	8.4	5.4	7.3	7.3
15	BR11718-4R-230	113.3	148	8.4	7.7	6.8	10.1	5.1	5.6	6.7	7.9	3.2	6.8	6.9
	BRRi dhan67	113.5	135	6.7	7.3	5.9	10.5	5.3	6.4	5.6	8.7	5	6.8	6.9
	BRRi dhan89	112.2	143	8.4	7.3	5.1	10.9	6.6	6.8	7.2	8.2	5.1	7.3	7.2
	BRRi dhan99	106.3	145	7.6	7.9	6.8	10.6	6.9	6.7	8.1	8.2	5.6	7.6	7.5
	LSD<0.05	2.44	2.82	0.34	0.92	0.79	0.71	0.4	0.42	0.63	0.38	0.65	0.37	
	H2b	0.95	0.65	0.94	0.49	0.5	0.49	0.86	0.78	0.87	0.83	0.81	0.74	

*L1: Bhanga; L2: Cumilla; L3: Gazipur; L4: Gopalganj; L5: Kustia; L6: Rajshahi; L7: Rangpur; L8: Satkhira; L9: Sonagazi

Experiment 6.10: Advanced Line Adaptive Research Trial (ALART), Development of Salt Tolerant Rice, T. Aman 2024-25

Specific objective: On-farm evaluation of advanced breeding lines compared to standard checks for testing their specific and general adaptability in different agro-ecological zones (AEZs) to nominate for proposed variety trial (PVT).

Materials and Methods: Two ALARTs consists of six genotypes along with BR23, BRRi dhan30, BRRi dhan73(Tolerant check) and BRRi dhan75 (Sensitive and standard check) were evaluated in ten locations of Bangladesh. Thirty-five days old seedling of each genotype was transplanted @ 2-3 seedlings with a spacing of 20 cm × 20 cm. The unit plot size was 5.0 m × 20 rows (20.0 m²) and the field layout was done following RCB design with three replications Fertilizer doses and time of application were the same as in Experiment no. 6.1. Crop management such as weeding and controlling disease was done in time.

Principal Investigator: ARD Scientist

Co-Investigators: M.A. Rahman, Nusrat Jahan, A A Setu, Ribed Farzana Disha, and all regional head who conducted ALART.

Results: In ALART-1, two entries were evaluated against two check varieties. Among these entries one entry BR13113-4R-63 was selected for PVT based on their grain yield performance, grain quality and shorter growth duration (6.10.1a). This entry is also about resistance to tungro disease. One the other hand, ALART-2 will be conducted as Re-ALART for the next T. Aman season.

Table.6.10.1a. Yield Performance of genotypes in ALART-1 Salinity Breeding, T. Aman 2024-25

SL	Designation	Kalapara, Patuakhali	Taltali, Barguna	Kaliganj, Satkhira	Shyamnagar, Satkhira	Rampal, Bagerhat	Gazipur	Mean
1	BR13113-4R-63	4.79	5.21	3.65	3.77	4.87	2.75	4.17
2	BR13118-4R-76	5.21	4.74	3.61	3.73	4.54	2.77	4.10
3	BRRi dhan73 (T. Ck)	3.78	4.73	3.49	4.05	5.13	2.37	3.92
4	V4=BRRi dhan75 (Std. Ck) --	--	3.41	4.10	3.90	4.41	2.60	3.69
	LSD				0.48			.21
	CV				7.51			

Table.6.10.1b. Growth duration of genotypes in ALART-1 Salinity Breeding, T.Aman 2024-25

SL	Designation	Kalapara, Patuakhali	Taltali, Barguna	Kaliganj, Satkhira	Shyamnagar, Satkhira	Rampal, Bagerhat	Gazipur	Mean
1	BR13113-4R-63	121	120	114	116	127	111	118
2	BR13118-4R-76	117	126	117	120		124	122
3	BRRI dhan73 (T. Ck)	123	121	117	118,	128	117	121
4	V4=BRRI dhan75 (Std. Ck)		116	113	116	118	113	115
	LSD				0.82			.37
	CV				.42			

Table.6.10.2a. Grain yield of genotypes in ALART-2 Salinity Breeding, T. Aman 2024-25

SL	Designation	Bagerhat, Gopalganj	Kalapara, Patuakhali	Kaliganj, Satkhira	Rampal, Bagerhat	Syamnagr, Satkhira	Taltoli, Barguna	BRRI, Gazipur	Bagerhat, Gopalganj
1	BR13103-4R-37	3.44	4.95	4.09	3.56	4.63	4.33	4.71	4.24
2	BR13103-4R-7	4.92	4.6	4.13	5.3	3.87	4.3	4.3	4.5
3	BR13105-4R-37	4.21	3.54	3.62	4.46	4.00	4.87	4.6	4.19
4	BR13115-4R-122	4.29	4.56	3.78	4.55	3.42	4.4	4.43	4.21
5	BRRI dhan30(T. Ck)	4.82	4.51	3.11	4.91	3.89	4.45	4.15	4.26
6	BR23 (Std. Ck)	5.33	4.81	4.21	5.47	4.40	4.9	3.58	4.67
	LSD				0.54				0.20
	CV				7.49				

Table.6.10.2b. Growth duration of genotypes in ALART-2 Salinity Breeding, T. Aman 2024-25

SL	Designation	Bagerhat, Gopalganj	Kalapara, Patuakhali	Kaliganj, Satkhira	Rampal, Bagerhat	Syamnagr, Satkhira	Taltoli, Barguna	BRRI, Gazipur	Bagerhat, Gopalganj
1	BR13103-4R-37	129	141	131	131	133	132	149	135
2	BR13103-4R-7	144	144	144	146	146	132	149	143
3	BR13105-4R-37	138	141	138	143	140	141	141	140
4	BR13115-4R-122	146	145	142	148	146	137	145	142
5	BRRI dhan30(T. Ck)	146	145	149	138	125	143	145	142
6	BR23 (Std. Ck)	144	148	142	145	144	141	152	145
	LSD				9.9				3.74
	CV				4.31				

Experiment 6.11: Advanced lines Adaptive Research Trial (ALART)

Specific objective: On-farm evaluation of advanced breeding lines compared to standard checks for testing their specific and general adaptability.

Materials and Methods: Two genotypes along with BRRI dhan28 and BRRI dhan88 as standard checks for ALART (SD) and three genotypes along with BRRI dhan99 and BRRI dhan102 as standard checks for ALART (MD) were evaluated in ten locations of Bangladesh in Boro season. Forty-five days old seedling of each genotype were transplanted @ 2-3 seedlings with a spacing of 20 cm × 20 cm. The unit plot size was 5.4 m × 12 rows and the field layout was RCB design with three replications. Fertilizers @ 200 kg Urea: 62 kg TSP: 83kg MoP: 56kg Gypsum: 5 kg Zn kg/ha were applied in the trial. All amount of Urea, TSP, MoP and ZnSO 4 were applied at the time of final land preparation and nitrogen were applied in three equal splits at 15 days after transplanting (DAT), 30 DAT and 5 days before PI stage. Crop management such as weeding, controlling disease and insect pests were done when necessary. Data were collected such as Date of seeding and transplanting, days to 50% flowering and maturity (80%), phenotypic acceptance at vegetative and maturity stage, plant height (cm), lodging tolerance, SES score, Soil Salinity (EC dSm-1) and grain yield (t/ha), insect and disease infestation.

Principal Investigator: ARD Scientist

Co-Investigators: M.A. Rahman, Nusrat Jahan, A A Setu, Ribed Farzana Disha, and all regional head who conducted ALART.

Results: In ALART (SD), two genotypes; BR13113-4R-63 (6.70 t/ha) and BR13113-4R-116 (7.04 t/ha) produced higher yield than BRRI dhan28 and BRRI dhan88 as standard checks (Table 6.11.1a) which growth duration also similar to check varieties (Table 6.11.1b). These two entries were recommended for PVT.

In ALART (MD), BR13113-4R-185 (6.82 t/ha) and BR13122-4R-136 (7.04 t/ha) yielded higher than BRRI dhan99 and BRRI dhan102 (Table 6.11.2a). Their growth duration was shorter than check varieties (6.11.2b). These entries were recommended for PVT.

Table.6.11.1a. Yield Performance of genotypes in ALART (SD) Salinity Breeding, Boro 2024-25

Genotypes	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	Mean
V1= BR13113-4R-63	6.7	8.3	7.9	9.7	5.1	7.5	8.1	3.3	6.9	3.6	6.7
V2= BR13113-4R-116	7.0	8.8	8.5	10.5	5.5	6.8	8.7	2.0	8.3	4.3	7.0
V3= BRRI dhan28	6.1	6.6	6.2	6.7	6.0	7.4	8.0	1.7	7.8	3.5	6.0
V4= BRRI dhan88	6.3	7.6	7.2	5.9	4.3	6.5	7.5	0.0	7.1	3.3	6.2
cv	36.1										

Table.6.11.1b. Growth duration of genotypes in ALART (SD) Salinity Breeding, Boro 2024-25

Genotypes	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	Mean
V1= BR13113-4R-63	129	151	135	146	137	149	155	131	145	126	140
V2= BR13113-4R-116	131	149	135	145	135	143	155	135	145	126	140
V3= BRRI dhan28	135	145	136	142	138	149	152	131	145	126	140
V4= BRRI dhan88	138	147	138	141	136	145	152	131	145	126	141
cv	5.97										

*L1=Barishal, L2=Bhanga, L3=Cumilla, L4=Gazipur, L5=Gopalganj, L6=Rajshahi, L7=Rangpur, L8=Satkhira, L9=Sirajganj, L10=Sonagazi

Table.6.11.2a. Yield Performance of genotypes in ALART (MD) Salinity Breeding, Boro 2024-25

Genotypes	Locations										Mean
	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	
	Grain Yield (tha-1)										
V1= BR13106-4R-184	7.49	8.79	8.51	6.89	6.64	7.52	7.44	2.84	7.22	3.63	6.7
V2= BR13113-4R-185	7.79	9.21	8.05	8.71	5.48	7.09	6.98	4.04	7.98	2.91	6.82
V3= BR13122-4R-136	8.1	8.74	8.03	8.98	5.12	7.79	8.18	3.65	7.88	3.98	7.04
V4= BRRI dhan102 (Ck)	6.81	8.49	6.69	7.61	6.18	7.51	8.19	2.7	8.19	2.84	6.52
V5= BRRI dhan99 (Std. Ck)	6.25	8.03	-	7.91	5.61	7.68	7.12	3.67	6.97	3.36	6.29
CV	32.8										

*L1=Barishal, L2=Bhanga, L3=Cumilla, L4=Gazipur, L5=Gopalganj, L6=Rajshahi, L7=Rangpur, L8=Satkhira, L9=Sirajganj, L10=Sonagazi

Table.6.11.2b. Growth duration of genotypes in ALART (MD) Salinity Breeding, Boro 2024-25

Genotypes	Locations										Mean
	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	
Growth duration (Days)											
V1= BR13106-4R-184	139	154	133	149	135	148	165	131	150	137	144
V2= BR13113-4R-185	134	156	133	149	135	138	165	133	150	140	143
V3= BR13122-4R-136	140	155	134	150	139	144	165	139	150	143	146
V4= BRRI dhan102 (Ck)	142	155	133	156	144	144	165	144	150	130	146
V5= BRRI dhan99 (Std. Ck)	146	154	0	154	141	144	165	144	150	131	148
CV	15.9										

*L1=Barishal, L2=Bhanga, L3=Cumilla, L4=Gazipur, L5=Gopalganj, L6=Rajshahi, L7=Rangpur, L8=Satkhira, L9=Sirajganj, L10=Sonagazi



Fig.6.9.1. Field view of ALART plot Boro 2024-2

Experiment 6.12: IRRI NARES trials in Bangladesh for Salinity Prone Environment

Principal Investigator: M. Akhlasur Rahman, PI, Salinity Breeding Program

Co-Investigators: M. Akhlasur Rahman¹, Nusrat Jahan¹, Armin Akter Setu¹, Ribed Farzana Disha¹, K M Iftekharuddaula¹, Sazzadur Rahman², Md. Mizan Ul Islam³, Sheikh Farah Diba³, M. Rafiqul Islam³ and Waseem Hussain⁴

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Experiment 6.12.1: Evaluation of genotypes under IRRI NARES Trial T. Aman 2024

General objective: Development of salt-tolerant rice variety suitable for the salinity prone areas of coastal districts in T. Aman season.

Specific objective: To evaluate the genotypes in the natural salinity-prone environment at the farmers' field of Satkhira region in T. Aman season.

Materials and Methods: A total of 184 genotypes were evaluated in Stage-1 along with IRRI 147, CSR 28, IRRI 154, IR29 as international checks and BRRI dhan54, BRRI dhan73, BRRI dhan87 and Binadhan-23 as local checks in two locations of salinity prone areas of Bangladesh, i.e., Kaliganj and Shyamnagar upazillas of Satkhira district.

A total of 30 genotypes were evaluated in Stage-2 along with IRRI 147, CSR 28, IRRI 154, IR29 as international checks and BRRI dhan30, BRRI dhan54, BRRI dhan73, BRRI dhan87 and Binadhan-23 as local checks in two locations of salinity prone areas of Bangladesh, i.e., Kaliganj and Shyamnagar upazillas of Satkhira district. The unit plot size was 3.00 square meters (5 rows × 15 hills). The field layout was done following Alpha lattice design and RCBD with two replications. Thirty days' seedlings were transplanted @ 2-3 seedlings per hill with the spacing of 20 cm × 20 cm. Per hectare fertilizer were applied at the rate of 108 (234 kg Urea): 17.4(87 kg TSP): 58.5 (117 kg MoP): 14 (78 kg Gypsum): 4.3 (12 kg Zn SO4) kg N P K S Zn/ha were applied in the trial. All amount of P, K, S and Zn were applied at the time of final land preparation and nitrogen (urea) were applied in three equal splits at 5-10, 20-25 and 35-40 days after transplanting (DAT). Crop management such as weeding and irrigation was done on time. Pest management and other cultural operations were also performed when deemed necessary.

Results

IRRI NARES Stage-1 trial:

In Kaliganj, grain yield ranged from 1.51 tha⁻¹ (IR 147469-5-149-1-B) to 4.60 tha⁻¹ (IR 147446-5-160-1-B), but the local check2 (BRRI dhan73) was the top yielder (4.88 tha⁻¹). Growth duration 110 days (IR 29, IR 147455-4-22-1-B) to 131 days (IR 147452-3-81-1-B, IR 147472-1-173-1-B, IR 147452-3-70-1-B) respectively. Among 184 entries, 35 genotypes from were selected based on grain type and grain yield in Kaliganj (Table 6.12.1a).

In Shyamnagar, grain yield ranged from 1.47 tha⁻¹ (IR 147446-5-102-1-B) to 6.03 tha⁻¹ (IR 147467-4-104-1-B). Ranges of the growth duration was varied by 95 days (IR 147448-4-82-

1-B) to 136 days (IR 147474-3-53-1-B) respectively. Among 184 entries, 56 genotypes from were selected based on grain type and grain yield in Shyamnagar (Table 6.12.1b).

Eleven entries were commonly selected in Kaliganj and Shyamnagar viz., IR 147474-3-12-1-B (3.71 tha⁻¹), IR147446-5-55-1-B (3.66 tha⁻¹), IR147446-5-160-1-B (4.1 tha⁻¹), IR147455-4-172-1-B (3.7 tha⁻¹), IR147455-4-109-1-B (3.65 tha⁻¹), IR147456-2-27-1-B (3.35 tha⁻¹), IR 147476-3-63-1-B (4.3 tha⁻¹), IR 147472-1-25-1-B (4.3 tha⁻¹), IR 147473-5-10-1-B (4.6 tha⁻¹), IR 147446-5-11-1-B (3.99 tha⁻¹), IR 147458-1-118-1-B (3.6 tha⁻¹). These genotypes may be considered as potential to evaluate in the advanced yield trial in stage-2 and also used as parents in the breeding program.

The performance of the checks was, IRRI 147 (4.04 tha⁻¹), CSR 28(3.5tha⁻¹), IRR154 (3.75 tha⁻¹), IR 29 (2.08 tha⁻¹), local check1 (4.72 tha⁻¹), local check2 (4.47tha⁻¹), local check3 (3.8 tha⁻¹), local check4 (3.71 tha⁻¹) as reported (Table 6.12.1c). Box plot shows a quick graphical summary of the variability in stage 1 trial in Figure 6.12.1 for Kaliganj and Figure 6.12.2 for Shyamanagar. Figure 6.12.3 shows the pictorial view of stage 1 and stage 2 trial. Figure 6.12.4 describes the magnitude of salinity during the cropping season.

Table 6.12.1a: Performance of all genotypes in T. Aman 2024 at Kaliganj under IRRI NARES Stage-1

Entry No.	Designation	Plant Height (cm)		Days to Maturity		Yield (tha ⁻¹)	
		Emmeans	BLUP	Emmeans	BLUP	Emmeans	BLUP
1	IR 147474-3-12-1-B	121.50	121.40	130	129.90	3.98	3.64
2	IR 147452-3-81-1-B	117.00	116.95	131	130.89	3.60	3.48
3	IR 147472-1-202-1-B	126.33	126.18	130	129.90	3.69	3.52
8	IR 147472-1-188-1-B	117.50	117.44	125.5	125.43	3.40	3.39
11	IR 147473-5-61-1-B	120.50	120.41	121.5	121.46	4.03	3.66
24	IR 147469-5-60-1-B	107.67	107.73	114	114.02	3.92	3.61
28	IR 147446-5-55-1-B	126.83	126.67	116	116.00	3.46	3.42
29	IR 147446-5-160-1-B	128.83	128.65	114.5	114.52	4.60	3.91
40	IR 147448-4-150-1-B	109.17	109.21	113.5	113.52	4.38	3.82
44	IR 147455-4-172-1-B	126.33	126.18	111.5	111.54	3.76	3.55
46	IR 147458-1-239-1-B	129.00	128.81	116	116.00	3.24	3.32
50	IR 147468-3-182-1-B	102.83	102.95	112.5	112.53	2.96	3.20
54	IR 147476-3-166-1-B	119.33	119.26	116.5	116.50	3.78	3.56
58	IR 147451-3-117-1-B	103.67	103.77	113.5	113.52	3.57	3.46
62	IR 147455-4-109-1-B	110.50	110.53	114	114.02	3.70	3.52
63	IR 147456-2-27-1-B	111.00	111.02	111.5	111.54	3.05	3.24
69	IR 147467-4-87-1-B	119.17	119.09	113	113.03	3.37	3.38
74	IR 147476-3-63-1-B	126.00	125.85	116.5	116.50	3.76	3.55
81	IR 147472-1-25-1-B	116.67	116.62	125	124.94	3.29	3.34
92	IR 147473-5-10-1-B	123.83	123.70	123	122.95	4.36	3.81
93	IR 147446-5-11-1-B	124.83	124.69	117.5	117.49	3.85	3.59
95	IR 147458-1-118-1-B	108.50	108.55	114	114.02	3.93	3.62
98	IR 147460-1-40-1-B	107.17	107.23	113	113.03	3.75	3.54
115	IR 147448-4-82-1-B	116.83	116.79	113.5	113.52	4.44	3.84
138	IR 147446-5-102-1-B	127.67	127.49	113	113.03	4.17	3.73
141	IR 147448-4-11-1-B	105.50	105.58	114.5	114.52	3.74	3.54
142	IR 147467-4-64-1-B	107.00	107.07	115	115.01	3.92	3.62
148	IR 147448-4-182-1-B	103.50	103.61	113.5	113.52	4.53	3.88
158	IR 147476-3-20-1-B	108.50	108.55	122	121.96	3.19	3.30
162	IR 147467-4-40-1-B	126.50	126.34	115.5	115.51	3.99	3.65
164	IR 147460-1-135-1-B	103.67	103.77	115	115.01	4.32	3.79
167	IR 147469-5-123-1-B	119.00	118.93	117	117.00	3.36	3.37
170	IR 147476-3-149-1-B	106.50	106.57	117	117.00	3.54	3.45
177	IR 147451-3-13-1-B	97.00	97.18	120	119.97	4.41	3.83
183	IR 147475-5-82-1-B	106.17	106.24	121	120.97	2.70	3.09
185	IRRI 147	101.17	101.30	113	113.03	4.45	3.85
186	CSR 28	103.67	103.77	112	112.03	3.55	3.46
187	IRRI 154	104.50	104.60	114.5	114.52	3.37	3.38
188	IR 29	87.83	88.12	110	110.05	1.86	2.72
189	LOCAL CHECK 1	126.50	126.34	125	124.94	4.53	3.88
190	LOCAL CHECK 2	122.50	122.39	112.5	112.53	4.88	4.03
191	LOCAL CHECK 3	115.50	115.47	116	116.00	3.57	3.47
192	LOCAL CHECK 4	112.17	112.17	111	111.04	3.24	3.32
SE		1.01		0.47		0.44	
h ² B		0.98		0.97		0.28	

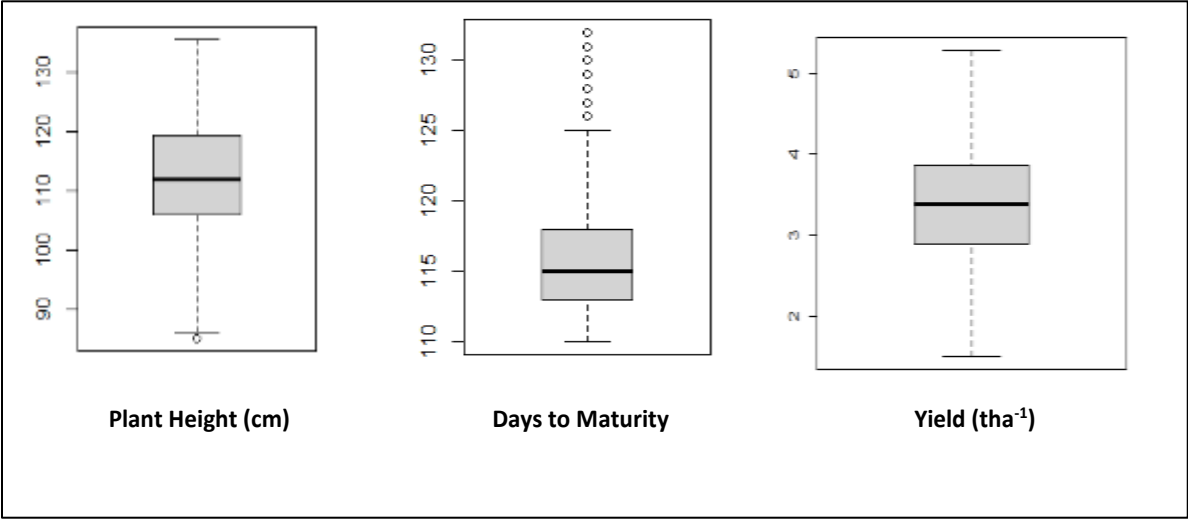


Figure 6.12.1: Boxplot shows the performance of genotypes evaluated in IRRI NARES Stage-1 trial at Kaliganj, Satkhira during T. Aman 2024

Table 6.12.1b: Performance of all genotypes in T. Aman 2024 at Shyamnagar under AGGRi Alliance Stage-1

Entry No.	Designation	Plant Height (cm)		Days to Maturity		Yield (tha ⁻¹)	
		Emmeans	BLUP	Emmeans	BLUP	Emmeans	BLUP
1	IR 147474-3-12-1-B	113.50	113.40	134.5	134.3	3.43	3.66
4	IR 147472-1-173-1-B	118.17	117.97	132.5	132.3	4.13	3.96
6	IR 147452-3-70-1-B	128.17	127.77	116.5	116.5	3.94	3.88
15	IR 147468-3-172-1-B	99.50	99.68	114.0	114.0	4.14	3.97
20	IR 147451-3-10-1-B	121.00	120.75	114.0	114.0	3.99	3.90
21	IR 147463-1-61-1-B	117.00	116.83	115.5	115.5	3.02	3.48
26	IR 147446-5-1-1-B	124.67	124.34	117.5	117.5	3.53	3.70
27	IR 147446-5-21-1-B	116.00	115.85	114.0	114.0	3.73	3.79
28	IR 147446-5-55-1-B	129.67	129.24	116.5	116.5	3.86	3.85
29	IR 147446-5-160-1-B	123.83	123.53	116.5	116.5	3.68	3.77
30	IR 147446-5-171-1-B	116.00	115.85	114.0	114.0	5.01	4.34
35	IR 147456-2-29-1-B	113.83	113.73	114.5	114.5	4.74	4.23
36	IR 147458-1-182-1-B	103.00	103.11	114.5	114.5	4.86	4.28
39	IR 147469-5-211-1-B	104.17	104.25	120.5	120.5	4.23	4.01
41	IR 147451-3-72-1-B	102.83	102.95	114.5	114.5	4.17	3.98
43	IR 147455-4-75-1-B	101.67	101.80	115.5	115.5	4.26	4.02
44	IR 147455-4-172-1-B	118.83	118.63	114.0	114.0	3.73	3.79
52	IR 147470-2-47-1-B	122.17	121.89	114.0	114.0	3.63	3.74
53	IR 147476-3-97-1-B	111.00	110.95	114.5	114.5	4.12	3.96
55	IR 147446-5-26-1-B	119.83	119.61	114.5	114.5	4.29	4.03
59	IR 147451-3-131-1-B	123.50	123.20	116.5	116.5	4.35	4.06
62	IR 147455-4-109-1-B	110.83	110.79	114.0	114.0	3.60	3.73
63	IR 147456-2-27-1-B	112.33	112.26	114.0	114.0	3.65	3.75
65	IR 147458-1-208-1-B	108.17	108.17	112.5	112.6	3.81	3.82
68	IR 147464-4-77-1-B	105.67	105.72	114.0	114.0	3.51	3.69
70	IR 147468-3-189-1-B	104.33	104.42	112.5	112.6	3.30	3.60
74	IR 147476-3-63-1-B	113.00	112.91	116.0	116.0	4.78	4.24
76	IR 147446-5-68-1-B	113.00	112.91	115.5	115.5	4.19	3.99
81	IR 147472-1-25-1-B	112.67	112.58	125.0	124.9	5.36	4.49
84	IR 147470-2-3-1-B	112.67	112.58	116.5	116.5	4.12	3.96
91	IR 147471-1-2-1-B	121.50	121.24	116.0	116.0	3.54	3.71
92	IR 147473-5-10-1-B	122.83	122.55	120.5	120.5	4.81	4.25
93	IR 147446-5-11-1-B	110.17	110.13	116.5	116.5	4.14	3.97
95	IR 147458-1-118-1-B	101.00	101.15	114.0	114.0	3.21	3.56
96	IR 147475-5-16-1-B	113.33	113.24	116.0	116.0	3.34	3.62
103	IR 147471-1-146-1-B	97.83	98.05	114.0	114.0	4.22	4.00
113	IR 147458-1-97-1-B	103.00	103.11	113.0	113.1	4.25	4.02
116	IR 147457-3-54-1-B	104.00	104.09	115.0	115.0	3.26	3.58
117	IR 147468-3-174-1-B	103.67	103.76	112.0	112.1	3.43	3.66
122	IR 147463-1-60-1-B	118.83	118.63	114.0	114.0	3.94	3.88
125	IR 147451-3-132-1-B	99.17	99.35	118.5	118.5	3.51	3.69
131	IR 147476-3-68-1-B	103.50	103.60	114.5	114.5	3.57	3.72
138	IR 147446-5-102-1-B	123.83	123.53	114.5	114.5	2.57	3.29
141	IR 147448-4-11-1-B	100.50	100.66	117.0	117.0	4.13	3.96
142	IR 147467-4-64-1-B	101.67	101.80	114.5	114.5	4.00	3.90
144	IR 147467-4-45-1-B	102.17	102.29	114.5	114.5	3.56	3.72

Entry No.	Designation	Plant Height (cm)		Days to Maturity		Yield (tha ⁻¹)	
		Emmeans	BLUP	Emmeans	BLUP	Emmeans	BLUP
145	IR 147455-4-57-1-B	111.50	111.44	111.0	111.1	4.52	4.13
149	IR 147448-4-44-1-B	96.67	96.90	112.5	112.6	4.40	4.08
153	IR 147451-3-155-1-B	108.17	108.17	120.5	120.5	4.10	3.95
155	IR 147455-4-235-1-B	114.83	114.71	113.0	113.1	4.24	4.01
156	IR 147458-1-195-1-B	104.00	104.09	112.5	112.6	3.63	3.75
163	IR 147455-4-28-1-B	112.50	112.42	115.5	115.5	3.65	3.76
170	IR 147476-3-149-1-B	120.00	119.77	113.5	113.5	3.54	3.71
172	IR 147463-1-107-1-B	124.67	124.34	114.0	114.0	3.60	3.73
180	IR 147470-2-54-1-B	102.33	102.46	113.5	113.5	3.73	3.79
181	IR 147470-2-74-1-B	107.67	107.68	114.5	114.5	3.80	3.82
182	IR 147471-1-35-1-B	111.50	111.44	115.5	115.5	3.10	3.52
185	IRRI 147	105.33	105.40	114.5	114.5	4.13	3.96
186	CSR 28	103.83	103.93	115.5	115.5	3.49	3.69
187	IRRI 154	112.50	112.42	118.5	118.5	4.92	4.30
189	LOCAL CHECK 1	95.00	95.27	115.0	115.0	3.64	3.75
190	LOCAL CHECK 2	112.83	112.75	112.5	112.6	4.06	3.93
191	LOCAL CHECK 3	121.50	121.24	121.0	120.9	4.03	3.92
192	LOCAL CHECK 4	104.50	104.58	115.0	115.0	4.18	3.98
SE		1.22		0.55		0.39	
h ² B		0.96		0.97		0.28	

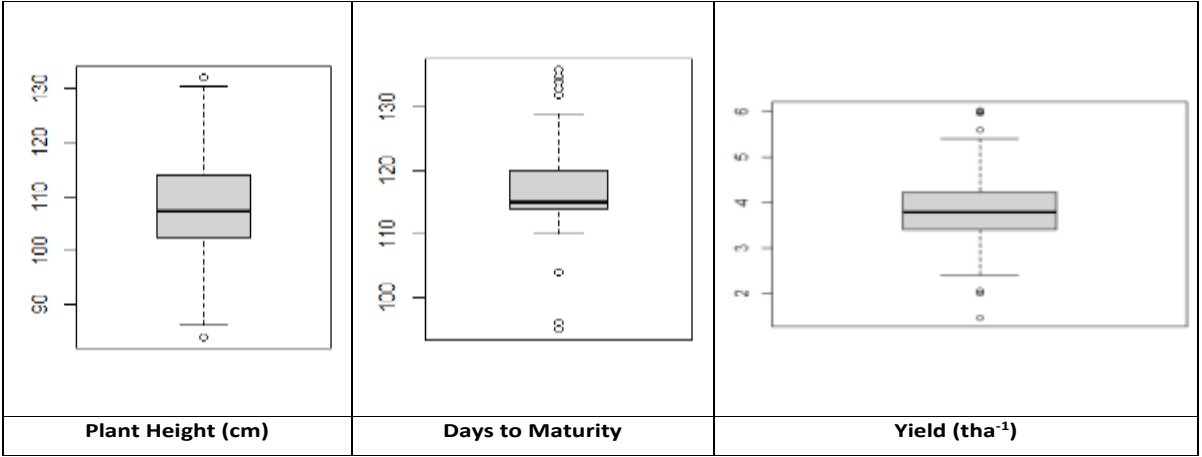


Figure 6.12.2: Boxplot shows the performance of genotypes evaluated in IRRI NARES Stage-1 trial at Shyamnagar, Satkhira during T. Aman 2024

Table 6.12.1c: Combined performance and commonly selected entries of IRRI NARES Stage 1 trial under salinity Breeding at Shyamnagar and Kaliganj Upazilla of Satkhira during T. Aman 2024

Entry No.	Designation	Plant Height (cm)		Days to Maturity		Yield (tha ⁻¹)	
		Emmeans	pBLUP	Emmeans	pBLUP	Emmeans	pBLUP
1	IR 147474-3-12-1-B	103.67	3.58	132.2	130.4	3.71	3.64
28	IR 147446-5-55-1-B	99.33	3.61	116.2	116.3	3.66	3.63
29	IR 147446-5-160-1-B	115.17	3.62	115.5	115.7	4.14	3.79
44	IR 147455-4-172-1-B	100.50	3.30	112.7	113.2	3.74	3.66
62	IR 147455-4-109-1-B	106.83	3.54	114.0	114.3	3.65	3.62
63	IR 147456-2-27-1-B	111.83	3.57	112.7	113.2	3.35	3.52
74	IR 147476-3-63-1-B	105.17	3.44	116.2	116.3	4.27	3.84
81	IR 147472-1-25-1-B	107.17	3.55	125.0	124.0	4.32	3.86
92	IR 147473-5-10-1-B	103.67	3.84	121.7	121.1	4.59	3.95
93	IR 147446-5-11-1-B	106.00	3.46	117.0	117.0	4.00	3.74
95	IR 147458-1-118-1-B	120.50	3.52	114.0	114.3	3.57	3.60
185	IRRI 147	116.33	3.36	114.0	114.3	4.04	3.76
186	CSR 28	87.83	3.29	113.7	114.1	3.52	3.58
187	IRRI 154	101.17	3.76	114.5	114.8	3.75	3.66
188	IR 29	104.50	3.66	110.2	111.7	2.08	3.29
189	LOCAL CHECK 1	126.50	4.00	121.7	121.1	4.72	4.00
190	LOCAL CHECK 2	122.50	3.91	112.5	113.0	4.47	3.91
191	LOCAL CHECK 3	115.50	3.68	118.5	118.3	3.80	3.68
192	LOCAL CHECK 4	112.17	3.64	113.0	113.5	3.71	3.64
SE		1.01		1.65		0.41	
h ² b		0.21		0.78		0.21	
Reliability		0.35		0.88		0.35	

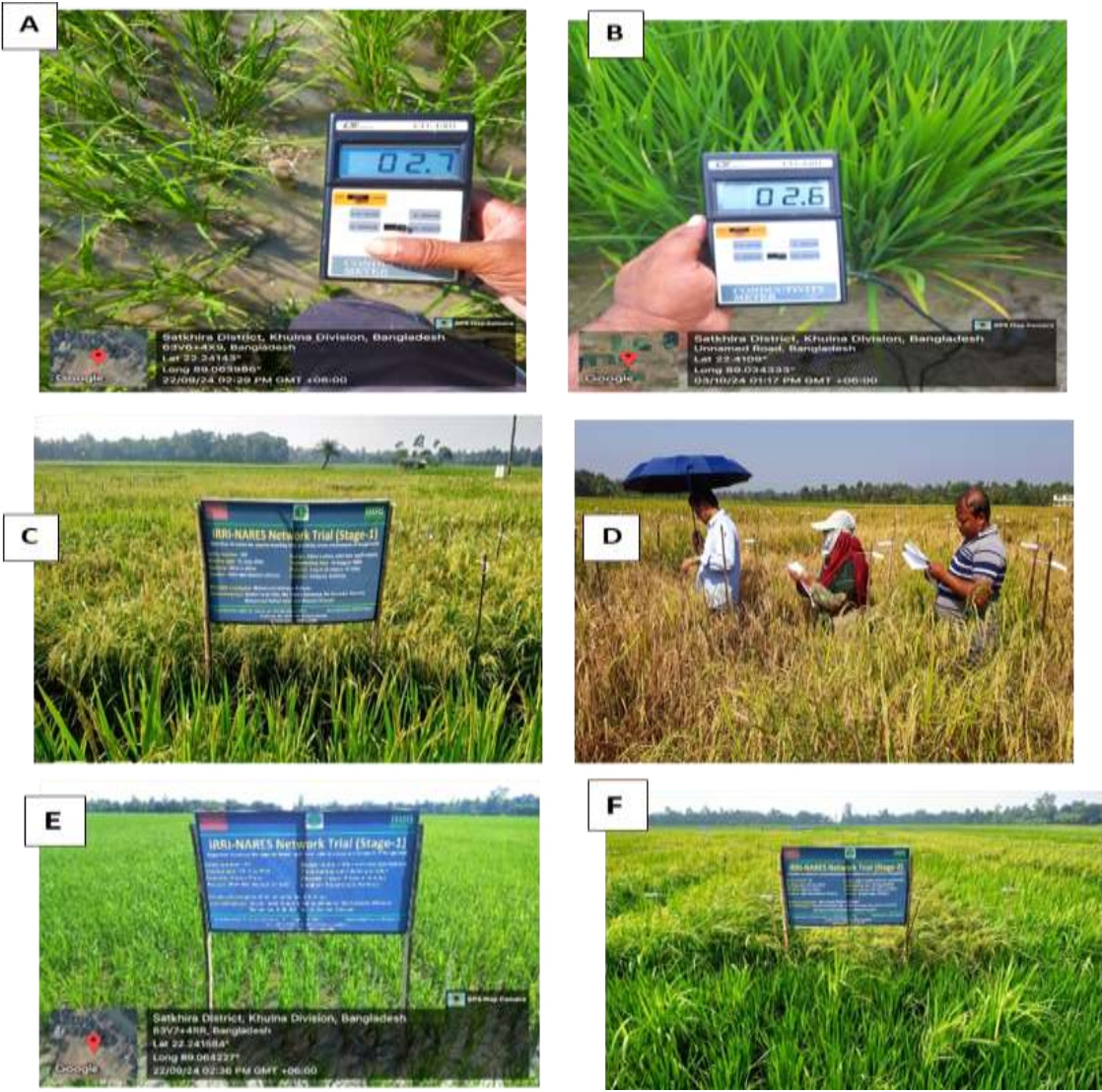


Figure 6.12.3: Pictorial field view of IRRI NARES during T. Aman 2024 under salinity Breeding

A. Salinity level at Shyamnagar, Satkhira; B. Salinity level at Kaliganj, Satkhira; C. Reproductive phase of Stage-1 trial at Kaliganj Upazilla of Satkhira; D. Field selection and final evaluation at Kaliganj Upazilla of Satkhira; E. Vegetative phase of Stage-1 trial at Shyamnagar Upazilla; F. Reproductive phase of Stage-2 trial at Shyamnagar Upazilla; G. Matured genotypes in Stage-1 trial at Shyamnagar Upazilla; H. Field evaluation and selection at Shyamnagar Upazilla of Satkhira

IRRI NARES Stage-2 trial:

In Kaliganj, grain yield ranged from 3.3 tha⁻¹ (Local check2) to 4.6 tha⁻¹ (IR22LT1603) and growth duration varied from 111 days (IR18A1251) to 134 days (local check 1, i.e., BRRI dhan30), respectively (Table 6.12.2a). The selected 10 genotypes may be considered as potential to evaluate in the advanced yield trials and also used as parents in the breeding program.

Table 6.12.2a: Performance of all genotypes in T. Aman 2024 at Kaliganj under IRRI NARES Stage-2

Entry No.	Designation	Plant Height (cm)		Days to Maturity		Yield (tha ⁻¹)	
		Emmeans	BLUP	Emmeans	BLUP	Emmeans	BLUP
2	IR22LT1605	102.2	102.2	116.0	116.2	3.8	4.06
4	IR22LT1345	108.2	108.2	115.5	115.8	4.3	4.07
5	IR22LT1698	108.0	108.0	113.5	114.3	3.9	4.06
6	IR22LT1246	97.0	97.1	123.5	122.0	4.3	4.07
8	IR22LT1621	118.7	118.6	125.5	123.6	4.0	4.06
10	IR16F1065	118.5	118.4	121.0	120.1	4.2	4.07
11	IR18A1251	113.8	113.8	111.0	112.3	4.0	4.06
12	IR22LT1266	92.8	93.0	114.5	115.0	4.1	4.06
16	IR21LT1020	106.8	106.8	125.0	123.2	4.1	4.06
17	IR22LT1603	111.5	111.5	113.5	114.3	4.6	4.08
22	IRRI 147	107.0	107.0	111.5	112.7	4.4	4.07
23	CSR 28	108.0	108.0	113.5	114.3	3.4	4.05
24	IRRI 154	116.5	116.4	112.0	113.1	4.1	4.06

Entry No.	Designation	Plant Height (cm)		Days to Maturity		Yield (tha ⁻¹)	
		Emmeans	BLUP	Emmeans	BLUP	Emmeans	BLUP
25	IR 29	92.0	92.2	115.5	115.8	4.1	4.06
26	LOCAL CHECK 1	123.5	123.3	133.5	129.8	4.1	4.06
27	LOCAL CHECK 2	128.5	128.3	125.5	123.6	3.4	4.05
28	LOCAL CHECK 3	126.5	126.3	115.5	115.8	3.6	4.05
29	LOCAL CHECK 4	112.2	112.1	125.5	123.6	3.3	4.05
30	LOCAL CHECK 5	110.3	110.3	112.0	113.1	4.4	4.07
	SE		1.1		2.8		0.34
	h2b		1.0		0.6		0.01

In Shyamnagar, grain yield ranged from 2.6 tha⁻¹ (IR21LT1495) to 4.6 tha⁻¹ (IR22LT1621) and growth duration varied from 112 days (IR21LT14951) to 132 days (local check 1, i.e., BRRI dhan30), respectively (Table 6.12.2b). The selected 11 genotypes considered as potential to evaluate in the advanced yield trials and also used as parents in the breeding program.

Table 6.12.2b: Performance of all genotypes in T. Aman 2024 at Shyamnagar under IRRI NARES Stage-2

Entry No.	Designation	Plant Height (cm)		Days to Maturity		Yield (tha ⁻¹)	
		Emmeans	BLUP	Emmeans	BLUP	Emmeans	BLUP
2	IR22LT1605	98.5	98.6	119.5	119.5	3.3	3.5
3	IR22LT1627	104.0	104.0	115.5	115.5	4.1	3.7
4	IR22LT1345	117.2	117.1	121.0	121.0	4.0	3.7
5	IR22LT1698	106.8	106.8	115.0	115.0	4.2	3.7
6	IR22LT1246	101.7	101.7	122.0	122.0	4.1	3.7
8	IR22LT1621	119.8	119.7	123.5	123.5	4.6	3.8
10	IR16F1065	118.7	118.6	124.0	124.0	4.3	3.8
11	IR18A1251	115.0	114.9	114.5	114.5	3.4	3.5
12	IR22LT1266	92.8	93.0	117.0	117.0	3.2	3.5
16	IR21LT1020	96.8	96.9	112.0	112.0	3.3	3.5
17	IR22LT1603	104.3	104.4	115.0	115.0	3.3	3.5
22	IRRI 147	104.2	104.2	114.0	114.0	4.0	3.7
23	CSR 28	100.3	100.4	117.0	117.0	2.8	3.4
24	IRRI 154	109.0	109.0	115.0	115.0	3.3	3.5
25	IR 29	97.3	97.4	114.0	114.0	2.7	3.3
26	LOCAL CHECK 1	114.0	114.0	131.5	131.4	4.1	3.7
27	LOCAL CHECK 2	126.8	126.7	118.5	118.5	3.4	3.5
28	LOCAL CHECK 3	116.8	116.8	114.5	114.5	4.1	3.7
29	LOCAL CHECK 4	121.3	121.2	124.5	124.5	3.7	3.6
30	LOCAL CHECK 5	112.2	112.1	115.0	115.0	4.0	3.7
	SE		0.87		0.33		0.46
	h2b		0.98		0.99		0.15

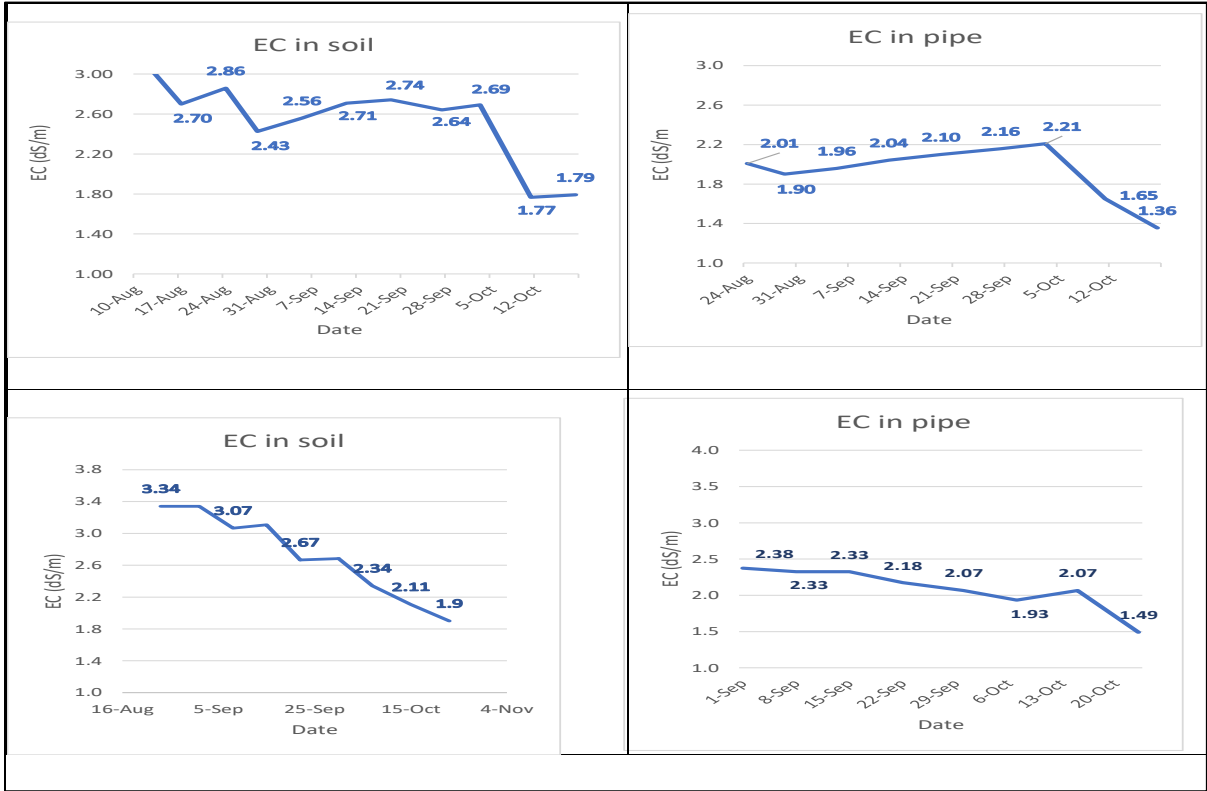


Figure 6.12.4. Salinity level at Shyamnagar and Kaliganj during T. Aman 2024

Experiment 6.13: IRRI NARES Trials in Bangladesh for Salt-Stress Prone Environment
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Specific objective: To evaluate the genotypes in the natural salinity-prone environment at the farmers’ field of four different salinity-prone environment in Boro 2024-25 Dry Season.

Materials and Methods: A total of 144 elite genotypes were evaluated in this trial along with BRRI dhan67, BRRI dhan97, BRRI dhan99, Binadhan-10 and IRRI 147 as tolerant checks and BRRI dhan102, IRRI240, IRRI 241 and IRRI 154 as sensitive at two locations in Satkhira, and each one location in Khulna & Cox’ Bazar. The unit plot size was 3.0 square meters (5 rows× 15 hills). The field layout was done following Alpha lattice design with two replications. Thirty-five days’ seedlings were transplanted @ 2-3 seedlings per hill with the spacing of 20 cm × 20 cm. Fertilizer were applied at the rate of 300 kg Urea: 100 kg TSP: 165 kg MoP: 112 kg Gypsum: 12 kg ZnSO₄ kg per hectare in the trial. All amount of P, K, S and Zn was applied at the time of final land preparation and nitrogen (urea) were applied in three equal splits at 5-10, 20-25 and 35-40 days after transplanting (DAT). Crop management such as weeding and irrigation was done on time. Pest management and other cultural operations were also performed when deemed necessary.

Results:

Chakoria Stage 1 Trial Results: The Stage-1 trial at the Chakoria site showed considerable variation among entries. Grain yields ranged from 0.54 t/ha (IR 147462-4-89-1-B) to 8.5 t/ha (IR 147462-4-77-1-B), while growth durations spanned 145 days (IR 147452-3-69-1-B) to 155 days (BRRI dhan99) (Table 6.13.1a). From the 144 entries, 34 genotypes were selected based on their performance in terms of salinity tolerance (at hotspot conditions), grain type, and grain yield. These selected genotypes are indicated in bold.

Table 6.13.1a: Performance of all genotypes in Dry season Boro 2024 at Chakoria Upazilla, Cox's Bazar under IRRI NARES Stage-1

Entry no.	Designation	Plant Height (cm)	Days to Maturity	Yield (tha ⁻¹)	
				BLUE	BLUP
3	IR 147455-4-240-1-B	111.5	147.2	3.7	3.8
4	IR 147450-4-47-1-B	106.3	148.1	4.6	4.0
26	IR 147478-3-44-1-B	108.7	148.1	2.5	3.7
28	IR 147455-4-200-1-B	103.2	147.7	4.8	4.0
32	IR 147449-5-115-1-B	117.3	148.1	6.2	4.0
33	IR 147462-4-77-1-B	118.4	148.1	8.5	4.1
35	IR 147465-1-196-1-B	110.7	147.7	5.3	3.8
36	IR 147469-5-100-1-B	98.8	147.6	3.6	4.1
37	IR 147448-4-203-1-B	105.7	146.3	5.3	3.9
39	IR 147455-4-39-1-B	93.6	147.6	5.3	3.9
42	IR 147470-2-154-1-B	108.9	147.7	4.1	3.6
47	IR 147464-4-152-1-B	108.0	147.2	4.3	4.2
50	IR 147463-1-17-1-B	105.4	147.3	2.4	3.7
52	IR 147452-3-73-1-B	104.9	146.4	3.8	3.9
57	IR 147448-4-208-1-B	110.7	147.6	2.7	3.8
58	IR 147457-3-119-1-B	110.1	148.0	5.2	3.8
68	IR 147455-4-111-1-B	112.6	147.3	4.5	3.8
70	IR 147472-1-19-1-B	96.4	147.9	3.8	3.9
72	IR 147467-4-74-1-B	103.5	147.6	5.8	3.9
75	IR 147462-4-4-1-B	110.4	147.5	3.5	3.8
85	IR 147475-5-4-1-B	113.3	147.0	3.4	3.6
87	IR 147463-1-208-1-B	96.8	147.7	6.3	4.1
89	IR 147470-2-86-1-B	110.0	147.6	5.2	3.8
90	IR 147470-2-90-1-B	106.0	147.2	6.9	4.2
94	IR 147457-3-112-1-B	118.1	148.2	5.5	4.0
95	IR 147468-3-175-1-B	113.4	147.8	4.6	4.0
97	IR 147476-3-229-1-B	117.0	147.4	1.5	3.6

Entry no.	Designation	Plant Height (cm)	Days to Maturity	Yield (tha ⁻¹)	
				BLUE	BLUP
103	IR 147470-2-206-1-B	104.6	147.6	4.5	3.8
116	IR 147448-4-24-1-B	101.6	148.1	4.6	3.9
120	IR 147448-4-164-1-B	103.2	148.1	5.9	4.0
122	IR 147470-2-11-1-B	115.6	148.0	5.3	4.0
136	IRRI 147	110.0	147.3	4.9	3.9
137	IRRI 154	111.1	147.4	2.6	3.6
138	IRRI 240	106.2	147.4	3.9	3.5
139	IRRI 241	112.2	147.7	4.8	4.0
140	BRRI dhan67	101.0	146.5	3.4	3.9
141	BRRI dhan97	100.0	148.2	4.4	3.8
142	BRRI dhan99	95.0	155.0	3.4	3.4
143	BRRI dhan102	103.0	150.0	3.0	3.2
144	Binadhan-10	104.0	150.0	5.3	4.6
SE		4.1	3.1	0.91	
h ² B		0.56	0.84	0.52	

Stage-1 Trial, Botiaghata: For Stage-1 trial at Botiaghata site, grain yield ranged from 2.6 tha⁻¹ (IR 147453-1-11-1-B) to 6.4 tha⁻¹ (IR 147469-5-173-1-B) and growth duration 146 days (IR 147448-4-203-1-B) to 167 days (IR 147448-4-195-1-B), respectively (Table 6.13.1b). Among 144 entries, only 35 genotypes (marked in Bold) were selected based on salinity tolerance at hotspot condition, grain type and grain yield.

Table 6.13.1b: Performance of all genotypes in Dry season Boro 2024 at Botiaghata Upazilla, Khulna under IRRI NARES Stage-1

Entry no.	Designation	Plant Height (cm)	Days to Maturity	Yield (tha ⁻¹)	
				BLUE	BLUP
1	IR 147465-1-50-1-B	91.0	151.0	4.5	4.6
2	IR 147455-4-100-1-B	97.5	149.0	5.2	4.7
3	IR 147455-4-240-1-B	104.5	155.5	5.5	4.8
8	IR 147455-4-121-1-B	112.5	159.0	4.3	4.6
13	IR 147448-4-205-1-B	93.0	149.0	5.5	4.7
20	IR 147463-1-36-1-B	122.0	156.0	3.5	4.4
23	IR 147451-3-35-1-B	99.0	149.0	4.7	4.6
26	IR 147478-3-44-1-B	88.0	152.5	4.6	4.6
30	IR 147455-4-50-1-B	101.0	149.0	4.7	4.6
39	IR 147455-4-39-1-B	104.5	148.5	5.1	4.7
40	IR 147473-5-42-1-B	106.0	157.0	5.6	4.8
42	IR 147470-2-154-1-B	111.0	154.5	5.2	4.7
43	IR 147463-1-222-1-B	109.5	147.0	4.5	4.6
45	IR 147455-4-10-1-B	100.5	154.5	3.8	4.5
47	IR 147464-4-152-1-B	99.0	158.5	4.7	4.6
52	IR 147452-3-73-1-B	103.0	148.0	4.4	4.6
68	IR 147455-4-111-1-B	96.5	156.5	4.7	4.6
75	IR 147462-4-4-1-B	98.5	159.5	4.4	4.6
89	IR 147470-2-86-1-B	116.0	158.0	5.2	4.7
98	IR 147446-5-189-1-B	115.5	158.0	4.0	4.5
99	IR 147457-3-9-1-B	93.0	152.0	5.4	4.7
103	IR 147470-2-206-1-B	99.0	156.0	4.2	4.5
108	IR 147469-5-156-1-B	110.0	158.0	4.9	4.7
111	IR 147463-1-167-1-B	111.0	152.0	4.1	4.5
113	IR 147474-3-112-1-B	112.0	160.0	5.6	4.8
116	IR 147448-4-24-1-B	92.5	147.5	4.7	4.6
118	IR 147469-5-22-1-B	96.5	157.0	3.8	4.5
119	IR 147476-3-227-1-B	88.5	149.0	5.2	4.7
125	IR 147458-1-176-1-B	111.0	159.0	5.2	4.7
131	IR 147455-4-190-1-B	93.0	149.5	4.7	4.6
133	IR 147451-3-92-1-B	106.0	154.0	4.3	4.6
136	IRRI 147	96.0	153.0	6.1	4.8
137	IRRI 154	116.0	158.5	5.0	4.7
138	IRRI 240	102.5	159.0	3.7	4.5
139	IRRI 241	102.5	157.5	3.8	4.5
140	BRRI dhan67	106.5	146.5	5.5	4.8
141	BRRI dhan97	100.0	149.0	4.5	4.6
142	BRRI dhan99	101.0	154.0	5.3	4.7
143	BRRI dhan102	96.5	156.0	4.9	4.7
144	Binadhan-10	102.0	149.5	5.1	4.7
SE		7.2	4.1	0.91	
h ² B		0.66	0.56	0.46	

Stage-1 Trial Results at Shyamnagar: The Stage-1 trial at Shyamnagar showed grain yields from 0.7 t/ha (IR 147446-5-189-1-B) to 4.0 t/ha (IR 147464-4-12-1-B), and growth durations from 120 days (IR 147470-2-90-1-B) to 158 days (BRRI dhan99) (Table 6.13.1c). Out of 144 entries, a rigorous selection process identified 21 genotypes (highlighted in bold) for their salinity tolerance in hotspot conditions and promising grain yield.

Table 6.13.1c: Performance of all genotypes in Dry season Boro 2024 at Shyamnagar Upazilla, Satkhira under IRRI NARES Stage-1

Entry no.	Designation	Plant Height (cm)	Days to Maturity	Yield (tha ⁻¹)	
				BLUE	BLUP
3	IR 147455-4-240-1-B	98.3	138.0	2.6	2.4
5	IR 147455-4-68-1-B	85.7	137.0	2.3	2.2
8	IR 147455-4-121-1-B	103.2	142.5	2.3	2.2
28	IR 147455-4-200-1-B	92.7	139.0	1.4	1.6
39	IR 147455-4-39-1-B	86.7	144.5	1.7	1.8
42	IR 147470-2-154-1-B	98.5	136.0	1.5	1.6
50	IR 147463-1-17-1-B	104.4	149.0	1.7	1.8
54	IR 147469-5-31-1-B	89.5	136.5	2.2	2.1
58	IR 147457-3-119-1-B	89.5	133.0	1.6	1.7
61	IR 147476-3-80-1-B	99.8	137.5	2.1	2.0
75	IR 147462-4-4-1-B	106.8	142.0	3.1	2.7
76	IR 147464-4-5-1-B	100.0	139.0	2.2	2.1
85	IR 147475-5-4-1-B	108.8	143.0	3.2	2.8
92	IR 147458-1-225-1-B	88.7	140.5	2.0	2.0
99	IR 147457-3-9-1-B	96.5	141.0	2.8	2.5
122	IR 147470-2-11-1-B	100.0	142.0	3.2	2.8
125	IR 147458-1-176-1-B	102.0	139.0	2.9	2.6
136	IRRI 147	98.3	137.0	2.1	2.1
137	IRRI 154	99.8	139.0	1.4	1.6
139	IRRI 241	90.7	136.0	1.5	1.7
140	BRRI dhan67	96.7	147.5	1.3	1.5
141	BRRI dhan97	99.2	154.0	3.0	2.7
142	BRRI dhan99	95.7	158.5	3.0	2.6
143	BRRI dhan102				
144	Binadhan-10	99.7	153.0	0.8	1.2
SE		5.4	3.5	1.02	
h ² B		0.79	0.97	0.64	

Stage-1 Trial Results at Kaliganj: In the Stage-1 trial at the Kaliganj site, grain yields varied significantly. The lowest yield recorded was 0.7 tons per hectare (t/ha) from entry IR 147453-1-11-1-B, while the highest was 3.5 t/ha from IR 147450-4-47-1-B. Growth durations ranged from 140 days for IR 147457-3-119-1-B to 154 days for BRRI dhan99 (Table 6.13.1d). Out of 144 entries, only 30 genotypes (highlighted in bold in the original data) were chosen. This selection was based on their demonstrated salinity tolerance under hotspot conditions and their grain yield performance.

Table 6.13.1d: Performance of all genotypes in Dry season Boro 2024 at Kaliganj under IRRI NARES Stage-1

Entry no.	Designation	Plant Height (cm)	Days to Maturity	Yield (tha ⁻¹)	
				BLUE	BLUP
3	IR 147455-4-240-1-B	91.5	149.0	1.9	2.1
4	IR 147450-4-47-1-B	96.5	149.0	3.5	2.7
16	IR 147450-4-59-1-B	97.7	151.0	3.4	2.7
25	IR 147464-4-16-1-B	87.2	146.0	2.2	2.2
51	IR 147455-4-194-1-B	90.7	150.0	2.0	2.2
63	IR 147475-5-10-1-B	93.5	142.5	2.0	2.2
72	IR 147467-4-74-1-B	91.0	152.5	2.2	2.2
75	IR 147462-4-4-1-B	93.0	149.0	2.5	2.3
91	IR 147455-4-142-1-B	92.9	151.0	2.3	2.3
92	IR 147458-1-225-1-B	83.5	152.5	2.7	2.4
94	IR 147457-3-112-1-B	80.5	151.0	2.4	2.3
97	IR 147476-3-229-1-B	95.7	147.0	1.7	2.1
99	IR 147457-3-9-1-B	94.5	151.5	2.8	2.5
112	IR 147462-4-65-1-B	90.5	151.0	3.1	2.6
125	IR 147458-1-176-1-B	91.3	152.0	1.9	2.1
129	IR 147475-5-55-1-B	97.8	150.5	2.1	2.2
132	IR 147447-4-18-1-B	103.2	147.5	2.7	2.4
136	IRRI 147	86.0	142.0	3.3	2.6

Entry no.	Designation	Plant Height (cm)	Days to Maturity	Yield (tha ⁻¹)	
				BLUE	BLUP
140	BRRRI dhan67	89.5	139.0	2.5	2.3
141	BRRRI dhan97	89.9	150.5	2.7	2.4
142	BRRRI dhan99	90.8	154.0	2.9	2.5
144	Binadhan-10	88.4	144.0	2.3	2.3
SE		6.7	4.6	0.32	
h²B		0.86	0.72	0.91	

Chakoria Stage-2 Trial: The Stage-2 trial at the Chakoria site revealed a wide range in performance among the tested genotypes. Grain yields spanned from 0.66 t/ha (IR 145388-B-B-2-B-B) to 4.6 t/ha (IRRI 242), while growth durations ranged from 145 days (IR 145367-B-B-177-B-B) to 154 days (IR21LT1532) (Table 6.13 2a). From the 40 entries, a rigorous selection process, focusing on salinity tolerance under hotspot conditions, grain type, and grain yield, resulted in 17 chosen genotypes.

Table 6.13.2a: Performance of all genotypes in Dry season Boro 2024 at Chakoria Upazilla, Cox's Bazar under IRRI NARES Stage-2

Entry no.	Designation	PH (cm)	GD (days)	Yield (tha ⁻¹)	
				BLUE	BLUP
11	IR 145405-4-B-136-B-B	85.3	149.0	3.3	3.2
12	IR 145389-B-B-349-B-B	100.2	147.5	2.2	2.2
14	IR21LT1532	95.6	153.5	2.4	2.4
15	IR21LT1636	94.2	145.5	2.1	2.1
18	IR21LT1223	117.9	150.5	2.8	2.7
22	IR 145396-B-B-369-B-B	93.5	149.0	2.2	2.2
23	IR 145396-B-B-154-B-B	87.3	146.5	2.9	2.8
26	IR 145398-B-B-342-B-B	79.2	153.5	1.9	2.0
28	IR 145398-B-B-28-B-B	93.8	151.5	1.5	1.6
29	IR 145411-B-B-96-B-B	105.7	150.0	2.6	2.6
37	IRRI 147	95.5	152.5	1.7	1.8
38	IRRI 154	84.4	147.0	2.2	2.2
39	IRRI 240	80.9	146.5	2.3	2.3
40	IRRI 242	96.8	150.5	4.6	4.3
SE		9.88	3.8	0.42	
h²B		0.41	0.86	0.75	

Botiaghata Stage-2 Trial: For Stage-2 trial at Botiaghata site, grain yield ranged from 3.3 tha⁻¹ (IR 145396-B-B-369-B-B) to 6.6 tha⁻¹ (IR 145398-B-B-124-B-) and growth duration 88 days (IR21LT1532) to 128 days (IR 145405-4-B-110-B-B), respectively (Table 6.13.2b). Among 144 entries, only 20 genotypes (marked in Bold) were selected based on salinity tolerance at hotspot condition, grain type and grain yield.

Table 6.13.2b: Performance of all genotypes in Dry season Boro 2024 at Botiaghata Upazilla, Khulna under IRRI NARES Stage-2

Entry no.	Designation	Plant Height (cm)	Days to Maturity	Yield (tha ⁻¹)	
				BLUE	BLUP
4	IR 145389-B-B-349-B-B	112.0	92.8	5.3	5.4
6	IR21LT1532	119.5	87.4	6.5	5.7
8	IR 145386-5-B-224-B-B	114.5	110.0	5.5	5.5
9	IR 145388-B-B-195-B-B	113.0	94.3	5.1	5.3
10	IR21LT1223	103.5	100.5	5.0	5.3
11	IR 145388-B-B-324-B-B	112.0	101.4	5.8	5.5
12	IR 145388-B-B-402-B-B	113.0	94.7	6.4	5.7
14	IR 145388-B-B-342-B-B	109.5	108.2	6.0	5.6
21	IR 145398-B-B-28-B-B	100.5	106.3	5.8	5.5
22	IR 145411-B-B-96-B-B	115.0	118.9	5.8	5.5
23	IR 145386-5-B-396-B-B	103.5	95.8	5.6	5.5
24	IR 145386-5-B-330-B-B	128.5	122.0	6.0	5.6
26	IR 145388-B-B-73-B-B	126.0	117.2	5.2	5.4
28	IR 145388-B-B-382-B-B	126.0	111.5	5.9	5.5
31	IRRI 147	94.0	99.2	5.8	5.5
32	IRRI 154	114.0	93.2	6.0	5.6
33	IRRI 240	115.0	106.9	4.4	5.2
34	IRRI 241	110.5	109.7	5.0	5.3
35	IRRI 242	123.0	103.9	5.9	5.5
36	BRRRI dhan67	102.0	102.4	5.3	5.4
37	BRRRI dhan97	110.0	113.3	6.3	5.6
38	BRRRI dhan99	114.5	98.7	4.1	5.1

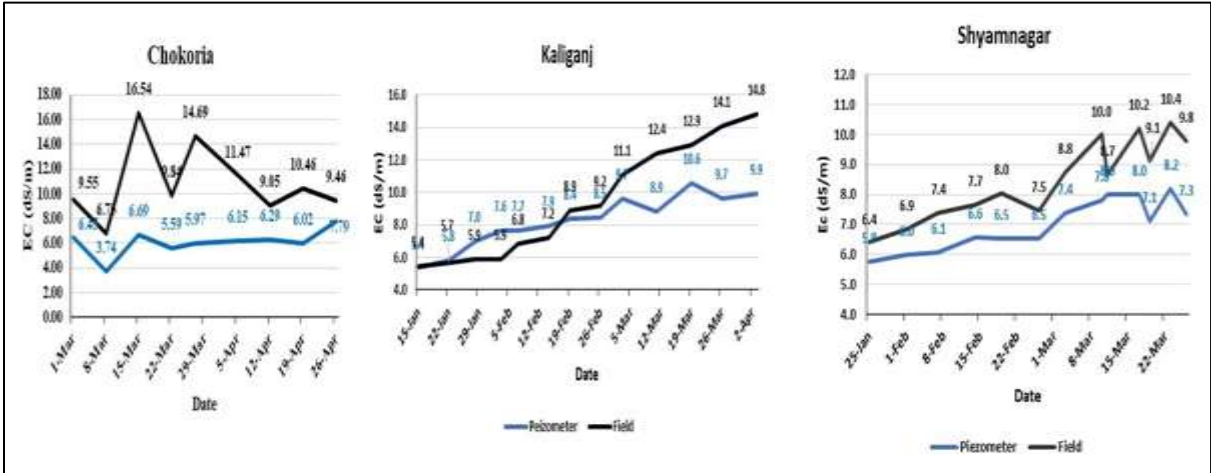
Entry no.	Designation	Plant Height (cm)	Days to Maturity	Yield (tha ⁻¹)	
				BLUE	BLUP
39	BRRI dhan102	116.5	92.3	5.2	5.4
40	Binadhan-10	97.5	97.5	5.7	5.5
SE		3.1	5.9	0.88	
h ² B		0.41	0.83	0.25	

Shyamnagar Stage-2 Trial: At the Shyamnagar site, grain yield in the Stage-2 trial exhibited a considerable range, from a minimum of 0.8 tonnes per hectare tha⁻¹ for genotype IRRI154 to a maximum of 4.0 tha⁻¹ for genotype IR 145388-B-B-73-B-B. Growth duration also varied, with Binadhan-10 maturing in 127 days and IR21LT1636 requiring 150 days (Table 6.13.2c). From a total of 144 entries, a rigorous selection process identified only seven genotypes (indicated in bold in the original data, which is not provided here) for advancement. This selection was based on their demonstrated salinity tolerance under hotspot conditions, desirable grain type, and superior grain yield.

Table 6.13.2c: Performance of all genotypes in Dry season Boro 2024 at Shyamnagar Upazilla, Satkhira under IRRI NARES Stage-2

Entry no.	Designation	Plant Height (cm)	Days to Maturity	Yield (tha ⁻¹)	
				BLUE	BLUP
9	IR 145388-B-B-195-B-B	92.3	135.5	3.0	2.7
11	IR 145388-B-B-324-B-B	99.5	139.5	3.5	3.0
24	IR 145386-5-B-330-B-B	106.0	145.5	3.8	3.2
26	IR 145388-B-B-73-B-B	97.0	141.5	4.0	3.3
28	IR 145388-B-B-382-B-B	101.3	142.5	2.4	2.3
31	IRRI 147	84.7	143.0	1.5	1.9
32	IRRI 154	90.0	139.5	0.8	1.3
33	IRRI 240	101.2	137.5	2.7	2.5
34	IRRI 241	93.0	142.5	1.4	1.7
35	IRRI 242	88.5	136.5	2.0	2.1
36	BRRI dhan67	99.0	141.5	2.2	2.2
37	BRRI dhan97	85.5	143.0	2.1	2.2
38	BRRI dhan99	95.8	139.5	2.7	2.5
39	BRRI dhan102	85.5	136.5	1.3	1.7
40	Binadhan-10	101.7	126.3	3.1	2.8
SE		0.82	3.8	0.77	
h ² B		0.66	0.36	0.61	

For the Stage-2 trial conducted at the Kaliganj site, all evaluated genotypes experienced severe damage attributable to saline stress. Consequently, no quantifiable data were available for collection or subsequent analysis from this specific location. Figure 6.13.3 present the salinity level at Chokoria, Shyamnagar and Kaliganj, respectively during Boro season 2024. Figure 6.13.4 comprises the graphics for snapshot covering different field views of the experiment.



*Blue line denotes the salinity level of piezometer & red line denotes the salinity level of field

Figure 6.13.3. Salinity level at Chokoria Kaliganj and Shyamnagar during Boro season 2024-25

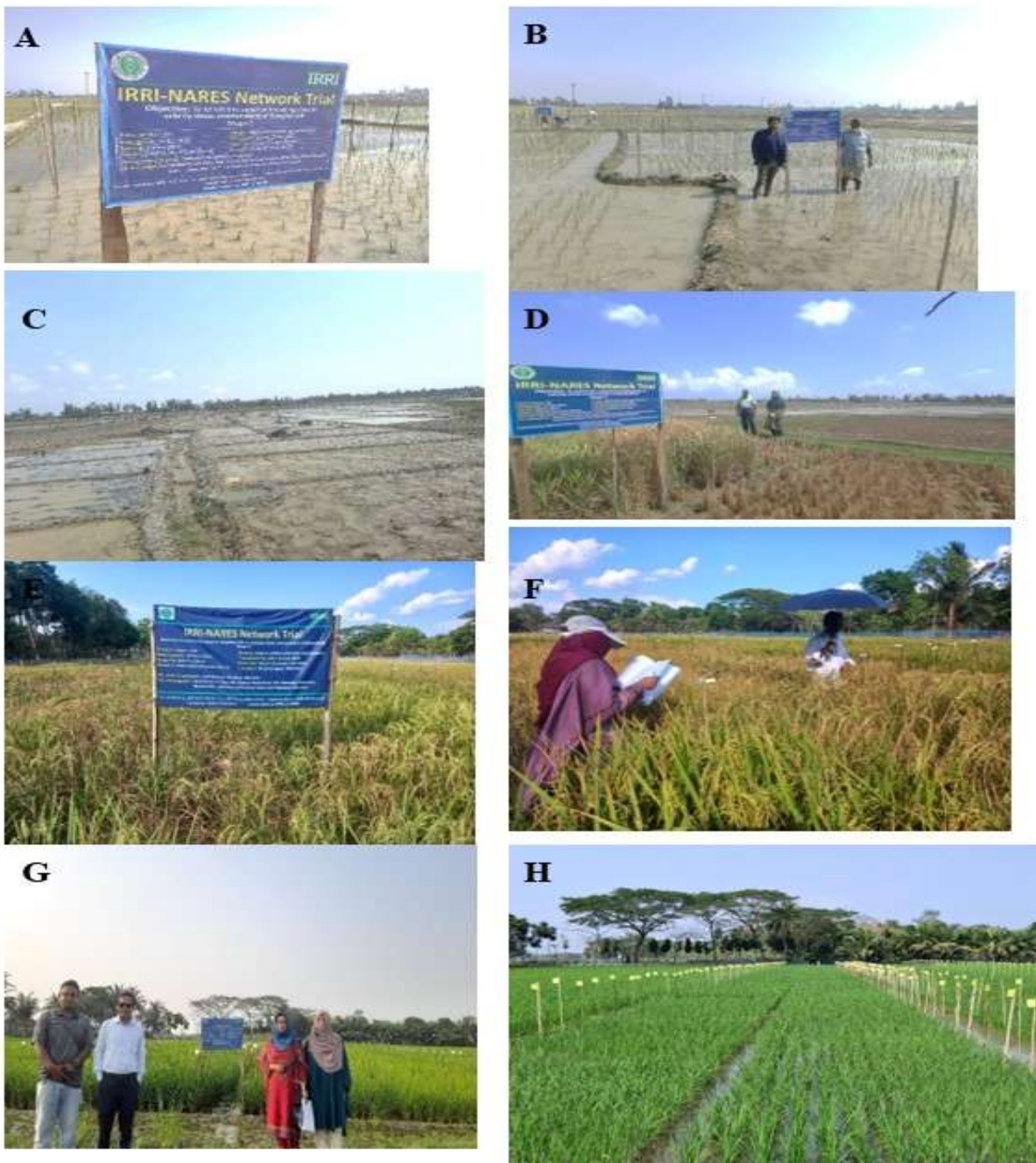


Figure 6.13.4. Pictorial field view of IRRI NARES network trial under salinity Breeding during Boro season 2024-25.

Figure 4. A & B: Trial establishment at Chokoria Site; Figure 4. C & D: Maturity stage of crop; Salt cultivation beside the experimental plot; Figure 4. E & F: Selection at Shyamnagar Site; Figure 4. G, H & I: Khulna, Botiaghata site, trial plot, scenario & field visit; Figure 4. J: data collection at Kaliganj Site; Figure 4. K: Salinity stress-prone damaged plot (Image of BRRI dhan97, a tolerant check); Figure 4. L: Spikelet sterility at Kaliganj Site

PROJECT 7A: DEVELOPMENT OF PREMIUM QUALITY RICE (T. AMAN)

General objectives: Development of aromatic fine-grain quality rice with national standards (BRRI dhan34, Kalizira, Chinigura, Kataribhog, Radhunipagol, Tulshimala and Bashful type).

Project Leader: Mohammad Rafiqul Islam

Experiment 7A.1: Hybridization

Principal Investigator: M R Islam

Co-Investigators: A Rahman, S T Tuba, S Maniruzzaman, and K M Iftekharuddaula

Specific objective: Development of progenies having strong plant type, photosensitivity, presence or absence of aroma, and fine grain quality.

Materials and Methods: A total seventeen varieties/advanced lines under premium quality rice were used for crossing (Table 7A.1a). Parents were grown in the hybridization block of the Plant Breeding Division at three staggers with an interval of seven days to synchronize

flowering among male and female parents. Around 30-day-old seedlings were transplanted in a 5.4 m × 2 rows plot with a spacing of 25 cm × 15 cm using a single seedling/hill. Fertilizers were applied at the rate of 83 (180 kg Urea): 15 (74 kg TSP): 50 (100 kg MP): 12 (67 kg Gypsum): and 3.6 (10 kg ZnSO4) kg N, P, K, S, and Zn, respectively, per hectare. All amounts of P, K, S, and Zn were applied at the time of final land preparation, and nitrogen was applied at three equal splits at 5-10, 20-25, and 35- 40 days after transplanting (DAT). Other cultural and pest management practices were carried out as and when necessary.

Results: A total of 30 single crosses and 2 backcrosses were made. F₁ seeds were harvested, dried, and preserved in a glass container with silica gel (Table 7A.1b).

Table 7A.1a. List of parents grown for hybridization, Development of Premium Quality Rice, T. Aman 2024-25

SN	Designation	Trait Marker
1	BR13943-5R-2	<i>fgr-1, Gnl</i>
2	BR13943-5R-7	<i>fgr-1, Gnl</i>
3	BR13942-5R-53	<i>fgr-1, Gnl</i>
4	BR13942-5R-59	<i>fgr-1, Gnl</i>
5	BR13942-5R-213	<i>fgr-1, Gnl</i>
6	IR20*1002: IRR1154+PI9+Hd9(N22)	<i>PI9+Hd9(N22)</i>
7	BR11607-4R-72	<i>Xa5+Xa13+Xa21</i>
8	BR11607-4R-192	<i>Xa5+Xa13+Xa21</i>
9	BRR1 dhan70	<i>fgr-1</i>
10	Bashful	<i>fgr-1</i>
11	Dudul lata	
12	Rasulbhog	<i>fgr-1</i>
13	Ranisalut	<i>fgr-1</i>
14	DRR dhan60	
15	Kalizira	<i>fgr-1</i>
16	Chinigura	<i>fgr-1</i>
17	BRR1 dhan90	

DS: 31/07/2024- 08/08/2024 DT: 22/08/204-08/09/2024

Table 7A.1b. List of crosses made for Premium Quality Rice, Development of Premium Quality Rice, T. Aman 2024-25

SN	Cross Combination	Type	Trait of interest	Average pBLUP	F1 seeds
1	BR13943-5R-2/BR13942-5R-59	Single Cross	<i>fgr-1</i>	4.53	65
2	BR13943-5R-2/IR20*1002: IRR1154+PI9+Hd9(N22)	Single Cross	<i>fgr-1, PI9+Hd9</i>	4.5	3
3	BR13943-5R-2/BR11607-4R-72	Single Cross	<i>fgr-1, Xa5, Xa13, Xa21</i>	4.63	6
4	BR13942-5R-59/IR20*1002: IRR1154+PI9+Hd9(N22)	Single Cross	<i>fgr-1, PI9+Hd9</i>	5	8
5	BR13942-5R-59/BR11607-4R-72	Single Cross	<i>fgr-1, Xa5, Xa13, Xa21</i>	5.21	50
6	BR13943-5R-2/DRR dhan60	Single Cross	<i>fgr-1, high yield</i>	4.9	9
7	Dudul lata/Bashful	Single Cross	<i>fgr-1, lodging tolerant</i>	4.1	1
10	Ranisalut/DRR dhan60	Single Cross	<i>fgr-1, high yield</i>	4.73	150
11	DRR dhan60/Bashful	Single Cross	<i>fgr-1, high yield</i>	4.57	10
13	Chinigura/BR11607-4R-192	Single Cross	<i>fgr-1, Xa5, Xa13, Xa21</i>	4.81	31
14	BR11607-4R-72/Bashful	Single Cross	<i>fgr-1, Xa5, Xa13, Xa21</i>	5.12	30
22	Ranislute/BR11607-4R-192	Single Cross	<i>fgr-1, Xa5, Xa13, Xa21</i>	4.53	83
23	DRR dhan60/IR20*1002: IRR1154+PI9+Hd9(N22)	Single Cross	<i>fgr-1, PI9+Hd9</i>	4.92	100
24	BRR1 dhan34/IR20*1002: IRR1154+PI9+Hd9(N22)	Single Cross	<i>fgr-1, PI9+Hd9</i>	4.65	80
25	BRR1 dhan90/Dudshail	Single Cross	<i>fgr-1</i>	4.69	112
26	BRR1 dhan70/IR20*1002: IRR1154+PI9+Hd9(N22)	Single Cross	<i>fgr-1, PI9+Hd9</i>	5.31	60
27	BRR1 dhan70/BR11607-4R-192	Single Cross	<i>fgr-1, Xa5, Xa13, Xa21</i>	5.13	250
28	BR13943-4R-7/DRR dhan60	Single Cross	<i>fgr-1, high yield</i>	5.23	5
29	Kalizira/BRR1 dhan70	Single Cross	<i>fgr-1</i>	4.29	63
30	Kalizira/BRR1 dhan90	Single Cross	<i>fgr-1, high yield</i>	4.32	90

SN	Cross Combination	Type	Trait of interest	Average pBLUP	F1 seeds
31	BRRI dhan90/Bashful (BR16311)//BRRI dhan90	Backcross	<i>fgr-1</i>	4.7	12
32	BRRI dhan90/BINA dhan13 (BR16313)//BRRI dhan90	Backcross	<i>fgr-1</i>	4.62	31
Total					1,249

Experiment 7A.2: Confirmation of F1s

Principal Investigator: M R Islam

Co-Investigators: A Rahman, S T Tuba, S Maniruzzaman, and K M Iftekharuddaula

Specific Objective: To confirm the crosses as true hybrids.

Materials and Methods: 17 crosses, along with their respective parents, were grown in the net house of the Plant Breeding Division. The F1 seeds were seeded in the earthen pots after germination. Thirty-day-old seedlings were transplanted at a spacing of 25 cm × 15 cm along with their respective parents using a single seedling/hill in the F1 confirmation block. Crop management was done as described in Experiment 7A.1. The leaf samples were collected from each of the 12 plants from each cross and respective parents for QC genotyping to determine true F1. QC genotyping was performed using 10 QC SNPs at Intertek, Australia. Genotyping results were analyzed using a genotyping data analytical tool called Flapjack. After confirmation, promising F1s were selected, harvested, dried, cleaned, and preserved in the cold room.

Results: A total of 17 crosses were confirmed as the plants with heterozygous alleles at two or more SNP loci were declared as true F₁s and selected as true hybrids. Selected F1 plants were harvested and F₂ seeds were dried and stored in cold room (Table 7A.2).

Table 7A.2: List of confirmed and selected F1s as true hybrids, Development of Premium Quality Rice, T. Aman 2024-25

SN	BR No.	Cross Combination	Type
1	BR16301	BR9053-16-3-4-1/BR10824-5-6-4-1	single cross
2	BR16302	BR9053-16-3-4-1/BR9178-7-2-4-4	single cross
3	BR16303	BR9053-16-3-4-1/BR8845-18-8-45-4-11	single cross
4	BR16304	BR9053-16-3-4-1/BINA dhan13	single cross
5	BR16305	BR9581-3-3-1-2/BR8845-18-8-45-4-11	single cross
6	BR16306	BR11224-7-9-4-3-P2/BRRI dhan70	single cross
7	BR16307	BR9674-1-1-5-1-P3/BR9178-7-2-4-4	single cross
8	BR16308	BR9674-7-3-2-2-P1/BRRI dhan70	single cross
9	BR16309	BR9674-8-15-3-28-P3/BR9178-7-2-4-4	single cross
10	BR16310	BR10571-15-6-8-5/BRRI dhan70	single cross
11	BR16311	BRRI dhan90/Bashful	single cross
12	BR16312	BRRI dhan90/BR8845-18-8-45-4-11	single cross
13	BR16313	BRRI dhan90/BINA dhan13	single cross
14	BR16670	BRRI dhan90/IRRI 154 frg1	single cross
15	BR16314	BRRI dhan90/BR10824-5-6-4-1	single cross
16	BR16315	BR9674-8-15-3-28-P3/BRRI dhan70	single cross
17	BR16669	BR9053-16-3-4-1/BRRI dhan70	single cross

DS: 19/08/2024

DT: 08/09/2024

Experiment 7A.3: Rapid Generation Advance (RGA)

Principal Investigator: M R Islam

Co-Investigators: A Rahman, S T Tuba, S Maniruzzaman, and K M Iftekharuddaula

Specific objective: Rapid advancement of segregating population for shortening the breeding cycle and development of large RIL population.

Materials and Methods: A total of 19 F₂, 17 F₃, 18 F₄, 47 F₅, one BC₁F₄, four BC₂F₄, one BC₃F₄, four BC₁F₅, and one BC₂F₅ population were grown in T. Aman 2024 season. Single-

seed progenies from a single panicle of one plant were grown in the RGA nursery in the field. The part of the panicles was sown directly on the soil. Thinning or pruning was not done. Fertilizer management was done using half of the dosages described in Expt. 7A.1. Appropriate pest management practices were carried out as and when necessary. During harvesting at maturity, one panicle was collected from each plant of all the crosses at different times, and the plant was uprooted. Harvested seeds remaining in the panicles were dried and subjected to dormancy breakage to initiate the next cycle of RGA. For dormancy breaking, at first, sun-drying was done for three days, followed by oven drying at 50°C for 72 hours.

Results: A total of 13,407 individuals (7,704 individuals from 19 F₂, 1,062 individuals from 17 F₃, 504 individuals 18 F₄ populations, 3,050 individuals from 47 F₅ populations, 105 individuals from one BC₁F₄, 404 individuals from four BC₂F₄, 102 individuals from one BC₃F₄, 336 individuals from four BC₃F₄, and 336 individuals from four BC₁F₅) were harvested at the time of maturity and preserved and processed with proper labels (Table 7A.3a & b).

Table 7A.3a: Summary of populations advanced through RGA, Development of Premium Quality Rice, T. Aman 2024-25

SN	Generation	No. of crosses	Progenies grown	Progenies harvested
1	F2	19	10,830	7,704
2	F3	17	3,996	1,062
3	F4	18	4,078	504
4	F5	47	8,368	3,050
5	BC1F4	1	488	105
6	BC2F4	4	1,548	404
7	BC3F4	1	720	102
8	BC1F5	4	1,116	336
9	BC2F5	1	360	140
Total		112	21,504	13,407

Table 7A.3b: List of F₂, F₃, F₄, and F₅ populations advanced through RGA, Development of Premium Quality Rice, T. Aman 2024-25

SN	BR No.	Parentage	Prog. grown	Prog.harvested
F₂ Generation				
1	BR15312	BR9590-45-1-3-2-P1/BR11768-10-4-6-P2*	570	428
2	BR15313	BR9590-45-1-3-2-P1/BR10821-15-7-8-5*	570	308
3	BR15315	BR9590-45-1-3-2-P1/BR8515-8-7-8-3*	570	342
4	BR15317	BR9053-16-3-4-1/BR8846-38-2-4-2*	570	827
5	BR15318	BR9590-45-1-3-2-P1/BR8846-38-2-4-2*	570	320
6	BR15319	BR9844-7-4-1-2-4-2/BR8846-38-2-4-2*	570	66
7	BR15320	Begunidhan/BR10062-8-3-2-1-P2*	570	387
8	BR15717	BR8493-12-7-4-P1*/ BRRi dhan90	570	328
9	BR15321	BR8234-1-3-7-1-3-HR2/BR10824-5-6-4-1*	570	464
10	BR15323	BR9053-16-3-4-1/BR9126-15-3-4-1*	570	414
11	BR15324	BR8234-1-3-7-1-3-HR2/BR9126-15-3-4-1*	570	443
12	BR15325	BR9126-15-3-4-1*/Begunidhan	570	567
13	BR15326	BR8234-1-3-7-1-3-HR2/BR10813-75-20-10-2*	570	389
14	BR15327	Begunidhan/BR10813-75-20-10-2*	570	352
15	BR15328	Chiniatop/BR9126-15-3-4-1*	570	429
16	BR15329	Chinisail/BR9126-15-3-4-1*	570	221
17	BR15331	BR10821-15-7-8-5*/Begunidhan	570	680
18	BR16316	BRRi dhan90/ BRRi dhan104	570	371
19	BR16317	BRRi dhan70/ BRRi dhan104	570	368
Total			10,830	7,704
F₃ Generation				
1	BR14517	BR9590-45-1-3-2-P2/BR9126-15-3-4-1	332	140
2	BR14518	BR9590-45-1-3-2-P2/BR10820-36-21-11-1	216	26
3	BR14521	BR8882-30-2-5-2/BR10820-36-21-11-1	180	21
4	BR14522	BR8882-30-2-5-2/Black rice-Sylhet	208	38
5	BR14523	BR8882-30-2-5-2/BR8515-23-6-3	180	69
6	BR14531	BR9581-16-3-5-3/BRRi dhan70	216	62

SN	BR No.	Parentage	Prog. grown	Prog.harvested
7	BR14532	BR9126-15-3-4-1/BR8297-1-1-2-HR7	252	66
8	BR14533	BR8297-1-1-2-HR7/Dadkhani	180	30
9	BR14538	BR8526-2-1-4/BR8515-23-6-3	432	52
10	BR14539	BR11806-8-5-3-3-4/BR10813-75-20-10-1	216	42
11	BR14540	BR11806-8-5-3-3-4/BR8862-29-1-5-1-3	108	90
12	BR14551	BR11224-3-24-2/ Basmati 370	108	29
13	BR14552	BR11802-11-3-1/BRRI dhan70	432	72
14	BR14553	BR11224-7-9-4-4/BRRI dhan70	396	75
15	BR14554	BR11224-3-24-2/ Pusa Basmati	108	20
16	BR14890	BR10824-5-6-4-1/ BRRI dhan90	216	28
17	BR14891	BR8493-12-7-4-P1/ BRRI dhan90	216	202
		Total	3,996	1,062
F₄ Generation				
1	BR13938	BR8297-1-1-2-HR7(com)/Tulshimala	350	132
2	BR13939	Ranisalute/ BRRI dhan90	288	125
3	BR14178	BR9590-45-1-3-2-P2/BR9178-7-2-4-4	144	42
4	BR14180	BR9844-7-4-1-2-4-2/BR9178-7-2-4-4	288	75
5	BR14181	BR9178-7-2-4-4-P1/ BR9844-7-4-1-2-4-2	144	39
6	BR14182	BR8528-2-2-3-HR2/BR9178-7-2-4-4	360	150
7	BR14184	BRRI dhan90/ BR9178-7-2-4-4-P1	200	145
8	BR14185	BR9178-7-2-4-4-P1/ BRRI dhan90	252	65
9	BR14186	BR9178-7-2-4-4-P1/ BRH13-1-9-7B	288	48
10	BR15188	BRRI dhan90/BR9580-30-2-1-1*	144	35
11	BR15189	BRRI dhan90/BR10824-5-6-4-1*	144	28
12	BR14512	BRRI dhan90/BR9126-15-3-4-1*	216	22
13	BR15190	BR10813-75-20-10-2*/BRRI dhan90	180	50
14	BR15191	BINA dhan13*/BRRI dhan90	180	52
15	BR15193	BR10821-15-7-8-5*/ BRRI dhan90	288	92
16	BR15194	BR10821-15-7-8-5*/Bashful	180	39
17	BR15196	Begunidhan/ BRRI dhan70	252	130
18	BR15330	Bashful/BRRI dhan50	180	56
		Total	4,078	504
F₅ Generation				
1	BR13716	Tulshimala/Dhonia	108	98
2	BR13717	Kalizira/Dhonia	72	39
3	BR13718	Dhonia/Kalizira	108	32
4	BR13719	Dhonia/Tulshimala	108	44
5	BR13720	Radhunipagol/BRRI dhan90	72	39
6	BR13721	BRRI dhan49/Dadkhani	160	115
7	BR13724	BRRI dhan87/Dadkhani	144	95
8	BR13725	Dadkhani/BRRI dhan34	72	32
9	BR13728	BR8536-27-2-1-2/BRRI dhan80	144	42
10	BR13729	BR8526-2-1-1-4/D. Kataribhog	108	39
11	BR13730	BR8515-23-6-3/Kalizira	108	42
12	BR13731	BR8515-23-6-3/Tulsimala	180	49
13	BR13732	BR9054-6-1-2-3/Tulsimala	108	90
14	BR13733	BR8297-1-1-2-HR7/Kalizira	28	26
15	BR13735	BR9178-7-2-4-3/D. Kataribhog	144	110
16	BR13737	BR9126-15-3-4-1/BRRI dhan34	32	19
17	BR13738	BR9126-15-3-4-1/Kalizira	56	29
18	BR13739	BRRI dhan87/Ranisalute	180	220
19	BR13740	BRRI dhan87/ BRRI dhan90	108	80
20	BR14179	BR9178-7-2-4-4/ BR9590-45-1-3-2-P2	180	65
21	BR13943	BRRI dhan90/BRRI dhan70	684	195
22	BR14515	BRRI dhan70/BRRI dhan90	396	80
23	BR14519	BR8528-2-2-3-HR2/BRRI dhan70	468	190
24	BR14527	BR9844-7-4-1-2-4-2/BRRI dhan70	324	75
25	BR13943	BRRI dhan90/BRRI dhan70// BRRI dhan90	396	73
26	BR14506	BRRI dhan90/BR9178-7-2-4-4	72	22
27	BR14514	BRRI dhan90/BR8845-21-1-5-4-10-4	216	65
28	BR14520	BR8528-2-2-3-HR2/BR8845-21-1-5-4-10-4	144	65

SN	BR No.	Parentage		Prog. grown	Prog.harvested
29	BR14528	BR8845-21-1-5-4-10-4/BR9844-7-4-1-2-4-2		324	85
30	BR14529	BR8845-21-1-5-4-10-4/BRRi dhan90		216	75
31	BR14530	BR8845-21-1-5-4-10-4/BRRi dhan70		324	69
32	BR14542	BR11806-8-5-3-3-4/Pusa Basmati		72	21
33	BR14543	BR11224-7-9-4-4/BR10813-75-20-10-1		216	49
34	BR14544	BR11224-7-9-4-4/BR8862-29-1-5-1-3		252	38
35	BR14545	BR11224-7-9-4-4/Basmati 370		108	39
36	BR14546	BR11224-7-9-4-4/Pusa Basmati		180	43
37	BR14548	BRRi dhan81/BRRi dhan70		108	19
38	BR14549	BRH11-9-11-45B-HR3/BR8845-21-1-5-4-10-4		108	26
39	BR14550	Ja Hua/BRRi dhan70		108	18
40	BR14893	BR8493-12-7-4-P1/Begunidhan		288	77
41	BR14894	BRRi dhan81/IRRI154 frg1		72	36
42	BR14895	Begunidhan/BRRi dhan50		144	62
43	BR14896	IRRI 154 frg1/BRRi dhan90		108	42
44	BR14898	Pusa Basmati/IRRI 154 frg1		180	82
45	BR14899	BR9844-7-4-1-2-4-2/ IRRI 154 frg1		108	38
46	BR14900	IRRI154-frg1/BR8862-29-1-5-1-3		252	86
47	BR14507	BRRi dhan90/BR8493-3-5-1-P1		280	75
Total				8,368	3,050
Backcross population(F ₄ -F ₅)					
SN.	Generation	BR No.	Parentage	Prog. grown	Harvested
1	BC1F4	BR15197	BRRi dhan90/BR8493-3-5-1-P1	488	105
2	BC2F4	BR15200	BRRi dhan70/BRRi dhan90// BRRi dhan90	504	150
3	BC2F4	BR15201	BR9590-45-1-3-2-P2/BRRi dhan70// BR9590-45-1-3-2-P2	180	59
4	BC2F4	BR15202	BR8528-2-2-3-HR2/BRRi dhan70// BR8528-2-2-3-HR2	432	95
5	BC2F4	BR15203	BR9844-7-4-1-2-4-2/BRRi dhan70// BR9844-7-4-1-2-4-2	432	100
6	BC3F4	BR15207	BRRi dhan90/BRRi dhan70/// BRRi dhan90	720	102
7	BC1F5	BR14882	BRRi dhan70/BRRi dhan90// BRRi dhan90	288	135
8	BC1F5	BR14883	BR9590-45-1-3-2-P2/BRRi dhan70// BR9590-45-1-3-2-P2	324	100
9	BC1F5	BR14884	BR8528-2-2-3-HR2/BRRi dhan70// BR8528-2-2-3-HR2	288	52
10	BC1F5	BR14885	BR9844-7-4-1-2-4-2/BRRi dhan70// BR9844-7-4-1-2-4-2	216	49
11	BC2F5	BR14880	BRRi dhan90/BRRi dhan70/// BRRi dhan90	360	140
Total				4,232	1,087
Sub Total				21,504	13,407

DS: 24/06/2024

Experiment 7A.4: Line Stage Testing (LST)

Principal Investigator: M R Islam.

Co-Investigators: S T Tuba, S Maniruzzaman, M M Yasmin, A Rahman, and K M Iftekharuddaula.

Specific objective: Selection of uniform aromatic genotypes in terms of uniformity in flowering, plant height, amylose content, presence or absence of aroma with good plant type, and higher predicted yield indicated by key target trait markers.

Materials and Methods: A total of 5,753 fixed advanced lines from 30 crosses were grown in 12-hill single-row plots using systematic arrangement design with respective parents and check varieties. Thirty days old single seedling was transplanted at 20 cm × 20 cm spacing. Fertilizer management was done following the dosages described in Expt. 7A.1. Crop management was done as recommended for modern rice cultivation practices. Leaf samples were collected from single plant of each entry for genotyping with specific trait markers using 10 trait-based SNP markers. At maturity, line selection was done considering uniformity in flowering and plant height, grain size and shape, lodging tolerance and tolerance to major

disease and insect, presence and absence of aroma with good plant type, and higher predicted yield indicated by key target trait markers.

Results: A total of 393 lines were selected from 5,753 progenies from 30 crosses (Table 7A.4) based on phenotypic acceptance, uniformity in flowering, plant height, grain size and shape, lodging tolerance and tolerance to major disease and insect, presence and absence of aroma with good plant type and higher predicted yield indicated by key target trait markers.

Table 7A.4: List of superior fixed lines selected from LST populations, Development of Premium Quality Rice, T. Aman 2024-25

SN	BR No.	Cross Combination	Lines Grown	Lines selected
1	BR13304-4R	BR8850-24-6-7-3/IR9669-pp823-1	253	0
2	BR13305-4R	BR8536-27-2-1-2/Aftab-5	132	15
3	BR13306-4R	BR8536-27-2-1-2/BR8493-3-5-1(Com)	262	21
4	BR13307-4R	BR8493-3-5-1(Com)/BR9178-7-2-4-4	33	2
5	BR13308-4R	BR8535-2-1-2/Noyonmoni-1	56	5
6	BR13309-4R	Noyonmoni-2/BR8535-2-1-2	26	1
7	BR13310-4R	BR8887-26-8-2-3/Dudulata	138	8
8	BR13311-4R	BR8887-26-8-2-3/Kataribhog	76	0
9	BR13312-4R	BR9584-6-3-5-3/Kataribhog	30	2
10	BR13313-4R	BR9593-5-1-1-1/Krishnobhog	21	0
11	BR13315-4R	Krishnobhog/BR8536-27-2-1-2	75	6
12	BR14188-4R	BR8493-3-5-1-P1/ Pusa Basmati	126	18
13	BR14189-4R	BR9178-7-2-4-4/Pusa Basmati	159	9
14	BR14191-4R	BR9178-7-2-4-4/Indian Basmati	148	20
15	BR14192-4R	DR-6/ BR8493-3-5-1-P1	74	6
16	BR14193-4R	BR8862-29-1-5-1-3/BR9178-7-2-4-4-P1	133	11
17	BR14194-4R	SwarnaKatari (Poba)/BR9178-7-2-4-4	184	9
18	BR14195-4R	BR9178-7-2-4-4/ SwarnaKatari (Poba)	56	3
19	BR13943-4R	BRRi dhan90/BRRi dhan70	317	48
20	BR14515-4R	BRRi dhan70/BRRi dhan90	397	52
21	BR14519-4R	BR8528-2-2-3-HR2/BRRi dhan70	425	20
22	BR14527-4R	BR9844-7-4-1-2-4-2/BRRi dhan70	383	29
23	BR13943-4R	BRRi dhan90/BRRi dhan70// BRRi dhan90	404	48
24	BR14563-4R	BRRi dhan90/Black rice (PKSF)	294	5
25	BR14564-4R	BRRi dhan99/PadiBungi	218	23
26	BR14565-4R	BRRi dhan100/Padichelam	387	8
27	BR14567-4R	BRH11-9-11-45B-HR3/Black rice (Sylhet)*	111	2
28	BR14568-4R	Ja Hua/Black rice (Sylhet)*	142	1
29	BR14571-4R	BRRi dhan90/ Black rice (Sylhet)*	387	7
30	BR14572-4R	BR8882-30-2-5-2/ Black rice (Sylhet)*	306	14
Total			5,753	393

DS: 18/07/2024 DT: 13/08/2024

Experiment 7A.5: Observational Yield Trial (OYT)

Principal Investigator: M R Islam

Co-Investigators: A Rahman, S T Tuba, S Maniruzzaman and K M Iftekharuddaula

Specific objective: Selection of materials with better phenotypic acceptance, homogeneity in the population, shorter growth duration, aroma and higher yield potential than the standard check varieties.

Materials and Methods: A total of 150 genotypes, along with six checks, were evaluated in an Augmented RCB design with four replications. Thirty days old seedlings were transplanted at a spacing of 20 cm × 20 cm using a single seedling/hill. The plot size was 3m². Fertilizers were applied as described in experiment 7a.1. Crop management was carried out as and when necessary.

Results: A total of 66 genotypes were selected out of 150 genotypes based on homogeneity in the population, phenotypic acceptance, plant type, grain type, presence/absence of aroma, and higher yield. The yield ranged from 1.27-5.43 t/ha with a growth duration of 119 to 146 days. The genotype BR14189-5R-49 produced the highest yield of 5.43 t/ha with a growth duration of 134 days (Table 7a.5). The heritability obtained for the plant height, growth duration and yield were 67%, 88% and 72%, respectively, indicating high level of precision in this experiment (Table 7a.5).

Table 7a.5: Performance of the genotypes of Observational Yield Trial, Development of Premium Quality Rice, T. Aman 2024-25

SN	Designation	PH (cm)	GD (days)	PAcp at Maturity	Grain Yield (t/ha)	
					BLUE	BLUP
1	BR14189-5R-49	106	134	3	5.43	4.83
2	BR14192-5R-41	129	127	3	5.25	4.65
3	BR14189-5R-159	116	125	5	5.2	4.67
4	BR14192-5R-37	118	132	3	4.93	4.42
5	BR14194-5R-44	119	132	5	4.93	4.47
6	BR14189-5R-17	124	128	7	4.79	4.32
7	BR14189-5R-100	126	130	9	4.77	4.36
8	BR14192-5R-20	133	127	3	4.71	4.37
9	BR12808-5R-47	111	132	5	4.69	4.3
10	BR14193-5R-84	130	126	7	4.69	4.35
11	BR12808-5R-73	131	130	3	4.61	4.24
12	BR14188-5R-122	115	134	7	4.56	4.16
13	BR12808-5R-150	122	132	3	4.52	4.13
14	BR14192-5R-15-1	117	127	9	4.44	4.12
15	BR14192-5R-15	118	124	5	4.4	4.17
16	BR14192-5R-45	114	127	3	4.32	4.09
17	BR12808-5R-23	132	130	7	4.31	4.11
18	BR14189-5R-228	122	126	9	4.23	3.92
19	BR14192-5R-2	121	125	5	4.23	4.05
20	BR12806-5R-8	129	137	7	4.17	4.01
21	BR12807-5R-1	120	134	3	4.17	3.93
22	BR12808-5R-45	112	132	3	4.1	3.93
23	BR12806-5R-2	139	135	5	4.09	3.82
24	BR14189-5R-197	120	130	7	4.06	3.9
25	BR14193-5R-87	109	125	3	4.05	3.79
26	BR14189-5R-3	129	125	9	4.02	3.9
27	BR14191-5R-114	120	126	3	4.02	3.87
28	BR12808-5R-53	122	130	3	3.97	3.84
29	BR12808-5R-89	132	133	7	3.97	3.73
30	BR13722-5R-22	110	130	7	3.96	3.73
31	BR14194-5R-38	119	125	7	3.95	3.77
32	BR12808-5R-9	130	126	9	3.93	3.76
33	BR14189-5R-218	127	123	7	3.93	3.81
34	BR14193-5R-60	140	125	7	3.93	3.71
35	BR14192-5R-22	125	127	5	3.92	3.7
36	BR12808-5R-84	118	130	5	3.91	3.79
37	BR12808-5R-20	120	138	5	3.9	3.73
38	BR12808-5R-146	122	132	3	3.89	3.68
39	BR14195-5R-11	137	123	9	3.88	3.8
40	BR14192-5R-35	125	125	7	3.85	3.65
41	BR12808-5R-170	121	134	3	3.84	3.69
42	BR14195-5R-31	122	127	7	3.84	3.74
43	BR12807-5R-16	125	139	3	3.83	3.63
44	BR14189-5R-58	123	133	5	3.83	3.63
45	BR12808-5R-3	115	132	3	3.82	3.73
46	BR13722-5R-6	122	135	7	3.81	3.62
47	BR13943-5R-7	111	126	7	3.77	3.59
48	BR14183-5R-66	117	133	5	3.77	3.72
49	BR12807-5R-21	142	138	5	3.75	3.68
50	BR14194-5R-22	124	121	7	3.75	3.58
51	BR13722-5R-20	122	126	5	3.73	3.69
52	BR14188-5R-76	129	124	9	3.69	3.53
53	BR14189-5R-149	151	120	9	3.69	3.58
54	BR13722-5R-2	103	125	3	3.66	3.56
55	BR14192-5R-5	109	121	7	3.65	3.5
56	BR12808-5R-79	129	132	7	3.63	3.62
57	BR13722-5R-4	99	131	5	3.61	3.53
58	BR14183-5R-113	108	133	3	3.6	3.47
59	BR14194-5R-74	114	125	5	3.6	3.57
60	BR12806-5R-22	104	141	9	3.58	3.5
61	BR12812-5R-9	100	132	5	3.58	3.56
62	BR14192-5R-11	145	127	7	3.57	3.45
63	BR12807-5R-7	134	137	3	3.56	3.57
64	BR13723-5R-7	123	125	7	3.55	3.56
65	BR12812-5R-8	130	141	5	3.54	3.55
66	BR13736-5R-10	112	127	5	3.53	3.52
67	BR14194-5R-76	132	125	7	3.53	3.52
68	BR13722-5R-7	125	138	5	3.51	3.51
69	BR14188-5R-147	122	126	7	3.51	3.45
70	BR12808-5R-34	114	127	9	3.5	3.45

SN	Designation	PH (cm)	GD (days)	PAcp at Maturity	Grain Yield (t/ha)	
					BLUE	BLUP
71	BR12808-5R-95	110	126	5	3.5	3.4
72	BR12812-5R-22	128	134	7	3.46	3.37
73	BR14195-5R-23	106	119	5	3.46	3.42
74	BR14189-5R-8	119	127	7	3.45	3.41
75	BR12808-5R-39	134	130	5	3.42	3.47
76	BR12812-5R-21	116	126	9	3.39	3.45
77	BR14192-5R-32	129	121	9	3.36	3.35
78	BR14192-5R-7	133	137	5	3.35	3.34
79	BR13943-5R-20	121	124	5	3.33	3.32
80	BR13942-5R-89	106	120	7	3.28	3.24
81	BR14192-5R-25	122	124	5	3.27	3.36
82	BR14194-5R-23	127	124	7	3.25	3.35
83	BR13722-5R-14	116	135	3	3.23	3.25
84	BR13722-5R-5-1	106	132	7	3.21	3.32
85	BR14189-5R-23	128	125	9	3.21	3.32
86	BR12806-5R-12	116	137	7	3.2	3.28
87	BR13722-5R-25-1	130	127	9	3.2	3.31
88	BR13722-5R-5	95	130	5	3.2	3.18
89	BR13736-5R-7	108	129	3	3.19	3.28
90	BR14183-5R-1	116	130	5	3.18	3.17
91	BR13722-5R-17	121	124	5	3.17	3.29
92	BR13723-5R-9	117	134	7	3.17	3.26
93	BR13736-5R-17	105	126	5	3.16	3.26
94	BR12808-5R-42	114	131	3	3.15	3.25
95	BR13943-5R-2	109	125	9	3.11	3.12
96	BR14183-5R-101	104	130	5	3.11	3.22
97	BR13942-5R-59	104	125	5	3.1	3.21
98	BR12812-5R-1	131	132	9	3.05	3.2
99	BR12807-5R-31	143	142	3	3.04	3.2
100	BR12808-5R-68	127	133	7	3.04	3.17
101	BR13723-5R-11	113	126	5	3.04	3.07
102	BR14183-5R-117	125	131	9	3.04	3.12
103	BR12812-5R-25	119	131	5	3.01	3.17
104	BR14188-5R-139	125	139	3	3.01	3.15
105	BR13942-5R-85	115	125	5	2.98	3.15
106	BR12808-5R-5	131	137	5	2.97	3.12
107	BR13723-5R-13	105	131	7	2.97	3.12
108	BR12817-5R-26	147	128	9	2.95	3
109	BR14183-5R-42	125	137	7	2.95	3
110	BR13942-5R-49	109	127	7	2.94	3.1
111	BR14194-5R-102	121	134	7	2.93	3.12
112	BR14195-5R-8	119	128	7	2.93	3.09
113	BR12816-5R-15	135	124	9	2.91	3.02
114	BR13943-5R-8	105	134	7	2.87	2.99
115	BR12812-5R-3	120	131	7	2.82	2.91
116	BR13736-5R-21	111	131	5	2.82	2.96
117	BR13736-5R-2	112	134	7	2.79	2.94
118	BR14187-5R-132	121	141	5	2.78	3.01
119	BR13942-5R-87	99	126	9	2.77	2.92
120	BR12808-5R-107	128	130	5	2.75	2.96
121	BR13942-5R-53	98	120	9	2.75	2.91
122	BR12806-5R-19	147	145	3	2.72	2.97
123	BR14191-5R-24	118	132	3	2.7	2.95
124	BR12808-5R-158	123	124	7	2.69	2.94
125	BR14187-5R-119	108	127	7	2.69	2.87
126	BR12808-5R-82	121	129	5	2.67	2.9
127	BR14183-5R-45	100	125	9	2.62	2.77
128	BR12807-5R-2	142	134	5	2.59	2.85
129	BR13722-5R-3	111	123	7	2.58	2.74
130	BR13722-5R-9	107	132	9	2.57	2.86
131	BR13723-5R-1	113	131	7	2.57	2.73
132	BR12806-5R-15	130	139	5	2.54	2.81
133	BR13723-5R-2	100	134	9	2.51	2.74
134	BR13722-5R-25	119	131	9	2.48	2.79
135	BR12807-5R-32	149	137	9	2.4	2.66
136	BR14187-5R-28	110	120	9	2.39	2.65
137	BR13736-5R-1	118	125	9	2.38	2.72
138	BR14187-5R-133	109	133	9	2.36	2.63
139	BR13942-5R-20	112	121	5	2.33	2.66
140	BR14187-5R-48	114	120	9	2.28	2.57
141	BR14187-5R-5	102	120	9	2.21	2.6
142	BR12808-5R-1	113	131	7	2.1	2.39
143	BR13942-5R-48	103	121	9	2.03	2.44

SN	Designation	PH (cm)	GD (days)	PAcp at Maturity	Grain Yield (t/ha)	
					BLUE	BLUP
144	BR13942-5R-97	97	125	5	2.03	2.39
145	BR13736-5R-15	105	127	7	1.89	2.34
146	BR14191-5R-108	124	125	9	1.62	2.18
147	BR14194-5R-126	123	121	9	1.56	2.01
148	BR14183-5R-11	128	134	5	1.27	1.9
CK1	BRR1 dhan34	129	146	5	2.7	2.76
CK2	BRR1 dhan70	120	128	6	3.5	3.49
CK3	BRR1 dhan75	101	119	5	3.27	3.28
CK4	BRR1 dhan80	113	130	6	3.81	3.77
CK5	BRR1 dhan90	103	121	8	2.68	2.74
CK6	Kalizira	144	138	7	2.42	2.51
Range		95-151	119-146		1.27-5.43	1.9-4.83
H2b		0.67	0.88	0.78	0.72	
LSD (0.05)		20.28	5.65	2.44	1.12	

DS: 14/07/2024 DT: 07/08/2024

Experiment 7A.6: Preliminary Yield Trial PYT#1 (PYT#1)

Principal Investigator: M R Islam

Co-Investigators: A Rahman, S T Tuba, S Maniruzzaman and K M Iftekharuddaula

Specific objective: Preliminary yield evaluation of advanced breeding lines with strong plant type, fine grain properties and presence or absence of aroma.

Materials and Methods: A total of 42 fixed lines along with six checks were evaluated in RCB design with two replications. Thirty days old seedlings were transplanted at a spacing of 20 cm × 20 cm using single seedling/hill. The plot size was 6.24m². Fertilizers were applied as described in experiment 7a.1. Crop management was carried out as and when necessary.

Results: A total of 17 genotypes were selected out of 42 genotypes based on homogeneity in the population, phenotypic acceptance, plant type, grain type, presence/absence of aroma, and yield. The highest yielding genotype, BR13943-3R-64 gave 4.62 t/ha yields with a duration of 128 days (Table 7A.6). The yield of the selected genotypes ranged from 2.01 t/ha to 4.62 t/ha whereas that of the growth duration was 116 days to 141 days. The heritability obtained for plant height, growth duration and yield were 96%, 96% and 58%, respectively, indicating a high level of precision in this experiment (Table 7A.6).

Table 7A.6: Performance of selected genotypes in Preliminary Yield Trial PYT#1 (PYT#1), Development of Premium Quality Rice, T. Aman 2024-25

SL	Designation	Plant Height (cm)	Growth duration (days)	PAcp at Maturity	Grain Yield (t/h)	
					BLUE	BLUP
1	BR13943-3R-64	146	128	6	4.62	4.28
2	BR13722-3R-165	112	132	5	4.31	4.07
3	BR13943-3R-103	135	123	5	4.12	3.93
4	BR13736-3R-56	99	138	3	4.09	3.91
5	BR13736-3R-60	114	133	3	4.08	3.9
6	BR13942-3R-213	113	122	6	4.07	3.89
7	BR13942-3R-170	112	122	4	4.03	3.87
8	BR13942-3R-128	101	125	3	3.95	3.81
9	BR13723-3R-130	121	133	3	3.85	3.74
10	BR13722-3R-50	124	124	7	3.83	3.73
11	BR13736-3R-169	135	124	6	3.81	3.71
12	BR13942-3R-299	110	123	4	3.8	3.7
13	BR13943-3R-85	135	122	5	3.79	3.7
14	BR13942-3R-1	106	122	5	3.77	3.69
15	BR13723-3R-55	133	120	5	3.76	3.68
16	BR13943-3R-28	119	128	7	3.73	3.66
17	BR13943-3R-95	122	131	4	3.71	3.64
18	BR13736-3R-59	118	120	9	3.64	3.59
19	BR13736-3R-139	135	126	8	3.63	3.59
20	BR13942-3R-420	117	123	7	3.6	3.56
21	BR13942-3R-436	107	125	3	3.59	3.56
22	BR13943-3R-91	133	125	6	3.58	3.55
23	BR13942-3R-419	111	121	7	3.54	3.53
24	BR13722-3R-49	126	122	6	3.52	3.51
25	BR13942-3R-308	105	121	5	3.45	3.46

SL	Designation	Plant Height (cm)	Growth duration (days)	PAcp at Maturity	Grain Yield (t/h)	
					BLUE	BLUP
26	BR13723-3R-114	116	121	7	3.44	3.45
27	BR13942-3R-289	104	120	4	3.4	3.43
28	BR13942-3R-195	107	120	8	3.38	3.41
29	BR13736-3R-74	94	127	6	3.34	3.38
30	BR13943-3R-22	100	128	4	3.32	3.37
31	BR13942-3R-435	114	121	7	3.31	3.36
32	BR13942-3R-429	106	119	4	3.29	3.35
33	BR13723-3R-14	121	122	7	3.25	3.32
34	BR13942-3R-457	120	124	7	3.25	3.32
35	BR13723-3R-176	128	125	8	3.17	3.27
36	BR13736-3R-177	105	123	6	3.16	3.26
37	BR13942-3R-2	108	117	6	3.14	3.24
38	BR13943-3R-97	129	126	5	3.13	3.24
39	BR13942-3R-421	111	116	5	2.81	3.01
40	BR13942-3R-181	117	121	5	2.79	3
41	BR13942-3R-409	100	121	6	2.79	3
42	BR13942-3R-229	111	121	6	2.68	2.92
Ck1	BRRI dhan34	143	141	5	3.25	3.32
Ck2	BRRI dhan70	130	129	4	4.06	3.89
Ck3	BRRI dhan90	123	125	6	3.37	3.41
Ck4	Dudshail	164	139	5	3.01	3.15
Ck5	Kalizira	162	134	7	2.01	2.45
Ck6	Tulshimala	163	138	7	2.44	2.75
Range		94-164	116-141		2.01-4.62	2.45-4.28
H2b		0.96	0.96	0.58	0.7	
LSD (0.05)		9.36	3.17	1.96	0.75	

DS: 16/07/2024DT: 11/08/2024

Experiment 7A.7: Preliminary Yield Trial PYT#2 (PYT#2)

Principal Investigator: M R Islam

Co-Investigators: A Rahman, S T Tuba, S Maniruzzaman and K M Iftekharuddaula

Specific objective: Preliminary yield evaluation of advanced breeding lines with strong plant type, fine grain properties and presence or absence of aroma.

Materials and Methods: A total of seven fixed lines along with three checks were evaluated in RCB design with two replications. Thirty days old seedlings were transplanted at a spacing of 20 cm × 20 cm using single seedling/hill. The plot size was 7.2m². Fertilizers were applied as described in experiment 7a.1. Crop management was carried out as and when necessary.

Results: A total of four genotypes were selected out of seven genotypes based on homogeneity in the population, phenotypic acceptance, plant type, grain type, presence/absence of aroma, and yield. The highest yielding genotype, BR11811-9-2-2-P2*, gave 3.74 t/ha yields with a duration of 126 days (Table 7A.7). The yield of the selected genotypes ranged from 2.11 t/ha to 3.74 t/ha, whereas the growth duration was 120 days to 139 days. The heritability obtained for plant height, growth duration, and yield was 88%, 54% and 47%, respectively, indicating a high level of precision in this experiment (Table 7A.7).

Table 7A.7: Performance of selected genotypes in Preliminary Yield Trial PYT#2 (PYT#2), Development of Premium Quality Rice, T. Aman 2024-25

SN	Designation	PH (cm)	GD (days)	PAcp at Maturity	Grain Yield (t/h)	
					BLUE	BLUP
1	BR11811-9-2-2-P2*	136	126	7	3.74	3.67
2	BR9178-7-2-4-4-P2-7	132	131	4	3.56	3.51
3	BR9178-7-2-4-4-P2-2	110	133	3	3.33	3.3
4	BR9178-7-2-4-4-P2-12	117	122	5	3.26	3.23
5	BR9178-7-2-4-4-P2-6	123	128	3	3.25	3.23
6	BR9178-7-2-4-4-P2-10	132	139	5	3.06	3.05
7	BR9178-7-2-4-4-P2-11	119	124	6	2.97	2.98
Ck1	BRRI dhan34	144	139	4	2.11	2.19
Ck2	BRRI dhan70	121	127	5	3.02	3.02
Ck3	BRRI dhan90	106	120	6	2.11	2.2
Range		106-144	120-139		2.11-3.74	2.19-3.67
H2b		0.88	0.54	0.77	0.91	

LSD (0.05)	11.5	12.41	1.75	0.47
DS: 16/07/2024	DT: 08/08/2024			

Experiment 7A.8: Advanced Yield Trial#1 (AYT#1)

Principal Investigator: M R Islam

Co-Investigators: S T Tuba, S Maniruzzaman, M M Yasmin, A Rahman, and K M Iftekharuddaula

Specific objective: Advanced yield evaluation of advanced breeding lines with strong plant type, fine grain properties and with or without aroma.

Materials and Methods: 11 genotypes along with four checks were evaluated in RCB design with two replications. Twenty-five days old seedlings were transplanted at a spacing of 20 cm × 20 cm using two to three seedlings/hill. The plot size was 7.2m². Fertilizers were applied as described in experiment 7A.1. Crop management was carried out as and when necessary.

Results: A total of seven genotypes were selected out of seven genotypes based on phenotypic acceptance, plant type, grain type, photosensitivity, and higher yield. The genotype BR10812-8-4-3-2-P2* produced significantly higher yield (3.91 t/ha) with 122 days growth days (Table 7A.8). The yield of the genotypes was from 1.37 t/ha to 3.91 t/ha. The heritability obtained for the plant height, growth duration and yield were 93%, 94% and 88%, respectively, indicating high level of precision in this experiment (Table 7A.8).

Table 7A.8: Performance of selected genotypes in Advanced Yield Trial#1, (AYT#1), Development of Premium Quality Rice, T. Aman 2024-25

SN	Designation	PH(cm)	GD(days)	PAcp	Yield(t/h)	
					BLUE	BLUP
1	BR10812-8-4-3-2-P2*	127	122	5	3.91	3.75
2	BR11224-7-9-4-3-P2	122	121	7	3.27	3.18
3	BR8845-18-8-45-4-11*	117	126	5	2.83	2.8
4	BR9178-7-2-4-4-P1	103	117	5	2.64	2.64
5	BR8845-21-1-10-3-1*	124	131	5	2.63	2.62
6	BR9053-16-3-4-1	111	131	4	2.47	2.49
7	BR9126-15-3-4-1*	146	137	4	2.43	2.45
8	BR8845-18-8-45-4-6*	121	126	8	2.25	2.29
9	BR11806-8-5-3-3-4-P3	112	132	6	2.21	2.26
10	BR10824-5-6-4-1*	128	139	3	2.19	2.24
11	BR10813-75-20-10-12*	140	139	5	1.37	1.52
Ck1	BRRI dhan34 (Ck)	152	136	5	1.85	1.94
Ck2	BRRI dhan70 (Ck)	120	127	5	3.18	3.1
Ck3	BRRI dhan80 (Ck)	109	124	5	3.58	3.46
Ck4	BRRI dhan90 (Ck)	108	116	6	2.35	2.38
Range		108-152	116-139		1.37-3.91	1.52-3.75
H2b		0.93	0.94	0.57	0.88	
LSD (0.05)		10.7	4.87	2.68	0.65	

DS: 18/07/2024	DT: 08/08/2024

Experiment 7A.9: Advanced Yield Trial#2 (AYT#2)

Principal Investigator: M R Islam

Co-Investigators: S T Tuba, S Maniruzzaman, M M Yasmin, A Rahman, and K M Iftekharuddaula

Specific objective: Advanced yield evaluation of advanced breeding lines with strong plant type, fine grain properties and with or without aroma.

Materials and Methods: Six genotypes along with two checks were evaluated in RCB design with two replications. Twenty-five days old seedlings were transplanted at a spacing of 20 cm × 20 cm using two to three seedlings/hill. The plot size was 12m². Fertilizers were applied as described in experiment 7A.1. Crop management was carried out as and when necessary.

Results: A total of three genotypes were selected out of six genotypes based on phenotypic acceptance, plant type, grain type, photosensitivity, and higher yield. The genotype BR8493-3-5-1-P1** produced significantly higher yield (3.18 t/ha) with 127 days growth days (Table

7A.9). The yield of the genotypes ranged from 2.21 t/ha to 3.18 t/ha. The heritability obtained for the plant height, growth duration and yield were 94%, 98% and 39%, respectively, indicating high level of precision in this experiment (Table 7A.9).

Table 7A.9: Performance of selected genotypes in Advanced Yield Trial#2, (AYT#2), Development of Premium Quality Rice, T. Aman 2024-25

SN	Designation	PH (cm)	GD (days)	PAcp	Yield (t/ha)
1	BR8493-3-5-1-P1**	116	127	5	3.18
2	BR9178-7-2-4-4-P2	119	137	6	3.03
3	BR9590-45-1-3-2-P2	115	138	5	3.00
4	BR10824-5-6-4-1*	124	141	3	2.74
5	BR8493-12-7-4-P1*	113	137	6	2.63
6	BR9580-30-2-1-1*	113	139	9	2.26
Ck1	BRRI dhan34 (Ck)	145	136	7	2.21
Ck2	Dudshail	153	137	3	2.69
	Range	113-153	127-141		2.21-3.18
	H2b	0.94	0.98	0.95	0.39
	LSD (0.05)	10.39	1.61	1.28	1.14

DS: 18/07/2025 DT: 08/08/2025

Development of Small Grain (national Grade) Premium Quality Rice (PQR) for Boro Season

Experiment 7A.10: Observational Yield Trial (OYT), Boro2024-25

Principal Investigator: M R Islam

Co-Investigators: A Rahman, S T Tuba, S Ghosal, and K M Iftekharuddaula

Specific objective: Selection of materials with better phenotypic acceptance, homogeneity in the population, shorter growth duration, aroma and higher yield potential than the standard check varieties.

Materials and Methods: A total of 315 genotypes, along with five checks, were evaluated in an Augmented RCB design with four replications. Thirty-day-old seedlings were transplanted at a spacing of 20 cm × 20 cm using a single seedling/hill. The plot size was 4m². Fertilizers were applied as described in experiment 7a.1. Crop management was carried out as and when necessary.

Results: A total of 66 genotypes were selected out of 315 genotypes based on homogeneity in the population, phenotypic acceptance, plant type, grain type, presence/absence of aroma, and higher yield. The yield ranged from 2.48-8.69 t/ha with a growth duration of 115-156 days. The genotype BR14191-4R-14 produced the highest yield of 8.52 t/ha with a growth duration of 136 days (Table 7a.10). The heritability obtained for the plant height, growth duration and yield were 88%, 98% and 70%, respectively, indicating high level of precision in this experiment (Table 7a.10).

Table 7a.10: Performance of Observational Yield Trial (OYT), Development of Premium Quality Rice (PQR), Boro2024-25

SN	Designation	PH (cm)	GD (days)	Grain yield (t/ha)		Trait Marker
				BLUE	BLUP	
1	BR14191-4R-14	112	136	8.52	7.75	<i>Wx(a) DTH8</i>
2	BR14189-4R-25	113	122	8.07	7.37	<i>DTH8</i>
3	BR14188-4R-58	121	120	7.94	7.34	<i>Wx(a) Pita fgr-1 DTH8</i>
4	BR14193-4R-36	116	124	7.58	7.09	<i>Wx(a) Pita fgr-1 DTH8</i>
5	BR14193-4R-29	105	123	7.49	7.28	<i>Wx(int)- fgr-1 DTH8</i>
6	BR14192-4R-1	107	127	7.44	6.92	<i>DTH8</i>
7	BR14193-4R-22	106	129	7.4	6.97	<i>Wx(a) fgr-1 DTH8</i>
8	BR14194-4R-9	103	136	7.27	6.87	<i>Wx(int)- DTH8</i>
9	BR14191-4R-43	122	123	7.24	6.85	<i>Wx(int)-IR64 Pita Xa5 Xa21 DTH8 Xa13</i>
10	BR14191-4R-103	117	122	7.15	6.72	<i>Wx(int)-IR64 Pita Xa5 Xa21 DTH8</i>
11	BR14193-4R-28	112	117	7.12	6.7	<i>Wx(a) fgr-1 DTH8</i>
12	BR14189-4R-24	119	124	7.03	6.71	<i>Wx(int)-IR64 Pita fgr-1</i>
13	BR14194-4R-37	108	127	6.74	6.5	<i>Wx(int)- fgr-1 DTH8</i>
14	BR14191-4R-6	105	126	6.67	6.45	<i>Wx(a) DTH8</i>
15	BR14192-4R-28	128	130	6.67	6.38	<i>Wx(int)- Pita DTH8</i>

16	BR14195-4R-3	99	137	6.66	6.44	<i>Wx(int)- DTH8</i>
17	BR14191-4R-18	119	121	6.63	6.37	<i>Wx(int) IR64/ Pita fgr-1Xa5DTH8 Xa13</i>
18	BR14189-4R-61	103	128	6.61	6.66	<i>Wx(int)-IR64 fgr-1 DTH8</i>
19	BR14189-4R-26	90	127	6.56	6.63	<i>wx(b) DTH8</i>
20	BR14194-4R-11	89	136	6.56	6.32	<i>Wx(a) fgr-1 DTH8</i>
21	BR14191-4R-29	98	128	6.49	6.26	<i>Wx(int)- fgr-1 DTH8</i>
22	BR14189-4R-9	122	125	6.41	6.27	<i>[Het]-Wx(int) IR64/ Pita fgr-1 DTH8</i>
23	BR14193-4R-1	119	124	6.4	6.19	<i>Wx(a) Pita DTH8</i>
24	BR14191-4R-89	102	121	6.38	6.50	<i>Waxy DTH8</i>
25	BR14191-4R-108	121	121	6.24	6.08	<i>Wx(int)-IR64 Pita Xa5 Xa21 DTH8 Xa13</i>
26	BR14194-4R-65	99	134	6.12	6.0	<i>Wx(int)- fgr-1 DTH8</i>
27	BR14191-4R-70	114	121	6.06	6.02	<i>Wx(int)- Pita fgr-1 DTH8</i>
28	BR14188-4R-8	114	115	6.05	6.27	<i>Wx(a) fgr-1 DTH8</i>
29	BR14189-4R-53	112	131	6.03	6.26	<i>Wx(a) DTH8</i>
30	BR14188-5R-76	114	132	6.01	5.93	
31	BR14193-4R-7	103	121	5.98	5.91	<i>Wx(int)- fgr-1 DTH8</i>
32	BR14192-4R-28	117	129	5.87	5.89	<i>Wx(int)- Pita DTH8</i>
33	BR14188-4R-37	143	128	5.85	5.88	<i>Wx(int) IR64/ fgr-1DTH8</i>
34	BR14192-4R-23	120	123	5.83	6.12	<i>Wx(int)-IR64 DTH8</i>
35	BR14191-4R-46	108	118	5.79	5.77	<i>Wx(int)- Pita fgr-1 DTH8</i>
36	BR14191-4R-4	98	123	5.69	5.77	<i>Wx(int)- Pita fgr-1 DTH8</i>
37	BR13315-4R-15	109	133	5.65	5.67	<i>Wx(a)-NB/Wx(op) Pita Xa5 DTH8</i>
38	BR14193-4R-68	111	127	5.64	5.67	<i>fgr-1DTH8</i>
39	BR14188-4R-33	106	133	5.63	5.98	<i>Wx(a) fgr-1 DTH8</i>
40	BR14191-4R-95	95	124	5.61	5.65	<i>Wx(int)- Pita fgr-1 DTH8</i>
41	BR14188-4R-34	125	126	5.59	5.95	
42	BR14188-4R-52	124	123	5.58	5.62	
43	BR14193-4R-63	106	130	5.57	5.61	<i>Wx(int)- fgr-1 DTH8</i>
44	BR14188-4R-26	106	123	5.51	5.64	<i>fgr-1DTH8</i>
45	BR14192-4R-9	106	132	5.51	5.57	<i>Pita DTH8</i>
46	BR14188-4R-27	122	126	5.5	5.56	<i>fgr-1 DTH8</i>
47	BR14192-4R-39	109	125	5.48	5.55	<i>Wx(int)- fgr-1 DTH8</i>
48	BR14191-4R-42	106	118	5.46	5.54	<i>Wx(int)- Pita fgr-1</i>
49	BR14191-4R-90	109	125	5.45	5.6	<i>Wx(int)- Pita fgr-1DTH8</i>
50	BR14188-4R-5	125	130	5.39	5.55	<i>Wx(int)- fgr-1 Xa5</i>
51	BR14194-4R-6	105	131	5.37	5.48	<i>DTH8</i>
52	BR14188-4R-61	102	132	5.31	5.75	<i>Wx(a) Pita fgr-1 DTH8</i>
53	BR14191-4R-93	94	126	5.3	5.49	<i>Wx(int)- fgr-1 DTH8</i>
54	BR13312-4R-13	128	123	5.28	5.48	<i>Wx(a) DTH8</i>
55	BR14189-4R-3	128	135	5.13	5.63	<i>Wx(int)- fgr-1 DTH8</i>
56	BR14195-4R-22	104	130	5.12	5.31	<i>Wx(int)- fgr-1DTH8</i>
57	BR14194-4R-30	105	135	5.09	5.29	<i>fgr-1DTH8</i>
58	BR14188-4R-47	145	127	5.08	5.28	<i>Wx(int)-IR64 Xa5Xa21 DTH8</i>
59	BR14191-4R-57	94	129	5.01	5.54	<i>Wx(int)- Pita fgr-1</i>
60	BR14191-4R-96	103	129	4.98	5.27	<i>Wx(int)- fgr-1 DTH8</i>
61	BR14188-4R-3	120	136	4.93	5.49	<i>Wx(a) fgr-1</i>
62	BR14188-5R-76	106	133	4.88	5.14	
63	BR14191-4R-7	104	121	4.88	5.45	<i>Wx(int)- Pita fgr-1 DTH8</i>
64	BR14194-4R-29	115	141	4.82	5.1	<i>Wx(int)- DTH8</i>
65	BR14195-4R-6	111	127	4.81	5.15	<i>Wx(a) Pita fgr-1 DTH8</i>
66	BR14188-4R-50	102	125	4.64	5.03	<i>Wx(int)- fgr-1 DTH8</i>
67	BR14191-4R-69	116	121	4.57	5.23	<i>Wx(int)- Pita fgr-1 DTH8</i>
68	BR13315-4R-31	105	124	4.54	5.21	<i>Pita DTH8</i>
69	BR14193-4R-73	96	130	4.39	4.85	<i>Wx(int)- fgr-1 DTH8</i>
70	BR14189-4R-29	109	136	4.36	4.78	<i>DTH8</i>
71	BR13315-4R-29	96	132	4.27	5.02	<i>Wx(int)- DTH8</i>
72	BR14188-4R-35	115	126	4.27	5.02	<i>Wx(a) fgr-1DTH8</i>
73	BR14194-4R-2	93	144	3.97	4.56	<i>Wx(int)- DTH8</i>
74	BR14188-4R-30	123	134	3.84	4.47	<i>Wx(a) fgr-1 DTH8</i>
75	BR14188-4R-251	116	121	3.69	4.62	<i>Wx(int)- fgr-1 DTH8</i>
76	BR14188-4R-51	120	129	3.64	4.27	<i>Wx(int) IR64/ fgr-1 Xa5 Xa21 DTH8</i>
77	BR14191-4R-72	98	128	3.64	4.58	<i>Wx(int)- Pita fgr-1 DTH8</i>
78	BR13315-4R-22	108	141	3.37	4.39	<i>wx(b)-IR34/Wx(a)-Swarna DTH8</i>
79	BR14193-4R-61	119	125	3.33	4.11	<i>Wx(a) fgr-1 DTH8</i>
80	BR13315-4R-34	95	134	3.32	4.05	<i>Wx(int)- DTH8</i>
81	BR14194-4R-60	99	143	3.14	3.91	<i>Wx(int)- fgr-1 DTH8</i>
82	BR14192-4R-10	104	135	2.48	3.77	<i>Wx(int)- Pita fgr-1DTH8</i>
Ck.1	BRRI dhan90	96	125	6.1	6.09	
Ck.2	BRRI dhan75	96	129	6.47	6.43	
Ck.3	BRRI dhan70	111	117	7.11	7.03	
Ck.4	BRRI dhan50	95	128	5.97	5.97	
Ck.5	BRRI dhan108	95	124	6.9	6.83	
	Range	78-145	115-156	2.48-8.69	3.75-7.87	
	LSD (0.05)	1.62	1.105	0.157		
	H2b	0.88	0.98	0.7		

Experiment 7A.11: Advanced Yield Trial#1 (AYT#1) evaluated in Boro2024-25

Principal Investigator: M R Islam.

Co-Investigators: A Rahman, S T Tuba, S Ghosal, and K M Iftekharuddaula.

Specific objective: Advanced yield evaluation of advanced breeding lines with strong plant type, fine grain properties and with or without aroma.

Materials and Methods: 17 genotypes, along with three checks, were evaluated in an RCB design with two replications. Twenty-five-day-old seedlings were transplanted at a spacing of 20 cm × 20 cm using two to three seedlings/hill. The plot size was 5m². Fertilizers were applied as described in experiment 7A.1. Crop management was carried out as and when necessary.

Results: A total of five genotypes were selected out of 17 genotypes based on phenotypic acceptance, plant type, grain type, photosensitivity, and higher yield. All the selected genotypes had aroma containing the *fgr-1* gene. The genotype BR14193-5R-87 produced significantly higher yield (6.18 t/ha) with 102 days of growth (Table 7A.11). The yield of the genotypes ranged from 1.98 t/ha to 6.18 t/ha. The heritability obtained for the plant height, growth duration, and yield were 77%, 76% and 76%, respectively, indicating a high level of precision in this experiment (Table 7A.11).

Table 7A.11: Performance of selected genotypes in Advanced Yield Trial#1 (AYT#1), Development of Premium Quality Rice (PQR), Boro2024-25

SN	Designation	PH (cm)	GD (days)	Yield (t/ha)		Trait Marker
				BLUE	BLUP	
1	BR14193-5R-87	100	127	6.18	5.91	Wx(int)-Basmati fgr-1 DTH8
2	BR14192-5R-15	122	131	6.16	5.89	Wx(int)-Basmati fgr-1, DTH8
3	BR14192-5R-22	121	146	6.13	5.87	Wx(int)-Basmati fgr-1 DTH8
4	BR14192-5R-15-1	106	123	6.01	5.78	Wx(int)-Basmati fgr-1,DTH8
5	BR14189-5R-218	121	120	5.93	5.72	Wx(a)/Wx(int) Pita fgr-1 DTH8
6	BR14189-5R-100	109	135	5.66	5.51	Wx(int),Pita fgr-1 DTH8
7	BR14183-5R-1	106	125	5.66	5.51	wx(b),Wx(a) fgr-1 DTH8 Xa13
8	BR14187-5R-119	100	138	5.43	5.34	Wx(a) fgr-1 DTH8
9	BR14193-5R-60	126	127	5.13	5.11	Wx(int)-Basmati fgr-1 DTH8
10	BR14192-5R-11	132	135	4.99	5	Wx(int)-Basmati fgr-1 DTH8
11	BR14189-5R-8	114	126	4.81	4.87	Wx(int)-Basmati fgr-1 DTH8
12	BR14192-5R-32	119	125	4.81	4.87	Wx(int)-Basmati fgr-1 DTH8
13	BR14191-5R-24	98	125	4.69	4.77	fgr-1 DTH8
14	BR14183-5R-42	100	117	4.64	4.74	Wx(int)-Basmati fgr-1 DTH8
15	BR14192-5R-5	99	122	4.54	4.66	Wx(a) fgr-1 DTH8
16	BR14192-5R-35	116	128	4.39	4.54	Wx(int)-Basmati fgr-1 DTH8
17	BR14189-5R-58	119	141	4.38	4.54	Wx(int),Pita fgr-1, DTH8
Ck1	BRRI dhan90	92	125	5.15	5.12	
Ck2	BRRI dhan75	94	127	6.1	5.85	
Ck3	BRRI dhan108	93	121	7.21	6.7	
LSD (0.05)		1.98	1.286	0.203		
H2b		0.77	0.76	0.76		

Experiment 7A.12: Advanced Yield Trial#2 (AYT#2) evaluated in Boro2024-25

Principal Investigator: M R Islam

Co-Investigators: A Rahman, S T Tuba, S Ghosal and K M Iftekharuddaula

Specific objective: Advanced yield evaluation of advanced breeding lines with strong plant type, fine grain properties and with or without aroma.

Materials and Methods: 32 genotypes, along with four checks, were evaluated in an RCB design with two replications. Twenty-five-day-old seedlings were transplanted at a spacing of 20 cm × 20 cm using two to three seedlings/hill. The plot size was 4m². Fertilizers were applied as described in experiment 7A.1. Crop management was carried out as and when necessary.

Results: A total of eight genotypes were selected out of 32 genotypes based on phenotypic acceptance, plant type, grain type, photosensitivity, and higher yield. All the selected

genotypes had aroma containing the *fgr-1* gene. The genotype BR13723-3R-114 produced significantly higher yield (8.19 t/ha) with 122 days of growth (Table 7A.12). The yield of the genotypes ranged from 3.36 t/ha to 8.19 t/ha. The heritability obtained for the plant height, growth duration, and yield were 80%, 41% and 76%, respectively, indicating a high level of precision in this experiment (Table 7A.12).

Table 7A.12: Performance of selected genotypes in Advanced Yield Trial#2 (AYT#2), Development of Premium Quality Rice (PQR), Boro2024-25

SN	Designation	PH (cm)	GD (days)	Grain Yield (t/ha)		Trait Marker
				BLUE	BLUP	
1	BR13723-3R-114	97	122	8.19	7.76	
2	BR9178-7-2-4-4-P1	102	125	7.14	6.94	
3	BR13942-3R-181	105	131	6.89	6.74	<i>Wx(a) fgr-1 DTH8</i>
4	BR13943-3R-103	106	126	6.88	6.73	<i>Wx(a) fgr-1 DTH8</i>
5	BR13942-3R-457	104	124	6.79	6.66	
6	BR13722-3R-50	100	124	6.57	6.49	<i>Wx(int)-Basmati fgr-1 DTH8</i>
7	BR13942-3R-419	94	124	6.55	6.47	
8	BR13942-3R-299	90	126	6.54	6.46	<i>Wx(a) fgr-1 DTH8</i>
9	BR13942-3R-213	109	143	6.47	6.41	<i>Wx(a)/Wx(int-IR64) Pita, fgr1,DTH8</i>
10	BR13942-3R-1	87	128	6.36	6.32	<i>Wx(a) fgr-1 DTH8</i>
11	BR13942-3R-195	94	127	6.35	6.32	
12	BR10812-8-4-3-2-P2	116	129	6.33	6.30	
13	BR13723-3R-14	102	127	6.30	6.28	
14	BR13942-3R-128	93	127	6.30	6.28	<i>Wx(a) fgr-1 DTH8</i>
15	BR11224-7-9-4-3-P2	113	126	6.27	6.25	
16	BR13723-3R-176	118	142	6.16	6.17	
17	BR13942-3R-289	92	124	6.07	6.10	<i>Wx(a) fgr-1 DTH8</i>
18	BR13722-3R-49	104	128	6.05	6.08	<i>Wx(int)-Basmati fgr-1 DTH8</i>
19	BR13942-3R-308	99	129	6.02	6.05	<i>fgr-1 DTH8</i>
20	BR13942-3R-409	87	127	5.96	6.01	<i>Wx(a) fgr-1 DTH8</i>
21	BR13942-3R-2	96	126	5.89	5.95	<i>Wx(a) fgr-1 DTH8</i>
22	BR13942-3R-229	92	128	5.88	5.95	<i>Wx(a) fgr-1 DTH8</i>
23	BR13723-3R-55	106	123	5.87	5.94	<i>Wx(a) DTH8</i>
24	BR13942-3R-429	99	129	5.84	5.91	<i>Wx(a) fgr-1 DTH8</i>
25	BR13942-3R-170	102	126	5.73	5.82	
26	BR13942-3R-420	105	131	5.73	5.83	
27	BR13736-3R-169	111	120	5.68	5.78	<i>Wx(a) fgr-1 DTH8</i>
28	BR13942-3R-435	113	128	5.54	5.67	
29	BR13942-3R-421	88	124	4.88	5.16	<i>Wx(a) fgr-1 DTH8</i>
30	BR13943-3R-85	121	125	4.67	4.99	
31	BR13736-3R-177	99	125	4.30	4.70	<i>Wx(int)-Basmati fgr-1 DTH8</i>
32	BR8845-18-8-45-4-11	118	123	3.36	3.96	
Ck1	BRRI dhan90	98	125	6.66	6.56	
Ck2	BRRI dhan75	93	127	7.34	7.09	
Ck3	BRRI dhan104	101	122	7.68	7.37	
Ck4	BRRI dhan108	104	120	7.81	7.47	
LSD		3.25	1.938	0.333		
H2b		0.8	0.41	0.76		

DS: 15/01/2025 DT: 10/02/2025

Experiment 7A.13: Advanced Yield Trial#3 (AYT#3) evaluated in Boro 2024-25

Principal Investigator: M R Islam

Co-Investigators: A Rahman, S T Tuba, S Ghosal, and K M Iftekharuddaula

Specific objective: Advanced yield evaluation of advanced breeding lines with strong plant type, fine grain properties and with or without aroma.

Materials and Methods: 58 genotypes, along with two checks, were evaluated in an RCB design with two replications. Twenty-five-day-old seedlings were transplanted at a spacing of 20 cm × 20 cm using two to three seedlings/hill. The plot size was 4m². Fertilizers were applied as described in experiment 7A.1. Crop management was carried out as and when necessary.

Results: A total of 13 genotypes were selected out of 58 genotypes based on phenotypic acceptance, plant type, grain type, photosensitivity, aroma and higher yield. The genotype BR18-7-14B produced significantly higher yield (8.66 t/ha) with 119 days of growth (Table 7A.13). The yield of the genotypes ranged from 2.84 t/ha to 8.66 t/ha. The heritability obtained

for the plant height, growth duration, and yield were 84%, 97% and 82%, respectively, indicating a high level of precision in this experiment (Table 7A.13).

Table 7A.13: Performance of selected genotypes in Advanced Yield Trial#3 (AYT#3), Development of Premium Quality Rice (PQR), Boro2024-25

SL. No.	Designation	PH (cm)	GD (days)	Yield (t/ha)
1	BR18-7-14B	95	119	8.66
2	BR9392-1-7-5B-P2	115	117	8.46
3	CN-5(2)	93	115	8.44
4	AC/007	105	135	8.43
5	CN-13	100	115	8.29
6	CN-11	96	115	8.27
7	BR9392-1-7-5B	93	120	8.25
8	BRH13-9-5-2B	101	118	8.22
9	BRH13-5-12-2-2B	101	120	8.21
10	BR10247-14-18-4	100	119	8.15
11	BRH11-7-17-10B	97	120	8.09
12	BRH15-2-4-7B	89	117	8.08
13	BRH13-5-12-2-2B	103	119	8.06
14	BRH1-2-1-7B	106	117	7.98
15	BRH13-2-4-6-4B	102	119	7.79
16	IR13N-190	83	111	7.79
17	BRH9-3-2B	89	118	7.77
18	BR9392-1-7-5B	93	120	7.74
19	BR15896-7-17-3-2B-7	102	116	7.74
20	BRH238-5-1-4-2	103	115	7.70
21	BRH9-3-14-2B	97	121	7.63
22	BR15896-7-17-3-2B-19	102	117	7.57
23	CN-5	96	114	7.53
24	BRH13-9-5-2B	100	118	7.51
25	BR9392-1-7-5B	101	120	7.45
26	BRH12-1-7B-P1	105	123	7.43
27	IR12A177	99	117	7.40
28	BRH10-1-14-2-6B	100	116	7.38
29	BRH18-9-4-2-3B	123	117	7.30
30	BR15903-2-3-5-11B-1	106	116	7.29
31	BR15896-7-17-3-2B-6	114	116	7.29
32	BRH15-24-7B	90	119	7.15
33	Cn-6	94	117	7.08
34	BR10247-4-7-4B	91	117	7.02
35	BR15896-7-17-3-2B-17	105	116	7.00
36	BR9892-1-2-4-4B	129	132	6.99
37	BRH11-7-17-10B	102	118	6.93
38	BRH17-23-8-2-7B	95	118	6.91
39	BRH13-7-9-3-2B	111	125	6.85
40	BRH18-9-4-2-3B	126	117	6.62
41	IR12A177	101	115	6.56
42	BR906-4-8-13-2B-3	114	117	6.51
43	MHR-15B	130	119	6.50
44	BRH11-9-11-5B-HR3-PS1	103	118	6.41
45	BRH13-7-9-3-2B	112	125	6.38
46	BR15897-8-1-1-8-2B-7	120	120	6.07
47	BR15903-2-3-5-11B-12	105	119	5.91
48	IR12A177	94	116	5.85
49	BR15903-2-3-5-11B	127	115	5.82
50	BR15897-8-1-1-8-2B	117	110	5.80
51	BRH13-2-14-2-9B	112	129	5.75
52	BR15903-2-3-5-11B-15	105	117	5.75
53	BRH13-2-4-7-2B	95	119	5.54
54	BR15903-2-3-5-11B-17	113	120	5.52
55	BR15897-8-1-1-8-2B-3	115	114	5.40
56	BR15896-7-17-3-2B-11	91	124	4.41
57	BR15897-8-1-1-8-2B-11	111	129	3.53
58	BR15897-8-1-1-8-2B-1	107	133	2.48
Ck. 1	BRRi dhan108	125	120	6.26
Ck. 2	Zirashail	104	110	6.04
Range		83-130	110-135	2.84-8.66
LSD		3.654	1.573	0.399
H2b		0.84	0.92	0.32

DS: 18/01/2025 DT: 10/02/2025

PROJECT 7B: DEVELOPMENT OF PREMIUM QUALITY RICE (BORO)

General objectives: Development of aromatic and non-aromatic fine quality rice with international (Basmati/Banglamati/Soru Balam type) standards in Boro season for domestic use and export.

Project Leader: Dr. Md. Abdul Kader

Experiment 7B.1: Hybridization

Principal Investigator: R R Majumder.

Co-Investigators: M A Kader, S S Chaity and M I H Joy.

Specific objective: Introgression of extra-long grain and small grain with or without aroma into high yielding rice genetic background.

Materials and Methods: Twenty-nine varieties/lines were used for crossing. Seeding was done in the hybridization block at three dates with an interval of seven days to synchronize flowering among the male and female parents. Forty-day-old seedlings were transplanted in a 5.4 m × 2 rows plot with a spacing of 20 cm × 15 cm. Single seedling was used for transplanting. Fertilizers @138 (300 Kg Urea): 20 (100 Kg TSP): 83 (165 Kg MP): 20 (112 Kg Gypsum): 4 (11 Kg Zn SO4) Kg/ha NPKSZn were applied in the trial. All amounts of P, K, S and Zn were applied at the time of final land preparation and nitrogen was applied at three equal splits at 10, 30 and 50 days after transplanting (DAT). Crop management such as weeding, irrigation etc. was done in time. Insects, diseases and other pests were controlled when necessary.

Results: Totally 1,011 F₁ seeds were obtained from 14 single crosses to develop premium quality rice. Additionally, one cross for line augmentation was made (Table 7B.1). These were recorded and labeled properly. The F₁ seeds were sun-dried and stored in a cool and dry place.

Table 7B.1. List of crosses made, Development of Premium Quality Rice (PQR), Boro 2024-25

SN	Cross combinations	Characteristics	Expected yield (t/ha)	No. of seeds
1	BR12587-4R-257/BR12587-4R-167	High yielding	7.12	30
2	BR12583-4R-6/IR 146434-3-4-B	High yielding	7.10	70
3	IR 146440-11-5-B/BR11966-4R-468	High yielding	7.06	144
4	BR12582-4R-238/IR 146443-11-8-B	High yielding	7.05	205
5	IR 146439-11-9-B/BR11980-4R-139	High yielding	7.04	76
6	BR12585-4R-43/BR12582-4R-9	High yielding	7.01	57
7	BR11966-4R-262/IR 146443-9-2-B	High yielding	6.98	27
8	BR12584-4R-14/BR12582-4R-261	High yielding	6.97	83
9	BRRI dhan102/BR12584-4R-52	High yielding	6.97	65
10	BR12583-4R-32/BR12582-4R-187	High yielding	6.95	12
11	IR 146442-11-6-B/BRRI dhan111	High yielding	6.99	8
12	BRRI dhan100/BRRI dhan114	Blast resistant	7.54	6
13	BRRI dhan104/BRRI dhan113	short duration	7.33	105
14	BRRI dhan107/BR12587-4R-257	High yielding	7.73	115
Line Augmentation				
1	BR11359-4R-279 /BR (Path)13800-BC3-134-25	BB and Blast resistant	7.1	8
Total				1,011

Experiment 7B.2: Confirmation of F₁

Principal Investigator: R R Majumder

Co-Investigators: M A Kader, S S Chaity and M I H Joy

Specific objectives: To confirm the crosses as true hybrid.

Materials and Methods: Nineteen crosses along with their respective parents were grown in the net house of Plant Breeding Division, BRRI Gazipur. The seeds were seeded in the earthen pots after germination. Forty-day-old seedlings were transplanted at a spacing of 20 cm × 15 cm along with their respective parents. Single seedling was used for transplanting. Fertilizers doses and management were done as experiment no. 7B.1. Crop management such as weeding,

irrigation etc. was done on time. Insects, diseases and other pests were controlled when necessary.

Results: Twelve F₁s crosses were confirmed as true hybrid using 10 SNP QC panel and phenotypically as well (Table 7B.2).

Table 7B.2. List of confirmed F₁'s, Development of Premium Quality Rice (PQR), Boro 2024-25

SN	BR No.	Cross combination	Characteristics
1	BR16861	Bangabandhu dhan100/BR10648-12-1-3-4-1	High yield, LS, high ER
2	BR16862	BRRI dhan107/BR(Path)12452-BC3-42-22-11-4	High ER, blast resistant
3	BR16863	BRRI dhan104/BR(Path)12452-BC6-53-21-11	High ER, aroma, blast resistant
4	BR16864	BR10648-12-1-3-4-1/BR11968-4R-474	High ER
5	BR16865	BR11970-4R-542/BR11972-4R-151	High ER, aroma
6	BR16866	BR11966-4R-421/BR11965-4R-1	High yield, high ER
7	BR16869	BRRI dhan107/Indian Basmati	High yield, high ER
8	BR16870	BR11978-4R-260/BR(Path)12452-BC3-42-22-11-4	High ER, blast resistant
9	BR16871	BR10648-12-1-3-4-1/BR(Path)12452-BC6-53-21-11	High ER, blast resistant
10	BR16872	BR11970-4R-542/BR12454-BC2-69-97-39-5-44	High ER, blast resistant
11	BR16873	BR11966-4R-421/BR12454-BC2-75-32-31-39-7	High ER, blast resistant
12	BR16874	Rata Boro/ BRRI dhan100/// BRRI dhan100	High yield, LS, high ER

Experiment 7B.3: RGA/FRGA nursery

Principal Investigator: R R Majumder

Co-Investigators: M A Kader, S S Chaity and M I H Joy

Specific objective: Advancement of segregating population for shortening breeding cycle of high yielding genotypes.

Materials and Methods: In total 31,535 progenies from 86 crosses of F₂ to F₄ generations were grown in RGA screen house and FRGA field of BRRI, Gazipur. Minimum amounts of N, P, K, S and Zn were applied at the time of final land/soil preparation. For FRGA spacing was 5 cm × 5 cm. Crop management such as thinning, irrigation etc. were done in time. Insects, diseases and other pests were controlled properly.

Result: Total 27,618 progenies were harvested from F₂ to F₄ generations respectively through RGA/FRGA method at the time of maturity and these were preserved and processed with proper labels (Table 7B.3).

Table 7B.3. List of FRGA nursery, Development of Premium Quality Rice (PQR), Boro 2024-25

SN	BR No.	Parentage	Transplanted Harvested	
F ₂ generation				
1	BR16041	BR10645-6-4-8-1-2/ BR8862-29-1-5-1-3	400	300
2	BR16042	BR10646-3-2-2-4-3/ BR8862-29-1-5-1-3	400	320
3	BR16043	BR10646-3-2-2-4-4/ BR8862-29-1-5-1-3	400	310
4	BR16044	BR10646-3-2-2-4-4/ Tepi Boro	400	320
5	BR16045	BR10646-3-3-3-1-4/ BR8862-29-1-5-1-3	400	310
6	BR16046	BR10646-3-3-3-1-4/ Basmati370	400	300
7	BR16047	BR10646-3-3-3-1-4/ Pusa basmati	400	330
8	BR15374	BR8862-29-1-5-1-3/ Tepi Boro	400	300
9	BR16048	BR9930-2-3-2-2/ BR8862-29-1-5-1-3	400	320
10	BR16049	BRRI dhan88/ BR8862-29-1-5-1-3	400	320
11	BR16051	Lomba Zira (Tanor)/ BR8862-29-1-5-1-3	400	320
12	BR16052	Lomba Zira (Tanor)/ Basmati370	400	220
13	BR16053	Lomba Zira (Tanor)/ Pusa basmati	400	310
14	BR16054	Lomba Zira (Tanor)/ Tepi Boro	400	200
15	BR16055	Miniket, Ballobpur/ BR8862-29-1-5-1-3	400	380
16	BR16056	Miniket, Ballobpur/ Basmati370	400	250
17	BR16057	Miniket, Ballobpur/ Pusa basmati	400	280
18	BR16059	Zira, Nachol/ BR8862-29-1-5-1-3	400	350
19	BR16060	Zira, Nachol/ Basmati370	400	340
20	BR16061	Zira, Nachol/ Pusa basmati	400	340
21	BR16062	Zira, Nachol/ Tepi Boro	400	340
22	BR16063	Rata Boro/ BRRI dhan100// BRRI dhan100	400	390
23	BR16064	BRRI dhan102/ Basmati (4488)	400	380
24	BR16065	BRRI dhan102/ Basmati 370 (4489)	400	300
25	BR16066	BRRI dhan102/ Basmati 37 (4491)	400	320
26	BR16067	BRRI dhan102/ Basmati 406 (4508)	400	310

SN	BR No.	Parentage	Transplanted Harvested	
27	BR16068	BRRi dhan89/ Basmati (4488)	400	340
28	BR16082	BRRi dhan89/ Basmati 370 (4489)	400	330
29	BR16069	BRRi dhan89/ Basmati 37 (4491)	400	300
30	BR16070	BRRi dhan89/ Basmati 406 (4508)	400	400
31	BR16072	BRRi dhan92/ Basmati 370 (4489)	400	340
32	BR16073	BRRi dhan92/ Basmati 37 (4491)	400	380
33	BR16074	BRRi dhan88/ Basmati (4488)	400	300
34	BR16075	BRRi dhan88/ Basmati 370 (4489)	400	380
35	BR16076	BRRi dhan88/ Basmati 37 (4491)	400	380
36	BR16077	BRRi dhan88/ Basmati 406 (4508)	400	310
37	BR16078	BR8862-29-1-5-1-3/ IR64-pi9 NILS	400	400
38	BR16079	Lomba Zira (Tanor)/ IR64-pi9 NILS	400	380
39	BR16080	Miniket, Ballobpur/ IR64-pi9 NILS	400	320
40	BR16081	BRRi dhan102/ IR64-pi9 NILS	400	300
41	BR16082	BRRi dhan89/ Basmati 370 (4489)	400	380
			Total	16,400
F₃ generation				
1	BR15358	Basmati (TH)/ Basmati TAPL-90 (2517)	320	310
2	BR15359	Basmati (TH)/ BR10337-2-3-1-5-B2	330	300
3	BR15360	BR10335-2-3-1-10-B2/ Indian Basmati	330	310
4	BR15361	BR10335-2-3-1-5-B2/ Indian Basmati	350	330
5	BR15362	BR10646-3-2-2-2-2/ Indian Basmati	360	340
6	BR15363	BR10646-3-2-2-2-2/ DA26	340	310
7	BR15364	BR10646-3-2-2-3-1/ Indian Basmati	350	340
8	BR15365	BR10646-3-2-2-4-4/ Indian Basmati	320	320
9	BR15356	BR10646-3-3-3-1-2/ BR10646-3-2-2-2-2	330	310
10	BR15367	BR10646-3-3-3-1-2/ Indian Basmati	330	310
11	BR15368	BR8862-29-1-5-1-3/ Basmati TAPL-90 (2517)	350	330
12	BR15369	BR8862-29-1-5-1-3/ Indian Basmati	320	300
13	BR15370	BR8862-29-1-6-1-3/ BR10335-2-3-1-10-B2	300	300
14	BR15371	BR8862-29-1-6-1-3/ BR10337-2-3-1-5-B2	320	310
15	BR15372	BR8862-29-1-6-1-3/ BR10646-3-2-2-2-2	300	300
16	BR15373	BR8862-29-1-6-1-3/ BR10646-3-2-2-4-4	350	340
17	BR15374	BR8862-29-1-6-1-3/ Tepi Boro	360	340
18	BR15375	BR9930-2-3-2-2/ Indian Basmati	340	320
19	BR15376	BR9930-2-3-3-1/ Indian Basmati	350	310
20	BR15377	DA26/ Indian Basmati	340	328
21	BR15378	Rata Boro/ Bangabandhu dhan100	345	340
			Total	7,035
F₄ generation				
1	BR14766	Swarna Katari (Tanor)/ Basmati-107 (4501)	350	310
2	BR14767	Swarna Katari (Tanor)/ Basmati Pardnr442 (4497)	320	300
3	BR14768	Miniket (Ballobpur)/ BR8862-29-1-5-1-3	350	310
4	BR14769	Miniket (Ballobpur)/ Indian Basmati	340	310
5	BR14770	Subollata (Jhenaidah)/ BR8862-29-1-5-1-3	350	315
6	BR14771	BR8526-38-2-1-HR1/ Lata Balam	340	315
7	BR14772	BR9930-2-3-2-2/ Basmati TAPL-90 (2517)	320	300
8	BR14773	BR9930-2-3-3-1/ Basmati Nanot 439 (4496)	340	310
9	BR14774	BR8862-29-1-5-1-3/ BRRi dhan50	350	320
10	BR14775	Lata Balam/ IR64-pi9 NILS	340	310
11	BR14776	Bashful/ IR64-pi9 NILS	320	300
12	BR14777	BR9930-2-3-2-2/ Basmati Pardnr442 (4497)	320	310
13	BR14778	BR9930-2-3-3-1/ Basmati-433 (4509)	350	320
14	BR14779	BR10322-23-1-2-4 / Lata Balam	330	310
15	BR14780	BR10322-23-6-3-7-B2/ Gochi	330	310
16	BR14781	BR8862-29-1-5-1-3/ Gochi	340	300
17	BR14782	BR8526-38-2-1-HR1/ Gochi	345	310
18	BR14783	Subollata (Jhenaidah)/IR64-pi9 NILS	350	320
19	BR14784	BR8862-29-1-5-1-3/ Lafa	320	300
20	BR14785	BR8526-38-2-1-HR1/ Lafa	340	320
21	BR14786	BR9930-2-3-3-1/ Lafa	350	300
22	BR14787	BR8526-38-2-1-HR1/ Pusa Basmati	320	310
23	BR14788	BR8862-29-1-5-1-3/ Pusa Basmati	335	300
24	BR14789	Subollata (Jhenaidah/) Indian Basmati	350	310
			Total	8,100
			Grand Total	31,535
				27,618

Experiment 7B.4: Line Stage Testing (LST) Trial

Specific objectives: Selection of uniform genotypes in terms of plant height and days to maturity with key target traits.

Principal Investigator: R R Majumder

Co-Investigators: M A Kader, S S Chaity and M I H Joy

Materials and Methods: A total of 6,502 advance breeding lines of 18 crosses (Table 7B.4a) were grown at BRRI, Gazipur. Forty-five days old seedlings were transplanted in a 2.6 m single-row plot with a spacing of 20 cm × 20 cm in the field. Fertilizers doses and management were done as experiment no. 7B.1. Crop management such as weeding, irrigation etc. was done on time. Insects, diseases and other pests were controlled when necessary.

Results: In total 541 lines were selected based on uniformity, plant height, growth duration, long slender grain type and lodging tolerance (Table 7B.4a). The selection intensity of the genotypes is 8.32% (Fig. 7B.4b). Agronomic performances will be observed of the lines in the following Boro season. Trait genotyping for aroma, amylose, zinc content, diseases and insects was completed for the selected genotypes. Most of the materials were found to have high amylose trait, with 181 materials with aroma trait. A few materials had grain zinc, one material showed BB resistance trait (Fig. 7B.4c). The list of different genotypic combinations in respect to the BR reg. no. is presented in Table 7B.4d.

Table 7B.4a: List of materials for Line Stage Testing (LST) Trial, Development of Premium Quality Rice (PQR), Boro 2024-25

SN	BR Reg. No.	Parentage	No of progenies transplanted	No of plant selected
1	BR14196	BR8995-2-5-5-2-1/ Bashful	148	13
2	BR14197	BR9937-22-3-2-3/ Pusha Basmati	223	40
3	BR14198	BR8526-38-2-1-HR1/ IR64-pi9 NILS	246	34
4	BR14199	Habu Balam/ BR9713-63-5-2-2	320	32
5	BR14200	BR9937-22-3-2-3/ DR-6	370	39
6	BR14201	BR9930-2-2-4-1/ DR-6	355	41
7	BR14202	BR9937-22-3-2-3/ Sonamukhi	400	32
8	BR14203	BRRI dhan81/ Bashful	400	33
9	BR14204	DR-6/ Habu Balam	400	36
10	BR14205	DR-6/Bashful	420	19
11	BR14206	BR8862-29-1-5-1-3/ Tapi Boro	300	11
12	BR14207	BR9930-2-2-4-1/ Sonamukhi	420	46
13	BR14208	BR9207-45-2-2/ IR64-pi9 NILS	450	30
14	BR14209	BR8590-5-2-5-2-1/ Rata Boro	450	26
15	BR14210	Super Basmati/ BR9937-22-3-2-3	420	28
16	BR14211	Basmati Sufaid 187/ BR9930-2-2-4-1	400	11
17	BR14212	Indian Basmati/ BR8526-38-2-1-HR1	400	35
18	BR14213	USPi9/BR9207-45-2-2	380	35
Grand Total			6502	541

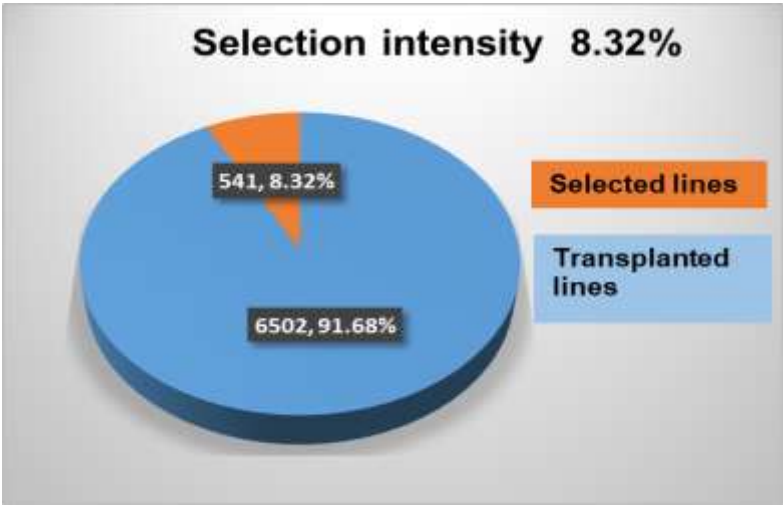


Fig. 7B.4b. Selection intensity of the genotypes of LST, PQR, Boro 2024-25

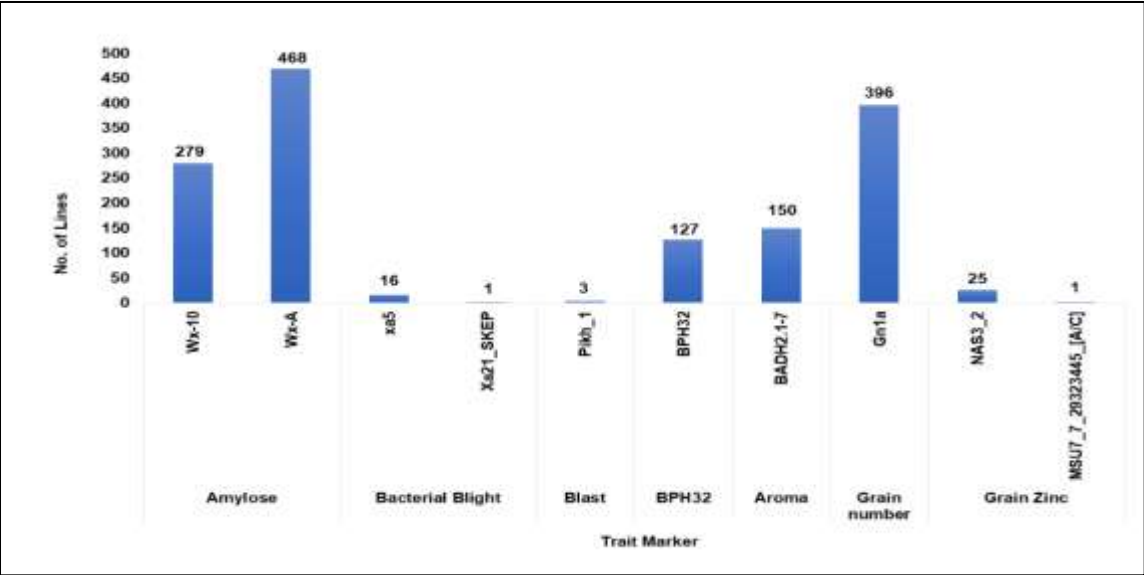


Fig. 7B.4c. Trait marker profile of the genotypes of LST, PQR, Boro 2024-25

Table 7B.4d. List of trait marker combinations of the crosses of Line Stage Testing (LST) Trial, Development of Premium Quality Rice (PQR), Boro 2024-25

SN	BR Reg No	Genotypic combination	lines
1	BR14196 BR8995-2-5-5-2-1/ Bashful	Wx-10+Wx-A	2
		Wx-10+Wx-A+BADH2.1-7	1
		Wx-10+Wx-A+BADH2.1-7+Gnl1a	2
		Wx-10+Wx-A+BADH2.1-7+NAS3_2	1
		Wx-10+Wx-A+Gnl1a	3
		Wx-A	1
		Wx-A+BPH32	1
		Wx-A+Gnl1a+NAS3_2	1
2	BR14197 BR9937-22-3-2-3/ Pusha Basmati	Wx-10+Wx-A	5
		Wx-10+Wx-A+BADH2.1-7	1
		Wx-10+Wx-A+BADH2.1-7+Gnl1a	21
		Wx-10+Wx-A+Gnl1a	8
		Wx-A	1
		Wx-A+BPH32+Gnl1a	1
		Wx-A+Gnl1a	3
3	BR14198 BR8526-38-2-1-HR1/ IR64-pi9 NILS	Wx-10+Wx-A	5
		Wx-10+Wx-A+BADH2.1-7	4
		Wx-10+Wx-A+Gnl1a	1
		Wx-A	1
		Wx-A+BADH2.1-7	4
		Wx-A+BPH32	12
		Wx-A+BPH32+BADH2.1-7	4
		Wx-A+NAS3_2	1
4	BR14199 Habu Balam/ BR9713-63-5-2-2	Wx-A+xa5	2
		Gnl1a	3
		Wx-10+Wx-A	1
		Wx-10+Wx-A+Gnl1a	26
		Wx-A+BPH32	1
5	BR14200 BR9937-22-3-2-3/ DR-6	Wx-A+BPH32+Gnl1a	1
		Gnl1a	1
		Wx-10+Wx-A+BADH2.1-7+Gnl1a	1
		Wx-10+Wx-A+BPH32+Gnl1a	1
		Wx-10+Wx-A+Gnl1a	8
		Wx-A+BPH32+Gnl1a	25
6	BR14201 BR9930-2-2-4-1/ DR-6	Wx-A+Gnl1a	2
		Wx-10+Wx-A+BADH2.1-7	1
		Wx-10+Wx-A+BADH2.1-7+Gnl1a	2
		Wx-10+Wx-A+BPH32+BADH2.1-7+Gnl1a	1
		Wx-10+Wx-A+BPH32+Gnl1a	1
		Wx-10+Wx-A+Gnl1a	13
		Wx-A+BADH2.1-7+Gnl1a	2
		Wx-A+BPH32+BADH2.1-7+Gnl1a	1
		Wx-A+BPH32+Gnl1a	15
7	BR14202 BR9937-22-3-2-3/ Sonamukhi	Wx-A+Gnl1a	5
		Wx-10+Wx-A+Gnl1a	30
		Wx-A+BPH32+Gnl1a	1
		Wx-A+xa5+NAS3_2	1

SN	BR Reg No	Genotypic combination	lines
8	BR14203 BRR1 dhan81/ Bashful	Gn1a	1
		Wx-10+Wx-A	4
		Wx-10+Wx-A+BADH2.1-7+Gn1a	1
		Wx-10+Wx-A+BADH2.1-7+Gn1a+NAS3_2	1
		Wx-10+Wx-A+BPH32+Gn1a	1
		Wx-10+Wx-A+Gn1a	6
		Wx-10+Wx-A+Gn1a+NAS3_2	1
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445	1
		Wx-10+Wx-A+xa5	1
		Wx-A	3
		Wx-A+BPH32+Gn1a	2
		Wx-A+BPH32+Gn1a+NAS3_2	1
		Wx-A+BPH32+NAS3_2	1
		Wx-A+Gn1a	5
		Wx-A+NAS3_2	2
		xa5+BPH32	1
9	BR14204 DR-6/ Habu Balam	BPH32	1
		Wx-10+Wx-A+Gn1a	9
		Wx-A	1
		Wx-A+BPH32	2
		Wx-A+BPH32+Gn1a	18
		Wx-A+Gn1a	4
10	BR14205 DR-6/Bashful	BPH32+Gn1a	1
		Gn1a	2
		Wx-10+Wx-A	3
		Wx-10+Wx-A+BADH2.1-7	1
		Wx-10+Wx-A+Gn1a	1
		Wx-A+BPH32	1
		Wx-A+BPH32+BADH2.1-7+Gn1a	1
		Wx-A+BPH32+Gn1a	1
		Wx-A+BPH32+Gn1a+NAS3_2	1
		Wx-A+BPH32+NAS3_2	2
		Wx-A+Gn1a	2
		Wx-A+xa5+BPH32	1
		Wx-A+xa5+BPH32+Gn1a	1
11	BR14206 BR8862-29-1-5-1-3/ Tapi Boro	Wx-10+Wx-A	1
		Wx-10+Wx-A+Gn1a	3
		Wx-A+Gn1a	2
		Wx-A+Gn1a+NAS3_2	2
		Wx-A+xa5	2
12	BR14207 BR9930-2-2-4-1/ Sonamukhi	Wx-10+Wx-A+BADH2.1-7+Gn1a	16
		Wx-10+Wx-A+BPH32+Gn1a	1
		Wx-10+Wx-A+Gn1a	19
		Wx-A	1
		Wx-A+BADH2.1-7+Gn1a	1
		Wx-A+Gn1a	8
13	BR14208 BR9207-45-2-2/ IR64-pi9 NILS	Wx-10+Wx-A	2
		Wx-10+Wx-A+BPH32+Gn1a	2
		Wx-10+Wx-A+Gn1a	8
		Wx-A	1
		Wx-A+BPH32	9
		Wx-A+BPH32+Gn1a	7
		Wx-A+Gn1a	1
14	BR14209 BR8590-5-2-5-2-1/ Rata Boro	BADH2.1-7	1
		BADH2.1-7+Gn1a	1
		Wx-10+Wx-A	5
		Wx-10+Wx-A+BADH2.1-7	1
		Wx-10+Wx-A+BADH2.1-7+Gn1a+NAS3_2	3
		Wx-10+Wx-A+BADH2.1-7+NAS3_2	1
		Wx-10+Wx-A+Gn1a	2
		Wx-10+Wx-A+Xa21_SKEP+Gn1a	1
		Wx-A	2
		Wx-A+BADH2.1-7	2
		Wx-A+BADH2.1-7+Gn1a	2
		Wx-A+BADH2.1-7+NAS3_2	1
		Wx-A+Gn1a	3
		Wx-A+xa5+NAS3_2	1
15	BR14210 Super Basmati/ BR9937-22-3-2-3	BADH2.1-7	1
		BADH2.1-7+Gn1a	2
		BADH2.1-7+Gn1a+NAS3_2	1
		BPH32+Gn1a	1
		Gn1a	3
		Wx-10+Wx-A	3

SN	BR Reg No	Genotypic combination	lines
		Wx-10+Wx-A+BADH2.1-7+Gn1a	2
		Wx-10+Wx-A+Gn1a	3
		Wx-10+Wx-A+xa5	2
		Wx-A	1
		Wx-A+Gn1a+NAS3_2	1
		Wx-A+NAS3_2	1
		xa5+BPH32	3
16	BR14211	Gn1a	1
	Basmati Sufaid 187/ BR9930-2-2-4-1	Pikh_1+BADH2.1-7+Gn1a	1
		Wx-10+Wx-A	1
		Wx-10+Wx-A+BADH2.1-7	2
		Wx-10+Wx-A+BADH2.1-7+Gn1a	2
		Wx-A+Pikh_1+BADH2.1-7	1
		Wx-A+Pikh_1+BADH2.1-7+Gn1a	1
		Wx-A+xa5+BPH32	1
17	BR14212	BADH2.1-7	1
	Indian Basmati/ BR8526-38-2-1-HR1	BADH2.1-7+Gn1a	16
		Gn1a	3
		Wx-10+BADH2.1-7+Gn1a	1
		Wx-10+Wx-A+BADH2.1-7+Gn1a	13
18	BR14213	BADH2.1-7	5
	USPi9/BR9207-45-2-2	BADH2.1-7+Gn1a	9
		Gn1a	2
		Wx-10+Wx-A	1
		Wx-10+Wx-A+BADH2.1-7	6
		Wx-10+Wx-A+BADH2.1-7+Gn1a	7
		Wx-10+Wx-A+Gn1a	1
		Wx-A+BPH32	1
		Wx-A+BPH32+Gn1a	1
		Wx-A+Gn1a	2
Total			529

Experiment 7B.5: Observational Yield Trial (OYT)

Principal Investigator: R R Majumder

Co-Investigators: M A Kader, S S Chaity and M I H Joy

Specific objective: Selection of homogeneous breeding lines with fine grain properties having high yield with good plant type.

Materials and Methods: Three hundred seventy genotypes in two OYT_s along with standard checks were evaluated in three locations of Bangladesh. In OYT_{#1}, 181 lines with growth duration less than140 days and in OYT_{#2}, 189 lines growth duration ranged from140-150 days were evaluated along with BRRI dhan50, BRRI dhan63, BRRI dhan81, BRRI dhan104 and BRRI dhan107. The trial was conducted in augmented RCB design with three blocks. Thirty-five days old seedlings were transplanted at the rate of 2-3 seedlings at a spacing of 20 cm × 20 cm. The unit plot size for OYT was 3.3 m × 3 rows. Fertilizers doses and management were done same as experiment no. 7B.1. Crop management such as weeding, irrigation etc. was done in time. Insects, diseases and other pests were controlled if necessary.

Results: A total of 40 materials were selected from two OYT_s. From OYT_{#1}, 23 genotypes out of 181 and from OYT_{#2}, 17 genotypes out of 189 were selected based on their yield performances and grain type as compared to check varieties (Table 7B.5).

Table 7B.5: Performances of selected genotypes in Observational Yield Trial (OYT), PQR, Boro 2024-25

SN	Designation	PH (cm)	GD (days)	Grain yield (t/ha)			
				Gazipur	Rangpur	Rajshahi	Mean BLUE
OYT#1							
1	BR13257-4R-195	99	139	8.58	7.00	8.78	8.12
2	BR13257-4R-317	105	138	7.93	6.18	9.24	7.78
3	BR13257-4R-88	107	146	7.45	6.08	9.42	7.65
4	BR13258-4R-296	96	144	5.94	7.37	9.36	7.56
5	BR13258-4R-403	121	147	7.47	7.14	7.93	7.51
6	BR13257-4R-309	116	143	6.48	7.51	8.53	7.51
7	BR13257-4R-162	114	143	6.43	6.96	9.04	7.47
8	BR13257-4R-431	107	140	6.38	8.62	7.25	7.42
9	BR13257-4R-92	96	144	5.92	7.00	9.25	7.39

SN	Designation	PH (cm)	GD (days)	Grain yield (t/ha)			
				Gazipur	Rangpur	Rajshahi	Mean BLUE
10	BR13257-4R-289	112	141	6.45	7.71	7.92	7.36
11	BR13258-4R-254	113	144	6.43	6.30	9.30	7.34
12	BR13257-4R-258	113	141	7.93	7.16	6.69	7.26
13	BR13257-4R-2	107	140	7.46	5.14	9.16	7.25
14	BR13258-4R-177	98	145	8.67	6.09	6.93	7.23
15	BR13257-4R-169	98	139	6.41	7.12	8.05	7.19
16	BR13259-4R-450	104	147	5.85	8.13	7.59	7.19
17	BR13259-4R-407	117	141	6.43	6.50	8.59	7.17
18	BR13258-4R-326	115	143	4.70	7.26	9.45	7.14
19	BR13258-4R-92	102	138	5.93	6.91	8.48	7.10
20	BR13257-4R-114	120	141	5.90	6.56	8.71	7.06
21	BR13257-4R-340	99	140	6.38	5.98	8.64	7.00
22	BR13259-4R-158	89	148	5.45	8.14	7.34	6.97
23	BR13257-4R-227	117	146	6.94	5.94	7.83	6.91
24	BRRRI dhan50 (Ck)	91	155	5.57	4.57	7.06	5.73
25	BRRRI dhan63 (Ck)	92	146	5.77	6.07	6.62	6.15
26	BRRRI dhan81 (Ck)	99	143	5.91	5.37	6.88	6.05
27	BRRRI dhan104 (Ck)	99	150	5.82	5.21	6.86	5.96
28	BRRRI dhan107 (Ck)	106	149	6.09	4.73	6.67	5.83
lsd (0.05)		6.6	12.7	0.79	1.48	1.25	1.563
h ² b		0.83	0.72	0.95	0.75	0.85	0.49
OYT#2							
1	BR13257-4R-266	87	146	6.68	7.29	7.68	7.22
2	BR13258-4R-160	111	148	5.86	7.66	7.61	7.05
3	BR13258-4R-243	107	151	7.45	7.39	6.23	7.02
4	BR13257-4R-283	105	143	5.90	6.88	8.16	6.98
5	BR13259-4R-335	105	148	5.93	6.96	7.93	6.94
6	BR13259-4R-232	105	150	6.60	6.98	7.23	6.94
7	BR13259-4R-424	108	143	6.02	7.18	7.57	6.92
8	BR13258-4R-380	106	150	6.41	6.75	7.56	6.91
9	BR13257-4R-319	111	147	7.06	6.59	6.96	6.87
10	BR13257-4R-48	100	151	6.42	7.73	6.25	6.80
11	BR13257-4R-253	96	150	7.96	5.57	6.71	6.75
12	BR13258-4R-410	113	153	6.95	6.58	6.54	6.69
13	BR13259-4R-309	105	139	6.45	6.45	7.15	6.68
14	BR13259-4R-38	100	149	5.88	7.38	6.73	6.66
15	BR13257-4R-275	97	147	5.38	7.10	7.41	6.63
16	BR13257-4R-349	123	146	6.39	7.04	6.43	6.62
17	BR13259-4R-323	105	150	6.45	6.22	7.17	6.61
18	BRRRI dhan50 (Ck)	91	155	6.12	5.21	5.92	5.75
19	BRRRI dhan63 (Ck)	87	147	6.41	4.90	6.77	6.03
20	BRRRI dhan81 (Ck)	97	144	7.00	5.75	6.45	6.40
21	BRRRI dhan104 (Ck)	101	152	6.37	5.49	7.01	6.29
22	BRRRI dhan107 (Ck)	106	152	6.63	5.97	6.34	6.32
lsd (0.05)		5.6	12.4	0.60	1.46	0.72	0.9
h ² b		0.81	0.32	0.90	0.36	0.94	0.48

OYT#1: Gazipur: D/S: 07/12/2024, D/T: 10/01/2025 Rangpur: D/S: 06/12/2024, D/T: 18/01/2025 Rajshahi: D/S: 23/12/2024, D/T: 05/02/2025

OYT#2: Gazipur: D/S: 08/12/2024, D/T: 11/01/2025 Rangpur: D/S: 06/12/2024, D/T: 18/01/2025 Rajshahi: D/S: 20/12/2024, D/T: 31/01/2025

Experiment 7B.6: Advanced Yield Trial (AYT)

Principal Investigator: R R Majumder

Co-Investigators: M A Kader, S S Chaity and M I H Joy

Specific objective: Selection of homogeneous breeding lines with fine grain properties having high yield with good plant type.

Materials and Methods: Forty genotypes in two AYT_s along with standard checks were evaluated in three locations of Bangladesh. In AYT#1, 23 lines with growth duration 138-145 days along with BRRRI dhan81, BRRRI dhan104 and BRRRI dhan107; in AYT#2, 25 lines growth duration ranged from 146-150 days along with BRRRI dhan50, BRRRI dhan81, BRRRI dhan104 and BRRRI dhan10 were evaluated. Thirty-five days old seedlings were transplanted at the rate of 2-3 seedlings at a spacing of 20 cm × 20 cm. The plot size was 5.4 m × 4 rows. Fertilizer doses and management were done same as experiment no. 7B.1. Crop management such as

weeding, irrigation etc. was done on time. Insects, diseases and other pests were controlled when necessary.

Results: A total of 8 materials were selected from two AYT_s. From AYT#1, 4 genotypes out of 20 and from AYT#2, 4 genotypes out of 20 genotypes were selected based on their yield performances and grain type as compared to check varieties (Table 7B.5).

Table 7B.6: Performances of genotypes in Advanced Yield Trial (AYT), PQR, Boro 2024-25

SN	Designation	PH (cm)	GD (days)	Grain yield (t/ha)				Grain type	Amylose (%)
				Gazi	Rang	Rajsh	BLUE		
AYT#1									
1	BR12582-4R-151	111	143	6.15	6.57	6.40	6.38	LS	21.4
2	BR12582-4R-253*	105	144	7.57	7.17	7.61	7.45	LS	20.6
3	BR12582-4R-261*	106	144	6.66	7.34	6.33	6.78	LS	20.4
4	BR12582-4R-280	111	142	6.57	6.51	6.86	6.65	LS	20.4
5	BR12582-4R-294*	108	145	7.32	7.00	6.45	6.92	LS	20.9
6	BR12582-4R-304	109	143	6.27	6.48	7.24	6.66	LS	20.7
7	BR12582-4R-85	108	144	6.73	6.68	6.58	6.66	LS	20.8
8	IR 146426-7-7-B	114	142	5.58	5.84	5.88	5.77	LS	23.3
9	IR 146426-8-4-B	112	143	4.91	4.67	6.16	5.25	LS	21.7
10	IR 146426-8-5-B	110	143	4.37	7.26	6.71	6.11	LS	22.6
11	IR 146428-9-2-B	90	143	5.12	3.55	5.79	4.82	LS	22.7
12	IR 146428-9-8-B	127	140	5.55	3.69	6.30	5.18	LS	21.9
13	IR 146430-10-3-B	117	144	6.29	6.84	6.78	6.64	LS	22.3
14	IR 146434-3-4-B	101	143	4.26	8.10	6.85	6.41	LS	22.1
15	IR 146435-1-9-B	103	148	6.27	6.20	5.98	6.15	LS	22.7
16	IR 146439-11-9-B	102	144	5.64	7.35	6.83	6.61	LS	23.0
17	IR 146440-11-5-B	106	143	6.02	6.89	7.09	6.66	LS	22.8
18	IR 146442-11-6-B	121	145	5.07	7.51	5.89	6.15	LS	23.2
19	IR 146443-11-8-B*	108	151	6.81	6.96	7.03	6.94	LS	22.7
20	IR 146443-9-2-B	100	144	5.41	5.92	7.82	6.38	LS	22.2
21	BRRI dhan81 (Ck)	103	145	6.28	4.53	7.04	5.95	LS	26.0
22	BRRI dhan104 (Ck)	101	150	6.26	7.08	7.29	6.88	LS	26.5
23	BRRI dhan107 (Ck)	109	150	6.66	6.72	6.55	6.64	LS	27.5
lsd (0.05)		5.9	10.5	0.528	0.30	0.75	0.978		
h ² b		0.86		0.91	0.99	0.55	0.43		
AYT#2									
1	BR12582-4R-187	103	147	5.86	5.75	6.79	6.13	LS	19.1
2	BR12582-4R-238*	112	143	7.56	8.08	7.10	7.58	LS	23.2
3	BR12582-4R-245*	101	147	7.28	6.62	7.51	7.14	MB	19.2
4	BR12582-4R-281	105	145	6.60	6.78	5.12	6.17	LS	20.8
5	BR12582-4R-75	109	148	7.16	6.65	4.25	6.02	LS	21.4
6	BR12582-4R-83*	105	148	6.82	6.97	7.05	6.95	LS	21.3
7	BR12582-4R-9	108	151	6.87	6.75	3.87	5.83	LS	20.6
8	BR12583-4R-197	110	153	6.23	5.84	7.43	6.50	MB	23.4
9	BR12583-4R-32	116	153	5.81	5.62	6.68	6.04	MB	21.5
10	BR12583-4R-6	110	155	5.47	5.52	6.81	5.93	LS	18.7
11	BR12584-4R-14	118	154	5.45	4.18	6.77	5.47	LS	23.4
12	BR12584-4R-52	124	149	5.92	6.35	6.43	6.23	MB	24.3
13	BR12584-4R-68	103	152	6.12	4.54	7.55	6.07	LS	24.5
14	BR12585-4R-43	96	147	6.57	5.62	7.43	6.54	LS	24.4
15	BR12585-4R-59	95	148	6.14	5.68	6.99	6.27	LS	23.0
16	BR12585-4R-6	118	151	5.84	5.81	6.87	6.18	MB	18.5
17	BR12586-4R-48	114	151	5.57	6.37	6.89	6.27	LS	16.7
18	BR12587-4R-167	106	151	5.89	6.52	7.27	6.56	LS	19.7
19	BR12587-4R-201*	107	150	7.05	5.84	7.45	6.78	LS	26.1
20	BR12587-4R-257	110	148	7.07	5.96	6.63	6.55	LS	19.6
21	IR 146441-12-3-B	114	151	5.25	3.92	6.51	5.23	MB	16.5
22	BRRI dhan104 (Ck)	101	150	6.66	6.28	7.20	6.71	LS	16.5
23	BRRI dhan107 (Ck)	111	149	6.94	5.85	6.78	6.52	LS	27.5
24	BRRI dhan50 (Ck)	91	153	6.49	5.54	6.96	6.33	LS	26.0
25	BRRI dhan81 (Ck)	102	147	7.07	4.78	3.35	5.07	LS	26.5
lsd (0.05)		6.4	9.6	0.361	0.274	0.669	1.070		
h ² b		0.83	0.62	0.93	0.975	0.91	0.12		

*Selected for RYT

AYT#1: Gazipur: D/S: 01/12/2024, D/T: 06/01/2025 Rangpur: D/S: 03/12/2024, D/T: 14/01/2025 Rajshahi: D/S: 15/12/2024, D/T: 23/01/2025

AYT#2: Gazipur: D/S: 01/12/2024, D/T: 06/01/2025 Rangpur: D/S: 03/12/2024, D/T: 14/01/2025 Rajshahi: D/S: 15/12/2024, D/T: 23/01/2025

Experiment 7B.7: Regional High yield Trial (RYT)

Principal Investigator: R R Majumder

Co-Investigators: M A Kader, S S Chaity and M I H Joy.

Specific objective: To evaluate specific and general adaptability of the advanced breeding lines as compared with standard checks in on-station condition.

Materials and Methods: Fourteen genotypes along with BRRI dhan50, BRRI dhan104 and BRRI dhan107 as standard checks were evaluated at eight locations of Bangladesh. The trial was conducted following RCB design with three replications. Thirty-five to forty days old seedlings were transplanted at the rate of 2-3 seedlings at a spacing of 20 cm × 20 cm. The plot size was 5.4 m × 12 rows. Fertilizer doses and management were done same as experiment no. 7B.1. Crop management such as weeding, irrigation etc. was done on time. Insects, diseases and other pests were controlled when necessary.

Results: Three genotypes were selected as compared to check varieties based on their specific and general adaptability in eight regional stations of BRRI (Table 7B.7a) and advanced for ALART in next Boro season. Grain quality parameter of the tested lines is shown in Table 7B.7b that needs to be re-checked. (*Selected genotypes).

Table 7B.7a. Performances of genotypes in Regional Yield Trial (RYT), PQR, Boro 2024-25

SL	Designation	PH (cm)	GD (days)	Yield(t/ha)								
				Gaz	Rang	Dinaj	Goda	Raj	Kush	Sat	Cum	BLUE
1	BR11965-4R-75*	106	145	7.38	8.80	7.312	7.743	7.73	7.78	6.83	6.92	7.55
2	BR11966-4R-262	110	143	5.42	7.10	7.19	6.56	7.54	7.87	7.91	3.82	6.54
3	BR11966-4R-313	111	144	6.14	4.88	6.60	5.51	7.51	6.26	7.44	5.97	6.02
4	BR11966-4R-344*	106	145	6.50	6.44	7.75	7.64	7.68	7.86	7.46	6.92	7.26
5	BR11966-4R-406	116	152	5.64	7.08	7.003	6.576	7.25	6.54	7.14	5.41	6.48
6	BR11966-4R-439	123	146	7.24	5.20	6.37	7.071	6.86	6.40	7.57	7.26	6.76
7	BR11966-4R-468	125	152	7.74	8.37	6.91	6.78	7.27	6.63	6.91	5.45	6.93
8	BR11971-4R-1	106	146	6.49	7.60	6.357	6.46	7.55	5.89	7.53	5.53	6.52
9	BR11971-4R-228	112	144	7.17	5.47	6.47	7.60	7.61	6.61	7.47	6.83	6.89
10	BR11973-4R-224	111	147	6.64	6.04	6.31	6.332	7.86	7.09	7.41	6.40	6.55
11	BR11973-4R-309*	123	145	6.42	7.39	7.10	7.497	8.21	7.05	7.56	7.45	7.23
12	BR11973-4R-363	104	146	5.76	6.32	5.44	6.89	7.64	6.77	7.30	6.95	6.53
13	BR11978-4R-112	109	153	5.61	7.12	7.621	6.40	8.027	6.11	6.84	5.31	6.41
14	BR11980-4R-139	114	150	5.62	8.33	7.08	7.56	8.098	6.73	7.14	7.28	7.15
15	BRRI dhan104 (Ck)	104	150	6.67	7.34	7.16	6.74	7.15	7.39	7.43	6.90	7.03
16	BRRI dhan107 (Ck)	109	151	6.99	7.13	6.55	7.87	7.65	7.28	6.87	5.98	7.05
17	BRRI dhan50 (Ck)	99	153	6.42	7.48	6.66	6.44	6.32	6.32	6.53	5.37	6.44
	LSD (0.05)	12.4	9.5	0.305	0.634	0.161	0.323	0.905		0.638	0.468	0.508
	h2b	0.86	0.93	0.96	0.91	0.99	0.95	0.36		0.32	0.95	0.62

Table 7B.7b: Physico-chemical properties of the genotypes of Regional Yield Trial (RYT), PQR, Boro 2024-25

SN	Designation	Milling outturn (%)	Head rice yield (%)	Milled Rice length (mm)	Milled Rice breadth (mm)	L-B ratio	Size & Shape	1000 grain weight (g)	Amylose (%)	ER	IR
1	BR11965-4R-75	69.5	50.8	7.1	1.9	3.7	LS	24.3	16.8	1.3	4.2
2	BR11966-4R-262	66.0	24.7	7.0	2.0	3.5	LS	25.9	18.8	1.3	3.8
3	BR11966-4R-313	65.9	31.1	7.3	2.1	3.5	LS	27.1	18.2	1.3	3.5
4	BR11966-4R-344	76.9	33.1	7.0	2.1	3.3	LS	25.6	17.1	1.3	4.1
5	BR11966-4R-406	68.8	49.5	6.6	2.0	3.3	LS	22.6	17.0	1.3	4.6
6	BR11966-4R-439	67.0	38.4	6.9	2.0	3.4	LS	21.5	16.2	1.2	3.8
7	BR11966-4R-468	69.0	49.8	5.5	1.9	2.9	MB	18.4	23.0	1.5	5.0
8	BR11971-4R-1	70.1	41.4	7.1	1.9	3.7	LS	21.8	20.9	1.3	4.3
9	BR11971-4R-228	68.1	41.2	6.8	2.0	3.4	LS	23.3	17.8	1.3	4.0
10	BR11973-4R-224	78.4	48.8	7.1	2.2	3.2	LS	26.2	16.7	1.2	3.8
11	BR11973-4R-309	70.8	47.6	7.1	2.0	3.6	LS	25.3	17.7	1.3	3.7
12	BR11973-4R-363	69.5	50.5	6.8	2.0	3.4	LS	22.0	21.7	1.3	3.8
13	BR11978-4R-112	66.0	35.7	7.4	1.8	4.1	LS	25.0	19.9	1.3	4.1
14	BR11980-4R-139	66.6	39.7	6.0	2.0	3.0	MB	22.8	17.1	1.4	5.0
15	BRRI dhan50(Ck)	72.0	48.5	6.3	1.8	3.5	LS	17.9	26.0	1.2	3.8
16	BRRI dhan104(Ck)	66.0	49	7.2	1.7	4.2	LS	24	26.3	1.3	4.0
17	BRRI dhan107(Ck)	70.0	56	7.9	1.7	4.5	ELS	27.4	27.1	1.4	3.9
18	BRRI dhan50(Ck)	72.0	48.5	6.3	1.8	3.5	LS	17.9	26.0	1.2	3.8

Experiment 7B.8: Advanced Line Adaptive Research Trial (ALART)

Principal Investigator: R R Majumder

Co-Investigators: M A Kader, S S Chaity and M I H Joy

Specific objective: Evaluation of specific and general adaptability of the genotypes under on farm conditions.

Materials and Methods: There were two ALARTs evaluated in Boro 2024-25 season. In ALART#PQR, two genotypes along with BRRI dhan104 and BRRI dhan107 as standard checks were evaluated at ten locations of Bangladesh. Another one ALART#Pathology where one genotype was evaluated along with BRRI dhan50 and BRRI dhan104. Thirty-five to forty days old seedlings were transplanted @ 2-3 seedlings at a spacing of 20 cm × 20 cm and the field layout will be RCB design with three replications. The plot size will be 5 m × 20 rows. Fertilizers doses and management were done same as experiment no. 7B.1. Crop management such as weeding, irrigation etc. will be done on time. Insects, diseases and other pests will be controlled properly.

Results: None of the genotypes were selected from ALART as compared to check varieties based on their specific and general adaptability under on-farm conditions by ARD (Table 7B.8a). Grain quality parameter of the tested lines is shown in Table 7B.8c.

Table 7B.8a: Performance of the genotypes of Advanced Line Adaptive Research Trial (ALART), PQR, Boro 2024-25

SN	Genotype	PH (cm)	GD (days)	Grain yield (t/ha)										Mean
				Rang	Cumilla	Sona gazi	Gopal ganj	Kushtia	Gazipur	Sadar Natore	Sadar Satkhira	Habi ganj	Siraj ganj	
1	BR11359-4R-181	117	148	6.34	6.39	5.7	5.32	6.41	6.45	7.4	6.86	7.26	7.04	6.45
2	BR11359-4R-279	114	145	8.04	6.97	5.67	6.9	6.07	7	6.26	7.07	6.83	8.05	6.81
3	BRRI dhan104(Ck)	101	145	7.56	5.91	6.38	7.61	6.46	7.84	7.41	6.21	7.25	7.16	6.93
4	BRRI dhan107(Ck)	106	145	7.44	6.39	5.91	7.83	6.44	7.11	6.53	6.73	8.22	7.79	6.97
lsd 0.05		1.6	0.32							0.87				0.27
CV(%)		2.8	0.42							7.85				7.85

Table 7B.8b: Performance of the genotypes of Advanced Line Adaptive Research Trial (ALART), PQR-Pathology, Boro 2024-25

SN	Genotype	PH (cm)	GD (days)	Grain yield (t/ha)										Mean
				Habig	Cumilla	Sirajg	Kusht	Rang	Gazipur	Gopal	Natore	Satkhira	Sona gazi	
1	BRRI(Path)-Premium1	101	144	7.53	7.47	7.47	6.32	6.11	6.58	8.47	7.4	8.13	5.97	7.14
2	BRRI dhan50(Ck)	92	147	6.32	6.68	6.07	6.61	7.28	7.23	7.06	6.26	7.64	6.78	6.79
3	BRRI dhan104(Ck)	102	147	7.11	6.98	6.67	6.85	7.71	7.71	7.63	7.41	7.45	6.97	7.25
lsd 0.05		1.4	0.3							0.92				0.29
CV(%)		2.7	0.37							7.94				7.94

Table 7B.8c: Physico-chemical properties of the genotypes in Advanced Line Adaptive Research Trial (ALART), PQR, Boro 2024-25

SN	Designation	Milling outturn (%)	Head rice yield (%)	Milled Rice length (mm)	Milled Rice breadth (mm)	L-B ratio	Size & Shape	Amylose (%)	1000 grain weight (g)	ER	IR
1	BR11359-4R-181	70.0	58.1	7.0	1.9	3.7	LS	22.5	21.8	1.2	2.7
2	BR11359-4R-279	70.5	62.8	6.4	2.0	3.3	LS	21.8	21.0	1.5	2.7
3	BRRI (Path)-Premium-1	71.5	56.7	6.3	2.0	3.2	LS	20.5	25.2	1.5	2.7
4	BRRI dhan50 (Ck)	72.0	48.5	6.3	1.8	3.5	LS	17.9	26.0	1.2	3.8
5	BRRI dhan104 (Ck)	66.0	49	7.2	1.7	4.2	LS	24	26.3	1.3	4.0
6	BRRI dhan107 (Ck)	70.0	56	7.9	1.7	4.5	ELS	27.4	27.1	1.4	3.9

PROJECT 8: DEVELOPMENT OF RICE VARIETIES FOR FAVORABLE BORO ECOSYSTEM

General objective: Development of improved genotypes with high yield potential (≥8.0 t/ha), earliness and acceptable grain quality for irrigated ecosystem in Bangladesh.

Project Leader: Partha Sarathi Biswas

Experiment 8.1: Parental purification and Hybridization

Principal investigator: P S Biswas

Co-Investigators: MA Syed, F Akter, MFRK Prince, F Mehmood, and KM Iftekharuddaula

Specific objectives: To create variations for the development of new high yielding genotypes with acceptable grain quality.

Materials and Method: Forty varieties/lines (Table 8.1a) were grown in the hybridization block of the Plant Breeding Division at three staggers with an interval of seven days to synchronize flowering among male and female parents. Thirty-five-day old seedling was transplanted in 8-hill triple rows plot at 25 cm × 20 cm spacing. Fertilizer management was done at the rate of 260:100:120: 110:11 kg Urea, TSP, MP, Gypsum and ZnSO4/ha. Urea was applied in three equal splits at 15 days after transplanting (DAT), 30 DAT and 5 days before PI stage. Total amount of TSP, MP, Gypsum and ZnSO4 were applied at final land preparation. For parental purification, leaf samples were collected from all plants of each parent for QC genotyping with 10 SNP panel. The plants showing unique genomic profiles of each parent were used to make crosses. To make desired cross combination, emasculation was done on the day before anthesis using vacuum emasculator and emasculated panicles were bagged with glassine paper bags. Pollination was performed with just anthesized panicles of the male parent by dusting pollens on the emasculated panicles of the female parent.

Results: Fifty-two crosses were made (Table 8.1b) using 40 varieties/lines as parents targeting to develop high-yielding breeding lines enriched with favorable alleles of key target traits, viz. disease resistance (blast and BLB), insect resistance (BPH) and acceptable grain quality (amylose, chalkiness, palatability, zinc content, etc).

Table 8.1a List of parents used in making crosses for the development of rice varieties for favorable Boro environment during 2024-25

Sl	Designation	GD (days)	PH (cm)	Yield (t/ha)	GEBV -Yield	Trait of inheritance
1	BR8899-14-4-1-2-2-1	145	86	6.4	5.8	<i>Wx(a), GS3, SCT1, SP</i>
2	BR11640-5R-86	145	95.67	6.77	6.88	<i>Wx(a), SCT1, Pita, Ptr</i>
3	BR10317-5R-25	156	98	7.26	6.6	<i>Wx(a), Wx-10, chalk5</i>
4	BRR1 dhan102	150	103	8.1		<i>Wx(a), qDTY12.1, HZn</i>
5	IRRI154-Hd9+Pi9 (N22)	140	98	6.6	-	<i>Wx(a), Pi9, Hd9, xa5, TSV1</i>
6	BR12419-6R-102	151	119	8.91	6.35	<i>Wx(a), Wx-10</i>
7	BR13113-4R-116	138	-	8.5	-	<i>Dense and long panicle</i>
8	BR13113-4R-63	138	-	8.5	-	<i>Dense and long panicle</i>
9	BR11318-5R-84	159	107	7.5	6.7	<i>Wx(a), Chalk5, SCM2</i>
10	BR12508-5R-5	151	100	7.5	6.7	<i>Wx(a), TSV1</i>
11	BR12517-5R-57	151	109	7.5	6.23	<i>Wx(a), GS3, BPH32, TSV1</i>
12	BR12574-5R-29	149	117	7	6.9	<i>Wx(a), GS3, Pik_1, TSV1</i>
13	BR13026-BC1-3R-62	149	100	8.1	6.7	<i>Wx(a), GS3, Pik_1, TSV1</i>
14	BR13027-BC1-3R-25	147	103	8	7	<i>Wx(a), GS3, BPH32</i>
15	BR13141-5R-22	139	105	7.2	6.7	<i>Wx(a), GS3, Pita, Ptr, Pik_1, xa5, TSV1</i>
16	BR13142-5R-63	150	105	7.6	6.5	<i>Wx(a), GS3, Pita</i>
17	BR(Path)13800-BC3-134-8	151	102	8	-	<i>Wx(a)Wx-10, SCT1, Pi9, Pita, Pb1, Xa21</i>
18	BR12038-65-2-1	149	102	7.6	-	<i>Wx(a), NAS3</i>
19	BR12041-8-4-3	152	102	7.8	-	<i>Wx(a), NAS3</i>
20	BR12096-4R-25-1	155	100	6.9	-	<i>Wx(a), Xa21, xa13, xa5</i>
21	BRR1 dhan108	150	102	8.52		<i>Wx(a), Pita, Ptr</i>
22	BR11303-5R-156	151	104.23	7.47	6.3	<i>Wx(a), qPSST3, qPSST7, qPSST9</i>
23	BR12520-5R-67	146	107.41	8.22	-	<i>Wx(a), Wx.10, SCT1, BPH32, Pb1, xa13</i>
24	IR18A1398	152	105.53	8.41	-	<i>Wx(a), Wx-10</i>
25	BR12512-5R-78	151	92.9	6.31	6.31	<i>Wx(a), Wx-10, SCT1</i>
26	BR12096-4R-124-X-1					<i>Wx(a)</i>
27	BR9945-5R-21	157	109	4.8	5.78	<i>Wx(a)</i>
28	BR10604-5R-58	148	101	5.81	6.56	<i>wx(b), SCT1</i>

Sl	Designation	GD (days)	PH (cm)	Yield (t/ha)	GEV -Yield	Trait of inheritance
29	BR12423-6R-38	151	101	6.95	6.23	<i>Wx(a), Wx-10, SCT1</i>
30	BR12096-4R-124-1	157	118	7.6	-	<i>Wx(a), Xa21, xa13, xa5</i>
31	BR12509-5R-45	154	109.54	7.18	6.39	<i>Wx(a), Wx-10, SCT1, BPH32</i>
32	BR12524-5R-56	146	99.41	8.04	6.27	<i>Wx(a), Wx-10, SCT1, Pbl, BPH32, Pita</i>
33	BR13407-5R-68	152	89	5.4	5.2	<i>Wx(a), GS3, Pita, Pi21, SCT1</i>
34	BR12454- BC2-69-97-39-5-44	160	109	7.5		<i>Wx(a), Pi9</i>
35	BR(Path)12452-BC3-42-22-11-4	146	111	6.1	-	<i>Wx(a), Pi9</i>
36	BR13409-5R-26	142	113	6.9	6.1	<i>Wx(a), GS3, BPH32, TSV1, NAS3</i>
37	BR12416-6R-219	155	121	6.84	6.15	<i>Wx(a),Wx10,Pbl,Pita,Pi9,xa5,xa13, Xa21</i>
38	BR12567-5R-91	155	95.56	7.16	6.27	<i>Wx(a), Wx-10, SCT1, Cold1.jap, Pbl</i>
39	IR126952-29-82-206-12-8	-	-	-	-	<i>bph17, bph32, Pi9</i>
40	BR11607-4R-72	157	94	5.9	-	<i>Wx(a), Xa21, xa13, xa5, qHTSH4.1</i>

Table 8.1b List of crosses made for the development of rice varieties for favorable Boro environment during 2024-25

Sl	Parentage	Objectives/Gene of inheritance	seed
1	BR8899-14-4-1-2-2-1/IRRI154-Hd9+Pi9 (N22)	<i>Wx(a), xa5, Pi9, TSV1, SCT1</i>	70
2	BR11640-5R-86/IRRI154-Hd9+Pi9 (N22)	<i>Wx(a), xa5, Pita, Ptr, Pi9, TSV1, SCT1</i>	70
3	BR10317-5R-25/IR20X1002: IRRI 154- Pi9+Hd9(N22)	<i>Wx(a), xa5, Wx-10, chalk5, Pi9, TSV1</i>	65
4	BRRI dhan102/BR13407-5R-68	<i>Wx(a), SCT1, qDTY12.1, HZn, GS3, Pita, Pi21</i>	30
5	IRRI154-Hd9+Pi9 (N22)/BR13407-5R-68	<i>Wx(a), xa5, Pi9, GS3, Pita, Pi21, TSV1, SCT1</i>	40
6	BR12419-6R-102/BR13407-5R-68	<i>Wx(a), Wx.10, GS3, Pita, Pi21, SCT1</i>	30
7	BR13113-4R-116/BR13407-5R-68	<i>Wx(a), qHTSF4.1, qPSST6, qPSST7, GS3, Pita, Pi21, SCT1</i>	70
8	BR13113-4R-63/BR13407-5R-68	<i>Wx(a), qPSST7, Ptr, GS3, Pita, Pi21, SCT1</i>	70
9	BR11318-5R-84/BR13407-5R-68	<i>Wx(a), Chalk5, SCM2, GS3, Pita, Pi21, SCT1</i>	95
10	BR12508-5R-5/BR13407-5R-68	<i>Wx(a), GS3, Pita, Pi21, TSV1, SCT1</i>	60
11	BR12517-5R-57/BR13407-5R-68	<i>Wx(a), Pbl, GS3, Pita, Pi21, SCT1</i>	70
12	BR12517-5R-57/BR(Path)13800-BC3-134-8	<i>Wx(a), Pbl, Pi9, Pbl, Xa21</i>	80
13	BR12517-5R-57/BR12454- BC2-69-97-39-5-44	<i>Wx(a), Pbl, Pi9</i>	65
14	BR12517-5R-57/BR(Path)12452-BC3-42-22-11-4	<i>Wx(a), Pbl, Pi9</i>	70
15	BR12517-5R-57/BR13026-BC1-3R-62	<i>Wx(a), Pbl, GS3, Pik_1, TSV1</i>	65
16	BR12574-5R-29/BR(Path)13800-BC3-134-8	<i>Wx(a), GS3, Pik_1, Pi9, Pbl, Xa21, TSV1,</i>	45
17	BR12574-5R-29/BR12454- BC2-69-97-39-5-44	<i>Wx(a), GS3, Pik_1, Pi9, TSV1</i>	60
18	BR13026-BC1-3R-62/BR12041-8-4-3	<i>Wx(a), GS3, Pik_1, NAS3, TSV1</i>	50
19	BR13026-BC1-3R-62/BR12038-65-2-1	<i>Wx(a), GS3, Pik_1, NAS3, TSV1</i>	30
20	BR13026-BC1-3R-62/BR12096-4R-124-X-1	<i>Wx(a), GS3, Pik_1, TSV1</i>	55
21	BR13026-BC1-3R-62/BR13027-BC1-3R-25	<i>Wx(a), GS3, Pik_1, GS3, BPH32, TSV1</i>	60
22	BR13027-BC1-3R-25/BR12041-8-4-3	<i>Wx(a), GS3, BPH32, NAS3</i>	75
23	BR13027-BC1-3R-25/BR(Path)13800-BC3-134-8	<i>Wx(a), GS3, BPH32, Pi9, Pbl, Xa21</i>	12
24	BR13027-BC1-3R-25/BR13026-BC1-3R-62	<i>Wx(a), GS3, BPH32, Pik_1, TSV1</i>	30
25	BR13027-BC1-3R-25/BR(Path)12452-BC3-42-22- 11-4	<i>Wx(a), GS3, BPH32, Pi9</i>	60
26	BR13141-5R-22/BR12454- BC2-69-97-39-5-44	<i>Wx(a), xa5, GS3, Pita, Pik_1, Pi9, TSV1</i>	20
27	BR13141-5R-22/BR12038-65-2-1	<i>Wx(a), xa5, GS3, Pita, Pik_1, NAS3, TSV1</i>	25
28	BR13141-5R-22/BR(Path)12452-BC3-42-22-11-4	<i>Wx(a), xa5, GS3, Pita, Pik_1, Pi9, TSV1</i>	50
29	BR13141-5R-22/BR13409-5R-26	<i>Wx(a), xa5, GS3, Pita, Pik_1, BPH32, NAS3 TSV1,</i>	40
30	BR13142-5R-63/BR(Path)13800-BC3-134-8	<i>Wx(a), Pi9, Pbl, Xa21,</i>	65
31	BR(Path)13800-BC3-134-8/BR13409-5R-26	<i>Wx(a), Pi9, Pbl, Xa21, GS3, BPH32, NAS3, TSV1</i>	40
32	BR12038-65-2-1/BR(Path)13800-BC3-134-8	<i>Wx(a), NAS3, Pi9, Pbl, Xa21</i>	16
33	BR12038-65-2-1/BR13409-5R-26	<i>Wx(a), NAS3, GS3, BPH32, NAS3, TSV1</i>	70
34	BR12041-8-4-3/BR13409-5R-26	<i>Wx(a), GS3, BPH32, NAS3, TSV1</i>	30
35	BR12096-4R-25-1/BR13409-5R-26	<i>Wx(a), xa5, xa13, Xa21, GS3, BPH32, NAS3, TSV1,</i>	12
36	BR12517-5R-57/BR12041-8-4-3	<i>Wx(a), Pbl, NAS3</i>	75
37	BR13113-4R-116/BRRI dhan102	<i>Wx(a), qHTSF4.1, qPSST6, qPSST7, qDTY12.1, HZn</i>	75
38	BR13113-4R-63/BRRI dhan102	<i>Wx(a), qPSST7, Ptr, qDTY12.1, HZn, SCT1</i>	60
39	BR13113-4R-116/BRRI dhan108	<i>Wx(a), qHTSF4.1, qPSST6, qPSST7, Pita, Ptr</i>	50

Sl	Parentage	Objectives/Gene of inheritance	seed
40	BR13113-4R-63/BRRI dhan108	<i>Wx(a), qPSST7, Ptr, Pita, Ptr, SCT1,</i>	70
41	BRRI dhan108/BR13407-5R-68	<i>Wx(a), Pita, Ptr, GS3, Pi21, SCT1</i>	50
42	BR13027-BC1-3R-25/BR12454- BC2-69-97-39-5-44	<i>Wx(a), BPH32, GS3, Pi9</i>	50
43	BR11894-R-R-R-169/BR13141-5R-22	<i>Wx(a), xa5, Chalk5, SCM2, DTY12.1, GS3, Pita, Pik_1, TSV1</i>	70
44	BR11303-5R-156/IRRI154-Hd9+Pi9 (N22)	<i>Wx(a), Wx-10, xa5, Pb1, chalk5, qHTSF4.1, Pi9, Pita, SCT1,</i>	105
45	BR12520-5R-67/BR12524-5R-56	<i>Wx(a), Wx.10, BPH32, Pb1, xa13, Pita, Pb1, SCT1</i>	80
46	IR18A1398/BR12416-6R-219	<i>Wx(a), Wx-10, qPSST7, Ptr, SCT1,</i>	10
47	BR12512-5R-78/BR12567-5R-91	<i>Wx(a), Wx.10, xa13, Pb1, TSV1, SCT1</i>	50
48	BR12096-4R-124-X-1/BR12096-4R-25-1	<i>Wx(a), xa5, xa13, Xa21</i>	35
49	BR12520-5R-67/BR13207-4R-1	<i>Wx(a), Wx.10, BPH32, Pb1, xa13, Pita, Ptr, SCT1</i>	85
50	BR12454-BC2-69-97-39-5-44/BR12645-4R-71	<i>Wx(a), Wx(10), Pb1, qPSST7</i>	150
51	BR11303-5R-156/BR13201-4R-252	<i>Wx(a), Pb1, Wx-10, chalk5</i>	40
52	IR64EMF3/BR13201-4R-225	<i>Wx(a), Wx(10)</i>	20

Experiment 8.2: Hybridity test and confirmation of F₁

Principal investigator: P S Biswas

Co-Investigators: MA Syed, F Akter, MFRK Prince, F Mehmood, and KM Iftekharuddaula

Specific objectives: To confirm the crosses as true F₁s and use of the selected F₁s to produce F₂ seeds or use in making different types of crosses.

Materials and Methods: A total of 57 crosses [43 crosses for forward breeding (FB) and 14 for line augmentation (LA)] were grown along with their parents in the crossing blocks at BRRI Gazipur using single seedling/hill at 20 cm × 20 cm spacing in 8-hill single row plots. The recipient parents of the crosses for LA were separately grown in six staggers to synchronize flowering with the F₁ plants. Fertilizer management was done following the protocol described in Experiment 8.1. Leaf samples were collected from each of the plants of F₁ and parents for QC genotyping to determine true F₁s. QC genotyping was performed using 10 QC SNPs at Intertek, Australia. Trait genotyping with target trait SNPs were performed for the LA crosses. All genotyping results were analyzed using Flapjack.

Results: The plants with heterozygous alleles at two or more QC SNP loci were declared as true F₁ in the case of FB crosses. A total of 43 crosses were identified as true F₁. Seeds of these F₁ plants were selfed to produce F₂ seeds. At maturity stage, F₂ seeds of all selected plants were harvested individually. Then they were dried, cleaned and preserved in cold room for proper storage (Table 8.2a). In the case of line augmentation, 6-8 plants with heterozygous alleles at the target loci (e.g. Pi9, xa5, xa13, Xa21, bph17, BPH32, etc) were selected for making backcrosses with the respective recipient parents. All 14 crosses were found to be a true hybrid for the target trait marker and used making backcrosses (Table 8.2b).

Table 8.2a List of crosses confirmed for the development of rice varieties for favorable Boro environment during 2024-25

New Sl	BR Number	Parentage	Gene of inheritance
1	BR16671	BR8899-14-4-1-2-2-1/IRRI154-Hd9+Pi9 (N22)	<i>Wx(a), xa5, Pi9, TSV1, SCT1</i>
2	BR16672	BR11640-5R-86/IRRI154-Hd9+Pi9 (N22)	<i>Wx(a), xa5, Pita, Ptr, Pi9, TSV1, SCT1</i>
3	BR16700	BR12517-5R-57/BR(Path)13800-BC3-134-8	<i>Wx(a), Pb1, Pi9, Xa21</i>
4	BR16701	BR12517-5R-57/BR12454- BC2-69-97-39-5-44	<i>Wx(a), Pb1, Pi9</i>
5	BR16702	BR12517-5R-57/BR(Path)12452-BC3-42-22-11-4	<i>Wx(a), Pb1, Pi9</i>
6	BR16703	BR12517-5R-57/BR13026-BC1-3R-62	<i>Wx(a), Pb1, GS3, Pik_1, TSV1</i>
7	BR16706	BR13026-BC1-3R-62/BR12041-8-4-3	<i>Wx(a), GS3, Pik_1, NAS3, TSV1</i>
8	BR16707	BR13026-BC1-3R-62/BR12038-65-2-1	<i>Wx(a), GS3, Pik_1, NAS3, TSV1</i>
9	BR16708	BR13026-BC1-3R-62/BR12096-4R-124-X-1	<i>Wx(a), GS3, Pik_1, TSV1</i>
10	BR16709	BR13026-BC1-3R-62/BR13027-BC1-3R-25	<i>Wx(a), GS3, Pik_1, GS3, BPH32, TSV1</i>
11	BR16710	BR13027-BC1-3R-25/BR12041-8-4-3	<i>Wx(a), GS3, BPH32, NAS3</i>

New Sl	BR Number	Parentage	Gene of inheritance
12	BR16711	BR13027-BC1-3R-25/BR(Path)13800-BC3-134-8	<i>Wx(a), GS3, BPH32, Pi9, Pb1, Xa21</i>
13	BR16713	BR13027-BC1-3R-25/BR(Path)12452-BC3-42-22-11-4	<i>Wx(a), GS3, BPH32, Pi9</i>
14	BR16714	BR13141-5R-22/BR12454- BC2-69-97-39-5-44	<i>Wx(a), xa5, GS3, Pita, Pik_1, Pi9, TSV1</i>
15	BR16715	BR13141-5R-22/BR12038-65-2-1	<i>Wx(a), xa5, GS3, Pita, Pik_1, NAS3, TSV1</i>
16	BR16716	BR13141-5R-22/BR(Path)12452-BC3-42-22-11-4	<i>Wx(a), xa5, GS3, Pita, Pik_1, Pi9, TSV1</i>
17	BR16717	BR13141-5R-22/BR13409-5R-26	<i>Wx(a), xa5, GS3, Pita, Pik_1, BPH32, NAS3 TSV1,</i>
18	BR16718	BR13142-5R-63/BR(Path)13800-BC3-134-8	<i>Wx(a), Pi9, Pb1, Xa21,</i>
19	BR16719	BR(Path)13800-BC3-134-8/BR13409-5R-26	<i>Wx(a), Pi9, Pb1, Xa21, GS3, BPH32, NAS3, TSV1</i>
20	BR16720	BR12038-65-2-1/BR(Path)13800-BC3-134-8	<i>Wx(a), NAS3, Pi9, Pb1, Xa21</i>
21	BR16721	BR12038-65-2-1/BR13409-5R-26	<i>Wx(a), NAS3, GS3, BPH32, NAS3, TSV1</i>
22	BR16722	BR12041-8-4-3/BR13409-5R-26	<i>Wx(a), GS3, BPH32, NAS3, TSV1</i>
23	BR16723	BR12096-4R-25-1/BR13409-5R-26	<i>Wx(a), xa5, xa13, Xa21, GS3, BPH32, NAS3, TSV1,</i>
24	BR16724	BR12517-5R-57/BR12041-8-4-3	<i>Wx(a), Pb1, NAS3</i>
25	BR16725	BR13113-4R-116/BRR1 dhan102	<i>Wx(a), qHTSF4.1, qPSST6, qPSST7, qDTY12.1, HZn</i>
26	BR16726	BR13113-4R-63/BRR1 dhan102	<i>Wx(a), qPSST7, Ptr, qDTY12.1, HZn, SCT1</i>
27	BR16727	BR13113-4R-116/BRR1 dhan108	<i>Wx(a), qHTSF4.1, qPSST6, qPSST7, Pita, Ptr</i>
28	BR16728	BR13113-4R-63/BRR1 dhan108	<i>Wx(a), qPSST7, Ptr, Pita, Ptr, SCT1,</i>
29	BR16201	BR12512-5R-78/BR12557-5R-105	<i>Wx(a), Wx-10, SCT1, Pi9</i>
30	BR16202	IR18A1398/BR12557-5R-105	<i>Wx(a), Wx-10, Pi9</i>
31	BR16205	BR12509-5R-45/BR12096-4R-25-1	<i>Wx(a), Pb1, Xa21, xa13, xa5</i>
32	BR16210	BR12520-5R-67/BR11894-R-R-R-R-169	<i>Wx(a), Chalk5, SCM2, DTY12.1</i>
33	BR16211	BR12557-5R-105/BR12567-5R-91	<i>Wx(a), Wx-10, Pi9, SCT1, Cold1.jap, Pb1</i>
34	BR15692	SVIN109/BR12421-4R-171	<i>Wx(a), Wx-10, SCT1, Xa21,</i>
35	BR15953	BR12527-5R-1/BR12524-5R-56	<i>Wx(a), Wx-10, SCT1, Pita, Pb1</i>
36	BR15954	BR12567-5R-91/BR12524-5R-56	<i>Wx(a), Wx-10, SCT1, Cold1.jap, Pb1, Pita, Pb1</i>
37	BR15961	BR12419-6R-102/BR11894-R-R-R-R-329	<i>Wx(a), GS3, ColdVeg</i>
38	BR15965	IR18A1398/BR11894-R-R-R-R-169	<i>Wx(a), Wx-10, Chalk5, SCM2, DTY12.1</i>
39	BR16238	BR12454-BC2-69-97-39-5-44/BR12524-5R-56	<i>Wx(a), Pi9, SCT1, Pita, Pb1</i>
40	BR15950	BR12520-5R-67/BR12527-5R-1	<i>Wx(a), Wx-10, SCT1</i>
41	BR15964	IR18A1398/BR12567-5R-91	<i>Wx(a), Wx-10, SCT1, Cold1.jap, Pb1</i>
42	BR15089	BR11318-5R-106/BR11607-4R-72	<i>Wx(a), xa5, xa13, Xa21, SCT1, qHTSF4.1</i>
43	BR15125	BR10604-5R-58/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	<i>Wx(a), Pita, Pi9, xa5, TSV1</i>

Table 8.2b List backcrosses (BC1F1) made for line augmentation for the development of rice varieties for favorable Boro environment during 2024-25

SL	Cross	Objectives/Gene of inheritance	Seeds
1	BR10317-5R-25*2/IR20X1002:IRRI 154-Pi9+Hd9 (N22)	<i>Wx(a), Pb1, Pi9, xa5, TSV1</i>	155
2	BRR1 dhan102*2/BR13407-5R-68	<i>Wx(a), SCT1, qDTY12.1, HZn, GS3, Pita, Pi21</i>	448
3	IRRI154-Hd9+Pi9 (N22) *2/BR13407-5R-68	<i>Wx(a), xa5, Pi9, GS3, Pita, Pi21, TSV1, SCT1</i>	813
4	BR12419-6R-102*2/BR13407-5R-68	<i>Wx(a), Wx.10, GS3, Pita, Pi21, SCT1</i>	75
5	BR13113-4R-116*2/BR13407-5R-68	<i>Wx(a), qHTSF4.1, qPSST6, qPSST7, GS3, Pita, Pi21, SCT1</i>	67
6	BR13113-4R-63*2/BR13407-5R-68	<i>Wx(a), qPSST7, Ptr, GS3, Pita, Pi21, SCT1</i>	185
7	BR11318-5R-84*2/BR13407-5R-68	<i>Wx(a), Chalk5, SCM2, GS3, Pita, Pi21, SCT1</i>	443
8	BR11894-R-R-R-R-169*2/BR13407-5R-68	<i>Wx(a), Chalk5, SCM2, DTY12.1, GS3, Pita, Pi21, SCT1</i>	83
9	BR12508-5R-5*2/BR13407-5R-68	<i>Wx(a), GS3, Pita, Pi21, TSV1, SCT1</i>	345
10	BR12517-5R-57*2/BR13407-5R-68	<i>Wx(a), Pb1, GS3, Pita, Pi21, SCT1</i>	565
11	BRR1 dhan108*2/BR13407-5R-68	<i>Wx(a), Pita, Ptr, GS3, Pi21, SCT1</i>	10
12	BR12419-6R-102*2/IR20X1002:IRRI 154-Pi9+Hd9 (N22)	<i>Wx(a), SCT1, Pita, Pi9, Pb1, xa5, qHTSF4.1</i>	230

13	BR12517-5R-57*2/BR11607-4R-72	<i>Wx(a), xa5, xa13, Xa21, Pb1, SCT1, qHTSF4.1</i>	380
14	BR12524-5R-56*2/BR12454- BC2-69-97-39-5-44	<i>Wx(a), SCT1, Pita, Pb1, Pi9</i>	520

Experiment 8.3: Advancing segregating progenies in RGA nurseries

Principal investigator: PS Biswas

Co-Investigators: MA Syed, F Akter, MFRK Prince, F Mehmood, and KM Iftekharuddaula

Specific objectives: Rapid advancement of segregating population for shortening breeding cycle.

Materials and Method: A total of 14,161 individual segregating progenies of 44 crosses comprising 8,640 progenies of 16 F₂, 3,373 progenies of 20 F₃, 540 progenies of 1 BC₁F₂ and 1,608 progenies of 7 BC₁F₃, were grown at Gazipur under greenhouse and field RGA condition. In case of field RGA, panicles were directly seeded on the raised bed at 5 cm × 5 cm spacing. A wooden frame was used to make single-row plots on the beds. Fertilizer management was done using half doses of all fertilizers used in Experiment 8.1. At maturity stage, single panicle was harvested from each bunch of hills. Harvested panicles were dried and subjected to keep in the oven at 50⁰C for breaking dormancy and the same method was repeated to initiate next cycle of RGA immediately.

Results: A total of 11,498 progenies comprising 7,184 progenies from 16 F₂ population, 2,166 progenies from 20 F₃ population, 540 progenies from 1 BC₁F₂ population and 1,608 progenies from 7 BC₁F₃ population were harvested from 14,161 progenies comprising 8,640 F₂, 3,373 F₃, 540 BC₁F₂ and 1608 BC₁F₃ for advancing in the next generation (Table 8.3).

Table 8.3 Segregating progenies of different generations advanced in the RGA nurseries for the Development of Favorable Boro Rice (FBR) during 2024-25.

SL	BR number	Parentage	Plants grown	Plants Harvested
F₂ Generation				
1	BR15948-R	BR12419-6R-102/IR18A1398	540	512
2	BR15949-R	IR18A1398/BR12520-5R-75	540	220
3	BR15951-R	BR12520-5R-67/BR12567-5R-91	540	234
4	BR15952-R	BR12520-5R-67/BR12520-5R-75	540	513
5	BR15953-R	BR12527-5R-1/BR12524-5R-56	540	519
6	BR15954-R	BR12567-5R-91/BR12524-5R-56	540	520
7	BR15956-R	BR12096-4R-124-1/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	540	501
8	BR15957-R	BR12419-6R-102/BR12567-5R-91	540	505
9	BR15967-R	BR12557-5R-105/BR12524-5R-56	540	509
10	BR15969-R	BR10604-5R-58/IR126952-29-82-206-12-8	540	540
11	BR15100-R	BR11894-R-R-R-110/BR8333-2-3-1-3	540	380
12	BR15102-R	BR11894-R-R-R-270/BR11896-5R-28	540	118
13	BR15103-R	BR11894-R-R-R-270/GSR IR1-17-D6-Y1-D1-11	540	540
14	BR15123-R	BR9945-5R-21/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	540	533
15	BR15115-R	BR11640-5R-86/BR11607-4R-72	540	540
16	BR15125-R	BR10604-5R-58/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	540	500
Sub Total			8,640	7,184
F₃ Generation				
1	BR15090-2R	BR11318-5R-106/IR64EMF3	257	86
2	BR8899-2R	BR8899-14-4-1-2-2-1/IR19X1001: IRRI 154-Cold1	172	73
3	BR15124-2R	BR11640-5R-86/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	175	188
4	BR15654-2R	IR18A1398/BR12096-4R-124	216	23
5	BR15655-2R	BR12520-5R-75/BR12509-5R-45	85	96
6	BR15656-2R	BR12509-5R-45/BR (path)12452- BC3-42-22-11-4	273	144
7	BR15657-2R	BR12557-5R-105/BR12096-4R-25-1	119	74
8	BR15658-2R	BR12517-5R-57/BR (path)12452- BC3-42-22-11-4	151	38
9	BR15660-2R	BR12559-5R-30/BR12416-6R-219	13	13
10	BR15661-2R	BR12096-4R-25-1/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	225	186
11	BR15662-2R	BR12517-5R-57/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	382	342
12	BR15663-2R	BR12517-5R-57/BR12416-6R-219	460	237
13	BR15664-2R	BR12423-6R-38/BR12416-6R-219	282	141
14	BR15671-2R	BR11315-5R-17/IR126952-29-82-206-12-8	58	58
15	BR15672-2R	BR9945-5R-21/IR126952-29-82-206-12-8	47	47
16	BR15673-2R	BR11640-5R-86/IR126952-29-82-206-12-8	29	29
17	BR14879-2R	BR10317-5R-25/BR11607-4R-72	7	7
18	BR15691-2R	BR12517-5R-57/BR11607-4R-72	113	113

SL	BR number	Parentage	Plants grown	Plants Harvested
19	BR15692-2R	SVIN109/BR12421-4R-171	160	160
20	BR15116-2R	BR10604-5R-58/BR11607-4R-72	155	117
Sub Total			3,373	2,166
BC ₁ F ₂ Generation				
1	BR15694-BC1-R	BR10604-5R-58*2/BR11607-4R-72	540	540
Sub Total			540	540
BC ₁ F ₃ Generation				
1	BR15675-BC1-2R	BR11315-5R-17*2/IR20X1002: IRR1 154-Pi9+Hd9 (N22)	259	259
2	BR15676-BC1-2R	BR11640-5R-86*2/IR20X1002: IRR1 154-Pi9+Hd9 (N22)	655	655
3	BR15679-BC1-2R	BR10604-5R-58*2/IR20X1002: IRR1 154-Pi9+Hd9 (N22)	311	311
4	BR15693-BC1-2R	BR11318-5R-106*2/BR11607-4R-72	62	62
5	BR15677-BC1-2R	BR11315-5R-17*2/BR11607-4R-72	146	146
6	BR15678-BC1-2R	BR9945-5R-21*2/BR11607-4R-72	24	24
7	BR15694-BC1-2R	BR10604-5R-58*2/BR11607-4R-72	151	151
Sub Total			1,608	1,608
Grand Total			14,161	11,498

Experiment 8.4: Line Stage Testing (LST)

Principal investigator: PS Biswas

Co-Investigators: MA Syed, F Akter, MFRK Prince, F Mehmood, and KM Iftekharuddaula

Specific objectives: To select uniform genotypes in terms of plant height and days to flower with key target traits.

Materials and Methods: Total 19,901 progenies from 169 crosses were grown in Boro season in 12-hills single-row plots using systematic arrangement design. Thirty-five-day-old single seedling was transplanted at 20 cm × 20 cm in the plots. Fertilizer management was done following the protocol described in Experiment 8.1. Leaf samples were collected from single plant of each entry for genotyping with trait markers using trait-based SNP markers. At maturity stage, line selection was done considering uniformity in plant height, days to flowering, grain size and shape, lodging tolerance and tolerance to major disease and insect over check varieties under field conditions and presence of target key traits. Additionally, five plants were harvested from selected LST lines to compare the grain weight among selected progenies of same cross combination.

Results: Initially 2,172 LST lines from 153 crosses (Table 8.4) were selected and harvested based on visual observation on phenotypic acceptance, homogeneity in flowering, plant height and grain size and shape. Genotyping results have not yet been received.

Table 8.4 List of breeding lines selected from the LST conducted for the Development of Favorable Rice (FBR) during 2024-25.

SL	Cross name	Parentage	Lines grown	Lines selected
1	BR14215-5R	BR10317-5R-25/BR11303-5R-116	163	60
2	BR14216-5R	BR10317-5R-25/BR11318-5R-106	172	59
3	BR14218-5R	BR10318-5R-1/BR8899-14-4-1-2-2-1	178	49
4	BR14221-5R	BR11303-5R-19/BR8899-14-4-1-2-2-1	122	20
5	BR14222-5R	BR11303-5R-19/BR11388-4R-17	62	14
6	BR14223-5R	BR11318-5R-106/BR8899-14-4-1-2-2-1	71	17
7	BR14225-5R	BR11318-5R-18/BR8912-12-6-1-1-1-1	134	20
8	BR14226-5R	BR11318-5R-18/IR99285-1-1-1-P2	245	62
9	BR14227-5R	BR11318-5R-18/BR11388-4R-17	187	59
10	BR14229-5R	BR11342-5R-5/BR11607-4R-72	219	97
11	BR14231-5R	BRRI dhan29-SC3-28-16-10-6-HR6(Com)-HR1(Gaz)-P8(Habj)/BR8631-12-3-5-P2	96	27
12	BR14232-5R	BR9942-1-2-1-1-B2/BR9943-26-2-3-6	103	6
13	BR14233-5R	BR9942-1-2-1-1-B2/IR172244	150	12
14	BR14234-5R	BR9942-1-2-1-1-B2/IR64-Pi9	180	9
15	BR14236-5R	BR8912-12-6-1-1-1-1/IR172244	263	37
16	BR14237-5R	IR99285-1-1-1-P2/IR107995-B-BRG-BRG-2-1	249	42
17	BR14238-5R	BINA dhan17/IR172244	112	20
18	BR14239-5R	BR11607-4R-72/IR172244	199	26
19	BR14240-5R	BR10317-5R-25/IR126952-28-94-31-B	26	3
20	BR14241-5R	BR11303-5R-156/IR126952-28-94-31-B	89	14
21	BR14242-5R	BR11318-5R-106/IR126952-28-94-31-B	30	1

SL	Cross name	Parentage	Lines grown	Lines selected
22	BR14244-5R	BR10317-5R-25/BR11868-5R-59	97	7
23	BR14245-5R	BR10589-5R-39/BR11868-5R-59	30	11
24	BR14246-5R	BR11303-5R-116/BR11868-5R-59	106	28
25	BR14247-5R	IR16L1172/IR96925-B-B-B-B-61	139	50
26	BR14249-5R	HR(Pth)-10/BR7812-19-1-6-1-P2	120	33
27	BR14252-5R	BR11001-5R-37/TP26717	96	19
28	BR14257-5R	BR11303-5R-19/BR11868-5R-59	278	47
29	BR14258-5R	BR10317-5R-25/IR172244	70	12
30	BR14259-5R	BR11303-5R-156/IR172244	141	16
31	BR14261-5R	BR8899-14-4-1-2-2-1/IR172244	53	10
32	BR14265-5R	BR12266-44-11-32-5-1-1-HR10-B/BR11723-4R-172	52	11
33	BR14266-4R	BR9651-15-2-1-3/BR11000-5R-2	410	111
34	BR14599-4R	BR11303-5R-19/BR11723-4R-172	120	12
35	BR14609-4R	BR11607-4R-72/BR9943-26-2-3-6	132	56
36	BR14610-4R	BR11607-4R-72/IR64-Pi9	230	46
37	BR14611-4R	BR11723-4R-172/BR8912-12-6-1-1-1-1	268	47
38	BR14612-4R	BR11723-4R-172/BR8631-12-3-5-P2	264	48
39	BR14615-4R	TP26717/IR96925-B-B-B-B-61	143	57
40	BR14616-4R	BRR1 dhan88/BRR1 dhan89	89	10
41	BR14617-4R	BU dhan2/BR11723-4R-172	52	15
42	BR14618-4R	BU dhan2/BRR1 dhan81	57	9
43	BR14620-4R	BIN dhan14/BR11723-4R-172	38	17
44	BR14621-4R	BR12266-44-11-32-5-1-1-HR10-B/BINA dhan14	78	36
45	BR14622-4R	BIN dhan14/BR11712-4R-227	34	10
46	BR14630-4R	BR11712-4R-227/IR20X1003:IRRI154-Pi35	70	16
47	BR14631-4R	BR11712-4R-227/IR20X1005: IRRI 154-Pi54(Ttp)+Pi35	117	20
48	BR14634-4R	BR11712-4R-227/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	165	21
49	BR14635-4R	BR11712-4R-227/IR64EMF3	195	12
50	BR14636-4R	BR10317-5R-25/IR20X1003:IRRI154-Pi35	238	17
51	BR14640-4R	BR10317-5R-25/IR64EMF3	55	3
52	BR14642-4R	BR11303-5R-156/IR20X1005: IRRI 154-Pi54(Ttp)+Pi35	125	6
53	BR14650-4R	BR11318-5R-106/IR20X1003:IRRI154-Pi35	56	1
54	BR14651-4R	BR11318-5R-106/IR19X1001: IRRI 154-Cold1	90	14
55	BR14652-4R	BR11318-5R-106/BR11315-5R-17	152	12
56	BR14653-4R	BR12266-44-11-32-5-1-1-HR10-B/IR20X1003:IRRI154-Pi35	145	6
57	BR14655-4R	BR12266-44-11-32-5-1-1-HR10-B/IR19X1001: IRRI 154-Cold1	54	6
58	BR14657-4R	BR12266-44-11-32-5-1-1-HR10-B/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	232	11
59	BR14661-4R	IR126952-29-82-206-12-8/BR10317-5R-25	67	4
60	BR14870-BC1-4R	BR11318-5R-106*2/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	89	2
61	BR14871-BC2-4R	BR11303-5R-156*3/BR11607-4R-72	77	1
62	BR14872-BC2-4R	BR8899-14-4-1-2-2-1*3/BR11607-4R-72	156	8
63	BR14873-BC1-4R	IR126952-29-82-206-12-8/BR10317-5R-25*2	142	2
64	BR14874-BC1-4R	BR11318-5R-18*2/IR126952-29-82-206-12-8	195	10
65	BR14659-BC1-4R	BR11303-5R-156*2/BR11607-4R-72	96	1
66	BR14632-3R	BR10317-5R-25/IR19X1001: IRRI 154-Cold1	166	13
67	BR14643-3R	BR11303-5R-156/IR19X1001: IRRI 154-Cold1	182	4
68	BR14651-3R	BR11318-5R-106/IR19X1001: IRRI 154-Cold1	217	23
69	BR14638-4R-CT	BR10317-5R-25/IR19X1001: IRRI 154-Cold1	23	1
70	BR14643-4R-CT	BR11303-5R-156/IR19X1001: IRRI 154-Cold1	19	1
71	BR14254-4R-CT	BRR1 dhan88/BR8909-B-12-2-CS1-4-CS2-P2-3-2	25	1
72	BR14855-3R	BR11894-R-R-R-169/BRR1 dhan29-CS3-28-16-10-6-HR6(com)-HR1(Gaz)-P8(Habj)	244	11
73	BR14857-3R	BR11894-R-R-R-329/BR11894-R-R-R-169	255	14
74	BR14598-4R-CT	BR11303-5R-156/BR11723-4R-172	279	3
75	BR14599-4R-CT	BR11303-5R-19/BR11723-4R-172	173	10
76	BR14600-4R-CT	BR11303-5R-19/IR107995-B-BRG-BRG-2-1	279	22
77	BR14601-4R-CT	BR11318-5R-18/BR8938-194-3-4-1-1-P2-HR3	140	4
78	BR14602-4R-CT	BR11318-5R-18/BR8631-12-3-5-P2	219	2
79	BR14603-4R-CT	BR11330-5R-29/BR11342-5R-5	218	28
80	BR14604-4R-CT	BR11330-5R-29/BR8899-14-4-1-2-2-1	103	13
81	BR14605-4R-CT	BRR1 dhan29-SC3-28-16-10-6-HR6(Com)-HR1(Gaz)-P8(Habj)/BR9943-26-2-3-6	90	5
82	BR14607-4R-CT	BRR1 dhan29-SC3-28-16-10-6-HR6(Com)-HR1(Gaz)-P8(Habj)/BR8912-12-6-1-1-1-1	68	3
83	BR14608-4R-CT	BRR1 dhan29-SC3-28-16-10-6-HR6(Com)-HR1(Gaz)-P8(Habj)/IR99285-1-1-1-P2	78	9
84	BR14609-4R-CT	BR11607-4R-72/BR9943-26-2-3-6	47	5
85	BR14610-4R-CT	BR11607-4R-72/IR64-Pi9	111	2
86	BR14611-4R-CT	BR11723-4R-172/BR8912-12-6-1-1-1-1	55	3
87	BR14612-4R-CT	BR11723-4R-172/BR8631-12-3-5-P2	52	4

SL	Cross name	Parentage	Lines grown	Lines selected
88	BR14613-4R-CT	BR8631-12-3-5-P2/IR172244	295	11
89	BR14614-4R-CT	IR107995-B-BRG-BRG-2-1/BIN dhan17	161	6
90	BR14615-4R-CT	TP26717/IR96925-B-B-B-B-61	50	1
91	BR14619-4R-CT	BR11303-5R-156/BR11868-5R-59	160	5
92	BR14620-4R-CT	BIN dhan14/BR11723-4R-172	27	2
93	BR14621-4R-CT	BR12266-44-11-32-5-1-1-HR10-B/BINA dhan14	14	1
94	BR14630-4R-CT	BR11712-4R-227/IR20X1003:IRRI154-Pi35	27	1
95	BR14631-4R-CT	BR11712-4R-227/IR20X1005: IRRI 154-Pi54(Ttp)+Pi35	28	1
96	BR14634-4R-CT	BR11712-4R-227/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	37	3
97	BR14636-4R-CT	BR10317-5R-25/IR20X1003:IRRI154-Pi35	29	1
98	BR14650-4R-CT	BR11318-5R-106/IR20X1003:IRRI154-Pi35	32	3
99	BR14653-4R-CT	BR12266-44-11-32-5-1-1-HR10-B/IR20X1003:IRRI154-Pi35	27	4
100	BR14657-4R-CT	BR12266-44-11-32-5-1-1-HR10-B/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	42	6
101	BR14223-5R-CT	BR11318-5R-106/BR8899-14-4-1-2-2-1	46	3
102	BR14225-5R-CT	BR11318-5R-18/BR8912-12-6-1-1-1-1	18	1
103	BR14641-2R	BR11303-5R-156/IR20X1003:IRRI154-Pi35	150	2
104	BR14650-2R	BR11318-5R-106/IR20X1003:IRRI154-Pi35	252	6
105	BR14656-2R	BR12266-44-11-32-5-1-1-HR10-B/BR11315-5R-17	289	32
106	BR14657-2R	BR12266-44-11-32-5-1-1-HR10-B/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	106	3
107	BR15088-2R	BR11303-5R-156/IR64EMF3	67	1
108	BR15089-2R	BR11318-5R-106/BR11607-4R-72	176	8
109	BR15090-2R	BR11318-5R-106/IR64EMF3	96	10
110	BR14630-3R	BR11712-4R-227/IR20X1003:IRRI154-Pi35	258	29
111	BR14631-3R	BR11712-4R-227/IR20X1005: IRRI 154 Pi54(Ttp)+Pi35	157	15
112	BR14639-3R	BR10317-5R-25/BR11315-5R-17	68	1
113	BR14645-3R	BR8899-14-4-1-2-2-1/IR20X1003:IRRI154-Pi35	156	6
114	BR14646-3R	BR8899-14-4-1-2-2-1/IR20X1005: IRRI 154-Pi54(Ttp)+Pi35	131	4
115	BR14649-3R	BR8899-14-4-1-2-2-1/IR64EMF3	250	3
116	BR14848-3R	BR11318-5R-106/IR20X1005: IRRI 154-Pi54(Ttp)+Pi35	221	4
117	BR14850-3R	BR11894-5R-77/BR11894-R-R-R-213	153	9
118	BR14851-3R	BR11894-5R-77/BR11896-5R-28	88	1
119	BR14852-3R	BR11894-R-R-R-110/BR11896-5R-28	208	9
120	BR14853-3R	BR11894-R-R-R-110/GSR IR1-17-D6-Y1-D1-11	212	9
121	BR14856-3R	BR12421-4R-171/BRR1 dhan 29-CS3-28-16-10-6-HR6(com)-HR1(Gaz)-P8(Habj)	152	3
122	BR14858-3R	BR8899-14-4-1-2-2-1/HRB-190-23-17-B-5	170	30
123	BR14601-2R	BR11318-5R-18/BR8938-194-3-4-1-1-P2-HR3	120	2
124	BR14616-2R	BRR1 dhan88/BRR1 dhan89	120	3
125	BR14620-2R	BIN dhan14/BR11723-4R-172	113	26
126	BR14647-2R	BR8899-14-4-1-2-2-1/IR19X1001: IRRI 154-Cold1	154	7
127	BR15091-2R	BR11636-5R-194/BR11894-R-R-R-270	76	3
128	BR15092-2R	BR11660-5R-254/BR11894-5R-77	42	1
129	BR15093-2R	BR11660-5R-254/BR11894-R-R-R-110	164	7
130	BR15094-2R	BR11660-5R-254/BR11894-R-R-R-270	71	2
131	BR15095-2R	BR11660-5R-254/BR11894-R-R-R-299	139	10
132	BR15096-2R	BR11660-5R-254/GSR IR1-17-D6-Y1-D1-11	173	4
133	BR15097-2R	BR11887-5R-368/BR11894-R-R-R-11	195	29
134	BR15098-2R	BR11887-5R-368/BR11894-R-R-R-270	64	8
135	BR15099-2R	BR11894-R-R-R-110/BR11894-R-R-R-299	90	6
136	BR15104-2R	BR11894-R-R-R-270/BR8333-2-3-1-3	81	10
137	BR15105-2R	BR11894-R-R-R-299/BR11896-5R-28	43	1
138	BR15106-2R	BR11636-5R-194/BRR1 dhan100	59	3
139	BR15107-2R	BR11660-5R-254/BRR1 dhan100	141	3
140	BR15108-2R	BR11887-5R-368/BRR1 dhan100	96	4
141	BR15109-2R	BR11894-5R-77/BRR1 dhan100	199	4
142	BR15110-2R	BR11894-R-R-R-110/BRR1 dhan100	106	6
143	BR15112-2R	BR11894-R-R-R-299/BRR1 dhan100	21	2
144	BR15114-2R	BR9945-5R-21/BR11607-4R-72	26	4
145	BR15116-2R	BR10604-5R-58/BR11607-4R-72	118	8
146	BR15118-2R	BR11315-5R-17(long)/BR12421-4R-171	140	15
147	BR15119-2R	BR10604-5R-58/BR12421-4R-171	114	7
148	BR15120-2R	BRR1 dhan89/HRB-190-23-17-B-5	61	5
149	BR15122-2R	BR11315-5R-17/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	33	5
150	BR15117-2R	BR11894-R-R-R-329/BR12421-4R-171	29	4
151	BR14878-3R	BR10317-5R-25/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	194	12
152	BR14666-3R	BR11303-5R-156/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	169	5
153	BR14597-4R	BR10317-5R-25/BR11303-5R-156	205	6

Experiment 8.5: Observational Yield Trial (OYT-FBC)

Principal investigator: P S Biswas

Co-Investigators: MA Syed, KM Iftekharuddaula (Gazipur), T Shaha (Cumilla), H khatun (Barishal), MR Hassan and RJ Promee (Rangpur), M Anisuzzaman (Habiganj), U Rani (Bhanga), (Gopalganj), MR Dewan (Kushtia), TK Hore (Rajshahi), S Sultana (Sirajganj), A Islam (Sonagazi).

Specific objective: Selection of superior lines with desired agronomic characters.

Materials and Methods: A total of 1982 genotypes were evaluated at twelve locations (Gazipur, Barishal, Bhanga, Cumilla, Gopalganj, Habiganj, Kushtia, Rajshahi, Rangpur, Satkhira, Sirajganj and Sonagazi) following sparse model of genomic selection (Fig. 8.5). A total of 190-238 genotypes, in which around 9-12% of the total genotypes were tested at each of twelve sites as training population. In this trial, BRRI dhan29, BRRI dhan88, BRRI dhan92, and BRRI dhan102 were used as standard check varieties. Forty-day-old seedlings of each entry were transplanted in 5.4 m × 5 rows plot using single seedling at a spacing of 20 × 20 cm. Fertilizer doses and application method were the same as in Experiment 8.1. Data on plant height, days to flowering and maturity, yield, lodging and disease and insect infestation were recorded.

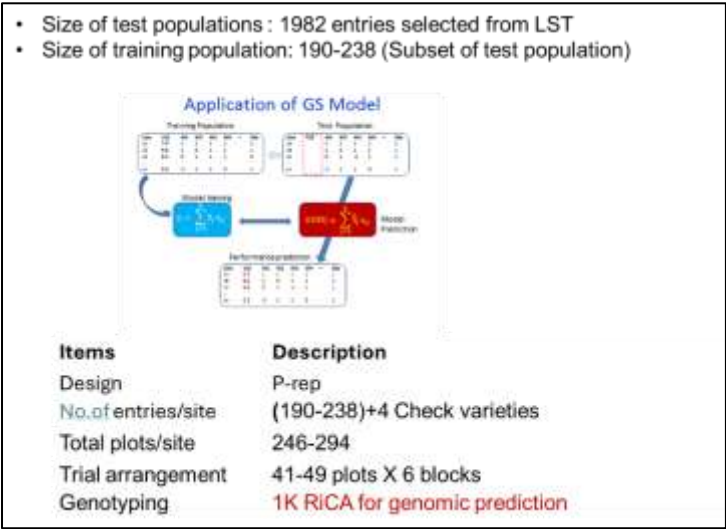


Fig 8.5: Sparse testing 1982 breeding lines at 12 locations during Boro 2024-25 for genomic selection.

Green leaf tissues from all 1982 breeding lines including the check varieties were collected in labeled glassine bags at 4-5 weeks after transplanting and stored immediately on ice. The samples were stored in a -80°C freezer until processing for genotyping. Genotyping with genome-wide 1024 SNP markers including 92 trait-specific markers named as 1k-RiCA panel (Arbelaez et al. 2019) was performed at an outsourcing genotyping service provider with the help of IRRI Genotyping Services Laboratory.

Results: In the trial, 1968 breeding lines showed a wide range of variation in plant height 81.3-152.2 (cm), growth duration starting from 107days to 162 days with 1.01-10.57 t/ha yield over the 12 locations. However, the training population of 190-238 breeding lines (a subset of 1968) tested at 12 locations showed variable yield performance. The trial heritability ranged from 34.8% to 95.20% across the twelve locations. The wide variation in heritability might be due to the inconsistent performance of the breeding lines at different trial sites.

Out of 1982, 119 lines were selected based on the site-specific performance at 12 locations compared to check varieties for further advancement (Table 8.5). Among them, 72 selected SD lines showed average yield ranging from 4.82-10.57 t/ha with growth duration varied from 117-149 across the locations, 44 MD lines produced 4.58–9.89 t/ha grain yield with 126-156 days growth duration, and three lines yielded 7.37–8.35 t/ha grain with growth duration of 146–160 days (LD). The check variety BRRI dhan29 yielded 6 t/ha with 142 days growth duration, BRRI dhan88 yielded 6.20 t/ha with 130 days growth duration, BRRI dhan92

produced 6.23 t/ha grain with growth duration of 143 days, and BRRI dhan102 yielded 6.27 t/ha with 141 days growth duration

Table 8.5: List of selected breeding lines from OYT-FBC conducted for the Development of Favorable Rice (FBR) during Boro 2024-25

Sl#	Designation	PH (cm)	GD (days)	Yield(t/ha)	Selection
1	BR13983-R-R-R-27	87.3	128	4.93	Sel_MD
2	BR13995-R-R-R-84	110.4	136	9.89	Sel_MD
3	BR14870-BC1-R-115	98.7	124	5.02	Sel_SD
4	BR14231-R-R-R-23	112.9	133	6.75	Sel_SD
5	BR14223-R-R-R-18	119.1	131	7.89	Sel_SD
6	BR14215-R-R-R-101	127.3	142	8.09	Sel_SD
7	BR14216-5R-66	118.1	141	9.81	Sel_MD
8	BR14221-R-R-R-52	122.5	137	8.13	Sel_SD
9	BR14215-R-R-R-33	100.5	132	8.51	Sel_SD
10	BR14218-5R-117	89.0	145	8.56	Sel_MD
11	BR14229-R-R-R-46	99.0	138	8.65	Sel_SD
12	BR14218-5R-92	107.7	156	8.07	Sel_MD
13	BR14231-R-R-R-8-P1	125.6	137	8.71	Sel_SD
14	BR14218-R-R-R-244	121.4	143	8.81	Sel_SD
15	BR14218-R-R-R-254	105.0	139	8.90	Sel_SD
16	BR14870-BC1-R-44	104.9	125	4.82	Sel_SD
17	BR14227-5R-155	96.7	122	4.91	Sel_SD
18	BR14223-5R-21	113.6	132	8.55	Sel_SD
19	BR14216-5R-144	112.1	146	8.35	Sel_LD
20	BR14218-R-R-R-170	108.6	135	7.98	Sel_MD
21	BR14227-5R-126	117.5	136	8.57	Sel_SD
22	BR14872-BC2-R-13	93.3	134	8.72	Sel_SD
23	BR14218-R-R-R-213	116.9	147	8.26	Sel_MD
24	BR14259-R-R-R-48	120.8	134	8.59	Sel_SD
25	BR14218-R-R-R-59	118.4	141	8.79	Sel_MD
26	BR14261-5R-52	106.3	139	8.61	Sel_SD
27	BR14221-5R-1	109.7	131	4.61	Sel_MD
28	BR14218-R-R-R-237	110.1	160	7.51	Sel_LD
29	BR14223-5R-43	123.1	139	8.93	Sel_MD
30	BR14225-5R-91	110.9	139	9.27	Sel_MD
31	BR14225-R-R-R-7	112.2	139	8.09	Sel_MD
32	BR14226-5R-32	103.8	138	8.66	Sel_SD
33	BR14226-5R-121	98.7	140	6.79	Sel_MD
34	BR14226-R-R-R-118	111.9	129	8.90	Sel_MD
35	BR14615-4R-69	103.5	138	8.82	Sel_SD
36	BR14226-R-R-R-160	114.5	126	6.54	Sel_MD
37	BR14216-5R-87	103.4	138	8.82	Sel_SD
38	BR14237-R-R-R-164	108.1	134	8.85	Sel_SD
39	BR14226-R-R-R-168	104.4	136	6.72	Sel_MD
40	BR14223-R-R-R-33	112.2	143	8.98	Sel_SD
41	BR14257-5R-158	123.4	131	6.55	Sel_SD
42	BR14215-5R-82	111.0	127	6.75	Sel_SD
43	BR14227-5R-129	125.8	133	7.00	Sel_SD
44	BR14229-5R-175	118.8	129	7.21	Sel_SD
45	BR14237-5R-249	94.6	132	7.41	Sel_SD
46	BR14233-R-R-R-52	118.6	134	7.77	Sel_SD
47	BR14227-5R-59	110.9	137	9.72	Sel_MD
48	BR14236-5R-6	99.8	131	9.42	Sel_SD
49	BR14258-5R-7	121.3	133	9.50	Sel_SD
50	BR14215-5R-99	102.6	134	9.81	Sel_SD
51	BR14643-4R-83	120.1	135	9.85	Sel_SD
52	BR14229-R-R-R-68	115.4	150	7.07	Sel_MD
53	BR14231-5R-75	107.5	135	6.80	Sel_MD
54	BR14236-5R-62	109.4	135	10.29	Sel_SD
55	BR14239-5R-117	114.5	129	6.69	Sel_SD
56	BR14216-5R-137	119.3	132	6.72	Sel_SD
57	BR14259-5R-136	112.6	131	6.72	Sel_SD
58	BR14233-5R-103	102.6	131	4.69	Sel_MD
59	BR14233-5R-114	112.0	137	9.46	Sel_MD
60	BR14609-4R-131	117.6	129	6.73	Sel_SD
61	BR14234-5R-144	107.3	131	4.58	Sel_MD
62	BR14236-5R-16	113.4	141	6.96	Sel_MD
63	BR14227-5R-104	91.5	132	6.75	Sel_SD
64	BR14237-5R-86	110.5	134	6.78	Sel_SD
65	BR14215-5R-58	109.8	132	6.96	Sel_SD
66	BR14229-5R-35	106.3	129	6.96	Sel_SD
67	BR14237-5R-38	105.5	146	8.96	Sel_MD

Sl#	Designation	PH (cm)	GD (days)	Yield(t/ha)	Selection
68	BR14238-5R-61	116.3	129	7.12	Sel_SD
69	BR14216-R-R-R-7	116.7	134	7.17	Sel_SD
70	BR14237-5R-90	100.6	137	8.27	Sel_MD
71	BR14218-R-R-R-123	108.2	135	7.18	Sel_SD
72	BR14259-5R-59	121.1	130	7.20	Sel_SD
73	BR14232-5R-65	117.6	131	7.22	Sel_SD
74	BR14254-4R-211	116.5	132	8.09	Sel_SD
75	BR14609-4R-22	105.4	134	8.44	Sel_SD
76	BR14616-4R-84	111.3	145	6.69	Sel_SD
77	BR14631-4R-10	104.7	147	6.69	Sel_SD
78	BR14241-R-R-R-23	102.2	140	6.90	Sel_MD
79	BR14246-5R-73	122.1	137	9.11	Sel_MD
80	BR14231-R-R-R-31	104.8	144	6.99	Sel_SD
81	BR14249-5R-91	117.6	145	8.67	Sel_MD
82	BR14872-BC2-R-71	85.3	147	7.02	Sel_SD
83	BR14216-5R-100	112.3	143	7.52	Sel_SD
84	BR14254-4R-132	124.9	139	9.37	Sel_MD
85	BR14254-4R-136	120.2	141	6.70	Sel_MD
86	BR14231-5R-84	110.5	149	7.75	Sel_SD
87	BR14254-4R-90	114.9	137	8.59	Sel_MD
88	BR14229-5R-184	109.6	120	7.48	Sel_SD
89	BR14257-5R-257	118.7	129	7.85	Sel_MD
90	BR14227-5R-41	106.2	117	7.71	Sel_SD
91	BR14226-R-R-R-198-P2	119.7	124	7.88	Sel_SD
92	BR14599-4R-2	112.6	133	6.49	Sel_SD
93	BR14266-4R-268	112.8	131	6.53	Sel_SD
94	BR14266-4R-256	116.9	137	9.26	Sel_MD
95	BR14240-5R-2	110.1	134	6.57	Sel_SD
96	BR14609-4R-105	110.6	159	7.37	Sel_LD
97	BR14226-5R-1	107.7	133	6.60	Sel_SD
98	BR14610-4R-204	108.9	135	6.91	Sel_SD
99	BR14231-R-R-R-106	116.9	132	7.43	Sel_SD
100	BR14611-4R-200	111.0	139	9.57	Sel_MD
101	BR14611-4R-267	109.5	145	8.72	Sel_MD
102	BR14612-4R-101	112.6	130	7.58	Sel_MD
103	BR14218-5R-55	112.0	132	7.95	Sel_SD
104	BR14617-4R-7	113.5	125	8.07	Sel_SD
105	BR14617-4R-11	81.3	127	4.94	Sel_MD
106	BR14872-BC2-R-159	102.7	122	8.62	Sel_SD
107	BR14620-4R-28	101.5	154	7.18	Sel_MD
108	BR14215-5R-44	110.5	119	8.64	Sel_SD
109	BR14631-4R-22	116.3	129	8.39	Sel_MD
110	BR14636-4R-136	116.9	129	8.14	Sel_MD
111	BR14640-4R-7	107.9	154	7.84	Sel_MD
112	BR14642-4R-7	108.6	130	4.69	Sel_MD
113	BR14643-4R-52	107.8	130	8.37	Sel_MD
114	BR14227-R-R-R-170	117.6	124	8.90	Sel_SD
115	BR14651-4R-53	121.8	143	9.29	Sel_MD
116	BR14237-5R-98	115.5	118	9.43	Sel_SD
117	BR14612-4R-250	113.1	119	9.54	Sel_SD
118	BR14239-5R-20	120.2	124	10.41	Sel_SD
119	BR14252-5R-48	112.5	121	10.57	Sel_SD
120	BRRi dhan29 (Ck)	94.9-117.4	127-158	2.85-7.71	
121	BRRi dhan88 (Ck)	85.6-120.7	118-146	4.05-8.09	
122	BRRi dhan92 (Ck)	104.9-134.1	130-159	3.59-8.15	
123	BRRi dhan102 (Ck)	97.1-134.1	131-157	4.14-7.96	

Experiment 8.6: Observational Yield Trial (OYT-AGGRiNet)

Principal investigator: P S Biswas

Co-Investigators: MA Syed, F Akter, KM Iftekharuddaula (Gazipur), TK Hore and S Abedin (Rajshahi), T Shaha (Cumilla), M Anisuzzaman (Habiganj).

Specific objective: Selection of superior lines for direct use in product development pipeline or as parents in the breeding program under favorable Boro ecosystem.

Materials and Methods: The Stage-1 trial was conducted with 527 advanced breeding lines/varieties along with 6 international and 6 national check varieties at BRRi Gazipur, BRRi Rajshahi, BRRi Cumilla and BRRi Habiganj following alpha lattice design with two replications under sparse testing method of genomic selection. At Gazipur, 115 breeding lines

along with six international check variety and five national check varieties, at Cumilla 138 breeding lines and 16 check varieties, at Habiganj, 140 breeding lines and 11 check varieties and at Rajshahi, 140 breeding lines, 12 hybrids and 11 check varieties were evaluated. The Stage-2 trial with 60 breeding line/varieties including six national and six international check varieties evaluated at the same locations following Alpha lattice design with two replicates. Unit plot size at all locations was 27 hills $\times$ 4 rows. Thirty-six days old seedlings at Cumilla, 35 days at Habiganj and 45 days old seedlings at Rajshahi and 32 days old seedlings at Gazipur were transplanted in the plots with a spacing of 20 cm $\times$ 20 cm using 2-3 seedlings per hill. Fertilizer management was performed as per the BRRI recommendation for Boro season. Crop management such as weeding, controlling disease and insect pests were done in time. Observations on plant height from five random hills of each plot, 50% flowering, 80% maturity, plot yield, disease and insect pest infestation were recorded. Grain yield was calculated adjusting the moisture content at 14 %. Data was analysed using lme4 package in R 3.6.2 following two-stage mixed liner model.

Results: Fig 8.6a and 8.6b showed the variations in yield performance of the breeding lines tested in Stage-1 at Cumilla, Gazipur, Habiganj and Rajshahi. The entries showed a wide range of variation in grain yield starting 0.64 t/ha to 9.33 t/ha at Cumilla, 1.59 t/ha to 8.69 t/ha at Gazipur, 5.01 t/ha to 8.45 t/ha at Rajshahi and 3.49 t/ha to 7.32 t/ha at Habiganj. Wide variations in plant height were also observed within and between locations. The entries showed 87 cm to 130 cm height at Cumilla site, 75.2 cm to 132.6 cm at Gazipur, while at Rajshahi it was 69 cm to 127 cm and 82 cm to 140 cm at Habiganj. The trial heritability estimates at Cumilla were 94.2%, 97.6% and 94.5% for days to maturity, plant height and yield, respectively. At Rajshahi, the estimates were 98.5%, 99.5% and 76.9% for days to maturity, plant height and yield, respectively. At Habiganj, the heritability estimates were 85.1%, 56.1% and 76.8% for days to maturity, plant height and yield, respectively. The heritability estimates at Gazipur were 75.8%, 75.9% and 52.8% for these traits, respectively (Out of 527 entries tested at four locations, 19 breeding lines comprising seven lines from Gazipur, three lines from Habiganj, two breeding lines from Rajshahi and seven breeding lines from Cumilla were selected for further trial.

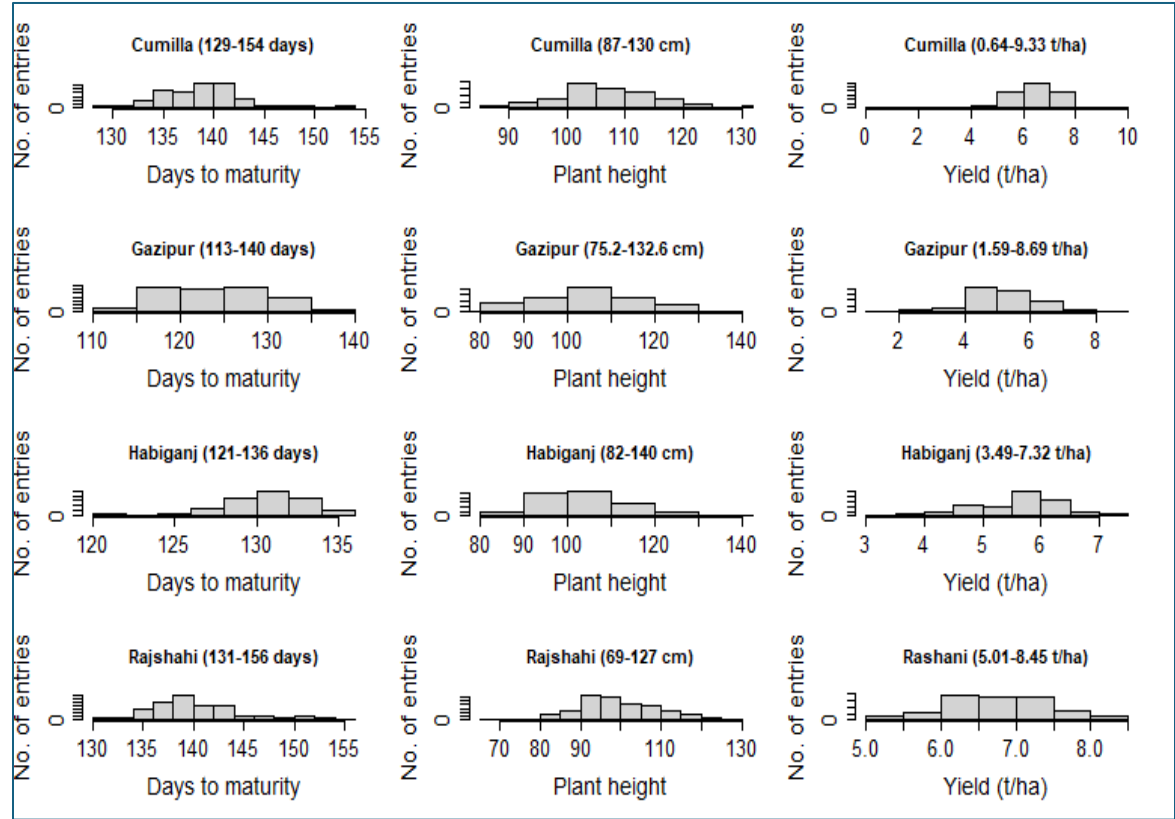


Fig 8.6a. Histogram of Growth duration, Plant height and Grain yield the breeding lines/varieties of IRRI NARES Stage-1 trial evaluated at four locations.

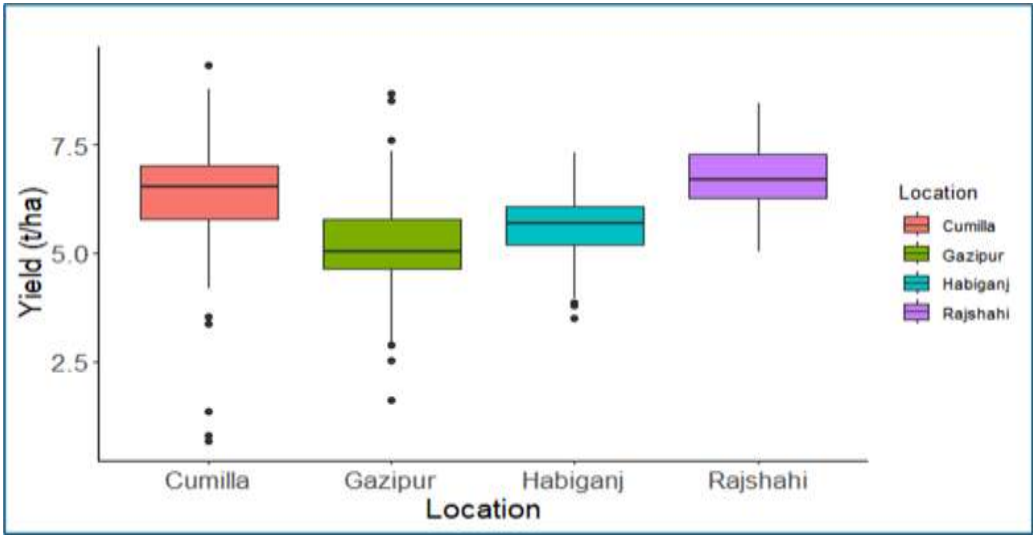


Fig 8.6b. Yield performance of the breeding lines/varieties of IRRI NARES Stage-1 trial evaluated at four locations during Boro 2024-25.

Agronomic performance of the selected 19 breeding lines among 140 entries from IRRI NARES Stage-1 trial conducted at four locations, each showing clear yield advantage over the checks. Growth duration ranged from 122–142 days and plant height from 91.0–130.5 cm, with yields consistently between 7.0–8.8 t/ha. High performers included IR23MD6154 (8.8 t/ha, Cumilla), IR23MD9062 (8.7 t/ha, Gazipur), and IR23MD8764 (8.5 t/ha, Gazipur), all of which outperformed checks such as BINA dhan24 and BRRI dhan102 (6.3 t/ha) and BRRI dhan67 (5.6 t/ha).

Table 8.6 Yield performances of the selected breeding lines from OYT-AGGRiNet trials conducted during Boro 2024-25.

Sl#	Designation	PH (cm)	GD (days)	Yield (t/ha)	Remarks
1	IR23MD9062	102.0	126	8.7	Sel_Gaz
2	IR23MD8764	123.5	125	8.5	Sel_Gaz
3	IR23MD8522	104.5	126	7.6	Sel_Gaz
4	IR16A3891	123.2	131	7.4	Sel_Gaz
5	IR23MD3779	104.4	122	7.3	Sel_Gaz
6	IR23MD5884	102.3	128	7.3	Sel_Gaz
7	IR16A3838	107.2	140	7.1	Sel_Gaz
8	IR23MD9226	95.5	131	7.2	Sel_Hab
9	IR23MD3633	96.5	127	7.2	Sel_Hab
10	IR23MD1148	99.0	122	7.0	Sel_Hab
11	IR23MD3797	91.0	136	8.4	Sel_Raj
12	IR23MD1719	104.6	136	8.2	Sel_Raj
13	IR23MD6154	129.0	141	8.8	Sel_Cum
14	IR23MD7210	108.1	139	8.1	Sel_Cum
15	IR23MD5664	103.2	140	8.0	Sel_Cum
16	IR23MD8958	130.5	141	7.8	Sel_Cum
17	IR23MD1777	101.4	142	7.7	Sel_Cum
18	IR23MD9068	111.4	133	7.6	Sel_Cum
19	IR23MD5763	118.6	139	7.6	Sel_Cum
	BINA dhan24 (Ck)	101.8	131	6.3	
	BRRI dhan102 (Ck)	99.3	135	6.3	
	BRRI dhan67 (Ck)	113.0	122	5.6	
	BRRI dhan89 (Ck)	105.0	139	6.6	
	BRRI dhan92 (Ck)	105.7	139	7.0	

D/S: 16.01.2025 (Gazipur), 16.12.2021 (Cumilla), 22.12.2024 (Habiganj), and 12.12.2024 (Rajshahi).

Experiment 8.7: Observational Yield Trial (AYT-AGGRiNet)

Principal investigator: P S Biswas

Co-Investigators: MA Syed, F Akter, KM Iftekharuddaula (Gazipur), TK Hore and S Abedin (Rajshahi), T Shaha (Cumilla), M Anisuzzaman (Habiganj).

Specific objective: Selection of superior lines for direct use in product development pipeline or as parents in the breeding program under favorable Boro ecosystem.

Materials and Methods: The Stage-2 trial with 60 breeding line/varieties including six national and six international check varieties was conducted at BRRI Gazipur, BRRI Rajshahi, BRRI Cumilla and BRRI Habiganj following Alpha lattice design with two replicates. Unit plot size at all locations was 27 hills × 4 rows. Thirty-six days old seedlings at Cumilla, 35 days at Habiganj and 45 days old seedlings at Rajshahi and 32 days old seedlings at Gazipur were transplanted in the plots with a spacing of 20 cm × 20 cm using 2-3 seedlings per hill. Fertilizer management was performed as per the BRRI recommendation for Boro season. Crop management such as weeding, controlling disease and insect pests were done in time. Observations on plant height from five random hills of each plot, 50% flowering, 80% maturity, plot yield, disease and insect pest infestation were recorded. Grain yield was calculated adjusting the moisture content at 14 %. Data was analysed using lme4 package in R 3.6.2 following two-stage mixed liner model.

Results: In Stage-2, the breeding lines yielded 1.92 t/ha to 7.45 t/ha with growth duration of 131-155 days at Cumilla, 3.81 t/ha to 7.92 t/ha with growth duration of 111-135 days at Gazipur, 3.84 t/ha to 6.78 t/ha with growth duration of 123 –136 days at Habiganj and 2.83-8.03 t/ha with growth duration of 136 -167 days at Rajshahi (Fig. 8.7a). Heritability estimates for yield of these trials were 98.7%, 72.9%, 80.8% and 78.6% for Cumilla, Gazipur, Habiganj and Rajshahi, respectively (Table 8.7). The genetic correlation of the breeding lines for yield across the location shows that the trial at Habiganj was poorly correlated indicating weakness of this site for realizing potential yield of the genotypes compared to other location (Fig. 8.7b).

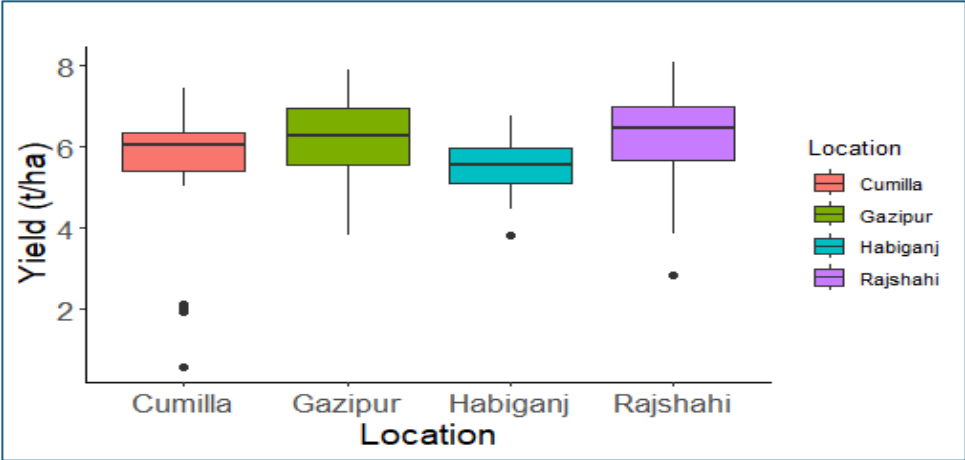


Fig 8.7a. Yield performance of the breeding lines/varieties of IRRI NARES Stage-2 trial evaluated at four locations during Boro 2024-25.

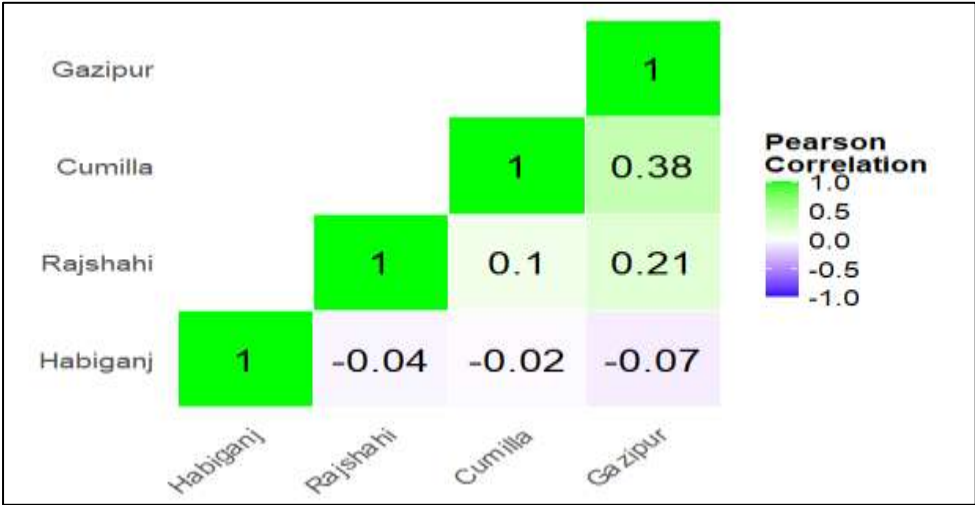


Fig 8.7b. Genetic correlation between the trial sites for yield in IRRI NARES Stage-2 trial conducted at four locations during Boro 2024-25

The combined analysis showed a yield range of 2.24-7.73 t/ha with growth duration range 94-120 days (Table 8.7). Two inbred line IR22MD3502 and IR22MD2741 and one hybrid (IR 138867 H) showed 0.5 t/ha yield advantage over the best inbred check variety BRRI dhan92, but much lower yield compared to hybrid check varieties. Thus, none of the entries were selected for further advancement.

Table 8.7: Performance of the tested entries in IRRI NARES Stage-2 trial, Boro 2024-25

Parameter	PH (cm)	GD (days)	Yield (t/ha)				
			Gazipur	Habiganj	Rajshahi	Cumilla	Ave
BRRI dhan67	116	145	4.95	5.99	7.55	-	6.11
BRRI dhan89	117	144	6.62	5.19	6.63	-	6.48
BRRI dhan92	114	143	5.58	5.98	8.11	5.9	6.53
BRRI dhan102	104	141	6.31	6.13	7.79	6.13	6.74
BINADHAN 24	94	136	5.32	4.67	6.58	5.26	6.36
BRRI Hybrid Dhan 8	111	141	-	5.53	7.29	7.45	7.4
LSD	9.26	13.97	1.36	0.75	1.42	0.54	1.2
H ₂ B (%)	75.2	75.2	72.9	80.8	78.6	98.7	62.1
Tested entries (N=60)	94-120	127-145	3.81-7.92	3.84-6.78	2.83-8.03	1.92-7.45	2.24-7.73

Experiment 8.8: Advanced Yield trial (AYT)

Principal investigator: P S Biswas

Co-Investigators: MA Syed, F Akter, KM Iftekharuddaula, UR Shaha, M Anisuzzaman.

Specific objective: Initial evaluation for yield potential in a replicated trial.

Materials and Methods: A total of 46 genotypes in AYT-1 and 100 genotypes in AYT-2 were evaluated along with standard check varieties BRRI dhan88, BRRI dhan92, and BRRI dhan102 respectively. Thirty-five-day-old seedlings of each genotype were transplanted in a 5.4 m×6 rows plot using 2/3 seedling/hill at a spacing of 20 cm × 20 cm in two replications. Fertilizer doses were the same as in experiment no. 8.1. Data on plant height, days to flowering and maturity, yield, lodging and disease and insect infestation were recorded.

Results: The AYT-1 was conducted at three locations (Gazipur, Bhanga and Habiganj). The trial heritability for yield ranged from 33.09% to 95.65% across the three locations, and it was 27% over the location. This might be due to inconsistent performance of the breeding lines at different trial sites (Table 8.8a). The check varieties BRRI dhan88, BRRI dhan92, and BRRI dhan102 yielded 6.35 t/ha with 134 days growth duration, 6.71 t/ha with 146 days growth duration and 6.66 t/ha with 146 days growth duration, respectively. In this trial, 9 breeding lines were selected for further evaluation as they showed 7.05-7.76 t/ha grain yield potentiality with 132-139 days growth duration.

Table 8.8a: Agronomic performance of the selected entries from 46 breeding lines tested in FBR_AYT-1 at three locations during Boro 2024-25

Sl#	Designation	Growth duration (days)	Plant height (cm)	Grain Yield (t/ha)			
				Gazipur	Bhanga	Habiganj	Average
1	BR13983-3R-166	134	106.2	7.16	8.78	7.16	7.70
2	BR13983-3R-99	134	109.4	7.56	9.65	6.05	7.76
3	BR13985-3R-148	135	109.5	6.32	9.66	6.35	7.44
4	BR13988-3R-124	131	99.7	6.41	8.69	6.05	7.05
5	BR13990-2R-35	138	102.7	6.75	9.79	5.30	7.28
6	BR13997-3R-6	132	106.5	6.96	8.75	6.20	7.30
7	BR14007-3R-78	138	101.6	6.95	9.10	6.94	7.66
8	IR22X1008	137	103.6	7.14	8.73	6.21	7.36
9	IR22MD3597	139	103.3	6.49	9.37	6.64	7.50
	BRRI dhan92	146	114.6	6.76	8.21	5.16	6.71
	BRRI dhan102	145	107.9	5.87	8.24	5.87	6.66
	BRRI dhan88	134	95.6	5.15	8.38	5.52	6.35
	Range (N=46)	131-146	95.6-118.4	5.07-7.75	1.89-9.8	4.78-7.16	4.49-7.76
	LSD	3.56	6.8	0.95	1.01	1.04	1.95
	H ₂ B (%)	85.49	43.66	65.08	95.65	33.09	26.32
D/S: 09/12/2024 (Gazipur); 12/12/2024 (Bhanga); 12/12/2024 (Habiganj)							
D/T: 15/01/2025 (Gazipur); 26/01/2025 (Bhanga); 14/01/2025 (Habiganj)							

In AYT-2, the trial heritability for yield ranged from 55.78% to 13.51% across the three locations (Table 8.8b). The check varieties BRRI dhan88, BRRI dhan89, BRRI dhan92, BRRI dhan102 yielded 5.83 t/ha with 142 days growth duration, 6.89 t/ha with 153 days growth duration, 5.99 t/ha with 155 days growth duration and 6.14 t/ha with 153 days growth duration,

respectively. In this trial, two breeding lines showed 6.94-6.95 t/ha grain yield with 148-150 days growth duration. These two lines were selected for further evaluation.

Table 8.8b Agronomic performance of the selected entries from 100 breeding lines tested in FBR_AYT-2 at three locations Boro 2024-25

Sl#	Designation	GD (days)	PH (cm)	Grain yield (t/ha)				Remarks
				Gazipur	Barishal	Habiganj	Average	
1	BR14007-2R-47	150	106.7	6.57	7.70	6.58	6.95	MD
2	BR14007-3R-100	148	105.5	6.01	8.11	6.70	6.94	MD
	BRRI dhan88	142	99.2	5.15	6.21	6.12	5.83	
	BRRI dhan89	153	111.8	6.26	8.03	6.40	6.89	
	BRRI dhan92	155	118.1	5.75	7.11	5.10	5.99	
	BRRI dhan102	153	108.6	6.21	6.25	5.95	6.14	
	Range (N=100)	136-155	94.5-127.9	1.07-7.15	5.54-8.11	4.15-7.56	3.98-6.95	
	LSD	12.37	14.17	1.85	0.96	1.23	1.67	
	H2B (%)	88.75	66.97	55.78	34.06	13.51	-	

D/S: 11/12/2024 (Gazipur); 10/12/2024 (Barishal); 13/12/2024 (Habiganj)
D/T: 23/01/2025 (Gazipur); 17/01/2025 (Barishal); 17/01/2025 (Habiganj)

Experiment 8.9: Regional Yield Trial

Investigators: PS Biswas, MA Syed, F Akter and KM Iftekharuddaula (Gazipur), M Jakaria and UR Shaha (Bhanga), MR Hasan and RJ Promee (Rangpur), MA Islam (Sonagazi), MMR Dewan (Kushtia), MA Rahman and T Shaha (Cumilla), M Hossain and TK Hore (Rajshahi), H Barman and M Anisuzzaman (Habiganj), MAI Khan and H Khatun (Barishal), S Akter (Sirajganj), MS Rahman and W Afrin (BRRI Satkhira).

Specific Objectives: Evaluation of genotypes for specific and general adaptability across multiple trial sites of Bangladesh

Materials and Methods: A total of 13 entries including BRRI dhan28, BRRI dhan88 and BRRI dhan102 as check varieties under RYT-SD, 14 entries including BRRI dhan88, BRRI dhan89, and BRRI dhan102 as check varieties under RYT-MD, 15 entries including BRRI dhan92 and BRRI dhan102 as check varieties under RYT-MLD were evaluated at BRRI-Gazipur, Barishal, Satkhira, Sonagazi, Rangpur, Kushtia, Habiganj, Rajshahi, Bhanga and Cumilla. Thirty-five-day-old seedlings of each genotype were transplanted in 5.4 m×10 rows plot using single seedling at a spacing of 20 cm × 20 cm in three replications. Fertilizer doses and application methods were the same as in Experiment 8.1. Date of seeding, transplanting, flowering, maturity, plant height, phenotypic acceptance, disease and insect infestation score and yield per plot were recorded. Seeds were preserved from the selected entries.

Results: In RYT-SD, the trial heritability for yield ranged from 57.64% to 93.91% among the sites but the heritability over the site was 57.89% (Table 8.9a). The highest yield was observed at Bhanga (6.71-8.60 t/ha) followed by Rajshahi site (7.47-8.34 t/ha) whereas the lowest yield was found at Gazipur (4.25-6.13 t/ha). The check varieties, BRRI dhan28, BRRI dhan88 and BRRI dhan102 yielded 6.22 t/ha, 6.52 t/ha and 6.74 t/ha with 135 days, 135 days and 144 days growth duration, respectively. Five breeding lines showed 6.90-7.11 t/ha yield with 137-138 days growth duration. These lines were selected for further evaluation.

Table 8.9a Agronomic performances of the of the genotypes tested in RYT-SD during Boro 2024-25

Designation	GD (days)	PH (cm)	Grain yield (t/ha)										
			L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	Ave
SVIN109	137	107	6.3	8.5	7.3	6.1	6.9	7.7	8.3	6.8	7.3	6.0	7.1
BR13136-5R-165	137	100	6.4	8.2	6.8	5.8	6.4	6.5	7.8	6.9	7.2	7.9	7.0
BR13027-BC1-3R-198	137	111	6.1	8.6	6.7	5.9	6.6	6.8	7.7	7.3	7.4	6.6	7.0
BR13136-5R-139	137	95	6.3	8.1	6.3	5.2	6.8	6.9	8.2	6.5	7.4	7.7	6.9
BR13418-5R-21	138	98	5.9	7.7	7.4	4.3	7.0	6.3	7.5	7.8	7.6	7.6	6.9
BRRI dhan28 (Ck)	135	104	5.8	6.4	5.8	5.9	6.6	6.1	7.3	5.9	7.8	4.7	6.2
BRRI dhan88 (Ck)	135	95	6.3	7.6	5.6	4.2	6.4	6.1	8.1	6.1	7.7	7.0	6.5

Designation	GD (days)	PH (cm)	Grain yield (t/ha)										
			L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	Ave
BRRI dhan102 (Ck)	144	109	5.1	8.1	7.2	5.6	6.3	7.0	7.7	6.7	7.6	6.1	6.7
Range (N=13)	135-144	91-110	5.14-6.6	6.4-8.6	4.8-7.4	4.2-6.13	6.3-7.55	5.8-7.6	7.3-8.34	5.7-7.79	6.8-8.0	4.6-7.9	6.2-7.1
LSD	4.47	4.15	0.5	0.34	0.38	0.62	0.21	0.43	0.46	0.48	0.76	1.15	0.57
H2B (%)	92	95	75	93	93	71	92	80	57	84	-	68	57

*PH=Average Plant height, DM= Average days to maturity

L1= Barishal, L2= Bhanga, L3= Cumilla, L4= Gazipur, L5= Habiganj, L6= Kushtia, L7= Rajshahi, L8= Rangpur, L9= Satkhira, L10= Sonagazi, Av= Average
D/S: 09.12.25 (L1); 07.12.24 (L2); 04.12.24 (L3); 25.11.24 (L4); 04.12.24 (L5); 05.12.24 (L6); 07.12.24 (L7); 07.12.24 (L8); 03.12.23 (L9); 26.12.24 (L10)
D/T: 15.01.25 (L1); 22.01.25 (L2); 09.01.25 (L3); 07.01.25 (L4); 07.01.25 (L5); 18.01.25 (L6); 14.01.25 (L7); 16.01.25 (L8); 06.01.24 (L9); 29.01.25 (L10)

In RYT-MD, the trial heritability ranged from 16.52% to 96.35% across ten locations but across the site, it was 62.33% (Table 8.9b). The highest yield was observed at Satkhira (7.75-8.90 t/ha) followed by Bhanga (7.07-8.57 t/ha) whereas the lowest yield was found at Gazipur (4.33-5.90 t/ha). The check varieties, BRRI dhan88, BRRI dhan89, and BRRI dhan102 yielded 6.46 t/ha, 7.17 t/ha, and 6.71 t/ha with 136 days, 146 days, and 145 days growth duration, respectively. Two breeding lines BR13027-BC1-3R-21 and BR13027-BC1-3R-5 showed 10.2-12.7% yield advantage over BRRI dhan88 with similar growth duration. These two lines were selected for further evaluation.

Table 8.9b: Agronomic performances of the selected genotypes out of 14 tested entries in RYT-MD during Boro 2024-25.

Designation	GD (days)	PH (cm)	Grain yield (t/ha)										
			L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	Av
BR13027-BC1-3R-21	138	112	6.1	7.7	8.7	5.6	6.7	6.3	8.4	7.5	8.3	7.4	7.3
BR13027-BC1-3R-51	138	102	5.9	8.1	8.6	5.9	6.4	6.5	7.8	7.1	8.8	6.1	7.1
BRRI dhan88	136	96	5.9	7.8	6.9	4.3	6.5	5.1	7.2	5.1	8.9	7.0	6.5
BRRI dhan89	146	110	6.4	8.2	8.0	5.2	6.5	7.2	8.3	8.2	8.9	4.9	7.2
BRRI dhan102	145	108	5.4	7.9	7.6	5.0	6.5	6.3	7.8	7.2	8.5	5.1	6.7
Range (N=14)	136-146	96.4-113.6	5.33-6.38	7.07-8.57	5.69-8.72	4.33-5.90	6.24-6.78	5.05-7.22	6.3-8.37	5.1-8.46	7.75-8.9	4.72-8.17	6.12-7.28
LSD	4.58	4.45	0.42	0.37	0.35	0.52	0.29	0.83	0.41	0.53	0.69	1.47	0.73
H2B (%)	88	90	56	84	96	66	-	61	88	93	17	68	62

PH=Average Plant height, DM= Average Days to maturity
L1= Barishal, L2= Bhanga, L3= Cumilla, L4= Gazipur, L5= Habiganj, L6= Kushtia, L7= Rajshahi, L8= Rangpur, L9= Satkhira, L10= Sonagazi, Av= Average
D/S: 07.12.24 (L1); 08.12.24 (L2); 07.12.24 (L3); 25.11.24 (L4); 06.12.24 (L5); 05.12.24 (L6); 07.12.24 (L7); 07.12.24 (L8); 03.12.23 (L9); 26.12.24 (L10)
D/T: 14.01.25 (L1); 23.01.25 (L2); 11.01.24 (L3); 09.01.25 (L4); 08.01.25 (L5); 20.01.25 (L6); 15.01.25 (L7); 18.01.25 (L8); 06.01.24 (L9); 01.02.25 (L10)

In RYT-MD, the trial heritability ranged from 23.46% to 95.38% across the ten locations but across the site, it was 75% (Table 8.9c). The highest yield was observed at Bhanga (6.14-8.57 t/ha) followed by Satkhira (6.94-9.04 t/ha) whereas the lowest yield was found at Gazipur (3.63-6.99 t/ha). The check varieties, BRRI dhan92 and BRRI dhan102 yielded 6.86 t/ha, and 6.62 t/ha with 145 and 148 days of growth duration, respectively. Four breeding lines were selected that showed 5.7-12.2% yield advantage with 2-5 days shorter growth duration than BRRI dhan102.

Table 8.9c: Agronomic performances of the selected genotypes out of 15 tested entries in RYT MLD during Boro 2024-2

Designation	GD	PH	Grain yield (t/ha)										
			L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	Av
BR12679-4R-6	143	111	6.39	8.57	8.02	6.22	6.53	7.55	7.71	8.04	8.11	7.20	7.43
IR19A8188	143	113	6.33	7.41	8.58	6.10	7.06	6.5	8.3	7.84	9.04	5.07	7.22
BR12672-4R-261	143	113	6.23	8.47	9.78	5.00	5.61	6.34	8.28	7.35	6.94	6.32	7.03
BR12671-4R-138	140	112	6.48	8.33	6.98	5.21	7.22	6.72	7.94	7.75	7.59	5.81	7.00
BRRI dhan102	145	108	5.22	7.87	8.1	4.83	6.34	6.15	7.4	7.15	7.85	5.25	6.62
BRRI dhan92	148	116	5.07	8.18	8.31	5.92	6.95	5.91	8.28	7.85	7.30	4.83	6.86
Range	138-	97.2-	4.83-	6.14-	5.18-	3.63-	5.61-	5.53-	5.56-	4.35-	6.94-	2.88-	5.86-
	148	131.6	7.28	8.57	9.78	6.99	7.25	7.55	8.31	8.04	9.04	7.20	7.43
LSD (N=15)	5.4	4.05	0.49	0.31	0.62	0.71	0.28	0.54	0.79	0.27	1.01	0.82	0.75
H2B (%)	93.79	96.62	86.99	95.38	94.92	83.51	88.74	75.01	71.01	98.39	23.46	87.52	64.51

***PH=Average Plant height, DM= Average Days to maturity, BLUE=Best Linear Unbiased Estimation**
L1= Barishal, L2= Bhanga, L3= Cumilla, L4= Gazipur, L5= Habiganj, L6= Kushtia, L7= Rajshahi, L8= Rangpur, L9= Satkhira, L10= Sonagazi, Av= Average
D/S: 08.12.24 (L1); 11.12.24 (L2); 07.12.24 (L3); 02.12.24 (L4); 03.12.24 (L5); 05.12.24 (L6); 07.12.24 (L7); 03.12.24 (L8); 03.12.23 (L9); 26.12.24 (L10)
D/T: 14.01.25 (L1); 27.01.25 (L2); 11.01.25 (L3); 07.01.25 (L4); 06.01.25 (L5); 19.01.25 (L6); 16.01.25 (L7); 14.01.25 (L8); 06.01.24 (L9); 30.01.25 (L10)

Experiment 8.10: Proposed Variety Trial (PVT), Favorable Boro Rice (FBR), Boro2024-25

Specific Objective: On-farm evaluation of proposed genotype by the NSB team for recommendation to release as a new variety.

Materials and Methods: The experiment was conducted at 10 locations under administrative control of the Seed Certification Agency (SCA). One advanced line BR11318-5R-84 and an standard check variety, BRRI dhan92 were evaluated in the PVT trials. Forty to forty-five-day-old seedlings were transplanted at a spacing of 20 cm × 20 cm. The plot size was 5.4 m × 20 rows. Two to three seedlings were used for transplanting. BRRI recommended fertilizer doses were applied. Crop management such as weeding, irrigation etc. was done in proper time. Insects and other pests were controlled properly.

Results: The proposed variety BR11318-5R-84 (8.59 t/ha, 150 days) produced 12.8% higher grain yield over the check variety BRRI dhan92 (7.61 t/ha, 150 days) (Table 8.10a). The grain quality and chemical characteristics are also satisfactory.

Table 8.10a: Performance of proposed variety in the Proposed Variety Trial (PVT#FBR) at ten locations in Haor areas during Boro 2024-25

Locations	BR11318-5R-84 (proposed)		BRRI dhan92 (Ck)		% Yield advantage
	GD (days)	Yield (t/ha)	GD (days)	Yield (t/ha)	
BRRI Gazipur	154	8.59	153	6.62	29.7%
BRRI Faridpur	158	9.40	158	9.07	3.6%
BRRI Rangpur	160	7.70	158	8.10	-4.9%
BRRI Barishal	136	8.52	135	7.59	12.3%
Sadar, Jashore	149	8.08	142	6.03	34.0%
Sadar, Feni	142	9.36	141	7.55	23.9%
Paba, Rajshahi	144	8.80	145	7.93	10.9%
Sadar, Bogura	148	7.56	152	7.10	6.5%
Debidar, Cumilla	142	7.55	142	7.22	4.6%
Sadar, Dinajpur	160	10.36	164	8.87	16.8%
Range	136-160	7.56-10.36	135-164	6.62-9.07	-4.9-34.0
Mean	150	8.59	150	7.61	12.8

Table 8.10b: Physical properties of the proposed variety BR11318-5R-84

Designation	Milling Yield (%)	Head Rice (%)	Milled rice length (mm)	Milled rice breadth (mm)	L/B	Size and shape	1000 GW (g)
BR11318-5R-84	67.6	57.4	6.2	2.0	3.1	MS	19.6
BRRI dhan92 (Ck)	71.2	57.9	6.3	2.0	3.1	MS	23.6

Table 8.10c: Chemical and cooking properties of the proposed variety BR11318-5R-84

Designation	Amylose (%)	Protein (%)	Cooking time (min)	Elongation ratio (ER)	Imbibition Ratio (IR)	Chalkiness
BR11318-5R-84	24.3	-	14.0	1.4	2.9	Tr
BRRI dhan92 (Ck)	25.8	-	17.3	1.5	3.3	Tr

PROJECT 9: DEVELOPMENT OF COLD TOLERANT RICE (CTR)

General objective: Development of high yielding rice varieties tolerant to cold stress at seedling and reproductive stage

Project Leader: P S Biswas

Experiment 9.1: Parental purification and use in hybridization

Principal investigator: P S Biswas

Co-Investigators: MA Syed, F Akter, MFRK Prince, F Mehmood, and KM Iftekharuddaula

Specific objectives: To create variations for the development of new genotypes with cold tolerance at reproductive and seedling stage with acceptable grain quality.

Materials and Methods: Twenty-nine varieties/lines (Table 9.1a) were grown in the hybridization block of Plant Breeding Division, Gazipur at three staggers with an interval of seven days to synchronize flowering among male and female parents. Thirty-five-day old seedlings were transplanted in 1.6 m triple-row plots at 25 cm × 20 cm spacing. Fertilizer management was done at the rate of 260:100:120: 110:11 kg Urea, TSP, MP, Gypsum and ZnSO4/ha. Urea was applied in three equal splits at 15 days after transplanting (DAT), 30 DAT and 5 days before PI stage. Total amount of TSP, MP, Gypsum and ZnSO4 were applied at final land preparation. Leaf samples were collected from all 24 plants of each parent for QC genotyping with 10 SNP panels. The plants showing unique profiles of each parent were used to make crosses following the pre-designed and selected high-value cross combinations. At flowering, emasculation was done on the day before anthesis using vacuum emasculator and emasculated panicles were bagged with glassine paper bag. Pollination was performed with just anthesized panicles of the male parent by dusting pollens on the emasculated panicle of the female parent.

Results: A total of 1,140 plant samples of 29 parents were genotyped with 10 QC SNPs. The plants with unique profiles for all 10 SNPs were declared as true plants of that parent. The true plants were used in making crosses. A total of 5 single crosses were made using 10 true parents (Table 9.1b). Mature F₁ seeds were harvested, sun-dried, and stored separately in paper bags with proper labelling.

Table 9.1a List of parents used in making crosses for the development of cold tolerant rice (CTR) during Boro 2024-25

SL	Designation	GD (days)	PH (cm)	Yield (t/ha)	GEBV-Yield	Trait of inheritance
1	BR11894-R-R-R-R-329	145	94	6.3	7.04	<i>Wx(a), qPSST3, qPSST7, qPSST9</i>
2	BR11894-5R-77	-	-	-	-	<i>Wx(a), Ctb</i>
3	BRR1 dhan74	147	92	7.1	-	<i>Wx(a), qPSST3, qPSST7, qPSST9</i>
4	BR11303-5R-156	151	104.23	7.47	6.3	<i>Wx(a), qPSST3, qPSST7, qPSST9</i>
5	BR11636-5R-194	141	91.4	9.07	6.6	<i>Wx(a), Wx-b, SCT1, Pi-ta</i>
6	BRR1 dhan97	152	100	7	-	<i>Wx(a), Wx (10), SCT1, qHTSF4.1,Pita, Pi9</i>
7	BRR1 dhan100	147	102	7.04	-	<i>Wx(a)</i>
8	BR13113-4R-116	138	-	8.5	-	<i>Wx(a), qHTSF4.1, qPSST6, qPSST7</i>
9	BR13113-4R-63	138	-	8.5	-	<i>Wx(a), SCT1, qPSST7, Ptr</i>
10	BR8899-14-4-1-2-2-1	145	86	6.4	5.8	<i>Wx(a), GS3, SCT1, SP</i>
11	BR11607-4R-72	157	94	5.9	-	<i>Wx(a), Xa21, xa13, xa5, qHTSH4.1</i>
12	IRRI154-Hd9+Pi9 (N22)	140	98	6.6	-	<i>Wx(a), Pi9, Hd9, xa5, TSV1</i>
13	BRR1 dhan102	150	103	8.1	-	<i>Wx(a), qDTY12.1, HZn</i>
14	BR12419-6R-102	151	118.61	8.91	6.35	<i>Wx(a), Wx-10</i>
15	BR11660-5R-254	155	104	9.2	7	<i>Wx(a), Wx-b, Wx-10, Pi-ta,</i>
16	BRR1 dhan28	140	90	6	-	<i>Wx(a)</i>
17	BR11318-5R-106	153	104.53	6.17	6.6	<i>Wx(a), Wx-10, chalk5, Pi-ta, NAS3</i>
18	BR11894-R-R-R-270	145	110	7.7	7.1	<i>Wx(a), Wx-10, TSV1</i>
19	BR11894-R-R-R-299	148	107	7.7	6.9	<i>Wx(a)</i>
20	BRR1 dhan67	149	114.16	5.94	6.4	<i>Wx(a)</i>
21	BR11712-4R-227	159	105	8.8	-	<i>Wx(a), Wx-10, Ptr</i>
22	BR11887-5R-368	147	99	9.7	6.8	<i>Wx(a), Wx-b, SCT1, Pi-ta</i>
23	IR83222-F11-173	148	96	3.8	6.12	<i>Wx(a), Wx(10), Pita, SCT1, qPSST3, qPSST7, qPSST9</i>
24	TP16199	156	125	6.8	-	<i>Wx(a), Ctb</i>
25	Bhutan	155	94	6.4	6.71	<i>Wx(a), SCT1, qPSST3, qPSST7, qPSST9</i>

SL	Designation	GD (days)	PH (cm)	Yield (t/ha)	GEBV-Yield	Trait of inheritance
26	Rata Boro (Acc.8208)	-	-	-	-	<i>qPSST3, qPSST6, qPSST7, qPSST9</i>
27	Rata Boro	149	134.67	4.09	-	<i>Wx(a), Xa21, Pi33, SCT1, qPSST3, qPSST7, qPSST9</i>
28	BR11894-R-R-R-R-169	146	102	7.3	6.95	<i>Wx(a), Wx (10), DTY12.1, DTY3.2, GS3, TSV1, chalk5, Ctb</i>
29	BR13407-5R-68	152	89	5.4	5.2	<i>Wx(a), GS3, Pita, Pi21, SCT1</i>

Table 9.1b. List of crosses made for the development of cold tolerant rice (CTR) during Boro 2024-25

SL	Cross	Objectives/Gene of inheritance	No of seed
1	BR11894-R-R-R-R-329/IR83222-F11-173	<i>Wx (a), Wx. 10, Pita, qPSST3, qPSST7, qPSST9, SCT1</i>	15
2	BR11894-5R-77/TP16199	<i>Wx (a), Ctb</i>	50
3	BRRI dhan74/Bhutan	<i>Wx (a), qPSST3, qPSST7, qPSST9, SCT1</i>	150
4	BR11303-5R-156/Rata Boro (Acc.8208)	<i>Wx (a), Wx. 10, chalk5, Pita, Pb1, qPSST3, qPSST6, qPSST7, qPSST9</i>	56
5	BR11894-R-R-R-R-169/BR13407-5R-68	<i>Wx(a), Chalk5, SCM2, DTY12.1, GS3, Pita, Pi21, SCT1</i>	60

Experiment 9.2: Hybridity test and confirmation of true F₁

Principal investigator: P S Biswas

Co-Investigators: MA Syed, F Akter, MFRK Prince, F Mehmood, and KM Iftekharuddaula

Specific objectives: To isolate true F₁s and use in line augmentation (backcrossing) and/or selfing to produce F₂ seeds.

Materials and Methods: Sixty-one crosses including 39 single crosses and 22 backcrosses were grown along with their parents in the backcrossing nursery. Thirty-five-day-old single seedling was transplanted at 25 cm × 20 cm spacing in 8-hilled 1-3 rows plots. The recipient parents of the crosses were separately grown in six staggers to synchronize flowering with the F₁ plants. Fertilizer management was done following the protocol described in Experiment 9.1. Leaf samples from all plants were collected from each of the plants from F₁ and parents for trait genotyping to determine true F₁ for the target trait SNPs (*SCT1, qPSST3, qPSST6, qPSST7, qPSST*, etc). Trait genotyping was performed using 16 trait SNPs at Intertek, Australia. Genotyping results were analyzed using a genotyping data analytical tool called Flapjack.

Results: The crosses showing heterozygous SNP loci in any sample F₁ plant for the target trait SNPs were considered as true F₁. The analysis of genotyping data identified 2-5 true F₁ plants from 58 crosses out of 61 crosses. At maturity, seeds were collected only from true F₁ plants. Table 9.2a shows the list of confirmed crosses and genes segregating in them. A total of 36 backcrosses (Table 9.2b) were made for augmentation of 19 elite breeding lines/varieties with seedling and reproductive stage cold tolerance using selected F₁ plants heterozygous for the target SNP marker loci as the pollen parents. At maturity, backcross seeds were collected, dried and preserved. F₂ seeds of all the selected F₁ plants were also harvested individually, dried, cleaned, and preserved in the cold room.

Table 9.2a. List of crosses confirmed for the development of cold tolerant rice during Boro 2024-25

Sl#	BR No.	Parentage	Objectives/segregated genes
Single cross			
1	BR14862	IR83222-F11-173/TP16199	<i>Wx(a), qPSST3, qPSST7, qPSST9, SCT1</i>
2	BR16674	BR13113-4R-116/BR11894-R-R-R-R-169	<i>Wx(a), Wx(10), qHTSF4.1, qPSST6, qPSST7, DTY12.1, DTY3.2, GS3,TSV1, chalk5, Ctb</i>
3	BR16675	BR13113-4R-63/BR11894-R-R-R-R-169	<i>Wx(a), Wx(10), SCT1, qPSST7, Ptr, DTY12.1, DTY3.2, GS3,TSV1, chalk5, Ctb</i>
4	BR16677	BR11607-4R-72/BR11894-R-R-R-R-169	<i>Wx(a), Wx(10), SCT1, xa5, xa13, Xa21, qHTSF4.1, DTY12.1, DTY3.2, GS3,TSV1, chalk5, Ctb</i>
5	BR16678	IRRI154-Hd9+Pi9 (N22)/BR11894-R-R-R-R-169	<i>Wx(a), Wx(10), Pi9, xa5, TSV1, DTY12.1, DTY3.2, GS3,TSV1, chalk5, Ctb</i>
6	BR15126	BR11636-5R-194/IR83222-F11-173	<i>Wx(a), Wx(10), Wx-b, SCT1, Pi-ta, Pita, qPSST3, qPSST7, qPSST9</i>

Sl#	BR No.	Parentage	Objectives/segregated genes
7	BR16673	BRR1 dhan97/Bhutan	<i>Wx(a), Wx(10), SCT1, Pita, Pi9, TSV1, SCT1, qPSST3, qHTSF4.1, qPSST7, qPSST6</i>
8	BR15134	BRR1 dhan100/Bhutan	<i>Wx(a), TSV1, SCT1, qPSST3, qPSST7, qPSST6</i>
9	BR15959	BR12419-6R-102/IR83222-F11-173	<i>Wx(a), Wx(10), Pita, qPSST3, qPSST7, qPSST9</i>
10	BR16680	BR13113-4R-116/IR83222-F11-173	<i>Wx(a), Wx(10), Pita, qPSST3, qHTSF4.1, qPSST6, qPSST7, qPSST9</i>
11	BR16681	BR13113-4R-63/IR83222-F11-173	<i>Wx(a), Wx(10), SCT1, Ptr, Pita, qPSST3, qPSST7, qPSST9</i>
12	BR14264	BR8899-14-4-1-2-2-1/IR83222-F11-173	<i>Wx(a), Wx(10), Pita, SCT1, qPSST3, qPSST7, qPSST9</i>
13	BR16682	BR11607-4R-72/IR83222-F11-173	<i>Wx(a), Wx(10), xa5, xa13, Xa21, Pita, SCT1, qPSST3, qHTSF4.1, qPSST7, qPSST9</i>
14	BR16683	IRRI154-Hd9+Pi9 (N22)/IR83222-F11-173	<i>Wx(a), Wx(10), Pita, Pi9, xa5, TSV1, qPSST3, qPSST7, qPSST9</i>
15	BR16684	BRR1 dhan102/IR83222-F11-173	<i>Wx(a), Wx(10), Pita, qDTY12.1, HZn, qPSST3, qPSST7, qPSST9</i>
16	BR15958	BR12419-6R-102/TP16199	<i>Wx(a), SCT1, qPSST3, qPSST7, qPSST9</i>
17	BR16685	BR13113-4R-116/TP16199	<i>Wx(a), SCT1, qPSST3, qHTSF4.1, qPSST6, qPSST7, qPSST9 Ctb</i>
18	BR16686	BR13113-4R-63/TP16199	<i>Wx(a), SCT1, qPSST3, qPSST7, qPSST9 Ptr, Ctb</i>
19	BR16687	BR8899-14-4-1-2-2-1/TP16199	<i>Wx(a), SCT1, qPSST3, qPSST7, qPSST9, Ctb</i>
20	BR16688	BR11607-4R-72/TP16199	<i>Wx(a), xa5, xa13, Xa21, SCT1, qHTSF4.1, qPSST3, qPSST7, qPSST9, Ctb</i>
21	BR16689	IRRI154-Hd9+Pi9 (N22)/TP16199	<i>Wx(a), Pi9, xa5, TSV1, Ctb, SCT1, qPSST3, qPSST7, qPSST9</i>
22	BR16690	BRR1 dhan102/TP16199	<i>Wx(a), qDTY12.1, HZn, Ctb, SCT1 qPSST3, qPSST7, qPSST9</i>
23	BR16730	BRR1 dhan97/TP16199	<i>Wx(a), Wx(10), xa5, Pita, Pi9, SCT1, , qPSST3, qPSST7, qPSST9, qHTSF4.1, Ctb</i>
24	BR15977	BR11660-5R-254/Rata Boro	<i>Wx(a), Wx(b), Wx(10), Pita, qPSST3, qPSST6, qPSST7, qPSST9</i>
25	BR15127	BR11660-5R-254/IR83222-F11-173	<i>Wx(a), Wx(10), Pita, qPSST3, qPSST7, qPSST9</i>
26	BR15131	BR11894-R-R-R-299/IR83222-F11-173	<i>Wx(a), Wx(10), TSV1, qPSST3, qPSST7, qPSST9</i>
27	BR11894	BRR1 dhan28/Bhutan	<i>Wx(a), TSV1, SCT1, qPSST3, qPSST7, qPSST6</i>
28	BR14627	BR11318-5R-106/Rata Boro	<i>Wx(a), Wx(10), chalk5, Ptr, Pb1, qPSST3, qPSST7, qPSST9</i>
29	BR14865	BRR1 dhan81/Bhutan	<i>Wx(a), TSV1, SCT1, qPSST3, qPSST6, qPSST7</i>
30	BR15979	BRR1 dhan81/Rata Boro	<i>Wx(a), Xa21, Pi33, SCT1, qPSST3, qPSST7, qPSST9</i>
31	BR15975	BR11894-R-R-R-299/Rata Boro	<i>Wx(a), Wx(10), qPSST3, qPSST7, qPSST9</i>
32	BR15976	BR11636-5R-194/Rata Boro	<i>Wx(a), Wx(b), SCT1, qPSST3, qPSST7, qPSST9</i>
33	BR15974	BR11894-R-R-R-270/Rata Boro	<i>Wx(a), Wx(10), TSV1, SCT1, qPSST3, qPSST7, qPSST9</i>
34	BR14625	BR11303-5R-156/Rata Boro	<i>Wx(a), Wx(10) , Pi9, Pb1, chalk5, SCT1, qPSST3, qPSST7, qPSST9</i>
35	BR16209	BR12520-5R-67/TP16199	<i>Wx(a), SCT1, qPSST3, qPSST7, qPSST9</i>
36	BR16212	BR12557-5R-105/TP16199	<i>Wx(a), Wx-10, Pi9, SCT1, qPSST3, qPSST7, qPSST9</i>
37	BR15128	BR11887-5R-368/IR83222-F11-173	<i>Wx(a), Wx-b, SCT1, Pita, qPSST3, qPSST7, qPSST9</i>
Backcross			
38	BR15698	BRR1 dhan100*2/Bhutan	<i>Wx(a), Wx(10), qPSST3, qPSST7, qPSST9</i>
39	BR15984	BR11894-R-R-R-299*2/IR83222-F11-173	<i>Wx(a), Wx(10), TSV1, qPSST3, qPSST7, qPSST9</i>
40	BR15695	BR11894-R-R-R-270*2/IR83222-F11-173	<i>Wx(a), SCT1, Wx(10), TSV1, qPSST3, qPSST7, qPSST9,Pita, BPH32,Pb1</i>
41	BR15697	BRR1 dhan67*2/Bhutan	<i>Wx(a), Wx(10), qPSST3, qPSST7, qPSST9</i>
42	BR15670	BR11712-4R-218*2/IR83222-F11-173	<i>Wx(a), SCT1, qPSST3, qPSST6, qPSST7, qPSST9</i>
43	BR15183	BR11712-4R-227*2/Rata Boro	<i>Wx(a), SCT1, SCM2, Pita, qPSST3, qPSST6, qPSST7, qPSST9</i>
44	BR15682	BR11887-5R-368*2/IR83222-F11-173	<i>Wx(a), SCT1, Wx(10), qPSST3, qPSST7, qPSST9</i>
45	BR15783	BR11318-5R-106*3/Rata Boro	<i>Wx(a), Wx(10), Pb1, qPSST3, qPSST7, qPSST9</i>
46	BR15983	BRR1 dhan100*3/IR83222-F11-173	<i>Wx(a), Wx(10), qPSST3, qPSST7, qPSST9</i>
47	BR16223	BR12419-6R-102*2/TP16199	<i>Wx(a), SCT1, qPSST3, qPSST7, qPSST9</i>
48	BR16736	BR11894-R-R-R-270*3/Rata Boro	<i>Wx(a), Wx(10), SCT1, qPSST3, qPSST7, qPSST9</i>
49	BR16739	BR11887-5R-368*3/Rata Boro	<i>Wx(a), Wx(b), Wx(10), SCT1, Pita, qPSST3, qPSST7, qPSST9</i>
50	BR15696	BRR1 dhan100*2/IR83222-F11-173	<i>Wx(a), Wx(10), Pita, qPSST3, qPSST7, qPSST9</i>
51	BR16223	BR12419-6R-102*2/TP16199	<i>Wx(a), SCT1, qPSST3, qPSST7, qPSST9</i>
52	BR16225	BR12520-5R-67*2/IR83222-F11-173	<i>Wx(a), Wx(10), Pita, qPSST3, qPSST7, qPSST9</i>
53	BR16227	BR11894-R-R-R-110*2/Rata Boro	<i>Wx(a), SCT1, qPSST3, qPSST6, qPSST7, qPSST9</i>
54	BR16228	BR11894-R-R-R-270*2/Rata Boro	<i>Wx(a), SCT1, qPSST3, qPSST6, qPSST7, qPSST9</i>
55	BR16231	BR11887-5R-368*2/Rata Boro	<i>Wx(a), SCT1, qPSST3, qPSST6, qPSST7, qPSST9</i>
56	BR16232	BRR1 dhan81*2/Rata Boro	<i>Wx(a), SCT1, qPSST3, qPSST6, qPSST7, qPSST9</i>
57	BR16235	BRR1 dhan28*2/Bhutan	<i>Wx(a), TSV1, SCT1, qPSST3, qPSST7, qPSST6</i>
58	BR16236	BR11318-5R-106*2/Rata Boro	<i>Wx(a), qPSST3, qPSST6, qPSST7, qPSST9</i>

Table 9.2b. List of backcrosses made for line augmentation for the development of cold tolerant rice (CTR) during Boro 2024-25

Sl#	Cross	Objectives/Gene of inheritance	No. of seeds	Type of seeds
1	BR11636-5R-194*2/IR83222-F11-173	<i>Wx(a), Wx-b, Wx.10, SCT1, Pita, qPSST3, qPSST7, qPSST9</i>	33	BC1F1
2	BRRI dhan97*2/Bhutan	<i>Wx(a), Wx. 10, qHTSF4.1, Pita, Pi9, TSV1, SCT1, qPSST3, qPSST6q, PSST7</i>	35	BC1F1
3	BRRI dhan100*2/Bhutan	<i>Wx(a), TSV1, SCT1, qPSST3, qPSST7, qPSST6</i>	30	BC1F1
4	BR13113-4R-116*2/IR83222-F11-173	<i>Wx(a), Wx. 10, Pita, qHTSF4.1, qPSST3, qPSST6, qPSST7, qPSST9</i>	60	BC1F1
5	BR13113-4R-63*2/IR83222-F11-173	<i>Wx(a), Wx. 10, Pita, Ptr, qPSST3, qPSST7, qPSST9, SCT1</i>	176	BC1F1
6	BR8899-14-4-1-2-2-1*2/IR83222-F11-173	<i>Wx(a), Wx. 10, Pita, qPSST3, qPSST7, qPSST9, SCT1</i>	8	BC1F1
7	BR11607-4R-72*2/IR83222-F11-173	<i>Wx(a), Wx. 10, Pita, xa5, xa13, Xa21, qHTSF4.1, qPSST3, qPSST7, qPSST9, SCT1</i>	77	BC1F1
8	IRRI154-Hd9+Pi9 (N22) *2/IR83222-F11-173	<i>Wx(a), Wx. 10, Pita, Pi9, xa5, TSV1, qPSST3, qPSST7, qPSST9</i>	75	BC1F1
9	BRRI dhan102*2/IR83222-F11-173	<i>Wx(a), Wx. 10, Pita, qDTY12.1, HZn, qPSST3, qPSST7, qPSST9</i>	130	BC1F1
10	BR12419-6R-102*2/TP16199	<i>Wx(a), Wx.10, qPSST3, qPSST7, qPSST9</i>	305	BC1F1
11	BR13113-4R-116*2/TP16199	<i>Wx(a), qHTSF4.1, qPSST6, qPSST7, Ctb</i>	175	BC1F1
12	BR13113-4R-63*2/TP16199	<i>Wx(a), qPSST7, Ptr, Ctb, SCT1</i>	39	BC1F1
13	BR8899-14-4-1-2-2-1*2/TP16199	<i>Wx(a), Ctb, SCT1,</i>	15	BC1F1
14	BR11607-4R-72*2/TP16199	<i>Wx(a), xa5, xa13, Xa21, qHTSF4.1, Ctb, SCT1,</i>	285	BC1F1
15	IRRI154-Hd9+Pi9 (N22) *2/TP16199	<i>Wx(a), Pi9, xa5, TSV1, Ctb</i>	642	BC1F1
16	BRRI dhan102*2/TP16199	<i>Wx(a), qDTY12.1, HZn, Ctb</i>	34	BC1F1
17	BRRI dhan97*2/TP16199	<i>Wx(a), Wx. 10, xa5, Pita, Pi9, Ctb, SCT1, qHTSF4.1</i>	92	BC1F1
18	BR11660-5R-254*2/IR83222-F11-173	<i>Wx(a), Wx(10), Pita, qPSST3, qPSST7, qPSST9</i>	50	BC1F1
19	BRRI dhan28*2/Bhutan	<i>Wx(a), TSV1, SCT1, qPSST3, qPSST7, qPSST6</i>	10	BC1F1
20	BR11318-5R-106*2/Rata Boro	<i>Wx(a), Wx(10), chalk5, Ptr, Pb1, qPSST3, qPSST7, qPSST9</i>	15	BC1F1
21	BR11636-5R-194*2/Rata Boro	<i>Wx(a), Wx(b), qPSST3, qPSST7, qPSST9, SCT1</i>	80	BC1F1
22	BR11894-R-R-R-270*2/Rata Boro	<i>Wx(a), Wx(10), TSV1, qPSST3, qPSST7, qPSST9, SCT1,</i>	115	BC1F1
23	BR11303-5R-156*2/Rata Boro	<i>Wx(a), Wx. 10, chalk5, , Pb1, qPSST3, qPSST7, qPSST9</i>	85	BC1F1
24	BRRI dhan100*3/Bhutan	<i>Wx(a), Wx(10), qPSST3, qPSST7, qPSST9</i>	70	BC2F1
25	BR11894-R-R-R-299*3/IR83222-F11-173	<i>Wx(a), Wx(10), TSV1, qPSST3, qPSST7, qPSST9</i>	12	BC2F1
26	BR11894-R-R-R-270*3/IR83222-F11-173	<i>Wx(a), Wx(10), Pita, Pb1, TSV1, qPSST3, qPSST7, qPSST9, BPH32, CT1</i>	92	BC2F1
27	BRRI dhan67*3/Bhutan	<i>Wx(a), Wx (10), qPSST3, qPSST7, qPSST9</i>	68	BC2F1
28	BR11712-4R-227*3/Rata Boro	<i>Wx(a), SCT1, SCM2, Pita, qPSST3, qPSST6, qPSST7, qPSST9</i>	189	BC2F1
29	BRRI dhan100*3/IR83222-F11-173	<i>Wx(a), Wx.10, qPSST3, qPSST7, qPSST9</i>	15	BC2F1
30	BR11318-5R-106*3/Rata Boro	<i>Wx(a), Wx-10, Pb1, qPSST3, qPSST7, qPSST9</i>	50	BC2F1
31	BR11894-R-R-R-270*3/Rata Boro	<i>Wx(a), Wx.10, qPSST3, qPSST7, qPSST9, SCT1</i>	130	BC2F1
32	BR11887-5R-368*3/Rata Boro	<i>Wx(a),Wx.b, Wx.10, SCT1, Pita, qPSST3, qPSST7, qPSST9</i>	200	BC2F1
33	BR11887-5R-368*2/Rata Boro	<i>Wx(a), Wx.b, Wx.10, SCT1, Pita, qPSST3, qPSST7, qPSST9</i>	200	BC1F1
34	BR11318-5R-106*2/Rata Boro	<i>Wx(a), Wx-10, chalk5, Xa21, Pi33, SCT1, qPSST3, qPSST7, qPSST9</i>	52	BC1F1
35	BR11887-5R-368*2/IR83222-F11-173	<i>Wx(a), Wx-b, Wx(10), Pita, SCT1, qPSST3, qPSST7, qPSST9,</i>	400	BC1F1
36	BR12419-6R-102*2/TP16199	<i>Wx(a), Wx.10, Ctb</i>	185	BC1F1

Experiment 9.3: Advancing segregating progenies in RGA nurseries

Principal investigator: P S Biswas

Co-Investigators: MA Syed, F Akter, MFRK Prince, F Mehmood, and KM Iftekharuddaula

Specific objectives: Rapid advancement of segregating population for shortening breeding cycle.

Materials and Methods: In total 34,850 segregating progenies comprising 3,240 F₂ progenies of 6 crosses, 14,975 F₃ progenies of 31 crosses, 1,730 F₄ progenies of 12 crosses, 4,320 BC₁F₂ progenies of 8 crosses, 4,026 BC₁F₃ progenies of 10 crosses, 1,839 BC₁F₄ progenies of 13 crosses, 4,549 BC₂F₃ progenies of 12 crosses and 171 BC₂F₄ progenies of 2 crosses were advanced in greenhouse and field RGA nursery. Sowing of seeds at both greenhouse and field RGA nurseries was staggered into two batches to ease management. The first batch was seeded on October 10 and 2nd batch was seeded on December 20. At maturity of the crop, a single panicle was harvested from each bunch grown from a single panicle of previous generation.

Population grew in fields following SSD method of breeding in single-hill plot at a spacing of 5 cm × 5 cm on raised bed in the field. A small portion of a panicle with 8-10 seed from a single plant harvested from previous generation was seeded directly on the bed. A specialized wooden frame was used to furrow on the puddled bed 5 cm apart to sow seeds. Fertilizer management was done using 130:50:55:6 kg Urea, TSP, MOP, Gypsum and ZnSO4/ha. Half of urea and MOP, and all other fertilizers were applied at final land preparation. Rest of the fertilizers were applied 50 days after seeding. At maturity of the crop, a single panicle was collected from each hill. The harvested panicle was dried immediately and subjected to 50°C for three days for breaking dormancy to initiate next cycle of RGA.

Results: A total of 20,688 progenies comprising 450 progenies from 6 F₂ population, 9,637 progenies from 31 F₃ population, 1392 progenies from 12 F₄ population, 1001 progenies from 5 BC₁F₂ population (3 crosses not yet harvested), 2941 progenies from 8 BC₁F₃ population (2 crosses not yet harvested), 1541 progenies from 13 BC₁F₄ population, 3609 progenies from 12 BC₂F₃ population and 117 progenies from 2 BC₂F₄ population were harvested from 34,850 progenies comprising 3240 F₂, 14975 F₃, 1730 F₄, 4320 BC₁F₂, 4026 BC₁F₃, 1839 BC₁F₄, 4549 BC₂F₃ and 171 BC₂F₄ for advancing in the next generation (Table 9.3).

Table 9.3. List of segregating progenies of different generations grown in the RGA nurseries for the Development of Cold Tolerant Rice (CTR) during Boro 2024-25

Sl#	BR number	Parentage	Plants grown	Plants harvested
F₂ Generation				
1	BR15956-B-PSR	BR12096-4R-124-1/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	540	163
2	BR16236-R	BR11318-5R-106*2/Rata Boro	540	28
3	BR16223-R	BR12419-6R-102*2/TP16199	540	42
4	BR16209-R	BR12520-5R-67/TP16199	540	42
5	BR16212-R	BR12557-5R-105/TP16199	540	86
6	BR14865-R	BRRI dhan81/Bhutan	540	89
Sub Total			3240	450
F₃ Generation				
1	BR15958-2R	BR12419-6R-102/TP16199	509	353
2	BR15959-2R	BR12419-6R-102/IR83222-F11-173	340	218
3	BR15960-2R	BR12419-6R-102/BR11894-R-R-R-169	540	370
4	BR15961-2R	BR12419-6R-102/BR11894-R-R-R-329	511	420
5	*BR15962-2R	BR12512-5R-78/IR83222-F11-173	517	470
6	BR15963-2R	BR12512-5R-78/BR11894-R-R-R-169	279	200
7	BR15966-2R	BR12520-5R-67/IR83222-F11-173	505	316
8	*BR15968-2R	BR11712-4R-218/BR12524-5R-56	503	300
9	*BR14625-2R	BR11303-5R-156/Rata Boro	530	400
10	BR15970-2R	BR11894-R-R-R-270/TP16199	490	418
11	BR15971-2R	BR11894-R-R-R-299/TP16199	372	348
12	BR15972-2R	BRRI dhan100/TP16199	510	479
13	BR15973-2R	BR11894-R-R-R-110/Rata Boro	163	143
14	BR15974-2R	BR11894-R-R-R-270/Rata Boro	519	430
15	BR15975-2R	BR11894-R-R-R-299/Rata Boro	501	413
16	BR15976-2R	BR11636-5R-194/Rata Boro	375	255
17	BR15978-2R	BR11887-5R-368/Rata Boro	519	441
18	BR15979-2R	BRRI dhan81/Rata Boro	540	340
19	BR14865-2R	BRRI dhan81/Bhutan	278	230
20	BR15127-2R	BR11660-5R-254/IR83222-F11-173	540	324
21	BR11894-2R	BRRI dhan28/Bhutan	534	380
22	BR14627-2R	BR11318-5R-106/Rata Boro	540	348
23	BR15977-R	BR11660-5R-254/Rata Boro	540	155
24	BR15127-R	BR11660-5R-254/IR83222-F11-173	540	354
25	BR15131-R	BR11894-R-R-R-299/IR83222-F11-173	540	291
26	BR11894-R	BRRI dhan28/Bhutan	540	232
27	BR14627-R	BR11318-5R-106/Rata Boro	540	296
28	BR14865-R	BRRI dhan81/Bhutan	540	152
29	BR15976-21-R	BR11636-5R-194/Rata Boro	540	74
30	BR15974-11-R	BR11894-R-R-R-270/Rata Boro	540	238
31	BR14625-1-R	BR11303-5R-156/Rata Boro	540	249
Sub Total			14975	9637
F₄ Generation				
1	BR15126-3R	BR11636-5R-194/IR83222-F11-173	209	100
2	BR15128-3R	BR11887-5R-368/IR83222-F11-173	150	112
3	BR15129-3R	BR11894-R-R-R-110/IR83222-F11-173	124	112

Sl#	BR number	Parentage	Plants grown	Plants harvested
4	BR15130-3R	BR11894-R-R-R-270/IR83222-F11-173	118	106
5	BR15131-3R	BR11894-R-R-R-299/IR83222-F11-173	182	176
6	BR15132-3R	BRRI dhan100/IR83222-F11-173	75	70
7	BR15133-3R	BRRI dhan67/Bhutan	77	39
8	BR15666-3R	IR18A1398/TP16199	131	93
9	BR15667-3R	BR12527-5R-1/BR11894-R-R-R-169	234	210
10	BR15668-3R	BR12416-6R-219/BR12567-5R-91	42	35
11	BR15669-3R	BR12416-6R-219/BR12524-5R-56	178	130
12	BR15134-3R	BRRI dhan100/Bhutan	210	209
Sub Total			1730	1392
BC ₁ F ₂ Generation				
1	BR15696-BC1-R	BRRI dhan100*2/IR83222-F11-173	540	132
2	BR16228-BC1-R	BR11894-R-R-R-270*2/Rata Boro	540	235
3	BR16231-BC1-R	BR11887-5R-368*2/Rata Boro	540	200
4	BR16214-BC1-R	BR11712-4R-218*2/IR83222-F11-173	540	60
5	BR15699-BC1-R	BR11712-4R-227*2/Rata Boro	540	374
6	BR16225-BC1-R	BR12520-5R-67*2/IR83222-F11-173	540	NYH**
7	BR16227-BC1-R	BR11894-R-R-R-110*2/Rata Boro	540	NYH
8	BR16232-BC1-R	BRRI dhan81*2/Rata Boro	540	NYH
Sub Total			4320	1001
BC ₁ F ₃ Generation				
1	BR14876-BC1-2R	BR11318-5R-106*2/IR83222-F11-173	248	245
2	BR15681-BC1-2R	BR11660-5R-254*2/IR83222-F11-173	150	NYH
3	BR15683-BC1-2R	BR11894-R-R-R-110*2/IR83222-F11-173	384	NYH
4	BR15695-BC1-2R	BR11894-R-R-R-270*2/IR83222-F11-173	26	20
5	BR15695-BC1-2R	BR11894-R-R-R-270*2/IR83222-F11-173	535	500
6	BR15984-BC1-2R	BR11894-R-R-R-299*2/IR83222-F11-173	540	528
7	BR15696-BC1-2R	BRRI dhan100*2/IR83222-F11-173	534	465
8	BR15697-BC1-2R	BRRI dhan67*2/Bhutan	540	483
9	BR15698-BC1-2R	BRRI dhan100*2/Bhutan	529	380
10	BR15698-BC1-PSR	BRRI dhan100*2/Bhutan	540	320
Sub Total			4026	2941
BC ₁ F ₄ Generation				
1	BR15135-BC1-3R	BR11894-5R-77*2/IR83222-F11-173	201	182
2	BR15136-BC1-3R	BR11636-5R-194*2/TP16199	117	114
3	BR15137-BC1-3R	BR11887-5R-368*2/TP16199	36	36
4	BR15138-BC1-3R	IR83222-F11-173*2/TP16199	367	287
5	BR15139-BC1-3R	BRRI dhan 74*2/Bhutan	120	118
6	BR15140-BC1-3R	BRRI dhan84*2/Bhutan	133	130
7	BR15141-BC1-3R	BRRI dhan 97*2/Bhutan	124	115
8	BR15142-BC1-3R	BRRI dhan 98*2/Bhutan	68	65
9	BR15183-BC1-3R	BR11712-4R-227*2/Rata Boro	98	73
10	BR15184-BC1-3R	BR10317-5R-25*2/Rata Boro	138	123
11	BR15185-BC1-3R	BR11318-5R-106*2/Rata Boro	186	89
12	BR15186-BC1-3R	BR10317-5R-25*2/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	173	131
13	BR15187-BC1-3R	BR11318-5R-106*2/IR83222-F11-173	78	78
Sub Total			1839	1541
BC ₂ F ₃ Generation				
1	BR15687-BC2-2R	BRRI dhan84*3/Bhutan	127	125
2	BR15688-BC2-2R	BRRI dhan97*3/Bhutan	129	125
3	BR15689-BC2-2R	BRRI dhan98*3/Bhutan	141	112
4	BR15699-BC2-2R	BR11712-4R-227*3/Rata Boro	288	108
5	BR15980-BC2-2R	BR11318-5R-106*3/IR83222-F11-173	540	380
6	BR15699-BC2-2R	BR11712-4R-227*3/Rata Boro	525	417
7	BR15783-BC2-2R	BR11318-5R-106*3/Rata Boro	531	406
8	BR15981-BC2-2R	BR11894-R-R-R-110*3/IR83222-F11-173	540	473
9	BR15982-BC2-2R	BR11894-R-R-R-270*3/IR83222-F11-173	532	512
10	BR15983-BC2-2R	BRRI dhan100*3/IR83222-F11-173	511	292
11	BR15985-BC2-2R	BR11636-5R-194*3/IR83222-F11-173	337	332
12	BR15986-BC2-2R	BR11887-5R-368*3/IR83222-F11-173	348	327
Sub Total			4549	3609
BC ₂ F ₄ Generation				
1	BR15690-BC2-3R	BR10317-5R-25*3/Rata Boro	134	80
2	BR15783-BC2-3R	BR11318-5R-106*3/Rata Boro	37	37
Sub Total			171	117
Grand Total			34,850	20,688

**NYH: Not yet harvested

Experiment 9.4: Evaluation of fixed lines in the Line Stage Testing (LST) Trial

Principal investigator: PS Biswas

Co-Investigators: MA Syed, F Akter, MFRK Prince, F Mehmood, and KM Iftekharuddaula

Specific objectives: To select uniform genotypes in terms of plant height and days to flower with key target traits.

Materials and Methods: Total 7,069 progenies from 73 crosses were grown in 12-hill single-row plots using systematic arrangement design. Thirty-five-day-old single seedling was transplanted at 20 cm × 20 cm in the plots using single seedling per hill. Fertilizer management was done at the rate of 260:100:120: 110:11 kg Urea, TSP, MP, Gypsum and ZnSO4/ha. Urea was applied in three equal splits at 15 days after transplanting (DAT), 30 DAT and 5 days before PI stage. Total amount of TSP, MP, Gypsum and ZnSO4 were applied at final land preparation. Leaf samples were collected from single plant of each entry for genotyping with trait markers using trait-based SNP markers. At maturity stage, line selection was done considering uniformity in plant height, days to flowering, grain size and shape, lodging tolerance and tolerance to major disease and insect over check varieties under field conditions and presence of target key traits. Additionally, five plants were harvested from selected LST lines to compare the grain weight among selected progenies of same cross combination.

Results: A total of 492 uniform lines based on flowering, plant height, grain size and shape were isolated from 6,688 lines tested in LST and used in genotyping for QTL fingerprinting (Table 9.4). Genotyping results have not yet been received.

Table 9.4: List of breeding lines selected from the LST conducted for the Development of Cold Tolerant Rice (CTR) during 2024-25

Sl#	Cross name	Parentage	Lines grown	Lines selected
1	BR14254-4R	BRRI dhan88/BR8909-B-12-2-CS1-4-CS2-P2-3-2	289	39
2	BR14264-5R	BR8899-14-4-1-2-2-1/IR83222-F11-173	106	32
3	BR14632-4R	BR11712-4R-227/IR19X1001: IRR1 154-Cold1	122	13
4	BR14640-4R	BR10317-5R-25/IR19X1001: IRR1 154-Cold1	12	4
5	BR14643-4R	BR11303-5R-156/IR19X1001: IRR1 154-Cold1	98	14
6	BR14654-4R	BR12266-44-11-32-5-1-1-HR10-B/IR20X1005:IRRI 154-Pi54(Ttp)+Pi35	235	15
7	BR14875-BC1-4R	BR10317-5R-25*2/IR83222-F11-173	144	5
8	BR14876-BC1-4R	BR11318-5R-106*2/IR83222-F11-173	148	14
9	BR14877-BC1-4R	BR8899-14-4-1-2-2-1*2/IR83222-F11-173	252	10
10	BR14664-2R	BR11318-5R-106/IR83222-F11-173	42	3
11	BR15121-2R	BR11723-4R-172/BR11894-R-R-R-169	63	3
12	BR15134-2R	BRRI dhan100/Bhutan	67	5
13	BR14854-3R	BR11894-R-R-R-169/BRRI dhan67	172	21
14	BR14859-3R	BR11894-5R-77/IR83222-F11-173	203	14
15	BR14860-3R	BR11636-5R-194/TP16199	168	9
16	BR14861-3R	BR11887-5R-368/TP16199	100	8
17	BR14862-3R	IR83222-F11-173/TP16199	87	19
18	BR14863-3R	BRRI dhan74/Bhutan	31	15
19	BR14864-3R	BRRI dhan84/Bhutan	35	1
20	BR14867-3R	BRRI dhan98/Bhutan	81	6
21	BR14263-3R	BR11318-5R-106/IR83222-F11-173	184	11
22	BR14623-3R	BR11712-4R-227/Rata Boro	13	1
23	BR14632-3R	BR10317-5R-25/IR19X1001: IRR1 154-Cold1	166	13
24	BR14643-3R	BR11303-5R-156/IR19X1001: IRR1 154-Cold1	182	4
25	BR14651-3R	BR11318-5R-106/IR19X1001: IRR1 154-Cold1	217	23
26	BR14638-4R-CT	BR10317-5R-25/IR19X1001: IRR1 154-Cold1	23	1
27	BR14643-4R-CT	BR11303-5R-156/IR19X1001: IRR1 154-Cold1	19	1
28	BR14254-4R-CT	BRRI dhan88/BR8909-B-12-2-CS1-4-CS2-P2-3-2	25	1
29	BR14855-3R	BR11894-R-R-R-169/BRRI dhan29-CS3-28-16-10-6-HR6(com)-HR1(Gaz)-P8(Habj)	244	11
30	BR14857-3R	BR11894-R-R-R-329/BR11894-R-R-R-169	255	14
31	BR14598-4R-CT	BR11303-5R-156/BR11723-4R-172	279	3
32	BR14599-4R-CT	BR11303-5R-19/BR11723-4R-172	173	10
33	BR14600-4R-CT	BR11303-5R-19/IR107995-B-BRG-BRG-2-1	279	22
34	BR14601-4R-CT	BR11318-5R-18/BR8938-194-3-4-1-1-P2-HR3	140	4
35	BR14602-4R-CT	BR11318-5R-18/BR8631-12-3-5-P2	219	2
36	BR14603-4R-CT	BR11330-5R-29/BR11342-5R-5	218	28
37	BR14604-4R-CT	BR11330-5R-29/BR8899-14-4-1-2-2-1	103	13
38	BR14605-4R-CT	BRRI dhan29-SC3-28-16-10-6-HR6(Com)-HR1(Gaz)-P8(Habj)/BR9943-26-2-3-6	90	5
39	BR14607-4R-CT	BRRI dhan29-SC3-28-16-10-6-HR6(Com)-HR1(Gaz)-P8(Habj)/BR8912-12-6-1-1-1-1	68	3

Sl#	Cross name	Parentage	Lines grown	Lines selected
40	BR14608-4R-CT	BRRI dhan29-SC3-28-16-10-6-HR6(Com)-HR1(Gaz)-P8(Habj)/IR99285-1-1-1-P2	78	9
41	BR14609-4R-CT	BR11607-4R-72/BR9943-26-2-3-6	47	5
42	BR14610-4R-CT	BR11607-4R-72/IR64-Pi9	111	2
43	BR14611-4R-CT	BR11723-4R-172/BR8912-12-6-1-1-1-1	55	3
44	BR14612-4R-CT	BR11723-4R-172/BR8631-12-3-5-P2	52	4
45	BR14613-4R-CT	BR8631-12-3-5-P2/IR172244	295	11
46	BR14614-4R-CT	IR107995-B-BRG-BRG-2-1/BIN dhan17	161	6
47	BR14615-4R-CT	TP26717/IR96925-B-B-B-B-61	50	1
48	BR14619-4R-CT	BR11303-5R-156/BR11868-5R-59	160	5
49	BR14620-4R-CT	BIN dhan14/BR11723-4R-172	27	2
50	BR14621-4R-CT	BR12266-44-11-32-5-1-1-HR10-B/BINA dhan14	14	1
51	BR14630-4R-CT	BR11712-4R-227/IR20X1003:IRRI154-Pi35	27	1
52	BR14631-4R-CT	BR11712-4R-227/IR20X1005: IRRI 154-Pi54(Ttp)+Pi35	28	1
53	BR14634-4R-CT	BR11712-4R-227/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	37	3
54	BR14636-4R-CT	BR10317-5R-25/IR20X1003:IRRI154-Pi35	29	1
55	BR14650-4R-CT	BR11318-5R-106/IR20X1003:IRRI154-Pi35	32	3
56	BR14653-4R-CT	BR12266-44-11-32-5-1-1-HR10-B/IR20X1003:IRRI154-Pi35	27	4
57	BR14657-4R-CT	BR12266-44-11-32-5-1-1-HR10-B/IR20X1002: IRRI 154-Pi9+Hd9 (N22)	42	6
58	BR14223-5R-CT	BR11318-5R-106/BR8899-14-4-1-2-2-1	46	3
59	BR14225-5R-CT	BR11318-5R-18/BR8912-12-6-1-1-1-1	18	1
Total			6,688	492

Experiment 9.5: Evaluation of breeding lines in the Observational Yield Trial under Cold stress and non-stress field condition

Principal investigator: P S Biswas

Co-Investigators: MA Syed, F Akter, MFRK Prince, F Mehmood, KM Iftekharuddaula (Gazipur), and M Anisuzzaman (Habiganj)

Specific objective: Selection of superior and cold tolerant lines under natural cold conditions.

Materials and Methods: A total 80 (OYT-1) and 110 (OYT-2) breeding lines were evaluated at two locations (Gazipur and Habiganj) with two sowing staggers (15 October and another in 28 November) following Row-Column design with two replications. BRRI dhan28, BRRI dhan67, BRRI dhan88 and BRRI dhan89 were used as standard check varieties. In addition, a set of 60 IRRI-bred breeding lines were evaluated in OYT-3 and 60 breeding lines in OYT-4 at BRRI Gazipur under natural low temperature. Sowing of seeds on the 31 October was done to allow the booting stage of the crop to be exposed to low temperatures in the end of January to first week of February. The 30-48 days old seedlings of each entry were transplanted in 5.0 m×4 rows plot using single seedling at a spacing of 20 × 20 cm. Fertilizer management was done @ 260:100:120:110:11 kg Urea, TSP, MP, Gypsum and ZnSO4/ha. Urea was applied in three equal splits at 15 days after transplanting (DAT), 30 DAT and 50 DAT. Total amounts of TSP, ½ MP, Gypsum and ZnSO4 was applied at final land preparation. Rest of half MP was applied at the 2nd top-dress of Urea. Crop management such as weeding, irrigation etc. was done on time. Disease-insect and other pests were controlled when necessary. Data on days to flowering and maturity, plot yield, lodging and disease and insect infestation were recorded. Plot yield was recorded from the whole plot and moisture content (MC) in the grain was recorded using a moisture meter. Grain yield (g/plot) was estimated from plot yield adjusted with 14% MC. Yield reduction was estimated from the yield difference between non-stress plot and cold stress plot as the percentage of non-stress plot. Also, maximum and minimum temperatures were collected throughout the growth stages of the crop.

Results: Majority of the breeding lines grown from October sowing in OYT-1, OYT-2, OYT-3 and OYT-4 flowered between 7 Feb to 20 March in Gazipur. Therefore, the PI to booting stage of the lines was between 2nd week January to 1st week of February at Gazipur. The maximum and minimum temperature during this period were 17.8⁰C to 30⁰C and 9.5⁰C to 22.6⁰C in Gazipur. The average daily temperature below 20⁰C with maximum temperature 19.5⁰C to 25.5⁰C was observed from 15 to 30 January 2024 at Gazipur. The above findings suggests that the entries which flowered during 7 to 20 February at Gazipur were exposed to

natural low temperature below 20⁰C at PI to booting stage and PI stage, respectively. Moderate level of cold stress (21⁰C-22⁰C) also affected the entries that flowered during second week of February to 20th of March at PI stage at Gazipur.

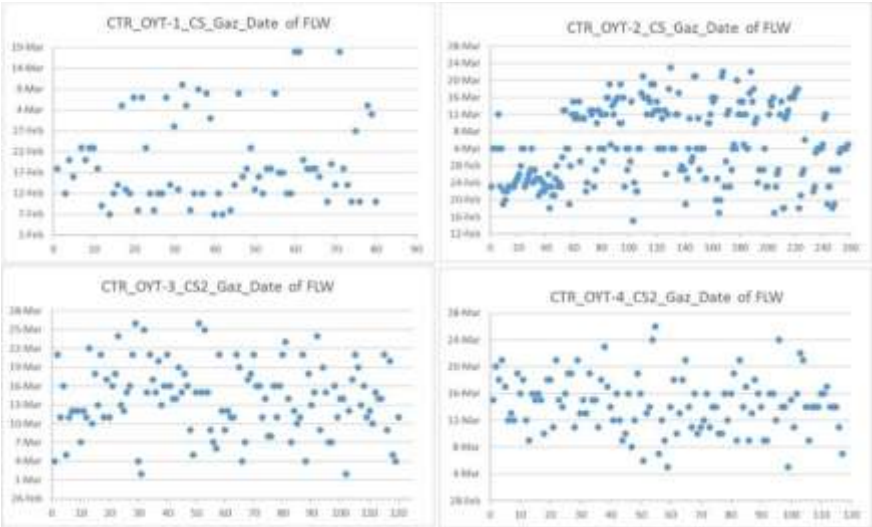


Fig. (9.5a) Dot plot showing flowering window of the breeding tested in OYT-1, OYT-2, OYT-3 and OYT-4 under early sown cold stress batch in Gazipur during Boro 2024-25



Fig. 9.5b: Maximum and minimum temperature during Boro 2023-24 at Gazipur OYT-1, OYT-2, OYT-3, OYT-4

The OYT-1, under cold stress, was severely affected by Tungro disease. Tungro affected plants were discarded leaving only few healthy plants per plot. Poor density of plant population in the plots allowed the genotypes to avoid cold stress. Therefore, yield (t/ha) was not recorded, rather visual scoring on different cold related traits from the remaining plants at each plot. Three genotypes BR14877-BC1-R-63, BR14877-BC1-R150 and BR14877-BC1-R-133 were selected based on visual score 1 for panicle degeneration, panicle exsertion and spikelet fertility (Table 9.5a). From OYT-1-NS trial four short lines (133–135 days, 105.4–107.9 cm) with stable performance across Gazipur and Habiganj, including BR14877-BC1-R-30 (6.71–7.41 t/ha), BR14877-BC1-R-36 (6.04–7.88 t/ha), BR14877-BC1-R-105 (6.61–7.85 t/ha), and BR14877-BC1-R-186 (5.75–8.14 t/ha) were identified (Table 9.5b).

Table 9.5a: List of selected breeding lines from OYT-1-CS conducted under natural cold stress conditions during Boro 2024-25.

Sl#	Designation	Panicle degeneration score	Panicle exsertion score	Spikelet fertility (%)
1	BR14877-BC1-R-63	1	1	1

Sl#	Designation	Panicle degeneration score	Panicle exertion score	Spikelet fertility (%)
2	BR14877-BC1-R-150	1	1	1
3	BR14877-BC1-R-133	1	1	1
	BRRI dhan28 (Ck)	3	5	5
	BRRI dhan67 (Ck)	1	1	1
	BRRI dhan102 (Ck)	1	1	1

Table 9.5b: List of selected breeding lines from OYT-1-NS conducted under non- stress conditions during Boro 2024-25

Sl#	Designation	GD (days)	PH (cm)	Grain yield (t/ha)		
				Gazipur	Habiganj	Average
1	BR14877-BC1-R-105	133	107.9	6.61	7.85	7.23
2	BR14877-BC1-R-30	135	107.3	6.71	7.41	7.06
3	BR14877-BC1-R-36	133	107.3	6.04	7.88	6.96
4	BR14877-BC1-R-186	133	105.4	5.75	8.14	6.94
	BRRI dhan28 (Ck)	137	105.1	6.02	7.19	6.60
	BRRI dhan67 (Ck)	142	110.4	6.12	6.72	6.42
	BRRI dhan102 (Ck)	149	109.6	6.45	6.11	6.28
	IR83222-F11-173 (Ck)	144	109.5	4.52	6.35	5.43
	LSD	8.64	7.33	0.99	1.19	1.21
	H ² B (%)	49.41	3.00	30.7	14.8	-

Table 9.5c summarizes the performance of selected seven breeding lines from 80 breeding lines of OYT-2 under natural cold stress during Boro 2024-25, along with five check varieties. The growth duration of tested entries ranges from 150-183 days, plant height ranges 68.2-152.7 cm and grain yield 0.80-4.89 while the selected entries matured within 152–169 days, with plant height ranging from 86.6 to 113.5 cm and grain yield from 3.13 to 4.60 t/ha. Among the selected lines, the five breeding lines (3.13-4.19 t/ha, 152-160 days) produced 23.7–65.6% yield advantage with the similar growth duration of BRRI dhan28 (2.53 t/ha, 158 days) and the other two breeding lines (3.73-4.60 t/ha, 165-169 days) gave 48.1-70.3% yield advantage with the similar growth duration of BRRI dhan67 (2.70 t/ha, 165 days). The highest yield (4.60 t/ha) was obtained from BR11894-R-R-R-R-148-Phy, followed by BR14625-4R-116-Gaz-1 (4.19 t/ha) and BR13990-2R-41-Hab-1 (3.90 t/ha). Table 9.5d presents the performance of nine breeding lines tested among 110 breeding lines from OYT-2 under non-stress conditions during Boro 2024-25, compared with five check varieties. The growth duration of tested entries ranges from 139-156 days, plant height ranges 92.9-159.5 cm and grain yield 2.38-8.79 while the selected lines matured within 142-156 days, with plant height ranging from 95.2 to 118.8 cm and grain yield from 6.35 to 8.79 t/ha, all exceeding the checks (4.88–5.79 t/ha). The highest yield (8.79 t/ha) was recorded by BR13995-2R-2-Hab-1-B, followed by genotypes BR14628-4R-171-Gaz-1-B (8.18 t/ha) and BR14624-4R-7-Gaz-1-B (8.07 t/ha).

Table 9.5c: Performance of the selected short and medium duration breeding lines from OYT-2 conducted under natural cold stress conditions during Boro 2024-25.

Sl#	Designation	GD (days)	PH (cm)	Yield (t/ha)	Remarks
1	BR11894-R-R-R-R-148-Phy	169	99.2	4.60	MD
2	BR14625-4R-116-Gaz-1	156	113.5	4.19	SD
3	BR13990-2R-41-Hab-1	158	91.3	3.90	SD
4	BR14625-4R-35-Gaz-1	165	86.6	3.73	MD
5	BR14628-4R-234-Gaz-1-B	156	104.0	3.72	SD
6	BR14625-4R-12-Gaz-1	152	102.3	3.43	SD
7	BR11894-R-R-R-R-152-Phy	160	95.9	3.13	SD
	BRRI dhan28 (Ck)	158	81.2	2.53	
	BRRI dhan67 (Ck)	165	86.4	2.70	
	BRRI dhan102 (Ck)	176	85.0	2.77	
	TP16199 (Ck)	164	93.4	2.79	
	BR11894-R-R-R-R-169 (Ck)	156	87.0	2.83	
	Range (N=110)	150-183	68.2-152.7	0.80-4.89	
	LSD	5.0	12.2	1.01	
	H ² B (%)	92.0	87.4	67.7	

Table 9.5d: List of selected breeding lines from OYT-2 conducted with 110 entries under non- stress conditions during Boro 2024-25

Sl#	Designation	GD (days)	PH(cm)	Yield (t/ha)	Remarks
1	BR13027-BC1-3R-109-Nik-2	147	111.0	6.54	MD
2	BR13027-BC1-3R-139-Nik-1	142	95.2	7.00	SD
3	BR13995-2R-1-Hab-2-B	156	102.5	6.84	LD
4	BR13995-2R-2-Hab-1-B	155	113.1	8.79	LD
5	BR14624-4R-7-Gaz-1-B	155	118.1	8.07	LD
6	BR14624-4R-97-Gaz-1	149	107.2	6.63	MD
7	BR14625-4R-19-Gaz-2-B	142	103.2	6.92	SD
8	BR14625-4R-28-Gaz-1-B	148	112.5	6.35	MD
9	BR14628-4R-171-Gaz-1-B	155	118.8	8.18	LD
	BRRI dhan28 (Ck)	142	107.4	4.88	
	BRRI dhan67 (Ck)	149	116.3	5.29	
	BRRI dhan102 (Ck)	155	113.3	5.05	
	TP16199(Ck)	152	127.6	5.23	
	BR11894-R-R-R-R-169 (Ck)	147	111.6	5.79	
	Range (N=110)	139-156	92.9-159.5	2.38-8.79	
	LSD	3.26	9.34	1.41	
	H ² B (%)	87.9	91.1	58.3	

In OYT-3, among the 55 breeding lines varied in yield from 0.07 t/ha to 5.38 t/ha with growth duration ranging from 149 days to 169 days (Table 9.5e). No genotypes outperformed over the check varieties BRRI dhan28, BRRI dhan67, and BRRI hybrid dhan8, thus no breeding lines were selected.

Table 9.5e: Performance of the tested breeding lines from OYT-3 conducted under stress conditions (CS2) during Boro 2024-25

Designation	GD (days)	PH (cm)	Yield (t/ha)
Range of breeding lines (N=60)	149-169	69.4-151.9	0.07-5.38
BRRI dhan28	149	94.6	5.38
BRRI dhan67	154	111.0	4.67
BRRI hybrid dhan8	156	97.2	4.96
LSD	3.35	24.3	1.09
Heritability	0.92	68.8	0.88

Table 9.5f summarizes the performance of selected seven breeding lines out of 60 entries tested in OYT-4_CS under stress conditions during Boro 2024-25, along with the three check varieties. The growth duration of tested entries ranges from 150-159 days, plant height ranges 83.3-138.1 cm and grain yield ranges 1.89-6.55 while growth duration of the selected lines ranges from 151 to 163 days, plant height from 94.8 to 116.8 cm, and grain yield ranges from 5.40 to 6.55 t/ha. Among the selected lines, the two breeding lines (5.43-5.48 t/ha, 151-155 days) produced 32.4–33.6% yield advantage with the similar growth duration of BRRI dhan88 (4.10 t/ha, 150 days) and the other five breeding lines (5.40-6.55 t/ha, 157-163 days) gave 6.8-29.6% yield advantage with the growth duration similar to BRRI dhan67 (5.05 t/ha, 158 days).The highest yield (6.55 t/ha) was recorded with BR14264-5R-20, followed by with BR14264-5R-21 (5.82 t/ha) and BR14264-5R-40 (5.75 t/ha). Heritability estimates were moderate for growth duration (41.8%) and high for plant height (69.6%), indicating potential for effective selection under stress conditions.

Table 9.5f: Performance of the selected short and medium-duration breeding lines from OYT-4 CS2 conducted under stress conditions during Boro 2024-25

Sl#	Designation	GD (days)	PH (cm)	GY(t/ha)
1	BR14875-BC1-R-136-P2	158	112.60	5.40
2	BR14628-B-R-R-R-55	151	94.80	5.43
3	BR14264-5R-20	163	109.50	6.55
4	BR14264-5R-21	162	104.40	5.82
5	BR14264-5R-40	159	116.80	5.75
6	BR14264-5R-46	155	110.20	5.48
7	BR14264-5R-70	157	115.30	5.47
	BRRI dhan88	150	88.00	4.10
	BRRI dhan67	158	117.10	5.05
	BRRI dhan102	169	102.70	3.89
	Range (N=60)	150-169	83.3-138.1	1.89-6.55
	LSD	30.62	32.97	1.24

Experiment 9.6: Evaluation of breeding lines in the Advanced Yield Trial (AYT) under natural condition of Haor environment.**Principal investigator:** P S Biswas**Co-Investigators:** MA Syed, F Akter, MFRK Prince, F Mehmood, KM Iftekharuddaula (Gazipur), M Anisuzzaman (Habiganj)**Specific objective:** Evaluation of breeding lines for yield potential in multi-locations in replicated trials.

Materials and Methods: In total, 78 breeding lines were evaluated at four locations (Gazipur, Habiganj, Nikli, and Tahirpur) along with three standard check varieties BRRI dhan28, BRRI dhan67, and BRRI dhan102 under two sowing staggers (Early sowing (CS): 21-29 October and Regular sowing (NS): 19-27 November) in two AYT trials. Thirty-five-day-old seedlings of each genotype were transplanted in 5.4 m × 6 rows plot using 2/3 seedlings/hill at a spacing of 20 cm × 20 cm in a Row-Column design with two replications. Fertilizer management was done @ 260:100:120:110:11 kg Urea, TSP, MP, Gypsum and ZnSO₄/ha. Urea was applied in three equal splits at 15 days after transplanting (DAT), 30 DAT and 50 DAT. Total amounts of TSP, ½ MP, Gypsum and ZnSO₄ was applied at final land preparation. Rest of half MP was applied at the 2nd top-dress of Urea. Crop management such as weeding, irrigation etc. was done in time. Disease-insect and other pests were controlled when necessary. Data on plant height, days to flowering and maturity, yield, lodging and disease and insect infestation were recorded. Plot yield was recorded from the whole plot and moisture content (MC) in the grain was recorded using a moisture meter. Grain yield (t/ha) was estimated from plot yield adjusted with 14% MC.

Results: At the four sites of Gazipur, Habiganj, Nikli and Tahirpur, all the forty breeding lines in AYT-1_CS flowered in between 25 February 2025 and 25 March 2025 (Fig. 9.6a). The figure illustrates the flowering window of breeding lines evaluated at four locations under early-sown cold stress during Boro 2024–25. In Gazipur, flowering was distributed from late February to mid-March, with the majority concentrated between 28 February and 5 March. In Habiganj, flowering extended up to mid-March, with a relatively wider spread compared to other sites. In Nikli, most entries flowered between 23 February and 7 March, while in Tahirpur, the window ranged from 21 February to 10 March, showing more clustering in late February. It shows that the average temperature during 20 January to 6 February was in between 17.5°C -19.85°C with maximum daily temperature of 19.6°C-22.9°C and from 7 February to 29 February, the average temperature was 20.25°C-21.85°C with maximum temperature of 21.6°C-25.2°C, which suggests that majority of the materials experienced severe to moderate level of cold shock during PI to booting stage at Nikli site (Fig 9.6b). The temperature curves reveal a distinct **cold-dip period** during the **panicle initiation to booting stage** (denoted by the orange dashed boxes), with **Nikli** showing the **most pronounced low minimum temperatures**, noticeably cooler than the other locations. Throughout this stage, the temperature profiles indicate that Nikli's breeding materials were subjected to **significant cold stress**, likely affecting early reproductive development. As the crop transitioned into the flowering period (highlighted by green dashed boxes), temperatures climbed steadily across all sites, creating a warmer and more favorable environment for anthesis and grain setting.

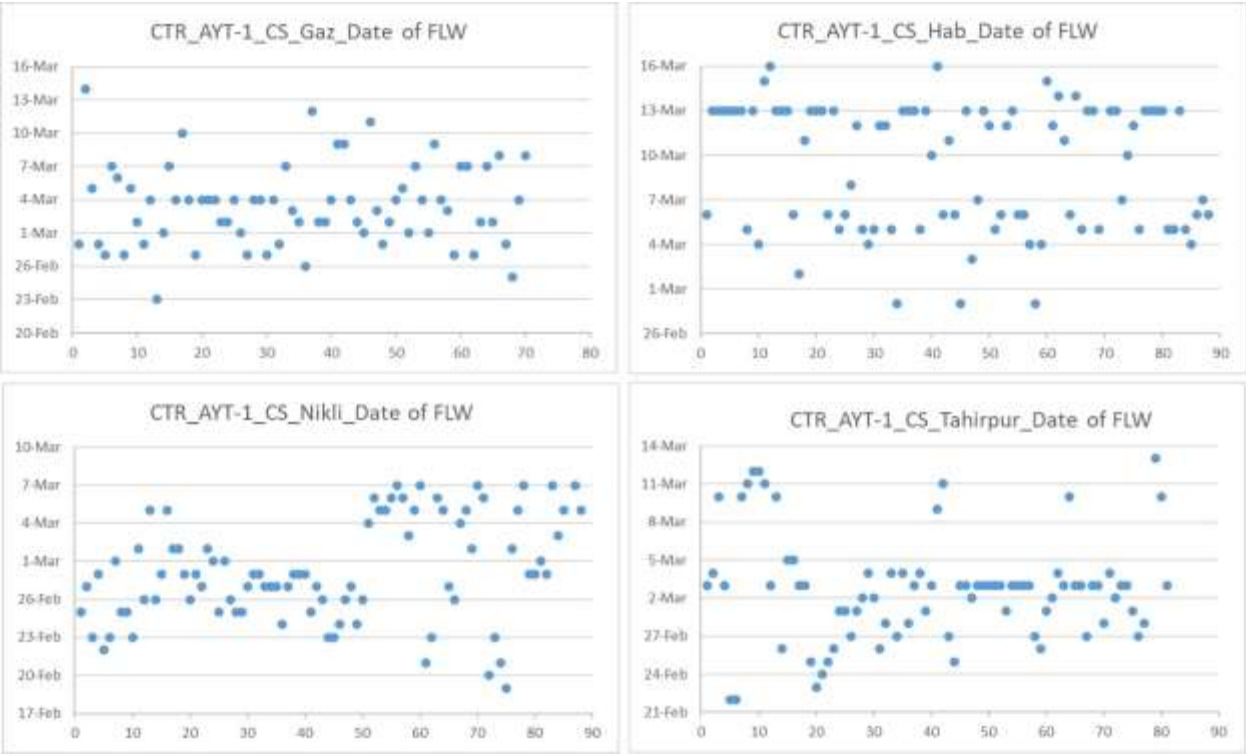


Fig. 9.6a: Dot plot showing flowering window of the breeding tested in Gazipur, Habiganj, Nikli and Tahirpur under early sown cold stress batch during Boro 2024-25

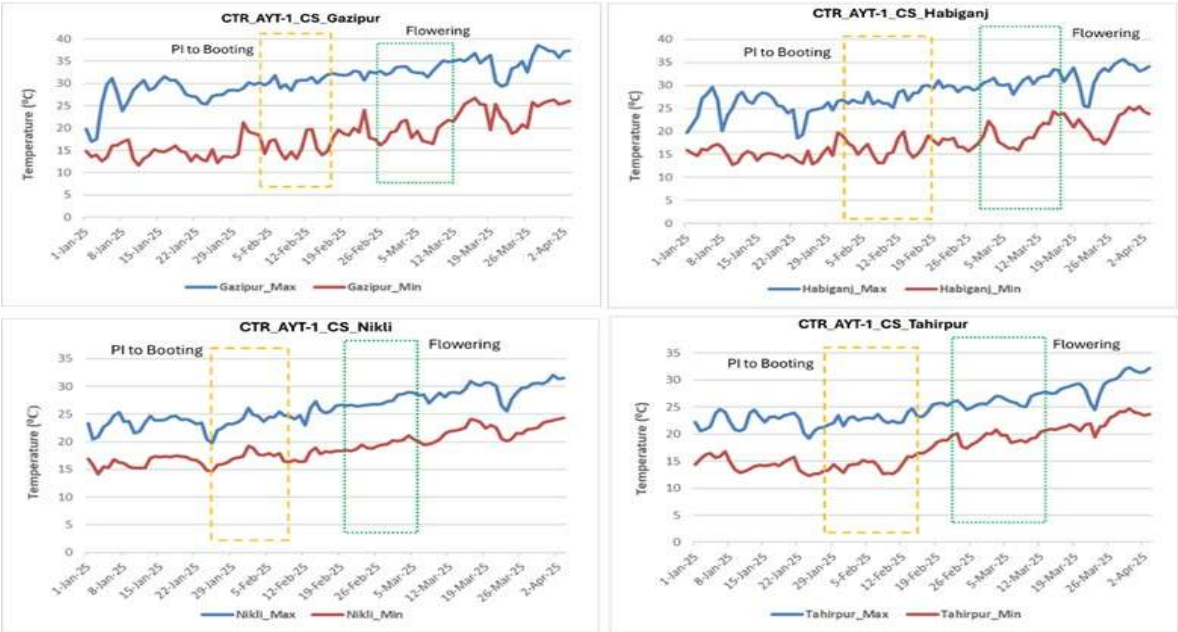


Fig. 9.6b: Maximum and minimum temperature at Gazipur, Habiganj, Nikli and Tahirpur during Boro 2024-25. Orange dotted box represents PI to booting stage and green dotted box represents flowering stage of 40 breeding tested in this site

Forty breeding lines/varieties grown under early sowing (21-25 October) in the AYT-1 showed the growth duration of tested entries ranges from 144-161 days, plant height ranges 82.0-113.1 cm and grain yield ranges 2.03-5.21 while the selected breeding lines showed 144-160 days growth duration, 90.8 to 110.4 cm plant height and 2.93 to 6.42 t/ha yield over four locations i. e. Gazipur, Habiganj, Nikli and Tahirpur (Table 9.6a). One genotype BR13990-2R-57 (4.49 t/ha, 144 days) produced 121.2% yield advantage over BRRI dhan28 (2.03 t/ha, 152 days). Another six genotypes with yield ranging from 3.90-5.21 t/ha and growth duration 154-160 days scored 65.9-116.2% yield advantage over BRRI dhan67 (2.41 t/ha, 159 days) and 19.3-59.3% yield advantage over BRRI dhan102 (3.27 t/ha, 160 days). On the other hand, these lines when grown in regular time (i.e. 19-27 November) in non-stress conditions, showed the growth duration ranging from 140-155 days, plant height ranging from 86.2-120.3 cm and grain yield ranging from 3.67-7.53 t/ha, while the selected breeding lines showed 142-143 days growth duration, 110.7-112.2 cm plant height and 6.90-7.53 t/ha yield (Table 9.6b). The selected three genotypes (6.90-7.53 t/ha, 142-143 days) produced 10.2-20.4% yield advantage

with the similar growth duration of BRRI dhan28 (6.90 t/ha, 141 days). The check varieties BRRI dhan28, BRRI dhan67 and BRRI dhan102 produced 6.31 t/ha, 6.43 t/ha and 7.02 t/ha, respectively with 141 days, 145 days and 155 days, growth duration in regular batch.

Table 9.6a: Performance of the AYT-1_CS breeding lines under early sowing time (21-25 October) in three haor locations during Boro 2024-25.

Sl#	Designation	GD (days)	PH (cm)	Grain yield (t/ha)					Remarks
				Gaz	Hab	Nikli	Tahirpur	Avg	
1	BR13152-5R-324	154	100.0	3.49	6.14	6.15	1.87	4.41	MD
2	BR13152-5R-4	157	97.9	-	5.18	5.41	1.58	4.00	MD
3	BR13986-2R-93	161	110.4	5.03	4.76	5.36	2.29	4.36	MD
4	BR13988-2R-119	156	102.2	6.42	5.15	5.06	4.24	5.21	MD
5	BR13990-2R-57	144	105.0	4.67	4.92	5.71	2.67	4.49	SD
6	BR13996-2R-10	159	90.8	4.38	5.56	5.33	2.84	4.53	MD
7	IR 139675:7-1-2 RGA-1 RGA-1-B	160	100.9	2.93	5.64	5.24	-	3.90	MD
	BRRI dhan28 (Ck)	152	93.2	1.65	5.63	0.84	0.01	2.03	
	BRRI dhan67 (Ck)	159	99.4	3.25	5.03	1.24	0.12	2.41	
	BRRI dhan102 (Ck)	160	98.5	1.79	5.28	4.64	1.37	3.27	
	Range (N=40)	144- 161	82- 113.1	1.65- 7.14	3.69- 7.21	0.84- 6.15	0.01- 4.20	2.03- 5.21	
	LSD	7.20	6.81	1.49	1.18	1.98	0.78	1.96	
	H ² B (%)	-	-	77.8	51.3	74.0	93.7	91.7	

Table 9.6b: List of selected breeding lines from AYT-1 conducted with 40 entries under non-stress condition during Boro 2024-25

Sl#	Designation	GD (days)	PH (cm)	Grain yield (t/ha)				Remarks
				Gaz	Nikli	Tahirpur	Average	
1	BR13152-5R-332	143	110.7	6.65	7.12	6.92	6.90	SD
2	BR13152-5R-404	142	112.2	6.88	6.56	8.72	7.39	SD
3	BR13990-2R-57	143	110.8	6.28	6.81	9.50	7.53	SD
	BRRI dhan28 (Ck)	141	102.6	6.03	6.31	6.43	6.26	
	BRRI dhan67 (Ck)	145	111.3	6.33	6.43	6.70	6.49	
	BRRI dhan102 (Ck)	155	107.8	6.11	7.09	7.55	6.92	
	Range (N=40)	140- 155	86.2- 120.3	3.32- 7.10	4.20- 7.62	2.92- 9.50	3.67- 7.53	
	LSD	2.76	9.82	1.27	1.13	1.29	1.11	
	H ² B (%)	95.5	76.8	97.0	99.0	93.0	69.5	

At Gazipur, Habiganj, Nikli and Tahirpur, all the thirty-eight breeding lines in AYT-2_CS flowered between 20 February 2025 and 22 March 2025 (Fig. 9.6c). The figure illustrates the flowering window of breeding lines evaluated at four locations under early-sown cold stress during Boro 2024–25. In Gazipur, flowering was distributed from late February to mid-March, with the majority concentrated between 22 February and 15 March. In Habiganj, flowering extended up to mid-March, with a relatively wider spread compared to other sites. In Nikli, most entries flowered between 23 February and 7 March, while in Tahirpur, the window ranged from 27 February to 20 March, showing more clustering in late February to mid-March.

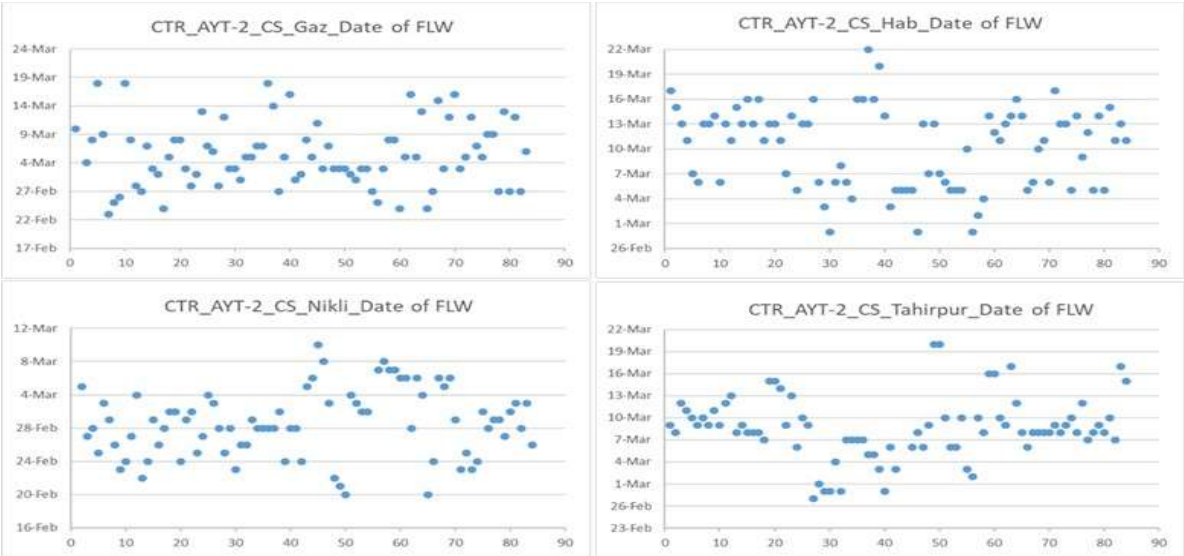


Fig. 9.6c: Dot plot showing flowering window of the breeding tested in Gazipur, Habiganj, Nikli and Tahirpur under early sown cold stress batch during Boro 2024-25

At all four trial sites (Gazipur, Habiganj, Nikli, and Tahirpur), the breeding lines in AYT-2_CS consistently flowered between **late February and late March 2025**, as indicated in **Figure 9.6d**. It shows that the average temperature during 20 January to 6 February was in between 17.5⁰C – 19.85⁰C with maximum daily temperature of 19.6⁰C-22.9⁰C and from 7 February to 29 February, the average temperature was 20.25⁰C-21.85⁰C with maximum temperature of 21.6⁰C-25.2⁰C, which suggests that majority of the materials experienced severe to moderate level of cold shock during PI to booting stage at Nikli and Tahirpur site. The temperature curves reveal a distinct **cold-dip period** during the **panicle initiation to booting stage** (denoted by the orange dashed boxes), with **Nikli** showing the **most pronounced low minimum temperatures**, noticeably cooler than the other locations. Throughout this stage, the temperature profiles indicate that Nikli's breeding materials were subjected to **significant cold stress**, likely to affect early reproductive development. As the crop transitioned into the flowering period (highlighted by green dashed boxes), temperatures climbed steadily across all sites, creating a warmer and more favorable environment for anthesis and grain setting.

In the AYT-2, among 38 breeding lines/varieties grown under early sowing (21-29 October) highlights the performance of 11 medium-duration breeding lines across Gazipur, Habiganj, and Nikli during Boro 2024–25 (Table 9.6c). The growth duration of the selected entries ranged from 155-158 days, plant height ranged 85.9-103.8 cm and grain yield ranged from 3.26 to 5.11 t/ha, while the tested entries showed the growth duration ranged from 150-167 days, plant height ranged 82.9-109.5 cm and grain yield 1.57-5.45 t/ha. The selected genotypes produced 61.2-152.5% yield advantage with the similar growth duration BRRI dhan67 (2.02 t/ha, 158 days) and 2.7-38.6% yield advantage with the similar growth duration BRRI dhan102 (3.69 t/ha, 161 days).

In regular sowing batch (19-27 November 2024), five genotypes were selected comparing performance of all check varieties (Table 9.6d). Two genotypes (6.50-6.51 t/ha, 142 days) showed 15.4-15.6% yield advantage over BRRI dhan28 (5.63 t/ha, 138 days) with similar growth duration. Another three genotypes produced 8.2-23.2% yield advantage over BRRI dhan67 with the similar growth duration (6.26 t/ha, 141 days) and 5.7-20.5% yield advantage over BRRI dhan102 (6.40 t/ha, 150 days) with similar growth duration.

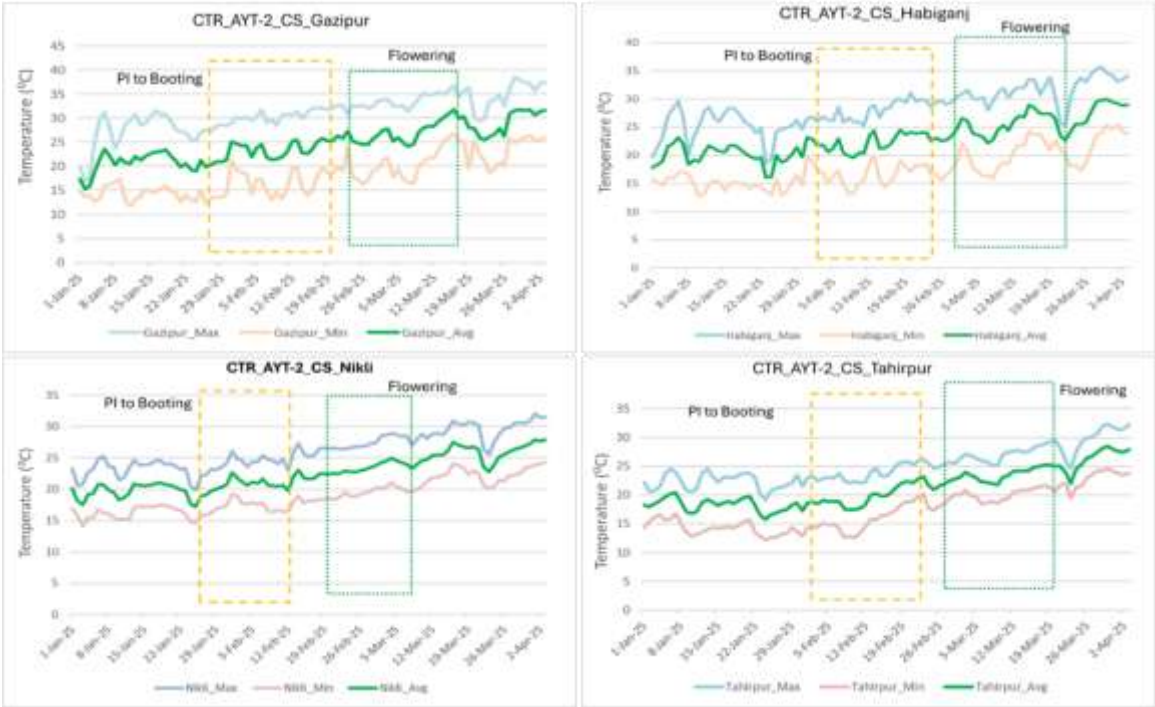


Fig. 9.6d: Maximum and minimum temperature at Gazipur, Habiganj, Nikli and Tahirpur during Boro 2024-25. Orange dotted box represents PI to booting stage and green dotted box represents flowering stage of 38 breeding tested in this site

Table 9.6c: Performance of the AYT-2_CS conducted with 38 breeding lines under early sowing time (21-23 October) in three haor locations during Boro 2024-25

Sl#	Designation	GD (days)	PH (cm)	Grain yield (t/ha)				Remarks
				Gaz	Hab	Nik	Avg	
1	BR13151-5R-62-Gaz-1	158	99.2	2.44	3.31	5.28	4.86	MD
2	BR13152-5R-174-Gaz-1	156	97.4	2.12	5.82	5.48	4.92	MD
3	BR13152-5R-205-Gaz	156	103.8	2.96	4.98	3.74	4.62	MD
4	BR13152-5R-368-Hab-1	157	98.7	2.29	5.27	6.37	5.11	MD
5	BR13152-5R-381-Gaz-1	156	102.4	2.19	4.29	4.15	4.47	MD
6	BR13152-5R-386-Gaz-1	156	102.1	2.07	6.69	3.82	4.64	MD
7	BR13152-5R-404-Gaz	158	98.9	2.14	5.14	5.57	4.76	MD
8	BR14624-4R-88-Gaz	157	85.9	3.64	-	5.20	4.42	MD
9	BR14628-4R-125-Gaz	158	97.2	2.04	5.27	5.06	4.38	MD
10	BR14628-4R-126-Gaz	157	98.5	3.07	4.63	3.16	3.79	MD
11	BR14628-4R-51-Gaz	155	94.8	1.89	6.23	2.15	3.26	MD
	BRRI dhan28 (Ck)	151	88.4	2.02	4.35	0.0	1.77	
	BRRI dhan67 (Ck)	158	102.0	2.28	4.35	0.72	2.02	
	BRRI dhan102 (Ck)	161	99.7	2.44	4.65	4.50	3.69	
	Range (N=38)	150-167	82.9-109.5	0.77-3.64	3.13-7.54	0-7.54	1.57-5.45	
	LSD	4.62	5.8	0.83	1.96	1.56	1.84	
	H ² B (%)	81.6	78.3	-	-	88.8	58.8	

Table 9.6d: List of selected breeding lines from AYT-2 conducted with 38 entries under non- stress condition during Boro 2024-25

Sl#	Designation	GD (days)	PH (cm)	Grain yield (t/ha)					Remarks
				Gaz	Hab	Nikli	Tahirpur	Average	
1	BR13027-BC1-3R-14-Phy	142	110.34	5.33	5.86	7.46	7.40	6.51	SD
2	BR13152-5R-44-Hab	142	107.05	5.33	5.90	6.82	7.96	6.50	SD
3	BR14628-4R-125-Gaz	148	107.06	7.24	6.78	7.33	9.47	7.71	MD
4	BR14628-4R-180-Gaz-1	149	111.54	5.65	5.52	6.82	9.96	6.99	MD
5	BR14628-4R-50-Gaz-1	149	105.48	5.97	6.54	6.51	8.04	6.77	MD
	BRRI dhan102 (Ck)	150	108.50	5.14	5.49	6.87	8.09	6.40	
	BRRI dhan28 (Ck)	138	103.27	3.52	5.81	6.58	6.62	5.63	
	BRRI dhan67 (Ck)	141	109.53	6.10	5.32	6.52	7.09	6.26	
	Range (N=38)	138-152	97.5-116.1	3.52-7.24	3.20-6.78	5.05-7.46	4.50-9.96	5.20-7.71	
	LSD	7.96	9.20	1.31	1.58	1.58	1.05	1.03	
	H ² B (%)	89.0	34.5	48.9	38.5	38.5	85.9	31.8	

Experiment 9.7: Evaluation of breeding lines in the Regional Yield Trial for yield under cold stress and non-stress conditions at Haor areas

Principal investigator: P S Biswas

Co-Investigators: MA Syed, F Akter, MFRK Prince, F Mehmood, KM Iftekharuddaula (Gazipur), M Anisuzzaman (Habiganj)

Specific objective: Evaluation of breeding lines for yield potential in multi-locations in replicated trials.

Materials and Methods: In total, twenty-eight genotypes (14 in RYT-1 and 14 in RYT-2) were evaluated at four sites in Habiganj, three sites in Nikli and three sites in Tahirpur along with three standard check varieties, BRRI dhan28, BRRI dhan67 and BRRI dhan102 at cold stress under two sowing intervals (CS: sowing on 23-24 October, and NS: sowing during 15-25 November conditions. The same set of materials were also evaluated under non-stress condition in Gazipur. Thirty-five-day-old seedlings of each genotype were transplanted in 5.4 m × 10 rows plot using 2/3 seedlings/hill at a spacing of 20 cm × 20 cm. The trials were conducted with three replications following RCB design. Fertilizer management was done @ 260:100:120:110:11 kg Urea, TSP, MP, Gypsum and ZnSO4/ha. Urea was applied in three equal splits at 15 days after transplanting (DAT), 30 DAT and 50 DAT. Total amounts of TSP, ½ MP, Gypsum and ZnSO4 was applied at final land preparation. Rest of half MP was applied at the 2nd top-dress of Urea. Crop management such as weeding, irrigation etc. was done in time. Disease-insect and other pests were controlled when necessary. Data on plant height,

days to flowering and maturity, yield, lodging and disease and insect infestation were recorded. Plot yield was recorded from the whole plot and moisture content (MC) in the grain was recorded using a moisture meter. Grain yield (t/ha) was estimated from plot yield adjusted with 14% MC. Yield reduction was estimated from the yield difference between non-stress plot and cold stress plot as the percentage of non-stress plot. The maximum and minimum temperature data of each of the sites was recorded using digital max-min thermometer.

Results: Fig 9.7a shows that the average temperature from 1st February to 17 February 2025, prevailed between 20.5⁰C – 24.8⁰C with maximum daily temperature of 25.1⁰C-29.7⁰C and from 1 March to 15 March 2025, the average temperature was 22.5⁰C-27.4⁰C with maximum temperature of 27.6⁰C-32.2⁰C. The breeding lines flowered from 1 March to 14 March 2025 which indicated slight to moderate cold shock during PI stage and slight or no cold stress during booting stage at Habiganj site. At Nikli site, the average temperature during 27 January to 15 February was in between 19.0⁰C – 22.1⁰C with maximum daily temperature of 20.6⁰C-24.9⁰C and from 18 February to 10 March, the average temperature was 22.25⁰C-24.9⁰C with maximum temperature of 25.6⁰C-29.2⁰C. The breeding tested under CS condition flowered between 19 February 2025 to 10 March 2025, which suggests that most lines experienced severe to moderate level of cold shock during PI to booting stage. At Tahirpur site, the average temperature during 25 January to 14 February was in between 15.8⁰C – 20.1⁰C with maximum daily temperature of 20.3⁰C-24.8⁰C and from 18 February to 13 March, the average temperature ranged between 20.5⁰C – 24.2⁰C with maximum daily temperature of 24.7⁰C-26.2⁰C. The breeding tested under CS condition flowered from 18 February to 13 March, indicated that breeding lines experienced severe to moderate level of cold shock during PI to booting stage at this site.



Fig 9.7a. The maximum, minimum, and average temperature at the project sites and the flowering window of the breeding lines tested in RYT-1 during Boro 2024-25

In the CS batch of RYT-1, the tested breeding lines showed growth duration of 142-170 days at Habiganj sites, 136-162 days at Nikli sites, and 148-172 days at Tahirpur sites (Table 9.7a). On the other hand, in NS batch they showed growth duration ranging from 136-149 days at Gazipur site, 133 days to 147 days at Habiganj sites, 138 days to 150 days at Nikli and 141 days to 159 days in Tahirpur sites (Table 9.7b).

Table 9.7a: Growth duration of the breeding lines tested under early sowing time (23-24 October) in three haor locations in Regional Yield Trial (RYT-1_CS) during Boro 2024-25

Designation	Growth duration (days)									
	Hab1	Hab2	Hab3	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Average
BR11894-R-R-R-R-228	153	152	163	145	145	144	136	152	148	149
BR13027-BC1-3R-109	156	153	157	145	148	151	140	161	151	151
BR12421-4R-171	162	166	162	148	147	146	139	155	150	153
BR12570-5R-146-1	157	159	156	151	153	155	145	164	156	155
BR13027-BC1-3R-102	166	168	163	149	148	153	138	157	155	155

Designation	Growth duration (days)									
	Hab1	Hab2	Hab3	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Average
BR13027-BC1-3R-164	159	164	156	142	144	148	138	155	151	151
BR13027-BC1-3R-52	157	163	158	144	143	147	139	156	151	151
BR12570-5R-33-2	161	164	155	152	155	158	149	165	156	157
BR13027-BC1-3R-149	161	164	161	148	150	154	145	169	159	157
BR13026-BC1-3R-209	160	159	161	146	149	154	148	164	156	155
BR13027-BC1-3R-108	162	163	162	149	149	153	143	161	155	155
BR11894-R-R-R-R-59-Phy	160	159	161	152	152	155	154	164	159	157
BR11894-R-R-R-R-169	158	158	158	148	149	152	147	163	155	154
BRRI dhan28 (ck)	162	161	164	147	145	146	141	152	149	152
BRRI dhan67 (ck)	163	166	167	149	150	157	147	164	160	158
BRRI dhan102 (ck)	154	163	170	156	161	162	156	172	167	162
Range (N=17)	153-166	152-168	155-170	142-156	143-161	144-162	136-156	152-172	148-167	149-162
LSD	5.21	5.25	4.93	2.23	1.94	2.44	3.25	3.91	2.05	4.72
H ² B(%)	34.2	65.8	78.5	90.6	96.2	94	91.9	88.9	88.9	89.4

D/S: 24/10/24 (Hab1); 24/10/24 (Hab2); 24/10/24 (Hab3); 23/10/24 (Nik1); 23/10/24 (Nik2); 23/10/24 (Nik3); 24/10/24 (Tah1); 24/10/24 (Tah2); 24/10/24 (Tah3); D/T: 04/12/24 (Hab1); 27/11/24 (Hab2); 14/12/24 (Hab3); 21/11/24 (Nikli1); 23/11/24 (Nik2); 25/11/24 (Nik3); 23/11/24 (Tah1); 05/12/24 (Tah2); 28/11/24 (Tah3).

Table 9.7b: Growth duration of the breeding lines tested under regular sowing time (15-25 November) in three haor locations in Regional Yield Trial (RYT-2_NS) during Boro 2024-25

Designation	Grain yield (t/ha)											
	Gaz	Hab1	Hab2	Hab3	Hab4	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Ave
BR11894-R-R-R-R-228	136	136	136	137	134	140	142	138	141	149	147	140
BR13027-BC1-3R-109	141	138	145	138	136	142	144	144	147	152	151	144
BR12421-4R-171	137	139	140	138	138	140	144	143	141	145	145	141
BR12570-5R-146-1	141	136	139	137	134	146	150	146	146	154	152	144
BR13027-BC1-3R-102	137	137	135	136	133	142	144	143	142	151	148	141
BR13027-BC1-3R-164	137	137	138	135	134	138	143	139	142	148	150	140
BR13027-BC1-3R-52	138	136	136	135	134	140	143	140	142	150	148	140
BR12570-5R-33-2	148	137	139	138	139	148	152	149	151	154	155	146
BR13027-BC1-3R-149	139	134	147	134	133	144	146	145	147	154	151	143
BR13026-BC1-3R-209	139	136	135	137	140	143	145	142	147	153	149	142
BR13027-BC1-3R-108	139	137	139	136	136	144	146	143	145	155	152	143
BR11894-R-R-R-R-59-Phy	143	139	136	136	135	-	-	147	144	155	152	144
BR11894-R-R-R-R-169	142	138	133	135	138	146	148	146	143	154	152	143
BRRI dhan28	138	136	139	135	135	142	143	143	141	146	145	140
BRRI dhan67	145	136	137	133	136	146	148	149	144	155	151	144
BRRI dhan102	149	139	139	133	135	150	152	152	151	159	159	147
Range (N=17)	136-149	134-139	133-147	133-138	133-140	138-150	142-146	138-152	141-151	145-159	145-159	140-147
LSD	2.82	2.72	5.01	2.64	3.36	1.33	1.07	1.93	1.72	2.52	2.02	3.63
H ² B (%)	88	33.7	58.4	23.9	32.3	96.8	97.4	93.3	92.8	88.4	95.1	88.7

D/S: 25/11/24 (Gaz); 04/12/24 (Hab1); 04/12/24 (Hab2); 05/12/24 (Hab3); 05/12/24 (Hab4); 15/11/24 (Nik1); 15/11/24 (Nik2); 15/11/24 (Nik3); 18/11/24 (Tah1); 18/11/24 (Tah2); 18/11/24 (Tah3); D/T: 07/01/25 (Gaz); 09/01/25 (Hab1); 11/01/25 (Hab2); 05/01/25 (Hab3); 14/01/25 (Hab4); 21/12/24 (Nikli1); 23/12/24 (Nik2); 25/12/24 (Nik3); 20/12/24 (Tah1); 28/12/24 (Tah2); 02/01/25 (Tah3).

Plant height of the breeding lines and the check varieties varied across the sowing time in RYT-1. The variety BRRI dhan28 showed 77.7-101.1 cm with an average of 92 cm plant height under CS batch (Table 9.7c), and 90.6-105.7 cm with an average value of 98.3 cm in NS batch (Table 9.7d). The selected breeding lines BR13027-BC1-3R-109, BR12570-5R-33-2, BR12570-5R-146-1 and BR13027-BC1-3R-52 had plant height 90.3 cm (82.1-102.3cm), 93.4 cm (95.3-114.9 cm), 93.7 cm (82.7-104.3 cm), and 89.7 cm (79.3-115.5 cm), respectively in CS batch (Table 9.7c). In NS batch, the selected breeding lines BR13027-BC1-3R-109, BR13027-BC1-3R-52, BR13027-BC1-3R-149 and BR11894-R-R-R-R-59-Phy were 100.9 cm (95.8-108.3 cm), 97.4 cm (90.4-104.9 cm), 98.2 cm (90.7-106.1 cm), and 105.3 cm (97.7-111.9 cm), respectively (Table 9.7d).

Table 9.7c: Plant height of the breeding lines tested under early sowing time (23-24 October) in three haor locations in Regional Yield Trial (RYT-1_CS) during Boro 2024-25

Designation	Plant height (cm)									
	Hab1	Hab2	Hab3	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Ave
BR11894-R-R-R-R-228	94.9	102.7	104.6	76.8	76.8	72.2	84.5	74.7	79.1	85.1
BR13027-BC1-3R-109	97.1	102.3	100.7	88.3	85.1	82.1	82.9	91.1	83	90.3
BR12421-4R-171	99.4	110.8	101.9	84.1	75.3	73.1	89.9	82.1	80	88.5
BR12570-5R-146-1	104.3	104.1	103.7	87.3	89.4	82.7	88.5	92.9	90.7	93.7
BR13027-BC1-3R-102	97.9	101.9	101.4	89.9	93.9	90.5	101	93.5	96.6	96.3
BR13027-BC1-3R-164	92.1	106.4	93.1	85.3	81.9	74.7	82.8	71.5	74.6	84.7
BR13027-BC1-3R-52	97.2	111.5	102.6	87.3	81.6	79.3	81.9	84.9	81.3	89.7
BR12570-5R-33-2	104	103.6	104.2	88.5	89.9	82.7	90.3	86.1	91.6	93.4
BR13027-BC1-3R-149	100	102.4	106.7	82.9	85	81.3	92.4	110.5	86.3	94.2
BR13026-BC1-3R-209	99.7	104.5	100.7	100.1	92.8	84.9	102.1	99.7	97.3	98
BR13027-BC1-3R-108	100.8	104.2	102.3	83.2	84.5	78	86.5	88.5	84.6	90.3
BR11894-R-R-R-R-59-Phy	98.9	103.5	102.8	82.1	80.7	73.9	95.5	89.4	82.6	89.9
BR11894-R-R-R-R-169	102.3	104.1	97.9	89.7	95.6	85.8	99	89.5	92.1	95.1
BRR1 dhan28 (ck)	96.6	101.7	101.7	93.9	85.9	77.7	89.4	92.3	88.9	92.0
BRR1 dhan67 (ck)	99.9	112.3	103.5	91.9	91.1	85	106	100.8	98.8	98.8
BRR1 dhan102 (ck)	95.4	108.3	98.3	92.9	91.7	80.2	95.7	89.6	87.8	93.3
Range (N=17)	92.1-104.3	101.7-112.3	93.1-106.7	76.8-100.1	75.3-95.6	72.2-90.5	81.9-106.0	71.5-110.5	74.6-98.8	84.7-98.8
LSD	4.14	6.86	7.72	6.21	6.22	3.73	2.01	4.58	2.4	6.07
H ² B(%)	59.9	-	-	67.6	72.4	86.4	98.2	94	97.3	85.6

Table 9.7d: Plant height of the breeding lines tested under regular sowing time (15-25 November) in three haor locations in Regional Yield Trial (RYT-1_NS) during Boro 2024-25

Designation	Plant height (cm)											
	Gaz	Hab1	Hab2	Hab3	Hab4	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Ave
BR11894-R-R-R-R-228	96.0	100.5	101.2	104.2	103.5	85.1	91.4	89.2	78.6	82.6	82.4	92.3
BR13027-BC1-3R-109	108.3	102.6	102.1	100.9	97.3	101.3	100	99.5	95.8	101.3	100.7	100.9
BR12421-4R-171	95.1	105.7	93.2	100.5	102.9	84.4	90.5	85.1	95.4	88.2	86.5	93.4
BR12570-5R-146-1	112	99	102.9	99.4	104.9	102.3	100.8	99.3	103.5	96.8	96.1	101.5
BR13027-BC1-3R-102	105.1	95.8	99.5	92.5	103.1	106.6	102.9	101	109.1	103.1	102.7	101.9
BR13027-BC1-3R-164	104.9	102.5	100.7	95.3	103.1	96.6	95.7	89.3	92.7	85.9	85.1	95.6
BR13027-BC1-3R-52	104.9	101.1	103.8	103.8	96.9	94.3	97.9	90.4	94.4	93.4	90.9	97.4
BR12570-5R-33-2	114.9	105.7	98.8	103.7	103.1	102.2	102.6	100.2	104.6	96.3	95.3	102.5
BR13027-BC1-3R-149	106.1	101.5	106.4	100.5	96.8	95.4	96.9	90.3	103.2	91.9	90.7	98.2
BR13026-BC1-3R-209	100.9	103.7	105.3	92.5	102.7	99	101.5	98.2	102.3	98.1	98.9	100.3
BR13027-BC1-3R-108	101.2	96.8	96.3	102.8	103.5	94.1	97.3	87	96.8	91.7	92.5	96.4
BR11894-R-R-R-R-59-Phy	109.6	97.7	105.2	95.5	100.4	-	-	108.4	109.7	111.9	110.2	105.3
BR11894-R-R-R-R-169	109.1	106	103.7	102.6	103	105.5	107.7	101.4	104.9	102.7	102.1	104.4
BRR1 dhan28	103.6	106.5	105.7	94.3	103.5	97.2	95.2	90.6	92.5	97.2	94.5	98.3
BRR1 dhan67	111.2	98.7	105.3	101.8	104.5	104.2	104.8	104.5	111.1	111.5	110.4	106.2
BRR1 dhan102	125.2	106.9	100.9	100.3	104.3	110.7	105.8	104.8	104.2	103.9	104.1	106.5
Range (N=17)	95.1-125.2	95.8-106.9	93.2-106.4	92.4-104.2	96.8-104.9	84.4-110.7	90.5-107.7	85.1-108.4	78.6-11.1	82.6-111.9	82.4-110.4	92.3-106.5
LSD	8.34	8.4	8.83	10.91	3.49	4.16	4.59	6.6	2.05	1.39	1.99	3.32
H ² B (%)	81.2	-	-	-	63.4	92.2	80.8	91.2	98.5	99.3	98.5	89.2

Table 9.7e presents the performance of 17 breeding lines along with three check varieties evaluated across nine environments in Habiganj, Nikli, and Tahirpur under early-sown conditions (23-24 October). Grain yield varied widely across the sites, reflecting the severity of cold stress, with overall means ranging from 2.04 to 4.21 t/ha among the test entries. The medium-duration line BR12570-5R-33-2 recorded the highest mean yield (4.21 t/ha), followed by BR12570-5R-146-1 (3.30 t/ha), both outperforming BRR1 dhan28 (1.43 t/ha) and BRR1 dhan67 (2.06 t/ha), and showing parity with BRR1 dhan102 (3.67 t/ha). Among short-duration entries, BR13027-BC1-3R-109 and BR13027-BC1-3R-52 performed modestly, each yielding just over 2.0 t/ha on average, reflecting greater susceptibility to cold stress. Importantly, BR12570-5R-33-2 stood out as the most stable and superior line across sites, offering more than double the yield advantage over the widely grown check BRR1 dhan28 under these challenging environments, making it a promising candidate for advancement.

Table 9.7e: Growth duration, plant height and yield of the breeding lines tested under early sowing time (23-24 October) in three haor locations in Regional Yield Trial (RYT-1_CS) during Boro 2024-25

Designation	GD (days)	PH (cm)	Grain Yield (t/ha)									
			Hab1	Hab2	Hab3	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Avg
BR11894-R-R-R-R-228	149	85.1	3.95	3.06	3.74	0	0	0	0	0.19	0.64	1.29

Designation	GD (days)	PH (cm)	Grain Yield (t/ha)									
			Hab1	Hab2	Hab3	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Avg
BR13027-BC1-3R-109	151	90.3	3.99	3.4	3.65	0	0.25	1.12	0	4.31	1.63	2.04
BR12421-4R-171	153	88.5	3.28	2.71	3.7	0	0.49	1.47	0.26	2.51	2.19	1.85
BR12570-5R-146-1	155	93.7	3.89	3.06	4.04	1.24	2.13	2.67	2.86	5.57	4.2	3.3
BR13027-BC1-3R-102	155	96.3	3.51	3.57	4.04	0	0	0.79	0	3.01	2.95	1.99
BR13027-BC1-3R-164	151	84.7	3.85	3.47	3.67	0.57	0	1.34	0	2.69	1.81	1.93
BR13027-BC1-3R-52	151	89.7	3.93	3.84	3.81	0.08	0.34	1.73	0.25	2.68	2.24	2.10
BR12570-5R-33-2	157	93.4	3.41	2.62	3.65	6.1	2.97	4.13	3.5	6.36	5.13	4.21
BR13027-BC1-3R-149	157	94.2	4.03	3.44	3.79	0	0.07	1.71	0	4.94	2.88	2.32
BR13026-BC1-3R-209	155	98	2.96	4.08	3.93	0.53	0.09	1.73	1.53	5.27	3.75	2.65
BR13027-BC1-3R-108	155	90.3	3.06	2.79	3.82	0	0.03	1.44	0	5.89	2.46	2.16
BR11894-R-R-R-R-59-Phy	157	89.9	3.33	3.22	3.97	0	0	0.58	0.43	6.32	4.9	2.53
BR11894-R-R-R-R-169	154	95.1	3.79	3.46	3.64	1.2	1.24	4.99	1.99	6.3	4.26	3.43
BRRI dhan28 (ck)	152	92	3.81	3.43	3.59	0	0.09	0.24	0	1.12	0.59	1.43
BRRI dhan67 (ck)	158	98.8	3.76	3.39	4.2	0	0	0.5	0	4.08	2.63	2.06
BRRI dhan102 (ck)	162	93.3	3.52	2.83	3.72	1.11	3.08	3.51	2.96	6.26	6.04	3.67
Range (N=17)	149-162	84.7-98.8	2.96-4.03	2.62-4.08	3.59-4.20	0-6.10	0-3.08	0-4.99	0-3.5	0.19-6.36	0.59-6.04	1.29-4.21
LSD	4.72	6.07	0.87	0.83	0.43	0.41	0.48	0.91	0.29	0.72	0.75	1.13
H ² B(%)	89.4	85.6	-	45.7	16.2	98.4	95	89.5	98.7	97	94.4	84.0

D/S: 24/10/24 (Hab1); 24/10/24 (Hab2); 24/10/24 (Hab3); 23/10/24 (Nik1); 23/10/24 (Nik2); 23/10/24 (Nik3); 24/10/24 (Tah1); 24/10/24 (Tah2); 24/10/24 (Tah3); D/T: 04/12/24 (Hab1); 27/11/24 (Hab2); 14/12/24 (Hab3); 21/11/24 (Nikli1); 23/11/24 (Nik2); 25/11/24 (Nik3); 23/11/24 (Tah1); 05/12/24 (Tah2); 28/11/24 (Tah3).

Table 9.7f summarizes the performance of fourteen advanced breeding lines along three check varieties tested in the Regional Yield Trial (RYT-1) under regular sowing (15-25 November) across 11 environments in three haor regions during Boro 2024–25. Growth duration among entries ranged from 140 to 147 days, with plant height between 92.3 and 106.5 cm, representing desirable medium stature types. Grain yield across locations varied from 4.7 to 6.05 t/ha, highlighting substantial adaptability under regular sown in haor conditions. Among the breeding lines, BR13027-BC1-3R-109 (6.05 t/ha), BR13027-BC1-3R-52 (5.66 t/ha), and BR13027-BC1-3R-149 (5.72 t/ha) consistently outperformed the leading check BRRI dhan28 (4.90 t/ha), with yield advantages of 15–23%. BR11894-R-R-R-R-59-Phy also maintained high stability, averaging 5.67 t/ha across sites. Importantly, these lines showed strong parity with BRRI dhan67 (5.77 t/ha) and BRRI dhan102 (5.59 t/ha), while excelling in certain environments such as Tahirpur and Nikli, where yields exceeded 7.0 t/ha. Overall, the short-duration BC1 derivatives, particularly BR13027-BC1-3R-109, demonstrated high yield potential coupled with early maturity, making them promising candidates for cold-prone haor ecosystems.

Table 9.7f: Yield of the breeding lines tested under regular sowing time (15-25 November) in three haor locations in Regional Yield Trial (RYT-1_NS) during Boro 2024-25

Designation	GD	PH	Grain yield (t/ha)											
			Gaz	Hab1	Hab2	Hab3	Hab4	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Ave
BR11894-R-R-R-R-228	140	92	4.6	4.0	5.4	4.3	3.9	5.0	3.7	6.2	2.3	7.3	5.0	4.7
BR13027-BC1-3R-109	144	100	4.8	6.0	-	5.4	4.8	6.7	5.6	7.1	6.6	8.1	6.2	6.1
BR12421-4R-171	141	93	4.9	6.8	-	5.5	4.9	5.8	5.4	6.8	5.9	5.5	5.0	5.6
BR12570-5R-146-1	144	101	3.6	6.5	4.1	6.1	4.0	5.9	4.8	6.4	6.6	6.9	6.1	5.5
BR13027-BC1-3R-102	141	102	2.6	6.5	4.6	5.5	4.9	6.1	4.9	6.1	-	7.5	-	5.5
BR13027-BC1-3R-164	140	95	5.1	4.9	-	4.3	4.5	5.7	5.2	6.1	5.5	6.7	5.8	5.3
BR13027-BC1-3R-52	140	97	5.2	5.9	-	5.8	4.3	5.5	5.0	6.5	6.4	7.3	5.5	5.7
BR12570-5R-33-2	146	102	3.7	4.8	4.1	5.4	3.9	5.4	4.5	6.3	6.1	6.5	6.7	5.2
BR13027-BC1-3R-149	143	98	4.9	5.0	-	-	3.9	6.8	4.9	6.6	6.6	7.7	6.0	5.7
BR13026-BC1-3R-209	142	100	5.0	4.5	4.7	-	4.3	6.3	4.6	6.4	6.2	6.6	4.3	5.3
BR13027-BC1-3R-108	143	96	4.6	5.7	4.6	4.2	4.0	6.4	5.2	6.6	6.7	7.2	5.6	5.5
BR11894-R-R-R-R-59-Phy	144	105	5.1	4.9	5.3	4.9	4.6	-	-	6.6	6.6	7.0	6.1	5.7
BR11894-R-R-R-R-169	143	104	4.7	5.7	-	4.9	3.7	6.8	5.5	6.9	6.3	6.9	5.8	5.6
BRRI dhan28	140	98	5.0	5.3	4.3	5.3	4.4	5.3	4.1	5.3	4.4	5.4	5.1	4.9
BRRI dhan67	144	106	5.1	5.7	3.9	7.0	3.4	6.7	5.3	6.7	6.2	7.5	6.0	5.8
BRRI dhan102	147	106	4.3	5.9	4.6	5.9	3.8	6.1	4.8	6.6	7.5	6.2	6.0	5.6
Range (N=17)	140-	92-	2.58	4.03-	3.89-	4.20-	3.40-	4.99-	3.69-	5.31-	2.28-	5.41-	4.30-	4.70
	147	106	- 5.19	6.82	5.36	7.02	4.92	6.83	5.12	7.14	7.46	8.07	6.71	- 6.05

Designation	GD	PH	Grain yield (t/ha)											
			Gaz	Hab1	Hab2	Hab3	Hab4	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Ave
LSD	3.63	3.32	0.69	1.26	0.65	1.41	0.85	0.57	0.41	0.7	0.69	0.71	0.46	0.63
H ² B (%)	88.7	89.2	81.4	26.6	84.1	38.2	13.5	76	86.4	23	92.7	78.5	85.2	66.2

D/S: 25/11/24 (Gaz); 04/12/24 (Hab1); 04/12/24 (Hab2); 05/12/24 (Hab3); 05/12/24 (Hab4); 15/11/24 (Nik1); 15/11/24 (Nik2); 15/11/24 (Nik3); 18/11/24 (Tah1); 18/11/24 (Tah2); 18/11/24 (Tah3); D/T: 07/01/25 (Gaz); 09/01/25 (Hab1); 11/01/25 (Hab2); 05/01/25 (Hab3); 14/01/25 (Hab4); 21/12/24 (Nikli1); 23/12/24 (Nik2); 25/12/24 (Nik3); 20/12/24 (Tah1); 28/12/24 (Tah2); 02/01/25 (Tah3).

Fig 9.7b shows that the average temperature from 07 February to 22 February 2025, prevailed between 19.5⁰C – 24.9⁰C with maximum daily temperature of 25.1⁰C-31.7⁰C and from 1 March to 19 March 2025, the average temperature was 22.5⁰C-28.5⁰C with maximum temperature of 27.5⁰C-33.1⁰C at Habiganj site. The breeding lines flowered from 3 March to 19 March 2025 which indicated slight to moderate cold shock during PI stage and slight or no cold stress during booting stage at Habiganj site. At Nikli site, the average temperature during 27 January to 08 February was between 17.0⁰C - 22.1⁰C with maximum daily temperature of 21.0⁰C-25.9⁰C and from 18 February to 03 March, the average temperature was 22.5⁰C-24.9⁰C with maximum temperature of 25.5⁰C-28.2⁰C. The breeding tested under CS condition flowered between 18 February 2025 to 03 March 2025, which suggests that most the lines materials experienced severe to moderate level of cold shock during PI to booting stage. At Tahirpur site, the average temperature during 06 February to 22 February was in between 16.8⁰C – 22.1⁰C with maximum daily temperature of 22.3⁰C-25.8⁰C and from 03 March to 19 March, the average temperature ranged between 21.5⁰C- 25.2⁰C with maximum daily temperature of 25.0⁰C-29.2⁰C. The breeding tested under CS condition flowered from 05 March to 19 March, indicated that breeding lines experienced severe to moderate level of cold shock during PI to booting stage at this site.



Fig 9.7b. The maximum, minimum, and average temperature at the project sites and the flowering window of the breeding lines tested in RYT-2 under cold stress during Boro 2024-25.

In the CS batch of RYT-2, the tested breeding lines showed growth duration of 156-170 days at Habiganj sites, 144-160 days at Nikli sites, and 149-171 days at Tahirpur sites (Table 9.7g). On the other hand, in NS batch they showed growth duration ranging from 137-152 days at Gazipur site, 131 to 143 days at Habiganj sites, 139 to 150 days at Nikli and 146 to 160 days in Tahirpur sites (Table 9.7h).

Table 9.7g: Plant height of the breeding lines tested under early sowing time (23-24 October) in three haor locations in Regional Yield Trial (RYT-2_CS) during Boro 2024-25

Designation	Growth duration (days)									
	Hab1	Hab2	Hab3	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Ave
BR11894-R-R-R-R-59-Haor	158	164	164	151	153	-	166	169	165	161
BR12570-5R-33-2-Haor	157	167	158	149	153	160	163	168	163	160
BR13152-5R-118-Haor	157	166	167	147	149	-	163	166	158	159

Designation	Growth duration (days)									
	Hab1	Hab2	Hab3	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Ave
BR13152-5R-137-Haor	158	166	166	148	150	155	162	165	158	159
BR13152-5R-324-Hab	158	167	166	146	149	156	163	166	160	159
BR13152-5R-333-Gaz	158	167	161	145	150	159	163	167	158	159
BR13152-5R-334-Haor	157	166	167	146	150	155	163	166	159	159
BR13152-5R-377-Hab	157	166	165	146	150	156	161	165	159	158
BR13152-5R-398-Hab	157	166	168	147	150	155	162	164	159	159
BR14001-2R-19-Gaz	156	162	156	145	146	153	163	165	158	156
BR14006-2R-94-Gaz	160	167	164	145	151	156	162	166	157	158
BR14624-4R-204-Gaz	164	167	169	154	159	158	169	171	166	164
IR100722-B-B-B-11	156	160	158	149	149	160	154	158	150	155
IR100722-B-B-B-61	169	-	163	-	-	-	-	-	-	164
BRRRI dhan102	163	170	159	152	156	156	165	170	164	162
BRRRI dhan28	158	157	158	144	148	147	155	160	149	153
BRRRI dhan67	162	-	166	149	152	159	163	164	158	160
Range (N=17)	156-169	157-170	156-169	144-154	146-159	147-160	154-169	158-171	149-166	153-164
LSD	1.86	2.95	2.7	1.99	1.83	3.72	1.29	1.55	1.92	4.92
H ² B (%)	92.1	77.1	89.3	86.9	92.6	73.6	96.5	93.95	95.7	81.3

D/S: 24/10/24 (Hab1); 24/10/24 (Hab2); 24/10/24 (Hab3); 23/10/24 (Nik1); 23/10/24 (Nik2); 23/10/24 (Nik3); 24/10/24 (Tah1); 24/10/24 (Tah2); 24/10/24 (Tah3); D/T: 04/12/24 (Hab1); 28/11/24 (Hab2); 15/12/24 (Hab3); 22/11/24 (Nikli1); 24/11/24 (Nik2); 26/11/24 (Nik3); 24/11/24 (Tah1); 06/12/24 (Tah2); 28/11/24 (Tah3).

Table 9.7h: Growth duration of the breeding lines tested under regular sowing time (15-25 November) in three haor locations in Regional Yield Trial (RYT-2_NS) during Boro 2024-25

Designation	Growth duration (days)										
	Gaz	Hab1	Hab3	Hab4	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Avg
BR11894-R-R-R-59-Haor	146	140	137	140	146	149	150	150	154	153	147
BR12570-5R-33-2-Haor	149	140	136	140	148	149	153	148	153	153	147
BR13152-5R-118-Haor	148	135	137	134	142	146	148	146	153	150	144
BR13152-5R-137-Haor	142	136	137	134	143	146	149	145	154	151	144
BR13152-5R-324-Hab	146	136	-	132	141	-	149	145	153	153	144
BR13152-5R-333-Gaz	144	133	135	133	142	146	148	145	153	149	143
BR13152-5R-334-Haor	145	138	132	134	143	146	146	145	154	150	143
BR13152-5R-377-Hab	148	136	140	133	142	144	146	148	152	150	144
BR13152-5R-398-Hab	145	138	134	133	144	146	146	146	154	150	144
BR14001-2R-19-Gaz	139	134	137	131	139	-	147	141	154	154	142
BR14006-2R-94-Gaz	141	135	139	132	143	146	147	145	152	150	143
BR14624-4R-204-Gaz	151	143	138	140	146	149	153	154	160	155	149
IR100722-B-B-B-11	137	134	134	131	139	142	144	141	147	146	140
IR100722-B-B-B-61	152	140	138	140	147	149	153	150	155	154	148
BRRRI dhan102	152	141	135	140	147	150	154	150	158	155	148
BRRRI dhan28	141	133	133	131	139	141	142	141	147	146	140
BRRRI dhan67	145	138	134	135	143	146	148	145	154	154	144
Range (N=17)	137-152	133-143	132-140	131-140	139-148	141-150	142-154	151-154	147-160	146-155	140-149
LSD	3.1	2.5	2.67	1.41	1.49	1.15	3.23	0.71	1.37	1.59	4.33
H ² B (%)	86.7	83	69.8	95.9	94.2	95.9	91.2	98.9	95.7	90.9	95.9

Plant height of the breeding lines and the check varieties varied across the sowing time in RYT-2. The variety BRRRI dhan28 showed 81.1-99.6 cm with an average of 91.5 cm plant height under CS batch (Table 9.7i), and 90.1-103.7 cm with an average value of 95.9 cm in NS batch (Table 9.7j). The plant height of tested lines ranges from 88.6-114.4 cm in Habiganj site, 77.8-109.1 cm in Nikli site and 89.3-120.9 cm in Tahirpur site whereas 91.5-105.8 cm over the locations under cold stress (CS) conditions (Table 9.7i). In NS batch, plant height of tested lines ranges from 99.0-122.1 cm in Gazipur site, 88.0-107.5 cm in Habiganj site, 86.1-109.3 cm in Nikli site and 90.1-115.5 cm in Tahirpur site whereas 95.9-107.3 cm over the locations under non-stress (NS) conditions (Table 9.7j). The plant height of selected breeding lines BR13152-5R-118-Haor, BR13152-5R-333-Gaz, and BR13152-5R-334-Haor were 101.2 cm (96.3-110.5 cm), 101.6 cm (97.0-105.7 cm), and 102.4 cm (93.0-107.3 cm), respectively (Table 9.7j).

Table 9.7i: Plant height of the breeding lines tested under early sowing time (23-24 October) in three haor locations in Regional Yield Trial (RYT-2_CS) during Boro 2024-25

Designation	Plant height (cm)									
	Hab1	Hab2	Hab3	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Ave
BR11894-R-R-R-R-59-Haor	100.0	105.3	102.1	92.4	83.4	79.9	92.6	93.1	89.7	93.2
BR12570-5R-33-2-Haor	99.0	106.7	96.1	93.2	91.5	83.9	95.3	93.5	92.9	94.7
BR13152-5R-118-Haor	102.7	99.5	102.1	97.9	97.5	88.5	91.3	102.5	101.3	98.1
BR13152-5R-137-Haor	104.1	98.7	106.0	92.5	91.8	88.3	99.5	100.0	93.7	97.2
BR13152-5R-324-Hab	103.4	114.4	104.7	98.9	94.8	85.5	97.7	95.4	91.7	98.5
BR13152-5R-333-Gaz	104.0	108.3	105.9	102.7	94.8	86.9	98.5	109.4	95.1	100.6
BR13152-5R-334-Haor	103.8	111.0	109.3	97.6	99.2	91.0	98.1	104.2	102.5	101.9
BR13152-5R-377-Hab	104.4	104.9	100.5	100.1	96.2	85.2	92.3	101.7	93.0	97.6
BR13152-5R-398-Hab	101.2	103.1	97.9	98.3	93.9	86.6	94.6	105.3	91.5	96.9
BR14001-2R-19-Gaz	100.6	88.6	103.2	91.4	89.1	83.0	98.7	97.8	93.7	94.0
BR14006-2R-94-Gaz	105.0	99.7	105.3	105.7	94.7	94.1	94.3	97.9	99.3	99.6
BR14624-4R-204-Gaz	106.9	99.4	101.7	103.8	109.1	95.1	108.7	120.9	107.1	105.8
IR100722-B-B-B-11	98.5	95.1	101.8	85.4	84.4	77.8	92.2	95.8	92.2	91.5
IR100722-B-B-B-61	95.4	-	102.0	-	-	-	-	-	-	94.0
BRR1 dhan102	103.6	108.6	98.9	96.7	91.6	92.3	96.1	103.6	95.7	98.6
BRR1 dhan28	93.6	89.5	99.6	93.7	93.2	81.1	89.3	91.9	91.7	91.5
BRR1 dhan67	103.4	-	107.2	95.7	91.1	87.7	105.5	103.3	109.7	101.0
Range (N=17)	93.6-106.9	88.6-114.4	96.1-109.3	85.4-105.7	83.4-109.1	77.8-95.1	89.3-108.7	91.9-120.9	89.7-109.7	91.5-105.8
LSD	2.16	9.95	8.65	6.74	5.57	3.34	1.0	3.39	0.85	4.48
H ² B (%)	91.1	52.8	0	59.5	87.9	88.3	99	94.3	99.5	87.1

Table 9.7j: Plant height of the breeding lines tested under regular sowing time (15-25 November) in three haor locations in Regional Yield Trial (RYT-2_NS) during Boro 2024-25

Designation	Plant height (cm)										
	Gaz	Hab1	Hab3	Hab4	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Ave
BR11894-R-R-R-R-59-Haor	106.5	94.3	96.4	103.7	95.3	94.7	86.1	96.9	94.5	96.0	96.4
BR12570-5R-33-2-Haor	102.4	104.1	99.6	99.8	106.0	102.4	99.7	99.8	105.2	102.1	102.1
BR13152-5R-118-Haor	110.5	99.5	99.7	101.6	102.0	102.9	98.7	104.8	96.4	96.3	101.2
BR13152-5R-137-Haor	110.2	105.4	93.0	104.4	100.7	104.5	99	101.9	97.7	95.8	101.3
BR13152-5R-324-Hab	105.7	98.5	NA	104.1	99.0	-	99.6	103.9	111.3	110.1	103.5
BR13152-5R-333-Gaz	103.9	93.9	99.4	98.7	104.3	104.1	97	105.7	105.1	103.4	101.6
BR13152-5R-334-Haor	104.5	101.3	93.0	101.6	107.3	103.8	99.9	103.3	105.0	104.4	102.4
BR13152-5R-377-Hab	101.4	94.8	101.3	102.0	101.3	101.5	96.9	100.7	97.1	93.8	99.1
BR13152-5R-398-Hab	100.2	104.0	89.2	101.0	106.3	105.7	95.3	105.1	106.0	106.4	101.9
BR14001-2R-19-Gaz	101.9	105.0	98.8	101.7	102.0	-	99.6	102.7	111.5	109.6	103.8
BR14006-2R-94-Gaz	115	107.5	96.4	99.3	105.7	104.8	100.9	106.1	106.1	104.3	104.6
BR14624-4R-204-Gaz	122.1	94.8	92.0	103.3	109.3	108.6	104.1	115.5	110.3	112.5	107.3
IR100722-B-B-B-11	99	105.6	98.6	103.0	93.0	98.9	91.1	98.1	95.8	93.9	97.7
IR100722-B-B-B-61	108.5	103.3	93.6	102.2	101.7	98.0	93.7	102.2	105.7	104.3	101.3
BRR1 dhan102	115.9	102.3	96.8	102.9	107.0	105.7	97.9	103.7	101.8	100.2	103.4
BRR1 dhan28	99.0	103.7	88.0	101.8	96.3	97.3	90.7	97.3	95.1	90.1	95.9
BRR1 dhan67	101.2	92.1	88.8	101.3	102.7	105.0	102	114.4	111.9	110.5	103
Range (N=17)	99.0-122.1	92.1-107.5	88.0-101.3	98.7-104.4	93.0-109.3	94.7-108.6	86.1-104.1	96.9-115.5	94.5-111.9	90.1-112.5	95.9-107.3
LSD	6.3	11.62	13.07	2.98	5.03	4.65	5.13	0.63	0.75	1.32	4.36
H ² B (%)	80.5	-	-	10.5	67.8	77.3	73.5	99.6	99.6	99.1	76.7

Table 9.7k summarizes the performance of fourteen advanced breeding lines along three check varieties tested in the Regional Yield Trial (RYT-2) under regular sowing (15-25 November) across 11 environments in three haor regions during Boro 2024-25. Growth duration among entries ranged from 140 to 149 days, with plant height between 95.9 and 107.3 cm, representing desirable medium stature types. Grain yield across locations varied from5.37 to 6.02 t/ha, highlighting substantial adaptability under regular sown in haor conditions. Among the breeding lines, BR13152-5R-333-Gaz (6.02 t/ha), BR13152-5R-334-Haor (5.94 t/ha), and BR13152-5R-118-Haor (5.91 t/ha) consistently outperformed the leading check BRR1 dhan28 (5.37 t/ha), with yield advantages of 10-12%.

Table 9.7k: Yield of the breeding lines tested under regular sowing time (15-25 November) in three haor locations in RYT-2_NS, Boro 2024-25

Designation	GD	PH	Grain yield (t/ha)										
			Gaz	Hab1	Hab3	Hab4	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Avg
BR11894-R-R-R-R-59-Haor	147	96	4.44	4.52	5.25	4.65	6.55	6.61	6.15	7.41	5.65	6.75	5.83
BR12570-5R-33-2-Haor	147	102	3.85	4.83	-	3.65	6.1	6.42	6.09	7.00	5.97	7.05	5.59
BR13152-5R-118-Haor	144	101	4.3	6.08	-	4.15	6.26	6.52	5.78	7.27	5.57	6.95	5.91
BR13152-5R-137-Haor	144	101	4.6	6.25	-	4.39	6.44	6.22	5.95	7.81	5.12	7.27	5.90

Designation	GD	PH	Grain yield (t/ha)										
			Gaz	Hab1	Hab3	Hab4	Nik1	Nik2	Nik3	Tah1	Tah2	Tah3	Avg
BR13152-5R-324-Hab	144	103	4.27	5.57	-	3.92	6.65	-	6.12	6.20	5.80	6.25	5.64
BR13152-5R-333-Gaz	143	101	4.29	5.56	-	4.08	6.89	6.70	6.1	8.31	5.69	7.54	6.02
BR13152-5R-334-Haor	143	102	4.59	5.13	-	3.53	6.83	6.83	6.33	6.52	5.65	7.46	5.94
BR13152-5R-377-Hab	144	99	4.26	6.17	4.09	3.81	6.52	6.87	6.36	6.67	6.24	7.48	5.86
BR13152-5R-398-Hab	144	101	4.13	3.66	5.74	3.81	6.57	6.44	5.38	6.34	6.01	7.52	5.77
BR14001-2R-19-Gaz	142	103	4.31	5.87	-	3.76	5.96	-	6.33	6.19	5.18	6.36	5.70
BR14006-2R-94-Gaz	143	104	4.51	5.37	4.43	3.49	5.93	5.17	5.7	5.19	6.37	7.11	5.66
BR14624-4R-204-Gaz	149	107	4.26	4.06	-	3.93	6.07	5.75	6.55	7.83	6.64	6.93	5.75
IR100722-B-B-B-11	140	97	4.85	5.33	-	3.51	5.23	5.90	5.86	6.54	6.17	6.55	5.55
IR100722-B-B-B-61	148	101	3.74	4.18	-	3.76	5.9	6.24	6.13	8.07	6.18	7.72	5.75
BRRI dhan102	148	103	3.41	4.31	4.87	4.23	5.62	6.25	5.72	7.50	6.10	6.46	5.53
BRRI dhan28	140	95	4.12	4.81	-	4.33	5.09	5.95	5.75	5.23	5.63	6.13	5.37
BRRI dhan67	144	103	4.59	5.49	-	3.88	6.44	6.42	6.73	6.14	5.64	6.84	5.86
Range (N=17)	140-149	95-107	3.41-4.85	3.66-6.25	4.09-5.74	3.49-4.65	5.09-6.89	5.17-6.87	5.38-6.73	5.19-8.31	5.12-6.64	6.13-7.72	5.37-6.02
LSD	4.33	4.36	0.51	1.28	1.09	0.75	0.45	0.51	0.42	0.45	0.6	0.42	0.69
H2B (%)	95.9	76.7	46.3	34.5	49.2	0	80.2	67.2	61.4	93.8	47.3	81.2	-

D/S: 25/11/24 (Gaz); 05/12/24 (Hab1); 05/12/24 (Hab2); 05/12/24 (Hab3); 05/12/24 (Hab4); 17/11/24 (Nik1); 17/11/24 (Nik2); 17/11/24 (Nik3); 18/11/24 (Tah1); 18/11/24 (Tah2); 18/11/24 (Tah3); D/T: 07/01/25 (Gaz); 09/01/25 (Hab1); 11/01/25 (Hab2); 05/01/25 (Hab3); 14/01/25 (Hab4); 22/12/24 (Nikli1); 24/12/24 (Nik2); 26/12/24 (Nik3); 21/12/24 (Tah1); 29/12/24 (Tah2); 30/01/25 (Tah3).

Experiment 9.8: Proposed Variety Trial (PVT), Cold Tolerance Rice (CTR), Boro2024-25

Specific Objective: On-farm evaluation of proposed genotype by the NSB team for recommendation to release as a new variety.

Materials and Methods: The experiment was evaluated at ten locations under administrative control of Seed Certification Agency (SCA). One advanced line BR11894-R-R-R-R-169 along with the standard check BRRI dhan28 and BRRI dhan67 were evaluated in the PVT trials under the development of cold tolerant rice (CTR) program. Thirty-five to forty-five-day-old seedlings were transplanted at a spacing of 20 cm × 20 cm. The plot size was 5.4 m × 20 rows. Two to three seedlings were used for transplanting. BRRI recommended fertilizer doses were applied. Crop management such as weeding, irrigation etc. was done in proper time. Insects and other pests were controlled properly.

Results: The proposed variety BR11894-R-R-R-R-169 (6.77 t/ha, 136 days) produced the 22.83% higher grain yield over the check variety BRRI dhan28 (5.64 t/ha, 133 days) (Table 9.8a) and gave 5.61% higher grain yield over the check variety BRRI dhan67 (6.41 t/ha, 136 days) (Table 9.8b). The grain quality and chemical characteristics are also satisfactory (Table 9.8c and 9.8d).

Table 9.8a: Performance of proposed variety in the Proposed Variety Trial (PVT#CTR) at ten locations in Haor areas during Boro 2024-25

Locations	BR11894-R-R-R-R-169		BRRI dhan28 (Ck)		% Yield advantage than BRRI dhan28*
	GD(days)	Yield (t/ha)	GD(days)	Yield (t/ha)	
BRRI, Habiganj	133	6.99	130	6.02	16.11
Baniachong, Habiganj	132	6.98	129	4.72	47.88
Ajmerigonj, Haiganj	135	6.03	132	5.63	7.10
BINA Sunamganj	144	8.50	140	8.00	6.25
Tahirpur, Sunamganj	145	6.36	139	4.87	30.60
Doarabazar, Sunamganj	145	7.77	142	4.76	63.24
Nasirnagaor,Bramhanbaria	132	5.56	129	4.10	35.61
Sharail, Brahmanbaria	134	5.53	125	5.12	8.01
Khaliajuri, Netrokona	134	6.76	131	6.02	12.29
Nikli, Kishoreganj	134	7.26	131	7.17	1.26
Range	133-145	5.53-8.50	129-140	4.10-8.00	1.26-63.24
Mean	136	6.77	133	5.64	22.83

Table 9.8b: Performance of proposed variety in the Proposed Variety Trial (PVT#CTR) at ten locations in Haor areas during Boro 2024-25

Locations	BR11894-R-R-R-R-169	BRRI dhan67 (Ck)

	GD(days)	Yield (t/ha)	GD(days)	Yield (t/ha)	%Yield advantage than BRRi dhan67
BRRi, Habiganj	133	6.99	135	6.34	10.25
Baniachong, Habiganj	132	6.98	133	6.27	11.32
Ajmerigonj, Haiganj	135	6.03	137	5.75	4.87
BINA Sunamganj	144	8.50	140	9.15	-7.10
Tahirpur, Sunamganj	145	6.36	139	5.66	12.37
Doarabazar, Sunamganj	145	7.77	142	7.74	0.39
Nasirnagaor,Bramhanbaria	132	5.56	134	5.14	8.17
Sharail, Brahmanbaria	134	5.53	130	5.1	8.43
Khaliajuri, Netrokona	134	6.76	136	6.48	4.32
Nikli, Kishoreganj	134	7.26	136	7.02	3.42
Range	133-145	5.53-8.50	130-142	5.10-9.15	-7.10 – 12.37
Mean	136	6.77	136	6.41	5.61

Table 9.8c: Physical properties of the proposed variety BR11894-R-R-R-R-R-169

Designation	Milling Yield (%)	Head Rice (%)	Milled rice length (mm)	Milled rice breadth (mm)	L/B	Size and shape	1000 GW (g)
BR11894-R-R-R-R-169	70	59.1	6.2	2.5	2.5	MB	22.7
BRRi dhan28 (Ck)	70.7	63.3	6.1	2	3.1	MS	22.3
BRRi dhan67 (Ck)	67.7	43.3	5.8	2.2	2.6	MB	21.8

Table 9.8d: Chemical and cooking properties of the proposed variety BR11894-R-R-R-R-R-169

Designation	Amylose (%)	Protein (%)	Cooking time (min)	Elongation ratio (ER)	Imbibition Ratio (IR)	Chalkiness
BR11894-R-R-R-R-169	28.3	9.1	17	1.4	3	Tr
BRRi dhan28 (Ck)	26.9	9.5	16	1.5	3	Tr
BRRi dhan67 (Ck)	22.4	8.9	18	1.4	2.9	Tr

PROJECT 10: DEVELOPMENT OF PIGMENTED RICE WITH NUTRACEUTICAL PROPERTIES

General objective: Development of anthocyanin-enriched, value-added rice genotypes with high yield potential for both rainfed and irrigated ecosystems in Bangladesh.

Project Leader: Sharmistha Ghosal

Season: T. Aman 2024-25

Experiment 10a.1: Hybridization

Principal Investigator: S Maniruzzaman,

Co-Investigators: M R Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Introgression of plant compounds with antioxidant properties including anthocyanin with or without aroma into high yielding genetic background.

Materials and Methods: A total of 18 genotypes were used for crossing (Table 10a.1a). All parents were grown in the hybridization block of the Plant Breeding Division in three staggered plantings, with an interval of seven days, to synchronize flowering between the male and female parents. Fertilizers were applied at the rate of 200 kg urea, 70 kg triple superphosphate (TSP), 80 kg muriate of potash (MoP), 60 kg gypsum, and 5 kg zinc sulfate per hectare during the T. Aman season. Urea was applied in three equal splits at 10-15, 25-30, and 40-45 days after transplanting. The fertilizers other than urea were applied basally during the final land preparation. Other cultural and pest management practices were conducted as needed. Leaf samples were collected from 12 labeled, healthy plants of each parent for QC genotyping using a 10-SNP QC panel. Plants exhibiting unique QC profiles for each parent were subsequently used to make crosses. At flowering, emasculation was performed the day before anthesis using a vacuum emasculator, and the emasculated panicles were then enclosed in glycine bags. Pollination was carried out by dusting pollen from newly anthesized panicles of the male parent onto the emasculated panicle of the female parent.

Results: A total of 20 crosses were made in the T. Aman season of which 1,331 F₁ seeds were produced (Table 10a.1b). The F₁ seeds were threshed, labeled, cleaned, dried, and properly preserved.

Table10a.1a: Parents List for development of pigmented rice with nutraceutical properties, T. Aman 2024-25

Sl No.	Designation	C3G Content	Trait
1	BR11607-4R-192		Xa5+Xa13+Xa21
2	BR11607-4R-72		Xa5+Xa13+Xa21
3	BR11716-4R-102		High yield
4	BR12836-4R-18	361	High antioxidant
5	BR12836-4R-312*	305	High antioxidant
6	BR12836-4R-63*	379	High antioxidant
7	BR12838-4R-89-1*	381	High antioxidant
8	BR12839-4R-106	479	High antioxidant
9	BR12839-4R-106-1	387	High antioxidant
10	BR12839-4R-34-1	459	High antioxidant
11	BR12839-4R-8*	374	High antioxidant
12	IRRI 154 frgl		High aroma
13	Ja Hua		High yield
14	Lal Binni		High antioxidant and Zn
15	BRRI dhan102		High yield
16	Black Rice-09 (GQN)		High antioxidant
17	Black Rice-10 (GQN)	780	Very high antioxidant
18	Black Rice-11 (GQN)	800	Very high antioxidant

DS: 31/07/2024-08/08/2024 DT: 22/08/2024-08/09/2024

Table 10a.1b: List of crosses made for development of pigmented rice with nutraceutical properties, T. Aman 2024-25

SLNo.	BR No.	Parentage	F1's seeds
1	BR16752	BR12839-4R-106/BR11607-4R-72	75
2	BR16753	BR12839-4R-106/BRRI dhan49	17
3	BR16754	BR12838-4R-89-1*/BR12839-4R-106	170
4	BR16755	BR12836-4R-312*/BR11607-4R-192	10
5	BR16756	BR12839-4R-34-1/IRRI 154 frgl	119
6	BR16757	BR12839-4R-34-1/BR11607-4R-72	12
7	BR16758	BR12836-4R-63*/BRRI dhan102	90
8	BR16759	BR13755-5R-14/BR12839-4R-34-1	35
9	BR16764	BR12839-4R-124-2/BR11607-4R-192	30
10	BR16765	BR9392-6-2-3B-PS2/BR12839-4R-106	20
11	BR16766	BR9392-6-2-3B-PS2/BR12839-4R-34-1	285
12	BR16767	BR12839-4R-106/BR11607-4R-192	18
13	BR16768	BR12836-4R-63/BR11607-4R-192	266
14	BR16769	BR12839-4R-106/IR20*1002:IRRI154+PI9+Hd9(N22)	95
15	BR16770	BRRI dhan89/Black Rice-10 (GQN)//BRRI dhan89	14
Total			1,331

Experiment 10a.2: Confirmation of F₁s

Principal Investigator: S Maniruzzaman,

Co-Investigators: M R Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Confirmation of F₁s as true crosses and selection of promising ones.

Materials and Methods: A total of 31 single crosses, along with their respective parents, were grown. F₁ seeds of each cross and their respective parents were germinated in petri dishes and then sown in earthen pots. Thirty to thirty-five days old seedlings were transplanted at the rate of a single seedling at a spacing of 25 cm x 20 cm. Respective parental seedlings were transplanted on both sides of each F₁ population. Crop management was done as described in Experiment 10a.1. The leaf samples were collected from each of the 12 plants from each cross and respective parents for QC genotyping to determine true F₁. QC genotyping was performed using 10-SNP QC panel at Intertek, Australia. Genotyping results were analyzed using Flapjack, a genotyping visualization tool. After confirmation, promising F₁s were selected. The F₂ seeds obtained from each cross were labeled, cleaned, dried, and preserved properly.

Results: Twenty-seven out of 31 crosses were confirmed and selected as true hybrids (Table 10a.2).

Table 10a.2: List of confirmed F₁, through QC SNP panel for development of pigmented rice with nutraceutical properties, T. Aman 2024-25

Sl No.	BR No.	Parentage	Type
1	BR16369	BRRI dhan89/BR12839-4R-106	single cross
2	BR16370	BRRI dhan108/BR12839-4R-106	single cross
3	BR16371	BRRI dhan102/BR12839-4R-106	single cross
4	BR16372	BRRI dhan89/BR12839-4R-34-1	single cross
5	BR16373	BRRI dhan89/BR12839-4R-157-2	single cross
6	BR16374	BRRI dhan108/BR12839-4R-5-2	single cross
7	BR16375	BRRI 43R/BR12839-4R-106	single cross
8	BR16376	BRRI 45R/BR12839-4R-106	single cross
9	BR16377	BRRI 47R/BR12839-4R-106	single cross
10	BR16378	BR11318-5R-63/BR12839-4R-106	single cross
11	BR16379	BRRI dhan102/BR12839-4R-34-1	single cross
12	BR16380	BR12520-5R-67/BR12839-4R-34-1	single cross
13	BR16381	BRRI dhan89/BR12839-4R-5-2	single cross
14	BR16382	BRRI dhan89/BR12838-4R-89-1a	single cross
15	BR16383	BRRI dhan108/BR12838-4R-89-1a	single cross
16	BR16384	BRRI dhan102/BR12839-4R-5-2	single cross
17	BR16385	BR11318-5R-84/BR12839-4R-5-2	single cross
18	BR16386	BRRI dhan89/BR12839-4R-137	single cross
19	BR16387	BRRI 43R/BR12839-4R-34-1	single cross
20	BR16388	BR11607-4R-72/BR12839-4R-34-1	single cross
21	BR16389	BR11318-5R-63/BR12839-4R-34-1	single cross
22	BR16390	BRRI dhan102/BR12838-4R-89-1a	single cross
23	BR16391	BR11318-5R-84/BR12838-4R-89-1a	single cross
24	BR16392	BRRI dhan89*2/Black Rice-10 (GQN)	Backcross
25	BR16393	BRRI dhan108/Black Rice-10 (GQN)	single cross
26	BR16394	BRRI dhan89*2/Black Rice-11 (GQN)	Backcross
27	BR16395	BR11607-4R-72/Black Rice-11 (GQN)	single cross

Experiment 10a.3: Rapid Generation Advance (RGA)

Principal Investigator: S Maniruzzaman,

Co-Investigators: M R Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Rapid advancement of segregating population for shortening the breeding cycle and development of large RIL populations.

Materials and Methods: In the T. Aman season, a total of 28 F₂, 22 F₃, six F₄, and 23 F₅ populations were grown (Table 10a.3). Single-seed progenies from a single panicle of one plant were grown in the RGA nursery in the field. The panicle was sown directly on the soil. No thinning or pruning was done. Fertilizer management was done using half of the dosages described in Expt. 10a.1. Appropriate pest management practices were carried out as and when necessary. During harvesting at maturity, one panicle was collected from each plant of all the crosses at different times, and the other plants were uprooted. Harvested seeds remaining in the panicles were dried and subjected to dormancy breakage to initiate the next cycle of RGA. For dormancy breaking, at first, sun-drying was done for three days, followed by oven drying at 50°C for 72 hours.

Results: A total of 26,694 progenies were advanced through Rapid Generation Advance (RGA) from 80 crosses. This included 12,808 progenies from 28 F₂ crosses, 8,714 progenies from 22 F₃ crosses, 1,361 progenies from six F₄ crosses, and 3,819 progenies from 23 F₅ crosses (Table 10a.3). The harvested panicles were labeled, dried and preserved properly.

Table 10a.3: List of F₂, F₃, F₄, and F₅ populations advanced through RGA for development of pigmented rice with nutraceutical properties, T. Aman 2024-25

SN	BR No.	Parentage	Progenies grown	Progenies harvested
F₂ Population				
1	BR16341	Ja Hua/BR12839-4R-106	1050	395
2	BR16342	Ja Hua*2/BR12839-4R-34-1	1050	149
3	BR16343	Ja Hua/BR12836-4R-312*	1050	384
4	BR16344	Ja Hua/BR12839-4R-185*	1050	523
5	BR16345	BRRI dhan103/BR12836-4R-312*	1050	782
6	BR16346	BRRI dhan103/BR12839-4R-106	1050	453
7	BR16347	BRRI dhan89*/Black Rice -10 (GQN)	1050	0

SN	BR No.	Parentage	Progenies grown	Progenies harvested
8	BR16348	BRRI dhan89*/Black Rice -11 (GQN)	1050	0
9	BR16349	BR11712-4R-218/BR12839-4R-185*	1050	678
10	BR16350	BR11712-4R-218/BR12836-4R-18*	1050	711
11	BR16351	BR11712-4R-218/BR12839-4R-137	1050	705
12	BR16352	BR11712-4R-227/BR12839-4R-157-2	1050	456
13	BR16353	BR11712-4R-227/BR12839-4R-34-1	1050	593
14	BR16354	BR9674-8-15-3-28-P3 (Zn)/China70(Acc.7170)	1050	732
15	BR16355	BR9674-8-15-3-28-P3 (Zn)/Black Rice (Acc 4968)	1050	628
16	BR16356	BR9674-8-15-3-28-P3 (Zn)/BR12839-4R-185*	1050	593
17	BR16357	BR10571-15-6-8-5 (Zn)/BR12836-4R-18*	1050	504
18	BR16358	BR10571-15-6-8-5 (Zn)/BR12839-4R-137	1050	583
19	BR16359	BRRI 43R/BR12839-4R-76	1050	765
20	BR16360	BRRI 45R/BR12839-4R-34-1	1050	639
21	BR16361	BRRI 47R/BR12839-4R-34-1	1050	607
22	BR16362	Barsha dhan/BR12839-4R-34-1	1050	286
23	BR16363	ACI dhan1/BR12838-4R-89-1*	1050	554
24	BR16364	ACI dhan1/BR12839-4R-185*	1050	280
25	BR16365	BR11712-4R-227/BR12839-4R-76	1050	331
26	BR16366	Barsha dhan/ BR12839-4R-89-1	1050	218
27	BR16367	Barsha dhan/ BR12839-4R-157-2	1050	259
28	BR16368	Barsha dhan/ BR12839-4R-106	1050	65
Sub Total			29,400	12,873
F ₃ Population				
1	BR15730	BR1137-5R-140/ Black Rice (Acc 4968)	1088	433
2	BR15731	BR1137-5R-140 / BR12836-4R-312*	884	581
3	BR15732	IR18A1398/ BR12839-4R-51*-	816	439
4	BR15733	BR11712-4R-227/ Black Rice -10 (GQN)	748	348
5	BR15734	BR11712-4R-227/ Black Rice -11 (GQN)	476	237
6	BR15735	BR9674-1-1-5-1P3 (Zn)/ BR12836-4R-312*	884	453
7	BR15736	BR9674-1-1-5-1P3 (Zn)/ BR12839-4R-51*-	952	183
8	BR15737	BR9674-8-15-3-28-P3 (Zn)/ BR12839-4R-138-4	748	407
9	BR15738	BR9674-8-15-3-28-P3 (Zn)/ BR12839-4R-73	680	374
10	BR15739	BR9674-8-15-3-28-P3 (Zn)/ BR12835-4R-142	816	572
11	BR15740	BR11315-5R-17-52/ BR12836-4R-312*	816	735
12	BR15741	BRRI 45R/ BR12836-4R-18	748	434
13	BR15742	BRRI 47R/ BR12839-4R-157-2	748	409
14	BR15743	IR19L1046/BR12839-4R-157-2	748	300
15	BR15744	BRRI dhan89/ BR12839-4R-157-2	680	398
16	BR15745	BRRI dhan89/ BR12836-4R-312*	714	296
17	BR15746	BR10571-15-6-8-5 (Zn)/ BR12839-4R-157-2	748	308
18	BR15747	BR10571-15-6-8-5 (Zn)/ BR12836-4R-312*	816	0
19	BR15748	BR10571-15-6-8-5 (Zn)/ BR12835-4R-142	816	235
20	BR15749	BR 11-9-11-4-5B/ BR12836-4R-63	884	315
21	BR15750	Purple rice/ BR12839-4R-21	816	382
22	BR15751	BR12835-4R-142/ BR11712-4R-227	748	415
23	BR15752	BR12835-4R-142/BR12835-4R-218	748	460
Sub Total			18,122	8,714
F ₄ Population				
1	BR15336	BR9674-1-1-5-1P3/BR12839-4R-93	476	237
2	BR15337	IR17A1694/BR12839-4R-90-1	476	242
3	BR15339	BR12839-4R-90-1/BRRI dhan87	306	112
4	BR15340	BR12839-4R-93/BRRI dhan87	442	212
5	BR15342	BR12839-4R-157/ BRRI dhan90	442	262
6	BR15347	BR12839-4R-157/ BRRI dhan87	578	296
Sub Total			2,720	1,361
F ₅ Population				
1	BR14902	Pusa Basmati/Black rice (Sylhet)*	408	177
2	BR14903	FBR-376/Black rice (Sylhet)*	102	85
3	BR14904	Nania/Black rice (Sylhet)*	272	200
4	BR14905	IR99285-1-1-1-P2 (Zn)/Black rice (Sylhet)*	170	118
5	BR14906	BR11716-4R-172/Black rice (Sylhet)*	170	150
6	BR14908	BR9930-2-3-2-2 (PQR Boro)/Black rice (Sylhet)*	340	150
7	BR14910	Nania/Black Rice (Acc.8096)	374	203
8	BR14912	BR11716-4R-172/Black Rice (Acc.8096)	170	168
9	BR14913	BR11712-4R-227/Black Rice (Acc.8096)	102	62
10	BR14916	BR8862-29-1-5-1-5/ Black Rice (Acc.8096)	136	73
11	BR14919	BRRI dhan90/ China70 (Acc.7170)	136	110
12	BR14920	BRRI dhan92/ China70 (Acc.7170)	170	90
13	BR14921	BRRI dhan50/China70 (Acc.7170)	102	29
14	BR14922	IRRI 154 frg1/ China70 (Acc.7170)	149	106
15	BR14923	IR99285-1-1-1- P2/China70 (Acc.7170)	238	183
16	BR14925	China70 (Acc.7170)/ BR11716-14-172	714	402

SN	BR No.	Parentage	Progenies grown	Progenies harvested
17	BR14926	China70 (Acc.7170)/ FBR-376	204	167
18	BR14927	China70 (Acc.7170)/ BR11712-4R-227	782	432
19	BR14928	Black rice Sylhet/ BRRI dhan90	306	210
20	BR14929	BR8862-29-1-5-1-3/ Black rice (Sylhet)	408	239
21	BR14930	IRRI 154 frg1/Black rice (Indonesia)	340	212
22	BR14932	BR11712-4R-227/ Black rice (Indonesia)	306	183
23	BR14934	Begunidhan/Black rice (Sylhet)	136	70
Sub Total			6,235	3,819
Grand Total			56,477	26,694

DS: 25/06/2025

Experiment 10a.4: Line Stage Testing (LST)

Principal Investigator: S Maniruzzaman,

Co-Investigators: M R Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Selection of uniform pigmented genotypes in terms of uniformity in flowering, plant height, amylose content with higher predicted yield with key target traits.

Materials and Methods: In the T. Aman season, a total of 2,167 fixed pigmented advanced lines from ten crosses were grown in 12-hills single-row plots using a systematic arrangement design with respective parents and check varieties. Twenty-five to thirty-day-old single seedlings were transplanted at 20 cm × 20 cm spacing. Fertilizer management was done following the dosages described in Expt. 10a.1. Crop management was done as recommended for modern rice cultivation practices.

Results: In T. Aman, 196 fixed lines from 2,167 fixed lines were selected from 10 crosses of LST (Table 10a.4a) based on phenotypic acceptance, uniformity in flowering, plant height, grain size and shape, lodging tolerance, pigmentation, key trait markers and presence of higher predicted yield. The traits markers of some of the selected lines are shown in Table 10a.4b.

Table 10a.4a: List of LST grown for development of pigmented rice with nutraceutical properties, T. Aman 2024-25

SNBR No.	Cross Combination	Progenies grown	Progenies selected
1	BR14563 BRRI dhan90/Black rice (PKSF)	294	53
2	BR14564 BRRI dhan99/PadiBungi	218	6
3	BR14565 BRRI dhan100/Padichelam	387	9
4	BR14567 BRH11-9-11-45B-HR3/Black rice (Sylhet)*	111	32
5	BR14568 Ja Hua/Black rice (Sylhet)*	142	16
6	BR14571 BRRI dhan90/ Black rice (Sylhet)*	387	41
7	BR14572 BR8882-30-2-5-2/ Black rice (Sylhet)*	306	22
8	BR14574 BRRI dhan81/ Black rice (Sylhet)*	170	11
9	BR13309 Noyonmoni-2/BR8535-2-1-2	26	1
10	BR14188 BR8493-3-5-1-P1/ Pusa Basmati	126	5
Total		2,167	196

DS: 24/06/2024 DT: 15/08/2024

Table 10a.4b. List of some superior fixed lines with key trait markers selected from LST populations, Pigmented rice, T. Aman 2024-25

Sl	Designation	Trait markers	Sl	Designation	Trait markers
1	BR14563-4R-102	Wx(a), DTH8	13	BR14563-4R-158	Wx(a), DTH8
2	BR14563-4R-106	Wx(a), DTH8	14	BR14563-4R-162	Wx(a)-NB, DTH8
3	BR14563-4R-113	Wx(a)-NB, DTH8	15	BR14563-4R-168	Wx(a), DTH8
4	BR14563-4R-125	Wx(a)-NB, DTH8	16	BR14563-4R-173	Wx(a)-NB, DTH8
5	BR14563-4R-131	Wx(a), DTH8	17	BR14563-4R-178	Wx(a), DTH8
6	BR14563-4R-137	Wx(a)-NB, DTH8	18	BR14563-4R-183	Wx(a), DTH8
7	BR14563-4R-139	Wx(a)-NB, DTH8	19	BR14563-4R-189	Wx(a)-NB, DTH8
8	BR14563-4R-142	Wx(a)-NB, DTH8	20	BR14563-4R-193	Wx(a)-NB, DTH8
9	BR14563-4R-145	Wx(a)-NB, DTH8	21	BR14563-4R-197	Wx(a), DTH8
10	BR14563-4R-149	Wx(a), DTH8	22	BR14563-4R-199	Wx(a) Pita, DTH8
11	BR14563-4R-154	Wx(a)-NB, DTH8	23	BR14563-4R-201	Wx(a), DTH8
12	BR14563-4R-157	Wx(a)-NB, DTH8	24	BR14563-4R-202	Wx(a), DTH8

Sl	Designation	Trait markers
25	BR14563-4R-214	Wx(a)-NB, DTH8
26	BR14563-4R-218	Wx(a)-NB, DTH8
27	BR14563-4R-22	Wx(a), DTH8
28	BR14563-4R-224	Wx(a),fgr-1,DTH8
29	BR14563-4R-23	Wx(a), DTH8
30	BR14563-4R-232	Wx(a)-NB, DTH8
31	BR14563-4R-24	Wx(a)-NB, DTH8
32	BR14563-4R-257	Pita, DTH8
33	BR14563-4R-259	Wx(a)-NB, DTH8
34	BR14563-4R-27	Wx(a)-NB, DTH8
35	BR14563-4R-278	Wx(a), DTH8
36	BR14563-4R-279	Wx(a)-NB, DTH8
37	BR14563-4R-283	Wx(a)-NB, DTH8
38	BR14563-4R-290	Waxy, DTH8
39	BR14563-4R-35	Wx(a)-NB, DTH8
40	BR14563-4R-36	Wx(a)-NB, DTH8
41	BR14563-4R-38	Wx(a)-NB, DTH8
42	BR14563-4R-61	Wx(a), DTH8
43	BR14563-4R-68	Wx(a)-NB, DTH8
44	BR14563-4R-75	Wx(a), DTH8
45	BR14563-4R-81	Wx(a), DTH8
46	BR14563-4R-94	Wx(a)-NB, DTH8
47	BR14563-4R-96	Wx(a)-NB, DTH8
48	BR14564-4R-106	Wx(a) Pita fgr-1, DTH8
49	BR14564-4R-114	Wx(a), Pita, DTH8
50	BR14564-4R-21	Wx(a), Pita, DTH8
51	BR14564-4R-42	Wx(a), DTH8
52	BR14564-4R-87	Wx(a), Pita, DTH8
53	BR14564-4R-99	Wx(a) Pita fgr-1, DTH8
54	BR14565-4R-133	Waxy
55	BR14565-4R-387	Wx(a) Pita, DTH8
56	BR14565-4R-69	Wx(a), Pita, DTH8
57	BR14565-4R-71	Wx(a) fgr-1
58	BR14565-4R-74	Wx(a) Pita, DTH8
59	BR14567-4R-1	Wx(a) Pita, DTH8
60	BR14567-4R-101	Wx(a)/Wx(int),fgr-1
61	BR14567-4R-103	Wx(a) Pita, DTH8
62	BR14567-4R-109	Wx(a) Pita fgr-1, DTH8
63	BR14567-4R-17	Wx(a) Pita fgr-1, DTH8
64	BR14567-4R-21	Wx(int),Pita, DTH8
65	BR14567-4R-22	Wx(a), Pita, DTH8
66	BR14567-4R-25	Wx(a) Pita fgr-1, DTH8
67	BR14567-4R-32	Wx(a) Pita fgr-1, DTH8
68	BR14567-4R-4	Wx(a) Pita, DTH8
69	BR14567-4R-42	Wx(a),Pita fgr-1,DTH8
70	BR14567-4R-45	Wx(a) fgr-1, DTH8
71	BR14567-4R-46	Wx(a) Pita
72	BR14567-4R-48	Wx(a) Pita fgr-1, DTH8
73	BR14567-4R-52	Wx(a) Pita fgr-1, DTH8
74	BR14567-4R-57	Wx(a) Pita, DTH8
75	BR14567-4R-60	Wx(a), Pita, DTH8
76	BR14567-4R-64	Wx(a), Pita, DTH8
77	BR14567-4R-68	Wx(a) Pita, DTH8
78	BR14567-4R-7	Pita fgr-1, DTH8
79	BR14567-4R-71	Wx(a)-NB, DTH8
80	BR14567-4R-73	Pita, DTH8
81	BR14567-4R-77	Wx(a), Pita, DTH8
82	BR14567-4R-78	Wx(a)/Wx(int), DTH8
83	BR14567-4R-82	Wx(a), Pita, DTH8
84	BR14567-4R-85	Wx(a) Pita
85	BR14567-4R-88	Wx(a), Pita, DTH8
86	BR14567-4R-9	Wx(a), Pita, DTH8
87	BR14567-4R-94	Wx(a), Pita, DTH8
88	BR14567-4R-99	Wx(a) fgr-1

Sl	Designation	Trait markers
89	BR14568-4R-107	Wx(a) Pita, DTH8
90	BR14568-4R-112	Wx(a) Pita fgr-1
91	BR14568-4R-114	Wx(a) Pita fgr-1, DTH8
92	BR14568-4R-116	Wx(a) fgr-1
93	BR14568-4R-121	Pita, fgr-1, DTH8
94	BR14568-4R-126	wx(b) Pita fgr-1, DTH8
95	BR14568-4R-130	wx(b) Pita fgr-1
96	BR14568-4R-134	wx(b)
97	BR14568-4R-2	Wx(a)-NB, DTH8
98	BR14568-4R-21	Wx(a), Pita, DTH8
99	BR14568-4R-40	Pita, fgr-1, DTH8
100	BR14568-4R-41	Wx(a), Pita, DTH8
101	BR14568-4R-43	Pita fgr-1
102	BR14568-4R-45	Wx(a), DTH8
103	BR14568-4R-94	Wx(a) Pita
104	BR14571-4R-10	Wx(a), fgr-1
105	BR14571-4R-113	Wx(a), DTH8
106	BR14571-4R-114	Wx(a), fgr-1, DTH8
107	BR14571-4R-123	Wx(a) Pita fgr-1, DTH8
108	BR14571-4R-128	Wx(a) Pita fgr-1
109	BR14571-4R-131	Wx(a), Pita, DTH8
110	BR14571-4R-14	Wx(a), Pita, DTH8
111	BR14571-4R-16	Pita, DTH8
112	BR14571-4R-162	Wx(a), Pita, DTH8
113	BR14571-4R-163	Wx(a), Pita, DTH8
114	BR14571-4R-217	Wx(a) Pita
115	BR14571-4R-222	Wx(a), Pita, DTH8
116	BR14571-4R-228	Wx(a) Pita
117	BR14571-4R-240	Wx(a) Pita fgr-1, DTH8
118	BR14571-4R-245	Wx(a), DTH8
119	BR14571-4R-253	Wx(a), DTH8
120	BR14571-4R-260	Wx(a), DTH8
121	BR14571-4R-266	Wx(a), DTH8
122	BR14571-4R-274	Wx(a) Pita fgr-1, DTH8
123	BR14571-4R-309	Wx(a) Pita fgr-1, DTH8
124	BR14571-4R-311	[Wx(a)/Wx(int), DTH8
125	BR14571-4R-314	Wx(a) fgr-1, DTH8
126	BR14571-4R-328	Wx(a), DTH8
127	BR14571-4R-329	Wx(a) fgr-1, DTH8
128	BR14571-4R-33	Wx(a), DTH8
129	BR14571-4R-34	Wx(a), Pita, DTH8
130	BR14571-4R-344	Wx(a) Pita fgr-1, DTH8
131	BR14571-4R-345	Wx(a), DTH8
132	BR14571-4R-346	Wx(a), Pita, DTH8
133	BR14571-4R-366	Wx(a), DTH8
134	BR14571-4R-387	Pita, DTH8
135	BR14571-4R-45	Wx(a)
136	BR14571-4R-47	Wx(a), DTH8
137	BR14571-4R-56	Wx(a) fgr-1, DTH8
138	BR14571-4R-68	Wx(a) fgr-1
139	BR14571-4R-70	Wx(a) fgr-1
140	BR14571-4R-82	Wx(a), Pita, DTH8
141	BR14571-4R-95	Wx(int),Pita, DTH8
142	BR14572-4R-135	Wx(int)-Basmati
143	BR14572-4R-157	Wx(int), Pita, DTH8
144	BR14572-4R-198	Wx(a) Pita fgr-1, DTH8
145	BR14572-4R-2	Wx(a) Pita, DTH8
146	BR14572-4R-201	Wx(int), DTH8
147	BR14572-4R-207	Pita fgr-1, DTH8
148	BR14572-4R-217	Wx(a) fgr-1
149	BR14572-4R-22	Wx(a), DTH8
150	BR14572-4R-226	Wx(int), fgr-1, DTH8
151	BR14572-4R-227	Wx(a)
152	BR14572-4R-233	Wx(a) fgr-1, DTH8

Sl	Designation	Trait markers	Sl	Designation	Trait markers
153	BR14572-4R-255	fgr-1, DTH8	164	BR14574-4R-101	Wx(a)-NB, fgr-1, DTH8
154	BR14572-4R-279	Wx(a)	165	BR14574-4R-114	Waxy
155	BR14572-4R-294	Wx(a), DTH8	166	BR14574-4R-135	Wx(a)-NB,fgr-1, DTH8
156	BR14572-4R-295	Wx(int), DTH8	167	BR14574-4R-136	Wx(a), DTH8
157	BR14572-4R-55	Wx(int)-Basmati Pita	168	BR14574-4R-142	Wx(a)NB,Pita,fgr1,DTH8
158	BR14572-4R-56	Wx(a) Pitafr-1, DTH8	169	BR14574-4R-17	Wx(a)
159	BR14572-4R-58	Wx(int),Pitafr-1,DTH8	170	BR14574-4R-59	fgr-1, DTH8
160	BR14572-4R-63	Wx(int)-Basmati	171	BR14574-4R-77	Wx(a)-NB, fgr-1, DTH8
161	BR14572-4R-73	Wx(a) Pita	172	BR14574-4R-86	Wx(a)-NB, fgr-1
162	BR14572-4R-84	Wx(a), DTH8	173	BR14574-4R-97	Wx(a)-NB, DTH8
163	BR14574-4R-1	Wx(a)-NB,fgr-1, DTH8			

Experiment 10a.5: Observational Yield Trial (OYT)

Principal Investigator: S Maniruzzaman.

Co-Investigators: M R Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Selection of materials with better phenotypic acceptance, homogeneity in the population, shorter growth duration, and higher yield potential with higher nutraceutical value than the standard check varieties.

Materials and Methods: A total of 156 genotypes, along with four checks, were evaluated in an Augmented RCB design with four replications. Thirty-day-old seedlings were transplanted at a spacing of 20 cm × 20 cm using a single seedling/hill. The plot size was 3.2m². Fertilizers were applied as described in experiment 10a.1. Crop management was carried out as and when necessary.

Results: A total of 16 genotypes were selected out of 156 genotypes based on homogeneity in the population, phenotypic acceptance, plant type, grain type, presence/absence of aroma, black pigmentation, and higher yield. The yield ranged from 1.65 to 5.33 t/ha with a growth duration of 112 to 136 days. The genotype BR13941-4R-156 produced the highest yield of 4.35 t/ha with a growth duration of 127 days, while the standard check, BRRI dhan87, yielded 3.89 t/ha with a 126-day growth duration (Table 10a.5). The heritability obtained for the plant height, growth duration and yield were 67%, 99% and 54%, respectively, indicating high level of precision in this experiment (Table 10a.5).

Table 10a.5: Performance of the genotypes of Observational Yield Trial for development of pigmented rice with nutraceutical properties, T. Aman 2024-25

Entry	Designation	GD(days)	PH(cm)	Yield(t/ha)	Remarks
1	BR13941-4R-156	127	136	4.35	Black Pericarp
2	BR13941-4R-80	123	134	4.06	Black Pericarp
3	BR13940-4R-76	124	128	3.81	Black Pericarp
4	BR13941-4R-146	125	130	3.75	Black Pericarp
5	BR13940-4R-40	128	125	3.7	Black Pericarp
6	BR13941-4R-159	126	138	3.67	Black Pericarp
7	BR13940-4R-69	126	117	3.57	Black Pericarp
8	BR13941-4R-38	127	126	3.49	Black Pericarp
9	BR13940-4R-29	121	126	3.37	Black Pericarp
10	BR13940-4R-19	134	121	3.36	Black Pericarp
11	BR13941-4R-24	123	117	3.27	Black Pericarp
12	BR13941-4R-138	127	118	3.27	Black Pericarp
13	BR13941-4R-132	136	129	3.22	Black Pericarp
14	BR13940-4R-6	135	128	3.11	Black Pericarp
15	BR13941-4R-25	121	130	3.09	Black Pericarp
16	BR13941-4R-81	133	121	3.06	Black Pericarp
Ck1	BRRI dhan87	126	129	3.89	
Ck2	BRRI dhan80	127	126	3.67	
P value		***	*	*	
LSD (0.05)		0.74	9.19	0.55	
H2b (%)		99	67	54	

DS: 14/07/2024

DT: 06/08/2024

Experiment 10a.6: Preliminary Yield Trial#1 (PYT#1)

Principal Investigator: S Maniruzzaman,

Co-Investigators: M R Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Selection of materials with better phenotypic acceptance, homogeneity in the population, shorter growth duration, and higher yield potential with higher nutraceutical value than the standard check varieties.

Materials and Methods: A total of 23 genotypes along with two checks were evaluated in RCB design with two replications. Thirty days old seedlings were transplanted at a spacing of 20 cm × 20 cm using single seedling/hill. The plot size was 6.72m². Fertilizers were applied as described in experiment 10a.1. Crop management was carried out as and when necessary.

Results: A total of five genotypes were selected out of 23 genotypes based on homogeneity in the population, phenotypic acceptance, plant type, grain type, presence/absence of aroma, black pigmentation and higher yield. The yield ranged from 2.09 to 3.4 t/ha with a growth duration of 122 to 143 days. The highest yielding genotype was BR12839-4R-153-1 (3.4 t/ha) with duration of 132 days followed by the genotype BR12839-4R-92-1 giving 3.17 t/ha yield (Table 10a.6). The heritability obtained for the plant height, growth duration and yield were 96%, 84% and 90%, respectively, indicating high level of precision in this experiment (Table 10a.6).

Table 10a.6: Performance of the selected genotypes of Preliminary Yield Trial#1 (PYT#1) for development of pigmented rice with nutraceutical properties, T. Aman 2024-25

SL No	Designation	GD(days)	PH (cm)	Yield(t/ha)	Remarks
1	BR12839-4R-153-1	132	105	3.4	Black Pericarp
2	BR12839-4R-92-1	133	117	3.17	Black Pericarp
3	BR12839-4R-117*	135	116	3.17	
4	BR12839-4R-103a	138	112	3.15	
5	BR12839-4R-141-1*	137	119	2.89	Black Pericarp
6	BR12837-5R-27	137	102	2.57	Black Pericarp
7	BR12837-5R-55	143	108	2.41	Black Pericarp
Ck1	BRRI dhan87	128	120	4.34	
Ck2	BRRI dhan49	128	107	4.03	
LSD (0.05)		2.28	7.65	0.48	
H2b (%)		96	84	90	

DS: 14/07/2024 DT: 08/08/2024

Experiment 10a.7: Preliminary Yield Trial #2 (PYT#2)

Principal Investigator: S Maniruzzaman,

Co-Investigators: M R Islam, S T Tuba, A Rahman, M M Yasmin, and K M Iftekharuddaula

Specific objective: Selection of materials with better phenotypic acceptance, homogeneity in the population, shorter growth duration, and higher yield potential with higher nutraceutical value than the standard check varieties.

Materials and Methods: A total of 13 advanced black rice genotypes along with two checks were evaluated in RCB design with two replications. Thirty days old seedlings were transplanted at a spacing of 20 cm × 20 cm using single seedling/hill. The plot size was 4 m × 8 rows. Fertilizers were applied as described in experiment 10a.1. Crop management was carried out as and when necessary.

Results: Nine genotypes were selected out of thirteen genotypes. The genotype BR12839-4R-124-2-P1a_Bold produced highest yield of 4.82 t/ha with a duration of 125 days followed by the genotype BR12839-4R-124-2-P1a_49 type giving a yield of 4.11 t/ha yield with 124 days growth duration (Table 10a.7). The yield range of all-other selected genotypes was 4.16 to 4.82 t/ha. The heritability obtained for the plant height, growth duration and yield were 85%, 98% and 74%, respectively, indicating high level of precision in this experiment (Table 10a.7).

Table 10a.7: Preliminary Yield Trial #2 (PYT#2) for development of pigmented rice with nutraceutical properties, T. Aman 2024-25

Entry	Designation	GD (days)	PH (cm)	Yield (t/ha)
1	BR12836-4R-250-1	102	131	3.78

Entry	Designation	GD (days)	PH (cm)	Yield (t/ha)
2	BR13316-5R-2	110	140	3.58
3	BR12836-4R-250-2	104	134	3.43
14	BR12839-4R-175	101	131	3.1
Ck1	BRRI dhan87	98	128	5.24
Ck2	BRRI dhan49	101	131	4.46
	LSD (0.05)	3.74	10.29	0.66
	H2b (%)	0.95	0.92	0.93
	CV(%)	15.48	34.225	2.31

DS: 14/07/2024

DT: 08/08/2024

Experiment 10a.8: Advanced Yield Trial #1 (AYT#1)

Principal Investigator: S Maniruzzaman,

Co-Investigators: M R Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Advanced evaluation of aromatic black rice genotypes for higher yield potential with intense black pigmentation.

Materials and Methods: A total of 11 genotypes were evaluated in RCB design with two replications. Thirty days old seedlings were transplanted at a spacing of 20 cm × 20 cm using two to three seedlings/hill. The plot size was 4.8 m². Fertilizers were applied as described in experiment 10a.1. Crop management was carried out as and when necessary.

Results: A single genotype was selected from a total of 11 genotypes based on its homogeneity in the population, phenotypic acceptance, plant type, grain type, antioxidant (C3G) content, and high yield. The selected genotype, BR12838-4R-5a, yielded 3.21 t/ha with a growth duration of 130 days. This genotype was chosen because it was the only one with a black pericarp, despite having a lower yield than the check. This genotype was also aromatic. The heritability values for plant height, growth duration, and yield were 90%, 88%, and 95%, respectively, which indicates a medium to high level of precision in this experiment (Table 10a.8)

Table 10a.8: Performance of the selected genotypes of Advanced Yield Trial#1 for development of pigmented rice with nutraceutical properties, T. Aman 2024-25

Entry	Designation	GD (days)	PH (cm)	Yield (t/ha)
1	BR12838-4R-5a	130	106	3.21
2	BR12835-4R-142a	135	114	2.9
3	BR12838-4R-57-1a	135	112	2.85
4	BR12839-4R-8a	131	110	2.62
5	BR12835-4R-142a	130	115	2.58
CK1	BRRI dhan70 (Ck)	126	129	3.64
CK2	BRRI dhan80 (Ck)	129	123	4.6
CK3	Black Rice (Sylhet)	115	102	1.94
CK4	Black Rice (Indonesia)	120	118	2.98
	P value	***	***	***
	LSD (0.05)	4.55	7.32	0.4
	H2b (%)	90	88	95

DS: 14/07/2024

DT: 08/08/2024

Experiment 10a.9: Advanced Yield Trial#2 (AYT#2)

Principal Investigator: S Maniruzzaman,

Co-Investigators: M R Islam, S T Tuba, A Rahman, M M Yasmin, and K M Iftekharuddaula

Specific objective: Advanced evaluation of aromatic black rice genotypes for higher yield potential with intense black pigmentation.

Materials and Methods: 13 breeding lines and two check varieties were evaluated in RCB design with two replications (Table 10a.9). Thirty-five to forty-day-old seedlings were transplanted at a spacing of 20 cm × 20 cm using two to three seedlings/hill. The plot size was 4.8m². Fertilizers were applied as described in experiment 10a.1. Crop management was carried out as and when necessary.

Results: Two genotypes were selected out of 13 genotypes based on higher yield and higher antioxidant (C3G) content. The genotype BR12839-4R-1 gave the highest average yield of 3.71 t/ha with a duration of 136 days, followed by the genotype BR12839-4R-95-1, which

produced a 3.64 t/ha yield. The heritability obtained for the yield ranged from 57%, 63%, 91% for growth duration, plant height, and yield, indicating a high level of precision in this experiment (Table 10a.9).

Table 10a.9: Performance of the selected genotypes of Advanced Yield Trial#2 for development of pigmented rice with nutraceutical properties, T. Aman 2024-25

Entry	Designation	GD (days)	PH (cm)	Yield (t/ha)
1	BR12839-4R-1	136	118	3.71
2	BR12839-4R-95-1	112	117	3.64
3	BR12839-4R-157-2	132	111	3.23
4	BR12839-4R-21	129	117	3.01
5	BR12837-5R-57	137	110	2.97
6	BR12839-4R-47-1	129	118	2.87
Ck1	BRRi dhan87	127	124	4.17
Ck2	BRRi dhan49	123	111	4.16
LSD (0.05)		12	11	0.58
H2b (%)		57	63	91

DS:14/07/2024 DT:08/08/2024

Experiment 18a.10: Regional Yield Trial (RYT)

Principal Investigator: S Maniruzzaman,

Co-Investigators: M R Islam, S T Tuba, A Rahman, M M Yasmin, and K M Iftekharuddaula

Specific objective: Evaluation of anthocyanin-enriched breeding lines for high yield potential and adaptability in different agro-climatic conditions.

Materials and Methods: Seven breeding lines and two check varieties were evaluated in RCB design with three replications (Table 10a.10a). Thirty-five days old seedlings were transplanted at a spacing of 20 cm × 20 cm using two to three seedlings/hill. The plot size was 8m². Fertilizer management was done as per the recommended dose according to agro-ecological zone. In general, the dose was 260 kg Urea, 100 TSP, 120 MP, 110 Gypsum, 11 kg ZnSO₄/ha. Urea was applied in three splits at 15, 30 and 45 days after transplanting (before PI stage). Total amount of P, K, Gypsum and ZnSO₄ were applied at final land preparation. Weeding, pest control measures and other cultural practices were carried out as and when necessary.

Results: Two genotypes were selected out of seven genotypes based on higher yield and higher antioxidant (C3G) content. The selected genotype BR12839-4R-106 gave the highest average yield of 3.33 t/ha with a duration of 130 days (Table 10a.10a). having C3G content which was 351.12 mg/Kg (Table 10a.10c). The other selected genotype having shorter growth duration, i.e. BR12839-4R-137 gave 3.25 t/ha yield having C3G content 615.61 mg/Kg (Table10a.10c). The other physicochemical property is presented in Table 10a.10b.

Table 10a.10a: Regional Yield Trial (RYT) Development of pigmented rice with nutraceutical properties, T. Aman 2024-25

SL	Designation	PH	GD	Yield(T/ha)						
				Cumilla	Gazipur	Kushtia	Rajshahi	Rangpur	Sirajganj	Mean
1	BR12839-4R-106	119	130	3.51	1.64	1.96	5.43	3.64	3.81	3.33
2	BR12839-4R-34-1	114	127	2.81	1.46	2.15	4.19	2.71	4.01	2.89
3	BR12839-4R-76	109	125	2.32	1.09	1.95	4.08	3.34	4.97	2.96
4	BR12839-4R-137	111	123	3.52	2.03	2.35	5.22	2.84	3.51	3.25
5	BR12839-4R-86-1	118	128	1.94	1.18	2.17	4.58	3.03	4.03	2.82
6	BR12839-4R-90-1	113	125	3.14	1.27	2.63	5.21	2.6	4.15	3.17
7	BR12839-4R-72	86	94	2.18	0.53	1.55	3.96	2.56	3.3	2.35
8	BRRi dhan87	121	130	3.79	3.27	3.63	5.86	3.13	5.4	4.18
9	BRRi dhan49	108	133	3.5	3.28	3.42	5.44	4.53	4.39	4.09
LSD (0.05)		13.62	18.49	0.625	0.49	0.47	0.82	0.3	0.4	0.59
H2b (%)		79	67	89	97	82	94	82	95	80
P value		***	*	***	****	****	**	****	****	****

DS: 05/07/2024 DT: 07/08/2024

Table10a.10b: Physicochemical properties of selected RYT genotypes for development of pigmented rice with nutraceutical properties, T. Aman 2024-25

SL. No	Variety/Line	Milling outturn (%)	Head Rice (%)	Thousand Grain Weight (gm)	Milled rice		L/B ratio	Size & Shape
					Length (L) mm	Breadth (B) mm		
1	BR12839-4R-137	70.8	64.6	16.8	5.9	1.8	3.3	MS
2	BR12839-4R-106	69.5	63.5	18.7	5.9	2.0	3.0	MB
3	BR12839-4R-34-1	66.7	37.4	18.9	6.2	2.1	2.9	LB
4	BR12839-4R-76	71.9	48.8	22.3	6.1	2.6	2.3	LB
5	BR12839-4R-86-1	66.5	47.1	18.7	5.9	2.4	2.4	MB
6	BR12839-4R-72	69	56.5	17.9	5.8	2.2	2.6	MB
7	BRRI dhan49	68.7	65.1	19	5.7	2.2	2.6	MB
8	BRRI dhan87	77.3	63.5	23.3	6.4	2	3.2	LS

Table10a.10c: Antioxidant properties of selected RYT genotypes for development of pigmented rice with nutraceutical properties, T. Aman 2024-25

Sl No.	Sample Name	Condition	Cyanidin-3- Glucoside C3G Conc. (ppm or mg/Kg or µg/g)	Total Phenolic Compound TPC mg/100g GAE	Total Antioxidant Capacity TAC µM AAE/100g
1	BR12839-4R-137	22.6	387.11	37.9	615.61
2	BR12839-4R-106	23.9	351.12	44.7	609.05
3	BR12839-4R-34-1	21.8	329.1	47.5	581.17
4	BR12839-4R-76	22.9	374.21	45.1	612.33
5	BR12839-4R-86-1	21.6	380.86	35.2	523.11
6	BR12839-4R-72	21.8	386.14	35.2	547.28
7	BRRI dhan49	24.8	Not Detected	20.6	356.07
8	BRRI dhan87	27	Not Detected	19.9	271.21

Experiment 10a.11: Proposed Variety Trial (PVT)

Principal Investigator: S Maniruzzaman

Co-Investigators: M R Islam, S T Tuba, A Rahman, M M Yasmin, and K M Iftekharuddaula

Specific objectives: Evaluation of advanced anthocyanin-enriched breeding line in the farmers’ field with standard checks by the NSB team for release as a new variety.

Materials and Methods: The advanced anthocyanin-enriched genotype BR12836-4R-63 was evaluated with one high-yielding check variety, BRRI dhan70, in PVT at ten locations of Bangladesh. Around 25-30 days old seedlings were transplanted @ 2-3 seedlings per hill at a spacing of 20 x 20 cm. The unit plot size was 20 square meters, and the field layout was RCB Design with three replications. Fertilizers were applied at @200 kg Urea, 70 kg TSP, 100 kg MP, 70 kg Gypsum, and 6 kg ZnSO4. One-third of the urea, half MoP, and all other fertilizers were applied as basal. First top dressing of urea was done after 15-20 DAS, and 2nd top dressing of Urea and remaining MoP after 35-40 DAS. Pest management and other cultural operations were carried out as and when necessary.

Results: The proposed variety yielded the highest in Dinajpur with 5.84 t/ha, whereas the check yielded 5.38 t/ha. In some locations, such as Gazipur, Bhanga, Sonagazi, and Khulna, the proposed variety had a lower yield due to factors like Bacterial Leaf Blight (BLB), rat damage, submergence, and flash flooding. Despite this, the proposed variety still outyielded the check in five locations. The overall mean yield of the proposed variety was 3.92 t/ha, compared to the overall mean of 3.86 t/ha for BRRI dhan70 (Table 10a.11a). The C3G content of the proposed line was 492.37 ppm, while its total antioxidant capacity was 701.21 TAC µM AAE/100g, compared to 371.21 TAC µM AAE/100g for the check (Table 10a.11c). As the trial was damaged in most of the location, the trial was recommended for re-evaluation in PVT.

Table10a.11a: Performance of the proposed variety at on farm trial in Proposed Variety Trial (PVT), T. Aman 2024-25

Region	Trial Location	Grain Yield (t/ha)		% Yield advantage	Remarks
		BR12836-4R-63	BRRI dhan70		
Dhaka	1 BRRI, Gazipur	3.00	2.49	20.5	BLB
	2 BRRI, Bhanga	3.60	5.15	-30.1	Rat attack

Chottogram	3	Sonagazi	4.93	5.30	-7.0	Flooding
	4	Cumilla	4.48	2.73	64.1	
Rajshahi	5	BRRI, Rajshahi	4.70	4.47	5.1	BLB
	6	Bogura	3.70	4.23	-12.5	
Rangpur	7	BRRI-Rangpur	2.29	2.61	-12.3	Lodging due to depression
	8	Dinajpur	5.84	5.68	2.8	
Khulna	9	Khulna	1.20	1.23	-2.4	Two times submergence
	10	Jessore	5.49	4.69	17.1	
Mean			3.92	3.86	1.68	

Table10a.11b: Physicochemical properties of the proposed variety

SL No	Variety/Line	Milling outturn (%)	Head Rice (%)	Amyl ose (%)	Thousand Grain Weight (gm)	Milled rice		L/B ratio	Alkali Spread ing Value	Elongat ion _Ratio	Imbibit ion Ratio (IB)	Size & Sha pe
						Length (L) mm	Breadth (B) mm					
1	BR12836-4R-63	70.2	64.2	21.9	19.2	6	2.2	2.8	4.3	1.3.03		MB
2	BRRI dhan70	71.2	62.7	21.7	20.2	6.3	1.9	3.3	3.7	1.3.05		LS

Table10a.11c: Antioxidant properties of the proposed variety

SL No	Sample Name	Cyanidin-3-Glucoside C3G Conc. (ppm or mg/Kg or µg/g)	Total Phenolic Compound (TPC mg/100g GAE)	Total Antioxidant Capacity (TAC µM AAE/100g)
1	BR12836-4R-63	492.37	50.1	701.21
2	BRRI dhan70	None	21.1	371.21

Season: Boro 2024-25

Experiment 10b.1: Hybridization

Principal Investigator: S Ghosal

Co-Investigators: S Maniruzzaman, M R Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Introgression of plant compounds with antioxidant properties, including anthocyanin with or without aroma, into high-yielding genetic background.

Materials and Methods: A total of 25 genotypes were used for crossing (Table10b.1a). Pigmented genotypes served as donor parents. All parents were grown in the hybridization block of the Plant Breeding Division in three stages, with a seven-day interval to synchronize flowering between male and female parents. Fertilizers were applied at a rate of 260 kg Urea, 100 kg TSP, 120 kg MP, 110 kg Gypsum, and 11 kg ZnSO4 per hectare. Urea was applied in three equal splits at 10-15, 25-30, and 40-45 days after transplanting, while other fertilizers were applied as a basal dose during the final land preparation. Other cultural and pest management practices were performed as needed. Leaf samples were collected from 12 labeled, healthy plants of each parent for QC genotyping using a 10 SNP panel. The plants with unique profiles for each parent were then used for making crosses. During flowering, emasculation was performed the day before anthesis using a vacuum emasculator, and the emasculated panicles were bagged with glycine bags. Pollination was carried out by dusting pollen from just-anthesized panicles of the male parent onto the emasculated panicles of the female parent.

Results: A total of 14 crosses were made in the Boro 2024-25 season. A total of 296 F1 seeds were produced (Table 10b.1b). The F₁ seeds were threshed, labeled, cleaned, dried, and preserved properly.

Table 10b.1a: Parents List for crossing, Pigmented rice with nutraceutical properties, Boro 2024-25

SL No	Designation	Traits
1	BR13944-4R-12	
2	BR11607-4R-192	Xa5, Xa13, Xa21
3	BR11607-4R-72	Xa5, Xa13, Xa21
4	BR13751-5R-4	
5	BR12450-4R-24	
6	BR12839-4R-106	Wx-ex10,Wx-A,Gn1a,Chalk5,GS3,Alk,Pi54,
7	BR12836-4R-312	frg-1,Wx-ex10,Wx-A, Gn1a, Chalk5, GS3, Alk, DTH8
8	BR12839-4R-34-1	Wx-ex10, Wx-A, Gn1a, Chalk5, GS3, Alk, DTH8, Pi54,Pita2
9	IR20*1002:IRRI154+PI9+Hd9(N22)	PI9+Hd9
10	Black Rice (Acc.8096)	
11	Black Rice (Acc 4672	
12	Rice-11(GQN)	
13	BRRI dhan49	
14	BRRI dhan70	
15	BRRI dhan89	

DS: 18/01/2025-29/01/2025 DT: 18/02/2025-26/02/2025

Table 10b.1b: List of crosses made for development of pigmented rice with nutraceutical properties, Boro 2024-25

Sl No	BR No.	Parentage	F ₁ seeds	Traits
1	BR16761	BR13944-4R-12/ BR11607-4R-192	13	Wx(int), Pita fgr-1, Xa5, Xa13, Xa21
2	BR16762	BR13944-4R-12/ BRRI dhan70	10	Wx(int)-Basmati Pita fgr-1
3	BR16763	BR13751-5R-4/ BR11607-4R-72	23	Wx(a), Xa5, Xa13, Xa21
4	BR16767	BR12839-4R-106/ BR11607-4R-192	30	Wx-ex10,Wx-A,Gn1a,GS3,Alk,Pi54, Xa5, Xa13, Xa21
5	BR16770	BRRI dhan 89*1/ Black Rice-11(GQN)	24	
6	BR16755	BR12836-4R-312/ BR11607-4R-192	6	frg-1,Wx-ex10,Wx-A,Gn1a,GS3,Alk, Xa5, Xa13, Xa21
7	BR16753	BR12839-4R-106/ BRRI dhan49	56	Wx-ex10,Wx-A,Gn1a,GS3,Alk,Pi54
8	BR16769	BR12839-4R-106/ IR20*1002:IRRI154+PI9+Hd9(N22)	25	Wx-ex10,Wx-A,Gn1a,GS3,Alk,Pi54,Pi9,Hd9
9	BR17295	BR11607-4R-192/ Black Rice (Acc 4672)	20	Xa5, Xa13, Xa21
10	BR17296	BR11607-4R-72/ BR12839-4R-106	19	Wx-ex10,Wx-A,Gn1a,GS3,Alk,Pi54, Xa5, Xa13, Xa21
11	BR16388	BR11607-4R-72/ BR12839-4R-34-1	40	Xa5, Xa13, Xa21, Wx-ex10,Wx-A, Gn1a,GS3, Alk, DTH8, Pi54, Pita2
12	BR17297	BR12450-4R-24/ Black Rice (Acc.8096)	9	
Total			296	

Experiment 10b.2: Confirmation of F₁s

Principal Investigator: S Ghosal

Co-Investigators: S Maniruzzaman, M R Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Confirmation of F₁s as true crosses and selection of promising ones.

Materials and Methods: A total of ten crosses along with their respective parents were grown in the Boro 2024-25 season. F₁ seeds of each cross and their respective parents were germinated in petri dishes and then sown in earthen pots. Thirty to thirty-five-day-old seedlings were transplanted at the rate of a single seedling at a spacing of 25 cm x 20 cm. Respective parental seedlings were transplanted on both sides of each F₁ population. Crop management was done as described in Experiment 10b.1. The leaf samples were collected from each of the 10 plants from each cross and respective parents for QC genotyping to determine true F₁. QC genotyping was performed using 10-QC SNP panel at Intertek, Australia. Genotyping results were analyzed using a genotyping data analytical tool called Flapjack. After confirmation, promising F₁s were selected. The F₂ seeds obtained from each cross were labeled, cleaned, dried, and preserved properly.

Results: Among ten crosses, six crosses were confirmed and selected as true hybrids (Table 10b.2).

Table 10b.2: List of confirmed and selected F₁s as true hybrids for development of pigmented rice with nutraceutical properties, Boro 2024-25

SL No.	BR No.	Parentage	No of F1's seed
1	BR16752	BR12839-4R-106/BR11607-4R-72	75
2	BR16754	BR12838-4R-89-1*/BR12839-4R-106	170
3	BR16756	BR12839-4R-34-1/IRRI 154 frg1	119
4	BR16758	BR12836-4R-63*/BRRI dhan102	90
5	BR16768	BR12836-4R-63/BR11607-4R-192	266
6	BR16769	BR12839-4R-106/IR20*1002:IRRI154+PI9+Hd9(N22)	95
Total			1,311

DS: 21/01/2025

DT: 22/02/2025

Experiment 10b.3: Rapid Generation Advance (RGA)

Principal Investigator: S Ghosal

Co-Investigators: S Maniruzzaman, M R Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Rapid advancement of segregating population for shortening breeding cycle and development of large RIL population.

Materials and Methods: In the Boro 2024-25 season, panicles of 34,828 progenies from 81 crosses (11,880 progenies of 27 F₂ crosses, 12,873 progenies of 26 F₃ crosses, 8,714 progenies of 22 F₄ crosses, and 1,361 progenies of six F₅ crosses) were grown through RGA (Table 10b.3a and b). A single seed of each progeny from a single panicle of one plant was grown in the RGA nursery in field. The part of the panicle was sown directly on the soil. No thinning or pruning was done. Fertilizer management was done using half of the dosages described in Expt. 10b.1. Appropriate pest management practices were carried out as and when necessary. During harvesting at maturity, one panicle was collected from each plant of all the crosses at different times, and the plant was uprooted. Harvested seeds remaining in the panicles were dried and subjected to dormancy breakage to initiate the next cycle of RGA. For dormancy breaking, at first, sun-drying was done for three days, followed by oven drying at 50°C for 72 hours.

Results: A total of 25,464 progenies from 81 crosses (5,924 progenies of 27 F₂ crosses, 10,316 progenies of 26 F₃ crosses, 8,006 progenies of 22 F₄ crosses, and 1,218 progenies of six F₅ crosses) were harvested for next generation (Table 10b.3a and 10b.3b). The harvested panicles were labeled, dried and preserved properly.

Table 10b.3a: RGA Summary for development of pigmented rice with nutraceutical properties, Boro 2024-25

Generation	No. of crosses	Progenies grown	Progenies harvested
F ₂	27	11,880	5,924
F ₃	26	12,873	10,316
F ₄	22	8,714	8,006
F ₅	6	1,361	1,218
Total	81	34,828	25,464

Table 10b.3b: List of F₂, F₃, F₄, and F₅ populations advanced through RGA for development of pigmented rice with nutraceutical properties, Boro 2024-25

SL	BR No.	Parentage	Progenies Grown	Progenies Harvested
Generation: F ₂ Population				
1	BR16369	BRRI dhan89/BR12839-4R-106	440	59
2	BR16370	BRRI dhan108/BR12839-4R-106	440	357
3	BR16371	BRRI dhan102/BR12839-4R-106	440	140
4	BR16372	BRRI dhan89/BR12839-4R-34-1	440	181
5	BR16373	BRRI dhan89/BR12839-4R-157-2	440	158
6	BR16374	BRRI dhan108/BR12839-4R-5-2	440	221
7	BR16375	BRRI 43R/BR12839-4R-106	440	332
8	BR16376	BRRI 45R/BR12839-4R-106	440	359
9	BR16377	BRRI 47R/BR12839-4R-106	440	138
10	BR16378	BR11318-5R-63/BR12839-4R-106	440	360

SL	BR No.	Parentage	Progenies Grown	Progenies Harvested
11	BR16379	BRR1 dhan102/BR12839-4R-34-1	440	209
12	BR16380	BR12520-5R-67/BR12839-4R-34-1	440	79
13	BR16381	BRR1 dhan89/BR12839-4R-5-2	440	240
14	BR16382	BRR1 dhan89/BR12838-4R-89-1a	440	98
15	BR16383	BRR1 dhan108/BR12838-4R-89-1a	440	168
16	BR16384	BRR1 dhan102/BR12839-4R-5-2	440	301
17	BR16385	BR11318-5R-84/BR12839-4R-5-2	440	197
18	BR16386	BRR1 dhan89/BR12839-4R-137	440	217
19	BR16387	BRR1 43R/BR12839-4R-34-1	440	524
20	BR16388	BR11607-4R-72/BR12839-4R-34-1	440	399
21	BR16389	BR11318-5R-63/BR12839-4R-34-1	440	429
22	BR16390	BRR1 dhan102/BR12838-4R-89-1a	440	242
23	BR16391	BR11318-5R-84/BR12838-4R-89-1a	440	136
24	BR16392	BRR1 dhan89*2/Black Rice-10 (GQN)	440	150
25	BR16393	BRR1 dhan108/Black Rice-10 (GQN)	440	39
26	BR16394	BRR1 dhan89*2/Black Rice-11 (GQN)	440	13
27	BR16395	BR11607-4R-72/Black Rice-11 (GQN)	440	178
Sub Total			11,880	5,924
Generation: F₃ Population				
1	BR16341	Ja Hua/BR12839-4R-106	395	406
2	BR16342	Ja Hua*2/BR12839-4R-34-1	149	179
3	BR16343	Ja Hua/BR12836-4R-312*	384	345
4	BR16344	Ja Hua/BR12839-4R-185*	523	404
5	BR16345	BRR1 dhan103/BR12836-4R-312*	782	722
6	BR16346	BRR1 dhan103/BR12839-4R-106	453	230
7	BR16349	BR11712-4R-218/BR12839-4R-185*	678	593
8	BR16350	BR11712-4R-218/BR12836-4R-18*	711	556
9	BR16351	BR11712-4R-218/BR12839-4R-137	705	454
10	BR16352	BR11712-4R-227/BR12839-4R-157-2	456	390
11	BR16353	BR11712-4R-227/BR12839-4R-34-1	593	481
12	BR16354	BR9674-8-15-3-28-P3 (Zn)/China70(Acc.7170)	732	638
13	BR16355	BR9674-8-15-3-28-P3 (Zn)/Black Rice (Acc 4968)	628	507
14	BR16356	BR9674-8-15-3-28-P3 (Zn)/BR12839-4R-185*	593	437
15	BR16357	BR10571-15-6-8-5 (Zn)/BR12836-4R-18*	504	491
16	BR16358	BR10571-15-6-8-5 (Zn)/BR12839-4R-137	583	518
17	BR16359	BRR1 43R/BR12839-4R-76	765	613
18	BR16360	BRR1 45R/BR12839-4R-34-1	639	499
19	BR16361	BRR1 47R/BR12839-4R-34-1	607	506
20	BR16362	Barsha dhan/BR12839-4R-34-1	286	219
21	BR16363	ACI dhan1/BR12838-4R-89-1*	554	427
22	BR16364	ACI dhan1/BR12839-4R-185*	280	245
23	BR16365	BR11712-4R-227/BR12839-4R-76	331	209
24	BR16366	Barsha dhan/ BR12839-4R-89-1	218	80
25	BR16367	Barsha dhan/ BR12839-4R-157-2	259	110
26	BR16368	Barsha dhan/ BR12839-4R-106	65	57
Sub Total			12,873	10,316
Generation: F₄ Population				
1	BR15730	BR1137-5R-140/ Black Rice (Acc 4968)	433	473
2	BR15731	BR1137-5R-140 / BR12836-4R-312*	581	557
3	BR15732	IR18A1398/ BR12839-4R-51*-	439	348
4	BR15733	BR11712-4R-227/ Black Rice -10 (GQN)	348	337
5	BR15734	BR11712-4R-227/ Black Rice -11 (GQN)	237	226
6	BR15735	BR9674-1-1-5-1P3 (Zn)/ BR12836-4R-312*	453	449
7	BR15736	BR9674-1-1-5-1P3 (Zn)/ BR12839-4R-51*-	183	282
8	BR15737	BR9674-8-15-3-28-P3 (Zn)/ BR12839-4R-138-4	407	325
9	BR15738	BR9674-8-15-3-28-P3 (Zn)/ BR12839-4R-73	374	313
10	BR15739	BR9674-8-15-3-28-P3 (Zn)/ BR12835-4R-142	572	393
11	BR15740	BR11315-5R-17-52/ BR12836-4R-312*	735	447
12	BR15741	BRR1 45R/ BR12836-4R-18	434	391
13	BR15742	BRR1 47R/ BR12839-4R-157-2	409	315
14	BR15743	IR19L1046/BR12839-4R-157-2	300	295
15	BR15744	BRR1 dhan89/ BR12839-4R-157-2	398	453

SL	BR No.	Parentage	Progenies Grown	Progenies Harvested
16	BR15745	BRRI dhan89/ BR12836-4R-312*	296	242
17	BR15746	BR10571-15-6-8-5 (Zn)/ BR12839-4R-157-2	308	319
18	BR15748	BR10571-15-6-8-5 (Zn)/ BR12835-4R-142	235	327
19	BR15749	BR 11-9-11-4-5B/ BR12836-4R-63	315	360
20	BR15750	Purple rice/ BR12839-4R-21	382	466
21	BR15751	BR12835-4R-142/ BR11712-4R-227	415	372
22	BR15752	BR12835-4R-142/BR12835-4R-218	460	316
Sub Total			8,714	8,006
Generation: F ₅ Population				
1	BR15336	BR9674-1-1-5-1P3/BR12839-4R-93	237	196
2	BR15337	IR17A1694/BR12839-4R-90-1	242	225
3	BR15339	BR12839-4R-90-1/BRRI dhan87	112	102
4	BR15340	BR12839-4R-93/BRRI dhan87	212	173
5	BR15342	BR12839-4R-157/ BRRI dhan90	262	272
6	BR15347	BR12839-4R-157/ BRRI dhan87	296	250
Sub Total			1,361	1,218
Grand Total			34,828	25,464

DS: 04/1/2025

Experiment 10b.4: Line Stage Testing (LST)

Principal Investigator: S Ghosal

Co-Investigators: S Maniruzzaman, M R Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Selection of uniform pigmented genotypes in terms of uniformity in flowering, plant height, and amylose content with higher predicted yield with key target traits.

Materials and Methods: In the Boro 2024-25 season, 3,819 fixed lines from 23 crosses were grown in 12-hills single-row plots using a systematic arrangement design with respective parents and check varieties. Twenty-five to thirty-day-old single seedlings were transplanted at 20 cm × 20 cm spacing. Fertilizer management was done following the dosages described in Expt. 10b.1. Crop management was done as recommended for modern rice cultivation practices.

Results: In the Boro 2024-25 season, 402 fixed lines from 3,819 fixed lines were selected from 23 crosses of LST (Table 10b.4a) based on phenotypic acceptance, uniformity in flowering, plant height, grain size and shape, lodging tolerance, pigmentation, key trait markers presence of higher predicted yield. The traits markers of some of the selected lines are shown in Table 10.b.4b.

Table 10b.4a: List of superior fixed lines selected from LST populations for development of pigmented rice with nutraceutical properties, Boro 2024-25

SL No	BR No.	Parentage	Lines grown	Lines selected
1	BR14902	Pusa Basmati/Black rice (Sylhet)*	177	5
2	BR14903	FBR-376/Black rice (Sylhet)*	85	0
3	BR14904	Nania/Black rice (Sylhet)*	200	6
4	BR14905	IR99285-1-1-1-P2 (Zn)/Black rice (Sylhet)*	118	8
5	BR14906	BR11716-4R-172/Black rice (Sylhet)*	150	5
6	BR14908	BR9930-2-3-2-2 (PQR Boro)/Black rice (Sylhet)*	150	2
7	BR14910	Nania/Black Rice (Acc.8096)	203	5
8	BR14912	BR11716-4R-172/Black Rice(Acc.8096)	168	5
9	BR14913	BR11712-4R-227/Black Rice(Acc.8096)	62	0
10	BR14916	BR8862-29-1-5-1-5/ Black Rice(Acc.8096)	73	4
11	BR14919	BRRI dhan90/ China70 (Acc.7170)	110	8
12	BR14920	BRRI dhan92/ China70 (Acc.7170)	90	6
13	BR14921	BRRI dhan50/China70 (Acc.7170)	29	14
14	BR14922	IRRI 154 frg1/ China70 (Acc.7170)	106	3

SL No	BR No.	Parentage	Lines grown	Lines selected
15	BR14923	IR99285-1-1-1- P2/China70 (Acc.7170)	183	6
16	BR14925	China70 (Acc.7170)/ BR11716-14-172	402	64
17	BR14926	China70 (Acc.7170)/ FBR-376	167	6
18	BR14927	China70 (Acc.7170)/ BR11712-4R-227	432	60
19	BR14928	Black rice Sylhet/ BRRi dhan90	210	20
20	BR14929	BR8862-29-1-5-1-3/ Black rice (Sylhet)	239	61
21	BR14930	IRRI 154 frg1/Black rice (Indonesia)	212	55
22	BR14932	BR11712-4R-227/ Black rice (Indonesia)	183	41
23	BR14934	Begunidhan/Black rice (Sylhet)	70	18
Total			3,819	402

DS: 03/01/2025

DT: 09/02/2025

Table 10.4b. List of some superior fixed lines with key traits selected from LST populations, Pigmented rice, Boro 2024-25

SL	Designation	Trait Markers	SL	Designation	Trait Markers
1	BR14902-4R-119	wx(b) Pitafr-1,Gn1a	55	BR14925-4R-121	Wx(a)
2	BR14902-4R-131	Wx(a) Pitafr-1,Gn1a	56	BR14925-4R-125	Wx(a) ,Gn1a
3	BR14902-4R-133	Wx(a) Pitafr-1,Gn1a	57	BR14925-4R-131	Wx(a) ,Gn1a
4	BR14902-4R-87	Wx(a) Pitafr-1,Gn1a	58	BR14925-4R-132	Wx(a) Pitafr-1,Gn1a
5	BR14904-4R-123	Wx(a) ,Gn1a	59	BR14925-4R-133	Wx(a) Pita,Gn1a
6	BR14904-4R-147	Wx(a) Pita,Gn1a	60	BR14925-4R-14	Wx(a) Pita,Gn1a
7	BR14904-4R-34	Wx(a) ,Gn1a	61	BR14925-4R-147	Wx(a) ,Gn1a
8	BR14904-4R-41	Wx(a) ,Gn1a	62	BR14925-4R-16	Wx(a)
9	BR14904-4R-55	Wx(a) Pita,Gn1a	63	BR14925-4R-165	Wx(a) ,Gn1a
10	BR14904-4R-7	Wx(a) fgr-1,Gn1a	64	BR14925-4R-206	Wx(a) ,Gn1a
11	BR14905-4R-20	Wx(a) Pitafr-1,Gn1a	65	BR14925-4R-226	Pita,Gn1a
12	BR14905-4R-35	Wx(a) Pita,Gn1a	66	BR14925-4R-237	Wx(a) ,Gn1a
13	BR14905-4R-36	Wx(a) Pita,Gn1a	67	BR14925-4R-253	Wx(a) Pitafr-1,Gn1a
14	BR14905-4R-48	Gn1a	68	BR14925-4R-254	Wx(a) Pita,
15	BR14906-4R-73	Wx(a) Pitafr-1,Gn1a	69	BR14925-4R-269	Wx(a) ,Gn1a
16	BR14906-4R-79	Wx(a) fgr-1,Gn1a	70	BR14925-4R-286	Wx(a) Pita,Gn1a
17	BR14906-4R-87	Wx(a) Pita,	71	BR14925-4R-289	Wx(a) ,Gn1a
18	BR14910-4R-55	Wx(a)-NB/Wx(op)	72	BR14925-4R-29	Wx(a) Pita,Gn1a
19	BR14910-4R-91	Wx(a) Pita,Gn1a	73	BR14925-4R-299	Wx(a) Pita,
20	BR14912-4R-142	Wx(a) Pitafr-1,Gn1a	74	BR14925-4R-300	Wx(a) Pita,Gn1a
21	BR14912-4R-146	Wx(a) Pita,Gn1a	75	BR14925-4R-305	Wx(a) Pita,Gn1a
22	BR14912-4R-73	Wx(a)	76	BR14925-4R-351	Wx(a)
23	BR14912-4R-93	Wx(a) Pita,Gn1a	77	BR14925-4R-360	Wx(a) ,Gn1a
24	BR14916-4R-10	Wx(a) fgr-1,Gn1a	78	BR14925-4R-367	Wx(a) ,Gn1a
25	BR14916-4R-55	Wx(a) Pitafr-1,Gn1a	79	BR14925-4R-375	Wx(a) Pita,
26	BR14916-4R-66	Wx(a) ,Gn1a	80	BR14925-4R-378	Wx(a) Pita,Gn1a
27	BR14919-4R-15	Wx(a) Pita,Gn1a	81	BR14925-4R-38	Wx(a) Pita,Gn1a
28	BR14919-4R-66	Wx(a) ,Gn1a	82	BR14925-4R-4	Wx(a) Pita,Gn1a
29	BR14920-4R-13	Wx(a) Pita,Gn1a	83	BR14925-4R-400	Wx(a) ,Gn1a
30	BR14920-4R-37	Gn1a	84	BR14925-4R-402	Wx(a) ,Gn1a
31	BR14920-4R-4	Wx(a) Pitafr-1,Gn1a	85	BR14925-4R-42	Wx(a) ,Gn1a
32	BR14920-4R-47	Wx(a) ,Gn1a	86	BR14925-4R-424	Wx(a) Pita,Gn1a
33	BR14921-4R-1	Wx(a) ,Gn1a	87	BR14925-4R-447	Wx(a) Pita,Gn1a
34	BR14921-4R-11	Wx(a) Pita,Gn1a	88	BR14925-4R-447	Wx(a) Pita,Gn1a
35	BR14921-4R-13	Wx(a) Pita,Gn1a	89	BR14925-4R-46	Wx(a) ,Gn1a
36	BR14921-4R-14	Wx(a) Pita,fgr-1,Gn1a	90	BR14925-4R-5	Wx(a) Pita,Gn1a
37	BR14921-4R-2	Wx(a)-NB/Wx(op)	91	BR14925-4R-51	Wx(a) ,Gn1a
38	BR14921-4R-20	Wx(a) ,Gn1a	92	BR14925-4R-53	Wx(a) Pita,Gn1a
39	BR14921-4R-23	Wx(a) Pita,Gn1a	93	BR14925-4R-55	Wx(a) ,Gn1a
40	BR14921-4R-26	Wx(a) Pitafr-1,Gn1a	94	BR14925-4R-61	Wx(a) Pita,xa5,fgr-1,Gn1a
41	BR14921-4R-30	Wx(a) ,Gn1a	95	BR14925-4R-70	Wx(a) Pita,Gn1a
42	BR14921-4R-34	Wx(a) fgr-1,Gn1a	96	BR14925-4R-8	Wx(a) ,Gn1a
43	BR14922-4R-18	Wx(a) ,Gn1a	97	BR14925-4R-91	Wx(a) ,Gn1a
44	BR14922-4R-76	Wx(a) ,Gn1a	98	BR14926-4R-10	Wx(a) ,Gn1a
45	BR14922-4R-98	Wx(a) ,Gn1a	99	BR14926-4R-105	Wx(a) Pitafr-1,Gn1a
46	BR14923-4R-134	Wx(a) fgr-1,Gn1a	100	BR14926-4R-14	Wx(a) ,Gn1a
47	BR14923-4R-2	Wx(a) ,Gn1a	101	BR14926-4R-18	Wx(a) ,Gn1a
48	BR14923-4R-40	Wx(a) Pita,Gn1a	102	BR14926-4R-21	Wx(a) Pitafr-1,Gn1a
49	BR14923-4R-44	Wx(a) fgr-1,Gn1a	103	BR14926-4R-9	Wx(a) Pitafr-1,Gn1a
50	BR14923-4R-79	Wx(a) ,Gn1a	104	BR14927-4R-107	Wx(a)
51	BR14925-4R-1	Wx(a) Pita,Gn1a	105	BR14927-4R-118	Wx(a) ,Gn1a
52	BR14925-4R-101	Wx(a) Pita,Gn1a	106	BR14927-4R-125	Wx(a) ,Gn1a
53	BR14925-4R-108	Pita,Gn1a	107	BR14927-4R-135	Wx(a) ,Gn1a
54	BR14925-4R-117	Wx(a) ,Gn1a	108	BR14927-4R-143	Wx(a) ,Gn1a

SL	Designation	Trait Markers
109	BR14927-4R-145	Wx(a) ,Gn1a
110	BR14927-4R-168	Wx(a) Pita,Gn1a
111	BR14927-4R-171	Wx(a) ,Gn1a
112	BR14927-4R-172	Wx(a) ,Gn1a
113	BR14927-4R-174	Wx(a) Pita,
114	BR14927-4R-179	Wx(a) fgr-1,Gn1a
115	BR14927-4R-187	Wx(a) Pita,Gn1a
116	BR14927-4R-193	Wx(int) Pita,Gn1a
117	BR14927-4R-204	Wx(int),Gn1a
118	BR14927-4R-205	Wx(a) ,Gn1a
119	BR14927-4R-207	Wx(a) Pita,Gn1a
120	BR14927-4R-214	Wx(a) ,Gn1a
121	BR14927-4R-218	Wx(a) ,Gn1a
122	BR14927-4R-251	Wx(a) Pita,Gn1a
123	BR14927-4R-26	Wx(a) Pitafr-1,Gn1a
124	BR14927-4R-303	Wx(a) ,Gn1a
125	BR14927-4R-313	Wx(a) Pita,Gn1a
126	BR14927-4R-314	Wx(a) ,Gn1a
127	BR14927-4R-317	Wx(a) Pitafr-1,Gn1a
128	BR14927-4R-330	Wx(a) Pita,Gn1a
129	BR14927-4R-332	Wx(a) Pita,Gn1a
130	BR14927-4R-335	Wx(a) ,Gn1a
131	BR14927-4R-338	Wx(a) Pita,Gn1a
132	BR14927-4R-344	Wx(a) Pita,Gn1a
133	BR14927-4R-345	Wx(a) Pita,Gn1a
134	BR14927-4R-354	Wx(a) Pita,Gn1a
135	BR14927-4R-355	Wx(a) Pita,
136	BR14927-4R-357	Wx(a) Pitafr-1,Gn1a
137	BR14927-4R-361	Wx(a) ,Gn1a
138	BR14927-4R-374	Wx(a) Pitafr-1,Gn1a
139	BR14927-4R-382	Wx(a) ,Gn1a
140	BR14927-4R-400	Wx(a) fgr-1,Gn1a
141	BR14927-4R-401	Wx(a) Pita,Gn1a
142	BR14927-4R-411	Wx(a) Pita,Gn1a
143	BR14927-4R-414	Wx(a) ,Gn1a
144	BR14927-4R-42	Wx(a) Pita,Gn1a
145	BR14927-4R-430	Wx(a)-NB/Wx(op)
146	BR14927-4R-8	Wx(a) Pita,Gn1a
147	BR14927-4R-89	Wx(a) ,Gn1a
148	BR14928-4R-101	Pitafr-1,
149	BR14928-4R-111	Wx(a) fgr-1,Gn1a
150	BR14928-4R-115	Wx(a) fgr-1,Gn1a
151	BR14928-4R-118	Wx(a) fgr-1,Gn1a
152	BR14928-4R-136	Wx(a) Pita,
153	BR14928-4R-154	Wx(a) fgr-1,Gn1a
154	BR14928-4R-158	Wx(a) Pita,Gn1a
155	BR14928-4R-30	Wx(a) fgr-1,Gn1a
156	BR14928-4R-32	Wx(a) fgr-1,Gn1a
157	BR14928-4R-37	Wx(a) ,Gn1a
158	BR14928-4R-4	Wx(a) Pita,Gn1a
159	BR14928-4R-51	Wx(a) ,Gn1a
160	BR14928-4R-57	Wx(a) fgr-1,Gn1a
161	BR14928-4R-60	Wx(a) Pita,Gn1a
162	BR14928-4R-61	Wx(a) fgr-1,Gn1a
163	BR14928-4R-67	Wx(int) fgr-1,
164	BR14928-4R-81	Wx(a) ,Gn1a
165	BR14929-4R-10	Wx(a) Pita,Gn1a
166	BR14929-4R-113	Wx(a) Pita,Gn1a
167	BR14929-4R-13	Wx(a) Pitafr-1,Gn1a
168	BR14929-4R-165	Wx(a) Pitafr-1,Gn1a
169	BR14929-4R-171	Wx(a) Pita,Gn1a
170	BR14929-4R-179	Wx(a)
171	BR14929-4R-180	Wx(a) Pitafr-1,Gn1a
172	BR14929-4R-188	Wx(a) Pita,Gn1a
173	BR14929-4R-196	Wx(a) Pitafr-1,Gn1a
174	BR14929-4R-200	Wx(a) ,Gn1a
175	BR14929-4R-201	Wx(a) ,Gn1a
176	BR14929-4R-209	Waxy

SL	Designation	Trait Markers
177	BR14929-4R-21	Wx(a) fgr-1,Gn1a
178	BR14929-4R-215	Wx(a) Pitafr-1,Gn1a
179	BR14929-4R-216	Wx(a) Pita,
180	BR14929-4R-218	Wx(a) Pita,Gn1a
181	BR14929-4R-219	Wx(a)
182	BR14929-4R-220	Wx(a) Pita,Gn1a
183	BR14929-4R-223	Wx(a) ,Gn1a
184	BR14929-4R-225	Pita,Gn1a
185	BR14929-4R-228	Wx(a) ,Gn1a
186	BR14929-4R-27	Wx(a) Pita,
187	BR14929-4R-29	Wx(a) ,xa5,fgr-1,Gn1a
188	BR14929-4R-38	Wx(a) ,Gn1a
189	BR14929-4R-39	Wx(a) ,Gn1a
190	BR14929-4R-49	Wx(a) fgr-1,Gn1a
191	BR14929-4R-56	Wx(a) Pita,Gn1a
192	BR14929-4R-57	Wx(a) fgr-1,Gn1a
193	BR14929-4R-62	Wx(a) Pita,Gn1a
194	BR14929-4R-63	Wx(a) Pita,Gn1a
195	BR14929-4R-80	Wx(a) Pita,Gn1a
196	BR14929-4R-92	Wx(a) Pita,Gn1a
197	BR14930-4R-117	Wx(int)-IR64 ,Gn1a
198	BR14930-4R-118	Wx(a) fgr-1,Gn1a
199	BR14930-4R-125	Wx(a) Pita,
200	BR14930-4R-131	Wx(a) Pita,Gn1a
201	BR14930-4R-132	Wx(a) Pita,Gn1a
202	BR14930-4R-15	Wx(a) fgr-1,
203	BR14930-4R-166	Wx(a) Pita,Gn1a
204	BR14930-4R-170	Wx(a) Pitafr-1,Gn1a
205	BR14930-4R-171	Wx(a) fgr-1,Gn1a
206	BR14930-4R-174	Wx(a) Pita,Gn1a
207	BR14930-4R-18	Wx(a) ,Gn1a
208	BR14930-4R-182	Wx(a) Pitafr-1,
209	BR14930-4R-184	Wx(a) Pitafr-1,Gn1a
210	BR14930-4R-189	Wx(a) Pitafr-1,Gn1a
211	BR14930-4R-191	Wx(a)
212	BR14930-4R-194	Wx(a) Pita,Gn1a
213	BR14930-4R-198	Wx(a) Pita,Gn1a
214	BR14930-4R-199	Wx(a) Pita,Gn1a
215	BR14930-4R-202	Wx(a) fgr-1,Gn1a
216	BR14930-4R-209	Wx(a) fgr-1,Gn1a
217	BR14930-4R-22	Wx(a) Pitafr-1,Gn1a
218	BR14930-4R-27	Wx-NBPita,xa5,fgr1,Gn1a
219	BR14930-4R-29	Wx(a)-NBPita,xa5
220	BR14930-4R-32	Wx(a) Pita,Gn1a
221	BR14930-4R-35	xa5,fgr-1
222	BR14930-4R-39	Pita
223	BR14930-4R-5	Wx(a) Pita,Gn1a
224	BR14930-4R-53	Wx(a) Pita,Gn1a
225	BR14930-4R-55	Wx(a) Pita,Gn1a
226	BR14930-4R-59	fgr-1
227	BR14930-4R-64	Wx(a) ,Gn1a
228	BR14930-4R-66	Wx(a)/Wx(int) Pita,
229	BR14930-4R-67	Wx(a) fgr-1,Gn1a
230	BR14930-4R-7	Wx(a) Pitafr-1,
231	BR14930-4R-9	Wx(a) Pitafr-1,Gn1a
232	BR14930-4R-98	Pita,Gn1a
233	BR14932-4R-2	Wx(a),qAG3
234	BR14934-4R-1	Wx(a) Pita,Gn1a
235	BR14934-4R-15	Wx(a) Pita,Gn1a
236	BR14934-4R-18	Wx(a)/Wx(int-IR64)
237	BR14934-4R-29	Wx(a) Pitafr-1,Gn1a
238	BR14934-4R-44	Wx(a)/Wx(int-IR64)
239	BR14934-4R-53	Wx(a) Pita,Gn1a
240	BR14934-4R-54	Wx(a) Pitafr-1,Gn1a
241	BR14934-4R-55	Wx(a) Pitafr-1,
242	BR14934-4R-57	Wx(a) Pitafr-1,Gn1a
243	BR14934-4R-7	Wx(a) Pita,Gn1a
244	BR14934-4R-8	Wx(a) Pitafr-1,Gn1a

Experiment 10b.5: Observational Yield Trial (OYT)

Principal Investigator: S Ghosal

Co-Investigators: S Maniruzzaman, M R Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Selection of materials with better phenotypic acceptance, homogeneity in the population, shorter growth duration, and higher yield potential with higher nutraceutical value than the standard check varieties.

Materials and Methods: A total of 200 genetically fixed black rice genotypes, along with three checks, were evaluated in an Augmented RCB design with two blocks. Thirty-day-old seedlings were transplanted at a spacing of 20 cm × 20 cm using a single seedling/hill. The plot size was 5.04m². Fertilizers were applied as described in experiment 10b.1. Crop management was carried out as and when necessary.

Results: A total of 25 genotypes were selected out of 200 genotypes based on homogeneity in the flowering, phenotypic acceptance (PAcp), agronomic traits, grain quality, presence/absence of aroma, black pigmentation, and higher grain yield potential. The yield ranged from 7.13 t/ha to 4.98 t/ha of the selected genotypes. The highest yield was found in BR14563-4R-96 which gave 7.13 t/ha yields with 134 days growth durations followed by the genotype BR14563-4R-259 having a grain yield of 7.02 t/ha (Table 10b.5). The heritability obtained for the growth duration, plant height and yield were 49%, 67% and 90%, respectively, indicating moderate to high level of precision in this experiment (Table 18b.5).

Table 10b.5. Performance of the selected genotypes of Observational Yield Trial (OYT) for development of pigmented rice with nutraceutical properties, Boro 2024-25

SL.No	Designation	GD(days)	PH(cm)	Yield (t/ha)	Trait Markers
1	BR14563-4R-96	134	112	7.13	Wx(a)-NB/Wx(op) DTH8
2	BR14563-4R-259	119	107	7.02	Wx(a)-NB/Wx(op) DTH8
3	BR14572-4R-73	130	123	6.40	Wx(a) Pita
4	BR14563-4R-224	121	129	6.11	Wx(a) fgr-1 DTH8
5	BR14567-4R-7	121	116	6.04	Pita fgr-1 DTH8
6	BR14563-4R-113	121	131	6.01	Wx(a)-NB/Wx(op) DTH8
7	BR14571-4R-346	133	114	5.96	Wx(a) Pita DTH8
8	BR14563-4R-129	134	116	5.92	DTH8
9	BR14572-4R-157	138	131	5.55	Wx(int)-Basmati Pita DTH8
10	BR14571-4R-345	129	141	5.50	Wx(a) DTH8
11	BR14574-4R-77	124	139	5.49	Wx(a)-NB fgr-1,DTH8
12	BR14567-4R-73	129	117	5.38	Pita DTH8
13	BR14563-4R-199	132	134	5.35	Wx(a) Pita DTH8
14	BR14563-4R-36	132	124	5.32	Wx(a)-NB/Wx(op) DTH8
15	BR14567-4R-64	137	118	5.27	Wx(a) Pita DTH8
16	BR14563-4R-35	132	110	5.27	Wx(a)-NB/Wx(op) DTH8
17	BR14563-4R-81	129	113	5.24	Wx(a) DTH8
18	BR14571-4R-314	138	111	5.24	Wx(a) fgr-1 DTH8
19	BR14563-4R-183	136	122	5.21	Wx(a) DTH8
20	BR14563-4R-27	128	103	5.20	Wx(a)-NB/Wx(op) DTH8
21	BR14572-4R-55	135	144	5.18	Wx(int)-Basmati Pita
22	BR14568-4R-121	129	100	5.12	
23	BR14571-4R-45	131	120	4.99	Wx(a)
24	BR14571-4R-162	137	107	4.99	Wx(a) Pita DTH8
25	BR14563-4R-149	134	102	4.98	Wx(a) DTH8
Ck	BRRI dhan102	130	105	6.54	
Ck	BRRI dhan89	129	109	6.80	
LSD(0.05)		11.6	5.5	0.68	
h2b		49	67	90	

DS: 29/12/2024

DT: 27/01/2025

Experiment 10b.6: Advanced Yield Trial (AYT)

Principal Investigator: S Ghosal

Co-Investigators: S Maniruzzaman, M R Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific objective: Advanced evaluation of medium duration pigmented/ black rice genotypes for higher yield potential with intense black pigmentation.

Materials and Methods: 33 advanced pigmented/black rice genotypes with along with three checks, were evaluated in an RCB design with two replications. Thirty-day-old seedlings were transplanted at a spacing of 20 cm × 20 cm using a single seedling/hill. The plot size was 6.72m². Fertilizers were applied as described in experiment 10b.1. Crop management was carried out as and when necessary.

Results: The overall performance of the AYT genotypes was not good, producing a yield ranging from 2.3 t/ha to 4.9 t/ha having very less or no-pigmentation. Only two genotypes were selected out of 33 genotypes to be repeated in AYT. The genotypes were BR13940-4R-197 and BR13940-4R-91. The heritability obtained for the growth duration, plant height and yield was 84%, 48% and 51%, respectively, indicating a medium to high level of precision in this experiment (Table 10b.6).

Table 10b.6: Performance of some of the genotypes of Advanced Yield Trial (AYT) for development of pigmented rice with nutraceutical properties, Boro 2024-25

SI No.	Designation	GD (days)	PH (cm)	Yield (t/ha)
1	BR13755-5R-49	133	137	4.95
2	BR13945-4R-24	133	124	4.76
3	BR13940-4R-191	129	135	4.74
4	BR13755-5R-14	131	134	4.64
5	BR13755-5R-6	133	140	4.40
6	BR13940-4R-69	131	129	4.34
7	BR13940-4R-56	123	131	4.28
8	BR13940-4R-14	132	135	4.25
9	BR13754-5R-8	133	131	4.24
10	BR13940-4R-197	132	124	4.53
33	BR13940-4R-91	132	132	4.31
34	BRRI dhan88 (Ck)	121	127	3.93
35	BRRI dhan89 (Ck)	133	121	5.01
	LSD(0.05)	3.996	4.9	0.945
	H ² B	0.84	48	51

DS: 29/12/2023

DT: 03/02/2024

Experiment 10b.7: Regional Yield Trial (RYT)

Principal Investigator: S Ghosal

Co-Investigators: S Maniruzzaman, M R Islam, S T Tuba, A Rahman, M M Yasmin and K M Iftekharuddaula

Specific Objectives: Evaluation of anthocyanin-enriched breeding lines for high yield potential and adaptability in different agro-climatic conditions.

Materials and Methods: A total of six materials, including two checks, were evaluated in the RYT across eight locations using a Randomized Complete Block (RCB) design with three replications (Table 18b.8). Thirty-five days old seedlings were transplanted at a spacing of 20 cm × 20 cm using two to three seedlings/hill. The plot size was 12m². Fertilizer management was done as per the recommended dose according to agro-ecological zone. In general, the dose was 260 kg Urea, 100 TSP, 120 MP, 110 Gypsum, 11 kg ZnSO₄/ha. Urea was applied in three splits at 15, 30 and 45 days after transplanting (before PI stage). Total amount of P, K, Gypsum and ZnSO₄ were applied at final land preparation. Weeding, pest control measures and other cultural practices were carried out as and when necessary.

Results: The genotype BR12839-4R-106 produced 5.53 t/ha yield with a growth duration of 139 days (Table 10b.8a). The Cyanidin-3-Glucoside (C3G) Conc., Total Phenolic Compound (TPC) and Total Antioxidant Capacity (TAC) of this genotype are 351.12 mg/100g GAE; 44.7 mg GAE and 609.05 μ M AAE/100g; which are very good value as a high antioxidant enriched genotype (Table 10b.8b). Though the genotype is not out-yielded than the non-pigmented check varieties BRRI dhan88 and BRRI dhan89 which produced 5.9 t/ha and 6.6 t/ha, respectively. This genotype can be selected for further evaluation in ALART. The heritability of growth duration and yield was 92% and 84% respectively, indicating a medium to high level of precision in this experiment (Table 10b.7a).

Table 10b.7a: Performance of genotypes in Regional Yield Trial (RYT), Development for development of pigmented rice with nutraceutical properties, Boro 2024-25

SN	Designation	GD (days)	Yield (t/ha)								Trait of Interest
			Bari	Bha	Cum	Gaz	Hab	Ran	Sat	Mean	
1	BR12839-4R-106	139	6.5	6.3	6.3	6.5	4.2	5.2	3.8	5.5	Wx-ex10,Wx-A, Gn1a,Chalk5,GS3,Alk,Pi54
2	BR12839-4R-138-4	138	5.6	7.6	6.1	5.9	3.8	5.7	3.7	5.5	Wx-ex10,Wx-A, Gn1a,Chalk5,GS3,Pi54
3	BR12839-4R-5-2	138	6.4	6.3	5.8	5.9	3.1	5.7	4.0	5.3	Wx-ex10,Wx-A, Gn1a,Chalk5,GS3,Alk,Pi54
4	BR12839-4R-137	132	5.5	5.9	4.8	5.1	3.5	6.5	4.2	5.1	Wx-ex10,Wx-A, Gn1a,GS3,Alk,Pi54,Pita2
5	BR12838-4R-89-1	135	6.4	5.7	5.3	4.9	3.0	6.9	3.1	5.0	Wx-ex10,Wx-A, Gn1a,Chalk5,GS3,Alk,Pi54,Pita2
6	BR 12839-4 R-93	135	6.7	6.8	5.7	3.9	3.2	4.3	3.3	4.8	Wx-ex10,Wx-A, Gn1a,Chalk5,GS3,Pi54
7	BR12837-5R-57	148	4.7	-	3.7	5.2	4.0	5.1	2.0	4.3	
8	BRRI dhan88	131	7.1	7.5	5.3	4.2	4.2	6.4	6.5	5.9	
9	BRRI dhan89	141	7.1	8.3	7.3	5.2	5.3	8.6	4.5	6.6	
	LSD	4.35	0.99	0.40	0.56	1.10	0.48	1.26	0.89	0.85	
	H2b	92	81	97	96	77	94	87	93	84	

Table 10b.7b: Physicochemical and antioxidant property of the top performing genotypes

SN	Designation	Amylose (%)	Cyanidin-3-Glucoside (C3G) Conc. (ppm or mg/Kg or µg/g)	Total Phenolic Compound (TPC) mg/100g GAE)	Total Antioxidant Capacity (TAC) µM AAE/100g)
1	BR12839-4R-106	23.9	351.12	44.7	609.05
2	BR12839-4R-138-4	20.7	-	--	--
3	BR12839-4R-5-2	21.6	441.66	38.09	642.81
4	BR12839-4R-137	22.6	387.11	37.9	615.61
8	BRRI dhan88	26.3	none	19.1	312.21
9	BRRI dhan89	28.3	none	19.5	298.65

Experiment 10b.8: Advanced Line Adaptive Research Trial of Medium duration Pigmented rice (ALART_AOE_Medium duration)

Principal Investigator: ARD scientists
Co-Investigators: S, Ghosal, S Maniruzzaman, M R Islam, S T Tuba, M M Yeasmin, A Rahman, K M Iftekharuddaula

Specific objective: Evaluation of antioxidant breeding lines for yield potential and adaptability test under different agro-climatic conditions of Bangladesh.

Materials and Methods: Advanced Line Adaptive Research Trial (ALART) consists of two genotypes and one check namely BRRI dhan88. Twenty-five days old seedlings of each genotype were transplanted @2-3 seedlings with a spacing of 20cm×20cm. The unit plot size was 5m×4m (20 m²). The field layout was RCBD with three replications. Fertilizers were applied @200 kg urea, 85 kg TSP, 110 kg MoP, 55 kg gypsum, and 9 kg zinc sulfate/ha. The total amount of TSP, gypsum, and two-thirds MoP was applied at the time of final land preparation. The total amount of zinc sulfate was applied at the first top dressing. Urea was applied in equal three splits at 15, 30, and 45 days after transplanting. The rest of the one-third MoP was applied during the second top-dressing of urea. Weeding, pest control measures, and other cultural practices were carried out as and when necessary. Fertilizer doses may be changed based on AEZ, location and soil fertility status.

Results: The genotype BR12839-4R-157-2 produced 7.27 t/ha yield with a growth duration of 148 days followed by the genotype BR12839-4R-5-2 which produced 5.20 t/ha yield with a growth duration of 147 days (Table 10b.9a). The non pigmented check variety, BRRI dhan100 produced a slightly higher yield of 7.65 t/ha which is not significantly different. The Cyanidin-3-Glucoside (C3G) Conc., Total Phenolic Compound (TPC) and Total Antioxidant Capacity (TAC) of this genotype BR12839-4R-157-2 are 459.10 mg/100g GAE; 38.80mg GAE and 691.05 µM AAE/100g; and that of for the genotype BR12839-4R-5-2 are 441.66 mg/100g

GAE; 38.09mg GAE and 642.81µM AAE/100g; which are very good value as a high antioxidant enriched genotype (Table 10b.9b). Any one of these two genotypes can be selected for Proposed variety trial (PVT) under the medium duration category in the next season. The CV of the experiment for grain yield was 6.0 indicating high level of precision in this experiment (Table 10b.8a).

Table 10b.8a. Performance of the genotypes in the ALART_medium duration, Boro 2024-25

Locations	PH (cm)			GD (days)			Yield (t/ha)		
	BR12839-4R-157-2	BR12839-4R-5-2	BRRI dhan100	BR12839-4R-157-2	BR12839-4R-5-2	BRRI dhan100	BR12839-4R-157-2	BR12839-4R-5-2	BRRI dhan100
Satkhira	118	104	121	141	132	140	9.0	8.30	8.80
Bhanga	117	112	107	148	153	152	7.66	8.12	8.41
Cumilla	110	110	101	138	138	138	6.42	6.12	6.97
Gopalganj	119	120	111	147	144	144	8.02	7.75	8.95
Rajshahi	115	115	102	143	143	125	6.30	6.64	6.85
Sirajganj	113	113	117	151	151	146	7.42	7.62	7.13
Rangpur	112	113	104	168	168	156	6.67	6.40	7.67
Habiganj	118	114	111	150	151	151	7.03	6.93	7.21
Gazipur	111	107	100	147	145	138	6.92	6.92	6.9
Mean	115	112	108	148	147	143	7.27	7.20	7.65
LSD(0.05)	4.15			2.1			0.72		
CV	2.27			0.88			6		

Table 10b.8b: Physicochemical and antioxidant property of the top performing genotypes

SN	Designation	Amylose (%)	Cyanidin-3-Glucoside (C3G) Conc. (µg/g)	Total Phenolic Compound (TPC mg/100g GAE)	Total Antioxidant Capacity (TAC µM AAE/100g)	Trait markers
2	BR12839-4R-157-2	22.6	459.10	38.80	691.05	Wx-ex10,Wx-A, Gn1a,GS3,Alk,Pi54,Pita2, Xa4_4
3	BR12839-4R-5-2	21.6	441.66	38.09	642.81	Wx-ex10,WxA, Gn1a,Chalk5,GS3,Alk,Pi54
4	BRRI dhan100		none	-	-	-

Experiment 10b.9: Advanced Line Adaptive Research Trial of Short duration Pigmented rice (ALART_AOE_Short duration)

Principal Investigator: ARD scientists

Co-Investigators: S, Ghosal, S Maniruzzaman, M R Islam, S T Tuba, M M Yeasmin, A Rahman, K M Iftekharuddaula

Specific objective: Evaluation of antioxidant breeding lines for yield potential and adaptability test under different agro-climatic conditions of Bangladesh.

Materials and Methods: Advanced Line Adaptive Research Trial (ALART) consists of two genotypes and one check namely BRRI dhan88. Twenty-five days old seedlings of each genotype were transplanted @2-3 seedlings with a spacing of 20 cm × 20 cm. The unit plot size was 5 m × 4 m (20 m²). The field layout was RCBD with three replications. Fertilizers were applied @200 kg urea, 85 kg TSP, 110 kg MoP, 55 kg gypsum, and 9 kg zinc sulfate/ha. The total amount of TSP, gypsum, and two-thirds MoP was applied at the time of final land preparation. The total amount of zinc sulfate was applied at the first top dressing. Urea was applied in equal three splits at 15, 30, and 45 days after transplanting. The rest of the one-third MoP was applied during the second top-dressing of urea. Weeding, pest control measures, and other cultural practices were carried out as and when necessary. Fertilizer doses may be changed based on AEZ, location and soil fertility status.

Results: The tested genotype BR12839-4R-137 produced 7.02 t/ha yield with a growth duration of 141 days whereas the non-pigmented check variety, BRRI dhan88 produced a slightly higher yield of 7.54 t/ha which is not significantly different than the test genotype. The Cyanidin-3-Glucoside (C3G) Conc., Total Phenolic Compound (TPC) and Total Antioxidant Capacity (TAC) of the genotype BR12839-4R-137 are 387.11 mg/100g GAE; 37.90mg GAE and 615.61 µM AAE/100g which is a very good value as a high antioxidant enriched genotype (Table 10b.10b). The genotype can be selected for Proposed variety trial (PVT) in short duration

category in the next season. The CV of the experiment for grain yield was 9.55 indicating high level of precision in this experiment (Table 10b.9a).

Table 10b.9a. Performance of the genotypes in the ALART_Short duration, Boro 2024-25

Locations	PH(cm)		GD(days)		Yield(t/ha)	
	BR12839-4R-137	BRRI dhan88	BR12839-4R-137	BRRI dhan88	BR12839-4R-137	BRRI dhan88
Satkhira	121	96	131	131	8.51	8.84
Bhanga	95	91	147	146	7.69	8.11
Cumilla	95	100	137	137	7.65	8.27
Sonagazi	83	77	155	155	5.13	5.88
Gopalganj	99	99	135	137	8.27	8.83
Rajshahi	98	95	135	133	7.16	6.68
Sirajganj	90	94	136	136	5.43	8.23
Rangpur	100	96	155	156	7.37	7.97
Habiganj	100	98	139	141	6.27	7.45
Gazipur	91	96	144	146	6.73	5.13
Mean	97	94	141	142	7.02	7.54
LSD(0.05)	6.29		1.19		0.81	
CV	5.67		0.73		9.55	

Table 10b.9b: Physicochemical and antioxidant property of the top performing genotypes

SN	Designation	Amylose (%)	Cyanidin-3-Glucoside (C3G) Conc. (ppm or mg/Kg or µg/g)	Total Phenolic Compound (TPC mg/100g GAE)	Total Antioxidant Capacity (TAC µM AAE/100g)	Trait markers
1	BR12839-4R-137	22.6	387.11	37.9	615.61	Wx-ex10,Wx-A, Gn1a,GS3,Alk,Pi54,Pita2
2	BRRI dhan88	26.3	none	19.1	312.21	

PROJECT 11: DEVELOPMENT OF ZINC ENRICHED RICE (ZER)

General objectives: Development of high yielding rice varieties with improved nutritional quality in term of high zinc (Zn≥24 mg/kg) in polished grain as well as development of stress tolerant with zinc enriched rice varieties like submergence + zinc, drought + zinc, salinity + zinc and cold + zinc with improved grain yield.

Project Leader: Dr. Md. Abdul Kader

Experiment 11.1: Hybridization

Principal Investigator: M A Kader

Co-investigators: R R Majumder, T K Hore, U R Shaha, S S Chaity and M I H Joy

Specific objectives: Development of new genotypes with high zinc content along with resistance to submergence, drought, salinity, cold, major insect pests and diseases, and acceptable grain quality.

Materials and Methods: Seventeen parents in T. Aman and 41 parents in Boro season were grown in four staggers at an interval of seven days to synchronize flowering for cross combinations. Twenty-five-day-old in T. Aman and thirty-day-old seedlings were transplanted in the hybridization block. Single seedling was transplanted at a spacing of 20 cm × 20 cm. Fertilizers @108 (234 kg Urea): 17.4 (87 kg TSP): 58.5 (117 kg MP): 14 (78 kg Gypsum): 4.3 (12 kg Zn SO₄) kg NPKSZn/ha were applied in the trial in T. Aman season. In Boro season, fertilizers @ 138 (300 kg Urea): 20 (100 kg TSP): 83 (165 kg MP): 20 (112 kg Gypsum): 4 (11 kg Zn SO₄) kg/ha NPKSZn were applied in the trial. All amounts of P, K, S and Zn were applied at the time of final land preparation and nitrogen were applied at three equal splits at 5-10, 20-25 and 35-40 days after transplanting (DAT). At flowering, emasculation was done on the day before anthesis using vacuum emasculator and bagging of the emasculated panicle of the recipient parents was done with glycine bag. Labelling of the glycine bag was done

properly. Pollination was performed with just anthesized panicles of the donor parent by dusting pollens on the emasculated panicle of the recipient parent.

Results: Twenty-three single crosses were made in T. Aman and 2,218 seeds were produced, while in Boro season twenty-one single crosses with 4,699 seeds were made (Table 11.1a and 11.1b). Mature F₁ seeds were harvested, sun dried and stored with proper labeling.

Table 11.1a: List of crosses made, Development of Zinc Enriched Rice (ZER), T. Aman 2024-25

SN	Cross Combination	Characteristics	No. of seeds
1	BR11665-3R-4/BR7833-11-1-3-1-2-B1	High yield and high zinc	154
2	BR11665-3R-4/BR8441-46-4-2-8	High yield and high zinc	90
3	BR11665-3R-4/BR7881-62-2-3-7-P3	High yield and high zinc	165
4	BR11666-3R-74/BR7879-17-2-4-HR3-P1	High yield and high zinc	25
5	BR11666-3R-74/BR10535-5-1-2-4-1	High yield and high zinc	120
6	BR11666-3R-74/BR10537-7-2-1-3-2	High yield and high zinc	111
7	BR11669-3R-68/BR8441-46-4-2-8	High yield and high zinc	188
8	BR11669-3R-68/BR10542-4-2-1-2-1	High yield and high zinc	78
9	BR11669-3R-106/BR7881-62-2-3-7-P3	High yield and high zinc	135
10	BR11669-3R-106/BR10537-7-2-1-3-2	High yield and high zinc	110
11	BR12145-3R-82/BR8441-46-4-2-8	High yield and high zinc	117
12	BR12145-3R-82/BR10535-5-1-2-4-1	High yield and high zinc	20
13	BR12145-3R-82/BR10537-7-2-1-3-2	High yield and high zinc	53
14	BR12145-3R-201/BR7881-62-2-3-7-P3	High yield and high zinc	38
15	BR12145-3R-201/BR10535-5-1-2-4-1	High yield and high zinc	58
16	BR12145-3R-263/BR10537-7-2-1-3-2	High yield and high zinc	60
17	BR12145-3R-263/BR10542-4-2-1-2-1	High yield and high zinc	198
18	BR12146-3R-136/BR7833-11-1-3-1-2-B1	High yield and high zinc	186
19	BR12146-3R-136/BR7879-17-2-4-HR3-P1	High yield and high zinc	25
20	BR12146-3R-136/BR10542-4-2-1-2-1	High yield and high zinc	96
21	BR12146-3R-205/BR8441-46-4-2-8	High yield and high zinc	57
22	BR12146-3R-205/BR7881-62-2-3-7-P3	High yield and high zinc	56
23	BR12152-3R-264/BR7881-62-2-3-7-P3	High yield and high zinc	78
Total			2,218

Table 11.1b: List of crosses made, Development of Zinc enriched rice (ZER), Boro 2024-25

SN	Cross combination	Characteristics	No. of F ₁ seeds
1	BR11433-4R-25/BR11431-4R-172	High yield and high zinc	150
2	BR12027-4R-118/BR12028-4R-237	High yield and high zinc	210
3	BR12038-4R-386/BR12025-4R-26	High yield and high zinc	295
4	BR11433-4R-119/BR12027-4R-156	High yield and high zinc	238
5	BR11423-4R-178/BR12036-4R-203	High yield and high zinc	257
6	BR11423-4R-196/BR12031-4R-222	High yield and high zinc	80
7	BR12038-4R-420/BR12038-4R-154	High yield and high zinc	286
8	BR11423-4R-18/BR12038-4R-403	High yield and high zinc	290
9	BR12025-4R-134/BR12038-4R-302	High yield and high zinc	146
10	BR11431-4R-28/BR12026-4R-627	High yield and high zinc	325
11	BR12036-4R-200/BR12031-4R-179	High yield and high zinc	403
12	BR11420-4R-30/BR11431-4R-38	High yield and high zinc	265
13	BR12038-4R-121/BR12035-4R-1	High yield and high zinc	174
14	BR12031-4R-96/BR11423-4R-155	High yield and high zinc	396
15	BR11423-4R-153/BR11423-4R-65	High yield and high zinc	260
16	BR12026-4R-142/BR12027-4R-169	High yield and high zinc	117
17	BR12031-4R-179/BR12027-4R-151	High yield and high zinc	172
18	BRR1 dhan100/ BRR1 dhan111	High yield and high zinc	39
19	BRR1 dhan102/ BRR1 dhan114	High yield and high zinc	247
20	BRR1 dhan84/ BRR1 dhan113	High yield and high zinc	235
21	BRR1 dhan84/ BR (Path)13800-BC3-134-25	High yield and high zinc	114
Total			4,699

Experiment 11.2: Confirmation of F₁

Principal Investigator: M A Kader

Co-investigators: R R Majumder, T K Hore, U R Shaha, S S Chaity and M I H Joy

Specific objectives: To confirm the crosses as true F₁s and use of the selected F₁s to produce F₂ seeds and use making different types of crosses.

Materials and Methods: Nineteen and eighteen single crosses were grown in T. Aman and Boro season, respectively. The F₁ seeds along with their parents were germinated in petri dish and sown on puddled soil in earthen pots. Twenty-five-day-old to thirty-day-old seedlings was transplanted at 20 cm × 20 cm in the net house along with respective parents. Fertilizer and crop management were done as experiment 11.1. From flowering to maturity stage, the F₁ plants of each cross were compared with their respective parents for different phenotypic traits to identify true F₁s.

Results: A total of 19 and 18 crosses in T. Aman and Boro season, respectively, were selected and confirmed as true F₁ comparing with their parents (Table 11.2a and 11.2b) and registered in the BR cross register.

Table 11.2a: List of crosses confirmed, Development of Zinc Enriched Rice (ZER), T. Aman 2024-25

SN	BR Reg. No.	Cross combination	Characteristics
1	BR16610	BR11664-3R-2-3/BR7833-11-1-3-1-2-B1	High yield, high zinc
2	BR16611	BR11665-3R-10-4/BR8441-46-4-2-8	High yield, high zinc
3	BR16612	BR11672-3R-3-1/BR7881-62-2-3-7-P3	High yield, high zinc
4	BR16613	BR11672-3R-3-4/BR7879-17-2-4-HR3-P1	High yield, high zinc
5	BR16615	BR11140-4-5-4-3/BR10537-7-2-1-3-2	High yield, high zinc
6	BR16616	BR11142-13-4-4-3/BR10542-4-2-1-2-1	High yield, high zinc
7	BR16617	BR11151-1-6-2-4/BR7833-11-1-3-1-2-B1	High yield, high zinc
8	BR16618	BR11140-4-4-2-6/BR8441-46-4-2-8	High yield, high zinc
9	BR16619	BR11143-5-3-3-4/BR7881-62-2-3-7-P3	High yield, high zinc
10	BR16620	BR11153-5-1-1-1/BR7879-17-2-4-HR3-P1	High yield, high zinc
11	BR16621	BR10854-4-1-1-2-8/BR10535-5-1-2-4-1	High yield, high zinc
12	BR16622	BR10855-3-2-5-2-5/BR10537-7-2-1-3-2	High yield, high zinc
13	BR16623	BR10863-8-3-5-3-2/BR10542-4-2-1-2-1	High yield, high zinc
14	BR16624	BR11176-16-7-4-4-2/BR7879-17-2-4-HR3-P1	High yield, high zinc
15	BR16625	BR11664-3R-2-3/BR8441-46-4-2-8	High yield, high zinc
16	BR16626	BR11665-3R-10-4/BR7881-62-2-3-7-P3	High yield, high zinc
17	BR16627	BR11672-3R-3-1/BR7879-17-2-4-HR3-P1	High yield, high zinc
18	BR16628	BR11672-3R-3-4/BR10535-5-1-2-4-1	High yield, high zinc
19	BR16629	BR11140-4-5-4-3/BR10535-5-1-2-4-1	High yield, high zinc

Table 11.2b: List of crosses confirmed, Development of Zinc Enriched Rice (ZER), Boro 2024-25

SN	BR Reg. No.	Cross combination	Characteristics
1	16875	BR11406-8-6-1-3/BR9674-3-12-2-2-P1	High yield, high zinc
2	16876	BR10570-29-7-3-2/BR8419-8-2-1-4-1-3-8-5	High yield, high zinc
3	16878	BR10571-15-6-8-5/BR7881-62-2-3-7-P3	High yield, high zinc
4	16879	BR11401-8-3-1-1/BR7881-62-2-3-7-P3	High yield, high zinc
5	16881	BR11406-8-6-1-3/BR7881-62-2-3-7-P3	High yield, high zinc
6	16882	BR11401-1-2-4-1/BR7879-17-2-4-HR3-P1	High yield, high zinc
7	16883	BR12041-17-5-1/BR7879-17-2-4-HR3-P1	High yield, high zinc
8	16884	BR12041-8-4-3/BR9674-1-1-5-1-P3	High yield, high zinc
9	16886	BR10552-1-1-3-4/T27A (IRR)	High yield, high zinc
10	16887	BR12041-6-1-3/BR10580-4-3-3-2	High yield, high zinc
11	16888	BR10552-1-1-4-6/BR8441-46-4-2-8	High yield, high zinc
12	16889	BR10572-2-7-1-4/BR8441-46-4-2-8	High yield, high zinc
13	16890	BR12041-45-3-3/BR8441-46-4-2-8	High yield, high zinc
14	16892	BR11406-8-6-1-3/BR8441-46-4-2-8	High yield, high zinc
15	16893	BR9674-1-4-1-3-P1/BR7833-11-1-3-1-2-B1	High yield, high zinc
16	16894	BR12041-45-3-3/BR7833-11-1-3-1-2-B1	High yield, high zinc
17	16895	BR11401-1-2-4-1/BR7833-11-1-3-1-2-B1	High yield, high zinc
18	16896	BR11406-8-6-1-3/BR7833-11-1-3-1-2-B1	High yield, high zinc

SN	BR Reg. No.	Cross combination	Characteristics

Experiment 11.3: Advancing segregating progenies in FRGA nurseries

Principal Investigator: M A Kader

Co-investigators: R R Majumder, T K Hore, U R Shaha, S S Chaity and M I H Joy

Specific objective: Rapid advancement of segregating population for shortening breeding cycle.

Materials and Methods: A total of 57,557 individual segregating progenies were grown during the reporting period. Among them, 29,769 progenies of 110 crosses of F₂-F₅ generations from T. Aman and 27,788 progenies of 81 crosses F₂-F₄ generations from Boro season were grown under field RGA condition at Gazipur. Twenty-five-day-old seedlings were transplanted at a spacing of 5 cm × 5 cm using single seedling per hill in the field. Minimal amount of fertilizers were applied and crop management were done as in experiment 11.1. Thinning of tillers was practiced in maximum tillering stage. At maturity, single mature tiller was harvested from each plant under field conditions.

Results: A total of 51,416 individual segregating progenies were harvested during the reporting period. Among these, 29,268 progenies of 110 crosses were harvested in T. Aman and 22,148 progenies of 81 crosses were harvested in Boro season from F₂ to F₄ generations at Gazipur under greenhouse and field RGA conditions (Table 11.3a and Table 11.3b).

Table 11.3a: List of segregating progenies harvested from field RGA nurseries, Development of Zinc Enriched Rice (ZER), T. Aman 2024-25

SN	BR Reg. No.	Parentage	Progenies grown	Progenies harvested
F ₂ generation				
1	BR15595	BR11144-6-1-1-3/ BR7833-11-1-3-1-2-B1	400	330
2	BR15596	BR11144-6-1-1-3/ BR10537-7-2-1-3-2	400	350
3	BR15597	BR11146-1-4-2-3/ BR10537-7-2-1-3-2	400	320
4	BR15599	BR11146-1-4-2-4/ BR10542-4-2-1-2-1	400	370
5	BR15600	BR11146-1-4-4-6/ BR8441-46-4-2-8	400	380
6	BR15601	BR11146-1-4-4-6/ BR10542-4-2-1-2-1	400	350
7	BR15602	BR11148-1-3-2-4/ BR10537-7-2-1-3-2	400	300
8	BR15603	BR11148-1-3-2-4/ BR11742-6R-27	400	370
9	BR15604	BR11148-1-3-6-5/ BR7833-11-1-3-1-2-B1	400	390
10	BR15605	BR11151-1-4-2-6/ BR11742-6R-27	400	360
11	BR15606	BR11153-1-2-2-5/ BR10542-4-2-1-2-1	400	350
12	BR15607	BR11174-1-2-3-5/ BR7833-11-1-3-1-2-B1	400	330
13	BR15609	BR12004-6R-56/ BR10537-7-2-1-3-2	400	380
14	BR15610	BR12004-6R-56/ BR11742-6R-27	400	350
15	BR15611	BR12022-6R-40/ BR8441-46-4-2-8	400	360
16	BR15612	BR12022-6R-40/ BR10537-7-2-1-3-2	400	375
			Total	6,400
				5,665
F ₃ generation				
1	BR15028	BR10005-25-8-4-7-20 /BR10537-7-2-1-3-2	300	300
2	BR15029	BR10005-25-8-4-7-20 /BR7833-11-1-3-1-2-B1	300	280
3	BR15030	BR10005-25-8-4-7-20 /BR8441-46-4-2-8	300	270
4	BR15031	BR10022-2-8-9-5-22 /BR10535-5-1-2-4-1	300	300
5	BR15032	BR10022-2-8-9-5-22 /BR7833-11-1-3-1-2-B1	300	290
6	BR15033	BR10022-2-8-9-5-22 /BR7881-62-2-3-7-P3	300	300
7	BR15034	BR10471-1-2-3-24-4 /BR10537-7-2-1-3-2	300	300
8	BR15035	BR10471-1-2-3-24-4 /BR10542-4-2-1-2-1	300	260
9	BR15036	BR10471-1-2-3-24-4 /BR7881-62-2-3-7-P3	300	300
10	BR15037	BR10475-1-2-3-5-5/BR10537-7-2-1-3-2	300	250
11	BR15038	BR10475-1-2-3-5-5/BR7833-11-1-3-1-2-B1	300	300
12	BR15039	BR10475-1-2-3-5-5/BR7881-62-2-3-7-P3	300	300
13	BR15040	BR10480-1-2-3-1-3 /BR10542-4-2-1-2-1	300	250
14	BR15043	BR10480-1-2-3-7-2/BR10537-7-2-1-3-2	300	300
15	BR15045	BR10480-1-2-3-7-2/BR7881-62-2-3-7-P3	300	290
16	BR15046	BR10490-1-2-3-11-3/BR10535-5-1-2-4-1	300	300
17	BR15047	BR10490-1-2-3-11-3/BR10542-4-2-1-2-1	300	300
18	BR15048	BR10490-1-2-3-11-3/BR8441-46-4-2-8	300	265
19	BR15049	BR10490-1-2-3-8-7 /BR10537-7-2-1-3-2	300	300
20	BR15051	BR10490-1-2-3-8-7 /BR7881-62-2-3-7-P3	300	260
21	BR15053	BR10492-1-2-3-1-1 /BR7881-62-2-3-7-P3	300	300

SN	BR Reg. No.	Parentage	Progenies grown	Progenies harvested
22	BR15054	BR10492-1-2-3-7-5 /BR10537-7-2-1-3-2	300	300
23	BR15055	BR10492-1-2-3-7-5 /BR10542-4-2-1-2-1	300	255
24	BR15056	BR10492-1-2-3-7-5 /BR7881-62-2-3-7-P3	300	300
25	BR15057	BR10493-1-2-3-21-7 /BR10542-4-2-1-2-1	300	300
26	BR15058	BR10493-1-2-3-21-7 /BR7879-17-2-4-HR3-P1	300	300
27	BR15059	BR10493-1-2-3-21-7 /BR8441-46-4-2-8	300	240
28	BR15060	BR10538-2-1-2-3-2/BR10535-5-1-2-4-1	300	260
29	BR15062	BR10538-2-1-2-3-2/BR7881-62-2-3-7-P3	300	300
30	BR15063	BR10540-4-1-2-4-1/BR10537-7-2-1-3-2	300	250
31	BR15065	BR10540-4-1-2-4-1/BR8441-46-4-2-8	300	300
32	BR15066	BR9674-1-1-5-2-P4 /BR10537-7-2-1-3-2	300	270
33	BR15067	BR9674-1-1-5-2-P4 /BR10542-4-2-1-2-1	300	300
34	BR15068	BR9674-1-1-5-2-P4 /BR7833-11-1-3-1-2-B1	300	260
35	BR15069	BRRI dhan97/BR10535-5-1-2-4-1	300	300
36	BR15072	BRRI dhan99/BR10537-7-2-1-3-2	300	300
37	BR15074	IR101791-10-1-4-3-2-4 /BR7833-11-1-3-1-2-B1	300	220
38	BR15075	IR101791-10-1-4-3-2-4 /BR7881-62-2-3-7-P3	300	300
39	BR15076	IR101791-10-1-4-3-2-4 /BR8441-46-4-2-8	300	300
40	BR15077	IR126952-41-148-38-9-60-B /BR10535-5-1-2-4-1	300	300
41	BR15078	IR126952-41-148-38-9-60-B /BR10537-7-2-1-3-2	300	230
42	BR15080	IR126952-41-148-38-9-60-B /BR7881-62-2-3-7-P3	300	270
43	BR15081	IR16F1148 /BR10537-7-2-1-3-2	300	260
44	BR15082	IR16F1148 /BR10542-4-2-1-2-1	300	300
45	BR15084	IR16F1148 /BR7881-62-2-3-7-P3	300	280
Total			13,500	12,710
F ₄ generation				
1	BR14391	BR10001-94-2-B/ BR7879-17-2-4-HR3-P1	236	220
2	BR14392	BR10001-94-2-B/ BR7840-34-4-2-2	212	200
3	BR14393	BR10001-94-2-B/ BR7528-2R-19-HR16-9-3-P7-2-2	266	245
4	BR14394	BR10001-94-2-B/ BR8444-37-2-3-1-1-B3	129	129
5	BR14395	BR9868-19-40-3-B/ IR99641-115-2-3	120	30
6	BR14396	BR9868-19-40-3-B/ BR7833-11-1-3-1-2-B1	247	247
7	BR14401	BR8442-12-1-3-1-B5/ BR7833-11-1-3-1-2-B2	283	270
8	BR14402	BR8442-12-1-3-1-B5/ BR8441-46-4-2-8	255	240
9	BR14403	BR8442-12-1-3-1-B5/ IR101760-48-1	125	125
10	BR14406	BR7528-2R-HR16-2-24-1/ BR7833-11-1-3-1-2-B1	302	280
11	BR14407	BR7528-2R-HR16-2-24-1/ BR7833-11-1-3-1-2-B2	246	246
12	BR14408	BR10534-2-3-2-1-1/ BR7833-11-1-3-1-2-B1	315	290
13	BR14409	BR10534-2-3-2-1-1/ IR101760-48-1	258	230
14	BR14410	BR10534-2-3-2-1-1/ BR7528-2R-19-HR16-9-3-P7-2-2	305	270
15	BR14412	BR10534-2-3-2-1-1/ BR8444-37-2-3-1-1-B3	262	250
16	BR14413	BR10535-5-1-2-2-1/ BR8441-46-4-2-8	245	230
17	BR14414	BR10535-5-1-2-2-1/ BR7833-11-1-3-1-2-B2	370	320
18	BR14416	BR10535-5-1-2-2-1/ BR7840-34-4-2-2	320	295
19	BR14417	BR10535-5-1-2-2-1/ BR7833-11-1-3-1-2-B1	248	248
20	BR14418	HHZ5-DT20-DT2-DT1/ IR17A1080	250	250
21	BR14419	HHZ5-DT20-DT2-DT1/ IR101760-48-1	350	320
22	BR14420	HHZ5-DT20-DT2-DT1/ BR7833-11-1-3-1-2-B2	370	330
23	BR14421	HHZ5-DT20-DT2-DT1/ BR7881-62-2-3-7-P3	200	200
24	BR14428	BR8548-8-22-5-15/ BR8441-46-4-2-8	165	160
25	BR14429	BR8548-8-22-5-15/ BR7879-17-2-4-HR3-P1	141	130
26	BR14430	BR9158-19-9-6-50-2-HR1/ BR8444-37-2-3-1-1-B3	225	225
27	BR14431	BR9158-19-9-6-50-2-HR1/ IR99641-115-2-3	195	160
28	BR14432	IR13F441/ BR7879-17-2-4-HR3-P1	250	240
29	BR14435	IR13F441/ IR101760-48-1	248	220
30	BR14436	BR7528-2R-HR16-2-24-1/ IR17A1211	338	300
31	BR14437	BR7528-2R-HR16-2-24-1/ IR17A1080	268	268
Total			7,744	7,168
F ₅ Generation				
1	BR13837	BRRI dhan71/ BR9674-1-1-5-4-P4	200	200
2	BR13838	BRRI dhan73 / BR7528-2R-19-HR16-E5-136-1	200	200
3	BR13839	BRRI dhan79 / BR9674-1-1-5-4-P4	175	175
4	BR13840	BRRI dhan80/ BR7528-2R-19-HR16-E5-136-1	172	172
5	BR13841	BRRI dhan84/ BR9674-1-1-5-4-P4	200	200
6	BR13842	BR7528-2R-HR16-2-24-1/ BRRI dhan43	225	225
7	BR13843	BR8442-12-1-3-1-B1/ BRRI dhan42	216	216
8	BR13844	IR101760-48-1 / BRRI dhan43	200	200
9	BR13845	IR99641-115-2-3/ BR9674-1-1-5-4-P4	225	225
10	BR13846	BRRI dhan89/ BR 7881-62-2-3-7-P3	200	200
11	BR13847	BRRI dhan80/ BR9674-1-1-5-4-P4	200	200
12	BR13848	BRRI dhan84/ BR 7528-2R-19-HR16-E5-136-1	227	227
13	BR13849	BRRI dhan87/ BR9674-1-1-5-4-P4	200	200

SN	BR Reg. No.	Parentage	Progenies grown	Progenies harvested
14	BR13850	BR8444-37-2-3-1-1-B3/ BR9674-1-1-5-4-P4	225	225
15	BR13851	IR101760-48-1/ BRR1 dhan42	220	220
16	BR13852	BRR1 dhan80/ BR7528-2R-19-HR16-9-3-P7-2-2	200	200
17	BR13853	BRR1 dhan87/ BR 7528-2R-19-HR16-E5-136-1	240	240
18	BR13854	BRR1 dhan89/ BR9674-1-1-5-4-P4	200	200
Total			3,725	3,725
Grand Total			29,769	29,268

Table 11.3b: List of segregating progenies harvested from field RGA nurseries, Development of Zinc Enriched Rice (ZER), Boro 2024-25

SN	BR Reg. No.	Parentage	Progenies grown	Progenies harvested
F₂ generation				
1	BR16083	BR9674-1-4-1-3-P1 / BR8419-8-2-1-4-1-3-8-5	400	200
2	BR16084	BR9674-7-3-2-1-P2 / BR7840-54-3-4-3	400	250
3	BR16085	BR9674-7-3-2-1-P2 / BR7833-11-1-3-1-2-B1	400	200
4	BR16086	BR9674-3-9-2-1-P3 / BR8441-46-4-2-8	400	200
5	BR16087	BR9674-7-3-2-2-P2 / BR8419-8-2-1-4-1-3-8-5	400	300
6	BR16088	BR9674-7-3-2-2-P2 / BR7879-17-2-4-HR3-P1	400	310
7	BR16089	BR10571-15-6-8-5 / BR10580-4-3-3-2	400	250
8	BR16090	BR10575-1-2-1-4 / BR8419-8-2-1-4-1-3-8-5	400	250
9	BR16091	BR10576-16-2-4-2 / BR7833-11-1-3-1-2-B1	400	200
10	BR16092	BR11894-4R-169/ BR7833-11-1-3-1-2-B1	400	200
11	BR16094	IR16F1063/ BR7881-62-2-3-7-P3	400	200
12	BR16095	IR16F1063/ BR8441-46-4-2-8	400	259
13	BR16096	BR11714-4R-148/ BR7840-54-3-4-3	400	250
14	BR16097	BR11714-4R-75/ BR8419-8-2-1-4-1-3-8-5	400	260
Total			5,600	3,329
F₃ generation				
1	BR15385	BR9674-8-15-3-28-P3/ T27A	100	100
2	BR15386	BR9674-3-9-2-1-P3/BR8441-46-4-2-8	150	150
3	BR15388	BR9674-7-3-2-2-P1/ BR10580-4-3-3-2	300	265
4	BR15389	BR9674-7-3-2-2-P1/ BR7881-62-2-3-7-P3	200	180
5	BR15390	BR9674-7-3-2-2-P1/ NSIC158	200	200
6	BR15391	BR11716-4R-105/ BR7879-17-2-4-HR3-P1	250	230
7	BR15393	BR11716-4R-105/ T27A	180	150
8	BR15394	BR11712-4R-227/ BR8419-8-2-1-4-1-3-8-5	400	250
9	BR15396	BR11712-4R-227/ BR7879-17-2-4-HR3-P1	400	300
Total			2,180	1,825
F₄ generation				
1	BR14790	BR8912-12-6-1-1-1-1/BR9674-3-12-2-2-P1	338	300
2	BR14791	BR8912-12-6-1-1-1-1/BR8419-8-2-1-4-1-3-8-5	341	335
3	BR14792	BR8912-12-6-1-1-1-1/BR7840-54-3-4-3	369	300
4	BR14793	BR8912-12-6-1-1-1-1/BR7881-62-2-3-7-P3	100	100
5	BR14794	BR8912-12-6-1-1-1-1/BR8441-46-4-2-8	378	300
6	BR14795	BR8912-12-6-1-1-1-1/BR7833-11-1-3-1-2-B1	336	320
7	BR14796	IR105837-8-95-2-1 /BR8419-8-2-1-4-1-3-8-5	338	320
8	BR14797	IR105837-8-95-2-1 /BR7840-54-3-4-3	360	300
9	BR14798	IR105837-8-95-2-1 /BR7881-62-2-3-7-P3	315	300
10	BR14799	IR105837-8-95-2-1 /BR8441-46-4-2-8	378	330
11	BR14800	BRR1 dhan102 /BR9674-3-12-2-2-P1	380	320
12	BR14801	BRR1 dhan102 /BR8419-8-2-1-4-1-3-8-5	341	300
13	BR14802	BRR1 dhan102 /BR7840-54-3-4-3	336	330
14	BR14803	BRR1 dhan102 /BR7881-62-2-3-7-P3	379	370
15	BR14804	BRR1 dhan102 /BR8441-46-4-2-8	370	250
16	BR14805	BRR1 dhan102 /BR7833-11-1-3-1-2-B1	378	350
17	BR14806	BRR1 dhan100/BR9674-3-12-2-2-P1	314	280
18	BR14807	BRR1 dhan100/BR7840-54-3-4-3	365	300
19	BR14808	BRR1 dhan100/BR7881-62-2-3-7-P3	382	300
20	BR14809	BRR1 dhan100/BR7833-11-1-3-1-2-B1	360	250
21	BR14810	IR101791-10-1-4-3-2-4/BR7881-62-2-3-7-P3	286	250
22	BR14811	BRR1 dhan97/BR9674-3-12-2-2-P1	377	350
23	BR14812	BRR1 dhan97/BR8441-46-4-2-8	380	250
24	BR14813	BRR1 dhan97/BR7833-11-1-3-1-2-B1	362	320
25	BR14814	BRR1 dhan99/BR9674-3-12-2-2-P1	330	190
26	BR14815	BRR1 dhan99/BR8419-8-2-1-4-1-3-8-5	331	300
27	BR14816	BRR1 dhan99/BR7840-54-3-4-3	359	280
28	BR14817	BRR1 dhan99/BR7881-62-2-3-7-P3	278	250
29	BR14818	BRR1 dhan99/BR7879-17-2-4-HR3-P1	321	250
30	BR14819	BRR1 dhan99/BR7833-11-1-3-1-2-B1	379	350
31	BR14820	BRR1 dhan81/BR8441-46-4-2-8	311	260

SN	BR Reg. No.	Parentage	Progenies grown	Progenies harvested
32	BR14821	BRR1 dhan81/BR7833-11-1-3-1-2-B1	380	330
33	BR14822	BRR1 dhan88/BR9674-3-12-2-2-P1	378	250
34	BR14823	BRR1 dhan88/BR8441-46-4-2-8	286	280
35	BR14824	BRR1 dhan89/BR7840-54-3-4-3	377	290
36	BR14825	BRR1 dhan89/BR7881-62-2-3-7-P3	330	280
37	BR14826	BRR1 dhan89/BR8441-46-4-2-8	319	319
38	BR14827	BRR1 dhan89/BR7833-11-1-3-1-2-B1	332	320
39	BR14828	BRR1 dhan92/BR9674-3-12-2-2-P1	380	270
40	BR14829	BRR1 dhan92/BR8419-8-2-1-4-1-3-8-5	360	250
41	BR14830	BRR1 dhan92/BR8441-46-4-2-8	352	280
42	BR14831	BRR1 dhan92/BR7833-11-1-3-1-2-B1	378	300
43	BR14832	BRR1 dhan96/BR9674-3-12-2-2-P1	380	200
44	BR14833	BRR1 dhan96/BR8419-8-2-1-4-1-3-8-5	376	350
45	BR14834	BRR1 dhan96/BR7840-54-3-4-3	380	340
46	BR14835	BRR1 dhan96/BR7879-17-2-4-HR3-P1	282	210
47	BR14836	BRR1 dhan96/BR8441-46-4-2-8	370	335
48	BR14837	BRR1 dhan96/BR7833-11-1-3-1-2-B1	320	290
49	BR14838	IR64-pi9 NILS /BR9674-3-12-2-2-P1	382	344
50	BR14839	IR64-pi9 NILS /BR8419-8-2-1-4-1-3-8-5	360	360
51	BR14840	IR64-pi9 NILS /BR7881-62-2-3-7-P3	298	274
52	BR14841	7 FBR-336/BR9674-3-12-2-2-P1	372	350
53	BR14842	7 FBR-355 /BR9674-3-12-2-2-P1	312	295
54	BR14843	7 FBR-355 /BR8419-8-2-1-4-1-3-8-5	331	320
55	BR14844	7 FBR-355 /BR7840-54-3-4-3	360	230
56	BR14845	7 FBR-355 /BR7881-62-2-3-7-P3	382	300
57	BR14846	7 FBR-355 /BR8441-46-4-2-8	379	362
58	BR14847	7 FBR-355 /BR7833-11-1-3-1-2-B1	280	260
Total			20,008	16,994
Grand Total			27,788	22,148

Experiment 11.4: Line Stage Testing (LST)

Principal investigator: MA Kader

Co-investigators: R R Majumder, T K Hore, U R Shaha, S S Chaity and M I H Joy

Specific objectives: To select uniform genotypes in terms of plant height and days to flowering with key target traits.

Materials and Methods: Total 4,494 progenies from 27 crosses were grown in T. Aman season and in Boro season 15,046 progenies from 81 crosses were grown in a 2.6 m single-row plot with a spacing of 20 cm × 20 cm in the field using systematic arrangement pattern. Thirty to thirty-five days old single seedling was transplanted at 20 cm × 20 cm in the plots. Fertilizer and crop management was done following the protocol described in experiment 11.1. Leaf samples were collected from single plant of selected entries for genotyping with trait markers using trait-based SNP markers. Selection was done considering uniformity in plant height, days to flowering, grain size and shape, lodging tolerance and tolerance to major disease and insect over check varieties under field conditions and presence of target key traits.

Results and Discussion: A total of 372 lines were harvested based on visual observation on homogeneity in flowering, plant height and grain size and shape (Table 11.4a) in T. Aman season. The selected lines showed a wide range of variations in plant height and growth duration. The growth duration of the selected lines started from 117-136 days, and the selection intensity was found 8% (Fig. 11.4a). The trait marker profile of the genotypes of LST is presented in Fig. 11.4b. Most of the selected materials from LST contained genes of high amylose and 144 lines harbored genes of high zinc content and some of the materials also showed drought tolerance QTLs. Some of the lines also showed gall midge and bacterial blight resistance (xa5). The list of QTL combinations of the BR cross families is presented in Table 11.4b. All the RGA derived fixed lines of the cross families were selected for initial yield evaluation.

In Boro Season, 963 lines were harvested from LST (F₅ and F₆ generation) based on visual observation on homogeneity in flowering, plant height and grain size and shape (Table 11.4c). The selected lines showed a wide range of variations in plant height and growth duration. The

growth duration of the selected lines started from 135-162 days, and the selection intensity was found 6.40% (Fig. 11.4c). The trait marker profile of the genotypes of LST is presented in Fig. 11.4d. Most of the selected materials from LST contained genes of high amylose. About 675 lines showed genes of higher no. of grains. A total of 159 lines showed the QTLs of high zinc content. Some of the materials also showed genes of aroma. A Few lines also showed bacterial blight and blast resistance genes. The list of QTL combinations of the BR cross families is presented in Table 11.4d.

Table 11.4a: List of selected genotypes of Line Stage Testing (LST) Trial, Development of Zinc Enriched Rice (ZER), T. Aman 2024-25

SN	BR Reg. No	Parentage	Progenies grown	Progenies harvested
1	BR13263	BRRI dhan71/BR7833-11-1-3-1-2-B1	183	16
2	BR13264	BRRI dhan71/ BR7833-11-1-3-1-2-B2	192	38
3	BR13265	BRRI dhan71/BR8441-46-4-2-8	187	30
4	BR13266	BRRI dhan71/ BR 7881-62-2-3-7-P3	136	18
5	BR13267	BRRI dhan71/BR 7879-17-2-4-HR3-P1	197	23
6	BR13268	BRRI dhan71/BR7528-2R-19-HR16-9-3-P7-2-2	144	17
7	BR13269	BRRI dhan73/BR7833-11-1-3-1-2-B1	194	14
8	BR13270	BRRI dhan73/BR7833-11-1-3-1-2-B2	148	12
9	BR13271	BRRI dhan73/BR8441-46-4-2-8	175	16
10	BR13272	BRRI dhan73/ BR 7881-62-2-3-7-P3	152	09
11	BR13273	BRRI dhan73/BR 7879-17-2-4-HR3-P1	115	15
12	BR13274	BRRI dhan73/BR7840-34-4-2-2	171	11
13	BR13275	BRRI dhan73/BR7528-2R-19-HR16-9-3-P7-2-2	150	05
14	BR13276	BRRI dhan79/BR7833-11-1-3-1-2-B1	180	08
15	BR13277	BRRI dhan79/BR7833-11-1-3-1-2-B2	175	19
16	BR13278	BRRI dhan79/BR 7881-62-2-3-7-P3	136	09
17	BR13279	BRRI dhan79/BR 7879-17-2-4-HR3-P1	153	12
18	BR13281	BRRI dhan80/ BR 7881-62-2-3-7-P3	154	08
19	BR13282	BRRI dhan84/BR 7879-17-2-4-HR3-P1	165	08
20	BR13283	BR7528-2R-HR16-2-24-1/BR7528-2R-19-HR16-9-3-P7-2-2	138	10
21	BR13284	BR8410-16-4-17-9-1/BR7833-11-1-3-1-2-B1	147	14
22	BR13285	BR8410-16-4-17-9-1/BR7833-11-1-3-1-2-B2	169	09
23	BR13286	BR8410-16-4-17-9-1/BR8441-46-4-2-8	170	09
24	BR13287	BR8444-37-2-3-1-1-B3/BR8441-46-4-2-8	198	12
25	BR13288	BRRI dhan79/BR8444-37-2-3-1-1-B3	200	11
26	BR13289	BRRI dhan84/BR7833-11-1-3-1-2-B2	195	11
27	BR13290	BR7528-2R-16-2-24-1/BR7833-11-1-3-1-2-B1	170	08
Total			4,494	372



Fig. 11.4a. Selection intensity genotypes of LST, ZER, T. Aman 2024-25

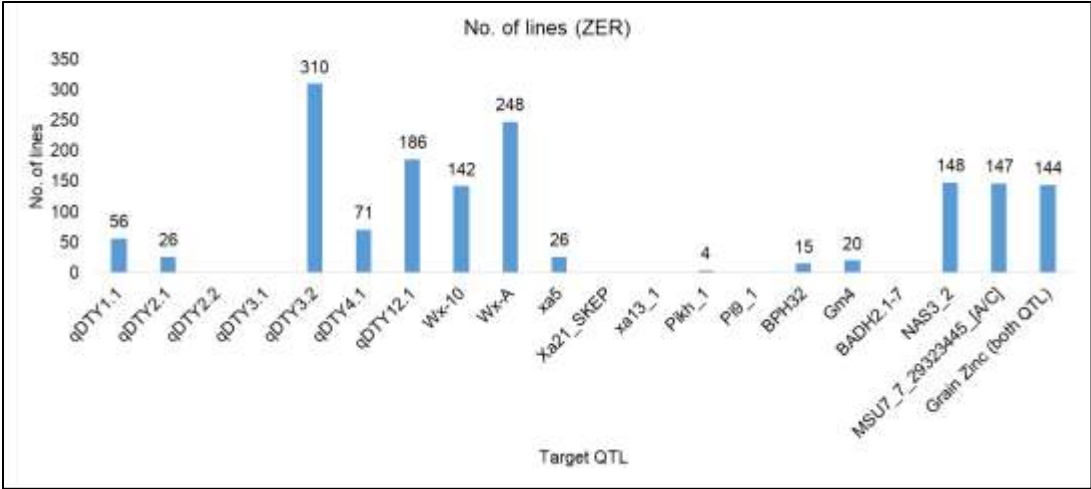


Fig. 11.4b: Trait marker profile of genotypes of LST, ZER, T. Aman 2024-25

Table 11.4.b. List of trait marker combination of the crosses of Line Stage Testing (LST) Trial, Development of Zinc Enriched Rice (ZER), T. Aman 2024-25

SN	BR Reg. No.	Trait combination	No. of lines
1	BR13263	qDTY1.1+qDTY3.2+qDTY4.1+qDTY12.1+Wx-A+Zinc	2
		qDTY1.1+qDTY3.2+qDTY4.1+qDTY12.1+Zinc	1
		qDTY1.1+qDTY3.2+Wx-A	1
		qDTY1.1+qDTY3.2+Wx-A+Zinc	1
		qDTY3.2+qDTY4.1+qDTY12.1+Wx-A+Zinc	1
		qDTY3.2+qDTY4.1+qDTY12.1+Zinc	2
		qDTY3.2+qDTY4.1+Wx-A+Zinc	1
		qDTY3.2+qDTY4.1+Zinc	3
		qDTY3.2+Wx-A+Zinc	1
		qDTY3.2+Zinc	1
		Wx-A	1
		Zinc	1
2	BR13264	qDTY1.1+qDTY3.2+Pikh_1+Zinc	1
		qDTY1.1+qDTY3.2+qDTY12.1+Zinc	1
		qDTY1.1+qDTY3.2+qDTY4.1+qDTY12.1+Wx-A+Zinc	2
		qDTY1.1+qDTY3.2+qDTY4.1+Zinc	7
		qDTY1.1+qDTY3.2+Zinc	3
		qDTY1.1+Zinc	1
		qDTY3.2+qDTY12.1+Wx-A+Zinc	1
		qDTY3.2+qDTY12.1+Zinc	2
		qDTY3.2+qDTY4.1+qDTY12.1+Zinc	4
		qDTY3.2+qDTY4.1+Wx-A+Zinc	4
		qDTY3.2+qDTY4.1+Zinc	4
		qDTY3.2+Zinc	6
		qDTY4.1+Zinc	1
3	BR13265	qDTY1.1+qDTY3.2+qDTY4.1+Wx-10+Wx-A+Zincc Q	1
		qDTY1.1+qDTY3.2+Wx-10+Wx-A	2
		qDTY1.1+qDTY3.2+Wx-A+Zinc	5
		qDTY3.2+qDTY4.1+qDTY12.1+Zinc	1
		qDTY3.2+qDTY4.1+Wx-10+Wx-A	7
		qDTY3.2+qDTY4.1+Wx-10+Wx-A+Zincc Z	2
		qDTY3.2+qDTY4.1+Wx-A+Zinc	1
		qDTY3.2+Wx-10+Wx-A	4
		qDTY3.2+Wx-10+Wx-A+BPH32	1
		qDTY3.2+Wx-10+Wx-A+Zinc	6
4	BR13266	qDTY1.1+qDTY2.1+qDTY3.2+qDTY12.1+Wx-A+Zinc	1
		qDTY1.1+qDTY3.2+qDTY12.1+Wx-10+Wx-A+Zincc	3
		qDTY1.1+qDTY3.2+qDTY4.1+qDTY12.1+Wx-10+Wx	3
		qDTY1.1+qDTY3.2+qDTY4.1+Wx-10+Wx-A	1
		qDTY12.1+Wx-A+Zinc	1
		qDTY2.1+qDTY3.2+qDTY4.1+Wx-A+Pikh_1+Zinc	1
		qDTY2.1+qDTY3.2+qDTY4.1+Wx-A+Zinc	1
		qDTY2.1+qDTY3.2+Wx-A+Zinc	1
		qDTY3.2+qDTY4.1+Wx-A	1
		qDTY3.2+Wx-10+Wx-A	1
		qDTY3.2+Wx-10+Wx-A+Zinc	1
		Wx-10+Wx-A+Zinc	1
		Wx-A	2
5	BR13267	qDTY1.1+qDTY2.1+qDTY3.2+qDTY12.1+Wx-A+Zinc	3
		qDTY1.1+qDTY2.1+qDTY3.2+qDTY4.1+qDTY12.1+	1
		qDTY1.1+qDTY2.1+qDTY3.2+qDTY4.1+Wx-A+Zinc	1

SN	BR Reg. No.	Trait combination	No. of lines
		qDTY1.1+qDTY2.1+qDTY3.2+Wx-A+Zincc	1
		qDTY1.1+qDTY3.2+qDTY12.1+Wx-A+Zinc	1
		qDTY1.1+qDTY3.2+qDTY4.1+qDTY12.1+Wx-A+Zinc	1
		qDTY2.1+qDTY3.2+qDTY4.1+qDTY12.1+Wx-10+W	1
		qDTY2.1+qDTY3.2+qDTY4.1+qDTY12.1+Wx-A+Gm	1
		qDTY2.1+qDTY3.2+qDTY4.1+Wx-A+Zinc	2
		qDTY2.1+qDTY3.2+Wx-A+Gm4+Zinc	2
		qDTY2.1+qDTY3.2+Wx-A+Zinc	1
		qDTY2.1+qDTY3.2+Zinc	1
		qDTY3.2+qDTY12.1+Wx-A+Gm4+Zincc Zi	1
		qDTY3.2+qDTY12.1+Wx-A+Zinc	1
		qDTY3.2+qDTY4.1+qDTY12.1+Wx-A+Zinc	3
		qDTY3.2+Wx-A+Gm4	1
		Wx-A+Zinc	1
6	BR13268	qDTY1.1+qDTY3.2	1
		qDTY1.1+qDTY3.2+qDTY12.1+Wx-A	1
		qDTY1.1+qDTY3.2+qDTY4.1+qDTY12.1+Wx-A	1
		qDTY1.1+qDTY3.2+qDTY4.1+qDTY12.1+Wx-A+Zinc	1
		qDTY1.1+qDTY3.2+qDTY4.1+Wx-A	2
		qDTY1.1+qDTY3.2+qDTY4.1+Wx-A+Zincc	2
		qDTY3.2	1
		qDTY3.2+qDTY12.1	1
		qDTY3.2+qDTY4.1	1
		qDTY3.2+qDTY4.1+Wx-A	1
		qDTY3.2+qDTY4.1+Wx-A+Zinc	1
		qDTY3.2+Wx-A	3
		Wx-A	1
7	BR13269	qDTY12.1	1
		qDTY12.1+Wx-10+Wx-A	1
		qDTY12.1+Wx-A	2
		qDTY12.1+Zinc	1
		qDTY3.2+qDTY12.1	2
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	6
		qDTY3.2+Wx-10+Wx-A	1
8	BR13270	qDTY3.2+qDTY12.1	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	5
		qDTY3.2+qDTY12.1+Wx-10+Wx-A+Zincc	2
		qDTY3.2+qDTY12.1+Wx-A+Gm4	1
		qDTY3.2+qDTY12.1+Zinc	2
		qDTY3.2+Wx-10+Wx-A+BPH32	1
9	BR13271	qDTY12.1+Wx-10+Wx-A	1
		qDTY2.1+qDTY3.2+Wx-A+xa5+Gm4	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	13
		qDTY3.2+Wx-10+Wx-A+xa5	1
10	BR13272	qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	7
		Wx-10+Wx-A	1
11	BR13273	qDTY3.2+qDTY12.1+Wx-10	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	10
		qDTY3.2+qDTY12.1+Wx-10+Wx-A+Gm4	3
		Wx-10+Wx-A	1
12	BR13274	qDTY3.2+qDTY12.1	7
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	4
13	BR13275	qDTY1.1+qDTY3.2+qDTY12.1	1
		qDTY3.2+qDTY12.1	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	2
		qDTY3.2+Wx-A+xa5	1
14	BR13276	qDTY3.2	2
		qDTY3.2+qDTY12.1	1
		qDTY3.2+Wx-A+xa5	1
		qDTY3.2+xa5	1
		qDTY3.2+Zinc	3
15	BR13277	qDTY12.1+Wx-A+xa5	2
		qDTY3.2	1
		qDTY3.2+qDTY12.1+Wx-A	1
		qDTY3.2+qDTY12.1+xa5	1
		qDTY3.2+Wx-A	4
		qDTY3.2+Wx-A+xa5	3
		Wx-10+Wx-A+xa5	1
		Wx-A	4
		Wx-A+xa5	2
16	BR13278	qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A+xa5+BPH32	1

SN	BR Reg. No.	Trait combination	No. of lines
		qDTY3.2+qDTY12.1+xa5+Zinc	1
		qDTY3.2+Wx-10+Wx-A+xa5	2
		qDTY3.2+Wx-A+xa5	1
		Wx-10+Wx-A	1
		Wx-10+Wx-A+xa5	1
		Wx-A+xa5	1
17	BR13279	qDTY2.1+qDTY3.2+qDTY12.1+Wx-10+Wx-A	1
		qDTY2.1+qDTY3.2+Wx-10+Wx-A	2
		qDTY2.1+qDTY3.2+Wx-10+Wx-A+Gm4	1
		qDTY2.1+qDTY3.2+Wx-A+Gm4	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A+Gm4	1
		qDTY3.2+qDTY12.1+Wx-A+Gm4	1
		qDTY3.2+Wx-10+Wx-A+xa5+Gm4	1
		qDTY3.2+Wx-A	1
		qDTY3.2+Wx-A+Gm4	1
		Wx-10+Wx-A+xa5	1
18	BR13281	qDTY12.1	1
		qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+qDTY12.1	2
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+Wx-A	2
		qDTY3.2+xa5	1
19	BR13282	qDTY12.1+Wx-10+Wx-A	2
		qDTY2.1+qDTY3.2+qDTY12.1+Wx-10+Wx-A+Gm4+	1
		qDTY2.1+qDTY3.2+qDTY12.1+Wx-10+Wx-A+Zinc	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A+Gm4+Zinc	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A+Zincc	1
		qDTY3.2+Wx-10+Wx-A	1
20	BR13283	Pikh_1	1
		qDTY1.1+qDTY3.2+Wx-A	1
		qDTY1.1+Wx-A	1
		qDTY3.2+qDTY12.1	3
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+qDTY12.1+Wx-A	1
		qDTY3.2+qDTY4.1+qDTY12.1+Wx-A	1
		qDTY3.2+Wx-10+Wx-A	1
21	BR13284	qDTY12.1	5
		qDTY12.1+Wx-10+Wx-A	1
		qDTY12.1+Wx-A+BPH32	1
		qDTY12.1+Zinc	1
		qDTY3.2+qDTY12.1	1
		qDTY3.2+qDTY12.1+Zinc	2
		qDTY3.2+Zinc	1
		xa5+BPH32+Gm4+Zinc	1
		Zinc	1
22	BR13285	qDTY1.1+qDTY12.1	1
		qDTY12.1	1
		qDTY12.1+Wx-A+BPH32	1
		qDTY12.1+Wx-A+Zinc	1
		qDTY12.1+Zinc	1
		qDTY3.2	1
		qDTY3.2+qDTY12.1+Pikh_1	1
		qDTY3.2+qDTY12.1+Wx-A	1
		qDTY3.2+qDTY12.1+Wx-A+Zinc	1
23	BR13286	qDTY12.1+Wx-10+Wx-A+BPH32	1
		qDTY12.1+Wx-A+BPH32	2
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+qDTY12.1+Wx-A+BPH32	1
		qDTY3.2+Wx-10+BPH32	1
		qDTY3.2+Wx-10+Wx-A+BPH32	2
		Wx-A+BPH32	1
24	BR13287	qDTY3.2	3
		qDTY3.2+qDTY12.1	2
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	2
		qDTY3.2+qDTY12.1+Wx-10+Wx-A+Zincc	1
		qDTY3.2+qDTY12.1+Zinc	1
		qDTY3.2+Wx-10+Wx-A	1
		qDTY3.2+Wx-10+Wx-A+Zinc	1
		Wx-10+Wx-A	1
25	BR13288	qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+Wx-10+Wx-A	4

SN	BR Reg. No.	Trait combination	No. of lines
		qDTY3.2+W _x -A	1
		qDTY3.2+W _x -A+xa5	1
		qDTY3.2+Zinc	8
		W _x -10+W _x -A	1
26	BR13289	qDTY3.2	4
		qDTY3.2+qDTY12.1	1
		qDTY3.2+W _x -10+W _x -A+Zinc	2
		qDTY3.2+Zinc	4
27	BR13290	qDTY3.2+qDTY12.1	4
		qDTY3.2+qDTY12.1+Zinc	3
		qDTY3.2+Zinc	1
Grand Total			376

Table 11.4c: List of selected genotypes of Line Stage Testing (LST) Trial, Development of Zinc Enriched Rice (ZER), Boro 2024-25

SN	BR Reg. No	Parentage	Progenies grown	Progenies harvested
F₅ generation				
1	BR14106	BRRI dhan88/BR9966-12-5-6-3-2	165	12
2	BR14107	BRRI dhan88/BRRI dhan100	181	8
3	BR14108	BRRI dhan88/BR7881-62-2-3-7-P3	160	5
4	BR14109	BRRI dhan88/BR7879-17-2-4-HR3-P1	166	6
5	BR14110	BRRI dhan88/BR7840-54-3-4-3	190	9
6	BR14111	BRRI dhan89/IR105837-8-95-2-1	191	6
7	BR14112	BRRI dhan89/IR99285-1-1-1-P1	189	3
8	BR14113	BRRI dhan89/BRRI dhan102	157	1
9	BR14114	BRRI dhan89/BR9966-12-5-6-3-2	169	9
10	BR14115	BRRI dhan67/BR9966-12-5-6-3-2	194	14
11	BR14116	BRRI dhan67/BRRI dhan100	165	14
12	BR14117	BRRI dhan67/BRRI dhan102	205	5
13	BR14118	BRRI dhan67/IR99285-1-1-1-P1	212	9
14	BR14119	BRRI dhan67/IR105837-8-95-2-1	179	2
15	BR14120	IR83484-3-B-7-1-1-1/BR9966-12-5-6-3-2	190	25
16	BR14121	IR83484-3-B-7-1-1-1/BRRI dhan102	182	20
17	BR14122	IR83484-3-B-7-1-1-1/IR99285-1-1-1-P1	191	20
18	BR14123	IR83484-3-B-7-1-1-1/IR105837-8-95-2-1	142	12
19	BR14125	IR83484-3-B-7-1-1-1/BRRI dhan100	160	2
20	BR14126	BRRI dhan92/BR7840-54-3-4-3	182	14
21	BR14127	BRRI dhan92/BR7881-62-2-3-7-P3	191	15
22	BR14128	BRRI dhan92/BR7879-17-2-4-HR3-P1	143	8
23	BR14129	BRRI dhan92/IR105837-8-95-2-1	140	14
24	BR14130	BRRI dhan92/IR99285-1-1-1-P1	131	6
25	BR14131	BRRI dhan92/BRRI dhan102	143	4
26	BR14132	BRRI dhan92/BR9966-12-5-6-3-2	165	6
27	BR14133	Rata Boro/BR9966-12-5-6-3-2	190	11
28	BR14134	Rata Boro/BRRI dhan102	188	10
29	BR14135	Rata Boro/IR99285-1-1-1-P1	155	7
30	BR14137	BRRI dhan81/BR9966-12-5-6-3-2	141	13
31	BR14138	BRRI dhan81/BRRI dhan100	140	10
32	BR14139	BRRI dhan81/BRRI dhan102	140	8
33	BR14140	BRRI dhan81/IR99285-1-1-1-P1	159	5
34	BR14141	BRRI dhan81/IR105837-8-95-2-1	170	3
35	BR14142	BRRI dhan100/BR9966-12-5-6-3-2	130	12
36	BR14143	BRRI dhan100/BR7840-54-3-4-3	140	6
37	BR14144	BRRI dhan100/BR7881-62-2-3-7-P3	125	3
38	BR14145	BRRI dhan100/BR7879-17-2-4-HR3-P1	145	3
39	BR14149	BRRI dhan102/IR105837-8-95-2-1	141	2
40	BR14150	BRRI dhan102/Rata Boro	175	5
41	BR14151	BR9966-12-5-6-3-2/BR7881-62-2-3-7-P3	160	3
42	BR14152	BR9966-12-5-6-3-2/BR7879-17-2-4-HR3-P1	190	1
43	BR14155	IR105837-8-95-2-1/BRRI dhan102	189	2
Total			8,274	353
F₆ generation				
1	BR13570	BRRI dhan81/ BR7879-17-2-4-HR3-P1	155	10
2	BR13571	BRRI dhan81/ BR7881-62-2-3-7-P3	155	10
3	BR13572	BRRI dhan81/ BRRI dhan43	132	18
4	BR13573	BRRI dhan81/ BRRI dhan42	170	15
5	BR13574	BRRI dhan81/ BR7840-54-3-4-3	185	16
6	BR13575	BRRI dhan89/ BR7879-17-2-4-HR3-P1	225	27
7	BR13576	BRRI dhan89/ BR7881-62-2-3-7-P3	259	19
8	BR13577	BRRI dhan89/ BRRI dhan43	175	17

SN	BR Reg. No	Parentage	Progenies grown	Progenies harvested
9	BR13578	BRRI dhan89/ BRRI dhan42	235	19
10	BR13579	BRRI dhan89/ BR7840-54-3-4-3	158	44
11	BR13580	BRRI dhan67/ BRRI dhan42	140	21
12	BR13581	BRRI dhan67/ BR7840-54-3-4-3	175	34
13	BR13582	BRRI dhan67/ BRRI dhan43	210	38
14	BR13583	IR83484-3-B-7-1-1-1(salt)/ BRRI dhan43	105	23
15	BR13584	IR83484-3-B-7-1-1-1(salt)/ BRRI dhan42	256	52
16	BR13585	IR87870-6-1-1-1-1-B (salt)/ BRRI dhan43	200	25
17	BR13586	IR87870-6-1-1-1-1-B (salt)/ BR7879-17-2-4-HR3-P1	105	15
18	BR13588	BRRI dhan102/ BR7881-62-2-3-7-P3	203	16
19	BR13589	BRRI dhan102/ BRRI dhan42	228	22
20	BR13590	BR8912-12-6-1-1-1-1/ BR7879-17-2-4-HR3-P1	200	18
21	BR13591	BR8912-12-6-1-1-1-1/ BRRI dhan43	197	28
22	BR13592	IR105837-8-83-1-1/ BR7840-54-3-4-3	264	22
23	BR13593	IR105837-8-83-1-1/BR7881-62-2-3-7-P3	165	7
24	BR13594	IR105837-8-95-2-1/ BRRI dhan42	147	9
25	BR13595	IR105837-8-95-2-1/ BR7881-62-2-3-7-P3	140	8
26	BR13596	BR8634-23-1-1-BHA-2/ BR7840-54-3-4-3	210	8
27	BR13598	IR105837-8-95-2-1/ BRRI dhan43	140	6
28	BR13599	BR8634-23-1-1-BHA-5/ BRRI dhan42	203	4
29	BR13600	BR8634-23-1-1-BHA-5/ BR7879-17-2-4-HR3-P1	210	6
30	BR13601	Rata Boro/ BR7879-17-2-4-HR3-P1	126	3
31	BR13604	BRRI dhan42/ Rata Boro	105	3
32	BR13605	BR 7879-17-2-4-HR3-P1/ Rata Boro	210	6
33	BR13606	IR100722-B-B-B-1-1/ BRRI dhan42	150	5
34	BR13607	IR100722-B-B-B-1-1/ BRRI dhan43	145	4
35	BR13608	IR100722-B-B-B-1-1/ BR 7879-17-2-4-HR3-P1	144	5
36	BR13609	IR100722-B-B-B-1-1/ BR 7881-62-2-3-7-P3	155	16
37	BR13610	BR8631-12-3-6-P3/BRRI dhan42	150	6
38	BR13611	BR8631-12-3-6-P3/BRRI dhan43	240	5
Total			6,772	610
Grand Total			15,046	963

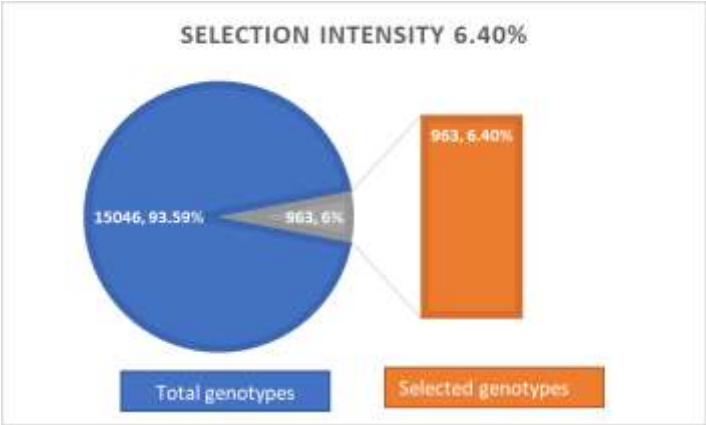


Fig. 11.4c: Selection intensity genotypes of LST, ZER, Boro 2024-25

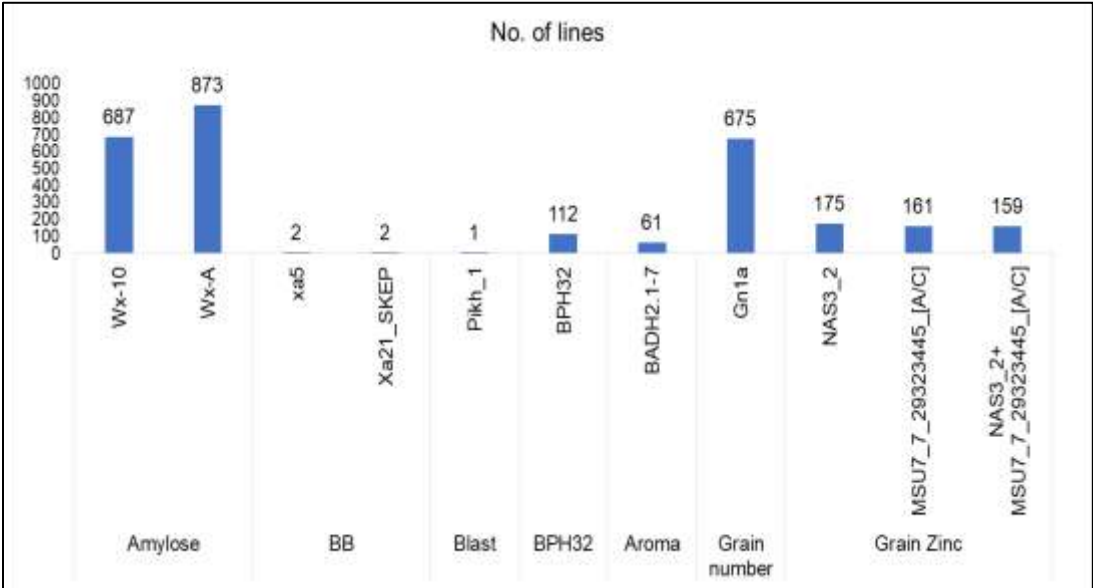


Fig. 11.4d: Trait marker profile of genotypes of LST, ZER, Boro 2024-25

Table 11.4.d. List of trait marker combination of the crosses of Line Stage Testing (LST) Trial, Development of Zinc Enriched Rice (ZER), Boro 2024-25

SN	BR Reg No	Genotypic combination	Lines#
1	BR13570	Wx-10+Wx-A+BPH32+Gn1a	8
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-A+BPH32+Gn1a	1
2	BR13571	Wx-10+Wx-A+Gn1a	4
		Wx-10+Wx-A+Gn1a+NAS3_2	1
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	3
		Wx-A+BPH32+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-A+Gn1a	1
3	BR13572	Wx-10+Wx-A+Gn1a	17
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
4	BR13573	Wx-10+Wx-A	2
		Wx-10+Wx-A+Gn1a	8
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	3
		Wx-10+Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	2
5	BR13574	Wx-10+Wx-A	2
		Wx-10+Wx-A+Gn1a	10
		Wx-A+Gn1a	4
6	BR13575	Wx-10+Wx-A+BPH32+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-10+Wx-A+Gn1a	12
		Wx-10+Wx-A+Gn1a+NAS3_2	1
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	12
		xa5	1
7	BR13576	Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-10+Wx-A	1
		Wx-10+Wx-A+BPH32+Gn1a	2
		Wx-10+Wx-A+Gn1a	8
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	3
		Wx-A+Gn1a	3
		Wx-A+Gn1a+NAS3_2	1
8	BR13577	Wx-10+Wx-A	1
		Wx-10+Wx-A+BPH32+Gn1a	2
		Wx-10+Wx-A+Gn1a	11
		Wx-10+Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	3
9	BR13578	BADH2.1-7+Gn1a	1
		Wx-10+NAS3_2	1
		Wx-10+Wx-A	4
		Wx-10+Wx-A+Gn1a	7
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	3
		Wx-10+Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	2
10	BR13579	Gn1a	1
		Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-10+Wx-A+BADH2.1-7+Gn1a	3
		Wx-10+Wx-A+Gn1a	37
		Wx-A	1
		Wx-A+Gn1a	1
11	BR13580	Wx-10+Wx-A	8
		Wx-10+Wx-A+BPH32+Gn1a	1
		Wx-10+Wx-A+Gn1a	2
		Wx-10+Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	2
		Wx-A	3
		Wx-A+Gn1a	1
		Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	4
12	BR13581	BADH2.1-7	4
		BADH2.1-7+Gn1a	9
		BPH32+Gn1a	1
		Gn1a	3
		Wx-10+Wx-A+Gn1a	2
		Wx-A	1
		Wx-A+BPH32	6
		Wx-A+BPH32+Gn1a	2
		Wx-A+Gn1a	3
13	BR13582	Wx-10+Wx-A	27
		Wx-10+Wx-A+BPH32+Gn1a	1
		Wx-10+Wx-A+Gn1a	4
		Wx-10+Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	3
		Wx-A+BPH32+Gn1a	2
		Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	1
14	BR13583	Wx-10+Wx-A	3
		Wx-10+Wx-A+BPH32	1
		Wx-10+Wx-A+Gn1a	3

SN	BR Reg No	Genotypic combination	Lines#
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	4
		Wx-10+Wx-A+NAS3_2	1
		Wx-10+Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-10+Wx-A+xa5+Xa21_SKEP+Gn1a	1
		Wx-A	3
		Wx-A+Gn1a	5
		Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	1
15	BR13584	Wx-10+Wx-A	10
		Wx-10+Wx-A+Gn1a	3
		Wx-10+Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	12
		Wx-A	12
		Wx-A+Gn1a	4
		Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	8
		Wx-A+Xa21_SKEP	1
16	BR13585	Gn1a+NAS3_2	1
		Wx-10+Wx-A+Gn1a	13
		Wx-10+Wx-A+Gn1a+MSU7_7_29323445_[A/C]	1
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	2
		Wx-A	2
		Wx-A+BADH2.1-7+Gn1a	4
		Wx-A+BPH32	1
17	BR13586	Wx-10+Wx-A	1
		Wx-10+Wx-A+Gn1a	13
18	BR13588	Wx-A+Gn1a	1
		Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	7
19	BR13589	Wx-10+Wx-A	9
		Wx-10+Wx-A+Gn1a	4
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	4
		Wx-10+Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	6
20	BR13590	Wx-10+Wx-A+BADH2.1-7+Gn1a	8
		Wx-10+Wx-A+BPH32+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-10+Wx-A+Gn1a	8
		Wx-10+Wx-A+Gn1a+NAS3_2	1
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	7
21	BR13591	Gn1a	1
		Wx-10+Wx-A+Gn1a	23
		Wx-A+BPH32	2
		Wx-A+BPH32+BADH2.1-7+Gn1a	1
22	BR13592	BADH2.1-7	2
		BADH2.1-7+Gn1a	10
		BADH2.1-7+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
		Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-A+BPH32+BADH2.1-7	2
23	BR13593	Wx-A+BPH32+BADH2.1-7+Gn1a	4
		Wx-10+Wx-A+Gn1a	2
		Wx-A+BADH2.1-7	1
		Wx-A+BPH32	1
24	BR13594	Wx-A+Gn1a	2
		BADH2.1-7+Gn1a	1
		Wx-10+Wx-A	1
		Wx-10+Wx-A+BPH32+Gn1a	1
		Wx-10+Wx-A+Gn1a	3
		Wx-10+Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-A+BPH32+Gn1a	1
25	BR13595	Wx-A+NAS3_2	1
		Wx-10+Wx-A	1
		Wx-10+Wx-A+BPH32+Gn1a	6
26	BR13596	Wx-10+Wx-A+Pikh_1+BPH32	1
		Wx-10+Wx-A+Gn1a	3
		Wx-A	2
		Wx-A+BPH32	1
27	BR13598	Wx-A+BPH32+Gn1a	2
		Wx-10+Wx-A+BPH32+Gn1a	4
28	BR13599	Wx-A+BPH32+Gn1a	1
		Wx-10+Wx-A	1
		Wx-10+Wx-A+Gn1a	1
29	BR13600	Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	2
		Wx-10+Wx-A+Gn1a	4
30	BR13601	Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	2
		Wx-A+BADH2.1-7	1

SN	BR Reg No	Genotypic combination	Lines#
		Wx-A+BPH32+Gn1a	2
31	BR13604	Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	2
32	BR13605	BPH32+Gn1a	1
		Wx-10+Wx-A+Gn1a	1
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	3
33	BR13606	Wx-10+Wx-A+Gn1a	1
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-10+Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-A+BPH32	2
34	BR13607	Wx-10+Wx-A	2
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-A+BPH32	1
35	BR13608	Wx-10+Wx-A+Gn1a	3
		Wx-A+Gn1a	2
36	BR13609	Wx-10+Wx-A	1
		Wx-10+Wx-A+Gn1a	15
37	BR13610	Wx-10+Wx-A	1
		Wx-10+Wx-A+BPH32+Gn1a	1
		Wx-10+Wx-A+Gn1a	2
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	2
38	BR13611	Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-A+BPH32	1
		Wx-A+BPH32+Gn1a	1
		Wx-A+Gn1a	2
39	BR14106	Wx-10+Wx-A+BPH32+Gn1a	1
		Wx-10+Wx-A+Gn1a	11
40	BR14107	Wx-10+Wx-A+Gn1a	8
41	BR14108	Wx-10+Wx-A+Gn1a	5
42	BR14109	Wx-10+Wx-A+BPH32+Gn1a	1
		Wx-10+Wx-A+Gn1a	1
		Wx-10+Wx-A+Gn1a+NAS3_2	1
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	3
43	BR14110	BADH2.1-7+Gn1a	3
		Gn1a	2
		Wx-10+Wx-A+BADH2.1-7+Gn1a	2
		Wx-10+Wx-A+Gn1a	2
44	BR14111	Wx-10+Wx-A+BPH32+Gn1a	2
		Wx-10+Wx-A+Gn1a	3
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
45	BR14112	Wx-10+Wx-A+BADH2.1-7+Gn1a	1
		Wx-10+Wx-A+Gn1a	2
46	BR14113	Wx-10+Wx-A+Gn1a	1
47	BR14114	Wx-10+Wx-A	1
		Wx-10+Wx-A+Gn1a	7
		Wx-A+BPH32	1
48	BR14115	Wx-10+Wx-A	8
		Wx-10+Wx-A+BPH32	1
		Wx-10+Wx-A+Gn1a	4
49	BR14116	Wx-10+Wx-A	4
		Wx-10+Wx-A+BPH32	3
		Wx-10+Wx-A+BPH32+Gn1a	2
		Wx-10+Wx-A+Gn1a	1
		Wx-A	1
		Wx-A+BPH32	2
		Wx-A+BPH32+Gn1a	1
50	BR14117	BPH32+Gn1a	1
		Wx-A+BPH32	4
51	BR14118	Wx-10+Wx-A	7
		Wx-10+Wx-A+Gn1a	2
52	BR14119	Wx-A+BPH32	2
53	BR14120	Gn1a	1
		Wx-10	1
		Wx-10+Gn1a	1
		Wx-10+Wx-A	3
		Wx-10+Wx-A+Gn1a	3
		Wx-A	8
		Wx-A+BPH32	1
		Wx-A+Gn1a	2
54	BR14121	Wx-10+Wx-A	5
		Wx-10+Wx-A+BPH32+Gn1a	1
		Wx-10+Wx-A+Gn1a	7
		Wx-A	3
		Wx-A+Gn1a	2

SN	BR Reg No	Genotypic combination	Lines#
55	BR14122	Wx-10+Wx-A	1
		Wx-10+Wx-A+Gn1a	2
		Wx-A	6
		Wx-A+Gn1a	9
56	BR14123	Wx-10+Wx-A+BPH32	3
		Wx-10+Wx-A+BPH32+Gn1a	1
		Wx-A	2
		Wx-A+BPH32	1
		Wx-A+BPH32+Gn1a	1
		Wx-A+Gn1a	4
57	BR14125	Wx-10+Wx-A	1
		Wx-10+Wx-A+Gn1a	1
58	BR14126	BADH2.1-7+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
		Gn1a	5
		Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-10+Wx-A+BADH2.1-7+Gn1a	1
		Wx-10+Wx-A+Gn1a	6
59	BR14127	Wx-10+Wx-A+Gn1a+MSU7_7_29323445_[A/C]	1
		Wx-10+Wx-A+Gn1a+NAS3_2	1
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	13
60	BR14128	Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	7
		Wx-10+Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	1
61	BR14129	Wx-10+Wx-A+BPH32	1
		Wx-10+Wx-A+BPH32+Gn1a	6
		Wx-10+Wx-A+Gn1a	2
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	4
		Wx-A+NAS3_2+MSU7_7_29323445_[A/C]	1
62	BR14130	Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	6
63	BR14131	Gn1a	1
		Wx-10+Wx-A+Gn1a	1
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	2
64	BR14132	Wx-10+Wx-A+Gn1a	1
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	5
65	BR14133	BADH2.1-7	1
		Gn1a	2
		Wx-10+Wx-A	1
		Wx-10+Wx-A+BADH2.1-7+Gn1a	2
		Wx-10+Wx-A+Gn1a	2
		Wx-A	1
		Wx-A+Gn1a	1
		Wx-A+NAS3_2	1
66	BR14134	Wx-10+Wx-A+BADH2.1-7+Gn1a	1
		Wx-10+Wx-A+Gn1a	1
		Wx-10+Wx-A+NAS3_2	1
		Wx-A	1
		Wx-A+BADH2.1-7	1
		Wx-A+BADH2.1-7+Gn1a	1
		Wx-A+Gn1a	1
		Wx-A+Gn1a+NAS3_2	3
67	BR14135	BPH32+Gn1a	1
		Wx-10+Wx-A	1
		Wx-10+Wx-A+Gn1a	1
		Wx-10+Wx-A+Gn1a+NAS3_2+MSU7_7_29323445_[A/C]	1
		Wx-A+Gn1a	3
68	BR14137	Wx-10+Wx-A+Gn1a	12
		Wx-A+Gn1a	1
69	BR14138	Wx-10+Gn1a	1
		Wx-10+Wx-A+Gn1a	9
70	BR14139	Gn1a	1
		Wx-10+Wx-A+Gn1a	7
71	BR14140	Wx-10+Wx-A	1
		Wx-10+Wx-A+Gn1a	4
72	BR14141	Wx-10+Wx-A	1
		Wx-10+Wx-A+BPH32+Gn1a	2
73	BR14142	Wx-10+Wx-A	1
		Wx-10+Wx-A+BPH32+Gn1a	3
		Wx-10+Wx-A+Gn1a	7
		Wx-A+Gn1a	1
74	BR14143	Gn1a	1
		Wx-10+Wx-A+Gn1a	5
75	BR14144	Wx-10+Wx-A+Gn1a	3
76	BR14145	Wx-10+Wx-A+Gn1a	2
77	BR14149	Wx-10+Wx-A+BPH32+Gn1a	1

SN	BR Reg No	Genotypic combination	Lines#
78	BR14150	Wx-10+Wx-A+Gn1a	1
		Wx-10+Wx-A+Gn1a	1
		Wx-A	1
		Wx-A+Gn1a	2
		Wx-A+NAS3 2+MSU7 7 29323445 [A/C]	1
79	BR14151	BADH2.1-7+NAS3_2	1
		BPH32	1
		Wx-A	1
80	BR14152	Wx-10+Wx-A+Gn1a	1
81	BR14155	Wx-10+Wx-A+Gn1a	2
Total			940

Experiment 11.5: Observational Yield Trial (OYT)

Principal Investigator: M A Kader

Co-investigators: R R Majumder, T K Hore, U R Shaha, S S Chaity and M I H Joy

Specific Objective: To select genetically fixed lines with desirable agronomic characters viz, homogeneity in flowering with less or no unproductive tiller, intermediate plant height, short growth duration, acceptable grain quality, zinc content and high yield potential

Materials and Methods: A total of 363 phenotypically fixed genotypes were evaluated along with four standard check varieties BRRI dhan49, BRRI dhan62, BRRI dhan72 and BRRI dhan87 in T. Aman season. In Boro season 532 phenotypically fixed genotypes were evaluated in two OYT_s. Growth duration was ranged from 136-148 days in OYT#1 and 149-168 days in OYT #2. In OYT#1, 244 lines were evaluated along with BRRI dhan74, BRRI dhan96, BRRI dhan100 and BRRI dhan102 and in OYT#2, 288 lines were evaluated along with BRRI dhan74, BRRI dhan84, BRRI dhan92 and BRRI dhan102. Twenty-five-day-old seedlings in T. Aman and thirty-day-old seedlings in Boro season were transplanted in 5.4 m × 4 rows plot using single seedling at a spacing of 20 cm ×20 cm in augmented RCB design. Fertilizer and crop management was done as in Experiment no. 11.1. Date of seeding, transplanting, flowering, maturity, plant height, phenotypic acceptance, disease infestation score, yield per plot of the selected entries along with checks were recorded.

Results: In T. Aman, a total of 91 genotypes out of 363 genotypes were selected based on their grain yield performances and grain type in comparison to check varieties. (Table 11.5a). In Boro season, 30 genotypes from OYT#1 and 37 genotypes from OYT#2 in total 67 genotypes were selected from 532 genotypes based on grain yield performances and grain type as compared to check varieties. (Table 11.5b).

Table 11.5a: List of selected materials from Observational Yield Trial (OYT), Development of Zinc Enriched Rice (ZER), T. Aman, 2024-25

SN	Designation	PH (cm)	GD (days)	Yield (t/ha)	Grain zinc (mg/kg)
1	BR12686-4R-118	134	122	5.891	28
2	BR12686-4R-153	145	120	5.793	32
3	BR12686-4R-26	148	125	5.605	27
4	BR12686-4R-41	140	124	5.944	28
5	BR12687-4R-26	137	126	5.730	27
6	BR12687-4R-98	137	117	5.802	31
7	BR12688-4R-24	130	123	5.803	26
8	BR12689-4R-15	131	126	5.818	30
9	BR12689-4R-21	134	123	6.563	30
10	BR12689-4R-29	140	121	5.996	32
11	BR12689-4R-31	133	124	6.142	27
12	BR12689-4R-72	141	126	5.751	30
13	BR12689-4R-75	133	122	5.939	33
14	BR12689-4R-93	132	122	5.619	25
15	BR12690-4R-2	140	107	5.879	29
16	BR12690-4R-50	135	122	6.049	28
17	BR12690-4R-61	131	121	6.263	33
18	BR12691-4R-112	143	120	5.802	27
19	BR12691-4R-22	135	124	5.664	25
20	BR12695-4R-138	137	123	5.660	23
21	BR12695-4R-16	138	126	5.638	25
22	BR12695-4R-28	139	122	5.827	25
23	BR12697-4R-66	145	120	5.634	24
24	BR12697-4R-81	133	120	5.771	31

SN	Designation	PH (cm)	GD (days)	Yield (t/ha)	Grain zinc (mg/kg)
25	BR12698-4R-100	138	122	6.719	27
26	BR12698-4R-179	144	123	6.462	21
27	BR12698-4R-41	143	124	5.791	30
28	BR12700-4R-128	142	121	5.646	32
29	BR12700-4R-38	143	130	5.809	30
30	BR12700-4R-41	141	120	5.681	28
31	BR12702-4R-31	134	121	6.035	32
32	BR12702-4R-34	141	125	6.499	27
33	BR12702-4R-57	147	129	5.695	27
34	BR12703-4R-106	144	128	5.664	26
35	BR12703-4R-13	145	132	6.167	26
36	BR12704-4R-157	137	127	6.143	27
37	BR12704-4R-6	132	119	5.873	24
38	BR12704-4R-64	144	121	6.846	28
39	BR12708-4R-122	124	117	6.040	32
40	BR12708-4R-128	131	119	6.050	25
41	BR12708-4R-145	133	122	5.638	28
42	BR12708-4R-151	128	118	5.682	29
43	BR12708-4R-164	125	118	6.126	25
44	BR12708-4R-166	128	120	5.943	26
45	BR12708-4R-36	126	122	6.378	30
46	BR12708-4R-59	136	118	6.465	29
47	BR12709-4R-115	128	121	5.910	28
48	BR12709-4R-124	125	122	5.960	30
49	BR12709-4R-133	139	120	6.221	30
50	BR12709-4R-141	129	120	5.723	26
51	BR12711-4R-128	134	118	5.868	32
52	BR12711-4R-79	127	120	5.816	
53	BR12713-4R-11	134	120	5.608	26
54	BR12715-4R-16	130	121	6.017	26
55	BR12716-4R-113	123	130	6.108	25
56	BR12716-4R-121	125	119	6.388	20
57	BR12716-4R-54	132	119	5.828	24
58	BR12716-4R-62	130	119	6.003	29
59	BR12716-4R-74	130	119	5.883	21
60	BR12716-4R-79	123	122	5.723	26
61	BR12716-4R-92	127	123	6.306	21
62	BR12717-4R-20	134	118	5.651	29
63	BR12717-4R-29	133	122	5.637	28
64	BR12717-4R-58	146	120	6.126	25
65	BR12719-4R-67	137	121	5.851	24
66	BR12719-4R-79	145	122	6.202	22
67	BR12719-4R-82	146	121	5.894	30
68	BR12720-4R-19	141	121	6.563	25
69	BR12722-4R-11	157	123	6.427	26
70	BR12722-4R-29	147	124	6.470	24
71	BR12722-4R-37	137	124	6.181	26
72	BR12722-4R-44	154	124	6.262	26
73	BR12723-4R-107	147	124	6.464	29
74	BR12724-4R-12	135	119	6.541	29
75	BR12724-4R-50	143	121	6.482	25
76	BR12725-4R-23	134	125	5.909	22
77	BR12725-4R-50	147	118	5.747	23
78	BR12726-4R-20	129	120	5.922	28
79	BR12726-4R-30	138	120	6.588	24
80	BR12726-4R-39	153	124	5.710	24
81	BR12726-4R-43	134	118	6.230	24
82	BR12726-4R-60	146	120	5.898	24
83	BR12728-4R-15	138	116	5.623	23
84	BR12728-4R-38	139	122	6.298	29
85	BR12729-4R-11	140	120	6.013	21
86	BR12729-4R-13	134	118	6.023	20
87	BR12729-4R-35	132	122	6.516	24
88	BR12729-4R-50	145	120	5.635	26
89	BR12729-4R-85	144	120	6.173	32
90	BR12729-4R-87	141	122	5.721	26
91	BR12729-4R-91	141	118	6.219	29
92	BRRI dhan49 (Ck)	117	130	4.481	
93	BRRI dhan62 (Ck)	107	105	3.511	
94	BRRI dhan72 (Ck)	129	128	5.102	
95	BRRI dhan87 (Ck)	133	125	5.207	
	LSD (0.05)	18.098	12.400	0.609	
	h ² b	0.38	0.40	0.45	

**Table 11.5b: List of selected materials from Observational Yield Trial (OYT),
Development of Zinc Enriched Rice (ZER), Boro 2024-25**

SN	Designation	PHcm)	GD (days)	Yield (t/ha)
OYT#1				
1	BR12027-4R-3	121	146	7.042
2	BR13060-4R-14	119	144	7.233
3	BR13060-4R-194	122	145	7.195
4	BR13061-4R-16	125	173	7.435
5	BR13066-4R-101	143	149	7.109
6	BR13066-4R-112	136	150	7.321
7	BR13066-4R-168	150	152	7.479
8	BR13067-4R-43	135	146	7.034
9	BR13071-4R-128	130	146	7.684
10	BR13071-4R-217	123	142	7.317
11	BR13071-4R-223	117	152	7.479
12	BR13071-4R-251	134	146	7.255
13	BR13072-4R-22	128	141	7.155
14	BR13072-4R-270	118	141	7.310
15	BR13072-4R-272	121	144	7.011
16	BR13075-4R-1	115	146	7.166
17	BR13075-4R-107	120	144	7.544
18	BR13075-4R-30	130	146	7.325
19	BR13076-4R-203	116	145	7.882
20	BR13076-4R-271	118	146	7.008
21	BR13076-4R-76	116	143	8.128
22	BR13076-4R-82	128	142	7.457
23	BR13077-4R-11	118	146	7.329
24	BR13077-4R-25	116	147	7.204
25	BR13077-4R-44	128	144	7.746
26	BR13078-4R-136	121	144	7.276
27	BR13078-4R-149	122	143	8.475
28	BR13078-4R-175	118	143	7.490
29	BR13078-4R-40	126	144	7.135
30	BR13082-4R-185	124	144	7.674
31	BRRI dhan74 (Ck)	98	145	6.362
32	BRRI dhan96 (Ck)	97	143	6.113
33	BRRI dhan100 (Ck)	105	143	6.679
34	BRRI dhan102 (Ck)	106	153	6.511
	lsd (0.05)	13.143	10.704	1.792
	h2b	0.67	0.41	0.27
OYT#2				
1	BR12027-4R-205	111	150	7.282
2	BR13061-4R-20	121	147	7.433
3	BR13061-4R-78	132	148	7.046
4	BR13066-4R-104	141	152	7.949
5	BR13066-4R-106	150	148	7.235
6	BR13066-4R-134	140	150	7.472
7	BR13066-4R-63	140	150	7.346
8	BR13068-4R-171	133	154	7.803
9	BR13068-4R-210	119	153	7.187
10	BR13068-4R-223	124	149	7.144
11	BR13069-4R-142	110	145	7.149
12	BR13069-4R-16	114	146	7.111
13	BR13069-4R-177	130	142	7.203
14	BR13069-4R-189	124	144	7.113
15	BR13069-4R-223	113	144	7.042
16	BR13072-4R-192	125	144	7.204
17	BR13072-4R-193	132	143	7.647
18	BR13072-4R-198	129	145	7.129
19	BR13072-4R-204	113	145	7.069
20	BR13073-4R-13	129	150	8.099
21	BR13073-4R-19	130	142	7.195
22	BR13073-4R-271	119	139	7.202
23	BR13073-4R-91	129	148	7.338
24	BR13077-4R-140	138	143	7.365
25	BR13078-4R-125	116	146	7.464
26	BR13078-4R-130	131	146	7.276
27	BR13078-4R-70	113	141	7.304
28	BR13078-4R-79	117	142	7.563
29	BR13079-4R-208	107	146	7.212
30	BR13080-4R-132	113	147	7.060

SN	Designation	PHcm)	GD (days)	Yield (t/ha)
31	BR13081-4R-241	100	145	7.177
32	BR13082-4R-203	114	147	7.018
33	BR13082-4R-205	112	139	7.493
34	BR13082-4R-244	128	149	7.330
35	BR13082-4R-261	122	146	7.632
36	BR13083-4R-146	98	149	7.053
37	BR13083-4R-241	102	149	7.632
38	BRRRI dhan74 (Ck)	105	145	6.308
39	BRRRI dhan84 (Ck)	116	143	6.316
40	BRRRI dhan92 (Ck)	112	156	7.110
41	BRRRI dhan102 (Ck)	108	154	6.317
lsd (0.05)		14.024	10.082	1.349
h2b		0.73	0.78	0.27

OYT#1: D/S: 04/12/2024 D/T: 10/01/2025 OYT#2: D/S: 06/12/2024 D/T: 12/01/2025

Experiment 11.6: Advanced Yield Trial (AYT)

Principal Investigator: M A Kader
Co-investigators: R R Majumder, T K Hore, U R Shaha, S S Chaity and M I H Joy
Specific objectives: Selection of homogeneous breeding lines with fine grain properties having high yield with good plant type.
Materials and Methods: A total of 56 advanced lines were evaluated along with five standard check varieties BRRRI dhan49, BRRRI dhan62, BRRRI dhan72, BRRRI dhan75 and BRRRI dhan87 in T. Aman season. In Boro season 50 advance lines were evaluated in AYT#1 (GD: ≤150 days) and AYT#2 (GD: 151-160 days). In AYT#1, 22 advanced lines were evaluated along with BRRRI dhan28, BRRRI dhan74 and BRRRI dhan84 and in AYT#2, 28 advanced lines were evaluated along with BRRRI dhan74, BRRRI dhan84, BRRRI dhan89, BRRRI dhan100 and BRRRI dhan102. Twenty-five-day-old seedlings in T. Aman and thirty-day-old seedlings in Boro season were transplanted in 5.4 m × 4 rows plot using single seedling at a spacing of 20 cm ×20 cm in RCB design with three replications. Fertilizer and crop management was done as in Experiment no. 11.1. Date of seeding, transplanting, flowering, maturity, plant height, phenotypic acceptance, disease infestation score, yield per plot of the selected entries along with checks were recorded.
Results: In T. Aman season, eight genotypes were selected from AYT based on better grain yield and other agronomic performances (Table 11.6a). In Boro, in total ten genotypes (seven from AYT#1 and three from AYT#2) were selected from 50 genotypes based on grain yield performances and grain type in comparison to check varieties. (Table 11.6b).

Table 11.6a: Yield performances of the selected genotypes of Advanced Yield Trial (AYT), Development of Zinc Enriched Rice (ZER), T. Aman 2024-25

SN	Designation	PH (cm)	GD (days)	Yield (t/ha)	Zinc(mg/kg)
1	BR11666-3R-74	142	129	6.20	26.0
2	BR11669-3R-106	132	131	5.98	24.0
3	BR11672-3R-24	141	129	6.06	33.5
4	BR12143-3R-11	146	129	5.97	34.5
5	BR12145-3R-246	139	125	6.22	22.5
6	BR12145-3R-263	138	123	6.03	23.5
7	BR12146-3R-136	139	128	5.90	25.0
8	BR12146-3R-7	137	123	5.95	29.0
9	BRRRI dhan49 (Ck)	111	129	5.86	19.5
10	BRRRI dhan62 (Ck)	103	116	4.33	21.5
11	BRRRI dhan72 (Ck)	119	120	5.93	23.5
12	BRRRI dhan75 (Ck)	107	128	5.35	18.5
13	BRRRI dhan87 (Ck)	126	124	5.14	19.5
lsd (0.05)		10.1	13.2	0.741	
h2b		0.86	0.73	0.51	

D/S: 25/06/2024 D/T: 20/07/2024

Table 11.6b: Yield performance of the genotypes in Advanced Yield Trial (AYT), Development of Zinc Enriched Rice (ZER), Boro 2024-25

SN	Designation	Plant height (cm)	Growth duration (days)	Grain yield (t/ha)
AYT#1				

SN	Designation	Plant height (cm)	Growth duration (days)	Grain yield (t/ha)
1	BR11423-4R-153	122	143	7.58
2	BR11423-4R-155	123	146	6.47
3	BR11423-4R-178	142	143	6.70
4	BR11423-4R-190	124	144	7.32
5	BR11423-4R-196	125	145	7.32
6	BR12026-4R-131	116	145	6.85
7	BR12026-4R-142	110	144	5.66
8	BR12026-4R-627	117	146	6.34
9	BR12027-4R-156	119	146	6.53
10	BR12035-4R-1	123	144	6.17
11	BR12036-4R-184	127	143	5.46
12	BR12036-4R-200	114	145	4.69
13	BR12036-4R-203	126	143	6.87
14	BR12036-4R-460	123	149	6.24
15	BR12036-4R-51	125	144	5.70
16	BR12038-4R-108	129	146	6.03
17	BR12038-4R-121	126	142	6.99
18	BR12038-4R-154	123	145	5.79
19	BR12038-4R-302	130	144	6.39
20	BR12038-4R-386	125	143	6.21
21	BR12038-4R-403	111	145	5.42
22	BR12038-4R-420	124	149	5.65
23	BRRI dhan28 (Ck)	99	144	5.48
24	BRRI dhan74 (Ck)	102	146	6.55
25	BRRI dhan84 (Ck)	106	144	5.76
	lsd (0.05)	8.406	7.736	1.004
	h2b	0.89	0.46	0.44
AYT#2				
1	BR11420-4R-30	127	155	6.40
2	BR11423-4R-136	130	153	6.50
3	BR11423-4R-158	115	148	5.20
4	BR11423-4R-18	125	149	6.32
5	BR11423-4R-65	122	148	6.95
6	BR11431-4R-172	113	152	6.46
7	BR11431-4R-227	126	148	5.66
8	BR11431-4R-28	113	148	6.95
9	BR11431-4R-38	121	148	6.76
10	BR11433-4R-119	122	152	5.68
11	BR11433-4R-25	123	146	7.09
12	BR11437-4R-56	100	147	5.52
13	BR12025-4R-134	112	147	6.19
14	BR12025-4R-175	112	148	5.58
15	BR12025-4R-26	120	154	6.34
16	BR12025-4R-264	116	154	5.61
17	BR12027-4R-118	134	153	6.51
18	BR12027-4R-151	140	151	5.51
19	BR12027-4R-169	131	152	5.66
20	BR12027-4R-26	122	152	6.10
21	BR12028-4R-237	121	157	4.80
22	BR12028-4R-27	114	152	6.55
23	BR12031-4R-179	105	153	5.34
24	BR12031-4R-217	131	153	5.92
25	BR12031-4R-222	134	153	6.27
26	BR12031-4R-3	118	154	5.58
27	BR12031-4R-96	130	147	6.35
28	BR12036-4R-541	131	148	5.37
29	BRRI dhan74 (Ck)	96	147	6.27
30	BRRI dhan84 (Ck)	106	145	6.05
31	BRRI dhan89 (Ck)	113	155	7.35
32	BRRI dhan100 (Ck)	108	148	6.86
33	BRRI dhan102 (Ck)	107	146	6.91
	lsd (0.05)	7.6	8.3	1.052
	h2b	0.86	0.40	0.44

D/S: 25/11/2024 D/T: 01/01/2025

Experiment 11.8: Regional Yield trial (RYT)

Principal Investigator: M A Kader

Co-investigators: HQ and R/S Scientists

Specific Objectives: Evaluation of elite breeding to determine specific and general adaptability under on-station conditions.

Materials and Methods: Nine genotypes in seven locations under T. Aman season and three genotypes in ten locations under Boro season were evaluated against standard check varieties. Twenty-five to forty-five-days-old seedlings were transplanted at 20 cm × 20 cm spacing in 5.4 m × 12 rows plots with three replications in T. Aman and Boro seasons, respectively. Fertilizer and crop management was done as in Experiment no. 11.1. At maturity, data on plant height, growth duration, phenotypic acceptance, diseases and insect score and grain yield were recorded.

Location: T. Aman: BRRI Gazipur, BRRI R/S Rangpur, Cumilla, Kushtia, Barishal, Sirajganj and Rajshahi

Boro: BRRI Gazipur, BRRI R/S Rangpur, Cumilla, Kushtia, Sonagazi, Barishal, Sirajganj, Satkhira, Bhanga and Rajshahi

Results: One of the entries was selected for re-evaluation in RYT from T. Aman and two genotypes were selected and forwarded from Boro season (Table 11.8a and Table 11.8c). Grain quality data for the genotypes of RYT from T. Aman and Boro seasons are presented in Table 11.8b and 11.8d.

Table 11.8a: Yield performance of the genotypes in Regional Yield Trial (RYT), Development of Zinc Enriched Rice (ZER), T. Aman 2024-25

SN Designation	PH (cm)	GD (days)	Grain yield (t/ha)								Zn (mg/ kg)
			Gaz	Rang	Kush	Cum	Shiraj	Raj	Bari	BLUE	
1 BR11151-1-6-2-4	118	122	5.1	3.7	2.9	3.0	2.7	3.8	4.4	3.7	23.4
2 BR11153-1-2-2-5	131	130	5.4	4.3	3.1	3.8	4.8	3.5	4.2	4.2	25.0
3 BR11664-3R-2-3	134	136	6.5	4.2	4.9	5.2	4.9	5.3	4.5	5.1	23.5
4 BR11665-3R-5-2	132	125	5.1	-	3.8	3.1	4.2	2.9	4.4	3.9	19.7
5 BR11666-3R-6-2	112	134	6.8	4.4	5.0	5.5	6.0	6.2	5.0	5.6	23.5
6 BR11672-3R-13-1	134	131	6.0	3.7	4.4	4.3	5.2	3.4	4.4	4.5	24.5
7 BR11672-3R-3-2	143	126	6.4	5.0	4.0	3.8	4.6	3.0	4.3	4.5	25.3
8 BR11672-3R-6-3	142	126	5.5	4.9	3.5	4.4	3.5	3.0	4.4	4.2	22.1
9 BR11675-3R-9-1	139	125	5.5	4.7	2.9	3.3	2.8	3.6	4.5	3.9	20.2
10 BRRI dhan49 (Ck)	109	136	6.4	4.0	4.6	4.5	4.9	5.4	4.5	4.9	16.4
11 BRRI dhan62 (Ck)	106	108	5.7	3.4	2.4	2.8	2.2	2.9	-	3.2	19.2
12 BRRI dhan72 (Ck)	122	132	6.3	4.5	5.0	4.4	5.8	5.7	4.9	5.2	23.4
13 BRRI dhan75 (Ck)	111	120	6.1	4.4	4.3	3.5	3.8	4.1	4.4	4.4	18.5
14 BRRI dhan87 (Ck)	129	130	6.2	4.1	4.7	4.2	6.8	5.3	5.1	5.2	18.5
lsd (0.05)	5.95	6.6	0.224	0.451	0.447	0.583	0.557	0.732	0.146	0.663	
h2b	0.97	0.95	0.96	0.76	0.93	0.87	0.96	0.90	0.93	0.89	

Table 11.8b: Physico-chemical properties of the genotypes of Regional Yield Trial (RYT), Development of Zinc Enriched Rice (ZER), T. Aman 2024-25

SN	Designation	Milling outturn (%)	Head rice yield (%)	Milled Rice length (L) (mm)	Milled Rice breadth (B) (mm)	L-B ratio	Size & Shape	Amylose (%)	Protein (%)	ER	IR
1	BR11151-1-6-2-4	68.3	52.7	6.2	2.0	3.1	LS	22.1	9.6	1.3	3.4
2	BR11153-1-2-2-5	66.3	52.0	6.4	2.1	3.0	LB	22.0	8.4	1.3	3.7
3	BR11664-3R-2-3	67.3	56.7	5.8	2.0	2.9	MB	23.2	9.2	1.4	3.9
4	BR11665-3R-5-2	66.7	57.1	5.8	1.8	3.2	MS	22.9	9.3	1.3	3.9
5	BR11666-3R-6-2	68.9	53.0	5.9	2.0	2.9	MB	22.5	9.1	1.4	4.3
6	BR11672-3R-13-1	68.0	58.8	6.2	2.1	2.9	LB	20.8	9.6	1.4	3.7
7	BR11672-3R-3-2	67.3	58.9	6.5	2.1	3.2	LS	23.8	9.5	1.4	4.1
8	BR11672-3R-6-3	63.4	42.2	6.9	2.1	3.2	LS	17.2	9.4	1.3	3.4
9	BR11675-3R-9-1	67.1	54.4	6.1	2.1	2.9	LB	18.7	9.5	1.4	3.6
10	BRRI dhan49 (Ck)	70.7	62.9	5.6	2.0	2.8	MB	24.7	8.7	1.4	3.6
11	BRRI dhan62 (Ck)	66.5	50.8	6.6	2.2	3.0	LB	19.2	7.7	1.4	2.9
12	BRRI dhan72 (Ck)	70.6	58.1	6.5	2.4	2.7	LB	25.5	8.9	1.4	3.5
13	BRRI dhan75 (Ck)	69.6	60.0	6.3	2.3	2.7	LB	20.5	9.2	1.2	3.0
14	BRRI dhan87 (Ck)	66.6	56.5	6.3	2.0	3.1	LS	26.5	7.5	1.3	3.2

Table 11.8c: Yield performance of the genotypes in Regional Yield Trial (RYT), Development of Zinc Enriched Rice (ZER), Boro 2024-25

SN	Designation	PH (cm)	GD (days)	Grain yield (t/ha)											Zn (mg/kg)
				Gazi	Bari	Cumi	Raj	Rang	Bhan	Shiraj	Satk	Sona	Kustia	BLUE	
1	BR11401-1-2-4-1	112	143	7.3	6.8	8.3	6.2	7.0	8.0	6.9	7.9	4.4	8.3	7.1	20.2
2	BR11401-8-3-1-1	101	140	6.4	5.3	6.3	6.6	6.4	6.4	7.3	6.7	4.5	7.7	6.4	22.3
3	BR12038-65-2-1	99	145	7.8	7.2	6.5	6.5	6.3	7.6	7.6	7.0	5.3	7.4	6.9	25.4
4	BRRI dhan28 (Ck)	103	144	6.0	6.4	6.7	6.6	6.6	6.4	6.0	7.7	3.3	6.9	6.3	17.8
5	BRRI dhan74 (Ck)	98	145	6.5	6.0	6.7	6.6	6.6	7.2	7.2	7.0	6.2	7.4	6.7	24.5
6	BRRI dhan89 (Ck)	107	151	6.5	6.7	6.5	7.2	6.8	8.5	8.1	7.0	5.5	7.1	7.0	19.5
7	BRRI dhan100 (Ck)	106	147	5.8	5.4	6.6	7.2	6.7	7.1	7.8	6.9	5.7	6.9	6.6	25.5
	lsd (0.05)	5.41	5.12	0.39	0.62	0.92	0.44	0.38	0.34	0.66	0.95	0.83	0.69	0.56	
	h2b	0.93	0.67	0.95	0.89	0.82	0.88	0.39	0.97	0.87	0.69	0.85	0.95	0.66	

Table 11.8d: Physico-chemical properties of the genotypes of Regional Yield Trial (RYT), Development of Zinc Enriched Rice (ZER), Boro 2024-25

SN	Designation	Milling outturn (%)	Head rice yield (%)	Milled Rice length (L) (mm)	Milled Rice breadth (B) (mm)	L-B ratio	1000 grain wt (g)	Size & Shape	Amylose (%)	Zinc (mg/ kg)	ER	IR
1	BR11401-1-2-4-1	70.5	47.0	6.2	2.2	2.8	21.5	LB	22.0	20.20	1.3	3.8
2	BR11401-8-3-1-1	71.0	43.2	5.4	2.2	2.5	20.0	MB	22.5	22.30	1.6	3.7
3	BR12038-65-2-1	71.0	39.4	5.8	1.8	3.2	21.4	MS	26.5	25.40	1.5	4.4
4	BRRI dhan28 (Ck)	70.5	20.6	5.8	2.2	2.6	28	MB	25.0	17.80	1.5	3.2
5	BRRI dhan74 (Ck)	68.9	55.0	5.7	2.1	2.7	23.3	MB	26.0	24.50	1.4	3.6
6	BRRI dhan89 (Ck)	68.8	62.1	5.3	1.9	2.8	17	MB	25.0	19.50	1.4	4.5
7	BRRI dhan100 (Ck)	70.5	47.0	6.2	2.2	2.8	21.5	LB	22.0	25.50	1.3	3.8

PROJECT 12: DEVELOPMENT OF INSECT RESISTANT RICE

General objectives: Development of rice varieties resistant to brown plant hopper (BPH), white backed brown plant hopper (WBPH), green leaf hopper (GLH) and gall midge (GM).

Project Leader: Md. Ruhul Amin Sarker

Experiment 12.1: Hybridization

Principal Investigator: M R A Sarker

Co-investigators: M Adil, N Jahan, M Maliha and M A Rahman

Specific objectives: Transfer of gall midge (GM), green leaf hopper (GLH), white backed brown plant hopper (WBPH) and brown plant hopper (BPH) resistance gene(s) into modern high yielding elite genetic background.

Materials and Methods: Nineteen parents including donors for gall midge (GM), green leaf hopper (GLH), white backed plant hopper (WBPH) and brown plant hopper (BPH) resistance were grown in T. Aman 2024-25, and 20 parents for GM, GLH, WBPH and BPH were used for crossing in Boro 2024-25 in three sets at BRRI Gazipur. Seed sowing started from July for T. Aman and November for Boro with an interval of seven days to synchronize flowering for making desired cross combinations at BRRI Gazipur (Table 12.1). Thirty- and 45-days old seedlings were transplanted in a 5.4 m × 2 rows plot with a spacing of 20 cm × 20 cm in T. Aman and Boro seasons, respectively. Single seedling was used for transplanting. Fertilizers at the rate of 70:10:40 kg NPK/ha (150-55-80 kg/ha Urea-TSP-MoP) were applied. Also, Gypsum and Zinc Sulfate were applied at the rate of 100 kg/ha and 10 kg/ha, respectively. For Boro season, fertilizer doses were at the rate of 120-20-60 kg NPK/ha (260-100-120 kg Urea-TSP-MoP/ha) and 100 kg/ha Gypsum and 10 kg/ha Zinc sulfate. Total amount of P, K, Gypsum and Zinc sulfate were applied at final land preparation. Urea was applied in three equal splits at 10-15 days after transplanting, maximum tillering and panicle initiation stage. Hand weeding was done in time. Plant protection measures were taken for pest infestation if necessary.

Results: Thirty-three for forward breeding, three F₁ crosses for Line Augmentation and 10 crosses for pre-breeding were made in T. Aman, and 24 crosses for forward breeding, two crosses for pre-breeding and three F₁ crosses for Line Augmentation were made in Boro season. Mature F₁ seeds were harvested, sun dried and stored separately along with parents in paper bags with proper labeling (Table 12.1).

Table 12.1: List of crosses made, Development of Insect Resistant Rice (IRR), T. Aman and Boro 2024-25

Sl	Cross combination	Trait of interest	No. of F ₁ seeds
T. Aman 2024-25			
Forward breeding			
1	BR13503-4 R-146/BR 12193-5 R-54	<i>Bph9, Bph17_all, Wx-A</i>	60
2	BR13503-4 R-146/IRBPHN-SVIN013-18	<i>Bph17_all, Bph32</i>	12
3	BR13503-4 R-146/IR126952-41-148-38-9-60-B	<i>Bph17all,Bph32,Gm4,Pi-ta, xa5,Xa21,Waxy-A</i>	37
4	BR13507-4 R-178/IR126952-41-148-38-9-60-B	<i>Bph17all Bph32,Gm4,Pi-ta, xa5,Xa21,Waxy-A</i>	2
5	BR13507-4 R-178/IR101791-10-1-4-3-2-4	<i>Bph17_all, Bph21 (BPH score-3)</i>	21
6	BR 13096-4 R-46/BR 12193-5 R-54	<i>Bph9, Bph17_all, Bph32, Wx-A</i>	56
7	BR 13096-4 R-46/BR 11052-4 R -234	<i>Bph17_all, Bph32, Wx-A</i>	43
8	BR 13096-4 R-46/IR101791-10-1-4-3-2-4	<i>Bph17_all, Bph32, Bph21 (BPH score-3)</i>	19
9	BR 13100-4 R-255/BR 12193-5 R-54	<i>Bph9, Bph17_all, BPH32, GM4, Wx-A</i>	11
10	BR 11296-4 R -74/BR 11044-4 R -47	<i>Bph17_all, BPh32, Gm4, Wx-A</i>	14
11	BR 11296-4 R -74/IR107736-7-1-2-1	<i>Bph32, Bph18 (BPH score-5), xa5, Xa21</i>	14
12	BR 11044-4 R -47/IR126952-41-148-38-9-60-B	<i>Bph17all,Bph32,Gm4,Pi-ta, xa5,Xa21,Waxy-A</i>	56
13	BR 11044-4 R -47/IR101791-10-1-4-3-2-4	<i>Bph17_all, Bph21 (BPH score-3)</i>	48
14	BR 11035-4 R -101/IR101791-10-1-4-3-2-4	<i>Bph17_all,Bph32, Bph21 score-3), Gm4</i>	12
15	BR12672-4 R-261/IR101791-10-1-4-3-2-4	<i>Bph17_all, Bph21 (BPH score-3)</i>	1
16	BR12676-4 R-392/IR126952-29-82-206-12-3	<i>Bph17all, Bph32 GM4_4,Pb1,Pi9,xa5,Wx-A</i>	1
17	BR13218-4 R-110/BR13217-4R-135	<i>bph17, bph32, Wx_A group</i>	11
18	BR13219-4 R-382/BR12671-4R-253	<i>bph17, bph32, Wx_A group</i>	9
19	BR12676-4 R-392/BR12208-5R-278	<i>bph32, Gm4, Wx_A group</i>	8
20	BR13218-4 R-110/BR12685-4R-122	<i>bph9, bph32, Wx-A</i>	3
21	BR12672-4 R-261/BR12208-5R-278	<i>bph32, Wx-A</i>	25
22	BR12671-4 R-253/BR12685-4R-122	<i>bph9, bph32, Wx-A</i>	45
23	BR12685-4 R-122/IR126952-41-148-38-9-60-B	<i>bph17,bph32,Gm4,Pi-ta, xa5,Xa21 Waxy-A,</i>	53
24	BR12208-5 R-278/BR-12279-4R-10	<i>bph32, Wx-A</i>	21
25	BR12672-4 R-253/IR10791-10-1-4-3-2-4	<i>bph17, bph21 (BPH score-3)</i>	5
26	BR13217-4 R-135/BR12685-4R-122	<i>bph9, Wx-A</i>	57
27	BR12671-4 R-253/IR126952-29-82-206-12-3	<i>bph17, bph32, GM4_4, Pb1, Pi9, xa5, Wx-A</i>	12
28	BR12672-4 R-261/BR107736-7-1-2-1	<i>bph18 (BPH score-5), xa5, Xa21</i>	36
29	BR13217-4 R-135/IR101791-10-1-4-3-2-4	<i>bph17, bph21 (BPH score-3)</i>	35
30	BR 13100-4 R-255/BRRI dhan33	<i>Bph17_all, Bph32, Gm4</i>	1
31	BR 13100-4 R-255/BR6	<i>GLH, Bph17_all, Bph32, Gm4</i>	12
32	BR 12193-5 R-54/BR6	<i>GLH, Bph9, Bph17_all, Wx-A</i>	7
33	BR 11035-4 R -101/BR6	<i>GLH, Bph17_all, Bph32, Gm4, Wx-A</i>	15
Line Augmentation (F ₁)			
1	BR12671-4R-253/IR126952-29-82-206-12-3	<i>Bph17_all, Bph32, Gm4, Pi9, xa5, Waxy-A</i>	12
2	BR12208-5R-278/IR126952-29-82-206-12-3	<i>Bph17_all, Bph32, Gm4, Pi9, xa5, Waxy-A</i>	6
3	BR12685-4R-122/IR126952-29-82-206-12-3	<i>Bph17_all, Bph32, Gm4, Pi9, xa5, Waxy-A</i>	70
Pre-Breeding (F ₁)			
1	BR12208-5R-343/LT489 (Digha-3)	<i>BPH Score-3, MS grain</i>	23
2	BR 13100-4 R-255/LT489 (Digha-3)	<i>Bph17_all, Bph32, Gm4</i>	6
3	BR13217-4R-135/LT489	<i>BPH Score-3, MS grain</i>	23
4	BR12208-5R-278/LT489	<i>BPH Score-3, MS grain</i>	51
5	BR12671-4R-135/LT489	<i>BPH Score-3, MS grain</i>	36
6	BR11715-4R-105/Swarnalota-1	<i>BPH</i>	5
7	BR13096-4R-46/Swarnalota-1	<i>BPH</i>	20
8	BR13503-4R-146/Swarnalota-1	<i>BPH</i>	15
9	Swarnalota-1/BR13507-4R-118	<i>BPH</i>	58
10	BR12672-4R-261/Fatema dhan	<i>High yield, Wx_A group</i>	26
Boro 2024-25			
Forward Breeding			
1	BR 12208-5 R-403/IR101791-10-1-4-3-2-4	<i>bph17, bph21</i>	33
2	BR14026-4R-47/IR64	<i>WBPH</i>	3
3	BR 12679-4 R-6/BR6	<i>GLH</i>	92
4	BR13467-4R-338/BR13482-4R-202	<i>bph32, Gm4</i>	25
5	BR 12208-5 R-403/BRRI dhan33	<i>GM</i>	139
6	BR 12672-4 R-261/IR126952-29-82-206-12-3	<i>bph17, bph32, GM4, Pi9, xa5, Wx-A</i>	66
7	BR13467-4R-338/BR6	<i>GLH</i>	56
8	BR 13219-4 R-382/BR6	<i>GLH, bph17, bph32, Wx_A group</i>	26
9	BR 12208-5 R-403/IR126952-41-148-38-9-60-B	<i>bph17, bph32, Gm4, Pi-ta, xa5, Xa21, Waxy-A</i>	112
10	BR13466-4R-61/BR6	<i>GLH, bph32, Gm4</i>	310
11	BR13466-4R-61/BRRI dhan33	<i>GM, bph32, Gm4</i>	104
12	BR 12685-4 R-122/IR126952-41-148-38-9-60-B	<i>bph9,bph17,bph32,Gm4,Pi-ta, xa5Xa21,Wx-A</i>	8
13	BR 12671-4 R-312/IR107736-7-1-2-1	<i>bph18, xa5, Xa21</i>	142
14	BR13482-4R-202/BRRI dhan33	<i>GM</i>	6
15	BR 12671-4 R-312/BRRI dhan33	<i>GM</i>	21
16	BR 13219-4 R-382/BR13482-4R-202	<i>bph17, bph32, Gm4, Wx_A group</i>	37
17	BR13219-4R-382/IR126952-29-82-206-12-3//BR13472-4R-124	<i>bph17_all, bph32, Gm4, Pi9, xa5, Waxy-A</i>	18

Sl	Cross combination	Trait of interest	No. of F ₁ seeds
18	BR13472-4R-124/IR126952-41-148-38-9-60-B	<i>bph17, bph32, Gm4, Pi-ta, xa5, Xa21, Waxy-A</i>	114
19	BR 13219-4 R-382/BR13467-4R-338	<i>bph17, bph32, Wx_A group</i>	165
20	BR13472-4R-124/BRR1 dhan33	<i>GM</i>	50
21	BR13466-4R-61/BR13482-4R-202	<i>bph32, Gm4</i>	265
22	BR 13219-4 R-382/IR107736-7-1-2-1	<i>bph17, bph18, bph32, xa5, Xa21, Wx_A group</i>	16
23	BR13482-4R-202/IR126952-41-148-38-9-60-B	<i>bph17, bph32, Gm4, Pi-ta, xa5, Xa21, Waxy-A</i>	3
24	BR 12671-4 R-312/BR6	<i>GLH</i>	12
Pre Breeding			
1	BR13466-4R-61/LT489	<i>bph32, Gm4, Wx-A</i>	9
2	BR 12672-4 R-261/LT489	<i>BPH Score-3, MS grain</i>	8
Line Augmentation (F₁)			
1	BR13467-4R-338/IR126952-29-82-206-12-3	<i>bph17, bph32, xa5, Pi9, Wx-A</i>	20
2	BR 12685-4 R-122/IR126952-29-82-206-12-3	<i>Bph9, bph17, bph32, xa5, Pi9, Wx-A</i>	64
3	BR 12671-4 R-312/IR126952-29-82-206-12-3	<i>bph17, bph32, xa5, Pi9, Wx-A</i>	6

Experiment 12.2: F₁ confirmation

Principal Investigator: M R A Sarker

Co Investigators: M Adil, N Jahan, M Maliha and M A Rahman

Specific objective: Confirmation of crosses as true hybrid with introgression of genes of interest into modern genetic background.

Materials and Methods: List of F₁’s is shown in Table 12.2. The F₁ seeds along with their respective parents were germinated in the petridish. Thirty- and 45-days old seedling was transplanted in 5.4 m × 1 rows plot with a spacing of 20 × 15 cm in T. Aman and Boro seasons, respectively at BRRI Gazipur. Single seedling was used for transplanting. Fertilizer doses and application were the same as in Experiment 12.1. Hand weeding was done in time. Plant protection measures were taken for only disease infestation if necessary. Leaf samples were collected from each of the plants of F₁ and respective parents for QC genotyping to determine true F₁s. QC genotyping was performed using 10 QC SNPs at Intertek, Australia. In flowering time, phenotypically good and resistant plants were used for back crossing.

Results: Twenty-five and 41 crosses were confirmed through F₁ verification using quality check (QC) genotyping with purity SNP panel as well as careful observation of plant characters in T. Aman and Boro seasons, respectively. After confirmation, F₂ seeds were collected and preserved. These confirmed F₁s’ were registered into BRRI cross list with BR number (Table 12.2).

Table 12.2: List of confirmed F₁s, Development of Insect Resistant Rice (IRR), T. Aman and Boro 2024-25

Sl	BR No	Cross combination	Trait of Interest (ToI)
T. Aman 2024-25			
1	BR16418	BR13104-4R-80/BR12208-4R-278	<i>bph32, Wx-A</i>
2	BR16419	BR11715-4R-186/D (R)6	<i>bph32, Wx-A</i>
3	BR16420	BR11715-4R-186/BR12685-4R-122	<i>bph9, Wx-A</i>
4	BR16421	BR12685-4R-122/BR11715-4R-186	<i>bph9, Wx-A</i>
5	BR16422	BR12279-4R-10/D (R)6	<i>bph32, Wx-A</i>
6	BR16423	BR13219-4R-382/IR107736-7-1-2-1	<i>bph17, bph18, bph32, xa5, Xa21, Wx_A</i>
7	BR16424	IR107736-7-1-2-1/BR11712-4R-172	<i>bph18 (BPH score-5), xa5, Xa21</i>
8	BR16425	BR12671-4R-253/BR11716-4R-105	<i>bph32, Wx_A group</i>
9	BR16426	IR101791-10-1-4-3-2-4/BR13219-4R-382	<i>bph17, bph32, bph21, Wx_A group</i>
10	BR16427	IR101791-10-1-4-3-2-4/BR11715-4R-186	<i>bph17, bph21 (BPH score-3)</i>
11	BR16428	BR13217-4R-135/IR107736-7-1-2-1	<i>bph17, bph18, bph32, xa5, Xa21, Wx_A</i>
12	BR16429	BR12715-4R-105/BRR1 dhan92	<i>bph32, Wx_A group</i>
13	BR16430	BR12685-4R-122/BR11716-4R-102	<i>bph9, Wx-A</i>
14	BR16431	BR13467-4R-139/IR64	<i>WBPH</i>
15	BR16432	BR13479-4R-93/IR64	<i>WBPH</i>
16	BR16433	BR13467-4R-139/BR6	<i>WBPH</i>
17	BR16434	BR13479-4R-93/BR6	<i>GLH</i>
18	BR16435	BR13460-4R-276/BR6	<i>GLH</i>
19	BR16436	BR11715-4R-105/IR126952-29-82-206-12-3	<i>GLH</i>
20	BR16437	BR13219-4R-382/IR126952-29-82-206-12-3	<i>bph17, bph32, xa5, Pi9, Wx-A</i>
21	BR16438	BR12685-4R-122/IR126952-29-82-206-12-3	<i>bph17, bph32, xa5, Pi9, Wx-A</i>
22	BR16439	BR11052-4R-234/IR126952-41-148-38-9-60-B//BR12208-4R-402	<i>bph17, bph32, xa5, Xa21, Pi9, Wx-A</i>

Sl	BR No	Cross combination	Trait of Interest (ToI)
23	BR16440	BR13098-4R-123/IR126952-29-82-206-12-3//BR12208-4R-402	<i>bph9, bph17, bph32, xa5, Pi9, Wx-A</i>
24	BR16441	BR12279-4R-10/Fatema dhan	BPH, high yield
25	BR16442	BR12672-4R-261/Fatema dhan	<i>bph32, Wx-A</i>
Boro 2024-25			
1	BR16936	BR13503-4R-146/BR 12193-5 R-54	<i>Bph9, Bph17_all, Wx-A</i>
2	BR16938	BR13503-4R-146/IR126952-41-148-38-9-60-B	<i>Bph17all, Bph32, Gm4 Pita, xa5 Xa21, Waxy-A</i>
3	BR16939	BR13507-4R-178/IR126952-41-148-38-9-60-B	<i>Bph17all, Bph32, Gm4, Pita xa5, Xa21, Waxy-A</i>
4	BR16940	BR13507-4R-178/IR101791-10-1-4-3-2-4	<i>Bph17_all, Bph21 (BPH score-3)</i>
5	BR16941	BR 13096-4 R-46/BR 12193-5 R-54	<i>Bph9, Bph17_all, Bph32, Wx-A</i>
6	BR16942	BR 13096-4 R-46/BR 11052-4 R -234	<i>Bph17_all, Bph32, Wx-A</i>
7	BR16943	BR 13096-4 R-46/IR101791-10-1-4-3-2-4	<i>Bph17_all, Bph32, Bph21 (BPH score-3)</i>
8	BR16944	BR 13100-4 R-255/BR 12193-5 R-54	<i>Bph9, Bph17_all, BPH32, GM4, Wx-A</i>
9	BR16945	BR 11296-4 R -74/BR 11044-4 R -47	<i>Bph17_all, BPH32, Gm4, Wx-A</i>
10	BR16946	BR 11296-4 R -74/IR107736-7-1-2-1	<i>Bph32, Bph18 (BPH score-5), xa5, Xa21</i>
11	BR16947	BR 11044-4 R -47/IR126952-41-148-38-9-60-B	<i>Bph17all, Bph32, Gm4, Pi-ta, xa5, Xa21 Waxy-A</i>
12	BR16948	BR 11044-4 R -47/IR101791-10-1-4-3-2-4	<i>Bph17_all, Bph21 (BPH score-3)</i>
13	BR16949	BR 11035-4 R -101/IR101791-10-1-4-3-2-4	<i>Bph17_all, Bph32, Bph21 (scoree-3), Gm4</i>
14	BR16950	BR12672-4R-261/IR101791-10-1-4-3-2-4	<i>Bph17_all, Bph21 (BPH score-3)</i>
15	BR16951	BR12676-4R-392/IR126952-29-82-206-12-3	<i>Bph17all, Bph32, GM44, Pb1, Pi9, xa5, Wx-A</i>
16	BR16952	BR13218-4R-110/BR13217-4R-135	<i>bph17, bph32, Wx_A group</i>
17	BR16954	BR12676-4R-392/BR12208-5R-278	<i>bph32, Gm4, Wx_A group</i>
18	BR16955	BR13218-4R-110/BR12685-4R-122	<i>bph9, bph32, Wx-A</i>
19	BR16956	BR12672-4R-261/BR12208-5R-278	<i>bph32, Wx-A</i>
20	BR16957	BR12671-4R-253/BR12685-4R-122	<i>bph9, bph32, Wx-A</i>
21	BR16958	BR12685-4R-122/IR126952-41-148-38-9-60-B	<i>bph17, bph32, Gm4, Pi-ta, xa5 Xa21, Waxy-A,</i>
22	BR16959	BR12208-5R-278/BR-12279-4R-10	<i>bph32, Wx-A</i>
23	BR16960	BR13217-4R-135/BR12685-4R-122	<i>bph17, bph21 (BPH score-3)</i>
24	BR16961	BR12671-4R-253/IR126952-29-82-206-12-3	<i>bph17, bph32, GM4_4, Pb1, Pi9, xa5, Wx-A</i>
25	BR16962	BR12672-4R-261/BR107736-7-1-2-1	<i>bph18 (BPH score-5), xa5, Xa21</i>
26	BR16963	BR13217-4R-135/IR101791-10-1-4-3-2-4	<i>bph17, bph21 (BPH score-3)</i>
27	BR16964	BR 13100-4 R-255/BRRI dhan33	<i>Bph17_all, Bph32, Gm4</i>
28	BR16965	BR 13100-4 R-255/BR6	<i>GLH, Bph17_all, Bph32, Gm4</i>
29	BR16966	BR 12193-5 R-54/BR6	<i>GLH, Bph9, Bph17_all, Wx-A</i>
30	BR16967	BR 11035-4 R -101/BR6	<i>GLH, Bph17_all, Bph32, Gm4, Wx-A</i>
31	BR16968	BR12208-5R-343/LT489	<i>BPH Score-3, MS grain</i>
32	BR16969	BR13217-4R-135/LT 489	<i>BPH Score-3, MS grain</i>
33	BR16970	BR12208-5R-278/LT 489	<i>BPH Score-3, MS grain</i>
34	BR16972	BR11715-4R-105/Swarnalota-1	<i>BPH</i>
35	BR16973	BR13096-4R-46/Swarnalota-1	<i>BPH</i>
36	BR16974	BR13503-4R-146/Swarnalota-1	<i>BPH</i>
37	BR16975	Swarnalota-1/BR13507-4R-118	<i>BPH</i>
38	BR16442	BR12672-4R-261/Fatema dhan	<i>High yield, Wx_A group</i>
39	BR16976	BR12208-5R-278/IR126952-29-82-206-12-3	<i>bph17, bph32, Gm4, Pi9, Waxy-A</i>
40	BR16978	BR11715-4R-105*2/IR126952-29-82-206-12-3	<i>bph17, bph32, Gm4, Pi9, Waxy-A</i>
41	BR16979	BR13219-4R-382*2/IR126952-29-82-206-12-3	<i>bph17, bph32, Gm4, Pi9, Waxy-A</i>

Experiment 12.3: Field Rapid Generation Advance (FRGA)

Principal Investigator: M R A Sarker

Co-investigators: M Adil, N Jahan, M Maliha and M A Rahman

Specific objectives: Rapid advancement of segregating population for reducing the breeding cycle.

Materials and Method: Individual progenies from 109 (T. Aman) and 112 (Boro) crosses were grown involving F₂, F₃ and F₄ population in field following SSD method of breeding at BRRI Gazipur. Thirty- and 45-days old seedling was transplanted at 5 cm × 5 cm spacing in the field in T. Aman and Boro seasons, respectively. In F₅ generation, populations were grown in field following SSD method of breeding in single-hill plot at a spacing of 5 cm × 5 cm on raised bed in the field. A small portion of a panicle with 8-10 seed from a single plant harvested from previous generation was seeded directly on the bed. A specialized wooden frame was used to furrow on the puddled bed at 5 cm apart to sow seeds. Fertilizer management was done using the half doses of all fertilizers used in Experiment 12.1. At maturity, single panicle was harvested from each plant of each cross. Harvested seed was dried and treated with 45⁰ C for five days to break dormancy for initiating next cycle of RGA immediately.

Results: In total 17,286 (T. Aman) and 23,610 (Boro) individual progenies were harvested from rapid generation advance (RGA) of segregating populations in different generations (Table 12.3.1 and Table 12.3.2).

Table 12.3.1: List of segregating population advanced in Field Rapid Generation Advance (FRGA), Development of Insect Resistant Rice (IRR), T. Aman 2024-25

SI#	BR Reg. #	Cross combination	Progenies transplanted	Progenies harvested
F₂ generation				
1	BR15919	BR12685-4R-122/BR12208-5R-402	1000	123
2	BR15920	BR12671-4R-73/BR12685-4R-122	1000	75
3	BR15921	BR12180-4R-17/BR12208-4R-402	1000	81
4	BR15922	BR12676-4R-308/BR12208-4R-402	1000	126
5	BR15923	BR12671-4R-73/BR12279-4R-11	1000	117
6	BR15924	BR12676-4R-302/IR10179-10-1-4-3-2-4	1000	90
7	BR15925	BR12279-5R-11/BR11593-5R-70	1000	90
8	BR15926	BR12671-4R-73/IR10179-10-1-4-3-2-4	1000	117
9	BR15927	BR12180-4R-17/IR126952-29-82-206-12-3	1000	223
10	BR15928	BR12685-4R-122/IR107736-7-1-2-1	1000	111
11	BR15929	BR11949-4R-137/IR101791-10-1-4-3-2-4	1000	123
12	BR15930	BR12180-4R-17/IR101791-10-1-4-3-2-4	1000	60
13	BR15931	BR11593-5R-70/IR126952-29-82-206-12-3	1000	246
14	BR15932	BR12208-5R-402/IR126952-29-82-206-12-3	1000	221
15	BR15933	BR12208-4R-402/IR101791-10-1-4-2-3-4	1000	177
16	BR15934	BR12671-4R-73/IR126952-29-82-206-12-3	1000	72
17	BR15935	BR12676-4R-302/BR12279-4R-11	1000	123
18	BR15936	BR12208-4R-402/IR107736-7-1-2-1	1000	225
19	BR15937	BR12671-4R-73/BR12208-4R-402	1000	138
20	BR15938	BR12208-4R-402/BRRi dhan89	1000	81
21	BR15939	BR12180-4R-17/LT489	1000	66
22	BR15940	BR12671-4R-73/LT489	1000	129
23	BR15941	BR12208-4R-402/LT489	1000	75
24	BR15942	BR12180-4R-17/IR107736-7-1-2-1	1000	102
25	BR15943	BR12208-4R-402/BRRi dhan29	1000	174
26	BR15944	BR12676-4R-302/IR107736-7-1-2-1	1000	117
27	BR15945	BRAC dhan-2/BR12208-4R-402	1000	138
Sub total			27000	3420
F₃ generation				
1	BR15618	BR 12180-5 R-62/BR 12208-5 R-227	300	124
2	BR15619	BR 12193-5 R-63/BR 11295-4 R -100	300	120
3	BR15620	BR 12177-5 R-156/BR 11035-4 R -101	300	135
4	BR15621	BR 11448-4 R -129/ IR101791-10-1-4-3-2-4	300	291
5	BR15622	BR 11295-4 R -100/IR101791-10-1-4-3-2-4	300	135
6	BR15623	BR 12177-5 R-156/IR126952-29-82-206-12-3	300	148
7	BR15624	BR 12480-5 R-62/IR126952-29-82-206-12-3	300	126
8	BR15625	IRBPHN-SVIN013-18/IR107736-7-1-2-1	300	105
9	BR15626	BR 11035-4 R -101/IR101791-10-1-4-3-2-4	300	132
10	BR15627	BR 12208-5 R-65 /IR101791-10-1-4-3-2-4	300	240
11	BR15628	BR 12208-5 R-65 /IR107736-7-1-2-1	300	261
12	BR15629	BR 12208-5 R-65 / IR126952-29-12-103-8-2	300	176
13	BR15630	BR11712-4R-218/BR11921-4R-135	300	225
14	BR15631	BR11948-4 R-129 /IR107736-7-1-2-1	300	180
15	BR15632	BR12193-4 R-63/IRBPHN-SVIN013-18	300	150
16	BR15633	BR11948-4 R-129 / IR126952-29-12-103-8-2	300	216
17	BR15634	BR11948-4 R-129 /BR11246-4R-215	300	315
18	BR15635	DR-6*2/Rathuhenathi	600	439
19	BR15636	BRRi dhan92/BR12177-4 R-11	300	147
20	BR15637	BRRi dhan89/BR11910-4 R-94	300	126
21	BR15638	BRRi dhna92/BR12177-4 R-156	300	289
22	BR15639	BRRi dhan89/BR11723-4 R-172	300	104
23	BR14987	BR11593-5R-55*2/IR126952-29-82-206-12-3	300	104
Sub total			7200	4288
F₄ generation				
1	BR15143	BR11296-4R-215/IR107736-7-1-2-1	220	171
2	BR15144	IR107736-7-1-2-1/BR11044-4R-279	160	234
3	BR15145	BR11039-4R-165/IR101791-10-1-4-3-2-4	235	168
4	BR15146	BR11295-4R-221/IR126952-41-148-38-9-60-B	220	121
5	BR15147	BR11295-4R-221/IR107736-7-1-2-1	160	97
6	BR15148	BR11302-4R-75/BR11052-4R-273	175	144
7	BR15149	IR101791-10-1-4-3-2-4/BR11044-4R-279	180	177
8	BR15150	BR12177-5R-308/IR126952-29-82-206-12-8	150	138

Sl#	BR Reg. #	Cross combination	Progenies transplanted	Progenies harvested
9	BR15151	BR11723-4R-172/IR101791-10-1-4-3-2-4	220	147
10	BR15152	BRRRI dhan87/BR12177-4R-108	270	115
11	BR15153	BRRRI dhan87/BR12180-4R-12	190	111
12	BR15154	BRRRI dhan99/BR11921-4R-227	210	123
13	BR15155	BR13093-4R-5/BR10162-4R-17	210	198
14	BR15156	BRRRI dhan87/BR12177-4R-171	200	168
15	BR15157	BRRRI dhan87/BR12180-4R-14	210	126
16	BR15158	BR 11948-4 R-129/BR 11949-4 R-258	260	264
17	BR15159	BR 11593-5 R-55/IR107736-7-1-2-1	290	130
18	BR15160	BR 11941-4 R-441/IR 126952-29-12-103-8-2	280	124
19	BR15161	BR11388-4R-45 / BR9891-19-2-2-8	190	171
20	BR15162	BR 11941-4 R-123/IR 126952-29-12-103-8-2	170	97
21	BR15163	BR 11386-4 R-325/IR107736-7-1-2-1	210	144
22	BR15164	BR 11593-5 R-55/IR101791-10-1-4-3-2-4	240	88
23	BR15165	BR11593-5R-57 / BR11386-4R-325	175	198
24	BR15166	BR 11942-4 R-134/BR 11949-4 R-39	220	145
25	BR15167	BR 11941-4 R-123/IR107736-7-1-2-1	200	195
26	BR15168	BR8340-5-6-1 / IR107995-B-BRGA-BRGA-2-1	260	124
27	BR15169	BR 11302-4 R-75/IR 126952-29-82-206-12-3	211	144
28	BR15170	BR 11949-4 R-39/BR 9891-18-5-2-7	220	237
29	BR15171	BR 11948-4 R-129/IR107736-7-1-2-1	260	285
30	BR15172	BR 11941-4 R-123/IR101791-10-1-4-3-2-4	180	138
31	BR15173	BRRRI dhan92/LT489	150	82
32	BR15174	Sunamukhi/DR-6	190	174
33	BR15175	BR11388-4R-17/BRRRI dhan99	160	100
34	BR15176	BR11296-4R-215*2/IR126952-29-82-206-12-8	250	222
35	BR15177	BR11302-4R-75*2/IR126952-29-82-206-12-8	270	309
36	BR15178	BR11723-4R-172*2/IR126952-29-82-206-12-8	180	97
37	BR15179	BR11039-4R-162*2/ IR126952-29-82-206-12-8	190	228
38	BR15180	D (R)6*2/Rathuhenathi	180	105
39	BR15181	BRRRI dhan87*2/ Rathuhenathi	170	117
40	BR15182	D (R)6*2/Babawee	210	124
Sub total			8326	6280
F₅ generation				
1	BR14740	BR9667-54-2-2-97*2/Fatema dhan	190	204
2	BR14741	BR11593-5R-54/BR11386-4R-325	220	128
3	BR14742	BR9669-23-3-2-23/IR107995-B-BRGA-BRGA-2-1	160	320
4	BR14743	BR12208-5R-1/BR8340-5-6-1	208	124
5	BR14744	IR108007-B-BRLA-BRLA-25-1/BR11386-4R-287	140	154
6	BR14745	BR11591-5R-12/LT489	120	194
7	BR14746	BR11588-5R-1/LT489	150	114
8	BR14747	BR11723-4R-172/IR126952-41-148-38-9-60-B	160	256
9	BR14748	BR12180-5R-1/IR126952-41-148-38-9-60-B	103	174
10	BR14750	D (R)- 6/IR126952-29-82-206-12-8	170	220
11	BR14751	BR12177-5R-94/IR126952-29-82-206-12-8	140	154
12	BR14752	BR11723-4R-172/IR126952-29-82-206-12-8	160	174
13	BR14753	BRRRI dhan93/BR11052-4R-273	190	106
14	BR14754	BR10762-4R-17/BR11035-4R-101	195	188
15	BR14755	BR12177-5R-94/IR101791-10-1-4-3-2-4	180	126
16	BR14756	BR12208-4R-352/IR101791-10-1-4-3-2-4	170	84
17	BR14757	BR12177-5R-17/IR101791-10-1-4-3-2-4	120	108
18	BR14758	BR111716-4R-120/IR101791-10-1-4-3-2-4	135	178
19	BR14759	BR10/IR101791-10-1-4-3-2-4	171	130
20	BR14760	BR12177-5R-1/IR126952-29-82-206-12-8	185	162
Sub-total			3467	3298
Grand Total			45993	17286

Table 12.3.2: List of segregating population advanced in Field Rapid Generation Advance (FRGA), Development of Insect Resistant Rice (IRR), Boro 2024-25

Sl#	BR Reg. #	Cross combination	Progenies transplanted	Progenies harvested
F₂ generation				
1	BR16116	BR 12193-5 R-54/IR101791-10-1-4-3-2-4	600	440
2	BR16119	BR 12216-5 R-31/IR107736-7-1-2-1	600	360
3	BR16120	BR 12193-5 R-54/IR126952-41-148-38-9-60-B	600	368
4	BR16122	BR 11035-4 R -101/BR 11052-4 R -234	600	304
5	BR16123	BR11716-4R-102/BR12193-4R-54	600	316
6	BR16124	BR13094-4R-123/BR13097-4R-105	600	348
7	BR16125	BR 13094-4 R-123/IR107736-7-1-2-1	600	420
8	BR16126	BR 13094-4 R-123/BR 12193-5 R-54	600	320
9	BR16127	BR 13094-4 R-123/IR101791-10-1-4-3-2-4	600	396

Sl#	BR Reg. #	Cross combination	Progenies transplanted	Progenies harvested
10	BR16128	BR 11052-4 R -234/IR126952-41-148-38-9-60-B	600	312
11	BR16129	BR 13088-4 R-423/BR 12216-5 R-31	600	408
12	BR16131	BR13088-4R-423/IR101791-10-1-4-3-2-4	600	348
13	BR16132	BR13088-4R-423/BR11716-4R-102	600	380
14	BR16133	BR 13094-4 R-123/IR126952-29-82-206-12-3	600	356
15	BR16134	BR 13088-4R-423/IR126952-29-82-206-12-3	600	308
16	BR16135	BR12193-4R-54/LT489	600	328
17	BR16136	BR13097-4R-105/LT489	600	296
18	BR16137	BR12193-4R-54/Fatema dhan	600	340
19	BR16138	Fatema dhan/BR13088-4R-423	600	332
20	BR16139	Fatema dhan/IR126952-41-148-38-9-60-B	600	316
21	BR16140	Fatema dhan/IR126952-29-82-206-12-3	600	456
22	BR16143	BR12208-4R-402*2/LT489	600	388
Sub-total			13200	7840
F₃ Generation				
1	BR15919	BR12685-4R-122/BR12208-5R-402	233	232
2	BR15920	BR12671-4R-73/BR12685-4R-122	230	228
3	BR15921	BR12180-4R-17/BR12208-4R-402	201	196
4	BR15922	BR12676-4R-308/BR12208-4R-402	226	236
5	BR15923	BR12671-4R-73/BR12279-4R-11	187	176
6	BR15924	BR12676-4R-302/IR10179-10-1-4-3-2-4	290	240
7	BR15925	BR12279-5R-11/BR11593-5R-70	190	152
8	BR15926	BR12671-4R-73/IR10179-10-1-4-3-2-4	317	264
9	BR15927	BR12180-4R-17/IR126952-29-82-206-12-3	423	380
10	BR15928	BR12685-4R-122/IR107736-7-1-2-1	211	204
11	BR15929	BR11949-4R-137/IR101791-10-1-4-3-2-4	423	412
12	BR15930	BR12180-4R-17/IR101791-10-1-4-3-2-4	160	152
13	BR15931	BR11593-5R-70/IR126952-29-82-206-12-3	346	356
14	BR15932	BR12208-5R-402/IR126952-29-82-206-12-3	221	190
15	BR15933	BR12208-4R-402/IR101791-10-1-4-2-3-4	277	220
16	BR15934	BR12671-4R-73/IR126952-29-82-206-12-3	172	152
17	BR15935	BR12676-4R-302/BR12279-4R-11	223	204
18	BR15936	BR12208-4R-402/IR107736-7-1-2-1	325	320
19	BR15937	BR12671-4R-73/BR12208-4R-402	238	228
20	BR15938	BR12208-4R-402/BRRI dhan89	381	324
21	BR15939	BR12180-4R-17/LT489	266	244
22	BR15940	BR12671-4R-73/LT489	129	102
23	BR15941	BR12208-4R-402/LT489	250	200
24	BR15942	BR12180-4R-17/IR107736-7-1-2-1	202	202
25	BR15943	BR12208-4R-402/BRRI dhan29	374	332
26	BR15944	BR12676-4R-302/IR107736-7-1-2-1	117	172
27	BR15945	BRAC dhan-2/BR12208-4R-402	238	204
Sub-total			6420	6116
F₄ generation				
1	BR15618	BR 12180-5 R-62/BR 12208-5 R-227	274	268
2	BR15619	BR 12193-5 R-63/BR 11295-4 R -100	160	144
3	BR15620	BR 12177-5 R-156/BR 11035-4 R -101	135	184
4	BR15621	BR 11448-4 R -129/ IR101791-10-1-4-3-2-4	291	204
5	BR15622	BR 11295-4 R -100/IR101791-10-1-4-3-2-4	175	156
6	BR15623	BR 12177-5 R-156/IR126952-29-82-206-12-3	248	236
7	BR15624	BR 12480-5 R-62/IR126952-29-82-206-12-3	126	116
8	BR15625	IRBPHN-SVIN013-18/IR107736-7-1-2-1	205	200
9	BR15626	BR 11035-4 R -101/IR101791-10-1-4-3-2-4	232	180
10	BR15627	BR 12208-5 R-65 /IR101791-10-1-4-3-2-4	240	214
11	BR15628	BR 12208-5 R-65 /IR107736-7-1-2-1	261	254
12	BR15629	BR 12208-5 R-65 / IR126952-29-12-103-8-2	276	208
13	BR15630	BR11712-4R-218/BR11921-4R-135	225	116
14	BR15631	BR11948-4 R-129 /IR107736-7-1-2-1	180	174
15	BR15632	BR12193-4 R-63/IRBPHN-SVIN013-18	150	104
16	BR15633	BR11948-4 R-129 / IR126952-29-12-103-8-2	316	306
17	BR15634	BR11948-4 R-129 /BR11246-4R-215	315	260
18	BR15635	DR-6*2/Rathuhenathi	439	332
19	BR15636	BRRI dhan92/BR12177-4 R-11	147	142
20	BR15637	BRRI dhan89/BR11910-4 R-94	126	120
21	BR15638	BRRI dhna92/BR12177-4 R-156	289	268
22	BR15639	BRRI dhan89/BR11723-4 R-172	304	282
23	BR14987	BR11593-5R-55*2/IR126952-29-82-206-12-3	304	244
Sub-total			4888	4610
F₅ generation				
1	BR15143	BR11296-4R-215/IR107736-7-1-2-1	271	209
2	BR15144	IR107736-7-1-2-1/BR11044-4R-279	234	177
3	BR15145	BR11039-4R-165/IR101791-10-1-4-3-2-4	168	168

Sl#	BR Reg. #	Cross combination	Progenies transplanted	Progenies harvested
4	BR15146	BR11295-4R-221/IR126952-41-148-38-9-60-B	121	62
5	BR15147	BR11295-4R-221/IR107736-7-1-2-1	97	65
6	BR15148	BR11302-4R-75/BR11052-4R-273	144	133
7	BR15149	IR101791-10-1-4-3-2-4/BR11044-4R-279	177	129
8	BR15150	BR12177-5R-308/IR126952-29-82-206-12-8	138	63
9	BR15151	BR11723-4R-172/IR101791-10-1-4-3-2-4	147	111
10	BR15152	BRRI dhan87/BR12177-4R-108	115	97
11	BR15153	BRRI dhan87/BR12180-4R-12	111	83
12	BR15154	BRRI dhan99/BR11921-4R-227	123	55
13	BR15155	BR13093-4R-5/BR10162-4R-17	198	121
14	BR15156	BRRI dhan87/BR12177-4R-171	168	105
15	BR15157	BRRI dhan87/BR12180-4R-14	126	83
16	BR15158	BR 11948-4 R-129/BR 11949-4 R-258	264	329
17	BR15159	BR 11593-5 R-55/IR107736-7-1-2-1	130	98
18	BR15160	BR 11941-4 R-441/IR 126952-29-12-103-8-2	124	73
19	BR15161	BR11388-4R-45 / BR9891-19-2-2-8	171	71
20	BR15162	BR 11941-4 R-123/IR 126952-29-12-103-8-2	97	72
21	BR15163	BR 11386-4 R-325/IR107736-7-1-2-1	144	86
22	BR15164	BR 11593-5 R-55/IR101791-10-1-4-3-2-4	188	123
23	BR15165	BR11593-5R-57 / BR11386-4R-325	198	96
24	BR15166	BR 11942-4 R-134/BR 11949-4 R-39	145	87
25	BR15167	BR 11941-4 R-123/IR107736-7-1-2-1	195	166
26	BR15168	BR8340-5-6-1 / IR107995-B-BRGA-BRGA-2-1	124	134
27	BR15169	BR 11302-4 R-75/IR 126952-29-82-206-12-3	144	174
28	BR15170	BR 11949-4 R-39/BR 9891-18-5-2-7	237	174
29	BR15171	BR 11948-4 R-129/IR107736-7-1-2-1	285	438
30	BR15172	BR 11941-4 R-123/IR101791-10-1-4-3-2-4	138	80
31	BR15173	BRRI dhan92/LT489	82	58
32	BR15174	Sunamukhi/DR-6	174	133
33	BR15175	BR11388-4R-17/BRRI dhan99	100	69
34	BR15176	BR11296-4R-215*2/IR126952-29-82-206-12-8	222	116
35	BR15177	BR11302-4R-75*2/IR126952-29-82-206-12-8	309	241
36	BR15178	BR11723-4R-172*2/IR126952-29-82-206-12-8	97	59
37	BR15179	BR11039-4R-162*2/ IR126952-29-82-206-12-8	228	299
38	BR15180	D (R)6*2/Rathuhenathi	105	84
39	BR15181	BRRI dhan87*2/ Rathuhenathi	117	46
40	BR15182	D (R)6*2/Babawee	124	77
Sub-total			6280	5044
Grand Total			27128	23610

Experiment 12.4: Line Stage Testing (LST)

Principal Investigator: M R A Sarker

Co-investigators: m Adil, N Jahan, M Maliha and M A Rahman

Specific Objective: Evaluation of FRGA derived advanced lines for uniformity and desirable agronomic characters.

Materials and Methods: Total 2032 advanced breeding lines (Table 12.4.1) from 21 families for BPH and GM were grown at BRRI Gazipur during T. Aman 2024-25. BRRI dhan33 (for gall midge) and T27A (for BPH) were used as resistant checks and BRRI dhan49 and BR3 used as susceptible checks. Total 5167 F_{5:6} lines (Table 12.4.2) from 26 families for BPH were grown at BRRI Gazipur during Boro 2024-25. Thirty- and 45-days old seedling was transplanted in a 2.4 m (12 hills) × 1 row plot with a spacing of 20 cm × 20 cm in T. Aman and Boro seasons, respectively. Single seedling was used for transplanting. Fertilizer doses and application were the same as in Experiment 12.1. Hand weeding was done in time. Importantly, no insecticides were applied in this experiment.

Results: A total of 358 lines were selected out of 2032 lines derived from 21 different crosses during T. Aman 2024-25 (Fig. 12.4.1a; Table 12.4.1). Total 778 out of 5167 lines comprising 26 different crosses were selected in Boro 2024-25 (Fig. 12.4.1b; Table 12.4.2). Selection was done based on flowering uniformity, phenotypic acceptability, pest infestation under field conditions and the presence of favourable alleles for target traits.

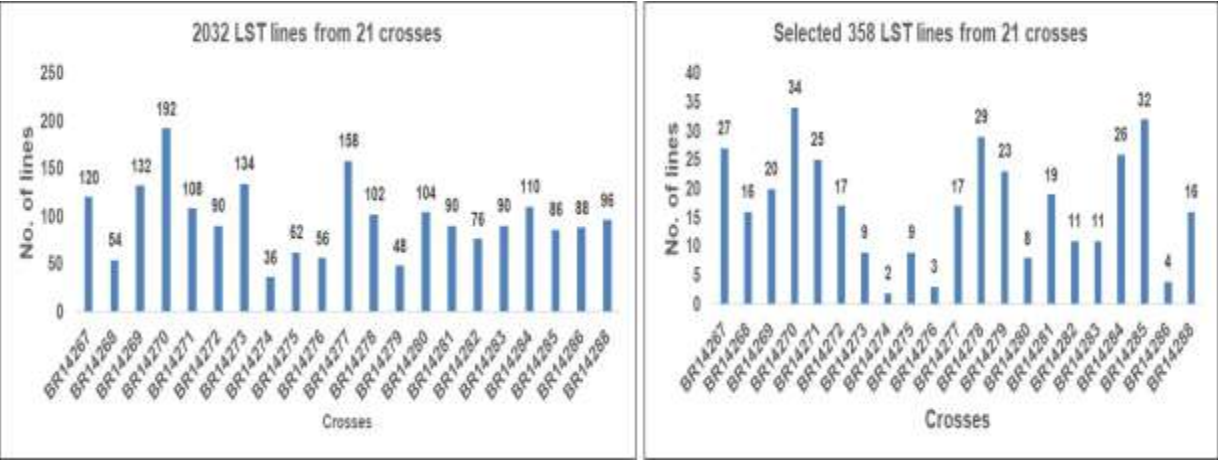


Fig. 12.4.1a Frequency distribution of LST lines, 2032 lines from 21 crosses, and finally selected based on phenotypic characters and trait marker (358 lines from 21 crosses) during T. Aman 2023-24

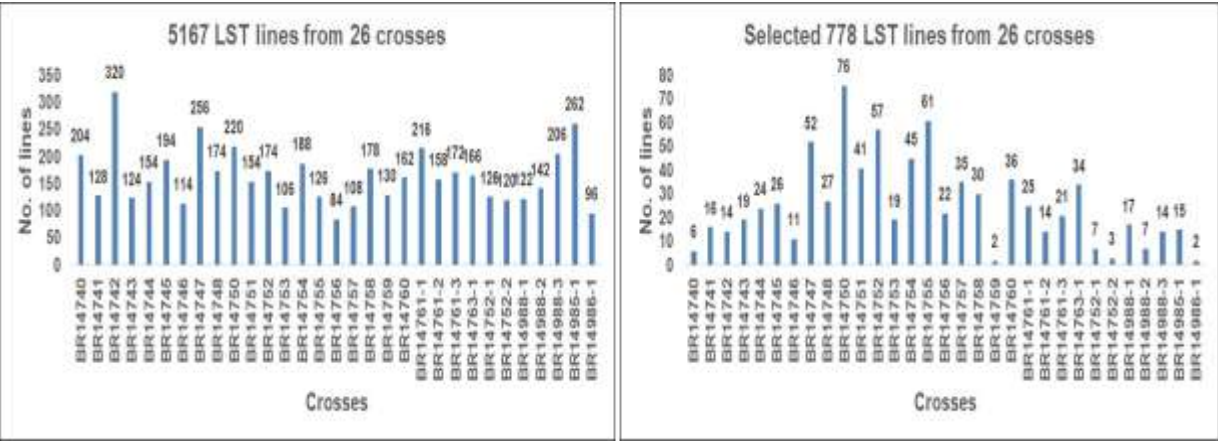


Fig. 12.4.1b Frequency distribution of LST lines, 5167 lines from 26 crosses, and finally selected based on phenotypic characters (778 lines from 18 crosses) during Boro 2024-25

Table 12.4.1: List of fixed lines identified from Line Stage Testing (LST), Development of Insect Resistant Rice (IRR), T. Aman 2024-25

SL #	Designation	Cross Combination	Lines evaluated	Lines selected
1	BR14267-4R	BRRI dhan75*2/ARC5984	120	27
2	BR14268-4R	BR9880-27-4-1-18/SVIN350	54	16
3	BR14269-4R	BR9881-24-2-2-25/BR8441-46-4-2-8	132	20
4	BR14270-4R	BRRI dhan87/IR126952-41-148-38-1-52-B	192	34
5	BR14271-4R	BR9881-24-2-2-25/SVIN350	108	25
6	BR14272-4R	BR9880-27-4-1-18/SVIN357	90	17
7	BR14273-4R	BR9881-24-2-2-25/IR126952-443-12-47-4-8-B	134	9
8	BR14274-4R	BRRI dhan75*2/Jamai Binni	36	2
9	BR14275-4R	BR9880-2-2-2-1/WANXIAN7777-P10	62	9
10	BR14276-4R	BR9880-27-4-1-18/IR126952-41-148-38-9-44-B	56	3
11	BR14277-4R	IR126953-624-22-18-8-1-B/SVIN357	158	17
12	BR14278-4R	BR9880-2-2-2-1/SVIN350	102	29
13	BR14279-4R	BR9888-1-2-2-5/IR126953-624-22-18-8-1-B	48	23
14	BR14280-4R	BR9880-27-4-1-18/BR9942-1-2-1-1-B1	104	8
15	BR14281-4R	BR9888-1-2-2-5/IR126953-624-22-18-8-1-B	90	19
16	BR14282-4R	BR9880-27-4-1-18/SVIN351	76	11
17	BR14283-4R	BRRI dhan87*2/ARC5984	90	11
18	BR14284-4R	BR9881-24-2-2-25/SVIN350	110	26
19	BR14285-4R	BR12231-5R-128/BRRI dhan49	86	32
20	BR14286-4R	BR9888-1-2-2-5/SVIN266	88	4
21	BR14288-4R	BRRI dhan87/LT489	96	16
Total			2032	358

Table 12.4.2: List of fixed lines identified from Line Stage Testing (LST), Development of Insect Resistant Rice (IRR), Boro 2024-25

Sl#	Desination	Cross Combination	Lines evaluated	Lines selected
1	BR14740-4R	BR9667-54-2-2-97*2/Fatema dhan	204	6
2	BR14741-4R	BR11593-5R-54/BR11386-4R-325	128	16
3	BR14742-4R	BR9669-23-3-2-23/IR107995-B-BRGA-BRGA-2-1	320	14
4	BR14743-4R	BR12208-5R-1/BR8340-5-6-1	124	19

Sl#	Desination	Cross Combination	Lines evaluated	Lines selected
5	BR14744-4R	IR108007-B-BRLA-BRLA-25-1/BR11386-4R-287	154	24
6	BR14745-4R	BR11591-5R-12/LT489	194	26
7	BR14746-4R	BR11588-5R-1/LT489	114	11
8	BR14747-4R	BR11723-4R-172/IR126952-41-148-38-9-60-B	256	52
9	BR14748-4R	BR12180-5R-1/IR126952-41-148-38-9-60-B	174	27
10	BR14750-4R	D (R)- 6/IR126952-29-82-206-12-8	220	76
11	BR14751-4R	BR12177-5R-94/IR126952-29-82-206-12-8	154	41
12	BR14752-4R	BR11723-4R-172/IR126952-29-82-206-12-8	174	57
13	BR14753-4R	BRRI dhan93/BR11052-4R-273	106	19
14	BR14754-4R	BR10762-4R-17/BR11035-4R-101	188	45
15	BR14755-4R	BR12177-5R-94/IR101791-10-1-4-3-2-4	126	61
16	BR14756-4R	BR12208-4R-352/IR101791-10-1-4-3-2-4	84	22
17	BR14757-4R	BR12177-5R-17/IR101791-10-1-4-3-2-4	108	35
18	BR14758-4R	BR111716-4R-120/IR101791-10-1-4-3-2-4	178	30
19	BR14029-4R	BR9669-23-3-2-23 / WANXIAN7777-P10	150	59
20	BR14069-4R	D (R)-6 / BR8340-5-6-1	170	18
21	BR14070-4R	Fatema dhan / BR8338-34-4-3*2	60	11
19	BR14759-4R	BR10/IR101791-10-1-4-3-2-4	130	2
20	BR14760-4R	BR12177-5R-1/IR126952-29-82-206-12-8	162	36
21	BR14761-3R-1	BR11296-4R-215*3/IR126952-29-82-206-12-8	216	25
	BR14761-3R-2	BR11296-4R-215*3/IR126952-29-82-206-12-8	158	14
	BR14761-3R-3	BR11296-4R-215*3/IR126952-29-82-206-12-8	172	21
22	BR14763-3R-1	BR11302-4R-75*3/IR126952-29-82-206-12-8	166	34
23	BR14752-35-1	BR11723-4R-172*3/IR126952-29-82-206-12-8	126	7
	BR14752-3R-2	BR11723-4R-172*3/IR126952-29-82-206-12-8	120	3
24	BR14988-3R-1	BR11039-4R-162*2/ IR126952-29-82-206-12-8	122	17
	BR14988-3R-2	BR11039-4R-162*2/ IR126952-29-82-206-12-8	142	7
	BR14988-3R-3	BR11039-4R-162*2/ IR126952-29-82-206-12-8	206	14
25	BR14985-3R-1	BR 11949-4 R-258*2/IR126952-29-82-206-12-8	262	15
26	BR14986-3R-1	BR 11941-4 R-441*2/IR126952-29-82-206-12-8	96	2
Total			5167	778

Experiment 12.5: Observational Yield Trial (OYT)

Principal Investigator: M R A Sarker

Co-investigators: M Adil, N Jahan & M A Rahman (BRRI Gazipur), M R Islam, M S Islam and T Shaha (BRRI R/S, Cumilla) and M R Hasan & R J Promee (BRRI R/S, Rangpur)

Specific objectives: Selection of homozygous breeding lines with desirable grain quality having high yield and resistance to Brown Plant hopper (BPH) and Gall Midge (GM).

Materials and Methods: Total 318 and 324 advanced breeding lines for BPH and GM were grown at three locations of BRRI Gazipur, Rangpur and Cumilla during T. Aman and Boro Seasons, respectively. BRRI dhan33 (for gall midge) was used as resistant checks and BRRI dhan49 & BRRI dhan87 used as standard checks for T. Aman season. T27A was used as resistant check for BPH and BR3, BRRI dhan88 & BRRI dhan89 were used as susceptible and standard checks for Boro season. Thirty and 45-days old seedling were transplanted in 5.4 m×5 rows plot with a spacing of 20 × 20 cm during T. Aman and Boro Season, respectively. Single seedling was used for transplanting. Fertilizer doses and application were the same as in Experiment 12.1. Hand weeding was done in time. Importantly, no insecticides were applied in this experiment.

Results: In T. Aman season, yield of the advanced breeding lines ranged from 2.6-7.9 t/ha in Gazipur and 2.1-7.2 t/ha in Rangpur (Fig. 12.5.1). The experiment at BRRI Cumilla was damaged due to flooding. The average yield ranged from 3.2-6.8 t/ha with the average of 114.9-140.8 days growth duration. Total 62 genotypes from 318 genotypes were selected for further evaluation, as they showed higher yield over the respective check varieties (Table 12.5.1). Among OYT genotypes, four entries BR13757-4R-44, BR13768-4R-79, BR13768-4R-106 and BR13768-4R-118 showed moderately susceptible reaction (score 5) against BPH (Table 12.5.1). In Boro season, yield of the advanced breeding lines ranged from 3.6-9.5 t/ha in Gazipur, 3.3-9.2 t/ha in Cumilla and 4.1-9.1 t/ha in Rangpur (Fig. 12.5.2). The average yield ranged from 4.3-8.7 t/ha with the average of 136.7-157.0 days growth duration. Out of 324 genotypes, 104 were selected for further evaluation, as they showed higher yield over the

respective check varieties (Table 12.5.2). Selection was made based on flowerings uniformity, phenotypic acceptability and pest infestation under field conditions. Among OYT genotypes, four entries BR14026-4R-21, BR14026-4R-25, BR14026-4R-28 and BR14024-4R-151 showed moderately susceptible reaction (score 5) against BPH artificial screening at Entomology Division, BRRI in Boro season (Table 12.5.2).

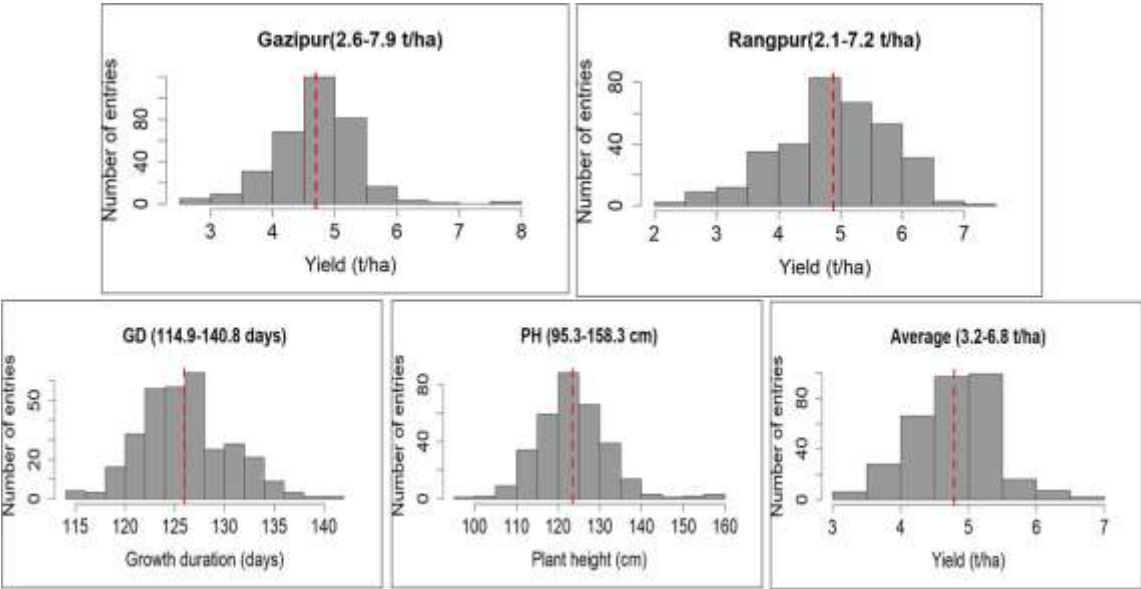


Fig. 12.5.1 Histogram showing average growth duration, plant height and yield performance of 318 genotypes tested in OYT at two locations during T. Aman 2024-25

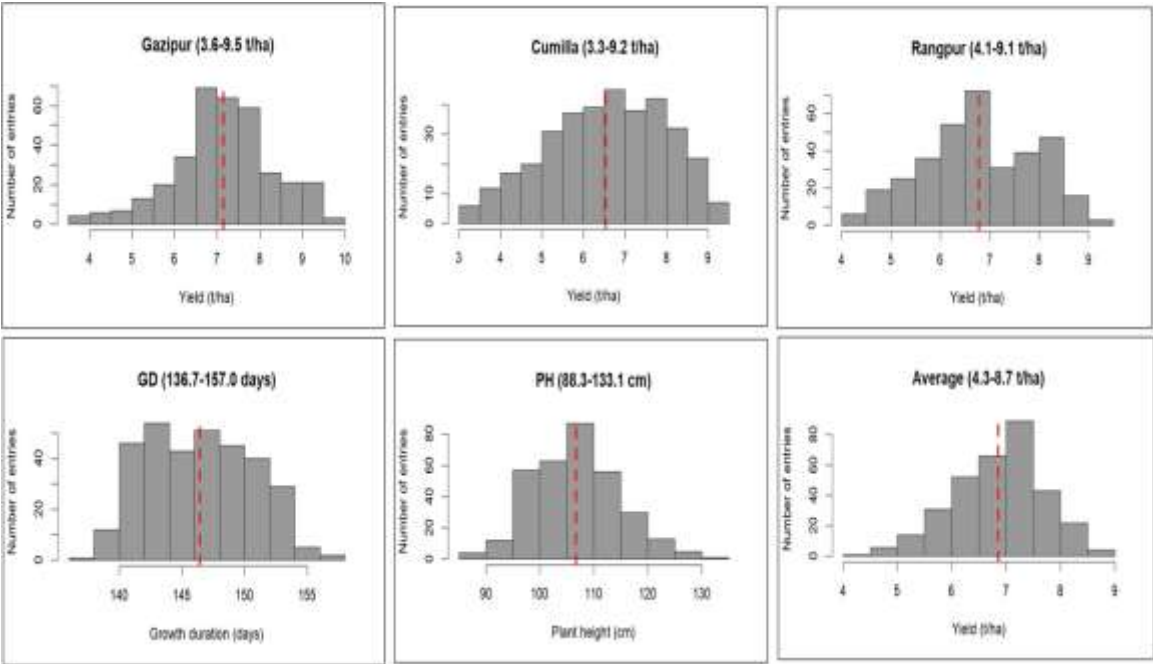


Fig. 12.5.2 Histogram showing average growth duration, plant height and yield performance of 324 genotypes tested in OYT at three locations during Boro 2024-25

Table 12.5.1: Agronomic performance of the genotypes selected from observational yield trial (OYT), Development of Insect Resistant Rice (IRR), T. Aman 2024-25

Sl#	Designation	GD (days)	PH (cm)	Yield (t/ha)				BPH Score	Trait of Interest
				Gaz	Ran	BLUE	BLUP		
1	BR13757-4R-4	123	121	4.9	5.9	5.4	4.9	9	<i>xa5,BPH32Wx-A</i>
2	BR13757-4R-6	120	129	4.9	6.0	5.4	4.9	9	<i>BPH32,Wx-A</i>
3	BR13757-4R-39	127	118	6.1	6.5	6.3	5.1	9	<i>xa5,BPH32Wx-A</i>
4	BR13759-4R-50	122	129	4.7	6.4	5.5	4.9	7	<i>BPH32</i>
5	BR13761-4R-86	122	129	5.5	6.6	6.0	5.0	7	<i>Wx-A</i>
6	BR13762-4R-5	121	126	4.3	6.7	5.5	4.9	7	<i>Wx-A</i>
7	BR13762-4R-29	120	130	4.5	7.3	5.9	5.0	7	<i>Wx-A</i>
8	BR13763-4R-1	123	129	5.2	5.6	5.4	4.9	9	<i>Wx-A</i>

Sl#	Designation	GD (days)	PH (cm)	Yield (t/ha)				BPH		Trait of Interest
				Gaz	Ran	BLUE	BLUP	Score		
9	BR13763-4R-21	123	129	5.6	6.2	5.9	5.0	7	Wx-A	
10	BR13763-4R-23	128	117	4.9	6.1	5.5	4.9	9	Wx-A	
11	BR13763-4R-29	130	111	6.2	5.8	6.0	5.0	7	Wx-A	
12	BR13763-4R-56	126	125	4.6	6.4	5.5	4.9	7	Wx-A	
13	BR13763-4R-63	131	119	4.8	6.4	5.6	4.9	9	Wx-A	
14	BR13763-4R-66	130	106	4.5	6.2	5.4	4.9	7	Wx-A	
15	BR13763-4R-130	126	130	4.8	6.3	5.5	4.9	9	Wx-A	
16	BR13764-4R-15	123	122	5.0	6.3	5.7	4.9	7	BPH32+Wx-A	
17	BR13764-4R-21	126	120	5.0	6.2	5.6	4.9	7	Wx-A	
18	BR13764-4R-32	134	126	5.1	5.8	5.5	4.9	7	Wx-A	
19	BR13764-4R-70	127	135	7.5	6.1	6.8	5.1	7	Wx-A	
20	BR13764-4R-92	124	144	5.2	7.1	6.2	5.0	7	Wx-A	
21	BR13764-4R-99	133	133	5.0	5.8	5.4	4.9	7	BPH32+Wx-A	
22	BR13764-4R-107	125	130	5.3	6.6	6.0	5.0	7	Wx-A	
23	BR13764-4R-115	123	133	6.2	6.7	6.4	5.1	7	Wx-A	
24	BR13764-4R-141	133	131	5.2	5.6	5.4	4.9	7	Wx-A	
25	BR13764-4R-146	134	130	5.8	5.2	5.5	4.9	9	BPH32+Wx-A	
26	BR13764-4R-150	126	137	5.3	6.1	5.7	5.0	7	Wx-A	
27	BR13765-4R-52	120	142	5.1	4.9	5.0	4.8	7	Bph17_1+Bph17_2+Bph17_3+Wx-A+Pi9	
28	BR13765-4R-60	122	130	4.9	5.4	5.1	4.9	7	Bph17_1+Bph17_2+Bph17_3+Wx-A	
29	BR13765-4R-77	124	127	4.4	4.6	4.5	4.7	7	BPH32+Wx-A+Gm4+Pi9	
30	BR13765-4R-79	123	126	5.1	5.9	5.5	4.9	7	Bph17_1+Bph17_2+Bph17_3,Wx-A	
31	BR13766-4R-7	122	119	2.6	4.9	3.8	4.6	7	Bph17_1+Bph17_2+Bph17_3BPH32+Wx-A,Gm4+Pi9	
32	BR13766-4R-8	133	121	3.0	5.4	4.2	4.7	7	Bph17_1+Bph17_2+Bph17_3,+BPH32+Wx- +Gm4+Pi9	
33	BR13766-4R-10	125	113	5.1	5.9	5.5	4.9	9	Bph17_1+Bph17_2+Bph17_3+Wx-A+Gm4	
34	BR13766-4R-90	121	122	4.4	4.8	4.6	4.8	7	Bph17_1+Bph17_2+Bph17_3+BPH32+Wx-A,Gm4+Pi9	
35	BR13768-4R-8	123	110	7.9	5.8	6.8	5.1	9	Wx-A	
36	BR13768-4R-9	123	129	4.8	6.3	5.5	4.9	NG	Wx-A	
37	BR13768-4R-15	125	122	5.1	5.7	5.4	4.9	7	BPH32+Wx-A	
38	BR13768-4R-30	126	116	4.7	5.9	5.3	4.9	9	Bph17_1+Bph17_2+Bph17_3,BPH32+Wx-A+Pi9	
39	BR13768-4R-33	122	122	4.6	6.2	5.4	4.9	9		
40	BR13768-4R-46	120	118	4.6	6.4	5.5	4.9	9	BPH32+Wx-A	
41	BR13768-4R-49	123	108	4.6	3.9	4.3	4.7	9	Bph17_1+Bph17_2+Bph17_3+BPH32+Wx-A	
42	BR13768-4R-79	121	121	5.2	5.1	5.1	4.9	5	Bph17_1+Bph17_2+Bph17_3+BPH32+Wx-A+Pi9	
43	BR13768-4R-83	120	119	5.0	5.1	5.1	4.8	7	Bph17_1+Bph17_2+Bph17_3+BPH32+Wx-A+Pi9	
44	BR13768-4R-89	129	128	5.0	6.5	5.8	5.0	7	Wx-A	
45	BR13768-4R-90	121	125	5.2	5.7	5.5	4.9	7	Wx-A	
46	BR13768-4R-116	127	122	4.7	6.2	5.5	4.9	9		
47	BR13768-4R-118	129	127	4.8	5.5	5.2	4.9	5	Bph17_1+Bph17_2+Bph17_3,+BPH32+Wx-A+Pi9	
48	BR13768-4R-119	131	126	5.1	6.3	5.7	4.9	9	Wx-A	
49	BR13768-4R-126	129	124	5.6	5.9	5.8	5.0	7	BPH32+Wx-A	
50	BR13768-4R-131	125	130	5.6	5.2	5.4	4.9	9	Wx-A	
51	BR13768-4R-134	125	125	4.7	5.0	4.9	4.8	7	Bph17_1+Bph17_2+Bph17_3+BPH32+Wx-A+Gm4	
52	BR13768-4R-135	123	122	5.4	4.7	5.1	4.8	7	Bph17_1+Bph17_2+Bph17_3+BPH32+Wx-A+Pi9	
53	BR13774-4R-99	134	123	5.3	3.4	4.4	4.7	9	BPH32+Wx-A,Gm4_4+BPH9	
54	BR15947-4R-4	127	134	5.0	7.3	6.1	5.0	7	Wx-A	
55	BR15947-4R-5	126	137	5.4	6.2	5.8	5.0	9	Bph17_3+BPH32+Wx-A	
56	BR15947-4R-10	125	129	5.0	5.8	5.4	4.9	9	Wx-A	
57	BR15947-4R-22	127	132	5.0	5.9	5.5	4.9	9	BPH32+Wx-A	
58	BR15947-4R-24	132	131	4.7	6.2	5.5	4.9	9		
59	BR15947-4R-31	125	128	4.7	6.1	5.4	4.9	9	Wx-A	
60	BR15947-4R-45	126	124	7.0	5.2	6.1	5.0	9	Wx-A	
61	BR15947-4R-114	124	123	4.7	6.2	5.5	4.9	7	Wx-A	
62	BR15947-4R-127	126	114	5.2	5.8	5.5	4.9	9	Wx-A	
	BRRi dhan33	117	119	4.7	4.0	4.3	4.7	9		
	BRRi dhan49	133	107	5.4	4.8	5.1	4.8	7		
	BRRi dhan87	126	126	5.3	5.4	5.4	4.9	9		
	LSD (0.05)	11.4	13.1	0.8	1.1	1.1				
	Heritability (%)	42.9	41.0	74.8	64.9	19.0				

Table 12.5.2: Agronomic performance of the selected genotypes from observational yield trial (OYT), Development of Insect Resistant Rice (IRR), Boro 2024-25

Sl#	Designation	GD (days)	PH (cm)	Yield (t/ha)				BPH Score	Trait marker
				Gaz	Cum	Ran	BLUE		
1	BR14016-4R-267	143	115	7.3	8.2	7.6	7.7	9	BPH17_all, Wx-A

Sl#	Designation	GD (days)	PH (cm)	Yield (t/ha)				BPH Score	Trait marker
				Gaz	Cum	Ran	BLUE		
2	BR14016-4R-283	142	117	5.4	7.6	8.3	7.1	7	BPH32, Wx-A
3	BR14016-4R-296	143	113	8.3	8.0	7.4	7.9	7	BPH17_all, Wx-A
4	BR14016-4R-309	144	107	6.8	7.1	8.3	7.4	7	BPH17_all, Wx-A
5	BR14016-4R-331	143	117	8.0	9.2	8.2	8.4	9	BPH17_all, BPH32, Wx-A
6	BR14025-4R-14	144	104	8.6	7.4	7.5	7.8	9	BPH32, Wx-A
7	BR14025-4R-43	150	116	6.5	8.0	6.7	7.1	9	Wx-A
8	BR14026-4R-1	148	97	7.0	7.0	7.6	7.2	7	Wx-A
9	BR14026-4R-6	152	103	8.4	8.4	6.9	7.9	9	Wx-A
10	BR14026-4R-8	150	106	6.8	9.1	5.3	7.0	9	Wx-A
11	BR14026-4R-12	151	103	7.8	9.3	4.6	7.2	7	Wx-A
12	BR14026-4R-20	152	100	6.3	7.7	6.2	6.7	7	Wx-A
13	BR14026-4R-21	153	94	6.9	5.7	6.4	6.3	5	Wx-A
14	BR14026-4R-22	151	103	6.2	9.2	6.6	7.3	7	Wx-A
15	BR14026-4R-24	147	103	7.7	6.5	7.7	7.3	9	BPH32, Wx-A
16	BR14026-4R-25	153	99	6.8	6.2	8.4	7.1	5	Wx-A
17	BR14026-4R-28	152	99	6.8	3.1	5.2	5.0	5	Wx-A
18	BR14026-4R-29	153	101	7.1	6.2	4.9	6.1	7	Wx-A
19	BR14026-4R-47	152	96	5.7	6.6	6.4	6.2	7	Wx-A, Pi9
20	BR14026-4R-59	155	105	6.3	8.7	5.3	6.8	7	BPH17_all, Wx-A
21	BR14026-4R-82	154	103	7.9	7.0	6.8	7.2	7	Wx-A
22	BR14026-4R-92	153	97	8.2	6.1	6.9	7.1	7	Wx-A
23	BR14026-4R-108	154	105	8.2	6.7	5.7	6.8	9	Wx-A
24	BR14026-4R-110	155	104	7.3	5.0	8.3	6.9	7	Wx-A
25	BR14026-4R-125	152	97	9.0	7.1	6.7	7.6	7	Wx-A
26	BR14026-4R-130	153	109	8.2	7.5	6.1	7.3	7	Wx-A
27	BR14026-4R-138	151	90	7.9	6.7	6.5	7.1	7	Wx-A
28	BR14026-4R-149	147	101	5.8	6.9	6.3	6.3	7	Wx-A
29	BR14026-4R-177	151	97	7.7	6.0	8.2	7.3	9	Wx-A
30	BR14026-4R-186	154	102	7.1	4.6	6.9	6.2	9	Wx-A
31	BR14010-4R-82	145	102	7.5	8.1	6.3	7.3	9	BPH32, Wx-A
32	BR14010-4R-122	142	99	9.5	6.2	7.4	7.7	9	BPH32, Wx-A
33	BR14024-4R-151	149	104	7.4	6.3	5.6	6.4	5	BPH17_all,Wx-A
34	BR14022-4R-38	143	123	7.9	5.7	7.1	6.9	9	BPH32, Wx-A
35	BR14023-4R-176	147	117	7.5	9.1	8.3	8.3	9	
36	BR14029-4R-1	140	100	7.9	7.2	7.6	7.6	9	BPH32, Wx-A
37	BR14029-4R-4	143	98	6.9	6.3	7.2	6.8	9	BPH32, Wx-A
38	BR14029-4R-9	143	102	7.1	6.7	7.2	7.0	9	Wx-A
39	BR14029-4R-11	140	98	9.3	8.6	8.3	8.7	9	BPH32, Wx-A
40	BR14029-4R-16	142	109	6.8	8.7	6.0	7.1	9	BPH32, Wx-A
41	BR14029-4R-34	140	99	8.4	6.5	6.4	7.1	7	BPH32, Wx-A
42	BR14029-4R-35	139	109	9.5	7.7	6.3	7.8	7	Wx-A
43	BR14029-4R-38	141	109	9.3	7.0	8.4	8.2	7	BPH32, Wx-A
44	BR14029-4R-45	143	101	8.5	5.2	8.3	7.4	7	BPH32, Wx-A
45	BR14029-4R-57	149	102	6.0	4.9	7.8	6.2	7	Wx-A
46	BR14029-4R-62	144	105	7.0	6.4	6.7	6.7	7	BPH17_all,Wx-A
47	BR14029-4R-65	141	110	7.0	8.4	6.3	7.2	7	BPH32, Wx-A
48	BR14029-4R-67	140	99	9.0	5.1	8.4	7.5	7	BPH32, Wx-A
49	BR14029-4R-69	141	96	7.8	7.4	8.0	7.7	7	BPH32, Wx-A
50	BR14029-4R-70	141	94	6.6	7.7	7.7	7.3	7	BPH32, Wx-A
51	BR14029-4R-73	141	103	7.4	6.0	8.3	7.2	7	BPH32, Wx-A
52	BR14029-4R-98	141	96	7.8	7.9	7.0	7.5	7	BPH32, Wx-A
53	BR14029-4R-120	139	106	8.7	7.2	8.4	8.1	9	BPH32, Wx-A
54	BR14029-4R-137	145	104	9.3	7.4	8.2	8.3	7	Wx-A
55	BR14029-4R-153	142	108	7.5	8.5	8.9	8.3	9	BPH32, Wx-A
56	BR14029-4R-169	141	99	9.4	5.3	8.2	7.6	7	Wx-A
57	BR14029-4R-173	142	94	7.9	8.6	8.1	8.2	7	BPH32, Wx-A
58	BR14029-4R-178	143	115	8.1	7.7	7.2	7.7	9	Wx-A
59	BR14029-4R-187	141	107	7.4	7.7	6.8	7.3	7	BPH32, Wx-A
60	BR14029-4R-191	140	112	8.2	6.8	6.5	7.2	7	BPH32 (H), Wx-A
61	BR14029-4R-204	147	101	7.9	8.4	7.3	7.8	9	BPH32, Wx-A
62	BR14029-4R-206	140	106	6.8	7.0	7.5	7.1	9	BPH32 (H), Wx-A
63	BR14029-4R-210	146	107	9.3	8.8	7.6	8.6	9	BPH32, Wx-A
64	BR14069-4R-2	147	109	7.7	5.6	5.2	6.2	9	BPH32, Wx-A
65	BR14069-4R-16	146	106	9.5	3.8	6.8	6.7	9	Wx-A
66	BR14069-4R-20	140	106	7.7	8.1	6.5	7.4	7	BPH32, Wx-A
67	BR14069-4R-25	142	98	8.7	7.7	4.8	7.1	9	Wx-A
68	BR14069-4R-34	141	98	9.1	5.5	8.1	7.6	9	BPH32
69	BR14069-4R-42	143	106	7.9	6.8	8.6	7.8	9	BPH32, Wx-A
70	BR14069-4R-55	139	101	8.9	5.8	8.9	7.9	7	BPH32, Wx-A
71	BR14069-4R-83	140	101	6.6	6.3	9.1	7.3	9	BPH32, Wx-A
72	BR14069-4R-87	141	98	7.7	7.7	8.9	8.1	7	BPH32, Wx-A
73	BR14069-4R-99	140	111	9.5	7.0	5.6	7.4	9	Wx-A
74	BR14018-4R-171	150	107	6.4	8.3	6.6	7.1	9	BPH32, Wx-A

Sl#	Designation	GD (days)	PH (cm)	Yield (t/ha)				BPH Score	Trait marker
				Gaz	Cum	Ran	BLUE		
75	BR14018-4R-216	143	110	9.5	7.8	8.7	8.6	7	BPH17_all, Wx-A
76	BR14011-4R-1	148	109	8.2	7.7	5.6	7.2	9	Wx-A
77	BR14011-4R-16	144	113	7.8	5.3	7.6	6.9	9	Wx-A
78	BR14011-4R-18	148	107	7.9	8.5	7.9	8.1	9	Wx-A
79	BR14011-4R-24	147	114	8.5	7.6	7.3	7.8	9	Wx-A
80	BR14011-4R-30	146	112	8.0	7.3	6.6	7.3	9	BPH32, Wx-A
81	BR14011-4R-51	144	109	7.5	5.1	8.9	7.2	9	Wx-A
82	BR14011-4R-63	142	105	8.7	8.4	7.2	8.1	9	BPH32, Wx-A
83	BR14011-4R-113	145	113	7.2	6.9	8.3	7.5	9	Wx-A
84	BR14011-4R-133	146	117	9.3	5.3	7.3	7.3	9	Wx-A
85	BR14017-4R-173	142	101	6.9	8.3	7.2	7.5	9	BPH17_all, Wx-A
86	BR14017-4R-191	141	113	6.9	7.5	6.8	7.1	9	BPH17_all, Wx-A, Gm4
87	BR14028-4R-43	148	113	5.4	7.6	6.4	6.5	9	Wx-A
88	BR14070-4R-3	152	100	7.1	8.1	6.6	7.3	7	Wx-A
89	BR14015-4R-14	146	96	7.4	5.7	8.5	7.2	7	BPH32, Wx-A
90	BR14015-4R-17	150	108	6.8	8.3	8.1	7.7	9	BPH32, Wx-A
91	BR14015-4R-20	143	107	7.3	6.3	4.9	6.2	9	Wx-A
92	BR14015-4R-26	145	107	7.8	6.8	8.2	7.6	9	BPH32, Wx-A
93	BR14015-4R-28	145	107	8.0	6.7	7.8	7.5	9	BPH32, Wx-A
94	BR14015-4R-32	151	111	7.7	8.6	8.3	8.2	9	BPH32, Wx-A
95	BR14015-4R-59	149	105	6.9	8.2	7.6	7.5	9	BPH32, Wx-A
96	BR14015-4R-60	152	110	7.9	6.7	6.0	6.9	9	BPH32, Wx-A
97	BR14015-4R-76	145	106	8.7	8.5	8.3	8.5	9	BPH32, Wx-A
98	BR14015-4R-89	145	110	7.9	5.2	8.3	7.1	9	BPH32, Wx-A
99	BR14015-4R-116	147	98	6.4	8.9	8.4	7.9	7	BPH32, Wx-A
100	BR14015-4R-117	143	107	8.2	5.6	7.7	7.2	9	BPH32, Wx-A
101	BR14015-4R-118	139	109	7.8	5.4	5.6	6.2	9	BPH32, Wx-A
102	BR14015-4R-134	151	106	9.3	8.3	6.8	8.1	7	BPH32, Wx-A
103	BR14015-4R-141	145	103	6.7	5.9	8.8	7.1	9	BPH32, Wx-A
104	BR14015-4R-152	148	109	7.8	7.5	8.5	7.9	9	BPH32, Wx-A
	BRRi dhan88 (Ck)	140	96	7.3	7.0	6.6	7.0	9	Wx-A
	BRRi dhan89 (Ck)	150	111	7.8	7.4	7.1	7.5	9	Wx-A
	BR 3 S. (Ck)	154	90	5.9	5.0	5.7	5.5	9	BPH32, Wx-A
	T27A (R. Ck)	137	122	4.3	5.6	5.4	5.1	5	BPH32, Wx-A, Gm4
	LSD (0.05)	4.9	11.4	0.88	0.74	0.78	1.8		
	Heritability (%)	57.1	46.7	90.1	96.0	95.1	37.0		

Experiment 12.6: Preliminary Yield Trial (PYT)

Principal Investigator: M R A Sarker

Co-investigators: M Adil, N Jahan & M A Rahman (BRRi Gazipur), M R Hasan & R J Promee (BRRi R/S, Rangpur) and M S Islam, T Shaha (BRRi R/S, Cumilla)

Specific objective: Initial yield evaluation and selection of desirable lines compared to standard checks in replicated trials.

Materials and Methods: Total 81 genotypes comprising PYT were evaluated at three locations of BRRi Gazipur, Rangpur and Cumilla in T. Aman 2024-24 against GM and BPH along with BRRi dhan33 (resistant check for GM), BRRi dhan49 (susceptible check) and BRRi dhan87 (Standard checks). Total 72 advanced breeding lines for BPH were grown at three locations of BRRi, Gazipur, Rangpur and Cumilla during Boro 2024-25. BRRi dhan88, BRRi dhan89 and BRRi dhan92 were used as standard checks. Twenty-five- and 45-days old seedling of each genotype was transplanted at the rate of 2-3 seedlings with a spacing of 20 × 20 cm following Row-Column design with two replications during T. Aman and Boro season, respectively. The unit plot size was 5.4 m×5 rows. Fertilizer doses and application were the same as in Experiment 12.1. Crop management such as weeding and controlling disease was done in time. Importantly, no insecticides were applied in this experiment.

Results: In T. Aman season, yield of the advanced breeding lines ranged from 4.1-7.5 t/ha at Gazipur and 2.3-7.8 t/ha at Rangpur (Fig. 12.6.1). The experiment at Cumilla was damaged due to flooding. The average plant height ranged from 107.6-146.9 cm. The average yield ranged from 3.7-6.5 t/ha with the average of 113.5-136.9 days. Total 25 genotypes from 81 genotypes were selected compared to check varieties for further evaluation (Table 12.6.1). In Boro season, yield of the advanced breeding lines ranged from 4.2-8.7 t/ha in Gazipur, 4.6-8.8 t/ha in Cumilla and 4.4-8.6 t/ha in Rangpur (Fig. 12.6.2). The average plant height ranged from

107.6-132.7 cm. The average yield ranged from 5.6-8.1 t/ha with the average of 139.5-156.5 days growth duration. Thirty genotypes were selected compared to the respective check varieties for further evaluation (Table 12.6.2). Selection was done based on flowering uniformity, phenotypic acceptability, growth duration, yield and pest infestation under field conditions.

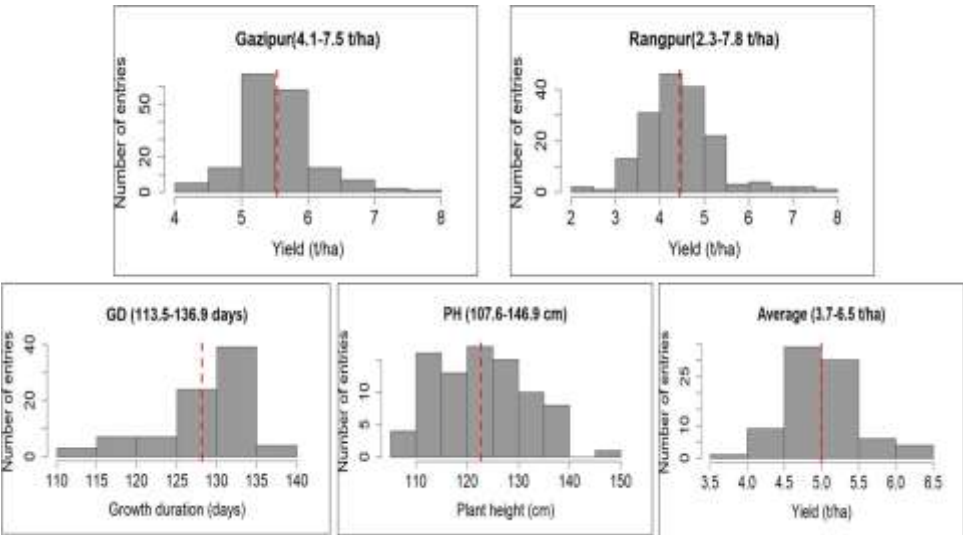


Fig. 12.6.1 Histogram showing average growth duration, plant height and yield performance of 81 genotypes tested in PYT at three locations during T. Aman 2024-25

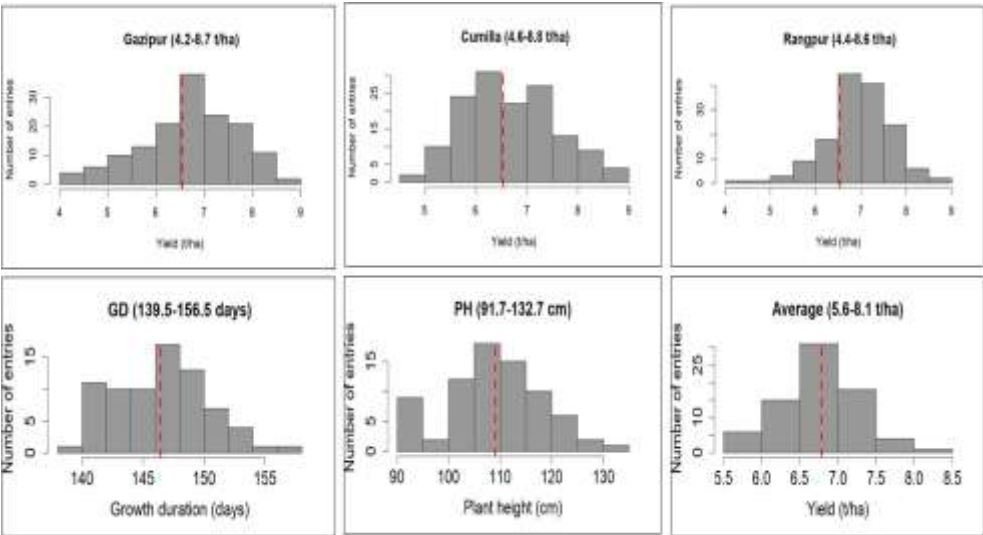


Fig. 12.6.2 Histogram showing average growth duration, plant height and yield performance of 84 genotypes tested in PYT at three locations during Boro 2024-25

Table 12.6.1: Performance of selected genotypes from PYT, Development of Insect Resistant Rice (IRR), T. Aman 2024-25

Sl#	Designation	GD (days)	PH (cm)	Yield (t/ha)				BPH Score
				Gaz	Ran	BLUE	BLUP	
1	BR13503-4R-1	127	123	6.1	4.3	5.2	5.1	7
2	BR13503-4R-132	135	126	7.0	4.6	5.8	5.3	9
3	BR13503-4R-146	130	136	6.0	4.5	5.3	5.1	9
4	BR13506-4R-150	129	131	5.8	4.8	5.3	5.1	7
5	BR13506-4R-174	133	134	6.0	5.3	5.6	5.2	9
6	BR13506-4R-183	130	131	6.7	5.8	6.2	5.4	7
7	BR13506-4R-184	127	134	5.8	5.2	5.5	5.2	9
8	BR13507-4R-9	134	123	5.7	5.0	5.3	5.1	9
9	BR13507-4R-50	130	111	5.2	5.8	5.5	5.2	7
10	BR13507-4R-81	132	116	5.7	4.7	5.2	5.1	7
11	BR13509-4R-143	132	125	7.0	4.3	5.6	5.2	7
12	BR13510-4R-1	132	134	6.5	4.2	5.4	5.1	7
13	BR13510-4R-21	129	118	6.2	5.1	5.6	5.2	5
14	BR13510-4R-47	131	135	5.7	7.2	6.4	5.5	7

Sl#	Designation	GD (days)	PH (cm)	Yield (t/ha)				BPH Score
				Gaz	Ran	BLUE	BLUP	
15	BR13510-4R-69	131	126	5.7	6.3	6.0	5.3	7
16	BR13510-4R-88	127	126	5.6	5.4	5.5	5.2	7
17	BR13510-4R-142	131	129	5.8	4.8	5.3	5.1	9
18	BR13510-4R-153	131	128	5.5	6.8	6.2	5.4	7
19	BR13510-4R-176	131	120	5.6	4.7	5.2	5.1	9
20	BR13513-4R-88	131	137	6.4	5.2	5.8	5.2	9
21	BR13518b-4R-48	127	131	5.6	5.1	5.4	5.1	9
22	BR13518b-4R-63	128	134	5.7	6.7	6.2	5.4	7
23	BR13518b-4R-170	128	138	5.4	5.1	5.3	5.1	7
24	BR12685-4R-72	114	123	5.6	5.2	5.4	5.1	7
25	BR12676-4R-288	128	119	5.7	4.9	5.3	5.1	9
	BRRI dhan33 (R. Ck)	119	121	4.3	4.1	4.2	4.7	
	BRRI dhan49 (Ck)	128	108	5.0	5.1	5.1	5.0	
	BRRI dhan87 (Ck)	126	129	4.6	5.2	4.9	5.0	
	LSD (0.05)	6.8	8.6	0.6	0.5	1.3		
	Heritability (%)	72.0	73.0	38.0	82.0	20.0		

Table 12.6.3: Performance of selected genotypes from PYT, Development of Insect Resistant Rice (IRR), Boro 2024-25

Sl#	Designation	GD (days)	PH (cm)	Yield (t/ha)				BPH Score	Trait of Interest (ToI)
				Gaz	Cum	Ran	BLUE		
1	BR13466-4R-225	152	112	6.6	7.2	7.6	7.2	9	<i>BPH32, Wx-A</i>
2	BR13466-4R-253	146	112	6.8	8.1	6.0	7.0	9	<i>BPH32, Wx-A</i>
3	BR13467-4R-21	141	102	7.9	7.3	6.8	7.3	7	<i>BPH32, Wx-A</i>
4	BR13467-4R-47	142	105	8.3	6.3	6.7	7.1	7	<i>BPH32, Wx-A</i>
5	BR13467-4R-49	142	100	8.0	5.9	7.0	7.0	7	<i>BPH32, Wx-A</i>
6	BR13467-4R-137	141	94	7.3	6.3	7.2	6.9	7	<i>Wx-A</i>
7	BR13467-4R-163	147	109	7.7	7.9	6.8	7.5	7	<i>BPH32, Wx-A</i>
8	BR13467-4R-208	140	113	8.2	6.5	6.6	7.1	7	<i>BPH32, Wx-A</i>
9	BR13467-4R-218	152	105	7.8	6.6	7.0	7.1	7	<i>BPH32, Wx-A</i>
10	BR13467-4R-275	141	93	8.3	6.1	5.6	6.7	7	<i>BPH32, Wx-A</i>
11	BR13467-4R-276	142	92	7.4	6.5	7.2	7.0	7	<i>Wx-A</i>
12	BR13467-4R-338	143	107	8.1	5.9	6.8	6.9	7	<i>BPH32, Wx-A</i>
13	BR13467-4R-346	142	94	8.2	7.1	7.5	7.6	7	<i>BPH32, Wx-A</i>
14	BR13468-4R-254	143	112	7.1	8.4	7.6	7.7	7	<i>Wx-A</i>
15	BR13470-4R-182	150	107	6.4	5.5	7.6	6.5	7	<i>Wx-A</i>
16	BR13473-4R-109	142	111	8.1	7.9	8.4	8.1	7	<i>BPH32, Wx-A</i>
17	BR13473-4R-246	147	108	7.2	7.7	7.2	7.4	7	<i>BPH32, Wx-A</i>
18	BR13479-4R-1	149	105	5.7	6.8	8.5	7.0	7	<i>Wx-A</i>
19	BR13479-4R-14	145	96	7.0	6.6	6.1	6.6	7	<i>Wx-A</i>
20	BR13481-4R-51	145	104	6.8	6.8	7.2	6.9	9	<i>BPH32, Wx-A</i>
21	BR13481-4R-52	142	95	7.9	5.6	6.2	6.6	7	<i>BPH32, Wx-A</i>
22	BR13481-4R-268	149	114	5.6	8.6	7.3	7.2	7	<i>Wx-A</i>
23	BR13481-4R-269	157	103	6.6	5.7	8.0	6.7	7	<i>BPH32, Wx-A</i>
24	BR13481-4R-270	152	108	5.4	7.9	4.6	6.0	7	<i>Wx-A</i>
25	BR13482-4R-152	141	102	7.8	6.2	6.7	6.9	7	<i>Wx-A, Gm4</i>
26	BR13482-4R-162	154	116	5.0	7.3	6.2	6.2	7	<i>Wx-A, Gm4</i>
27	BR13486-4R-64	145	110	6.9	7.5	8.0	7.5	7	<i>BPH32, Wx-A</i>
28	BR13487-4R-62	148	107	7.7	7.7	6.8	7.4	7	<i>Wx-A</i>
29	BR13488-4R-45	149	127	6.3	6.0	7.6	6.6	7	<i>BPH17_all, Wx-A</i>
30	BR13488-4R-48	149	108	7.5	7.7	7.3	7.5	7	<i>BPH32, Wx-A</i>
	BRRI dhan88 (Ck)	141	94	6.3	6.4	7.3	6.7	9	<i>Wx-A</i>
	BRRI dhan89 (Ck)	150	109	7.7	7.2	7.6	7.5	9	<i>Wx-A</i>
	BRRI dhan92 (Ck)	151	110	7.0	7.6	7.8	7.4	9	<i>Wx-A</i>
	LSD (0.05)	4.0	8.2	0.7	0.7	0.5	0.9		
	Heritability (%)	68.7	64.5	81.1	72.9	78.1	20.0		

Experiment 12.7: Advanced Yield Trial (AYT)

Principal Investigator: M R A Sarker

Co-investigators: M Adil, N Jahan & M A Rahman (BRRI Gazipur), M R Islam, T Shaha (BRRI R/S, Cumilla) and M R Hasan & R J Promee (BRRI R/S, Rangpur)

Specific objective: Confirmatory yield evaluation and selection of desirable lines compared to standard checks.

Materials and Methods: Twenty-five genotypes were evaluated at three locations of BRRI Gazipur, BRRI R/S Rangpur and BRRI R/S Cumilla in T. Aman season against GM and BPH

along with BRRI dhan33 (resistant check for GM), BRRI dhan49 (susceptible check), BRRI dhan75, BRRI dhan87 and BRRI dhan103 (Standard check). Total 39 genotypes were evaluated at three locations of BRRI Gazipur, BRRI R/S Cumilla and BRRI R/S Rangpur against BPH along with the checks BRRI dhan88, BRRI dhan89 and BRRI dhan92 in Boro season. Twenty-five- and 45-days old seedling of each genotype was transplanted at the rate of 2-3 seedlings with a spacing of 20 × 20 cm following Row-Column design with two replications T. Aman and Boro season, respectively. The unit plot size was 5.4 m×5 rows. Fertilizer doses and application were the same as in Experiment 12.1. Crop management such as weeding and controlling disease was done in time. Importantly, no insecticides were applied in this experiment.

Results: In T. Aman season, yield of the advanced breeding lines ranged from 3.5-6.4 t/ha in Gazipur and 3.7-7.6 t/ha in Rangpur (Fig. 12.7.1). The experiment at BRRI Cumilla was damaged due to flooding. The average plant height ranged from 101.2-145.0 cm. The average yield ranged from 4.1-6.9 t/ha with the average of 114.5-135.5 days growth duration. Ten genotypes from 25 genotypes were selected compared to check varieties for further evaluation (Table 12.7.1). In Boro season, yield of the advanced breeding lines ranged from 5.1-8.6 t/ha in Gazipur, 4.5-8.6 t/ha in Cumilla and 5.1-8.7 t/ha in Rangpur (Fig. 12.7.2). The average plant height ranged from 90.9-117.9 cm. The average yield ranged from 5.4-7.4 t/ha with average 139.2-150.9 days growth duration. Out of 39 genotypes, 12 were selected for further evaluation, as they showed higher yield over the respective check varieties (Table 12.7.2).

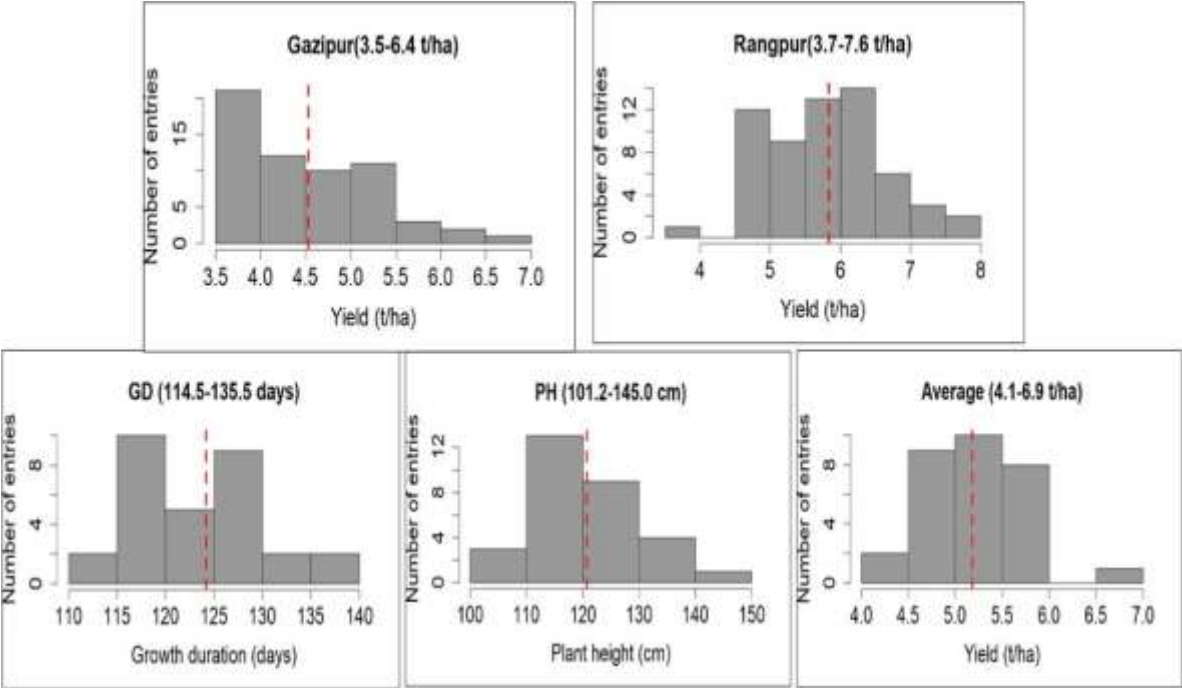


Fig. 12.7.1 Histogram showing average growth duration, plant height and yield performance of 25 genotypes tested in AYT at two locations during T. Aman 2024-25

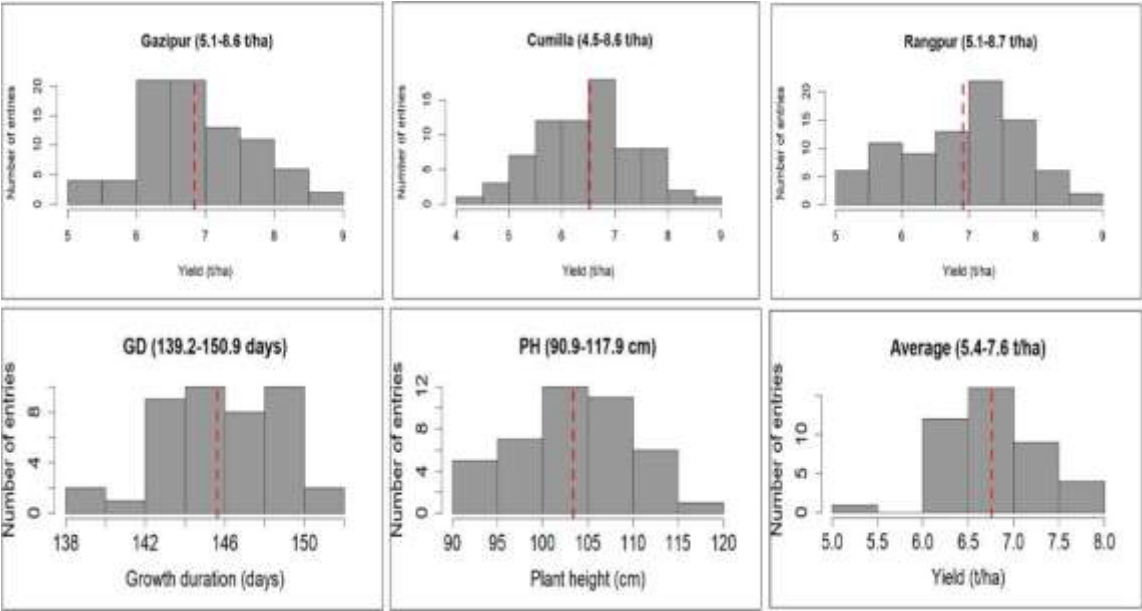


Fig. 12.7.2 Histogram showing average growth duration, plant height and yield performance of 39 genotypes tested in AYT at three locations during Boro 2024-25

Table 12.7.1: Performance of selected genotypes from AYT, Development of Insect Resistant Rice (IRR), T. Aman 2024-25

Sl#	Designation	GD (days)	PH (cm)	Yield (t/ha)			BPH Score	Trait of Interest
				Gazipur	Rangpur	BLUE		
1	BR 13094-4 R-162	120	123	5.5	6.3	5.9	7	<i>Bph32, Wx-A</i>
2	BR 13094-4 R-241	120	114	4.8	6.2	5.5	7	<i>Bph32, Wx-A</i>
3	BR 13096-4 R-46	128	122	5.2	6.2	5.7	7	<i>Bph17, Wx-A</i>
4	BR 13096-4 R-72	118	113	4.8	6.4	5.6	9	<i>Bph32, Gm4</i>
5	BR 13096-4 R-199	120	113	5.6	6.1	5.8	7	<i>Bph32, Wx-A</i>
6	BR 12213-5 R-175	123	130	5.0	5.9	5.4	9	<i>Gm4, Wx-A</i>
7	BR 12208-5 R-55	119	112	3.9	7.2	5.5	9	<i>Wx-A</i>
8	BR 11044-4 R-47	120	119	4.5	6.3	5.4	7	<i>Bph32, Wx-A</i>
9	IRBPHN-SVIN013-18	121	145	5.0	6.5	5.8	7	<i>Bph17_all, Bph32</i>
10	BR 11040-4 R-137	124	139	6.5	7.3	6.9	7	<i>Bph32, Wx-A</i>
	BRRI dhan33 (Ck)	122	114	4.3	4.8	4.5		
	BRRI dhan75 (Ck)	115	109	3.7	4.9	4.3		
	BRRI dhan49 (Ck)	132	115	5.2	5.1	5.1		
	BRRI dhan87 (Ck)	127	123	4.4	5.8	5.1		
	BRRI dhan103 (Ck)	128	130	5.0	6.0	5.5		
	LSD (0.05)	7	12.5	0.7	0.5	1.5		
	Heritability (%)	81	68.0	74.0	79.9	12.0		

Table 12.7.2: Performance of selected genotypes from AYT, Development of Insect Resistant Rice (IRR), Boro 2024-25

Sl#	Designation	GD (days)	PH (cm)	Yield (t/ha)				BPH Score	Trait of Interest (ToI)
				Gaz	Cum	Ran	BLUE		
1	BR 13224-4 R-101	143	100	7.5	8.6	5.7	7.3	7	Wx-A
2	BR 12668-4 R-34	149	100	7.7	6.5	6.9	7.0	7	Wx-A
3	BR 12668-4 R-163	145	107	7.2	6.8	5.7	6.6	-	Wx-A
4	BR 12671-4 R-531	147	101	8.5	6.6	5.5	6.9	7	Wx-A
5	BR 12672-4 R-205	149	106	8.2	7.1	7.6	7.6	9	Wx-A
6	BR 12678-4 R-187	149	106	6.3	7.2	8.3	7.3	9	Wx-A
7	BR 12685-4 R-251	149	102	6.5	6.8	6.1	6.5	5	Wx-A
8	BR 12671-4 R-154	149	118	7.8	-	7.4	7.5	9	Wx-A
9	BR 12679-4 R-67	151	111	7.2	7.8	7.2	7.4	9	Wx-A
10	BR 12685-4 R-159	148	115	6.9	8.1	6.5	7.2	9	BPH32, Wx-A
11	BR 12208-5 R-402	144	114	7.1	5.7	8.2	7.0	9	BPH32, Wx-A
12	BR 12671-4 R-95	147	114	7.2	6.6	7.2	7.0	9	Wx-A
	BRRI dhan88 (Ck)	140	91	6.7	6.6	6.2	6.5		
	BRRI dhan89 (Ck)	148	109	6.4	7.8	7.6	7.3		
	BRRI dhan92 (Ck)	151	108	6.7	6.7	8.5	7.3		
	LSD (0.05)	5.8	7.8	0.7	0.7	0.4	1.0		
	Heritability (%)	56.1	43.7	68.9	81.5	92.9	37.0		

Project 13: DEVELOPMENT OF DISEASE RESISTANT RICE

General objective: Development of genotypes resistant to bacterial blight (BB), blast and RTV.

Project Leader: Dr Mahmuda Khatun

Experiment 13.1: Hybridization

Principal Investigator: M Khatun

Co-investigator: Atiqur Rahman, H A Mashuk & N Tamanna

Specific objective: Introgression of resistant genes against bacterial blight (BB) and blast.

Materials and Methods: The experiment was conducted in BRRI Gazipur. The crossing program for BB & blast resistant genotype development was conducted in both T. Aman and Boro season. Seeding was done in the earthen pot at three dates with an interval of 7 days to synchronize flowering times between male and female parents. Twenty-five-day-old seedling in the T. Aman season and Forty-day-old seedlings for Boro season were transplanted in a 5.4 m × 2 rows plot with a 20 × 20 cm spacing. Single seedling was used for transplanting. Fertilizers @120 (261 kg Urea): 19 (95 kg TSP): 60 (120 kg MP): 20 (111 kg Gypsum): 4 (11 kg ZnSO₄) kg NPKSZn/ha were applied. All amounts of P, K, S and Zn were applied at the time of final land preparation and nitrogen was applied at three equal splits at 10, 25-30 and 40-45 days after transplanting (DAT). Crop management such as weeding, irrigation etc. was done in time. Insects, diseases, and other pests were controlled properly.

Results: Thirty-four crosses for bacterial blight (BB), blast, tungro, false smut and bakanae were made in T. Aman and 6967 F₁ seeds were collected (Table 13.1). Seventeen crosses for bacterial blight (BB), blast, tungro, false smut and bakanae were made in Boro 2024-25 and 1106 F₁ seeds were collected (Table 13.2). High yield, BB, blast, tungro, false smut and bakanae resistance with heat tolerance, lodging tolerance and low water requirement were emphasized in the crossing program (Table 13.1 & Table 13.2).

Table 13.1. List of the crosses made, Development of disease resistant rice (BB, blast, RTV, false smut, bakanae), T. Aman 2024-25

SN	BR No.	Designation	F ₁ seeds	Remarks
Back cross (BB & Blast), 2023-24				
1	BR17057	BR9138-4-4-5-5-P3-HR3-HR5*2/BR13164-4R-27	91	Earliness, BB res
2	BR17058	BRRI dhan102*2 / BR11607-4R-184	160	Earliness, BB res
3	BR17060	BR (Path)13800-BC3-8-6*2/ BRRI dhan28-EMF-4	122	
Single cross (BB, blast, RTV)				
4	BR17075	BR11869-5R-47/ IRR1 154-Pi9	110	Earliness, BB res
5	BR17076	BR11869-5R-47/ BR12450-4R-24	226	Earliness, BB res
6	BR17077	BR11869-5R-47/ BR12424-5R-46	108	Earliness, BB res
7	BR17078	BR11987-4R-156/ BR12450-4R-24	517	Earliness, Blast
8	BR17079	BR11987-4R-156/ BR11868-5R-23	285	
9	BR17080	BR11987-4R-156/ BR12424-5R-46	314	Earliness, BB res
10	BR17081	BR12450-4R-24/ BR12424-5R-46	189	Earliness, BB res
11	BR17083	IRRI 154-Pi9/ BR11868-5R-23	501	Earliness, Blast
12	BR17084	BRRI dhan98/ IRR1 154-Pi9	164	Earliness, Blast
13	BR17086	BR (Path)13800-BC3-8-11/ BR11601-14-4-1	56	Earliness, Blast
14	BR17087	BR11601-14-4-1/ BR11607-4R-192	24	Earliness, BB res
15	BR17088	BR11607-4R-192/ GSR IR1-DQ140-R2-Y1	130	Earliness, Blast
16	BR17089	BR11607-4R-192/ BR12096-4R-124	173	Earliness, Blast
17	BR17090	BR9942-1-2-1-2-B2/ BR12098-4R-71	249	Earliness, BB res
18	BR17091	BR9942-1-2-1-2-B2/ BR13180-4R-202	665	Earliness, Blast
19	BR17092	BR9942-1-2-1-2-B2/BRRI dhan108	139	Earliness, BB res
20	BR17096	BR(Path)13800-BC3-109-10/ BR12098-4R-127	57	Earliness, fine grain
21	BR17097	BR(Path)13800-BC3-109-10/ BR13164-4R-27	134	Earliness, BB res
22	BR17098	BR(Path)13800-BC3-109-10/ GSR IR1-DQ140-R2-Y1	117	Earliness, BB res
23	BR17100	BR9942-1-2-1-2-B2/BRRI dhan106	278	
24	BR17101	BR9138-4-4-5-5-P3-HR3-HR5/ BR12450-4R-24	6	Earliness, BB res
25	BR17105	BR9138-4-4-5-5-P3-HR3-HR5/ BR11110-3R-61	62	Earliness, Blast
26	BR17106	BRRI dhan98/BR11607-4R-192	9	Earliness, Blast
27	BR17107	BR9138-4-4-5-5-P3-HR3-HR5/ BR11114-3R-91	67	Earliness, Blast
Line Augmentation				
28	BR17108	BR11869-5R-47/IRRI 154-Pi9	203	Line augmentation

SN	BR No.	Designation	F ₁ seeds	Remarks
29	BR17109	BR11987-4R-156/BR12450-4R-24	475	Line augmentation
30	BR17110	BR11867-5R-442/BR (Path)13800-BC3-8-11	157	Line augmentation
31	BR17111	BR11867-5R-442/IRRI 154-Pi9	285	Line augmentation
32	BR17112	BR11987-4R-156/BR (Path)13800-BC3-8-11	268	Line augmentation
33	BR17113	BR (Path)13800-BC3-8-11/BR12450-4R-24	219	Line augmentation
34	BR17114	BR11869-5R-47/BR12450-4R-24	23	Line augmentation
Total			6967	

Table 13.2. List of the crosses made, Development of disease resistant rice (BB, blast, RTV, false smut and bakanae), Boro 2024-25

SN	Designation	No of seeds	Remarks
Single cross, BB			
1	BR12897-4R-318/BR12450-4R-108	110	BB & Blast resistance
2	BR11607-4R-192/BR12450-4R-108	28	BB & Blast resistance
3	BR12904-4R-130/BR12450-4R-108	33	BB & Blast resistance
4	BR11607-4R-192/BR (Path)13800-BC3-134-25	29	BB & Blast resistance
5	BR11607-4R-192/BR12125-6R-6	9	BB & Blast resistance
6	BR13178-4R-61/BR11607-4R-192	24	BB resistance & heat tol
7	BR12897-4R-318/BR12454(Path)-BC2-69-97-39-5-44	63	BB & Blast resistance
8	BR12904-4R-130/BR12125-6R-6	50	BB & Blast resistance
Backcross			
9	BR11869-5R-47*2/ IRRI 154-Pi9	239	Earliness, BB res
10	BR (Path)13800-BC3-8-11*2/ BR11601-14-4-1	90	Earliness, Blast
11	BR11601-14-4-1*2/ BR11607-4R-192	7	Earliness, BB res
12	BR9942-1-2-1-2-B2*2/BRRI dhan106	27	Earliness, BB res
Line Augmentation			
13	BR11869-5R-47*2/IRRI 154-Pi9	92	Line Augmentation
14	BR11867-5R-442*2/BR (Path)13800-BC3-8-11	63	Line Augmentation
15	BR11867-5R-442*2/IRRI 154-Pi9	106	Line Augmentation
16	BR (Path)13800-BC3-8-11*2/BR12450-4R-24	78	Line Augmentation
17	BR11869-5R-47*2/BR12450-4R-24	58	Line Augmentation
Total		1106	

Experiment 13.2: Confirmation of F₁

Principal Investigator: M Khatun

Co-investigator: Atiqur Rahman, H A Mashuk, S Das & N Tamanna

Specific objectives: To confirm the crosses as true F₁s

Materials and Methods: The experiment was conducted in BRRI Gazipur in both T. Aman and Boro season. F₁ seeds of each cross and their respective parents were germinated in the Petri-dishes and then sown in earthen pots. Twenty-five-day-old seedlings for T. Aman and forty-day-old seedlings for Boro season were transplanted at a spacing of 25 × 15 cm in the hybridization block. Respective parental seedlings were transplanted on both sides of each F₁ population. The cross-confirmation was done by careful observation of plant characters. F₁’s confirmation was done by both quality check (QC) genotyping and observation techniques. Leaf samples were collected from each of the plants from F₁ and parents for QC genotyping to determine true F₁. QC genotyping was performed using 10 QC SNPs at Intertek, Australia. Genotyping results were analyzed using a genotyping data analytical tool called Flapjack. After confirmation promising true F₁’s was selected and used for back and multiple crosses. The application of fertilizer & crop management was done as described in experiment 13.1

Results: Fifteen crosses for BB, blast, tungro, false smut & bakanae were confirmed in T. Aman2024-25 (Table 13.3) and forty-four crosses for BB, blast, tungro, false smut & bakanae were confirmed in Boro 2024-25 (Table 13.4). Seeds of these selected F₁ plants were selfed to produce F₂ seeds. At maturity, the F₂ seeds of all selected plants were harvested individually, dried, cleaned and preserved in the cold room. Targeted BB, blast and RTV resistance gene (s) was confirmed by *SNP*-based-trait genotyping in intertake, Australlia.

Table 13.3. List of F1s confirmed, Development of disease Resistant Rice, T. Aman
2024-25

SN	BR No.	Cross combination	Trait of interest
1	BR15821	BR11864-5R-99/BR9138-4-4-5-5-P3-HR3-HR5	<i>Xa21, TSV1</i>
2	BR16553	BRR1 dhan106*2/BR12450-4R-24	<i>qHTSF4.1, Pi9</i>
3	BR16556	BR13157-4R-261*2/BR11607-4R-192	<i>Xa21, xa5 & xa13qHTSF4.1</i>
4	BR16561	BRR1 dhan104*2/BR(Path)13800-BC3-8-11	<i>Xa21, Fgr, Pi9</i>
5	BR16562	BR9138-4-4-5-5-P3-HR3-HR5/BR13164-4R-27	<i>Xa21, TSV1</i>
6	BR16563	BR11607-4R-72 /BR12087-5R-196	<i>Xa21, xa5 & xa13qHTSF4.1</i>
7	BR16567	BRR1 dhan102/BR11607-4R-184	<i>Xa21, xa5 & xa13,qHTSF4.1</i>
8	BR16574	BR(Path) 13804-BC3-13/Khato Babu	<i>Pi9, qHTSF4.1</i>
9	BR16578	BR13169-4R-324/BR11866-5R-277	<i>Xa21, TSV1</i>
10	BR16579	BR12454 (Path)-BC2-75-32-31-39-7/BR13174-4R-379	<i>Xa21, Pi9</i>
11	BR16580	BR12454 (Path)-BC2-69-97-39-5-44/BR11607-4R-72	<i>Xa21, xa,xa13Pi9, qHTSF.1</i>
12	BR16581	BR (Path)13800-BC3-8-6/BRR1 dhan28-EMF-4	<i>Xa21, Pi9</i>
13	BR16582	BR (Path)13800-BC3-8-1/BR13157-4R-173	<i>Xa21, Pi9</i>
14	BR16583	BR11866-5R-223/BR12454 (Path)-BC2-75-32-31-39-7	<i>Xa21, Pi9</i>
15	BR16584	BR11866-5R-73/BR12454 (Path)-BC2-69-97-39-5-44	<i>Xa21, Pi9</i>

Table 13.4. List of F1s confirmed, Development of disease Resistant Rice, Boro2024-25

SN	BR No.	Parentage	Progenies	Remarks
Back cross (BB & Blast), 2023-24				
1	BR17057	BR9138-4-4-5-5-P3-HR3-HR5 *2 / BR13164-4R-27	500	Earliness, BB res
2	BR17058	BRR1 dhan102*2/BR11607-4R-184	500	Earliness, BB res
3	BR17059	BRR1 dhan98*2/ N22	500	
4	BR17060	BR (Path)13800-BC3-8-6*2/ BRR1 dhan28-EMF-4	500	
Single cross (BB, blast, RTV)				
5	BR17075	BR11869-5R-47/ IRR1 154-Pi9	500	Earliness, BB res
6	BR17076	BR11869-5R-47/ BR12450-4R-24	500	Earliness, BB res
7	BR17077	BR11869-5R-47/ BR12424-5R-46	500	Earliness, BB res
8	BR17078	BR11987-4R-156/ BR12450-4R-24	500	Earliness, Blast
9	BR17079	BR11987-4R-156/ BR11868-5R-23	500	
10	BR17080	BR11987-4R-156/ BR12424-5R-46	500	Earliness, BB res
11	BR17081	BR12450-4R-24/ BR12424-5R-46	500	Earliness, BB res
12	BR17082	BR11867-5R-442/ BRR1 dhan98	500	
13	BR17083	IRRI 154-Pi9/ BR11868-5R-23	500	Earliness, Blast
14	BR17084	BRR1 dhan98/ IRR1 154-Pi9	500	Earliness, Blast
15	BR17085	BRR1 dhan98/ BR11601-14-4-1	500	
16	BR17086	BR (Path)13800-BC3-8-11/ BR11601-14-4-1	500	Earliness, Blast
17	BR17087	BR11601-14-4-1/ BR11607-4R-192	500	Earliness, BB res
18	BR17088	BR11607-4R-192/ GSR IR1-DQ140-R2-Y1	500	Earliness, Blast
19	BR17089	BR11607-4R-192/ BR12096-4R-124	500	Earliness, Blast
20	BR17090	BR9942-1-2-1-2-B2/ BR12098-4R-71	500	Earliness, BB res
21	BR17091	BR9942-1-2-1-2-B2/ BR13180-4R-202	500	Earliness, Blast
22	BR17092	BR9942-1-2-1-2-B2/BRR1 dhan108	500	Earliness, BB res
23	BR17093	BR12098-4R-71/ BR9829-78-1-3-2	500	
24	BR17094	BR9829-78-1-3-2/BRR1 dhan108	500	
25	BR17095	BR9829-78-1-3-2/ BR13162-4R-232	500	
26	BR17096	BR(Path)13800-BC3-109-10/ BR12098-4R-127	500	Earliness, fine grain
27	BR17097	BR(Path)13800-BC3-109-10/ BR13164-4R-27	500	Earliness, BB res
28	BR17098	BR(Path)13800-BC3-109-10/GSR IR1-DQ140-R2-Y1	500	Earliness, BB res
29	BR17099	BR13169-4R-229/ BR12606-4R-327	500	
30	BR17100	BR9942-1-2-1-2-B2/BRR1 dhan106	500	
31	BR17101	BR9138-4-4-5-5-P3-HR3-HR5/ BR12450-4R-24	500	Earliness, BB res
32	BR17102	BR12442-4R-49/ BR13164-4R-27	500	Earliness, Blast
33	BR17103	BR11867-5R-119/ BR12096-4R-103	500	Earliness, Blast
34	BR17104	BR11110-3R-61/ BR13157-4R-265	500	Earliness, Blast
35	BR17105	BR9138-4-4-5-5-P3-HR3-HR5/ BR11110-3R-61	500	Earliness, Blast
36	BR17106	BRR1 dhan98/BR11607-4R-192	500	Earliness, Blast
37	BR17107	BR9138-4-4-5-5-P3-HR3-HR5/ BR11114-3R-91	500	Earliness, Blast
Line Augmentation				
38	BR17108	BR11869-5R-47/IRRI 154-Pi9	500	Line augmentation
39	BR17109	BR11987-4R-156/BR12450-4R-24	500	Line augmentation
40	BR17110	BR11867-5R-442/BR (Path)13800-BC3-8-11	500	Line augmentation
41	BR17111	BR11867-5R-442/IRRI 154-Pi9	500	Line augmentation
42	BR17112	BR11987-4R-156/BR (Path)13800-BC3-8-11	500	Line augmentation
43	BR17113	BR (Path)13800-BC3-8-11/BR12450-4R-24	500	Line augmentation
44	BR17114	BR11869-5R-47/BR12450-4R-24	500	Line augmentation
Total			22,000	

Experiment 13.3: Field RGA nursery

Principal Investigator: Mahmuda Khatun

Co-investigator: Atiqur Rahman, H A Mashuk, S Das & N Tamanna

Specific objectives: To rapid advancement of segregating population for shortening breeding cycle.

Materials and Methods: The experiment was conducted in BRRRI Gazipur. The progenies of 190 crosses for BB, blast, RTV and heat were grown in Boro and T. Aman seasons. About 600 progenies of F_{2:3} population for each cross of BB, blast, RTV and heat were grown in field RGA (Table 13.5). F₃-F₆ generations were advanced in field RGA by direct seeded panicle drop method. Fertilizers were applied as needed. Weeding, tiller cutting, and other cultural operations were done in time. In the direct seeded method panicle was placed directly in the raised bed with 6 strips per bed at 8 × 8 cm spacing. At 15 days after seeding water stress was imposed and was continued up to flowering. At maturity, a single panicle was harvested from each plant of each cross. The harvested seed was dried and was subjected to 50⁰ C for dormancy breaking to initiate the next cycle of RGA immediately.

Results: A total of 95,100 progenies of 167 crosses consisting of 21,000 progenies of 35 crosses for F_{2:3}; 28,200 progenies of 47 crosses for F_{3:4}; 20,400 of 34 crosses for F_{4:5}; 25,500 of 51 crosses for F_{5:6} generations were grown in the FRGA nursery (Table 13.5).

Table 13.5. RGA Nursery, Development of Disease Resistant Rice for BB & Blast resistance, Boro 2024-25

SN	BR No.	Parentage	Trait of interest	Progenies
F 2:3, 2024-25, Backcross				
1	BR16552	BRRRI dhan104*2/BR13169-4R-229	<i>qHTSF4.1</i>	600
2	BR16553	BRRRI dhan106*2/BR12450-4R-24	<i>qHTSF4.1, Pi9</i>	600
3	BR16554	BR11866-5R-277*2/BR12424-5R-46	<i>Xa21</i>	600
4	BR16555	BR11866-5R-73*2/BR12424-5R-46	<i>Xa21</i>	600
5	BR16556	BR13157-4R-261*2/BR11607-4R-192	<i>qHTSF4.1</i>	600
6	BR16557	BR13169-4R-229*2/EMF-1	<i>Xa21</i>	600
7	BR16558	BRRRI dhan98*2/EMF-1	<i>EMF3</i>	600
8	BR16559	BRRRI dhan98*2/EMF-3	<i>EMF3</i>	600
9	BR16560	BRRRI dhan106*2/EMF-4	<i>qHTSF4.1</i>	600
10	BR16561	BRRRI dhan104*2/BR(Path)13800-BC3-8-11	<i>Xa21,Fgr,Pi9</i>	600
Single cross, (BB, blast, RTV)				
11	BR15821	BR11864-5R-99/BR9138-4-4-5-5-P3-HR3-HR5	<i>Xa21</i>	600
12	BR16562	BR9138-4-4-5-5-P3-HR3-HR5/BR13164-4R-27	<i>Xa21</i>	600
13	BR16563	BR11607-4R-72 /BR12087-5R-196	<i>qHTSF4.1</i>	600
14	BR16564	BR13180-4R-202/BR13162-4R-232	<i>TSV1,Pita</i>	600
15	BR16565	BR12087-5R-196/BR13174-4R-396	<i>qHTSF4.1</i>	600
16	BR16566	BR12438-5R-233/BR13157-4R-173	<i>qHTSF4.1</i>	600
17	BR16567	BRRRI dhan102/BR11607-4R-184	<i>qHTSF4.1</i>	600
18	BR16568	BR13157-4R-173/BR13169-4R-324	<i>Xa21</i>	600
19	BR16569	BR13169-4R-324/BR13159-4R-96	<i>Xa21</i>	600
20	BR16570	BRRRI dhan98/BRRRI dhan28-EMF-6	<i>EMF3</i>	600
21	BR16571	BRRRI dhan108 /BR11601-14-4-1	<i>Fgr</i>	600
22	BR16572	BR13174-4R-396/Accession no. 630 (Laichya)	<i>Xa21,bakani</i>	600
23	BR16573	BR13178-4R-46/Accession no. 346 (Panati)	<i>Xa21, TSV1qHTSF4.1</i>	600
24	BR16574	BR(Path) 13804-BC3-13/Khato Babu	<i>qHTSF4.1</i>	600
25	BR16575	BRRRI dhan104 Rod minikit	<i>qHTSF4.1</i>	600
26	BR16576	BRRRI dhan98 / N22	<i>qHTSF4.1</i>	600
27	BR16577	BR13157-4R-173/Rod minikit	<i>qHTSF4.1</i>	600
28	BR16578	BR13169-4R-324/BR11866-5R-277	<i>Xa21</i>	600
29	BR16578	BR13169-4R-324/BR11866-5R-277	<i>Xa21,TSV1</i>	600
30	BR16579	BR12454 (Path)-BC2-75-32-31-39-7/BR13174-4R-379	<i>Xa21, Pi9</i>	600
31	BR16580	BR12454 (Path)-BC2-69-97-39-5-44/BR11607-4R-72	<i>qHTSF4.1</i>	600
32	BR16581	BR (Path)13800-BC3-8-6/BRRRI dhan28-EMF-4	<i>Xa21, Pi9</i>	600
33	BR16582	BR (Path)13800-BC3-8-1/BR13157-4R-173	<i>Xa21, Pi9</i>	600
34	BR16583	BR11866-5R-223/BR12454 (Path)-BC2-75-32-31-39-7	<i>Xa21, Pi9</i>	600
35	BR16584	BR11866-5R-73/BR12454 (Path)-BC2-69-97-39-5-44	<i>Xa21, Pi9</i>	600
Total				21,000
F3:4 T Aus (BB & Blast), 2023-24				
1	BR14987-R	BR11603-4R-49*2/BR11607-4R-192	<i>Xa21, xa5,xa13</i>	600
2	BR14987-R	BR11603-4R-49*2/BR11607-4R-192	<i>Xa21, xa5, TSV1, qHTSF4.1</i>	600

SN	BR No.	Parentage	Trait of interest	Progenies
3	BR15987-R	BR11864-5R-99*3/IRRI154-Pi9	<i>xa13</i>	600
4	BR15989-R	BR11603-4R-155*2/BR11607-4R-192	<i>Xa21, TSV1, Pb1</i>	600
5	BR15990-R	BRR dhan98*2/IR05N412	<i>Xa21, Pita</i>	600
6	BR15991-R	BRR dhan98*2/IR12N177	<i>Pita</i>	600
7	BR15992-R	BRR dhan98*2/IR64-EMF ₃	<i>Pita</i>	600
8	BR15993-R	BR11867-5R-442*2/BR12454-BC2-56-81-27-3-30	<i>Fgr, Xa21, TSV1</i> <i>qHTSF4.1, Pi9</i>	600
9	BR15993-R	BR11867-5R-442*2/BR12454-BC2-56-81-27-3-30	<i>Xa21, TSV1,</i> <i>qHTSF4.1, Pi9</i>	600
10	BR15994-R	BRR dhan102*2/BR12454-BC2-71-91-6-23-26	<i>Fgr, Xa21, TSV1,</i> <i>qHTSF4.1, Pi9</i>	600
11	BR15995-R	BR11867-5 R-442*2/Gota IRRI	<i>Fgr,</i> <i>Xa21,Pb1,qHTSF4.1</i>	600
12	BR15995-R	BR11867-5 R-442*2/Gota IRRI	<i>Xa2, Pb1, qHTSF4.1</i>	600
F3:4 Single cross, (BB, blast, RTV)				
13	BR15996-R	BR11869-5R-47/BR11986-4R-123	<i>Xa21, xa13</i> <i>qHTSF4.1,Pita,pb1</i>	600
14	BR15997-R	BR11874-5R-109/BR Path 13800-BC3-8-11	<i>Xa21 ,TSV1,Pi9</i>	600
15	BR15998-R	BR12098-4R-127/BR11607-4R-192	<i>xa5, xa13, Xa21,</i> <i>qHTSF4.1</i>	600
16	BR15999-R	BR11987-4R-156 /BR Path 13800-BC3-109-10	<i>Xa21, TSV1, Pi9</i>	600
17	BR16000-R	BR11986-4R-123/ BR12098-4R-117	<i>Xa21, xa13, Pita,</i> <i>qHTSF4.1, Pb1</i>	600
18	BR16001-R	BR12098-4R-117 /BR9942-1-2-1-2-B2	<i>Xa21, Pi9, Pb1</i>	600
19	BR16002-R	BR12098-4R-71/BR11987-4R-156	<i>Xa21, TSV1, Pb1</i>	600
20	BR16003-R	BR11869-5R-72/BR12450-4R-24	<i>xa5, a21,Pita,</i> <i>qHTSF4.1,TSV1,Pb1</i>	600
21	BR16004-R	BRR dhan103 /IRRI154- <i>Pi9</i>	<i>xa5,TSV1,Pi9,Pb1,</i> <i>pita, qHTSF4.</i>	600
22	BR16005-R	BRR dhan104 /BR13169-4R-229	<i>Fgr,Xa21,Pita, Pi9</i>	600
23	BR16006-R	BRR dhan106/BR12450-4R-24	<i>xa5,xa13, Xa21,Pi9,Pb1</i>	600
24	BR16007-R	BR12424-5R-46/BR11603-4R-49	<i>Fgr,Xa21,Pita, TSV1</i>	600
25	BR16008-R	BR12606-4R-327/BR Path 13800-BC3-8-11	<i>Xa21,Pi9,Pb1,qHTSF4.1</i>	600
26	BR16009-R	BR11601-14-4-1/BR12450-4R-24	<i>Fgr,Xa21,Pita, Pi9</i>	600
27	BR16010-R	BR11867-5R-119/BR13157-4R-265	<i>Xa21,Pb1,qHTSF4.1</i>	600
28	BR16011-R	BR11866-5R-277/BR12424-5R-46	<i>Fgr,Xa21,Pb1</i>	600
29	BR16012-R	BR11866-5R-73/BR12424-5R-46	<i>Fgr,Xa21,Pita,Pb1</i>	600
30	BR16013-R	BR13157-4R-261/BR11607-4R-192	<i>xa5, Xa21,Pita,</i> <i>qHTSF4.1,Pb1</i>	600
31	BR16014-R	BR13157-4R-265 /IRRI154- <i>Pi9</i>	<i>xa5, Xa21,Pita</i> <i>,qHTSF4.1,TSV1,Pb1</i>	600
32	BR16015-R (3 BB)	BR13169-4R-229 /EMF-1	<i>xa5, xa13, Xa21</i> <i>,qHTSF4.1,TSV1,Pb1</i>	600
33	BR16015-R (<i>xa5,Xa21,Pi9</i>)	BR13169-4R-229 /EMF-1	<i>xa5, Xa21,Pi9,</i> <i>qHTSF4.1,TSV1,Pb1</i>	600
34	BR16016-R	BR11868-5R-23 /BR Path 13800-BC3-109-10	<i>xa5, Xa21,Pi9,</i> <i>qHTSF4.1,</i> <i>TSV1,Pb1,Pita</i> <i>Xa21,TSV1,Pita,Pb1</i>	600
35	BR16017-R	BR9829-78-1-3-2/EMF-1	<i>Pita,Pb1</i>	600
36	BR16018-R	BRR dhan98/EMF-1	<i>Pita,Pb1</i>	600
37	BR16019-R	BRR dhan98/EMF-3	<i>Pita,Pb1</i>	600
38	BR16020-R	BRR dhan106 /EMF-4	<i>Pita,Pb1,Pi9, qHTSF4.1</i>	600
39	BR16021-R	BRR dhan98 /BR Path 13800-BC3-8-11	<i>Xa21, Pita,</i> <i>Pb1,Pi9</i>	600
40	BR16022-R (+ <i>Pi9</i>)	BRR dhan101/BR12450-4R-24	<i>Xa21,Pi9,qHTSF4.1,TSV</i> <i>1,Pb1</i>	600
41	BR16022-R	BRR dhan101/BR12450-4R-24	<i>Xa21,qHTSF4.1,TSV1,Pb</i> <i>1</i>	600
42	BR16023-R (3BB genes)	BR11866-5R-73 /BR12450-4R-24	<i>xa5, xa13, Xa21,</i> <i>qHTSF4.1,Pb1</i>	600
43	BR16023-R	BR11866-5R-73 /BR12450-4R-24	<i>Xa21,Pi9,Pita</i>	600
44	BR16024-R	BR10397-3-2-1-1-8 /BR11987-4R-156	<i>Pi9,Pita ,Pb1,</i> <i>qHTSF4.1,TSV1</i>	600
45	BR16025-R	BRR dhan104/BR Path 13800-BC3-8-11	<i>Fgr-homo, Pita, Pi9,Pb1</i>	600
46	BR16025-R (<i>Fgr+Xa21</i>)	BRR dhan104/BR Path 13800-BC3-8-11	<i>Fgr-hetero, Xa21,Pita,</i> <i>Pi9,Pb1,TSV1</i>	600
47	BR15824-R	BR11603-4R-49/BR11607-4R-192	<i>xa5, Xa21,xa13</i>	600
Total				28,200
F4:5, Single cross, T. Aus (BB)				
1	BR15821-2R	BR11864-5R-99/BR9138-4-4-5-5-P3-HR3-HR5	BB resistance	600
2	BR15011-2R	BR9138-4-4-5-5-P3-HR3-HR5/BR12442-4R-49	BB resistance	600
3	BR15822-2R	BR12442-4R-49/BR11603-4R-77	BB resistance	600
4	BR15823-2R	BR11603-4R-77/BR11603-4R-49	BB resistance	600
5	BR15824-2R	BR11603-4R-49/BR11607-4R-192	BB resistance	600

SN	BR No.	Parentage	Trait of interest	Progenies
6	BR15825-2R	BR11603-4R-155/BR11607-4R-192	BB resistance	600
7	BR15826-2R	BRR1 dhan98/IR05N412	BB resistance	600
8	BR15827-2R	BRR dhan98/IR12N177	BB resistance	600
9	BR15828-2R	BRR dhan98/IR64-EMF3	BB resistance	600
10	BR15829-2R	BR12603-4R-170/BR12599-4R-14	BB resistance	600
11	BR15830-2R	BR12603-4R-151/BR12113-5R-109	BB resistance	600
12	BR15831-2R	BR12109-4R-10/BR12087-5R-155	BB resistance	600
13	BR15832-2R	BR12087-5R-155/BR12090-5R-91	BB resistance	600
14	BR15833-2R	BR12090-5R-91/BR12087-5R-196	BB resistance	600
15	BR15834-2R	BR12091-4R-97/BR12088-5R-230	BB resistance	600
16	BR15835-2R	BRR1 dhan92/BR12101-5R-76	BB resistance	600
17	BR15836-2R	BR11723-4R-172/BR12091-4R-99	BB resistance	600
18	BR15837-2R	BR11867-5R-442/BR12454-BC2-56-81-27-3-30	Blast resistance	600
19	BR15838-2R	BRR1 dhan102/BR12454-BC2-71-91-6-23-26	Blast resistance	600
20	BR15839-2R	BRR dhan98/BR12454-BC2-75-32-31-39-7	Blast resistance	600
21	BR15840-2R	BR11867-5R-442/Gota IRR1	BB resistance	600
22	BR15841-2R	BR11607-4R-72/BR12450-4R-24	BB resistance	600
23	BR15842-2R	BR12109-4R-10/BR12101-5R-76	BB resistance	600
24	BR15843-2R	7 FBR-376/ BRR1 dhan101	BB resistance	600
25	BR15821-2R	BR11864-5R-99/BR9138-4-4-5-5-P3-HR3-HR5	BB resistance	600
F_{4:5}, Back cross			Imp. features	
26	BR15844-2R	BR9138-4-4-5-5-P3-HR3-HR5*2/BR11607-4R-72	BB resistance	600
27	BR15845-2R	BR11864-5R-99*2/IRRI154-Pi9	Blast resistance	600
28	BR15846-2R	BR11723-4R-12*3/IR12N177	BB resistance	600
29	BR15847-2R	BR12121-4R-53*3/ IR12N177	BB resistance	600
30	BR15848-2R	BRAC dhan2*3/BR12450-4R-24	Blast resistance	600
31	BR15849-2R	BR11723-4R-12*3/ BR12450-4R-24	Blast resistance	600
32	BR15850-2R	7 FBR-222*3/ IRR154-Pi9	Blast resistance	600
33	BR15851-2R	BR11723-4R-12*3/ IRBL9-W	Blast resistance	600
34	BR15852-2R	BR12442-4R-49*3/ IR64-EMF3	BB resistance	600
			Total	20,400
F_{5:6}, T. Aus (BB)			Imp. features	
1	BR15497-3R	BR11596-5R-39/ BR12087-5R-196	BB resistance	500
2	BR15498-3R	BR12091-4R-99 / BR11866-5R-312	BB resistance	500
3	BR15499-3R	BR11601-14-4-1/ BR11596-5R-39	BB resistance	500
4	BR15500-3R	BR9829-30-3-2-1-4/ BR11596-5R-39	BB resistance	500
5	BR15501-3R	7 FBR-189 / BR11866-5R-312	BB resistance	500
6	BR15502-3R	7 FBR-190 / BR12087-5R-196	BB resistance	500
7	BR15503-3R	7 FBR-376/ BR11596-5R-39	BB resistance	500
8	BR15504-3R	7 FBR-336/ BRR1 dhan98	BB resistance	500
9	BR15505-3R	BR11866-5R-312 / IR64-EMF	BB resistance	500
10	BR15506-3R	BRR1 dhan98 / BR11601-14-4-1	BB resistance	500
11	BR15507-3R	BRR1 dhan99 / BR11867-5R-103	BB resistance	500
12	BR15508-3R	BR11723-4R-12/BRR1 dhan101	BB resistance	500
13	BR15509-3R	BR9138-4-4-5-5-P3-HR3-HR5/BR11607-4R-72	BB resistance	500
14	BR15510-3R	BR11864-5R-99 / IRR154-Pi9	Blast resistance	500
15	BR15511-3R	Bangabandhu dhan100 / BR8781-16-1-3-P2	BB resistance	500
16	BR15512-3R	BRR1 dhan87/ BR8781-16-1-3-P2	BB resistance	500
17	BR15513-3R	BR9006-40-2-3-1*3/ BR11607-4R-72	BB resistance	500
18	BR15513-3R	BR9006-40-2-3-1*3/ BR11607-4R-72	BB resistance	500
19	BR15513-3R	BR9006-40-2-3-1*3/ BR11607-4R-72	BB resistance	500
20	BR15514-3R	BR9830-53-3-5-2*3/ BR11607-4R-72	BB resistance	500
21	BR15515-3R	BR11723-4R-12*3/N22	Blast resistance	500
22	BR15516-3R	BR11867-4R-371*3/ IR64-EMF3	Blast resistance	500
23	BR15517-3R	BR9006-40-2-3-1*3/ IRR154-Pi9	Blast resistance	500
24	BR15518-3R	BR8781-16-1-3-P2*3/ IRR154-Pi9	Blast resistance	500
25	BR15518-3R	BR8781-16-1-3-P2*3/ IRR154-Pi9	Blast resistance	500
26	BR15519-3R	BR11723-4R-12*3/ IR64-Pi9	Blast resistance	500
27	BR15521-3R	7 FBR-222*3/ IRBLta2-Pi(RL)-T(RL)	Blast resistance	500
28	BR15521-3R	7 FBR-222*3/ IRBLta2-Pi(RL)-T(RL)	Blast resistance	500
29	BR15522-3R	BR11723-4R-12*2/IR12N177	BB resistance	500
30	BR15523-3R	BR12121-4R-53*2/ IR12N177	BB resistance	500
31	BR15523-3R	BR12121-4R-53*2/ IR12N177	BB resistance	500
32	BR15523-3R	BR12121-4R-53*2/ IR12N177	BB resistance	500
33	BR15525-3R	BRAC dhan2 *2/ IRR154-Pi9	Blast resistance	500
34	BR15525-3R	BRAC dhan2 *2/ IRR154-Pi9	Blast resistance	500
35	BR15526-3R	BRAC dhan2*2/BR12450-4R-24-1	Blast resistance	500
36	BR15526-3R	BRAC dhan2*2/BR12450-4R-24-1	Blast resistance	500
37	BR15527-3R	BR11723-4R-12*2/ BR12450-4R-24-1	Blast resistance	500
38	BR15528-3R	7 FBR-222*2/ IRR154-Pi9	Blast resistance	500
39	BR15528-3R	7 FBR-222*2/ IRR154-Pi9	Blast resistance	500

SN	BR No.	Parentage	Trait of interest	Progenies
40	BR15529-3R	BR11723-4R-12*2/ IRBL9-W (Pi9)	Blast resistance	500
41	BR15529-3R	BR11723-4R-12*2/ IRBL9-W (Pi9)	Blast resistance	500
42	BR15530-3R	BR11607-4R-72 //BRRi dhan70*2/ IRRi154-Pi9	Blast resistance	500
43	BR15530-3R	BR11607-4R-72 //BRRi dhan70*2/IRRI154-Pi9	Blast resistance	500
44	BR15531-3R	BR11607-4R-72// BRAC dhan2/ IRRi154-Pi9	Blast resistance	500
45	BR15531-3R	BR11607-4R-72// BRAC dhan2/ IRRi154-Pi9	Blast resistance	500
46	BR15532-3R	BR11723-4R-172*3/IR64-EMF3	Blast resistance	500
47	BR15533-3R	BRRi dhan80*3/ IRRi154-Pi9	Blast resistance	500
48	BR15534-3R	BR11723-4R-12*3/ IRRi154-Pi9	Blast resistance	500
49	BR15535-3R	BRRi dhan70*3/ IRRi154-Pi9	Blast resistance	500
50	BR15536-3R	BR11607-4R-72//BR11723-4R-12*2 /IRRI154-Pi9	Blast resistance	500
51	BR15537-3R	BR12442-4R-49*2/ IR64-EMF3	BB resistance	500
			Total	25,500

Experiment 13.4: Line Stage Testing (LST)

Principal Investigator: M Khatun

Co-investigator: Atiqur Rahman, H A Mashuk, S Das & N Tamanna

Specific objective: Isolation of homogeneous breeding lines with improved plant type, disease-free and short duration

Materials and Methods: Line Stage Testing nearly isogenic lines (NILs) are evaluated along with resistance check and genotypes are selected based on their agronomic acceptance. The unit plot size was 5.4 m × 1 row (12 hills). The spacing for transplanting was 25 cm x 15 cm and thirty-five-day-old seedlings were transplanted @ a single seedling per hill. The application of fertilizer & crop management was done as described in experiment 1.

Results: In T. Aman 2024-25, 517 lines were selected from 5574 NIL based on uniform flowering, grain type, phenotypic acceptability (Table 13.6, Fig 13.1 and 13.2). Nine hundred fifty-three lines out of 6654 lines were selected based on uniform flowering, grain type, phenotypic acceptability and trait genotyping in Boro 2024-25 season (Table 13.7, Fig 13.3 and Fig 13.4). High selection pressure was applied in LST, in both T. Aman and Boro season based on visual selection.

Table 13.6 List of materials for Line Stage Testing (LST), Development of Disease Resistant Rice for BB, T. Aman 2023-24

F ₆ , Bacterial blight (BB)			Imp features	Progenies
1	BR15011-4R	BR9138-4-4-5-5-P3-HR3-HR5/BR12442-4R-49	BB resistance	300
2	BR15012-4R	BR11723-4R-12/ BR12442-4R-49	BB resistance	300
3	BR15013-4R	BR12442-4R-49/ IR64-EMF3	BB resistance	535
4	BR15014-4R	BR12121-4R-53/ IR12N177	BB, RTV	300
5	BR15015-4R	BR11723-4R-12/N22// BR11867-4R-371/ IR64-EMF3	BB resistance	804
6	BR15016-4R	BR8781-16-1-3-P2/ BR12442-4R-49	BB resistance	300
7	BR15023-4R	BRRi dhan71*3/ IR127152-3-22-2-1-B	BB, RTV	426
8	BR15024-4R	BR9829-78-1-2-1*3/ IR127152-3-22-2-1-B	BB, RTV	300
9	BR15025-4R	BRRi dhan99*3/ IR127152-3-22-2-1-B	BB, RTV	509
10	BR14999-4R	BRRi dhan80*2/ IRRi154-Pi9	BB resistance	300
11	BR15003-4R	BRRi dhan70*2/ IRRi154-Pi9	BB resistance	300
12	BR15018-4R	BRAC dhan2/ IRRi154-Pi9	BB resistance	300
13	BR15026-4R	Kataribhog/ IRBL9-W(RL)	BB resistance	300
14	BR15027-4R	Khasa/IR64-Pi9*2	BB resistance	300
15	BR14701-4R	BRRi dhan87*2/ IRBL9-W (RL)	BB resistance	300
Total				5574

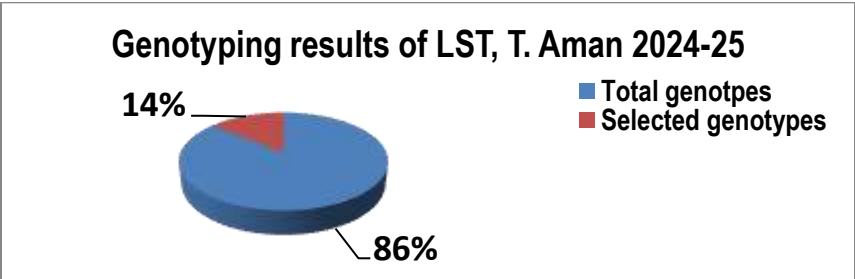


Fig 13.1. Frequency distribution of LST lines in T. Aman 2024-25

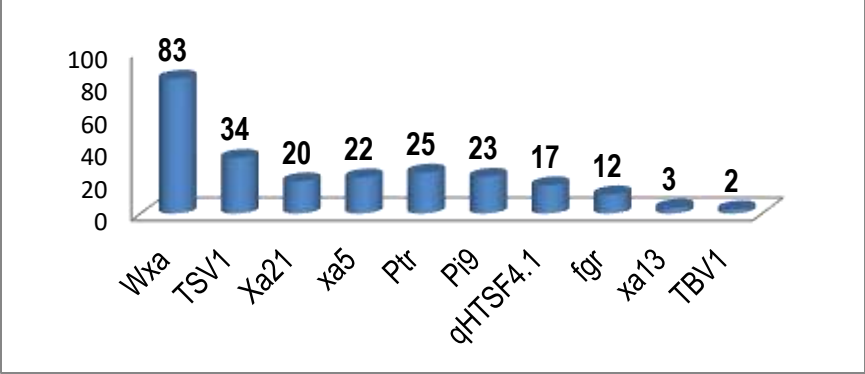


Fig. 13.2. Trait marker profiles showing the frequency of favorable alleles for key target traits in the selected LST lines from the T. Aman 2024–25

Table 13.7 List of materials for Line Stage Testing (LST), Development of Disease Resistant Rice for BB and Blast, Boro 2024-25

SN	BR No.	Designation	Imp. features	Progenies
F₅, T Aus (BB)				
1	BR14674-3R	BR9006-40-2-3-1/ BR11607-4R-72	BB reistance	300
2	BR14675-3R	BR9830-53-3-5-2/ BR11607-4R-72	BB reistance	200
3	BR14676-3R	BR9011-25-4-1-3/ BR11723-4R-172	BB reistance	200
4	BR14677-3R	BR9830-53-3-5-2/ BR11723-4R-172	BB reistance	200
5	BR14678-3R	BR9829-78-1-2-1/ BR11723-4R-12	BB reistance	200
6	BR14680-3R	7 FBR-376/ BR11723-4R-172	BB reistance	200
7	BR14682-3R	7 FBR-222/ BR11723-4R-12	BB reistance	200
8	BR14683-3R	BR11868-5R-2/BRBa-1-4-9	BB reistance	200
9	BR14684-3R	BR11868-5R-2/7 FBR-376	BB reistance	200
10	BR14686-3R	BR9006-40-2-3-1*2/ BR11868-5R-23	BB reistance	200
11	BR14687-3R	BR9006-40-2-3-1/ BR11868-5R-23// BR11723-4R-172	BB reistance	200
12	BR14688-3R	BR9829-78-1-2-1*2/ BR11607-4R-192	BB reistance	300
13	BR14689-3R	BR9829-78-1-3-2*2/ BR11868-5R-23	BB reistance	200
14	BR14690-3R	BR9829-78-1-3-2/ BR11868-5R-23// BR11723-4R-12	BB reistance	200
15	BR14691-3R	BR11600-4R-230/N22//BR11723-4R-172	BB reistance	200
Total			BB reistance	3000
F₆, Blast				
16	BR14694-3R	BR9006-40-2-3-1/ IRRI154-Pi9 (TSV1)	Blast resistance	200
17	BR14695-3R	BR8781-16-1-3-P2/ IRRI154-Pi9 (TSV1)	Blast resistance	200
18	BR14696-3R	BR11723-4R-12/ IRRI154-Pi9	Blast resistance	200
19	BR14698-3R	BR11723-4R-12/ IR64-Pi9	Blast resistance	150
20	BR14699-3R	BRBa-1-4-9/ IR64-Pi9	Blast resistance	150
21	BR14700-3R	7 FBR-222/ IRBLta2-Pi(RL)-T(RL)	Blast resistance	200
22	BR15000-4R	BR9006-40-2-3-1*2/ IRRI154-Pi9 (<i>xa5, xa13, Pi9</i>)	Blast resistance	200
23	BR15001-4R	BR8781-16-1-3-P2*2/ IRRI154-Pi9 (<i>Pi9, fgr, qHTSF4.1, TSV1</i>)	Blast resistance	200
24	BR15019-4R	BRAC dhan2/BR12450-4R-24-1 (<i>Pita,Pi9,frg</i>)	Blast resistance	200
25	BR15021-4R	7 FBR-222/ IRRI154-Pi9(<i>xa5,TSV1,Pi9,Pita</i>)	Blast resistance	200
26	BR15022-4R	BR12121-4R-53/ IRBL9-W (<i>Pita, Pi9, qHTSF4.1</i>)	Blast resistance	147
Total				2047
Grand Total				5047

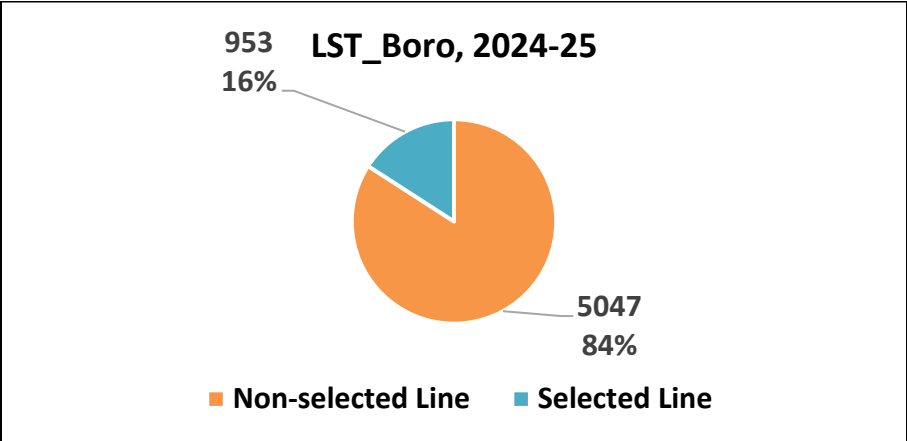


Fig 13.3. Frequency distribution of LST lines in Boro 2024-25

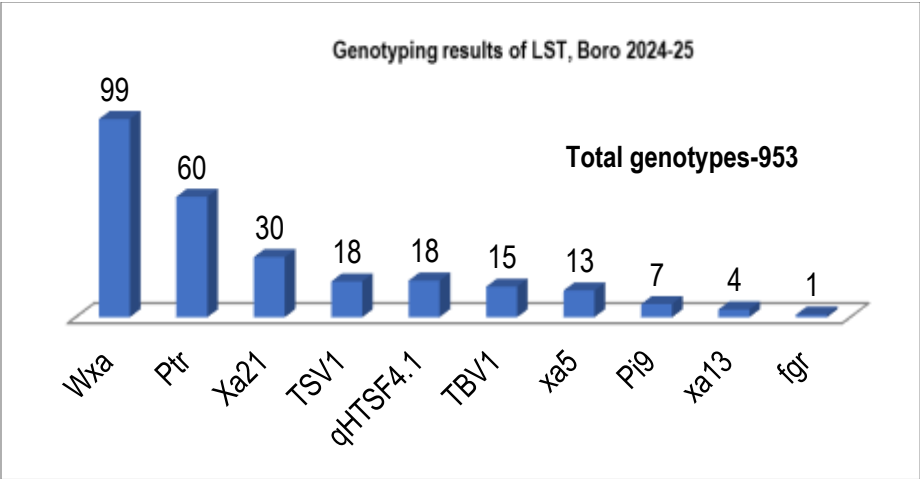


Fig 13.4. Frequency distribution of LST lines in Boro 2024-25

Experiment 13.5: Observational Yield Trial (OYT)

Principal Investigator: M Khatun
Co-Investigators: Atiqur Rahman, H A Mashuk & N Tamanna (Plant Breeding) and others Scientists from Regional stations
Specific objective: Selection of homogeneous breeding lines with acceptable grain quality having high yield with good plant type and resistance to BB.
Materials and Methods: In this experiment, genotypes which were selected from previous season LST were evaluated along with standard check in both T. Aman and Boro season. Twenty-five-day-old seedlings for T. Aman and Thirty-five-day-old seedlings for Boro season were transplanted at a spacing of 20 cm × 20 cm. The plot size was 5.4 m × 5 rows. Single seedling was used for transplanting. Fertilizer doses and application were same as experiment no.13.1. Crop management such as weeding, irrigation etc. was done in time. Insects and other pests were controlled properly.

Results: 260 NIL lines were evaluated at three locations (Gazipur, Rangpur & Rajshahi) in T. Aman 2024-25 season along with standard check BRRI dhan49 and BRRI dhan87. From this trial 20 lines were selected based on yield, growth duration, The average plant height of the materials varied from 115-126 cm and the growth duration was about 110 to 138 days. All of the selected genotypes produced 10% higher yield than both of the checks and the best line BR13963-4R-73 showed 31.7% and 46% higher yield than the check variety BRRI dhan87 and BRRI dhan49 respectively (Table 13.8).
In Boro 2024-25, 20 genotypes were selected out of 400 based on growth duration, yield, from OYT#1. The average plant height of the materials varied from 87-136 cm and the growth duration was about 135 to 157 days. The yield range of different locations is shown in boxplot (Fig 13.5). All of the selected genotypes produced 10% higher yield than the check varieties. The genotypes BR14336-4R-33, BR14318-4R-224, BR14329-4R-3, BR14336-4R-25 were the top yielders presented in Table 13.9.
Additionally, 15 genotypes were selected out of 150 based on growth duration, yield from OYT#2. The average plant height of the materials varied from 101-155 cm and the growth duration was about 117 to 147 days. The yield range of different locations is shown in boxplot (Fig 13.6). All of the selected genotypes produced 10% higher yield than the check varieties. The genotypes BR14321-4R-31, BR15023-4R-139, BR14331-4R-159, BR14336-4R-70, BR14335-4R-114, BR14321-4R-14, BR14343-3R-126 were the top yielder presented in the Table 13.10.

Table 13.8. Performance of the selected 20 advanced lines in the observational trial (OYT), Development of BB resistance, T. Aman 2024-25

SN	Designation	DM (day)	PH (cm)	Different locations (t/ha)			Mean
				Gazipur	Rajshahi	Rangpur	
*1	BR13963-4R-73	117	116	6.5	6.9	2.8	5.4
2	BR13962-4R-13	122	127	4.8	5.1	4.8	4.9
3	BR13962-4R-277	123	129	5.0	5.6	4.0	4.9

SN	Designation	DM (day)	PH (cm)	Different locations (t/ha)			Mean
				Gazipur	Rajshahi	Rangpur	
4	BR13650-4R-54	123	129	5.0	5.4	4.2	4.9
5	BR13963-4R-149	117	124	6.9	4.6	2.9	4.8
6	BR13962-4R-2	124	125	3.9	6.2	4.2	4.8
7	BR13974-4R-154	119	138	4.6	6.2	3.5	4.8
8	BR13962-4R-28	119	129	3.9	5.3	4.9	4.7
9	BR13636-4R-28	122	131	3.7	6.7	3.7	4.7
10	BR13974-4R-165	115	131	3.2	6.8	4.1	4.7
11	BR13962-4R-164	121	131	4.8	5.0	4.2	4.7
12	BR13962-4R-120	122	136	3.8	6.1	4.2	4.7
13	BR13962-4R-288	118	135	3.9	6.4	3.6	4.6
14	BR13971-4R-16	115	133	3.2	7.7	3.0	4.6
15	BR13968-4R-52	124	125	4.4	5.6	4.0	4.6
16	BR13974-4R-150	117	137	4.1	5.2	4.3	4.6
17	BR13650-4R-72	120	121	4.0	5.7	4.0	4.6
18	BR13650-4R-49	121	124	2.9	7.0	3.7	4.5
19	BR13971-4R-7	121	132	3.4	5.7	4.4	4.5
20	BR13964-4R-41	119	117	3.7	5.1	4.6	4.5
	BRRi dhan87 (ck)	123	124	3.7	5.0	3.5	4.1
	BRRi dhan49 (ck)	126	110	4.0	4.0	3.1	3.7
	LSD	8.71	12.15	0.82	1.6	0.72	1.19
	H2B	0.21	0.25	0.88	0.72	0.52	0.15

Table 13.9. Performance of the top 20 advanced lines in the observational trial (OYT#1), Development of BB resistance, Boro 2024-25

SN	Designation	PH (cm)	DM (day)	Different locations (t/ha)			Mean
				Gazipur	Rajshahi	Rangpur	
*1	BR14336-4R-33	118	143	8.77	10.10	7.19	8.75
*2	BR14318-4R-224	115	140	9.03	9.15	7.68	8.61
*3	BR14329-4R-3	117	146	8.78	8.73	7.17	8.26
*4	BR14336-4R-25	115	141	7.49	9.42	7.54	8.21
5	BR14326-4R-83	118	144	7.22	8.44	8.34	8.07
6	BR15001-2R-85	109	138	7.91	8.12	8.04	8.02
7	BR14317-4R-272	111	140	6.92	10.46	6.66	8.02
8	BR14326-4R-130	115	140	8.66	8.50	6.92	7.97
9	BR14333-4R-58	128	140	7.52	9.15	7.04	7.94
10	BR13959-4R-62	113	148	7.06	9.47	7.06	7.93
11	BR14322-4R-272	107	142	9.40	7.09	7.45	7.92
12	BR15000-2R-23	112	144	8.18	10.74	4.65	7.92
13	BR14333-4R-45	130	139	6.67	9.80	7.10	7.92
14	BR15001-2R-120	111	139	6.56	12.53	4.95	7.91
15	BR15001-2R-144	117	141	5.20	10.98	7.31	7.89
16	BR14320-4R-45	101	140	8.37	8.94	6.23	7.83
17	BR14336-4R-61	124	148	8.46	7.55	7.36	7.79
18	BR13959-4R-243	109	143	8.55	7.75	7.01	7.76
19	BR14998-2R-115	119	148	7.89	9.20	6.18	7.75
20	BR14336-4R-16	110	141	7.54	7.78	7.88	7.74
	BRRi dhan89 (Ck)	113	150	7.50	7.67	6.98	7.38
	BRRi dhan101 (Ck)	118	145	7.31	7.32	6.62	7.08
	BRRi dhan92 (Ck)	114	151	6.22	6.92	6.74	6.63
	BRRi dhan88 (Ck)	100	140	7.03	5.78	5.98	6.26
	LSD	0.62	0.61	0.90	0.59	0.75	0.24
	H2B	7.38	5.95	0.76	1.99	1.12	1.45

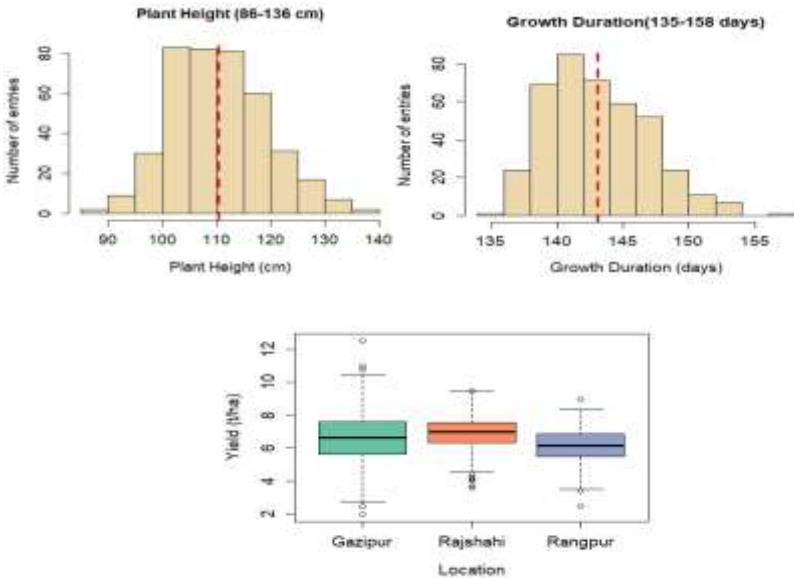


Fig 13.5. Histogram and Boxplot showing plant height, growth duration and yield performance of 400 entries tested in OYT#1 at three locations during Boro 2024-25

Table 13.10. Performance of the selected 15 advanced lines in the observational trial (OYT#2), Development of BB resistance, Boro 2024-25

SN	Designation	BLUE PH	BLUE GD	BLUE YLD	BLUP YLD
*1	BR14321-4R-31	109	135	9.96	8.94
*2	BR15023-4R-139	102	137	9.69	8.78
*3	BR14331-4R-159	113	135	10.19	8.72
*4	BR14336-4R-70	137	135	10.50	8.70
*5	BR14335-4R-114	137	139	10.14	8.69
*6	BR14321-4R-14	131	131	10.06	8.55
*7	BR14343-3R-126	142	138	9.40	8.53
8	BR14336-4R-124	103	138	9.11	8.43
9	BR13977-4R-45	124	140	9.79	8.40
10	BR14321-4R-18	114	129	9.57	8.35
11	BR13982-4R-40	146	140	8.82	8.19
12	BR14321-4R-139	117	131	9.00	8.00
13	BR13977-4R-8	127	137	8.37	7.99
14	BR15023-4R-81	101	138	8.35	7.97
15	BR14321-4R-146	116	129	8.86	7.92
	BRRI dhan101	129	137	5.75	6.29
	BRRI dhan58	110	136	7.05	7.27
	BRRI dhan88	113	127	4.63	5.45
	BRRI dhan89	125	134	5.87	6.38
	h2b	0.8	0.77	0.6	
	LSD	19.46	3.61	2.70	

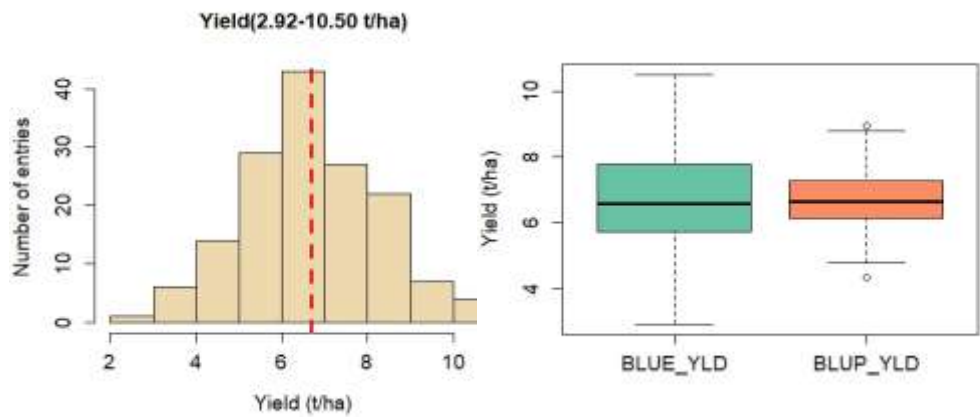


Fig 13.6. Boxplot showing plant height, growth duration and yield performance of 150 entries tested in OYT#2 during Boro 2024-25

Experiment 13.6: Advanced Yield Trial (AYT)

Principal Investigator: M Khatun

Co-investigators: S K Debsharma, Atiqur Rahman & N Tamanna (Plant Breeding) and other Scientists from Regional stations

Specific objectives: Initial yield evaluation and selection of desirable lines as compared with standard checks in on-station conditions.

Materials and Methods: The experiment was evaluated at four locations BRRI Gazipur, Kushtia, Rangpur and Rajshahi. The selected line from OYT trials were evaluated along with the standard checks under development of BB resistance. The twenty-five-day-old seedlings for T. Aman and thirty-five-day-old seedlings for Boro season were transplanted at a spacing of 20 cm × 20 cm. The plot size was 5.4 m × 5 rows. Single seedling was used for transplanting. Fertilizer doses and applications were same as experiment no.13.1. Crop management such as weeding, irrigation etc. was done on time. Insects and other pests were controlled properly.

Results: The average plant height of the advanced lines varied from 108-128 cm and the growth duration was from about 111 to 122 days. Two genotypes (BR12896-4R-124 and

BR12902-4R-127) out of 10 were selected from AYT trial compared to the check varieties in T. Aman season (Table 13.11). The genotype BR12902-4R-127 produced higher grain yield than the check variety BRRI dhan87 (Table 13.11).

The average plant height of the materials varied from 95-140 cm, and the growth duration was about 140 to 150 days. The yield range of different locations is shown in the boxplot (Fig 13.7). Six genotypes out of 19 were selected from AYT#1 trial based on grain yield compared to the check varieties in Boro season. The genotypes BR13634-4R-60 and BR13618-4R-91 produced higher grain yield but similar growth duration to the check varieties BRRI dhan58 and BRRI dhan101. On the other side, the genotypes BR13629-4R-182, BR13622-4R-113, BR13629-4R-11 and BR13626-4R-72 were selected for better grain yield and resistance to BB with similar growth duration to the check varieties BRRI dhan88 (Table 13.12).

In AYT#2, the average plant height of the materials varied from 91-120 cm, and the growth duration was about 145 to 157 days. The yield range of different locations is shown in the boxplot (Fig 13.8). Three genotypes out of 13 were selected based on grain yield compared to the check varieties. The genotypes BR13618-4R-186, BR13618-4R-208 and BR13618-4R-253 produced higher grain yield but similar growth duration to the check varieties BRRI dhan89, BRRI dhan92 and BRRI dhan101 (Table 13.13).

In AYT#3, four genotypes out of 35 were selected based grain yield compared to the check varieties. The genotypes BR13177-4R-397, BR13189-4R-8, BR13178-4R-69 and BR13174-4R-382 were selected for better grain yield and resistance to BB with similar growth duration to the check varieties BRRI dhan88 and BRRI dhan101 (Table 13.14). The average plant height varied from 83-130 cm, and the growth duration was about 128 to 145 days.

Table 13.11. Performance of the top ten advanced lines in Advanced Yield Trial (AYT), Development of BB resistance, T. Aman2024-25

SN	Designation	DM (days)	PH (cm)	Yield (t/ha)			
				Gazipur	Rajshahi	Rangpur	Mean
*1	BR12896-4R-124	114	128	4.30	5.41	4.52	4.34
2	BR12896-4R-239	117	125	3.17	4.36	4.84	4.12
3	BR12898-4R-82	118	120	3.20	5.20	4.59	4.33
*4	BR12902-4R-127	116	114	3.39	5.99	4.77	4.72
5	BR12902-4R-256	114	127	1.11	4.02	4.64	3.26
6	BR12906-4R-284	117	123	2.95	4.15	4.96	4.02
7	BR12907-4R-114	116	124	2.73	3.52	3.98	3.41
8	BR12913-4R-3	111	122	3.89	3.53	5.55	3.92
9	BR13631-3R-195	115	119	3.21	5.07	4.80	4.36
10	BR13631-3R-38	119	117	2.73	3.90	4.18	3.60
	BRRI dhan49 (Ck)	122	112	2.48	5.58	4.07	4.04
	BRRI dhan75 (Ck)	114	112	2.78	5.18	3.61	3.85
	BRRI dhan87 (Ck)	120	120	2.85	5.74	5.02	4.54
	IRBB60 (Ck)	114	108	2.02	4.73	4.45	3.73
	LSD	3.43	10.5	0.97	0.86	0.89	1.45
	H2	0.34	0.12	0.23	0.60	0.09	0.12

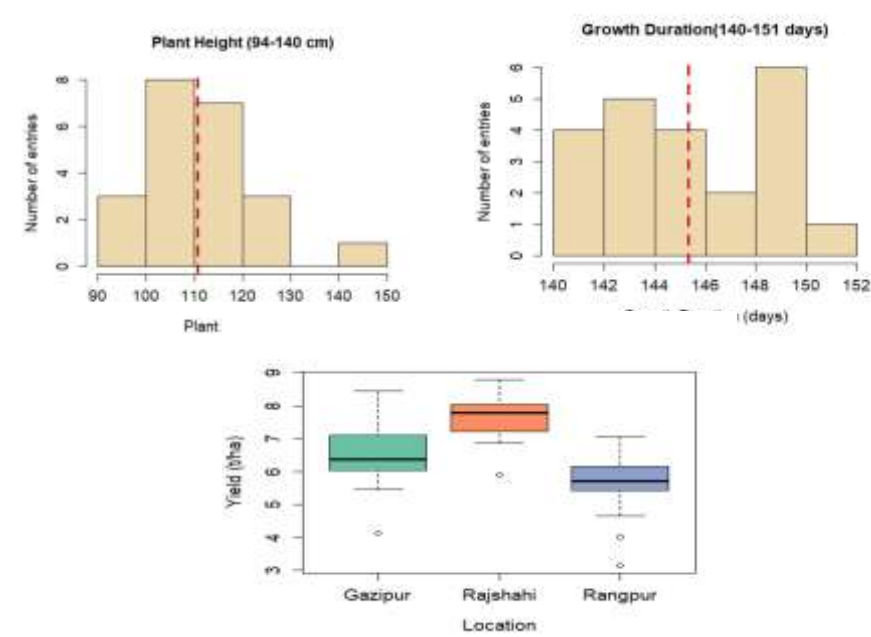


Fig 13.7. Histogram and Boxplot showing plant height, growth duration and yield performance of 23 entries tested in AYT#1 at three locations during Boro2023-24

Table 13.12. Grain yield and agronomic parameters of the top ten short duration entries, AYT#1, Trait development resistant to BB, Boro 2024-25

SN	Designation	PH (cm)	GD (days)	YLD (t/ha)			
				Gazipur	Rajshahi	Rangpur	Mean
*1	BR13634-4R-60	121	146	8.43	8.17	5.46	8.04
*2	BR13618-4R-91	111	149	7.37	8.80	5.59	7.82
3	BR13622-4R-54	103	144	7.91	7.29	3.15	7.34
4	BR13625-4R-83	121	146	7.04	8.03	5.42	7.28
5	BR13622-4R-109	118	145	5.68	7.95	6.50	7.12
6	BR13634-4R-23	117	146	7.50	7.26	6.21	7.12
7	BR13629-4R-172	105	148	6.18	8.71	6.36	7.08
*8	BR13629-4R-182	105	142	7.27	7.22	4.64	6.99
9	BR13627-4R-260	118	142	7.10	7.38	5.50	6.98
10	BR13622-4R-18	96	146	6.12	7.93	6.17	6.94
11	BR13625-4R-60	140	149	6.60	7.73	5.43	6.91
*12	BR13622-4R-113	105	142	6.39	7.85	5.21	6.86
*13	BR13629-4R-11	106	142	6.05	8.04	4.02	6.79
14	BR13618-4R-322	119	148	5.45	8.71	6.16	6.77
*15	BR13626-4R-72	108	140	6.10	8.14	6.01	6.75
	BRRI dhan101 (Res. Ck)	117	144	7.09	7.81	7.05	7.32
	BRRI dhan58 (Ck)	102	150	6.34	6.95	5.84	6.38
	BRRI dhan88 (Sus Ck)	95	141	5.78	6.87	5.32	5.99
h2b		0.85	0.61	0.57	0.27	0.89	0.26
LSD		6.45	4.29	0.98	1.15	0.35	1.05

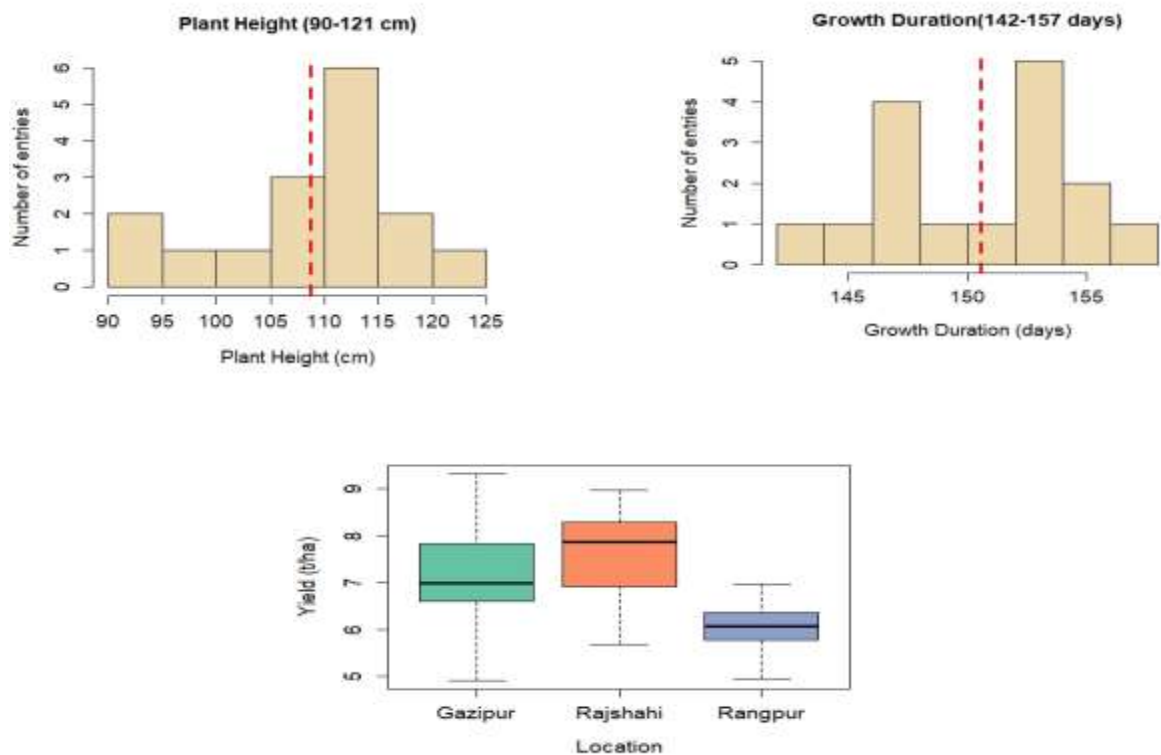


Fig 13.8. Histogram and Boxplot showing plant height, growth duration and yield performance of 16 entries tested in AYT#2 at three locations during Boro2024-25

Table 13.13. Grain yield and agronomic parameters of the top nine long-duration entries, AYT#2, Trait development resistant to BB, Boro2023-24

SN	Designation	PH (cm)	GD (days)	YLD (t/ha)			
				Gazipur	Rajshahi	Rangpur	Mean
*1	BR13618-4R-186	112	147	9.32	8.44	6.05	8.77
*2	BR13618-4R-208	110	149	8.17	8.35	5.95	8.15
*3	BR13618-4R-253	116	147	7.11	8.71	6.43	7.80
4	BR13629-4R-107	96	154	7.74	7.22	5.62	7.37

SN	Designation	PH (cm)	GD (days)	YLD (t/ha)			
				Gazipur	Rajshahi	Rangpur	Mean
5	BR13618-4R-209	108	157	6.67	8.97	6.24	7.29
6	BR13625-4R-58	116	154	6.62	8.13	4.94	7.26
7	BR13629-4R-137	100	153	6.43	8.22	6.08	7.22
8	BR13634-4R-12	113	147	7.90	6.72	5.64	7.20
9	BR13618-4R-79	114	151	7.77	6.71	6.31	6.93
10	BR13634-4R-50	113	148	7.44	5.68	6.03	6.74
	BRRI dhan101 (Res. Ck)	114	143	8.37	7.10	6.50	7.32
	BRRI dhan89 (Sus.Ck)	108	152	6.58	7.86	6.96	7.14
	BRRI dhan92 (Sus. Ck)	113	156	6.12	8.02	6.84	6.99
	h2b	0.88	0.66	0.74	0.88	0.81	0.34
	LSD	7.58	5.89	0.92	0.80	0.29	0.76

Table 13.14. Grain yield and agronomic parameters of the top nine long-duration entries, AYT#3, Trait development resistant to BB, Boro2023-24

SN	Designation	BLUE_PH	BLUE_GD	BLUE_YLD	BLUP_YLD
		(cm)	(days)	(t/ha)	(t/ha)
*1	BR13177-4R-397	129	134	6.98	6.25
*2	BR13189-4R-8	107	134	5.77	5.51
*3	BR13178-4R-69	123	134	5.59	5.30
*4	BR13174-4R-382	102	132	5.40	5.23
5	BR12904-4R-89	115	138	6.08	5.66
6	BR12904-4R-299	122	139	6.08	5.61
7	BR13618-4R-239	117	144	5.82	5.53
8	BR12115-5R-15	111	132	6.07	5.53
9	BR13189-4R-90	109	138	6.03	5.52
10	BR13188-4R-244	117	137	5.74	5.50
	BRRI dhan101 (Res. Ck)	111	133	4.94	4.76
	BRRI dhan88 (Sus. & Std. Ck)	83	128	3.37	4.24
	BRRI dhan89 (Sus. & Std. Ck)	118	142	6.00	5.41
	h2b	0.60	0.67	0.44	
	LSD	10.13	4.05	1.18	

Experiment 13.7: Regional Yield Trial (RYT)

Principal Investigator: M Khatun

Co-investigators: S K Debsharma, Atiqur Rahman & N Tamanna (Plant Breeding) and other Scientists from Regional stations

Specific objectives: To evaluate the specific and general adaptability of the advanced breeding lines as compared with standard checks in on-station conditions.

Materials and Methods: The experiment was evaluated at ten locations BRRI Gazipur, Rangpur, Rajshahi, Habigonj, Cumilla, Sonagazi, Satkhira, Sirajgonj, Bhanga and Kushtia. The selected materials from AYT were evaluated in RYT trial for both T. Aman and Boro season along with the standard under the development of BB resistance. Twenty-day-old seedlings for T. Aman and Twenty-five-day-old seedlings for Boro were transplanted at a spacing of 20 cm × 15 cm and 20 cm × 20 cm respectively. The plot size was 5.4 m × 10 rows. Two to three seedlings were used for transplanting. Fertilizer doses and applications were the same as experiment no.13.1. Crop management such as weeding, irrigation etc. was done in time. Insects and other pests were controlled properly.

Results: In T. Aman 2024-25, two genotypes were selected based on BB score and grain yield compared to the check variety BRRI dhan75. The genotypes BR11871-5R-127 and GSR IR1-DQ140-R2-Y1 produced around 12% higher yield than the check variety BRRI dhan75 with similar growth duration. The genotypes BR11871-5R-127 obtained BB resistant gene *Xa21* and tungro resistant gene *TSVI* (Table 13.15).

In Boro 2024-25, twelve genotypes were evaluated along with the check varieties BRRI dhan88 and BRRI dhan101. The genotype BR13188-4R-170 showed similar yield and similar growth duration compared to the check variety BRRI dhan101 (Table 13.16).

In RYT#2, fifteen genotypes were evaluated along with the check varieties BRRI dhan89, BRRI dhan92 and BRRI dhan101. Among them four genotypes were selected based on BB score and grain yield compared to the check varieties. The genotypes BR12904-4R-233, BR13174-4R-28, BR13180-4R-97 and BR13188-4R-170 produced higher yield than the check variety BRRI dhan101 along with the similar growth duration. Therefore, these genotypes BR12904-4R-233 and BR13188-4R-170 were selected as a potential parent for disease resistant variety development and promoted to ALART (Table 13.17).

Table 13.15 Grain yield and agronomic parameters of the entries, RYT#1, Development of BB, T. Aman 2024-25

SN	Designation	DM (day)	PH (cm)	Yield (t/ha)					Trait markers
				Gazipur	Kushtia	Rajshahi	Rangpur	Avg.	
1	BR11110-3R-61	118	128	4.3	3.1	4.0	4.2	3.9	<i>Xa21, TSV1</i>
*2	BR11871-5R-127	115	122	5.4	3.2	6.9	3.2	4.7	<i>Xa21, TSV1</i>
*3	GSRIR1-DQ140-R2-Y1	112	114	4.8	3.2	6.7	4.4	4.7	<i>TSV1</i>
4	BRRI dhan49 (Ck)	125	108	6.3	3.3	5.4	4.8	5.0	-
5	BRRI dhan75 (Ck)	112	115	4.4	3.2	5.4	4.0	4.2	-
6	BRRI dhan87 (Ck)	123	124	6.2	3.4	5.9	5.2	5.2	-
LSD		6.8	9.01	1.17	0.64	0.35	0.26	1.17	
H2		0.32	0.49	0.46	0	0.93	0.91	0.11	

Table 13.16. Grain yield and agronomic parameters of the entries, RYT#1, Development of BB, T. Boro 2024-25

SN	Designation	PH (cm)	GD (days)	YLD BLUE (t/ha)										Mean
				L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	
1	BR12904-4R-323	120	144	6.7	7.0	7.1	6.5	7.0	8.1	5.5	6.6	7.3	7.4	6.9
2	BR13174-4R-131	106	138	5.5	4.8	7.1	7.4	5.6	4.1	4.8	6.6	6.6	7.3	6.0
3	BR13174-4R-67	112	141	6.3	7.6	8.1	5.9	6.6	6.7	6.5	6.9	6.0	8.1	7.0
4	BR13178-4R-177	126	142	7.0	6.6	8.1	5.5	6.7	7.0	6.2	6.4	6.6	5.3	6.6
5	BR13178-4R-30	117	137	7.2	8.6	7.2	7.0	6.1	5.2	6.3	6.8	6.4	7.8	7.0
6	BR13178-4R-317	128	142	7.1	6.4	8.4	5.5	6.4	6.6	5.1	6.8	6.8	7.8	6.8
7	BR13178-4R-61	102	139	6.9	6.5	7.9	5.5	6.7	5.8	4.3	7.0	8.4	7.0	6.7
8	BR13180-4R-115	115	144	8.0	6.3	7.6	5.5	6.6	8.0	6.4	6.5	7.0	8.3	7.2
9	BR13180-4R-117	117	145	7.8	7.8	7.7	6.4	7.3	8.4	6.3	6.7	8.0	6.4	7.3
10	BR13180-4R-234	111	147	8.8	6.5	7.5	5.5	5.1	7.8	6.0	6.6	7.9	6.8	7.2
11	BR13180-4R-259	118	146	8.3	6.6	7.8	5.2	7.0	7.7	5.1	6.2	7.0	6.6	6.9
*12	BR13188-4R-170	120	142	7.4	8.0	7.5	6.5	6.1	8.3	5.7	7.1	7.7	7.7	7.2
13	BRRI dhan101(Res.Ck)	115	143	7.7	7.2	7.5	6.9	7.2	7.3	6.1	6.9	7.6	7.3	7.2
14	BRRI dhan88(Std.Ck)	97	137	7.0	6.8	7.1	5.7	5.5	5.9	3.8	6.6	7.1	7.1	6.3
h2b		0.62	0.55	0.59	0.59	0.19	0.59	0.81	0.89	0.44	0.00	0.09	0.47	0.17
LSD		4.39	3.66	0.86	0.88	0.69	0.95	0.74	0.80	1.53	0.64	1.40	0.90	0.55

Locations: L1= Cumilla, L2= Satkhira, L3=Rajshahi, L4= Gazipur, L5= Kushtia, L6= Rangpur, L7= Sirajgonj, L8= Habigonj, L9= Sonagazi, L10= Bhanga

Table 13.17. Grain yield and agronomic parameters of the entries, RYT#2, Development of BB, T. Boro 2024-25

SN	Designation	PH (cm)	GD (Day)	YLD BLUE (t/ha)										Mean
				L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	
1	BR11866-5R-277	104	147	7.67	7.75	7.66	5.66	6.72	7.32	9.22	6.38	6.40	7.34	7.21
2	BR12904-4R-132	117	144	7.21	7.81	7.44	6.16	6.53	6.77	8.14	6.30	6.86	6.09	6.93
3	BR12904-4R-219	113	145	6.26	8.97	7.42	5.85	6.97	6.06	10.25	7.03	7.29	5.73	7.18
*4	BR12904-4R-233	117	145	8.15	7.82	8.00	6.10	7.13	6.98	11.15	5.91	7.71	9.14	7.80
5	BR13174-4R-1	116	143	5.77	7.04	7.61	6.73	6.22	7.53	9.52	5.85	6.10	5.63	6.75
6	BR13174-4R-114	115	146	9.73	7.01	7.05	6.50	6.76	7.42	10.57	6.27	5.73	7.40	7.39
*7	BR13174-4R-28	111	143	6.80	7.38	8.44	8.63	6.65	6.16	10.79	6.56	7.18	6.39	7.45
8	BR13174-4R-390	105	142	6.14	7.32	7.97	7.84	6.75	5.91	11.71	6.89	6.49	8.80	7.53
9	BR13174-4R-9	115	144	7.22	8.28	6.50	8.72	5.44	6.90	8.28	6.81	5.93	5.01	6.91
10	BR13178-4R-46	120	148	8.01	5.88	7.27	5.43	6.16	7.76	8.84	5.90	5.71	7.80	6.83
11	BR13180-4R-202	116	146	8.86	7.59	8.22	6.15	6.55	7.76	11.58	6.64	7.81	6.01	7.70
*12	BR13180-4R-97	111	148	9.04	6.32	7.16	7.65	7.96	8.32	9.39	6.61	7.15	5.00	7.56
13	BR13188-4R-1	123	145	8.11	7.11	7.18	6.12	6.57	7.49	7.96	6.33	8.22	8.05	7.26
*14	BR13188-4R-170	119	143	6.58	8.69	7.55	7.36	6.23	7.90	10.59	6.65	8.76	8.84	7.86
15	BR13188-4R-304	114	144	6.87	7.43	7.60	5.92	6.19	8.16	10.79	7.01	7.75	7.16	7.44
16	BRRI dhan101 (Res. Ck)	116	144	7.68	6.43	7.13	7.66	6.05	8.53	10.43	6.96	7.25	7.55	7.57
17	BRRI dhan89 (Std. Ck)	113	146	8.79	8.00	8.16	6.94	6.15	7.22	10.37	7.12	7.71	8.46	7.89
18	BRRI dhan92 (Std. Ck)	117	146	8.26	5.83	8.22	6.61	5.77	6.91	8.26	6.63	7.90	8.75	7.31
h2b		0.66	0.62	0.99	0.27	0.02	0.87	0.52	0.70	0.48	0.28	0.30	0.96	0.24
LSD		5.06	4.49	0.63	1.52	1.05	0.64	0.61	0.78	1.71	0.63	1.45	0.47	0.53

Locations: L1=Cumilla, L2=Satkhira, L3=Rajshahi, L4= Gazipur, L5= Kushtia, L6= Rangpur, L7= Sirajgonj, L8= Habigonj, L9= Sonagazi, L10= Bhanga

Experiment 13.8: Proposed Variety Trial (PVT), Disease resistance (BB), Boro 2024-25

Specific Objectives: On-farm evaluation of proposed genotype by the NSB team for recommendation to release as a new variety.

Materials and Methods: The experiment was evaluated at ten locations under seed certification agency (SCA). Two advanced lines along with the standard check BRRI dhan89 and BRRI dhan101 were evaluated under PVT trials under the development of BB resistance. Thirty-five to forty-day-old seedlings were transplanted at a spacing of 20 cm × 20 cm. The plot size was 5.4 m × 20 rows. Two to three seedlings were used for transplanting. Fertilizer doses and applications were the same as experiment no.13.1. Crop management such as weeding, irrigation etc. was done on time. Insects and other pests were controlled properly.

Results: In PVT, the BB resistance genotype BR (Path)13800-BC3-8-9 evaluated along with the check varieties BRRI dhan89 (Sus. Ck) and BRRI dhan101 (Res. Ck). The proposed variety yielded an average of 9.11 t/ha which was 10% higher than the check variety BRRI dhan89 (8.29 t/ha) and 14.7% higher than the check variety BRRI dhan101 (7.94), Growth duration was 147 days that’s similar to BRRI dhan89 and three days longer than BRRI dhan101 (Table 13.18). The genotype BR (Path)13800-BC3-8-9 having 27.7% amylose content and the physico-chemical properties were satisfactory (Table 13.19 & 13.20).

Table 13.18. Grain yield and agronomic parameters of the entries, PVT, Disease resistance (BB), Boro, 2024-25

S N	Region	Location	Growth Duration (Day)			Yield (t/ha)			%Adv again st Sus. Ck	%Adv again st Res. Ck
			Pro. var	Su. Ck	Res. Ck	Pro. var	Sus. Ck	Res. Ck		
1	Dhaka	BRRI, Gazipur	144	149	137	9.17	8.34	8.39	10.0	9.3
2	Faridpur	BRRI, Faridpur	152	153	153	9.96	9.18	8.13	8.5	22.5
3	Rangpur	BRRI, Rangpur	157	155	154	9.22	8.20	8.57	12.4	7.6
4	Borishal	BRRI, Barishal	133	136	129	8.63	8.22	8.00	5.0	7.9
5	Jashore	Sadar, Jashore	148	143	138	8.81	7.75	7.58	13.7	16.3
6	Chottogram	Sadar, Feni	142	142	138	10.17	9.01	7.72	12.9	31.7
7	Rajshahi	Paba, Rajshahi	145	145	136	7.58	7.97	7.51	-5.0	0.9
8	Bogra	Sadar, Bogura	144	144	138	8.82	7.80	7.46	13.1	18.2
9	Comilla	Sadar, Comilla	140	138	138	8.25	7.80	7.39	5.8	11.6
10	Dinajpur	Sadar, Dinajpur	160	160	160	10.47	8.62	8.61	21.5	21.6
Mean			147	147	144	9.11	8.29	7.94	10.0	14.7

Abbreviations: Pro. Var=Proposed variety (BR(Path)13800-BC3-8-9), Std. CK=Standard check (BRRI dhan89), Res. CK= Resistant Check (BRRI dhan101)

Table 13.19. Physical properties of the proposed BB Resistance line (BR(Path)13800-BC3-8-9) in Boro season

S N	Designation	Milling outturn (%)	Head rice yield (%)	Milled rice Length (L) mm	Milled rice Breadth (B) mm	L/B ratio	Size & shape	Thousand Grain Weight (g)	Appea rance
1	BR(Path)13800-BC3-8-9	70.0	59.3	5.8	2.4	2.5	MB	25.0	Good
2	BRRI dhan89 (Ck)	70.0	61.7	5.7	2.0	2.8	MB	24.8	Good

Table 13.20. Chemical and cooking properties of the proposed Blast Resistance line (BR12454(Path)-BC2-69-97-39-5-44) in Boro season

SN	Designation	Amylose (%)	Protein (%)	Cooking time (min)	Elongation Ratio (ER)	Imbibition Ratio (IR)	Alk Spreading Value
1	BR (Path)13800-BC3-8-9	27.7	9.0	18.00	1.4	3	3.1
2	BRRI dhan89 (Ck)	27.5	7.5	19.30	1.4	3	3.1

PROJECT 14: DEVELOPMENT OF SUBMERGENCE AND STAGNANT FLOOD TOLERANT RICE VARIETIES

General objectives

- Development of high yielding rice varieties with two to three weeks of submergence, stagnant flood and anaerobic germination tolerances with yield target 6.0-6.5 t/ha (under stress 5.0 t/ha).
- Development of multiple stress tolerant rice varieties like submergence + stagnant flood, submergence + drought, submergence + anaerobic germination, submergence + biotic stress with yield target 6.0-6.5 t/ha (under stress 5.0 t/ha).
- Shorter growth duration.

Project Leader: Khandakar Md. Iftekharuddaula

Experiment 14.1: Hybridization

Principal Investigator: S Maniruzzaman

Co-investigator: S Ghosal, M M Yasmin, A Rahman and K M Iftekharuddaula

Specific objectives: To introgress submergence and medium stagnant water tolerant genes into modern genetic background with short/long growth duration, weakly/strongly photoperiod sensitivity, grain quality, etc.

Materials and Methods: Thirty-one parents (Table 14.1) were grown in the hybridization block of Plant Breeding Division at three staggers with an interval of seven days to synchronize flowering among male and female parents. Around 30-day old seedlings were transplanted in a 5.4 m × 2 rows plot with a spacing of 20 cm × 20 cm. Single seedling was used for transplanting. Fertilizers were applied at the rate of 200 kg urea, 70 kg TSP, 100 kg MoP, 70 kg gypsum and 6 kg zinc sulfate. Total amount of TSP, gypsum and two-third MoP were applied at the time of final land preparation. Total amount of zinc sulfate was applied at first top dressing. Urea was applied in equal three splits at 10, 25 and 40 days after transplanting. The remaining one-third of MoP was applied during second top-dressing of urea. Other cultural and pest management practices were carried out as and when necessary. Leaf samples were collected from previously labeled four healthy plants of each parent for QC genotyping with 10 SNP panel. The plants showing unique profiles of each parent were used to make crosses. At flowering, emasculation was done on the day before anthesis using vacuum emasculator and emasculated panicles were bagged with glycine bag. Pollination was performed with just anthesised panicles of the male parent by dusting pollens on the emasculated panicle of the female parent.

Results: A total of 38 crosses were made using 31 well characterized elite parents with high breeding value (Table 14.1a and Table 14.1b). These crosses were made to develop desirable F₁s having submergence tolerance with other useful traits. Parent selection for crossing was done on the basis of the breeding value, plant height, growth duration, survivability and the key trait marker Sub and other important markers like trait markers like *Wx-A group*, *Wx-A NB*, *xa13*, *Xa21* etc. A total of 1,595 F₁ seeds were obtained from 38 crosses, labeled properly, sun-dried and stored in a cool, dry place.

Table 14.1a. List of Parents for hybridization to be grown, Submergence & Medium Stagnant Water Tolerance Breeding, T. Aman 2024-25

SN	Designation	GY BLUP (t/ha)	Trait markers
1	BR11607-4R-72	7	<i>Xa5+Xa13+Xa21</i>
2	BR11607-4R-192	7	<i>Xa5+Xa13+Xa21</i>
3	IR19A8592	6.2	<i>Sub1, Wx-A, Wx-int, GS3</i>
4	BR12504-5R-217	6.2	<i>Sub1, Wx-A, Wx-10, GS3, qDTY3.2</i>
5	BR12504-5R-23	6	<i>Sub1, Wx-A, Wx-NB, GS3, qDTY3.2</i>
6	SV1570	5.9	<i>Sub1, Wx-A</i>
7	BR12484-5R-44	5.8	<i>Sub1, Wx-A, Wx-10, Gn1a, qDTY3.2, qDTY12.1</i>
8	BR12506-5R-83	5.8	<i>Sub1, Wx-A, Chalk5, Xa4, DTH8, Gn1a</i>
9	BR12504-5R-69	5.8	<i>Sub1, Wx-A, Wx-NB, GS3, qDTY3.2</i>
10	SVIN147_WS20-FP-15	5.7	<i>Sub1, Wx-A, Wx-int, GS3, Pita2</i>
11	BR11690-5R-289-P1	5.7	<i>Sub1, Pita2</i>

SN	Designation	GY BLUP (t/ha)	Trait markers
12	IR108042-B-B-B-4-B-B	5.6	<i>Sub1, Wx-A, Xa4, DTH8, Chalk5, Gnl1a</i>
13	IR15F1869	5.6	<i>Sub1, Wx-A, Wx-int, GS3, Pita2</i>
14	IR15F1745	5.5	<i>Sub1, Wx-A, Wx-NB, Pita2, GS3, Gnl1a</i>
15	BR12503-5R-121	5.4	<i>Sub1, Xa21, Wx-A, Wx-NB, GS3, qDTY3.2</i>
16	IR16F1243	5.2	<i>Sub1, Wx-A, Xa4, DTH8, Chalk5, Gnl1a</i>
17	IR16F1097	5.2	<i>Sub1, Wx-A, Wx-NB, Pita2, Chalk5, GS3, Gnl1a, Xa4</i>
18	BR12506-5R-93	5.2	<i>Sub1, Wx-A, Wx-10, Chalk5, Xa4, Gnl1a</i>
19	IR18T1275	5.2	<i>Sub1, Wx-A, Wx-int, GS3, qDTY2.2, qDTY3.2, qDTY12.1</i>
20	IR14T156	5.2	<i>Sub1, Wx-A, Wx-NB, GS3, Pi33, Pi54, pita2</i>
21	BR11196-5R-38	5.2	<i>Sub1, Wx-A, Wx-10, GS3, qDTY2.2, qDTY3.2, qDTY12.1</i>
22	BR12162-5R-350-3	5.1	<i>Sub1, Wx-A, Xa4, DTH8, Chalk5, Gnl1a, GS3</i>
23	BR12154-5R-219-PS1	5.1	<i>Sub1, Wx-A, Wx-NB, Xa4, DTH8, Chalk5, Gnl1a, GS3</i>
24	IR16F1033	5.1	<i>Sub1, Wx-A, Wx-int, GS3 xa5, Pita2</i>
25	BR12489-5R-39	5	<i>Sub1, Wx-A, Wx-10, Chalk5, Alk, Xa4, Xa7, Gnl1a</i>
26	Swarna Samriddhi	5	<i>High yield</i>
27	BR12950-5R-140	4.9	<i>Sub1, Wx-A, Wx-int, GS3, qDTY12.1</i>
28	IR15A4029	4.7	<i>Sub1, Wx-A, Wx-10, pita2, GS3, Gnl1a</i>
29	BR12950-5R-24	4.5	<i>Sub1, Wx-A, Wx-int, Gnl1a, GS3, qDTY12.1</i>
30	SV1599	4.4	<i>Sub1, Wx-A. Wx-10</i>
31	BR12950-5R-124	4.4	<i>Sub1, Wx-A, Wx-GBSS-ex10, Xa7, DTH8, Gnl1a</i>

Table 14.1b. List of cross combination, Submergence and Medium Stagnant Water Tolerance Breeding, T. Aman 2024-25

SL	BR Reg	Cross combinations	Av.Yld BLUP (t/ha)	No of F1 seeds	Expected Traits
1	BR17019	Swarna Samriddhi/BRRI dhan110	5.5	40	<i>Sub1, Wx-A,</i>
2	BR17020	BR12950-5R-140/IR 22LT1266	5.5	10	<i>Sub1, Wx-A,</i>
3	BR17021	BR12950-5R-24/IR 22LT1237	6.5	80	<i>Sub1, Wx-A,</i>
4	BR17022	BR12504-5R-217/BR12953-5R-10	5.2	40	<i>Sub1, Wx-A,</i>
5	BR17023	BR12154-5R-219-PS1/IR19A8595	5.5	20	<i>Sub1, Wx-A,</i>
6	BR17024	BR12950-5R-24/IR15A4029	5.0	25	<i>Sub1, Wx-A,</i>
7	BR17025	BR12950-5R-140/IR22LT1291	5.5	30	<i>Sub1, Wx-A,</i>
8	BR17026	IR16F1033/BR14161-4R-21	6.0	50	<i>Sub1, Wx-A,</i>
9	BR17027	IR15A4029/BR12504-5R-217	6.5	30	<i>Sub1, Wx-A,</i>
10	BR17028	Swarna Samriddhi/BR14161-4R-21	5.5	120	<i>Sub1, Wx-A,</i>
11	BR17029	BRRI dhan111/BRRI dhan52	5.5	100	<i>Sub1, Wx-A,</i>
12	BR17030	Indian Basmati/ Swarna Samriddhi	5.0	60	<i>Sub1, Wx-A,</i>
13	BR17031	BR12504-5R-23/BR12950-5R-24	5.5	150	<i>Sub1, Wx-A,</i>
14	BR17032	BR12504-5R-23/BR11607-4R-192	6.5	15	<i>Sub1, Wx-A,</i>
15	BR17033	IR108042-B-B-B-4-B-B/BR11607-4R-72	6.4	20	<i>Sub1, Wx-A,</i>
16	BR17034	IR108042-B-B-B-4-B-B/BR11607-4R-192	5.5	160	<i>Sub1, Wx-A,</i>
17	BR17035	IR18T1275/IR15F1745	5.6	5	<i>Sub1, Wx-A,</i>
18	BR17036	IR15F1745/Gainga	6.3	25	<i>Sub1, Wx-A,</i>
19	BR17037	BR12484-5R-44/BR12950-5R-24	6.2	20	
20	BR17038	BR12484-5R-44/ Swarna Samriddhi	5.4	80	<i>Sub1, Wx-A,</i>
21	BR17039	Gainga/SV0866	4.5	30	<i>Sub1, Wx-A,</i>
22	BR17040	BR12950-5R-122/IR18T1275	5.5	4	<i>Sub1, Wx-A,</i>
23	BR17041	BR12950-5R-120/BR12504-5R-217	6.0	30	<i>Sub1, Wx-A,</i>
24	BR17042	BR12506-5R-83/BR11690-5R-98-P6	5.9	30	<i>Sub1, Wx-A,</i>
25	BR17043	BR12504-5R-217/Indian Basmati	5.8	15	<i>Sub1, Wx-A,</i>
26	BR17044	BR12504-5R-217/BRRI dhan110	5.8	40	<i>Sub1, Wx-A,</i>
27	BR17045	BR9392-10-20-1B-PS2/FR13A.	5.8	20	<i>Sub1, Wx-A,</i>
28	BR17046	BR13365-4R-17/BR13373-4R-69	6.4	80	<i>Sub1, Wx-A,</i>
29	BR17047	BR12953-5R-25/BR12504-5R-217	5.7	51	<i>Sub1, Wx-A,</i>
30	BR17048	BR12953-5R-10/IR14T156	5.7	15	<i>Sub1, Wx-A,</i>
31	BR17049	BR11196-5R-38/BR12950-5R-140	5.5	15	<i>Sub1, Wx-A,</i>
32	BR17050	BR12484-5R-44/BR12503-5R-121	5.7	10	<i>Sub1, Wx-A,</i>
33	BR17051	BR12504-5R-69/BR12503-5R-121	5.6	50	<i>Sub1, Wx-A,</i>
34	BR17052	BR12162-5R-350-3/BR12506-5R-83	5.6	20	<i>Sub1, Wx-A,</i>
35	BR17053	BR11196-5R-38/BR12950-5R-124	5.5	10	<i>Sub1, Wx-A,</i>
36	BR17054	BR11196-5R-38/IR14T156	5.2	10	<i>Sub1, Wx-A,</i>
37	BR17055	BR11196-5R-38/BR12506-5R-83	5.5	60	<i>Sub1, Wx-A,</i>
38	BR17056	BR12506-5R-83/IR14T156	5.6	25	<i>Sub1, Wx-A,</i>
Total F1 seeds				1595	

Experiment 14.2: F₁ Confirmation through hybridity test

Principal Investigator: S Maniruzzaman

Co-investigator: S Ghosal, M M Yasmin, A Rahman and K M Iftekharuddaula

Specific objective: Confirmation of F₁s as true crosses and selection of promising ones.

Materials and Methods: A total of 37 single crosses along with their respective parents were grown. F₁ seeds of each cross and their respective parents were germinated in petri dishes and then sown in earthen pots. Twenty-five days old seedlings were transplanted at the rate of single seedling at a spacing of 20 cm × 20 cm. Respective parental seedlings were transplanted on both sides of each F₁ population. Crop management was done as described in experiment 1. The leaf samples were collected from each of the 12 plants per cross and respective parents for QC genotyping to determine true F₁. QC genotyping was performed using a 10-SNP QC panel at Intertek, Australia. Genotyping results were analyzed using a genotyping data analytical tool called Flapjack. After confirmation, promising F₁s were selected.

Results: Based on QC profile of the test F₁s, 30 crosses out of 37 crosses were confirmed and selected as true F₁. Seeds of these selected F₁ plants were selfed to produce F₂ seeds. At maturity, F₂ seeds of all selected plants were harvested individually, dried, cleaned, and preserved in cold room (Table 14.2). The cross combinations were selected based on complementary trait-specific SNPs.

Table 14.2. List of confirmed F₁s, Submergence and Medium Stagnant Water Tolerance Breeding, T. Aman 2024-25

SL	BR Reg. no	Crosses	Av. Yld	Objectives of crossing
1	BR16258	BRR dhan103/BR12506-5R-93	6.6	<i>Sub1, Wx-A, Saltol, Xa4, Pi33</i>
2	BR16260	BRR dhan103/ IR13F582	6.4	<i>Sub1, Wx-A, AG3, Xa4</i>
3	BR16261	BRR dhan103/ BR12154-5R-219	6.5	<i>Sub1, Wx-A, Hd3a, Pi33,</i>
4	BR16263	BRR dhan89/IR16F1081	6.7	<i>Sub1, Wx-A</i>
5	BR16264	BRR dhan95/IR13F652-1-P3	6.4	<i>Sub1, Wx-A Hd3a, Pi33,</i>
6	BR16265	BRR dhan95/IR18T1340	6.5	<i>Sub1, Wx-A,AG3_2,Saltol,Xa4,Pi33,Hd1</i>
7	BR16266	BINA dhan17/IR18T1340	6.6	<i>Sub1, Wx-A, AG3, GNP1, Xa4, Pi33, NAS3</i>
8	BR16268	IR19L1051/BR12506-5R-93	6.7	<i>Sub1, Wx-A, AG3, Hd3</i>
9	BR16269	IR19L1051/BR10212-10-4-1	6.7	<i>Sub1, Wx-A, AG3_2, Saltol, Xa4, Pi33</i>
10	BR16270	Thailand Pajam/SV1179	6.2	<i>Sub1, Wx-A, AG3, Hd3</i>
11	BR16271	Thailand Pajam/IR13F582	5.9	<i>Sub1,Wx-A,Xa4,Xa5,Pi33, GNP1</i>
12	BR16272	Thailand Pajam/IR13F652-1-P3	6.3	<i>Sub1, Wx-A, AG3, Hd3</i>
13	BR16273	Thailand Pajam/BR10212-4-3-1	6.3	<i>Sub1, Wx-A, AG3</i>
14	BR16274	Thailand Pajam/IR16F1081	6.4	<i>Sub1, Wx-A</i>
15	BR16276	BR11693-5R-15-P2/IR13F582	6.5	<i>Sub1, Wx-A, Hd3a, Pi33,</i>
16	BR16277	BR11693-5R-15-P2/IR15F1887	5.9	<i>Sub1, Wx-A, Saltol, Xa4, Pi33</i>
17	BR16279	BRR1 dhan103/IR13F652-1-P3	5.7	<i>Sub1, Wx-A</i>
18	BR15700	BR11712-4R-227/IR16F1081	5.9	<i>Sub1, Wx-A, AG3, Hd1, BPH17,</i>
19	BR16282	BRH13-5-12-2-2B/IR13F582	6.6	<i>Sub1, Wx-A, Pi33, Hd1</i>
20	BR16283	BRH18-9-4-2-3B/IR93339129-B-7-7-B-B-B-16	6.4	<i>Sub1, Saltol, Xa4, Pi33</i>
21	BR16284	BRR1 43R/IR93339129-B-7-7-B-B-B-16	5.8	<i>Sub1, Wx-A</i>
22	BR16285	BRR1 43R/IR15F1886	6.5	<i>Sub1, Wx-A, Hd3a, Pi33,</i>
23	BR16286	BRR1 45R/IR19A1862	6.3	<i>Sub1, Wx-A, AG3, Hd1, BPH17,</i>
24	BR16287	BRR1 45R/IR 122310:7-5-6	6.2	<i>Sub1, Wx-A,</i>
25	BR16290	Barsha dhan/SV1179	6	<i>Sub1, Wx-A,Xa4,Xa5,Pi33,GNP1, AG3 Hd3</i>
26	BR16291	Barsha dhan/IR15F1869	6.1	<i>Sub1, AG3, Wx-A, Hd3, GS3</i>
27	BR16292	ACI dhan1/IR93339129-B-7-7-B-B-B-16	6.2	<i>Sub1, Wx-A</i>
28	BR16295	BRH13-5-12-2-2B/SV1179	6.6	<i>Sub1, Wx-A, Xa4, GNP1</i>
29	BR16297	BR11607-4R-72/IR15F1886	6.4	<i>Sub1, Wx-A, Saltol, AG3, BPH17, Hd3</i>
30	BR16299	BINA dhan17/BR10212-10-4-1	5.8	<i>Sub1, Wx-A, Saltol,AG3, BPH17,Hd1,Hd3</i>

DS: 20/07/2024

DT: 14/08/2023

Experiment 14.3: Rapid Generation Advance (RGA)

Principal Investigator: S Maniruzzaman

Co-investigator: S Ghosal, M M Yasmin, A Rahman and K M Iftekharuddaula

Specific objectives: Rapid advancement of segregating population for shortening breeding cycle and development of large RIL population.

Materials and Methods: A total of 29,100 progenies of 17 F₂, 43 F₃, 10 F₄ and 34 F₅ populations were grown in T. Aman 2024-25 season. Single seed progenies from single panicle of one plant

were grown in the RGA field. While in the field, part of the panicle was sown directly on the soil. No thinning or pruning was done. Fertilizer management was done using half of the dosages described in Expt. 14.1. During harvesting at maturity, one panicle was collected from each plant of all the crosses at different times, and the plant was uprooted. Harvested seeds remaining in the panicles were dried and subjected for dormancy breaking to initiate next cycle of RGA immediately. For dormancy breaking, at first, sun-drying was done for three days followed by oven drying at 50°C temperature for 72 hours.

Results: A total of 20,644 progenies from 104 crosses in T. Aman 2024-25 comprising F₂ to F₅ generation were speedily advanced through FRGA technique. The average recovery percentage of the RGA generations was 71%. (Table 14.3a & 14.3b).

Table 14.3a. RGA Summary, Submergence tolerance breeding, T. Aman 2024-25

Generation	No. of crosses	Progenies grown	Progenies harvested	% Recovery
F2	17	5788	3320	57
F3	42	13304	9248	70
F4	10	3640	2472	68
F5	34	6368	5604	88
Total	104	29,100	20,644	71

Table 14.3b: List of F₂, F₃, F₄, and F₅ populations advanced through RGA, Submergence and Medium Stagnant Water Tolerance Breeding, T. Aman 2024-25

SN	BR Number	Crosses	Progenies grown	Progenies Harvested
F₂				
1	BR15700	BR11712-4R-227/IR16F1081	400	248
2	BR15701	Thailand Pajam/IR15F1886	400	120
3	BR15702	IR13F582/BR12839-4R-312	400	240
4	BR15760	Kanak Lata/BR12493-5R-151	300	300
5	BR15771	IR13F582/BR12839-4R-157-2	300	148
6	BR15703	BRR1 dhan58(T)/IR16F1063	400	192
7	BR15704	BR11710-5B-351/IR15F1886	300	88
8	BR15705	IR16F1063/BR10571-15-6-8-5	300	60
9	BR15706	Rahman dhan/BR12489-5R-119	300	184
10	BR15707	BR10571-15-6-8-5/IR13F582	300	140
11	BR15708	BRH11-9-11-4-5B/IR13F582	300	240
12	BR15709	BRH11-9-11-4-5B/IR15F1886	300	200
13	BR15710	BRR1 dhan101/IR15F1886	300	220
14	BR15711	BRR1 dhan101/IR13F582	300	200
15	BR15712	BR10571-15-6-8-5/IR15F1886	400	320
16	BR15713	BR11596-5R-39/IR16F1063	300	200
17	BR15714	BRR1 50R/IR16F1063	488	220
Sub total			5788	3320
F₃				
1	BR15233	BR12208-5R-352-P2/BR12162-5R-350	400	260
2	BR15234	BR12208-5R-352-P1/BR11690-5R-98	208	120
3	BR15235	BR12208-5R-352-P1/IR19L1016	400	240
4	BR15236	Nania/IR16F1063-P1	400	300
5	BR15237	Nania/BR11690-5R-98	360	150
6	BR15238	BRR1 dhan101/BR11690-5R-351	360	200
7	BR15239	BRR1 dhan101/IR16F1063	180	88
8	BR15240	BRR1 dhan102/IR16F1063	220	64
9	BR15241	BRR1 dhan102/BR11690-5R-98	360	224
10	BR15242	BRH11-9-11-4-5B/BR11690-5R-98	360	300
11	BR15243	Ranjit Swarna/BR11690-5R-98	360	240
12	BR15244	IR17A1694/BR11686-5R-179	412	190
13	BR15245	FBR-376/BR11690-5R-351	360	180
14	BR15246	IR17A1694/IR18T1192	320	520
15	BR15247	Guti Swarna/BR11196-5R-445	320	190
16	BR15248	IR17D1096/BR11690-5R-351	360	170
17	BR15249	IR17D1067/BR11686-5R-179	340	280
18	BR15251	FBR-376/IR19A1472	260	200
19	BR15252	IR13F652-1-P2/BR10570-29-3-3-4	360	340
20	BR15253	IR17D1096/BRR1 dhan102	360	184
21	BR15254	BR11204-5B-224/IR16F1063	340	340
22	BR15255	BR12208-5R-352-P2/IR17D1096	350	340
23	BR15256	BR12208-5R-352-P2/BR11690-5R-351	320	280
24	BR15257	BR10570-29-3-3-4/IR16F1063	320	200

SN	BR Number	Crosses	Progenies grown	Progenies Harvested
25	BR15258	BR11690-5R-351/IR16F1063-P2	320	192
26	BR15259	FBR-376/IR17D1096	320	260
27	BR15261	BR10570-29-3-3-4/IR17D1096	240	132
28	BR15262	BR10571-15-6-8-5/IR17D1096	350	320
29	BR15263	BRH13-2-4-6-4B/IR17D1067	176	92
30	BR15264	IR12A173/BR11690-5R-351	240	150
31	BR15265	BR11712-4R-218/IR17D1067	280	188
32	BR15266	BRH11-9-11-4-5B/BR11690-5R-351	244	208
33	BR15267	IR12A173/BR11690-5R-98	280	150
34	BR15268	Nania/BR10210-4-5-5	320	128
35	BR15310	BRR1 dhan92/IR13F652-1-PS2	392	280
36	BR15311	BRH13-2-4-6-4B/IR13F652-1-PS2	120	48
37	BR15269	BR10211-22-9-2_1/IR13F652-1-P3	360	140
38	BR15270	BR23/IR13F441	108	240
39	BR15271	BR22/IR13F441	328	220
40	BR15272	BR10211-7-5-1/IR16F1063-P2	320	500
41	BR15273	Ranjit Swarna/IR13F652-1-P3	320	152
42	BR15274	BR10211-7-5-1/Ranjit Swarna	216	128
Sub total			13304	9248
F ₄				
1	BR15224	BRR1 dhan98/IR16F1148-LS	300	212
2	BR15225	BR12208-5R-352-P1/IR16F1148	156	60
3	BR15226	BR12208-5R-352-P1/BR11693-5R-274	284	260
4	BR15227	BR12208-5R-352-P2/IR16F1148	440	540
5	BR15228	BR12208-5R-352-P2/BR11693-5R-274	520	220
6	BR15229	BRH13-1-9-7B/IR16F1148	340	80
7	BR15230	BRH11-9-11-45B-HR3/IR16F1148	440	280
8	BR15231	BRH10-1-14-2-6B/IR16F1148	360	240
9	BR15232	BRH13-2-4-7-2B/IR16F1148	420	280
10	BR13357	BRR1 dhan75/BRR1 dhan79	380	300
Sub total			3640	2472
F ₅				
1	BR14453	BR11802-11-3-1/IR13F441	280	220
2	BR14454	BR9590-45-1-3-2-P2/ IR13F441	220	218
3	BR14455	BR11224-9-9-4-4/IR13F441	300	240
4	BR14456	BRR1 dhan67/IR100842-B-B RGA-B RGA-B RGA-9	200	188
5	BR14457	BRR1 dhan67/BINA dhan11	120	114
6	BR14458	BRR1 dhan71/BR10212-7-5-2	180	180
7	BR14459	BRR1 dhan71/IR16F1019	290	280
8	BR14460	BRR1 dhan99/IR16F1148-LB	320	180
9	BR14461	BRR1 dhan100/IR16F1148-LB	160	100
10	BR14462	JaHua/IR13F441	280	180
11	BR14463	JaHua/IR16F1019	160	120
12	BR14464	JaHua/IR16F1148-LS	120	80
13	BR14465	JaHua /IR16F1148-LB	160	140
14	BR14466	BRH13-1-9-7B/ IR16F1148-LB	380	300
15	BR14467	BR11723-4R-172/BINA dhan11	180	100
16	BR14468	BR11723-4R-172/IR16F1148-LB	360	320
17	BR14469	BR11723-4R-172/BR10211-1-2-4	180	104
18	BR14470	BR11716-4R-105/BR10211-1-2-4	120	128
19	BR14471	BR11716-4R-105/BR10211-1-1-1-PS1	120	108
20	BR14472	BR11716-4R-102/IR16F1019	250	200
21	BR14473	BR11712-4R-227/BINA dhan11	220	248
22	BR14474	BR11712-4R-227/ IR16F1148-LS	240	220
23	BR14475	BR11712-4R-227/BR10211-1-2-4	160	88
24	BR14476	BR12180-5R-1/IR13F441	120	104
25	BR14477	BR12180-5R-3/IR13F441	120	96
26	BR14478	BR9674-2-9-10-1-P5/IR16F1148-LS	88	52
27	BR14479	BR9674-2-9-10-1-P5/IR16F1148-LB	152	60
28	BR14480	BR10571-15-6-5-3/IR16F1148-LS	280	320
29	BR14481	BR10571-15-6-8-3/IR16F1148-LB	120	228
30	BR14482	Fatema dhan/IR16F1148-LB	80	168
31	BR14483	Fatema dhan/IR16F1148-LS	80	200
32	BR14484	Fatema dhan/BINA dhan11	100	100
33	BR13361	BRR1 dhan87/IR 97383-88-B-B///BRR1 dhan87	140	140
34	BR13378	Guti Swarna/BRR1 dhan52///Guti Swarna	88	80
Sub total			6368	5604
Grand total			29100	20,644

DS: 14/07/2024

Experiment 14.4: Line Stage Testing (LST)

Principal Investigator: S Maniruzzaman
Co-investigator: S Ghosal, M M Yasmin, A Rahman and K M Iftekharuddaula

Specific objectives: Selection of uniform genotypes in terms of uniformity in flowering, plant height, acceptable plant type, grain size-shape, amylose content with key target traits especially submergence tolerance.

Materials and Methods: In total 4,796 lines from 21 crosses were transplanted in 12-hills single-row plots using systematic arrangement with respective parents and eight check varieties. Seventeen days old single seedling was transplanted at 20 cm × 20 cm spacing. Fertilizers were applied following the rate given in experiment 14.1. Crop management was done as recommended for modern rice cultivation for T. Aman season. Weeding and other cultural operations were done on time. Leaf samples were collected from single plant of phenotypically selected plants for genotyping with trait markers using trait-based SNP markers. At maturity, line selection was done considering uniformity in flowering and plant height, grain size and shape, lodging tolerance and tolerance to major disease and insect over check varieties under field conditions and presence of target major traits.

Results: A total of 4,796 fixed breeding lines of 21 crosses were evaluated in the Line Stage Testing (LST) among which 144 lines were selected (Table 14.4a). The selection was based on visual phenotypic performance and homogeneity, presence of flash flooding tolerant *SUB1* QTLs (four diagnostic SNPs viz. snpOS0040, snpOS0041, snpOS0042 and snpOS0043 spanning the *SUB1* QTL region), presence of high amylose content SNPs viz. Wx-int, Wx-GBSS-ex10, Wx-A and Wx-A-NB. Along with these genes, genes for bacterial Blight resistance, Blast resistance were also considered (Table 14.4b.). The frequencies of different genes in LST population have been illustrated in Fig. 14.1. Among the selected lines all four alleles of *Sub1* gene were presented in a frequency of around 50%, whereas amylose gene *Wx-A-group* was highly abundant with a 90% frequency. The other genes responsible for amylose content was presented in a 48 % (*Wx-int*) and 25% (*Wx-GBSS-ex10*) frequency indicating medium to high amylose content in the populations. The BLB resistance genes were almost absent in these populations (Fig. 14.1).

Table 14.4a. Selection of breeding lines in LST, Breeding for submergence and water stagnation tolerant Rice, T. Aman 2024-25

SL	BR Reg.	Cross combinations	Line transplanted	Line selected
1	BR13876	BRR1 dhan94/BR11185-5R-467-5	160	6
2	BR13877	BRR1 dhan94/BR11196-5R-38	240	2
3	BR13883	BRR1 dhan95/BR11196-5R-611	160	2
4	BR13885	BRR1 dhan95/IR127165-1-12-13-1-B	300	16
5	BR13889	IR16F1019//BR11196-5R-38	172	6
6	BR13890	Guti Swarna/BR9158-3-2-2-14-3	200	9
7	BR13896	BR9942-1-2-1-1-B1/BR11185-5R-569-3	300	2
8	BR13897	IR 127152-3-22-3-1-B/BR7833-11-1-3-1-2-B1	120	1
9	BR13898	IR 127165-1-12-13-1-B/BR7833-11-1-3-1-2-B1	200	2
10	BR13899	IR09A228/BR11196-5R-38	184	4
11	BR13900	IR09A228/BR11185-5R-467-5	200	3
12	BR13902	IR16A2332/BR11196-5R-38	160	4
13	BR13903	IR16A2332/BR11185-5R-467-5	280	8
14	BR14156	BR8899-17-1-1-1-1-1/ IR16F1148	180	7
15	BR14157	BR8899-17-1-1-1-1-1/ IR16F1019	180	16
16	BR14158	BRH13-1-9-7B/ Binadhan-11	280	8
17	BR14161	BR10-1-14-2-6B/ IR13F441	220	13
18	BR14162	CN6/ IR16F1019	200	11
19	BR14163	CN6/ IR16F1148	240	13
20	BR13361	BR13361/ BRR1 dhan87	220	5
21	BR13378	BR13378/ Guti Swarna	240	6
Total			4796	144

Table 14.4b. Trait marker profile of some superior lines selected from LST, Submergence and water stagnant tolerance rice breeding, T. Aman, 2024

SL No	Designation	Trait markers	GD(days)
1	BR13876-5R-136-1	Sub1,Wx-A	136

SL No	Designation	Trait markers	GD(days)
2	BR13877- 5R-21-1	Sub1,Wx-A	145
3	BR13885-5R-176-1	Sub1,Wx-int	142
4	BR13889-5R-110-1	Sub1,Wx-A	145
5	BR13890-5R-11-1	Sub1,Wx-A,Wx-GBSS-ex10	141
6	BR13890-5R-127-1	Sub1,Wx-A,Wx-GBSS-ex10	140
7	BR13896-5R-148-1	Sub1,Wx-A,Wx-GBSS-ex10	142
8	BR13898-5R-126-1	Sub1,Wx-int, Xa21	143
9	BR13899-5R-120-1	Sub1,Wx-A,Wx-A-NB	144
10	BR13899-5R-145-1	Sub1,Wx-A	132
11	BR13899-5R-64-1	Sub1,Wx-A,Wx-A-NB	139
12	BR13899-5R-99-1	Sub1,Wx-A,Wx-int	140
13	BR13902-5R-10-1	Sub1,Wx-A,Wx-A-NB	132
14	BR13902-5R-38-1	Sub1,Wx-A,Wx-GBSS-ex10	142
15	BR13903-5R-148-1	Sub1,Wx-A,Wx-A-NB	120
16	BR13903-5R-32-1	Sub1,Wx-A,Wx-A-NB	145
17	BR13903-5R-38-1	Sub1,Wx-A,Wx-GBSS-ex10	141
18	BR13903-5R-56-1	Sub1,Wx-A,Wx-GBSS-ex10	140
19	BR13903-5R-71-1	Sub1,Wx-A,Wx-A-NB	138
20	BR14156-5R-27-1	Sub1,Wx-A,Wx-int	137
21	BR14156-5R-52-1	Sub1,Wx-A,Wx-GBSS-ex10	125
22	BR14157-5R-241-1	Sub1,Wx-A,Wx-int	126
23	BR14157-5R-261-1	Sub1,Wx-A,Wx-int	144
24	BR14157-5R-87-1	Sub1,Wx-A,Wx-int	131
25	BR14158-5R-147-1	Sub1,Wx-A,Wx-int	106
26	BR14158-5R-5-1	Sub1,Wx-A,Wx-int	124
27	BR14158-5R-73-1	Sub1,Wx-A,Wx-int	122
28	BR14161-5R-166-1	Sub1,Wx-A	126
29	BR14161-5R-26-1	Sub1,Wx-A	142
30	BR14161-5R-28-1	Sub1,Wx-A,Wx-GBSS-ex10	120
31	BR14161-5R-53-1	Sub1,Wx-A,Wx-GBSS-ex10	145
32	BR14161-5R-6-1	Sub1,Wx-A	141
33	BR14161-5R-7-1	Sub1,Wx-A	140
34	BR14161-5R-76-1	Sub1,Wx-A	138
35	BR14161-5R-79-1	Sub1,Wx-A	137
36	BR14161-5R-81-1	Sub1,Wx-A	145
37	BR14162-5R-129-1	Sub1,Wx-A,Wx-int	141
38	BR14162-5R-130-1	Sub1,Wx-A, Wx-int	140
39	BR14162-5R-142-1	Sub1,Wx-A,Wx-int	138
40	BR14163-5R-153-1	Sub1,Wx-A,Wx-int	140
41	BR14163-5R-4-1	Sub1,Wx-A,Wx-int	138
42	BR14163-5R-97-1	Sub1,Wx-A,Wx-int	137
43	BR13361-5R-145-1	Sub1,Wx-A,Wx-GBSS-ex10	125
44	BR13378-5R-117-1	Sub1,Wx-A	126
45	BR13378-5R-19-1	Sub1,Wx-A,Wx-A-NB	144
46	BR13378-5R-72-1	Sub1,Wx-A,Wx-A-NB	131

DS: 13/07/2024
DT: 1/08/2024

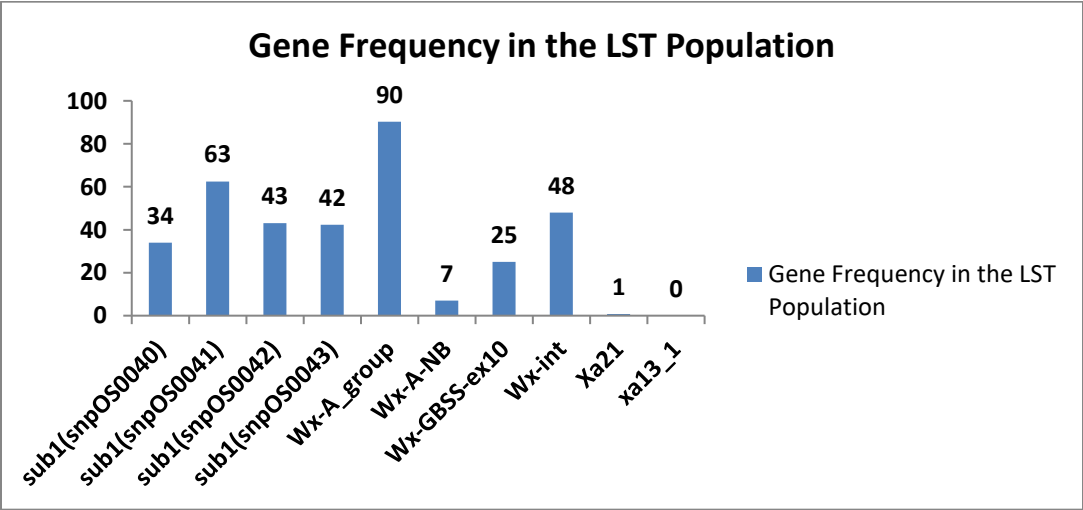


Fig. 14.1. Gene frequency in LST population, Breeding for submergence and water stagnant tolerance rice, T. Aman 2024-25

Experiment 14.5. Observational Yield Trial (OYT#1)

Principal Investigator: S Maniruzzaman

Co-investigator: S Ghosal, M R Hasan, M M Yasmin, A Rahman and K M Iftekharuddaula

Specific objective: Selection of materials with better phenotypic acceptance, homogeneity in the population and higher yield potential than the standard checks under rainfed conditions.

Materials and Methods: A total of 246 advanced lines with four check varieties were evaluated in the Augmented RCB design. The trial was conducted in four locations, one in a controlled submergence tank of BRRI regional station, Rangpur, one under rainfed conditions in BRRI Gazipur and two trials under flood prone farmers field of Lalmonirhat and Kurigram. Twenty-five-day old seedlings with single seedling per hill were transplanted at a spacing of 20 cm × 20 cm in a 5.4m × 4 rows plot. For rainfed trial, fertilizers were applied following the rate given in experiment 14.1. Crop management was done as recommended for modern rice cultivation for T. Aman season. Weeding and other cultural operations were done in time. In case of controlled submergence screening, four extra lines of susceptible genotypes were transplanted at four places at the water tank for regular checking of imposed stress at different duration of submergence starting from 10 days after submergence. At twenty-one days after transplanting, the lines were submerged with 1 meter of water depth for 16 days. Same basal dose of fertilizer of rainfed condition was applied during land preparation. First top dressing of urea was done after 15-20 DAS and 2nd top dress of Urea and half MoP after 35-40 DAS. The survivability of the seedling was counted at 20 days after de-submergence. Under flash flood condition, first top dressing of Urea was done at ten days after water recession and 2nd top dress of Urea and half MoP were applied after 20-25 days after water recession. Under flood prone farmers’ field condition fertilizer management decisions were taken instantly depending on the natural submergence and de-submergence condition of the crop field following the management practice given for controlled submergence condition. Pest management and other cultural operations were carried out as and when necessary.

Results: During the year 2024 T. Aman season, there was no flood in the experimental region. The breeding lines were selected based on better phenotypic acceptance, homogeneity in the population, disease infestation, and higher yield potential and higher survivability under controlled condition (Table 14.7). A total of 21 genotypes out of 246 genotypes were selected. The genotype BR13369-5R-11 gave the highest yield (6.0 t/ha) along with highest survivability (90%). This genotype also has a shorter growth duration of 122 days. The selected genotypes gave yields ranging from 4.0 t/ha to 6.0 t/ha with growth duration ranging from 115 to 136 days. The heritability obtained for plant height and growth duration were 72% and 90% respectively. That of grain yield under Gazipur, Kurigram, Lalmonirhat and Rangpur submergence tank were 78%, 59%, 90% and 90% respectively whereas combined heritability was 44%, indicating medium to high level of experimental precision (Table 14.5).

Table 14.5. Performance of the selected entries of OYT#1, Submergence, and water stagnation tolerant rice, T. Aman 2024-25

Ent no	Designation	PAcp	PH	GD	Yield/t/ha						Trait Markers
					Gaz	Kur	Lalm	Rang	Comb	Sur%	
2	BR13353-4R-2	5	146	115	5.7	4.4	4.0	4.7	4.7	82	Sub1, Wx-A, Wx-int
34	BR13364-4R-10	3	121	119	2.8	6.6	5.1	6.0	5.1	75	Sub1, Wx-A, Wx-ex10
37	BR13364-4R-26	3	140	120	2.8	3.4	4.6	5.8	4.1	68	Sub1,Wx-A,Wx-ex10
50	BR13364-4R-51	3	138	121	2.5	6.2	3.7	6.6	4.7	65	Sub1, Wx-A, Wx-ex10
60	BR13364-4R-76	5	136	119	3.2	3.4	3.7	6.3	4.1	72	Sub1,Wx-A,Wx-ex10
94	BR13367-4R-26	5	145	133	2.1	4.8	4.2	5.3	4.1	79	Sub1, Wx-A
103	BR13367-4R-48	3	124	124	2.3	5.8	5.9	5.6	4.9	84	Sub1, Wx-A
107	BR13368-4R-31	3	133	125	4.6	4.9	5.9	6.4	5.4	76	Sub1, Wx-A,Wx-ex10
112	BR13368-4R-53	3	141	130	3.3	5.4	6.3	4.5	4.9	88	Sub1, Wx-A
120	BR13368-4R-115	3	132	127	5.5	4.7	5.7	6.3	5.1	90	Sub1, Wx-A,Wx-ex10
149	BR13373-4R-69	3	131	129	2.1	6.1	5.1	4.5	4.4	88	Sub1,Wx-A
182	BR13356-5R-63	5	145	136	2.9	5.2	4.5	5.7	4.6	68	Sub1,Wx-A,Wx-A-NB
204	BR13362-5R-42	3	141	127	5.0	5.5	5.1	6.4	5.5	62	Sub1, Wx-A, Wx-A-NB
210	BR13369-5R-9	3	141	115	3.0	6.2	4.5	5.9	4.9	70	Sub1, Xa21
211	BR13369-5R-11	3	139	122	5.4	6.3	4.8	7.4	6.0	90	Sub1
221	BR13370-5R-2	3	147	120	5.5	6.3	4.3	6.1	5.5	88	Sub1, Wx-A,Wx-int
223	BR13370-5R-43	3	128	119	4.2	5.1	3.9	5.8	4.8	74	Sub1,Wx-A, Wx-int
224	BR13370-5R-45	3	131	118	2.0	4.9	3.0	4.6	4.6	80	Sub1,Wx-A,Wx-ex10
227	BR12953-5R-10	3	141	128	3.1	7.0	6.1	4.8	5.2	94	Sub1,Wx-A
229	BR12953-5R-25	3	126	129	2.9	5.6	4.6	3.9	4.3	88	Sub1,Wx-A, Wx-A-NB

Ent no	Designation	PAcp	PH	GD	Yield/t/ha						Trait Markers
					Gaz	Kur	Lalm	Rang	Comb	Sur%	
230	BR12953-5R-52 BRRI	5	145	120	4.6	4.6	4.0	2.9	4.0	80	Sub1,Wx-A, Wx-A-NB
247	dhan110(Ck)	3	119	124	4.9	4.7	5.7	5.7	5.3	82	Sub1, Wx-A, Wx-int, GS3
248	BRRI dhan52(Ck)	3	117	142	4.3	5.6	6.0	5.1	5.3	74	Sub1, Wx-A, Wx-NB, Gn1a
249	BRRI dhan79(Ck)	3	116	136	4.6	5.6	5.1	5.7	5.2	79	Sub1, Wx-A, Xa4, DTH8, Chalk5, Gn1a
250	BRRI dhan87(Ck)	3	122	128	4.5	6.4	5.4	2.5	4.3	30	Wx-A, Wx-10, Xa4, DTH8, GS3, Chalk5, Gn1a
	P-value		**	**	**	**	**	**	**		
	LSD (0.05)		11	3.8	0.5	1.99	1.07	0.82	1.30		
	Heritability		72	90	78	59	90	90	44		

DS: 16/07/2024

DT: 7/08/2024

Experiment 14.6. Observational Yield Trial (OYT#2_Stg)

Principal Investigator: S Maniruzzaman

Co-investigators: S Ghosal, M M Yeasmin and K M Iftekharuddaula.

Specific objective: Advanced evaluation of promising breeding lines in replicated trial under stagnant water and rainfed conditions.

Materials and Methods: In total, 76 entries with four check varieties were evaluated following Augmented RCB design with two replications. Trials were conducted in both stress and non-stress condition. Under stress condition 50-60 cm water depth was maintained starting from one month after transplanting to hard dough stage. Around 30 days old seedlings were transplanted at a spacing of 20 x 20 cm with single seedling per hill. The unit plot size was 5.4 m x 6 rows. Fertilizers were applied @ 100kg urea, 60kg TSP, 50kg MoP, 50kg gypsum and 5kg zinc sulfate/ha. Urea was applied in equal three splits at 10 and 30 days after transplanting. The fertilizers other than urea were applied as basal during final land preparation. Other cultural and pest management practices were carried out as and when necessary.

Results: Among all tested entries 29 lines were selected based on agronomic performance, phenotypic acceptability and yield performance. The genotype IR22LT1237 significantly produced highest yield (6.6 t/ha) followed by IR19A9004 (6.5 t/ha) and IR22LT1694 (6.2 t/ha) under rainfed condition. These three genotypes performed better under stress condition too producing 5.4, 4.5 and 5.0 t/ha yield respectively. The heritability obtained from plant height, growth duration and grain yield (stress and non-stress) were 81%, 84%, 43% and 74% respectively, indicating high level of precision of experiment (Table 14.6).

Table 14.6. Performance of the selected entries of OYT#2, Submergence, and water stagnation tolerant rice, T. Aman 2024-25

Ent no	Designation	PH	GD	Stress	Rainfed	Sur (%)	PAcp	Trait markers
4	IR19A7982	129	114	4.2	4.9	77	5	Sub1, Wx-A, Wx-ex10
6	IR19A7998	115	113	4.1	4.5	67	5	Sub1, Wx-A, Wx-ex10, AG3_1
7	IR19A8595	126	114	3.5	5.9	89	3	Wx-A
8	IR19A8985	127	110	3.2	4.0	73	3	Sub1, Wx-A, AG3_1
10	IR19A9004	125	114	4.5	6.5	79		Sub1, Wx-A
19	IR22LT1694	121	108	5.0	6.2	91	5	
20	IR22LT1070	119	122	4.0	4.5	69	3	Sub1, AG3_1, AG3_2
21	IR16T1372	123	122	3.5	4.2	79	3	AG3_1, AG3_2
22	IR18A1251	136	110	3.7	1.5	83	3	Sub1, Wx-A, Wx-ex10
24	IR22LT1599	125	110	2.2	4.2	89	3	Sub1, AG1_2, AG1_2
25	IR22LT1397	116	118	4.0	4.7	77	3	Sub1,Wx-A, Wxex10,AG3_1,AG3_2
26	IR22LT1237	118	116	5.4	6.6	85	3	Sub1,Wx-A, AG3_1, AG3_2
29	IR19R1138	127	102	4.0	4.5	87	5	Sub1,Wx-A, AG3_1, AG3_2
30	IR22LT1291	127	118	4.5	4.4	91	3	Sub1,AG1_2
32	IR22LT1380	116	112	2.1	3.8	87	1	Wx-A, AG3_1, AG3_2
34	IR21LT1020	115	107	4.0	4.4	91	3	Sub1
36	IR22LT1507	121	111	3.2	3.9	61	5	Sub1,Wx-A, Wx-GBSS-ex10
37	IR22LT1625	115	111	3.0	4.3	95	1	Sub1,Wx-A, AG1_2
38	IR20LT2435	141	126	2.7	4.4	79	5	Sub1,Wx-A,
39	IR22LT1288	119	113	3.2	3.6	93	1	Sub1,Wx-A,
41	IR22LT1732	106	114	1.4	3.4	91	3	Sub1,Wx-A,
45	IR22LT1611	128	109	3.1	4.7	93	5	Sub1,Wx-A, Wx-ex10,AG3_2
49	IR22LT1087	121	116	2.3	3.7	92	3	Wx-A, AG3_1, AG3_2

Ent no	Designation	PH	GD	Stress	Rainfed	Sur (%)	P Acp	Trait markers
50	IR22LT1698	132	120	2.9	5.6	95	1	Sub1
54	IR21LT1388	116	111	2.2	4.7	73	5	Sub1,Wx-A, AG3_1, AG3_2
56	IR17A2780	136	111	4.7	6.0	91	3	Sub1,AG1_2
58	IR22LT1779	117	114	2.0	3.8	93	5	Sub1,AG3_2
59	IR21LT1498	115	109	2.3	4.0	91	3	Sub1,AG3_1, AG3_2
61	IR16F1065	136	119	4.0	4.3	77	3	Sub1
77	IRRI119 (Ck)	135	127	4.5	5.0	54	3	
						85	3	Sub1, Wx-A, Xa4, DTH8, Chalk5, Gn1a
78	BRRI dhan79 (Ck)	111	135	1.3	5.3			
79	BRRI dhan52 (Ck)	116	143	2.4	4.2	89	3	Sub1, Wx-A, Wx-NB, Gn1a
						12	5	Wx-A, Wx-10, Xa4, DTH8, GS3, Gn1a
80	BRRI dhan87 (Ck)	121	130	2.5	5.6			
	P-value	**	**	**	**	**		
	LSD (0.05)	8	8	1.6	1.5	5.1		
	Heritability%	82	84	43	74	62		

DS: 16/07/2024
DT: 7/08/2024

Experiment 14.7: Advanced Yield Trial (AYT#1)

Principal Investigator: S Maniruzzaman

Co-investigator: S Ghosal, M R Hasan, M M Yasmin, A Rahman and K M Iftekharuddaula

Specific objectives: Advanced evaluation of promising submergence tolerant breeding lines in replicated trial under controlled submerged condition, flood prone farmers’ fields as well as under rainfed condition.

Materials and Methods: A total of 53 entries along with five checks were evaluated in RCB design with two replications. The trial was conducted in four locations, one in a controlled submergence tank of BRRI regional station, Rangpur, one under rainfed conditions in BRRI Gazipur and two trials under flood prone farmers field of Lalmonirhat and Kurigram. Twenty-five-day-old seedling with single seedling per hill was transplanted at a spacing of 20 cm × 20 cm in a 5.4m × 10 rows plot. For rainfed trial, fertilizers were applied following the rate given in experiment 14.1. Crop management was done as recommended for modern rice cultivation for T. Aman season. Weeding and other cultural operations were done in time. In case of controlled submergence screening, four extra lines of susceptible genotypes were transplanted at four places at the water tank for regular checking of imposed stress at different duration of submergence starting from 10 days after submergence. At twenty-one days after transplanting, the lines were submerged with 1 meter of water depth for 16 days. Same basal dose of fertilizer of rainfed condition was applied during land preparation. First top dressing of urea was done after 15-20 DAS and 2nd top dress of Urea and half MoP after 35-40 DAS. The survivability of the seedling was counted at 20 days after de-submergence. Under flash flood condition, first top dressing of Urea was done ten days after water recession and 2nd top dress of Urea and half MoP were applied after 20-25 days after water recession. Under flood prone farmers’ field condition fertilizer management decisions were taken instantly depending on the natural submergence and de-submergence condition of the crop field following the management practice given for controlled submergence condition. Pest management and other cultural operations were carried out as and when necessary.

Results: During the year 2024, T. Aman season, there was no flood in the experimental region. The breeding lines were selected based on better phenotypic acceptability, population homogeneity, low disease incidence, and higher yield potential and survivability under controlled condition. A total of 12 genotypes out of 53 genotypes were selected. The genotype BR14161-4R-21 produced the highest yield of 6.5 t/ha followed by BR12484-5R-44 (6.0 t/ha) and BR12950-5R-120 (6.0 t/ha) under controlled stress condition with the 96%, 96% and 84% survivability, respectively. The selected genotypes gave yields ranging from 4.0 t/ha to 6.1 t/ha under rainfed condition and 5.2 to 6.5 t/ha under controlled stress condition. The growth duration ranging from 108 to 129 days. The heritability obtained for plant height and growth duration were 93% and 98% respectively. That of for grain yield under Gazipur, Kurigram,

Lalmonirhat, Rangpur and submergence tank were 91%, 66%, 73%, 86% and 79% respectively indicating medium to high level of precision of this experiment (Table 14.7).

Table 14.7. Performance of the selected entries of AYT#1, Submergence and water stagnation tolerant rice, T. Aman 2024-25

SL	Designation	PH	GD	Yield					Surv (%)	Trait Markers	
				Gaz	Kur	Lal	Ran	Mean Tank			
1	BR12484-5R-44	117	129	5.0	5.4	5.2	6.2	5.0	6.0	96	Sub1, x-AWx-10,Gn1a,qDTY3.2,qDTY12.1 Sub1, Wx-int, Gn1a, GS3, qDTY2.2 Sub1, Wx-A, Wx-NB, qDTY3.2 Sub1, Wx-A, Wx-NB Sub1, GS3, qDTY2.2, qDTY12.1 Sub1, Xa21,Wx-A,Wx-NB,GS3,qDTY3.2 Wx-A,Wx-10,Xa4,DTH8,GS3,Chalk5,Gn1a Sub1, Wx-A, Wx-int, GS3 Sub1, Wx-A, Xa4, DTH8, Chalk5, Gn1a Sub1, Wx-A, Wx-int, GS3 Sub1, Wx-A, Wx-NB, Gn1a
2	BR12950-5R-122	114	117	6.3	6.0	5.4	6.5	6.1	5.7	77	
3	BR12966-5R-81	117	129	4.8	5.3	5.5	5.3	5.2	5.2	76	
4	BR12966-5R-103	120	128	4.1	5.6	4.9	6.2	5.2	5.4	77	
5	BR12950-5R-120	123	122	6.2	6.6	6.1	5.8	6.1	6.0	84	
6	BR12920-5R-4	110	128	5.2	5.3	4.8	5.5	5.2	6.0	87	
7	BR14161-4R-10	118	110	5.2	5.1	5.0	4.9	5.0	5.2	76	
8	BR14161-4R-16	117	108	5.6	3.9	4.7	5.9	5.0	5.6	79	
9	BR14161-4R-20	125	115	4.7	5.1	3.9	5.3	5.0	5.2	79	
10	BR14161-4R-21	127	110	5.3	4.6	3.2	2.4	5.0	6.5	96	
11	BR14161-4R-22	120	110	4.7	3.8	3.1	4.4	4.0	5.9	98	
12	BR14161-4R-36	112	124	5.0	5.5	6.3	4.5	5.3	5.7	74	
13	BRRI dhan87 (Ck)	128	125	5.1	6.0	4.2	5.6	5.2	00	00	
14	BINA dhan11 (Ck)	112	116	3.5	6.1	3.9	5.6	4.8	5.7	91	
15	BRRI dhan79 (Ck)	114	135	5.5	5.0	4.0	5.1	5.6	5.2	94	
16	BRRI dhan110 (Ck)	118	120	5.3	5.7	4.1	5.0	5.0	6.1	99	
17	BRRI dhan52 (Ck)	120	140	4.4	6.3	5.8	6.0	5.6	5.1	51	
LSD (0.05)		9.16	3.01	0.61	0.85	0.75	0.68	0.92			
Heritability		93	98	91	66	73	86	79			
P-value		****	****	****	**	***	****	****			

DS: 18/07/2024

DT: 11/08/2024

Experiment 14.8: Advanced Yield Trial#2 (AYT#2)

Principal Investigator: S Maniruzzaman

Co-investigator: S Ghosal, M R Hasan, M M Yasmin, A Rahman and K M Iftekharuddaula

Specific objectives: Advanced evaluation of promising submergence tolerant breeding lines in replicated trial under controlled submerged condition, flood prone farmers’ fields as well as under rainfed condition.

Materials and Methods: Total 16 entries with four checks were evaluated in RCB design with two replications. Same methodology was followed as experiment 14.7.

Results: During the year 2024, T. Aman season, there was no flood in the experimental region. The breeding lines were selected based on better phenotypic acceptability, population homogeneity, low disease incidence, and higher yield potential and survivability under controlled condition. Eleven genotypes out of 16 genotypes were selected. The genotype BR12506-5R-174 produced the highest yield of 6.47 t/ha with 94% survivability in tank followed by the genotype BR12490-5R-175 (6.2 t/ha) with 86% survivability. The yield range of other selected genotypes were 5.0 t/ha to 5.9 t/ha under controlled submergence condition and 5.0 to 6.2 t/ha under rainfed conditions. The heritability of all observed parameters ranged from 49% to 95%, indicating moderate to high level of precision of this experiment (Table 14.8).

Table 14.8. Performance of the entries of AYT#2, Submergence and water stagnation tolerant rice, T. Aman 2024-25

SL No	Designation	PH (cm)	GD (days)	Yield						Surv (%)	Trait markers
				Gazi	Kuri	Lalm	Rang	Mean	Tank		
1	BR12506-5R-174	143	132	7.2	5.1	6.3	6.3	6.2	6.7	94	Sub1, Wx-A, Wx-10, qDTY3.2
2	BR12487-5R-60	133	121	4.2	4.4	5	5.1	5.2	5.8	75	Sub1, Wx-A, Wx-10, Chalk5, Pita2, Xa4, DTH8, Gn1a
3	BR12489-5R-39	159	126	4.6	3.5	4.7	5.4	5.1	5.5	87	Sub1, Wx-A, Wx-10, Chalk5, Alk, Xa4, Xa7, Gn1a
4	BR12489-5R-63	142	120	4.6	5.9	6.9	5.1	5.6	5.9	90	Sub1, Pi54, Chalk5, Alk, Xa4, Gn1a
5	BR12489-5R-166	147	123	4.2	3.8	4.7	5.1	5	5.2	83	Sub1, Wx-A, Wx-10, Chalk5, ALk, Xa4, Xa7, Gn1a
6	BR12490-5R-175	138	129	3.9	5.4	6.5	5.2	5.3	6.2	86	Sub1, Wx-A, Wx-NB, Chalk5, Gn1a
7	BR12506-5R-93	118	130	5.3	3.8	3.7	5.6	4.6	5.2	96	Sub1, Wx-A, Wx-10, Chalk5, Xa4, Gn1a

SL No	Designation	PH (cm)	GD (days)	Yield						Surv (%)	Trait markers
				Gazi	Kuri	Lalm	Rang	Mean	Tank		
8	BR10211-30-2-1-5	146	122	5.2	5.8	7	6.3	6.1	5.8	79	Sub1, Xa13, Wx-A, Wx-int, GS3, qDTY12.1
9	BR12506-5R-83	120	133	5.8	4.5	5.1	5.5	5.2	5.5	95	Sub1, Wx-A, Chalk5, Xa4, DTH8, Gn1a
10	BR12162-5R-350	140	113	6.1	6.3	4.8	6.3	5.9	5.0	69	Sub1, SCT3, AG3, qXa4, Pi33, Wx-op, Wx-A, NAS3
11	BR12489-5R-32	140	126	6	5.1	5.5	6.2	5.7	5.0	93	Sub1, Wx-A, Wx-ex10, Xa7, DTH8, Gn1a
12	BRRI dhan110(Ck)	126	117	5.8	6.6	5.3	4.5	5.6	5.4	97	Sub1, Wx-A, Wx-int, GS3
13	BRRI dhan87(Ck)	132	121	5.4	5.7	5.0	5.1	5.3	00	00	Wx-A, Wx-10, Xa4, DTH8, GS3, Chalk5, Gn1a
14	BRRI dhan79(Ck)	115	126	5.4	5.0	4.9	4.8	5.0	5.5	90	Sub1, Wx-A, Xa4, DTH8, Chalk5, Gn1a
15	BRRI dhan52(Ck)	129	129	4.9	5.0	4.9	5.6	5.1	5.3	100	Sub1, Wx-A, Wx-NB, Gn1a
LSD (0.05)		5.18	3.97	0.94	0.98	0.82	0.94		1.52		
Heritability		95	88	71	76	49	62		59		
P-value		****	****	**	**	*	*		*		
DS: 18/07/2024				DT: 11/08/2024							

Experiment 14.9: Advanced Yield Trial (AYT_Early)

Principal Investigator: S Maniruzzaman

Co-investigator: S Ghosal, M R Hasan, M M Yasmin, A Rahman and K M Iftekharuddaula

Specific objectives: Advanced evaluation of promising submergence tolerant breeding lines in replicated trial under controlled submerged condition, flood prone farmers’ fields as well as under rainfed condition.

Materials and Methods: A total of 18 entries along with five checks were evaluated in RCB design with two replications. Same methodologies were followed as experiment 14.7.

Results: During the year 2024, T. Aman season, there was no flood in the experimental region. The breeding lines were selected based on better phenotypic acceptability, population homogeneity, low disease incidence, and higher yield potential and survivability under controlled condition. Seven genotypes out of 18 genotypes were selected. Based on the performance of the genotype under stress and nonstress conditions, a total of seven genotypes were selected based on the higher survivability and higher yield. The genotype BR11692-5R-345 produced the highest yield of 6.5 t/ha followed by IR16F1065 (6.4 t/ha) and BR12162-5R-350-1-P1 (5.8 t/ha) under tank condition with survivability rates of 99%, 99%, and 81%, respectively. The heritability of all observed parameters ranged from 56% to 96%, indicating moderate to high level of precision of this experiment (Table 14.9).

Table 14.9. Performance of the selected entries of AYT Early, Submergence and water stagnation tolerant rice, T. Aman 2024-25

SL	Designation	PH (cm)	GD (days)	Yield(t/ha)						Surv (%)	Trait Markers
				Gazi	Kuri	Lal	Rang	Mean	Tank		
1	BR12162-5R-350-1-P1	146	120	5.4	5.1	5.3	5.9	5.4	5.8	81	Sub1, Wx-A, Pita2, GS3, Gn1a
2	BR11692-5R-345	135	124	5.2	5.8	4.7	6.4	5.5	6.5	99	Sub1, Wx-A, Wx-NB, Xa4, DTH8, Gn1a
3	IR16F1081	121	113	5	4.5	6.1	4.3	5	5.6	88	Sub1, Wx-A, Wx-int, GS3
4	IR19A1473	122	114	6.3	6.7		6.3	6.2	5	96	Sub1, Wx-A,Wx-int,Pita2, GS3, Xa4, Xa5, Gn1a
5	IR18T1340	133	127	5.8	5.8	5.6	5.2	5.6	5.4	97	Sub1, Wx-A, Wx-10, pita2, GS3
6	IR16F1065	151	131	5.4	5.4	5.0	4.1	5.0	6.4	99	Sub1, Wx-A, Wx-NB, Pita2, GS3, Gn1a
7	IR15F1869	136	119	3.9	5.9	5.7	5.0	5.1	5.6	100	Sub1, Wx-A, Wx-int, GS3, Pita2
8	BINA dhan11(Ck)	116	111	4.6	5.3	5.7	5.8	5.4	5.5	92	Sub1, Wx-A, Wx-int, GS3
9	BRRI dhan79(Ck)	115	125	6.2	5.1	4.9	4.6	5.2	5.2	89	Sub1, Wx-A, Wx-NB, Gn1a
10	BRRI dhan110(Ck)	125	116	6	5.4	5.5	5.1	5.5	4.9	95	Sub1, Wx-A, Wx-int, GS3
11	BRRI dhan87(Ck)	131	119	6	5.9	6	5.7	5.9	0	3	Wx-A, Wx-10, Xa4, DTH8, GS3, Chalk5,Gn1a
12	BRRI dhan52(Ck)	130	128	5.5	6	5.6	5.9	5.7	5.4	89	Sub1, Wx-A, Wx-NB, Gn1a
LSD (0.05)		6.02	4.97	0.86	0.92	0.95	0.77		1.49		
Heritability		96	92	82	56	59	82		90		
P Value		*****	*****	***	*	*	***		****		
DS: 18/07/2024				DT: 10/08/2024							

Experiment 14.10: Advanced Yield Trial (AYT_Late)

Principal Investigator: S Maniruzzaman

Co-investigator: S Ghosal, M R Hasan, M M Yasmin, A Rahman and K M Iftekharuddaula

Specific objectives: Advanced evaluation of promising submergence tolerant breeding lines in replicated trial under controlled submerged condition, flood prone farmers’ fields as well as under rainfed condition.

Materials and Methods: In total, 17 entries with five checks were evaluated in RCB design with two replications. Same methodologies were followed as experiment 14.7.

Results: During the year 2024, T. Aman season, there was no flood in the experimental region. Based on the performance of the genotype under stress and nonstress conditions, a total of 6 genotypes were selected considering higher survivability and higher yield. The genotype IR16F1201 produced the highest yield of 5.78 t/ha with 98% survivability in tank followed by the genotype IR13F478-3 (5.58 t/ha) with 99% survivability. The yield range of other selected genotypes were 5.08 t/ha to 5.54 t/ha. The heritability of all observed parameters ranged from 59 to 88, indicating moderate to high level of precision of this experiment (Table 14.10).

Table 14.10. Performance of the entries of AYT Late, Submergence and water stagnation tolerant rice, T. Aman 2024-25

SLDesignation No	PH (cm)	GD (days)	Yield (t/ha)						Surv	Trait Markers	
			Gazi	Kuri	Lalmoi	Rang	Mean	Tank			
1 IR16F1201	137	126	5.5	5.8	4.5	7.3	5.8	5.78	98	Sub1, Wx-A, Wx-NB, Xa7, Pita2, Gnl1a, GS3	
2 BR11196-5R-38	138	132	6.4	4.6	4.5	6.1	5.4	5.23	96	Sub1, Wx-A, Wx-10, GS3, qDTY2.2, qDTY3.2, qDTY12.1	
3 IR13F478-3	146	133	5.6	6.1	4.2	6.5	5.6	5.58	99	Sub1, Wx-A, Wx-10, Xa4, DTH8, Chalk5, Gnl1a, GS3	
4 BR11196-5R-83	127	123	5.8	5	4.4	6.2	5.4	5.54	97	Sub1, Wx-A, Gnl1a, GS3	
5 IR13F441	133	130	5.7	5	4.7	5.6	5.3	5.08	95	Sub1, Wx-op, Wx-A, SCT, Saltol, AG3, GS3, BPH17, Hd3a	
6 BR11196-5R-5	134	135	5.5	4.4	5.1	5.4	5.1	5.18	96	Sub1, Wx-A, Wx-int, GS3, qDTY3.2	
7 BRRI dhan79(Ck)	116	126	4.9	5	4.5	5.1	4.9	4.78	93	Sub1, Wx-A, Wx-NB, Gnl1a	
8 BRRI dhan52(Ck)	135	129	4.4	6.2	5.0	7	5.7	3.88	88	Sub1, Wx-A, Wx-NB, Gnl1a	
9 BRRI dhan87(Ck)	132	121	4.7	5.9	4.7	6.4	5.4	3.33	0	Wx-A, Wx-10, Xa4, DTH8, GS3, Chalk5, Gnl1a	
10 BRRI dhan110(Ck)	124	118	5.8	4.9	4.7	5.8	5.3	5.23	98	Sub1, Wx-A, Wx-int, GS3	
11 BINA dhan11(Ck)	117	115	4.3	3.9	4.2	5.7	4.5	5.12	78	Sub1, Wx-A, Wx-NB, Gnl1a	
LSD (0.05)	18.5	4.75	0.85	1.07	0.96	1		0.96			
Heritability	88	66	59	88	86	62		83			
P-value	**	****	*	*	*	*		****			

DS: 16/07/2024 DT: 10/08/2024

Experiment 14.11: Participatory Variety Selection (PVS)

Principal Investigator: S Maniruzzaman

Co-investigator: S Ghosal, M R Hasan, M M Yasmin, A Rahman and K M Iftekharuddaula

Objective: Regional yield adaptation, evaluation and selection of promising submergence tolerant breeding lines in replicated trial under controlled submerged condition, flood prone farmers’ fields condition as well as under rainfed condition with the participation of farmers.

Materials and Methods: Five submergence tolerant high yielding advanced genotypes along with five standard check varieties having submergence tolerance were evaluated under rainfed, controlled on-station, tank and natural flash flooding conditions. The experiment was laid out in RCB design with three replications and conducted in eight locations including two in controlled submergence tank, two in on-station rainfed condition, and four in flash flood prone farmers’ fields (Kurigram, Lalmonirhat, Gaibandha, and Rangpur). Same methodologies were followed as experiment 14.7.

Results: During the year 2024, T. Aman season, there was no flood in the experimental region. The highest-yielding genotype, IR15F1886, produced 5.9 t/ha under rainfed and 6.0 t/ha under controlled stress condition with 92% survivability. The heritability of all observed parameters ranged from 39% to 92%, indicating moderate to high precision of this experiment, however the trial will be repeated next season.

Table 14.11. Performance of the entries of PVS, Submergence and water stagnation tolerant rice, T. Aman 2024-25

SL Designation No		PH (cm)	GD (days)	Yield						Surv Trait Markers (%)	
				Gaz	Kur	Lal	Ran	Mea	Tan		
								n	k		
1	BR10211-22-9-2_1-P1	120	119	5.5	3.4	--	5.4	4.8	5.0	90	Sub1, GS3, qDTY2.2, qDTY12.1
2	BR10211-22-9-2_3	120	123	6.7	4.4	4.7	5.6	5.3	5.2	88	Sub1,Xa21,Wx-A,Wx-NB,GS3,qDTY3.2
3	IR103783-B-B-6-2	122	124	4.6	3.9	6.0	6.5	5.3	5.9	94	Sub1,Xa21,Wx-A,Wx-NB,GS3,qDTY3.2
4	IR13F582	120	126	5.8	5.3	5.4	7	5.9	5.6	46	Sub1Wx-A, Wx-10, qDTY3.2
5	IR15F1886	118	122	5.3	6.4	5.6	6.4	5.9	6.3	92	Sub1,Xa21,Wx-A,Wx-NB,GS3,qDTY3.2
6	BINA dhan11(CK)	117	118	4.7	4.9	4.1	6.4	5.0	4.9	97	Sub1Wx-A, Wx-NB, Gn1a
7	BRRI dhan87 (CK)	127	128	5	3.6	5.2	6.2	5	0	0	Wx-A,Wx-10,Xa4,DTH8,GS3, ,Gn1a
8	BRRI dhan110 (CK)	120	123	5.7	5.2	4.8	5.5	5.3	5.5	94	Sub1, Wx-A, Wx-int, GS3
9	BRRI dhan52 (Ck)	122	139	5	2.6	4.7	6.3	4.6	5.1	78	Sub1, Wx-A, Wx-NB, Gn1a
10	BRRI dhan79 (Ck)	120	135	5.4	6.4	3.6	6.3	5.4	5	82	Sub1, Wx-A, Wx-NB, Gn1a
LSD (0.05)		7.28	7.85	0.71	2.87	1.77	0.69	0.96			
H2b		90	87	81	39	42	74	92			
P-value		**	****	*	*	*	*	***			

DS: 16/07/2024DT: 10/08/2024

PROJECT 15: DEVELOPMENT OF DROUGHT TOLARANT RICE

General objective: Development of genotypes superior to standard varieties and adaptable to rainfed lowland drought-prone environment in T. Aman season.

Project Leader: Md. Abdul Kader

Experiment 15.1: Hybridization

Principal investigator: M A Kader

Co-Investigators: R R Majumder, S S Chaity and M I H Joy

Specific objectives: Introgression of drought tolerance genes into high yielding rice genetic background.

Materials and Methods: Twenty-one recipient and fourteen donor varieties/lines (Table 15.1a) were grown in the hybridization block of plant breeding division at three staggers at an interval of seven days to synchronize flowering among male and female parents. The parents were chosen based on the grain yield, presence of favorable alleles of the key target traits like drought tolerance, medium duration etc. Twenty-five to thirty days old seedlings were transplanted in a 5.4 m × 2 rows plot at a spacing of 20 cm × 15 cm. Single seedling was used for transplanting. Fertilizers @108 (234 Kg Urea): 17.4 (87 Kg TSP): 58.5 (117 Kg MP): 14 (78 Kg Gypsum): 4.3 (12 Kg Zn SO₄) Kg NPKSZn/ha were applied in the trial. All amounts of P, K, S and Zn were applied at the time of final land preparation and nitrogen were applied at three equal splits at 5-10, 20-25 and 35-40 days after transplanting (DAT). Crop management such as weeding, irrigation etc. was done in time. Insects, diseases and other pests were controlled properly. To make the desired cross combination, emasculation was done on the day before anthesis using vacuum emasculator and emasculated panicles were bagged with glassine paper bags. Pollination was performed with freshly bloom panicles of the male parent by dusting pollens on the emasculated panicles of the female parent.

Results: Twenty-four crosses with 781 seeds were made with parents (Table 15.1a). Table 15.1b shows the list of crosses made in the season. Matured F₁ seeds were harvested, sun dried and stored separately in paper bags with proper labeling and packaging.

Table 15.1a. List of parents for crossing, Development of Drought Tolerant Rice, T. Aman 2024-25

SN	Designation	PH (cm)	GD (days)	pBLUP (t/ha)	Genotypic data
Recipient					
1	BR13530-4R-39	110	109	5.34	Waxy_A+ Waxy_10+ qDTY3.2+ qDTY4.1+ qDTY12.1
2	BR13051-4R-24	118	124	5.21	Waxy_A+ Pita+ qGm4(t)+ qDTY3.2+ qDTY4.1
3	BR13055-4R-210	116	102	5.12	Waxy_A+ Waxy_10+ fgr-1+ qDTY1.1+ qDTY3.2
4	BR13056-4R-10	119	125	5.21	Waxy_A+ Waxy_10+ qDTY3.2+ qDTY4.1
5	BR13056-4R-26	124	119	5.13	Waxy_A+ qDTY2.1

SN	Designation	PH (cm)	GD (days)	pBLUP (t/ha)	Genotypic data
6	BR13056-4R-35	127	126	5.19	<i>Waxy_A+ Waxy_10+ Pita+ qDTY2.1+ qDTY3.2</i>
7	BR13056-4R-48	124	125	5.17	<i>Waxy_A+ Waxy_10+ qDTY2.1+ qDTY4.1</i>
8	BR13057-4R-15	124	130	5.2	<i>Waxy_A+ qDTY3.2+ qDTY4.1+ qDTY12.1</i>
9	BR13057-4R-44	115	126	5.25	<i>Waxy_A+ Pita+ qDTY3.2</i>
10	BR13057-4R-222	108	127	5.14	<i>Waxy_A+ qDTY2.1+ qDTY3.2+ qDTY4.1+ qDTY12.1</i>
11	BR13058-4R-56	130	105	5.25	<i>Waxy_A+ Waxy_10+ xa5+ qDTY1.1</i>
12	BR13059-4R-13	140	125	5.21	<i>Waxy_A+ Waxy_10+ qDTY3.2+ qDTY12.1</i>
13	BR13059-4R-114	117	109	5.2	<i>Waxy_A+ Waxy_10+ qDTY3.2+ qDTY12.1</i>
14	BR13059-4R-188	132	124	5.11	<i>Waxy_A+ Waxy_10+ qDTY3.2+ qDTY12.1</i>
15	BR12023-6R-111	113	107	5.2	-
16	IR17L1360	124	114	5.0	-
17	BRRRI dhan71	108	115	5.5	-
18	BRRRI dhan75	110	115	5.5	-
19	BRRRI dhan103	125	133	6.2	-
20	BRRRI dhan104	92	147	7.3	-
21	BRRRI dhan107	100	150	8.19	-
Donor					
1	BR13017-4R-11	127	115	4.94	<i>Wx-10+ qDTY1.1_1+ qDTY2.2_1+ Wx-A+ Gm4_3+ Gm4_4+ DTY12.1_2</i>
2	BR13018-4R-31	128	114	4.94	<i>qDTY2.1 (5)+ qDTY3.1 (2)+ qDTY1.1_1+ qDTY1.1_4+ qDTY3.2_1+ Wx-A+ DTY12.1_2</i>
3	BR13018-4R-117	124	112	4.94	-
4	BR13023-4R-33	119	120	4.94	-
5	BR11788-5R-27	124	120	4.94	<i>Wx-10+ qDTY2.1 (1)+ qDTY2.1 (4)+ qDTY3.1 (1)+ qDTY3.1 (2)+ qDTY2.2_1+ qDTY3.2_1+ Wx-A</i>
6	BR12306-5R-14	119	134	5.17	<i>Wx-10+ qDTY2.1 (1)+ qDTY2.1 (4)+ qDTY3.1 (1)+ qDTY3.1 (2)+ qDTY2.2_1+ qDTY3.2_1+ Wx-A</i>
7	BR13024-4R-24	109	127	5.17	<i>Wx-10+ qDTY2.1 (1)+ qDTY2.1 (4)+ qDTY3.1 (1)+ qDTY3.1 (2)+ qDTY2.2_1+ qDTY3.2_1+ Wx-A</i>
8	BR12307-5R-226	126	122	5.17	<i>Wx-10+ qDTY2.1 (1)+ qDTY2.1 (4)+ qDTY3.1 (1)+ qDTY3.1 (2)+ qDTY2.2_1+ qDTY3.2_1+ Wx-A</i>
9	BR12311-5R-69	121	127	5.17	<i>Wx-10+ qDTY2.1 (1)+ qDTY2.1 (4)+ qDTY3.1 (1)+ qDTY3.1 (2)+ qDTY2.2_1+ qDTY3.2_1+ Wx-A</i>
10	BR12314-5R-180	117	121	5.17	<i>Wx-10+ qDTY2.1 (1)+ qDTY2.1 (4)+ qDTY3.1 (1)+ qDTY3.1 (2)+ qDTY2.2_1+ qDTY3.2_1+ Wx-A</i>
11	BR12316-5R-133	130	124	5.17	<i>Wx-10+ qDTY2.1 (1)+ qDTY2.1 (4)+ qDTY3.1 (1)+ qDTY3.1 (2)+ qDTY2.2_1+ qDTY3.2_1+ Wx-A</i>
12	BR11795-5R-51	126	126	5.17	<i>Wx-10+ qDTY2.1 (1)+ qDTY2.1 (4)+ qDTY3.1 (1)+ qDTY3.1 (2)+ qDTY2.2_1+ qDTY3.2_1+ Wx-A</i>
13	BRRRI gene bank acc. no. 2706				
14	BRRRI gene bank acc. no. 2728				

Table 15.1b: List of crosses made, Development of Drought Tolerant Rice, T. Aman 2024-25

SN	Cross combination	AveBLUP (t/ha)	Characteristics	No. of seeds
1	BR13530-4R-39/BR13017-4R-11	5.14	Drought tolerance with QTLs	25
2	BR13051-4R-24/BR13018-4R-31	5.08	Drought tolerance with QTLs	50
3	BR13055-4R-210/BR13018-4R-117	5.03	Drought tolerance with QTLs	25
4	BR13056-4R-26/BR11788-5R-27	5.04	Drought tolerance with QTLs	40
5	BR13056-4R-35/BR12306-5R-14	5.18	Drought tolerance with QTLs	50
6	BR13056-4R-48/BR13024-4R-24	5.17	Drought tolerance with QTLs	22
7	BR13057-4R-15/BR12307-5R-226	5.19	Drought tolerance with QTLs	50
8	BR13057-4R-44/BR12311-5R-69	5.21	Drought tolerance with QTLs	80
9	BR13057-4R-222/BR12314-5R-180	5.16	Drought tolerance with QTLs	22
10	BR13058-4R-56/BR12316-5R-133	5.21	Drought tolerance with QTLs	50
11	BR13059-4R-13/BR11795-5R-51	5.19	Drought tolerance with QTLs	35
12	BR13059-4R-114/BR12311-5R-69	5.19	Drought tolerance with QTLs	30
13	BRRRI dhan71/BR12316-5R-133	5.34	Drought tolerance with QTLs	25
14	BRRRI dhan75/BR11795-5R-51	5.34	Drought tolerance with QTLs	18
15	BRRRI dhan103/BR12306-5R-14	5.69	Drought tolerance with QTLs	9
16	BRRRI dhan104/BR13024-4R-24	6.24	Drought tolerance with QTLs	23
17	BRRRI dhan107/BR12307-5R-226	6.68	Drought tolerance with QTLs	35
18	BRRRI dhan107/BR12311-5R-69	6.68	Drought tolerance with QTLs	20
19	BR12023-6R-111/BR12306-5R-14	5.18	Drought tolerance with QTLs	50
20	IR17L1360/BR13024-4R-24	5.10	Drought tolerance with QTLs	25
21	BR13530-4R-39/ Genebank Accession no. 2706	-	Drought tolerance with QTLs	30
22	BR13055-4R-210/ Genebank Accession no. 2706	-	Drought tolerance with QTLs	30
23	BR13056-4R-10/ Genebank Accession no. 2728	-	Drought tolerance with QTLs	12
24	BR13057-4R-222/ Genebank Accession no. 2706	-	Drought tolerance with QTLs	25
Total				781

Experiment 15.2: Hybridity test and confirmation of F1

Principal investigator: M A Kader

Co-Investigators: R R Majumder, S S Chaity and M I H Joy

Specific objectives: Confirmation of the crosses as true F1s and use of the selected F1s to produce F2 seeds and use in making different types of crosses.

Materials and Methods: A total of 25 crosses were grown along with their parents in the crossing blocks at BRRI Gazipur using single seedling/hill at 20 cm × 15 cm spacing in 8-hill single row plots. Fertilizer management was done following the protocol described in Experiment 15.1. Leaf samples were collected from each of the plants of F1 and parents for QC genotyping to determine true F1s. QC genotyping was performed using 10 QC SNPs at Intertek, Australia

Results: The plants with heterozygous alleles at two or more SNP loci were declared as true F1. All 25 crosses were identified as true F1. Seeds of these F1 plants were selfed to produce F2 seeds. At maturity stage, F2 seeds of all selected plants were harvested individually. Then they were dried, cleaned and preserved in cold room for proper storage (Table 15.2).

Table 15.2: List of confirmed F1-s, Development of Drought Tolerant Rice, T. Aman 2024-25

SN	BR No.	Cross combination	Genotypic combinations
1	BR16585	BR11789-5R-55/BR12313-5R-267	<i>Wx-A + Wx-10+ qDTY3.2</i>
2	BR16586	BR12313-5R-267/BR11786-5R-114	<i>Wx-A+ qDTY3.2</i>
3	BR16587	BR11786-5R-114/BR13018-4R-116	<i>Wx-A+ qDTY3.2 + qDTY4.1</i>
4	BR16588	BR13018-4R-116/BR12312-5R-195	<i>Wx-A+ qDTY3.2 + qDTY4.1</i>
5	BR16589	BR12312-5R-195/BR11788-5R-64	<i>Wx-A + Wx-10+ xa5+ Pi-ta+ BPH32+ qDTY2.1</i>
6	BR16590	BR11788-5R-64/BR11795-5R-81	<i>Wx-A, Wx-10, xa5, Pi-ta, BPH32, Gm4, qDTY2.1 qDTY3.2</i>
7	BR16591	BR11795-5R-81/BR11797-5R-67	<i>Wx-A+ Gm4+ qDTY3.2+ qDTY4.1</i>
8	BR16592	BR11797-5R-67/BR13021-4R-18	<i>Wx-A+ Wx-10+ qDTY4.1 + qDTY12.1</i>
9	BR16593	BR13021-4R-18/BR12316-5R-77	<i>Wx-A +Wx-10+ qDTY3.2 +qDTY4.1+ qDTY12.1</i>
10	BR16594	BR12316-5R-77/BR13021-4R-32	<i>Wx-A+ Wx-10+ qDTY3.2 + qDTY4.1 + qDTY12.1</i>
11	BR16595	BR13021-4R-32/BR12314-5R-85	<i>Wx-A +Wx-10+ Pi-ta +qDTY3.2+ qDTY12.1</i>
12	BR16596	BR12314-5R-85/BR13020-4R-35	<i>Wx-A+ Pi-ta+ xa5+ qDTY3.2</i>
13	BR16597	BR13020-4R-35/BR13018-4R-190	<i>Wx-A+ Wx-10+ xa5+qDTY3.2+ qDTY4.1</i>
14	BR16598	BR13018-4R-190/BR12307-5R-161	<i>Wx-A +Wx-10+ qDTY3.2 +qDTY4.1</i>
15	BR16599	BR12307-5R-161/BR12316-5R-27	<i>Wx-A+ Pi-ta+ qDTY3.2 +qDTY4.1</i>
16	BR16600	BR12316-5R-27/BR13018-4R-31	<i>Wx-A+ Pi-ta+ qDTY3.2 + qDTY4.1 + qDTY12.1</i>
17	BR16601	BR13018-4R-31/BR13017-4R-11	<i>Wx-A+ Wx-A + Gm4 +qDTY3.2+ qDTY12.1</i>
18	BR16602	BR13017-4R-11/BR11792-5R-44	<i>Wx-A +Wx-10+ Gm4+ qDTY4.1+ qDTY12.1</i>
19	BR16603	BRRI dhan71/IR100097-B-B-RGA-B-RGA-8	
20	BR16604	BRRI dhan71/IR 126952-28-55-9-9-53-1-6	
21	BR16605	IR127009-B-8-2-1-2/IR100097-B-B-RGA-B-RGA-8	
22	BR16606	IR17L1314/IR15L1720	
23	BR16607	BRRI dhan66/IR100097-B-B-RGA-B-RGA-8	
24	BR16608	IR127009-B-8-2-1-2/IR 126952-41-58-26-4-12-1-9	
25	BR16609	IR17L1314/IR100097-B-B-RGA-B-RGA-8	

Experiment 15.3: Advancing segregating progenies in RGA/FRGA nurseries

Principal investigator: M A Kader

Co-Investigators: R R Majumder, S S Chaity and M I H Joy

Specific objective: To rapid advancement of segregating population for shortening breeding cycle.

Materials and Methods: In total, 14,930 progenies from 39 crosses of F2 and F3 generation were grown in RGA/FRGA and 18,800 progenies of 50 crosses were grown in Boro season from F2 and F3 generations at Gazipur under greenhouse and field RGA condition. In case of field RGA, panicles were directly seeded on the raised bed at 5 cm × 5 cm spacing. A wooden frame was used to make single-row plots on the beds. Half doses of the fertilizers were used as experiment 15.1. Crop management was done as Experiment 15.1. At maturity stage, single panicle was harvested from each bunch of hills. Harvested panicles were dried and subjected to keep in the oven at 50°C for breaking dormancy and repeat the same method to initiate next cycle of RGA immediately.

Results: In total 13,380 individual progenies of 39 crosses from F₂ and F₅ generation were harvested from segregating generations in T. Aman and 15,465 progenies of 50 crosses from F₂ and F₃ generation were harvested from segregating generations from Boro season (Table 15.3a and Table 15.3b).

Table 15.3a: List of selected progenies from RGA/FRGA nursery, Development of Drought Tolerant Rice, T. Aman 2024-25

SN	BR Reg. No.	Cross combinations	Progenies transplanted	Progenies harvested
F₂ generation				
1	BR15570	BRR1 dhan71/ BR12023-6R-111	400	370
2	BR15571	BRR1 dhan71/ BR12016-6R-145	400	350
3	BR15572	BRR1 dhan87/ BR12023-6R-111	400	345
4	BR15573	BRR1 dhan87/ BR11730-6R-26	400	350
5	BR15574	BRR1 dhan87/ BR12022-6R-102	400	375
6	BR15575	BRR1 dhan87/ BR12016-6R-145	400	370
7	BR15576	IR 126952-29-6-197-6-20-B/ BR12016-6R-145	400	365
8	BR15577	IR 126952-41-58-26-4-12-5-1/ BR12023-6R-111	400	350
9	BR15578	IR 126952-41-58-26-4-12-5-1/ BR12016-6R-145	400	365
10	BR15579	IR 126952-28-55-9-9-4-2-7/ BR12023-6R-111	400	360
11	BR15580	IR 126952-28-55-9-9-4-2-7/ BR12016-6R-145	400	365
12	BR15581	IR 126953:632-AC 32-B-2-4-11-B/ BR12023-6R-111	400	350
13	BR15582	IR 126953:632-AC 32-B-2-4-11-B/ BR11730-6R-26	400	345
14	BR15583	IR 126953:632-AC 32-B-2-4-11-B/ BR12016-6R-145	400	340
15	BR15584	IR 126952-29-65-16-2-10-B/ BR12023-6R-111	400	345
16	BR15585	IR 126952-29-65-16-2-10-B/ BR11730-6R-26	400	340
17	BR15586	IR 126952-29-65-16-2-10-B/ BR12016-6R-145	400	360
18	BR15587	IR 126952-443-12-33-7-53-4-B/ BR12023-6R-111	400	340
19	BR15588	IR 126952-443-12-33-7-53-4-B/ BR11730-6R-26	400	330
20	BR15589	IR 126952-443-12-33-7-53-4-B/ BR12016-6R-145	400	360
21	BR15590	IR 126952-28-55-9-10-50-B/ BR12023-6R-111	400	350
22	BR15591	IR 126952-28-55-9-10-50-B/ BR11730-6R-26	400	340
23	BR15592	IR 126952-28-55-9-10-50-B/ BR12016-6R-145	400	350
24	BR15593	BRR1 dhan87/ BR10540-4-1-2-4-1	400	340
25	BR15594	IR 126952-28-55-9-10-50-B/ BR10540-4-1-2-4-1	400	345
Total			10,000	8,800
F₅ generation				
1	BR14971	BR10480-1-2-3-7-2/ BRRIGeneBankAccNo1069	350	300
2	BR14972	BR9674-1-1-5-2-P4 / IR126952-443-83-68-6-6-1-3	355	320
3	BR14973	BR9674-1-1-5-2-P4 / IR126952-41-58-26-4-12-1-21	360	330
4	BR14974	IR16F1148 / IR 126952-28-94-36-10-31-6-1	370	350
5	BR14975	IR16F1148 / IR 126952-28-55-37-2-20-4-B	350	320
6	BR14976	IR16F441 / IR96322-34-223-B	300	280
7	BR14977	BR11607-4R-184 / BRR1 Gene Bank Acc No. 1434	350	320
8	BR14978	BR11607-4R-184 / IR96322-34-223-B-1-1-1	350	330
9	BR14979	BR11604-4R-84 / IR126952-41-148-1-5-9-8-1	350	335
10	BR14980	BR11604-4R-84 / IR96322-34-260-B-5-1-1-4-B	365	330
11	BR14981	BR10538-2-1-2-3-2 / HHZ23-DT16-DT1-DT1	360	335
12	BR14982	BR10539-8-1-3-2-2 / CAMPONI SML	350	345
13	BR14983	BR10539-43-1-1-1-1 / IR126952-443-83-68-6-6-1-3	360	340
14	BR14984	BR10540-4-1-2-4-1 / IR 126952-28-94-36-10-31-6-1	360	345
Total			4,930	4,580
Grand Total			14,930	13,380

Table 15.3b: List of selected progenies from RGA/FRGA nursery, Development of Drought Tolerant Rice, Boro 2024-25

SN	BR No.	Cross combinations	No of progenies transplanted	No of progenies harvested
F₂ generation				
1	BR16585	BR11789-5R-55/BR12313-5R-267	400	320
2	BR16586	BR12313-5R-267/BR11786-5R-114	400	300
3	BR16587	BR11786-5R-114/BR13018-4R-116	400	300
4	BR16588	BR13018-4R-116/BR12312-5R-195	400	300
5	BR16589	BR12312-5R-195/BR11788-5R-64	400	320
6	BR16590	BR11788-5R-64/BR11795-5R-81	400	350
7	BR16591	BR11795-5R-81/BR11797-5R-67	400	310
8	BR16592	BR11797-5R-67/BR13021-4R-18	400	240
9	BR16593	BR13021-4R-18/BR12316-5R-77	400	300
10	BR16594	BR12316-5R-77/BR13021-4R-32	400	230
11	BR16595	BR13021-4R-32/BR12314-5R-85	400	320

12	BR16596	BR12314-5R-85/BR13020-4R-35	400	310
13	BR16597	BR13020-4R-35/BR13018-4R-190	400	300
14	BR16598	BR13018-4R-190/BR12307-5R-161	400	300
15	BR16599	BR12307-5R-161/BR12316-5R-27	400	300
16	BR16600	BR12316-5R-27/BR13018-4R-31	400	300
17	BR16601	BR13018-4R-31/BR13017-4R-11	400	310
18	BR16602	BR13017-4R-11/BR11792-5R-44	400	300
19	BR16603	BRRRI dhan71/IR100097-B-B-RGA-B-RGA-8	400	200
20	BR16604	BRRRI dhan71/IR 126952-28-55-9-9-53-1-6	400	200
21	BR16605	IR127009-B-8-2-1-2/IR100097-B-B-RGA-B-RGA-8	400	200
22	BR16606	IR17L1314/IR15L1720	400	330
23	BR16607	BRRRI dhan66/IR100097-B-B-RGA-B-RGA-8	400	200
24	BR16608	IR127009-B-8-2-1-2/IR 126952-41-58-26-4-12-1-9	400	300
25	BR16609	IR17L1314/IR100097-B-B-RGA-B-RGA-8	400	310
Total			10,000	7,150
F₃ generation				
1	BR15570	BRRRI dhan71/ BR12023-6R-111	370	350
2	BR15571	BRRRI dhan71/ BR12016-6R-145	350	310
3	BR15572	BRRRI dhan87/ BR12023-6R-111	345	320
4	BR15573	BRRRI dhan87/ BR11730-6R-26	350	400
5	BR15574	BRRRI dhan87/ BR12022-6R-102	375	360
6	BR15575	BRRRI dhan87/ BR12016-6R-145	370	350
7	BR15576	IR 126952-29-6-197-6-20-B/ BR12016-6R-145	365	340
8	BR15577	IR 126952-41-58-26-4-12-5-1/ BR12023-6R-111	350	230
9	BR15578	IR 126952-41-58-26-4-12-5-1/ BR12016-6R-145	365	350
10	BR15579	IR 126952-28-55-9-9-4-2-7/ BR12023-6R-111	360	315
11	BR15580	IR 126952-28-55-9-9-4-2-7/ BR12016-6R-145	365	280
12	BR15581	IR 126953:632-AC 32-B-2-4-11-B/ BR12023-6R-111	350	320
13	BR15582	IR 126953:632-AC 32-B-2-4-11-B/ BR11730-6R-26	345	350
14	BR15583	IR 126953:632-AC 32-B-2-4-11-B/ BR12016-6R-145	340	220
15	BR15584	IR 126952-29-65-16-2-10-B/ BR12023-6R-111	345	380
16	BR15585	IR 126952-29-65-16-2-10-B/ BR11730-6R-26	340	370
17	BR15586	IR 126952-29-65-16-2-10-B/ BR12016-6R-145	360	360
18	BR15587	IR 126952-443-12-33-7-53-4-B/ BR12023-6R-111	340	360
19	BR15588	IR 126952-443-12-33-7-53-4-B/ BR11730-6R-26	330	310
20	BR15589	IR 126952-443-12-33-7-53-4-B/ BR12016-6R-145	360	320
21	BR15590	IR 126952-28-55-9-10-50-B/ BR12023-6R-111	350	330
22	BR15591	IR 126952-28-55-9-10-50-B/ BR11730-6R-26	340	340
23	BR15592	IR 126952-28-55-9-10-50-B/ BR12016-6R-145	350	370
24	BR15593	BRRRI dhan87/ BR10540-4-1-2-4-1	340	380
25	BR15594	IR 126952-28-55-9-10-50-B/ BR10540-4-1-2-4-1	345	300
Total			8,800	8,315
Grand Total			18,800	15,465

Experiment 15.4: Line Stage Testing (LST) Trial

Principal investigator: M A Kader

Co-Investigators: R R Majumder, S S Chaity and M I H Joy

Specific objectives: Selection of uniform genotypes in terms of plant height and days to maturity with key target traits.

Materials and Methods: A total of 4,243 advance breeding lines (Table 15.4a) were grown at BRRRI, Gazipur. Forty-day old seedlings were transplanted in a 2.6 m single-row plot with a spacing of 20 cm × 15 cm in the field. Fertilizers doses and management were done as experiment no. 15.1. Crop management such as weeding, irrigation etc. was done on time. Insects, diseases and other pests were controlled when necessary.

Results: In total, 398 lines were selected based on uniformity, plant height, growth duration, long slender grain type and lodging tolerance (Table 15.4a). The selection intensity of the genotypes is 9.38% (Fig. 15.4b). Trait genotyping results showed that most of the genotypes show traits high amylose, some of the lines showed insect resistance against BPH32 and Gm4 and disease resitance against xa5 gene. Most of the materials were found to have drought tolerance QTLs viz. qDTY3.2, qDTY2.1. and qDTY12.1. A few materials had high grain zinc containing traits (Fig. 7B.4c). The list of different combinations of traits in respect to the cross no. is presented inTablee 7B.4d.

Table 15.4a: List of materials for Line Stage Testing (LST) Trial, Development of Drought Tolerant Rice, T. Aman 2024-25

SN	BR No.	Parentage	No of progenies transplanted	No of plants selected
1	BR14371	BR9574-9-5-3-1-1/ HHZ23-DT16-DT1-DT1	173	3
2	BR14372	BR9574-9-5-3-1-1/ CAMPONI SML	320	3
3	BR14373	BR9574-9-5-3-1-1/ DRR dhan44	290	47
4	BR14374	BR10001-94-2-B/ CAMPONI SML	130	9
5	BR14375	BR9868-19-40-3-B/ DRR dhan44	330	38
6	BR14376	BR9868-19-40-3-B/ IR96322-34-223-B	200	7
7	BR14377	BR8442-12-1-3-1-B5/ HHZ23-DT16-DT1-DT1	250	9
8	BR14378	BR8442-12-1-3-1-B5/ IR96322-34-223-B	315	38
9	BR14379	HHZ5-DT20-DT2-DT1/ HHZ23-DT16-DT1-DT1	332	52
10	BR14380	HHZ5-DT20-DT2-DT1/ IR96322-34-223-B	385	56
11	BR14381	HHZ12-SAL2-Y3-Y2/ DRR dhan44	240	18
12	BR14382	HHZ12-SAL2-Y3-Y2/ CAMPONI SML	118	3
13	BR14383	BR8548-8-22-5-15/ DRR dhan44	235	34
14	BR14384	BR9158-19-9-6-50-2-HR1/ HHZ23-DT16-DT1-DT1	203	28
15	BR14385	BR9158-19-9-6-50-2-HR1/ CAMPONI SML	116	10
16	BR14386	BR9868-19-40-3-B/ SALKELE(2)	220	21
17	BR14387	BR8442-12-1-3-1-B5/ MOD SAIL	85	3
18	BR14388	HHZ12-SAL2-Y3-Y2/ CHANDRASAIL(2)	181	8
19	BR14389	BR9158-19-9-6-50-2-HR1/ CHANDRASAIL(2)	120	11
Total			4,243	398

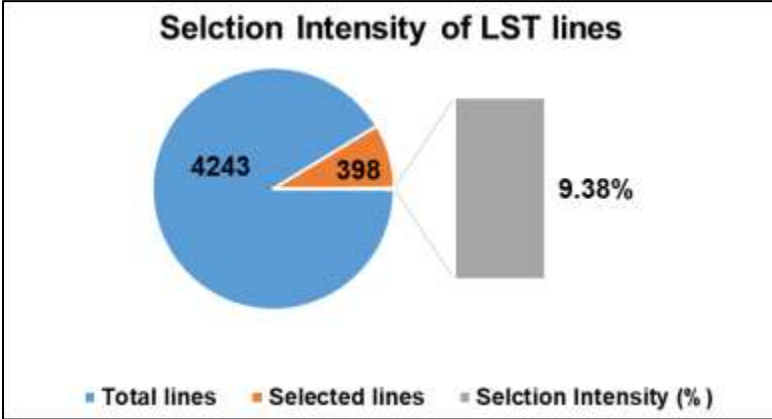


Fig. 15.4b. Selection intensity of the genotypes of LST, DTR, T. Aman 2024-25

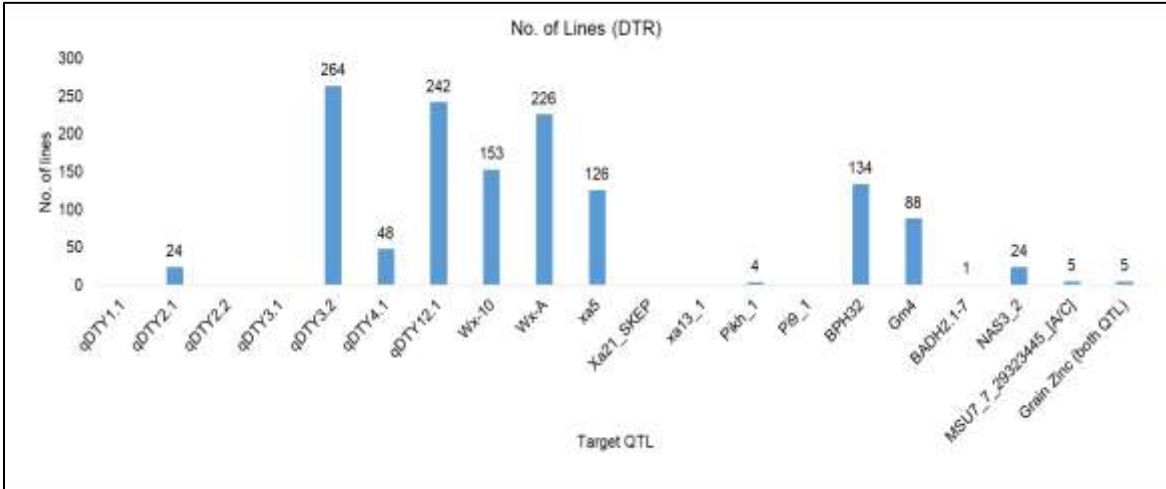


Fig. 15.4c. Trait marker profile of the genotypes of LST, DTR, T. Aman 2024-25

Table 15.4d. List of trait marker combination of the crosses of Line Stage Testing (LST) Trial, Development of Drought Tolerant Rice (DTR), T. Aman 2024-25

SN	BR Reg. No.	Cross combination	No. of lines
1	BR14371	qDTY3.2+qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+qDTY12.1+Wx-A	1
		qDTY3.2+qDTY4.1+qDTY12.1+Wx-A	1
2	BR14372	qDTY1.1+qDTY12.1+Wx-A	1
		qDTY12.1+Wx-A	1
		qDTY3.2+qDTY12.1+Wx-A+xa5	1
3	BR14373	BPH32	1
		BPH32+Gm4	1
		qDTY12.1+BPH32	5
		qDTY12.1+BPH32+Gm4	2
		qDTY12.1+Pikh_1+BPH32	1
		qDTY12.1+xa5+BPH32+Gm4	2

SN	BR Reg. No.	Cross combination	No. of lines
		qDTY3.2+qDTY12.1	1
		qDTY3.2+qDTY12.1+BPH32	7
		qDTY3.2+qDTY12.1+BPH32+Gm4	4
		qDTY3.2+qDTY12.1+Gm4	1
		qDTY3.2+qDTY12.1+Wx-A	2
		qDTY3.2+qDTY12.1+Wx-A+xa5	3
		qDTY3.2+qDTY12.1+xa5	2
		qDTY3.2+qDTY12.1+xa5+BPH32	10
		qDTY3.2+qDTY12.1+xa5+BPH32+Gm4	3
		qDTY3.2+xa5+BPH32	1
4	BR14374	Wx-A	1
		qDTY3.2+qDTY4.1+Wx-A+xa5	1
		qDTY3.2+Wx-A+Zin	1
		Wx-10+Wx-A	7
5	BR14375	qDTY1.1+qDTY3.2+qDTY4.1	1
		qDTY1.1+qDTY3.2+qDTY4.1+Wx-10+Gm4	1
		qDTY1.1+qDTY3.2+qDTY4.1+Wx-10+Wx-A+Gm4	4
		qDTY1.1+qDTY3.2+qDTY4.1+xa5+BPH32+Gm4	1
		qDTY1.1+qDTY3.2+xa5+BPH32+Gm4	3
		qDTY1.1+qDTY4.1+BPH32+Gm4	1
		qDTY1.1+qDTY4.1+qDTY12.1+BPH32+Gm4	1
		qDTY1.1+qDTY4.1+qDTY12.1+Wx-10+Wx-A+xa5+Gm4	1
		qDTY1.1+xa5+BPH32+Gm4	1
		qDTY12.1+Wx-10+Gm4	1
		qDTY12.1+xa5+BPH32+Gm4	1
		qDTY3.2+qDTY12.1+Gm4	2
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+qDTY12.1+Wx-A+BPH32	1
		qDTY3.2+qDTY4.1+qDTY12.1+Wx-10+Wx-A+xa5+Gm4	2
		qDTY3.2+qDTY4.1+qDTY12.1+Wx-A	1
		qDTY3.2+qDTY4.1+qDTY12.1+Wx-A+xa5+BPH32	1
		qDTY3.2+Wx-10+Wx-A	2
		qDTY3.2+Wx-10+Wx-A+xa5	2
		qDTY3.2+Wx-10+Wx-A+xa5+Gm4	2
		qDTY4.1+BPH32+Gm4	3
		qDTY4.1+Gm4	1
		qDTY4.1+Pikh_1+BPH32+Gm4	1
		qDTY4.1+qDTY12.1+Wx-10+Wx-A+xa5+Gm4	2
		qDTY4.1+qDTY12.1+Wx-A+xa5+BPH32+Gm4	1
6	BR14376	qDTY1.1+qDTY4.1+qDTY12.1+BPH32+Gm4	1
		qDTY1.1+qDTY4.1+Wx-10+Wx-A+Gm4	2
		qDTY1.1+qDTY4.1+Wx-10+Wx-A+xa5	1
		qDTY1.1+Wx-A+Gm4	1
		qDTY3.2+Wx-A	1
		qDTY4.1	1
7	BR14377	qDTY1.1+qDTY3.2+qDTY12.1+Wx-A	1
		qDTY12.1+Wx-10+Wx-A+Pikh_1	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	4
		qDTY3.2+qDTY12.1+Wx-A	1
		qDTY3.2+qDTY4.1+Wx-A	1
		qDTY3.2+Wx-A+BPH32+BADH2.1-7	1
8	BR14378	qDTY1.1+qDTY12.1+Wx-A	1
		qDTY1.1+qDTY4.1+Wx-A	2
		qDTY1.1+Wx-A	1
		qDTY2.1+qDTY3.2+qDTY4.1+Wx-10+Wx-A	1
		qDTY2.1+qDTY3.2+qDTY4.1+Wx-A+Zin	1
		qDTY2.1+qDTY3.2+Wx-10+Wx-A	2
		qDTY2.1+qDTY3.2+Wx-A	15
		qDTY2.1+qDTY3.2+Wx-A+Zin	3
		qDTY2.1+Wx-10+Wx-A	1
		qDTY2.1+Wx-A	1
		qDTY3.2+Wx-10+Wx-A	1
		qDTY3.2+Wx-A	6
		qDTY4.1+Wx-10+Wx-A	3
9	BR14379	qDTY12.1+Wx-10+Wx-A	20
		qDTY12.1+Wx-10+Wx-A+Pikh_1	1
		qDTY12.1+Wx-10+Wx-A+xa5	1
		qDTY12.1+Wx-10+Wx-A+xa5+Gm4	1
		qDTY12.1+Wx-A	1
		qDTY12.1+xa5+BPH32	1
		qDTY3.2+qDTY12.1+BPH32+Gm4	4
		qDTY3.2+qDTY12.1+Wx-10	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	5
		qDTY3.2+qDTY12.1+Wx-10+Wx-A+Gm4	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A+xa5	8
		qDTY3.2+qDTY12.1+Wx-10+Wx-A+xa5+Gm4	1
		qDTY3.2+qDTY12.1+Wx-A	1
		qDTY3.2+qDTY12.1+xa5+BPH32	1
		qDTY3.2+qDTY12.1+xa5+BPH32+Gm4	1
		qDTY3.2+Wx-A	2
		Wx-10+Wx-A	1
		Wx-A+xa5+BPH32+Gm4	1

SN	BR Reg. No.	Cross combination	No. of lines
10	BR14380	qDTY12.1	1
		qDTY12.1+BPH32	6
		qDTY12.1+BPH32+Gm4	4
		qDTY12.1+Wx-10+Wx-A	8
		qDTY12.1+Wx-10+Wx-A+xa5	1
		qDTY12.1+Wx-10+Wx-A+xa5+Gm4	1
		qDTY12.1+xa5+BPH32+Gm4	1
		qDTY3.2+qDTY12.1	2
		qDTY3.2+qDTY12.1+BPH32	11
		qDTY3.2+qDTY12.1+BPH32+Gm4	6
		qDTY3.2+qDTY12.1+Gm4	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	4
		qDTY3.2+qDTY12.1+Wx-10+Wx-A+xa5	2
		qDTY3.2+qDTY12.1+Wx-10+Wx-A+xa5+Gm4	6
		qDTY3.2+qDTY12.1+xa5+BPH32	1
		qDTY3.2+qDTY12.1+xa5+BPH32+Gm4	1
		qDTY3.2+Wx-10+Wx-A	1
11	BR14381	qDTY12.1+Wx-10+Wx-A+xa5	0
		qDTY12.1+xa5+BPH32	1
		qDTY3.2+qDTY12.1+BPH32	3
		qDTY3.2+qDTY12.1+BPH32	2
		qDTY3.2+qDTY12.1+BPH32+Gm4	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A+xa5	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A+xa5	3
		qDTY3.2+qDTY12.1+Wx-A	1
		qDTY3.2+qDTY12.1+xa5	1
12	BR14382	qDTY3.2+qDTY12.1+BPH32	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+xa5+BPH32	1
13	BR14383	qDTY3.2+qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+qDTY12.1+xa5+BPH32	8
		qDTY3.2+qDTY12.1+xa5+BPH32+Gm4	3
		qDTY3.2+Wx-A+xa5+Gm4	1
		qDTY3.2+xa5+BPH32	16
		qDTY3.2+xa5+BPH32+Gm4	1
		qDTY3.2+xa5+Gm4	1
		xa5	1
		xa5+BPH32+Gm4	1
14	BR14384	qDTY3.2+qDTY12.1	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	24
		qDTY3.2+qDTY12.1+Wx-A	1
		qDTY3.2+qDTY12.1+Wx-A+xa5	1
		Wx-10	1
15	BR14385	qDTY3.2+qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+qDTY12.1+Wx-A+xa5	1
		qDTY3.2+qDTY4.1+qDTY12.1+Wx-10+Wx-A	2
		qDTY3.2+qDTY4.1+Wx-10+Wx-A+	2
		qDTY3.2+Wx-A	1
		qDTY3.2+Wx-A+xa5	3
16	BR14386	qDTY1.1+qDTY3.2+qDTY4.1+Wx-10+Wx-A	1
		qDTY1.1+qDTY3.2+qDTY4.1+Wx-10+Wx-A+xa5	1
		qDTY1.1+qDTY3.2+qDTY4.1+Wx-A+xa5	1
		qDTY1.1+qDTY3.2+Wx-A+xa5	1
		qDTY1.1+qDTY3.2+Wx-A+xa5+Gm4	2
		qDTY1.1+qDTY3.2+xa5+BPH32	1
		qDTY1.1+Wx-10+Wx-A+Gm4	1
		qDTY1.1+Wx-A+xa5+Gm4	1
		qDTY3.2	1
		qDTY3.2+qDTY12.1+Wx-10+Wx-A	2
		qDTY3.2+qDTY4.1+qDTY12.1+Wx-10+Wx-A	1
		qDTY3.2+qDTY4.1+Wx-10+Wx-A+Gm4	1
		qDTY3.2+qDTY4.1+Wx-10+Wx-A+xa5	1
		qDTY3.2+qDTY4.1+Wx-A+xa5	1
		qDTY3.2+Wx-A+BPH32	3
		qDTY3.2+Wx-A+xa5	1
		Grand Total	371

Experiment 15.5: Advanced Yield Trial (AYT)

Principal investigator: M A Kader

Co-Investigators: R R Majumder, T K Hore, U R Shaha, S S Chaity and M I H Joy

Specific objective: Selection of superior lines with desired agronomic characters under natural drought.

Materials and Methods: Forty-three genotypes along with standard checks were evaluated in two AYT_s. In AYT_{#1}, 26 lines along with BRRI dhan56, BRRI dhan71 and BRRI dhan75 and

17 lines along with BRRI dhan49, BRRI dhan71 and BRRI dhan87 were evaluated in AYT#2. Thirty days old seedlings were transplanted in a 5.4 m × 4 rows at spacing of 20 cm × 15 cm in the field. The design was RCB with 3 replications in the field. Single seedling was used for transplanting. Single seedling was used for transplanting. Fertilizers and crop management were done as experiment no. 15.1.

Locations: Gazipur (Control), Rajshahi (Stress), Rangpur (Stress)

Result: Five genotypes from AYT#1 and two genotypes from AYT#2 were selected based on acceptable grain yield, uniformity of plant height, lodging tolerances, and insect and disease susceptibility (Table 15.5a). Fig. 15.5c and Fig. 15.5d shows the perch water table depth during the flowering period of the genotypes in Gazipur and Rajshahi, respectfully.

Table 15.5a: Performance of the genotypes of Advanced Yield Trial (AYT), Development of Drought Tolerant Rice, T. Aman 2024-25

SN	Designation	PH (cm)	GD (days)	Grain yield (t/ha)					Trait markers
				Gazi	Rajsh	Rang	BLUE	BLUP	
AYT#1									
1	BR13055-4R-210	121	114	5.44	5.73	2.71	4.62	5.28	Waxy_A,Waxy_10,fgr-1,qDTY1.1,qDTY3.2
2	BR13056-4R-26	123	120	5.72	5.35	5.41	5.49	5.48	Waxy_A,qDTY2.1
3	BR13057-4R-164	117	118	5.50	5.15	4.92	5.19	5.41	Waxy_A,Waxy_10,qDTY2.1,qDTY3.2,qDTY12.1
4	BR13058-4R-134	123	121	6.42	4.88	4.90	5.40	5.46	Waxy_A,xa5,qDTY1.1,qDTY3.2
5	BR13058-4R-135	124	120	7.03	5.34	4.24	5.53	5.49	
6	BR13058-4R-56	124	124		5.23	3.82	4.77	5.37	Waxy_A,Waxy_10,xa5,qDTY1.1
7	BR13058-4R-75	120	117	5.43	5.91	6.03	5.79	5.55	WaxA,xa5,qGm4(t),qDTY1.1,qDTY12.1
8	BR13059-4R-113	127	117	5.76	4.83	6.13	5.57	5.50	WaxA,Waxy_10,Pita,qDTY3.2
9	BR13059-4R-114	116	124	5.66	4.80	5.29	5.25	5.42	Waxy_A,Waxy_10,qDTY3.2,qDTY12.1
10	BR13060-4R-126*	130	120	7.27	5.37	5.22	5.95	5.58	WaxA,Pita,qGm4(t),qDTY4.1,qDTY12.1
11	BR13060-4R-65	126	119	5.81	5.18	5.93	5.64	5.51	qGm4(t),qDTY1.1,qDTY12.1
12	BR13530-4R-31*	120	119	7.19	5.35	7.07	6.54	5.72	WaxA,Waxy_10,Pita,qDTY4.1,qDTY12.1
13	BR13530-4R-35	113	113	5.55	4.08	5.49	5.04	5.38	WaxA,qGm4(t),qDTY3.2,qDTY4.1,qDTY12.1
14	BR13530-4R-39	109	112	5.65	5.63	5.22	5.50	5.48	Waxy_A,Waxy_10,qDTY3.2,qDTY4.1,qDTY12.1
15	BR13530-4R-60	131	119	6.38	4.55	3.36	4.77	5.31	Waxy_A,Waxy_10,qGm4(t),qDTY3.2,qDTY12.1
16	BR13530-4R-63	117	115	5.61	5.04	5.79	5.48	5.48	WaAWax10,qGm4(t),DTY3.2,DTY4.1,qDTY12.1
17	BR13532-4R-28	104	115	5.20	5.38	4.45	5.01	5.37	Waxy_A,BPH32,qDTY12.1
18	BR13533-4R-38	115	112	7.13	5.84	4.65	5.87	5.57	Waxy_A,Waxy_10,qDTY1.1,qDTY3.2
19	BR13534-4R-100*	122	117	6.25	6.01	5.94	6.06	5.61	Waxy_A,Waxy_10,qDTY12.1
20	BR13534-4R-104	113	115	5.39	5.18	4.62	5.06	5.38	Waxy_A,Waxy_10,qDTY12.1
21	BR13534-4R-107	113	118	6.33	6.01	3.89	5.41	5.46	Waxy_A,Waxy_10,Pita,qDTY12.1
22	BR13534-4R-13*	110	117	7.12	6.24	5.42	6.26	5.65	Waxy_A,Waxy_10,fgr-1,qDTY12.1
23	BR13534-4R-3*	118	118	6.45	5.58	6.55	6.19	5.64	Waxy_A,Waxy_10,qDTY12.1
24	BR13534-4R-41	101	114	6.24	5.64	4.78	5.55	5.49	Waxy_A,Waxy_10,fgr-1,qDTY12.1
25	BR13534-4R-76	111	114	5.41	5.63	4.65	5.23	5.42	Waxy_A,Waxy_10,fgr-1,qDTY12.1
26	BR13534-4R-92	105	116	5.31	5.85	4.63	5.26	5.43	Waxy_A,Waxy_10,qDTY12.1
27	BRRl dhan71	119	113	5.86	4.86	5.38	5.37	5.45	
28	BRRl dhan75 (Ck)	99	113	5.72	5.01	5.10	5.27	5.43	
	lsd (0.05)	4.845	1.639	0.201	0.578	0.444	0.94		
	h2b	0.903	0.974	0.977	0.639	0.943	0.226		
AYT#2									
1	BR13051-4R-24	131	125	5.91	4.87	5.94	5.57	5.44	WaxyA,Pita,qGm4(t),qDTY3.2,qDTY4.1
2	BR13051-4R-77	118	119	4.46	4.76	4.68	4.63	4.96	WaxyA,Waxy_10,BPH32,qDTY3.2
3	BR13056-4R-10	132	125	5.32	4.97	5.76	5.35	5.32	Wax_A,Waxy_10,qDTY3.2,qDTY4.1
4	BR13056-4R-35	134	125	4.60	3.20	5.46	4.42	4.85	WaxyA,Waxy_10,Pita,qDTY2.1,qDTY3.2
5	BR13056-4R-48	133	126	5.34	3.95	4.80	4.70	4.99	WaxyA,Waxy_10,qDTY2.1,qDTY4.1
6	BR13056-4R-52	130	126	4.09	5.09	5.17	4.78	5.03	WaxyA,Waxy_10,qDTY2.1,qDTY4.1
7	BR13056-4R-6	95	106	6.82	4.22	4.49	5.18	5.24	
8	BR13057-4R-123	109	130	4.43	4.69	5.78	4.97	5.13	WaxyA,qDTY2.1,qDTY4.1,qDTY12.1
9	BR13057-4R-126	117	129	4.89	5.29	6.25	5.47	5.39	WaxyA,Pita,qDTY2.1,qDTY3.2,qDTY4.1
10	BR13057-4R-15	130	131	4.84	4.48	5.04	4.78	5.04	WaxyA,qDTY3.2,qDTY4.1,qDTY12.1
11	BR13057-4R-222	106	131	4.67	5.88	5.60	5.38	5.34	WaxyAqDTY2.1,qDTY3.2,qDTY4.1,qDTY12.1
12	BR13057-4R-32	112	126	4.99	5.22	6.05	5.42	5.36	WaxA,Waxy10,qDTY2.1,qDTY3.2,qDTY12.1
13	BR13057-4R-44	120	133	5.43	4.87	6.03	5.44	5.37	Waxy_A,Pita,qDTY3.2
14	BR13059-4R-13*	113	129	5.75	6.24	6.52	6.17	5.74	Waxy_A,Waxy_10,qDTY3.2,qDTY12.1
15	BR13059-4R-18*	116	130	5.57	6.05	6.58	6.07	5.69	Waxy_A,Waxy_10,qDTY3.2
16	BR13059-4R-188	119	131	5.29	5.86	5.49	5.55	5.42	Waxy_A,Waxy_10,qDTY3.2,qDTY12.1
17	BR13530-4R-32	115	121	4.63	5.53	5.75	5.30	5.30	Waxy_A,Waxy_10,qGm4(t),qDTY12.1
18	BRRl dhan49 (Ck)	110	130	5.57	5.07	5.53	5.39	5.34	
19	BRRl dhan71 (Ck)	115	112	5.51	5.02	5.94	5.49	5.40	
20	BRRl dhan87 (Ck)	119	124	5.48	5.59	6.58	5.88	5.59	
	lsd (0.05)	19.0	9.6	0.423	0.512	0.629	0.731		
	h2b	0.8	0.9	0.892	0.884	0.677	0.507		

*Selected for further trial
AYT#1: Gaz: D/S- 05.07.24 D/T- 28.07.24, Raj: D/S- 23.07.24 D/T- 20.08.24, Rang: D/S- 05.07.24 D/T- 29.07.24
AYT#2: Gaz: D/S- 05.07.24 D/T- 29.07.24, Raj: D/S- 23.07.24 D/T- 20.08.24, Rang: D/S- 05.07.24 D/T- 29.07.24

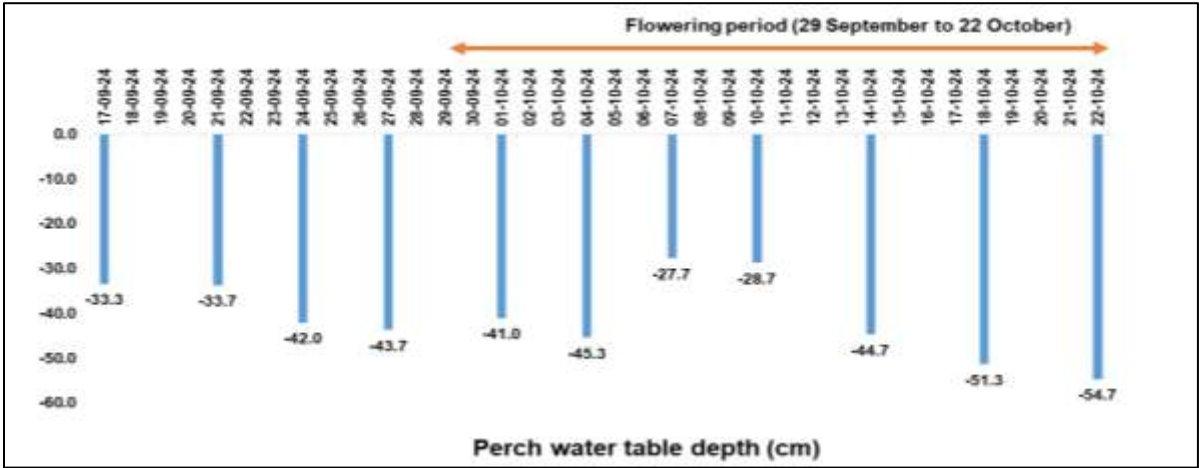


Fig. 15.5c: Perch water tale depth in the experimental field of BRRI Gazipur, T. Aman 2024-25

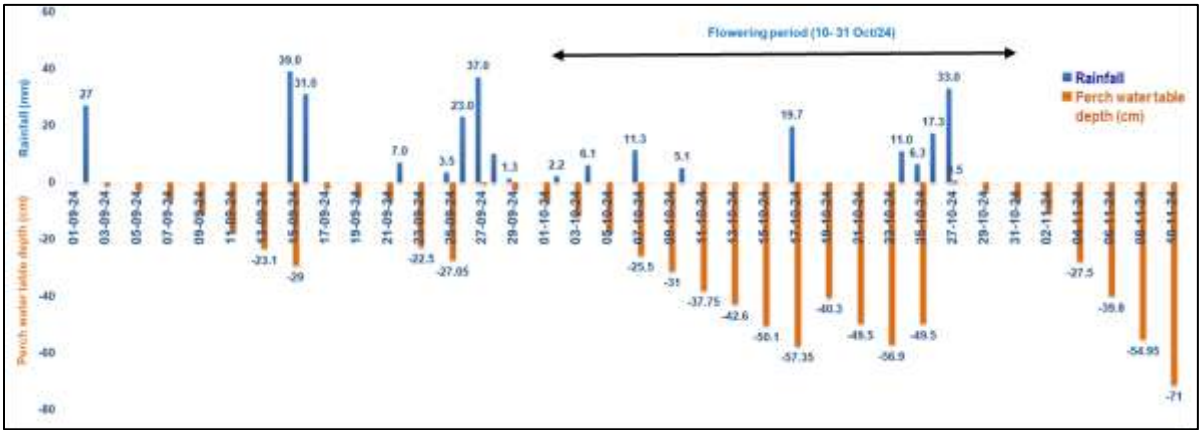


Fig. 15.5d: Perch water tale depth in the experimental field of Rajshahi, T. Aman 2024-25

Experiment 15.6: Regional Yield Trial (RYT)

Principal investigator: M A Kader

Co-Investigators: R R Majumder, T K Hore, U R Shaha, S S Chaity and M I H Joy

Specific objectives: To evaluate specific and general adaptability of the advanced breeding lines as compared with standard checks in on-station condition.

Materials and Methods: Twelve genotypes along with two standard checks were evaluated at BBRI Gazipur and eight locations of Bangladesh. Twenty-five to thirty days old seedlings were transplanted at a spacing of 20 cm × 15 cm. The plot size was 5.1 m × 12 rows. The design was RCB with two replications. Fertilizers doses and crop management was done as experiment no. 15.1.

Results: Based on grain yield in comparison to check varieties BR11788-5R-27 and BR12314-5R-180 were selected and advanced to ALART (Table 15.6a). Trait genotyping result showed BR11788-5R-27 and BR12314-5R-180 contains *Wx-A+Wx-10+qDTY3.2_1* and *Wx-A+qDTY3.2_1* genotypic combination respectively. The physico-chemical properties of different genotypes are shown in Table 15.6b. The percent yield reduction of the selected genotypes represented 41.7% and 45.7%, respectively are also shown in Table 15.6c. Genetic gain was measured for drought tolerant rice in T. Aman season from the year 2016 to 2024. Genetic trend of pBLUP (grain yield) in respect of trial year indicated an annual 84.77 kg/ha equivalent to about 2.1% increase in grain yield per year based on yield of 2016 (4.04 t/ha) (Fig 15.6d).

Table 15.6a: Performance of the genotypes of Regional Yield Trial (RYT), Development of Drought Tolerant Rice, T. Aman 2024-25

S N	Designation	PH (cm)	GD (days)	Grain yield (t/ha)								
				Gazi Raj		Goda Nach		Rang	Lalmo	Nilpha	Kush	BLUE
1	BR11788-5R-27*	123	118	6.5	5.7	5.6	6.0	5.8	5.3	5.7	6.0	5.8
2	BR11795-5R-51	120	112	5.8	4.8	4.9	2.8	5.0	4.7	5.4	4.3	4.7
3	BR12306-5R-14	117	120	5.7	5.5	4.4	4.9	5.1	5.3	5.5	5.3	5.2
4	BR12307-5R-226	124	112	5.1	4.4	4.1	4.0	4.1	4.4	4.8	4.4	4.4
5	BR12311-5R-69	122	115	6.0	4.2	5.4	5.2	3.3	4.0	4.7	3.7	4.5
6	BR12314-5R-180*	119	119	6.4	5.8	5.6	6.0	5.5	5.2	5.6	4.3	5.7
7	BR12316-5R-133	128	119	6.0	5.4	5.2	5.2	3.6	5.5	5.7	3.7	5.0
8	BR13017-4R-11	120	113	4.8	4.6	5.5	-	-	-	-	3.6	4.6
9	BR13018-4R-117	121	115	-	4.9	5.6	-	-	-	-	4.0	5.0
10	BR13018-4R-31	122	115	-	5.1	5.1	5.5	-	-	-	4.2	5.2
11	BR13023-4R-33	121	114	4.8	5.4	5.7	4.8	-	-	-	5.1	5.2
12	BR13024-4R-24	106	123	5.7	5.2	5.3	5.2	4.5	5.8	5.7	4.6	5.3
13	BRRI dhan71 (Ck)	119	114	6.1	5.0	4.7	4.7	3.3	4.7	5.8	2.7	4.6
14	BRRI dhan75 (Ck)	107	108	4.7	4.3	4.2	4.3	4.8	4.2	5.5	4.2	4.6
lsd (0.05)		5.6	5.2	0.6	0.4	0.4	0.8	0.3	0.1	0.1	0.9	0.5
h2b		0.89	0.80	0.8	0.9	0.9	0.8	1.0	1.0	1.0	0.9	0.8

Table 15.6b: Physicochemical properties of the genotypes of Regional Yield Trial (RYT), DTR, T. Aman 2024-25

Designation	Milling outturn (%)	Head rice recovery (%)	Milled rice length (mm)	Milled rice breadth (mm)	L-B ratio	Size & Shape	Amylose content (%)	Protein content (%)	ER	IR
BR11788-5R-27	68.7	61.1	6.6	2.1	3.1	LS	23.5	9.1	1.4	4.1
BR12314-5R-180	69.4	49.7	5.9	2.1	2.9	MB	23.5	9.2	1.4	4.6
BRRI dhan71 (Ck)	68.4	61.3	5.9	2.0	2.9	MB	24.3	7.0	1.5	3.0
BRRI dhan75 (Ck)	69.4	61.5	6.3	2.3	2.7	LB	20.6	9.2	1.2	3.0

Table 15.6c: Grain yield, Filled grain no., and %Sterility of 12 tested genotypes as affected by water stress at reproductive phase, T. Aman 2024-2025

SN	Designation	Grain yield (g/plant)			Filled grain no./plant		%Sterility	
		Control	Stress	% Reduction	Control	Stress	Control	Stress
1	BR10317-4R-11	27.13	9.84	63.7	1280.6	504.8	18.0	51.3
2	BR13018-4R-31	29.98	14.40	52.0	1358.5	694.5	17.5	36.1
3	BR13018-4R-117	24.60	7.40	69.9	1120.2	364.5	18.7	65.6
4	BR13023-4R-33	21.51	7.16	66.7	1129.8	365.0	18.5	40.3
5	BR11788-5R-27	28.77	16.76	41.7	1418.2	915.1	17.1	37.0
6	BR12306-5R-14	20.58	10.95	46.8	1066.3	653.3	23.0	38.8
7	BR13.24-4R-24	21.59	10.91	49.5	1091.4	624.6	23.3	59.8
8	BR12307-5R-226	21.18	10.40	50.9	1185.8	582.1	24.2	48.2
9	BR12311-5R-69	30.62	15.96	47.9	1522.5	1017.8	25.3	36.9
10	BR12314-5R-180	26.15	14.30	45.7	1358.3	1061.3	27.6	39.7
11	BR12316-5R-133	32.94	14.22	56.8	1618.6	809.6	27.7	59.1
12	BR11795-5R-51	28.19	19.51	30.8	1396.6	1063.1	29.0	45.1
13	BRRI dhan71	27.52	17.70	35.7	1337.6	988.1	22.3	34.0
14	BRRI dhan75	25.75	9.59	62.8	1325.8	509.6	28.4	63.7
15	IR64	35.17	8.72	75.2	1469.8	391.6	21.3	66.2
lsd (0.05)		5.06			229.6		10.0	
CV (%)		18.3			16.2		20.1	

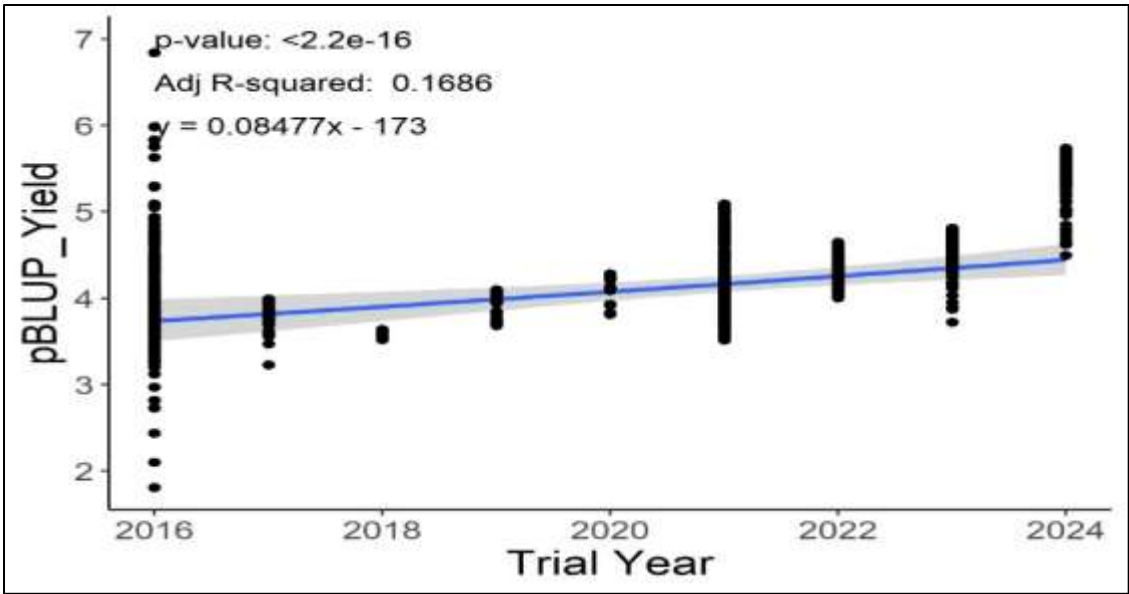


Fig 15.6d: Genetic trend of pBLUP (grain yield) in respect of trial year indicated an annual 84.77 t/ha equivalent to about 2.1% increase in grain yield per year based on yield of 2016

Experiment 15.7: Advanced Line Adaptive Research Trial (ALART)

Principal Investigator: R R Majumder

Co-Investigators: M A Kader, S S Chaity and M I H Joy

Specific objective: Evaluation of specific and general adaptability of the genotypes under on farm conditions.

Materials and Methods: In ALART, one genotype along with BRRI dhan71 as standard checks was evaluated at nine locations of Bangladesh. Thirty-five to forty days old seedlings were transplanted @ 2-3 seedlings at a spacing of 20 cm × 20 cm and the field layout will be RCB design with three replications. The plot size will be 5 m × 20 rows. Fertilizers doses and management were done same as experiment no. 15.1. Crop management such as weeding, irrigation etc. will be done in time. Insects, diseases and other pests will be controlled properly.

Results: The genotype was not recommended based on their specific and general adaptability under on-farm condition by ARD (Table 15.7).

Table 15.7: Performance of the genotypes of Advanced Line Adaptive Research Trial (ALART), DTR 2024-25

SN	Designation	PH(cm)	GD (days)	Grain yield (t/ha)									Mean
				Kushtia	Kushtia	Rajsh1	Rajsha2	Bogra1	Bogra2	Lalmon	Nilpha	Gazi	
1	BR1202-6R-111	116	114	5.84	5.35	5.2	5.97	5.76	5.44	4.64	5.95	3.59	5.3
2	BRRI dhan71 (Ck)	125	116	5.46	5.04	4.96	5.6	5.91	6.54	4.39	5.34	4.78	5.33
	lsd 0.05	1.04	0.26										0.2
	CV(%)	1.56	0.4										6.87

PROJECT 16: DEVELOPMENT OF WATER SAVING AND AEROBIC RICE VARIETIES

General Objective: Development of short-duration, water-use-efficient rice genotypes with ≥10% higher yield than check varieties under transplanted Alternate Wetting and Drying (AWD) and aerobic conditions.

Project Leader: Khandakar Md Iftekharuddaula

Experiment 16.1: Hybridization

Principal Investigator: Sharmistha Ghosal

Co-investigator: S Maniruzzaman, M M Yasmin and K M Iftekharuddaula

Specific objectives: To accumulate genes directly or indirectly responsible for water-use-efficiency in rice along with higher yield.

Materials and Methods: Twenty-six parents (Table 16.1a) were grown in the hybridization block of Plant Breeding Division in three staggers at seven-day intervals to synchronize flowering among male and female parents. Around 45 days old seedlings were transplanted in a 2.4 m × 2 rows plot with a spacing of 20 cm × 20 cm. Single seedling was used for transplanting. Fertilizers were applied at the rate of 260 kg urea, 120 kg TSP, 140 kg MoP, 80 kg gypsum and 10 kg zinc sulfate/ha. Urea was applied in three equal splits at 15, 35, and 55 days after transplanting. The fertilizers other than urea were applied as basal during final land preparation. Other cultural and pest management practices were carried out as and when necessary. Leaf samples were collected from four pre-labeled healthy plants per parent for QC genotyping with a 10-SNP panel. The plants showing unique profiles of each parent were used to make crosses. At flowering, emasculation was done on the day before anthesis using vacuum emasculator and emasculated panicles were bagged with glassine bag. Pollination was performed with just anthesized panicles of the male parent by dusting pollens on the emasculated panicle of the female parents.

Results: A total of 2,850 F₁ seeds were obtained from 29 crosses (Table 16.1b). These were recorded and labeled properly. The F₁ seeds were sun-dried and stored in a cool and dry place.

Table 16.1a: List of parents for hybridization, water saving and aerobic rice Breeding, Boro 2024-25

SL	Designation	GD(days)	Yield(t/ha)	Traits
1	BR11715-4R-186	145	7.0	WUE, High yield
2	BR11723-4R-27	145	8.4	WUE, Pita, Chalk5, Wx-A, Pi33
3	BR11723-4R-12	145	7.0	WUE, Saltol, qSES1-2_2
4	BR11712-4R-218	145	7.0	WUE, SCT, Saltol, qAG1, AG3, Xa4, Pi33, Wx-A, Wxx10, Hd1, Hd3a
5	BRRI dhan92	160	8.4	Water Use Efficient
6	BINA dhan17	118	6.8	Water Use Efficient
7	BRRI dhan102	150	8.4	High Zn
8	BR13108-4R-232	151	7.1	High Yield
9	BR13199-4R-136		6.8	High Yield
10	BR13113-4R-63	138	8.5	High Yield
11	BR11276-4R-21	160	8.1	Saltol
12	BR12502-5R-76	135	6.5	Xa7, chalk5, Wx-int, DTH8
13	BR12952-5R-55	135	6.5	Wx-A, Wx-A-NB,Gn1a
14	BR13405-5R-54	136	6.5	Wx-A, Wx-A-NB,Gn1a
15	Swarna Shomriddhi	145	6.5	Drought and submergence tolerant
16	DRR dhan60	142	6.5	Pop1, Xa5+Xa7+Xa13+Xa21
17	Potol parri	150	3.5	WUE, low input requirement
18	BR28(T)-qEMF3-late DTH	145	6.5	Early morning
19	BR28(T)-qEMF3-6	146	6.5	Early morning
20	BR13201-4R-27	145	6.5	High Yield
21	BR13201-4R-98	145	6.5	High Yield
22	BR13201-4R-186	145	6.5	High Yield
23	BR13208-4R-76	145	6.5	High Yield
24	BR13108-4R-232	145	6.5	High Yield
25	BR13122-4R-4	145	6.5	High Yield
26	BR13122-4R-14	145	6.5	High Yield
27	BR13122-4R-44	145	6.5	High Yield

Table 16.1b: List of crosses made, Water Saving Rice Breeding, Boro 2024-25

SL No	Cross Combination	F ₁ seeds	Predicted Yield(t/ha)	Traits
1	BR11723-4R-12/BR11276-4R-21	100	7.6	WUE, Saltol+qSES1-2_2
2	BR11715-4R-186/BR13113-4R-63	50	8.0	High yield, WUE
3	BR11712-4R-218/BR13199-4R-136	100	7.8	High yield, WUE
4	BR11723-4R-27/BR13108-4R-232	60	7.8	WUE, Pita+Chalk5+Wx-A+Pi33
5	BR13108-4R-232/BRRI dhan92	40	7.8	High yield, WUE
6	BR12502-5R-76/BINA dhan17	100	6.7	WUE, Xa7, chalk5, Wx-int, DTH
7	BR12952-5R-55/BINA dhan17	30	6.7	WUE, Wx-A, Wx-A-NB, Gn1a
8	BR13405-5R-54/ Swarna Shomriddhi	150	6.5	WUE, Wx-A, Wx-A-NB, Gn1a, Drought, Sub1
9	DRR dhan60/BR13405-5R-54	100	6.5	Pop1, Xa5+Xa7+Xa13+Xa21, Wx-A, Wx-A-NB, Gn1a
10	BRRI dhan92/Potol parri	180	6.0	WUE
11	BRRI dhan102/Potol parri	150	6.0	WUE, Zn
12	Swarna Shomriddhi/Potol parri	150	5.5	WUE, high yield

SL No	Cross Combination	F ₁ seeds	Predicted Yield(t/ha)	Traits
13	BR13201-4R-186/BR11723-4R-12	100	6.25	WUE, high yield
14	BR13122-4R-14/ Swarna Shomriddhi	200	6.25	WUE, high yield
15	BR13122-4R-44/BR11715-4R-186	150	6.75	WUE, high yield
16	BR13122-4R-44/BR11723-4R-27	150	6.5	WUE, high yield
17	BRRI dhan92/BR13201-4R-98	200	7.45	WUE, high yield
18	BR13122-4R-4/ Swarna Shomriddhi	70	6.0	WUE, high yield
19	BR13201-4R-27/BR28(T)-qEMF3-late DTH	60	6.3	WUE, high yield
20	BR13113-4R-63/BR28(T)-qEMF3-6	70	7.2	WUE, high yield
21	Swarna Shomriddhi/BR13208-4R-76	20	6.3	WUE, high yield
22	BR28(T)-qEMF3-6/Potol parri	60	5.5	WUE, high yield
23	BR13405-5R-54/Potol parri	90	5.8	WUE, high yield
24	BR28(T)-qEMF3-late DTH/Potol parri	200	5.5	WUE, high yield
25	BR28(T)-qEMF3-6/BR13405-5R-54	80	6.3	WUE, high yield
26	BR28(T)-qEMF3-late DTH/BR13405-5R-54	60	6.3	WUE, high yield
27	BR28(T)-qEMF3-late DTH/BR13201-4R-98	40	6.3	WUE, high yield
28	BR28(T)-qEMF3-6/BR13122-4R-44	80	6.0	WUE, high yield
29	BR28(T)-qEMF3-6/BR13122-4R-4	80	6.0	WUE, high yield
Total seed number		2850		

Experiment 16.2: Confirmation of F₁

Principal Investigator: Sharmistha Ghosal

Co-investigator: S Maniruzzaman, M M Yasmin and K M Iftekharuddaula

Specific objectives: Confirmation of the cross as true F₁s and use of the selected F₁s to produce F₂ seeds.

Materials and Methods: A total of 20 single crosses along with their respective parents were grown. F₁ seeds of each cross and their respective parents were germinated in petri dishes and then sown in earthen pots. Forty days old seedling was transplanted in 2.4 m double rows plot at 20 cm × 20 cm spacing. Fertilizer management was done at the rate of 260:100:120:110:10 kg Urea, TSP, MP, Gypsum and ZnSO₄/ha. Urea was applied in three equal splits at 15 days after transplanting (DAT), 30 DAT and 5 days before PI stage. Total amount of TSP, MP, Gypsum and ZnSO₄ were applied at final land preparation. Leaf samples were collected from each of the 12 plants from each F₁ and parents for QC genotyping to determine true F₁. QC genotyping was performed using 10 QC SNPs at Intertek, Australia. Genotyping results were analyzed using the genotyping data analytical tool Flapjack.

Results: Based on QC profile of the test F₁s, eighteen of twenty crosses were confirmed as true F₁. Seeds of these selected F₁ plants were selfed to produce F₂ seeds. At maturity, F₂ seeds of all selected plants were harvested individually, dried, cleaned and preserved in a cold room (Table 16.2).

Table 16.2: List of confirmed F₁, Water Saving Rice Breeding, Boro 2024-25

SL No	BR Number	Cross combination	Yield (t/ha)	Trait markers
1	BR16396	BRRI dhan102/BINA dhan25	8.0	
2	BR16412	IR93339129-B-7-7-B-B-B-16/BRRI dhan102	7.8	Sub1, Wx-A, AG3_1
3	BR16397	BRRI dhan102/BRRI dhan98	7.2	
4	BR16398	BRRI dhan102/BRAC dhan2	7.5	Wx-A, Wx-GBSS-ex10
5	BR16415	BR12154-5R-219-PS1/BRRI dhan102	6.8	Sub1, Wx-A, Wx-A-NB
6	BR16399	BRRI dhan98/BINA dhan25	6.8	
7	BR16400	IR93339129-B-7-7-B-B-B-16/BRRI dhan98	6.6	Sub1, Wx-A, AG3_1
8	BR16401	BINA dhan25/BRAC dhan2	7.1	
9	BR16402	IR93339129-B-7-7-B-B-B-16/BRAC dhan2	6.8	Sub1, Wx-A, AG3_1, Wx-ex10
10	BR16403	BRRI dhan98/BRAC dhan2	6.3	Wx-A, Wx-GBSS-ex10
11	BR16404	BRRI dhan102/BR11204-5R-224	7.5	AG3, Wx-A, Wx-ex10, SCT1, SCT2, SCT4, Saltol, qSES1-2_4, xa4_2
12	BR16413	IR93339129-B-7-7-B-B-B-16/BR12154-5R-219-PS1	6.1	Sub1, Wx-A, AG3_1

SL No	BR Number	Cross combination	Yield (t/ha)	Trait markers
13	BR16405	BR12154-5R-219-PS1/BRRI dhan98	5.6	Sub1, Wx-A, Wx-A-NB
14	BR16406	BINA dhan17/IR19A1473	7.3	Sub1, Wx-A, Wx-GBSS-ex10, Wx-int, GS3, Pita2, Gn1a, Xa4
15	BR16407	BINA dhan17/ BR12502-5R-76	7.3	Sub1, Wx-A, Wx-GBSS-ex10, Xa7, chalk5, Wx-int, DTH8
16	BR16408	IR16T1356/BR12502-5R-76	6.5	Wx-A, Wx-GBSS-ex10, GS3, Pita2, Gn1a, Xa4, Xa7, chalk5, Wx-int, DTH8
17	BR16409	IR16T1356/BR11692-5R-345	6.6	Wx-A, Wx-GBSS-ex10, GS3, Pita2, Gn1a, Xa4, Sub1, Wx-A-NB
18	BR16410	BR12952-5R-55/IR19A1473	6.5	Wx-A, Wx-A-NB, Gn1a, Sub1, Wx-int, GS3, Pita2, Gn1a, Xa4
19	BR16411	BR12952-5R-55/BR11692-5R-345	6.3	Wx-A, Wx-A-NB, Gn1a, Sub1
20	BR16416	BRAC dhan2/BRRI dhan98	6.3	Wx-A, Wx-GBSS-ex10

Experiment 16.3: Rapid Generation Advance (RGA)

Principal Investigator: Sharmistha Ghosal

Co-investigator: S Maniruzzaman, M M Yasmin and K M Iftekharuddaula

Specific objectives: Rapid advancement of segregating population for shortening breeding cycle and development of large RIL population.

Materials and Methods: A total of 12,231 progenies from thirty crosses comprising of 6 F₂, 26 F₃, 13 F₄ and 14 F₅ populations were grown in Boro 2024-25 season (Table 16.3). Single seed progenies from single panicle of one plant were grown in screen house and field RGA nursery. In the screen house seeds were directly sown in the tray followed by thinning and tiller pruning. Thinning, nutrient management and appropriate pest management practices were carried out as and when necessary. In field RGA, part of the panicle was sown directly on the soil. No thinning or pruning was done. Fertilizers were applied @100 kg urea, 80 kg TSP, 80 kg MoP, 50 kg gypsum and 5 kg zinc sulfate/ha. All fertilizers were applied during final land preparation. During harvesting at maturity, each panicle was collected from each plant of all the crosses at different times. Harvested seeds remaining in the panicles were dried and subjected to dormancy breaking to initiate next cycle of RGA immediately. For dormancy breaking, at first, sun-drying was done for three days followed by oven drying at 50°C temperature for 72 hours.

Results: In total 10,377 progenies comprising 1,540 F₂, 5,276 F₃, 1596 F₄ and 1965 F₅ progenies were harvested at the time of maturity and processed with proper labels and advanced through field RGA. The average recovery percentage of the RGA generations was 83% (Table 16.3).

Table 16.3: List of F₂, F₃, and F₅ populations advanced through FRGA, Water Saving Rice Breeding, Boro 2024-25

S L.	BR Number	Crosses	Progenie s grown	Progenies harvested	% recovery
F2 population					
1	BR16249	BRH11-9-11-5B-HR3-PS2/BRRI dhan108	320	300	94
2	BR16250	BRRI dhan108/BR10260-5-15-21-6B	320	280	88
3	BR16251	BR10260-5-15-21-6B/BRRI dhan108	528	420	80
4	BR16252	BR9392-6-2-1B/BRRI dhan108	360	360	100
5	BR16254	BR10260-5-15-21-6B/BRH11-9-11-5B-HR3-PS2	260	230	88
6	BR16255	BR10247-14-18-4-1B/BR9392-1-7-5B	280	240	86
Sub Total			1885	1540	82
F3 population					
1	BR15753	BR11710-5B-351/IRRI 249	200	180	90
2	BR15754	BR11710-5B-351/IR18R1120	180	145	81
3	BR15755	BR12493-5R-151/IRRI 249	120	100	83
4	BR15756	BRRI dhan101/IR19L1051	360	330	92
5	BR15757	BR11708-5B-224/IR12A173	166	160	96
6	BR15758	BR12493-5R-151/IR18R1120	210	188	90
7	BR15759	Thailand Pajam/IR19L1051	180	160	89
8	BR15761	Thailand Pajam/BR9674-8-15-3-28-P3	160	160	100
9	BR15762	BR11315-5R-17-52/Thailand Pajam	300	280	93
10	BR15763	BR10571-15-6-8-5/Thailand Pajam	250	230	92

S L.	BR Number	Crosses	Progenie s grown	Progenies harvested	% recovery
11	BR15765	BR10571-15-6-8-5/IR18R1120	260	240	92
12	BR15766	BR10571-15-6-8-5/BRH11-9-11-4-5B	200	180	90
13	BR15768	BRH11-9-11-4-5B/BR9674-8-15-3-28-P3	360	340	94
14	BR15769	BR11712-4R-227/BRR1 dhan101	188	170	90
15	BR15770	BR11712-4R-227/BR10571-15-6-8-5	400	390	98
16	BR15772	BRH11-9-11-4-5B/IR18R1120	500	448	90
17	BR15776	BRR1 dhan58(T)/IR19L1051	220	200	91
18	BR15764	BR10571-15-6-8-5/IR17A1694	300	250	83
19	BR15767	BR10571-15-6-8-5/IRRI 154	220	200	91
20	BR15774	BR11596-5R-39/BR9674-1-1-5-1-P3	200	160	80
21	BR15775	BRR1 dhan58(T)/BR9674-8-15-3-28-P3	80	80	100
22	BR15777	BRR1 dhan58(T)/BRR1 dhan28(T) qEMF 3-5	160	160	100
23	BR15778	BRR1 dhan58(T)/BRR1 dhan28(T) qEMF 3-6	200	170	85
24	BR15779	BRR1 dhan88/BRR1 dhan28(T) qEMF 3-1	200	180	90
25	BR15780	BRR1 dhan88/BRR1 dhan28(T) qEMF 3-3	180	180	100
26	BR15781	BRR1 dhan88/BRR1 dhan28(T) qEMF 3-5	180	180	100
Sub Total			5794	5276	91
F4 population					
1	BR15298	BR8899-14-4-1-2-2-1/Nania	240	210	88
2	BR15299	BRR1 dhan102/Pyree	220	200	91
3	BR15300	BR12208-5R-352-P1/BR11204-5B-224	120	97	81
4	BR15301	BRH11-9-11-4-5B/BR11949-4R-258	200	165	83
5	BR15302	BR11690-5R-98/BR11712-4R-218	200	160	80
6	BR15303	FBR-376/BR11204-5B-224	132	110	83
7	BR15304	BR11204-5B-224/BRH13-2-4-6-4B	100	80	80
8	BR15305	BR12208-5R-352-P1/Nania	320	300	94
9	BR15306	BR12208-5R-352-P2/BRR1 dhan102	200	170	85
10	BR15307	BR11716-4R-105/BR10571-15-6-8-5	220	205	93
11	BR15308	BR12208-5R-352-P1/BRR1 dhan102	100	80	80
12	BR15309	IR17A1694/FBR-376	180	155	86
13	BR15782	BRR1 dhan101/IR19A1472	200	164	82
Sub Total			2292	1596	70
F5 population					
1	BR15208	FBR-376/Chiherang Sub1-AG1-AG2	180	156	87
2	BR15209	FBR-376/BR8899-17-1-1-1-1-1	120	108	90
3	BR15210	FBR-376/BRR1 dhan92	100	80	80
4	BR15211	Nania/BRR1 dhan92	100	88	88
5	BR15213	BR11716-4R-102/BRR1 dhan92	160	150	94
5	BR15214	BR12208-5R-352/BRR1 dhan92	160	130	81
7	BR15215	BR9674-1-1-5-2-P4/BRR1 dhan92	120	110	92
8	BR15216	BR12177-5R-169/BR8899-17-1-1-1-1-1	120	120	100
9	BR15217	Fatema dhan/BRR1 dhan92	160	148	93
10	BR15219	Nariya-14/FBR-376	100	110	110
11	BR15220	BR12208-5R-352-P1/FBR-376	240	210	88
12	BR15221	BRH13-1-9-7B/FBR-376	320	320	100
13	BR15222	BRH11-9-11-45B-HR3/Ja Hua	180	145	81
14	BR15223	BR11716-4R-105/ Ja Hua	320	305	95
Subtotal			2260	1965	87
Grand Total			12,231	10,377	

Experiment 16.4: Line Stage Testing (LST)

Principal Investigator: S Ghosal

Co-investigator: S Maniruzzaman, M M Yasmin and K M Iftekharuddaula

Specific objectives: Selection of uniform genotypes in terms of uniformity in flowering, plant height, acceptable plant type, grain size-shape amylose content with key target traits especially submergence tolerant.

Materials and Methods: In total, 2,287 lines from 26 crosses were transplanted in 12-hill single-row plots using systematic arrangement with respective parents and eight check varieties. Thirty-day old single seedling was transplanted at 20 cm × 20 cm spacing. Fertilizers were applied following the rate given in experiment 16.1. Crop management was done as recommended for modern rice cultivation for T. Aman season. Weeding and other cultural operations were done on time. Leaf samples were collected from single plant of each phenotypically selected plant for genotyping with trait markers using trait-based SNP markers.

At maturity, line selection was done considering uniformity in flowering and plant height, grain size and shape, lodging tolerance and tolerance to major disease and insect over check varieties under field conditionss and presence of target major traits.

Results: The list of selected lines is given in Table 16.4a. A total of 333 lines were selected from 1,459 Lines, which were also selected from 1,884 lines based on uniformity and phenotypic acceptance of twenty-two crosses based on the key trait marker. The trait markers considered were amylose (e.g. *Wx-A*, *Wx-A-NB*, *Wx-GBSS-ex10*) and anaerobic germination (related with root vigor) (*AG3_1* & *AG3_2*). Among the genotyped lines abiotic stress (anaerobic germination) genes were present with a frequency of above 90%. Amylose contributing gene *Wx-A* was found in 85% lines, *Wx-A-NB* and *Wx-A-NB* were found in 8% and 25% line of LST populations, which indicated that medium to high amylose genes were abundant in the population. (Fig 16.1 and Table 16.4b).

Table 16.4a. List of LST Materials, Water Saving Rice Breeding, Boro 2024-25

SN	BR Number	Crosses	Progenies grown	Phenotypically selected lines	Finally selected lines
1	BR14164	BRRI dhan96/ IR15L1163	300	220	65
2	BR14165	BRRI dhan96/ IR16L1081	120	99	7
3	BR14166	BRRI dhan96/ IR16L1172	150	134	9
4	BR14167	BRRI dhan88/ IR15L1163	130	119	61
5	BR14169	BRRI dhan88/IR16L1172	50	26	6
6	BR14170	BRRI dhan92/BRRI dhan84	50	36	13
7	BR14171	BRRI dhan92/IR16L1090	52	39	10
8	BR14172	BRRI dhan92/BR11002-5R-112	75	67	8
9	BR14173	BRRI dhan92/BR8899-17-1-1-1-1-1	100	70	8
10	BR14174	BRRI dhan92/IR100740-89-B-2	89	63	5
11	BR14175	BRRI dhan92/BR11723-4R-172	85	56	2
12	BR14176	BR8899-17-1-1-1-1-1/ BR11002-5R-112	120	82	17
13	BR14177	BR8899-17-1-1-1-1-1/ IR100740-89-B-2	200	172	40
14	BR14493	BRH13-1-9-7B/Eu Muslema	120	101	35
15	BR14495	BRH11-7-17-10B/Eu Muslema	34	34	4
16	BR14496	BRH13-1-9-7B/Ja Hua	34	13	2
17	BR14497	BRH11-9-11-45B-HR3/Ja Hua	13	5	3
18	BR14498	BRH11-7-17-10B/Ja Hua	5	5	0
19	BR14500	BR11716-4R-102/Ja Hua	5	4	4
20	BR14502	BR11712-4R-227/Ja Hua	20	12	5
21	BR14504	CN6/Ja Hua	12	6	2
22	BR14505	CN6/Eu Muslema	120	96	27
Total			1,884	1,459	333

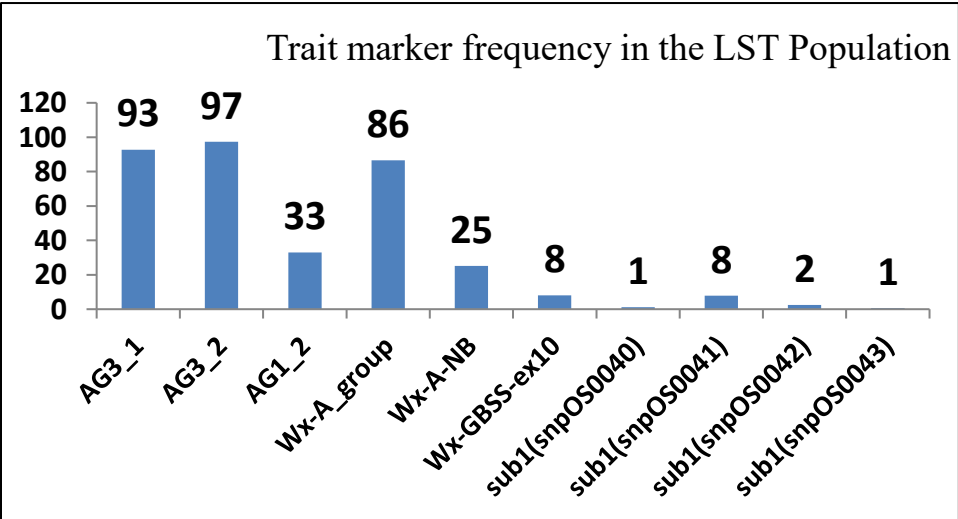


Fig. 16.1: Gene frequency (%) in LST population, Water Saving Rice, Boro 2024-25

Table. 16.4b. List of top selected line from LST population, Water Saving Rice, Boro 2024-25

SL	BR Number	PAcp	PH (cm)	GD (days)	Trait markers
1	BR14164-4R-2	3		143	Wx-A, Wx-A-NB, AG3_1, AG3_2
2	BR14164-4R-18	5	100	147	Wx-ex10, Sub1, Wx-A, AG1_2
3	BR14164-4R-19	3	105	147	Wx-A, AG3_1, AG3_2
4	BR14164-4R-20	3	102	151	AG3_1, AG3_2, AG1_2
5	BR14164-4R-134	5	106	148	Wx-A, Wx-A-NB, AG3_1, AG3_2
6	BR14164-4R-136	3	110	144	AG3_1, AG3_2
7	BR14166-4R-134	5	111	147	Wx-A, AG3_1, AG3_2
8	BR14167-4R-8	4	122	146	Wx-A, AG3_1, AG3_2, AG1_2
9	BR14167-4R-9	4	123	147	Wx-A, AG3_1, AG3_2, AG1_2
10	BR14167-4R-13	5	105	144	AG3_1, AG3_2, AG1_2
11	BR14167-4R-41	3	112	150	Wx-A, AG3_1, AG3_2
12	BR14167-4R-42	2	110	144	Wx-A, AG3_1, AG3_2, AG1_2
13	BR14167-4R-43	2	114	144	Wx-A, AG3_1, AG3_2, AG1_2
14	BR14167-4R-50	3	109	148	Wx-A, AG3_1, AG3_2, AG1_2
15	BR14167-4R-51	3	112	144	Wx-A, AG3_1, AG3_2
16	BR14167-4R-53	5	102	145	Wx-A, AG3_1, AG3_2, AG1_2
17	BR14167-4R-77	3	114	144	Wx-A, AG3_1, AG3_2
18	BR14167-4R-81	3	110	143	Wx-A, AG3_1
19	BR14167-4R-90	4		142	Wx-A, AG3_1, AG3_2, AG1_2
20	BR14167-4R-96	3	106	146	AG3_1, AG3_2, AG1_2
21	BR14167-4R-112	3	113	143	Wx-A, AG3_1, AG3_2, AG1_2
22	BR14167-4R-113	3	104	143	Wx-A, AG3_1, AG3_2
23	BR14167-4R-114	3	108	143	Wx-A, AG3_2
24	BR14167-4R-115	5	98	143	Wx-A, AG3_1, AG3_2
25	BR14167-4R-116	4	93	143	Wx-A, AG3_1, AG3_2
26	BR14171-4R-29	4	107	143	Wx-ex10, Wx-A, AG1_2
27	BR14171-4R-34	5		151	Wx-ex10, Wx-A, AG3_1, AG3_2, AG1_2
28	BR14171-4R-35	2	113	143	AG3_1, AG3_2, AG1_2
29	BR14171-4R-39	3	118	150	AG3_1, AG3_2, AG1_2
30	BR14172-4R-3	5	107	142	AG3_1, AG3_2, AG1_2
31	BR14172-4R-2	5	113	146	Wx-ex10, Wx-A, AG3_1, AG3_2
32	BR14176-4R-42	5	106	143	Wx-A, AG3_1, AG3_2
33	BR14176-4R-64	3	109	145	AG3_1, AG3_2
34	BR14176-4R-5	4	111	143	Wx-A, AG3_1, AG3_2, AG1_2
35	BR14176-4R-67	5	113	144	Wx-A, AG3_1, AG3_2, AG1_2
36	BR14176-4R-79	4	118		Wx-A, AG3_1, AG3_2, AG1_2
37	BR14176-4R-82	2	120		Wx-A, AG3_1, AG3_2, AG1_2
38	BR14176-4R-75-1	3	122		Wx-A, AG3_1, AG3_2
39	BR14176-4R-76	5			Wx-A, AG3_1, AG3_2
40	BR14177-4R-113	5	109	138	Wx-A, AG3_1, AG3_2
41	BR14177-4R-166	5	109	141	Wx-A, AG3_1, AG3_2
42	BR14177-4R-93	5	110	147	Wx-A, AG3_1, AG3_2
43	BR14177-4R-144	4	114	143	Wx-A, Wx-A-NB, AG3_1,AG3_2
44	BR14177-4R-78	5	117	147	Wx-A, AG3_1, AG3_2
45	BR14177-4R-56	4	125	143	Wx-A, Wx-A-NB, AG3_1, AG3_2
46	BR14177-4R-47	3	130	145	Wx-A, Wx-A-NB, AG3_1, AG3_2
47	BR14493-4R-42	3	106	145	Wx-A, Wx-A-NB, AG3_1,AG3_2
48	BR14493-4R-3	4	107	143	Wx-A, Wx-A-NB, AG3_1,AG3_2
49	BR14493-4R-65	3	109	150	Wx-A, Wx-A-NB, AG3_1,AG3_2
50	BR14493-4R-29	4	110	147	Wx-A, AG3_1, AG3_2
51	BR14493-4R-43	5	114	148	Wx-A, AG3_1, AG3_2, AG1_2
52	BR14493-4R-79	4	116	147	Wx-A, Wx-A-NB, AG3_1, AG3_2
53	BR14493-4R-101	4	130	144	Wx-A, Wx-A-NB, AG3_1, AG3_2
54	BR14495-4R-33	5	105		Wx-ex10, Wx-A, AG3_1, AG3_2

SL	BR Number	PACP	PH (cm)	GD (days)	Trait markers
55	BR14496-4R-13	5	114		Wx-A, AG3_2
56	BR14497-4R-4	5			Wx-GBSS-ex10, Wx-A
57	BR14497-4R-5-1	3	128		Wx-A, AG3_1, AG3_2
58	BR14497-4R-5-2				Wx-A, AG3_1, AG3_2
59	BR14497-4R-5-3				Wx-A, AG3_1, AG3_2
60	BR14497-4R-5-4				Wx-A, AG3_1, AG3_2
61	BR14500-4R-3	5	102		Wx-A
62	BR14500-4R-4	2	110		AG3_1, AG3_2, AG1_2
63	BR14500-4R-1	3	123		AG3_1, AG3_2, AG1_2
64	BR14502-4R-1	5	114		AG3_1, AG3_2
65	BR14502-4R-4	5	114		Wx-ex10, Wx-A, AG3_1, AG3_2, AG1_2
66	BR14502-4R-8	5	114		Wx-A, AG3_1, AG3_2, AG1_2
67	BR14502-4R-9	3	120		Wx-A, AG3_1, AG3_2
68	BR14504-4R-1	4	117		Wx-ex10, Wx-A, AG3_1, AG3_2, AG1_2
69	BR14505-4R-39	5	112	143	AG3_1, AG3_2, AG1_2
70	BR14505-4R-32	2	120	152	Wx-A, AG3_1, AG3_2, AG1_2
71	BR14505-4R-67	4	130		AG3_1, AG3_2, AG1_2
72	BR14505-4R-82	1			AG3_1, AG3_2, AG1_2
73	BR14505-4R-83	3			Wx-A, AG3_1, AG3_2
74	BR14505-4R-84	3			AG3_1, AG3_2, AG1_2
75	BR14505-4R-88	5			Wx-A, AG3_1, AG3_2
76	BR14505-4R-91	3			Wx-A, AG3_1, AG3_2, AG1_2
77	BR14505-4R-92	3			Wx-A, AG3_1, AG3_2, AG1_2
78	BR14505-4R-93-1	5			Wx-A, AG3_1, AG3_2, AG1_2
79	BR14505-4R-93-2				Wx-A, AG3_1, AG3_2, AG1_2
80	BR14505-4R-93-3				Wx-A, AG3_1, AG3_2, AG1_2
81	BR14505-4R-96	3	130		Wx-A, AG3_1, AG3_2

Experiment 16.6. Observational Yield Trial (OYT)

Principal Investigator: Sharmistha Ghosal

Co-investigator: S Maniruzzaman, MMYasmin and K M Iftekharuddaula

Specific objective: Selection of promising breeding lines for better phenotypic acceptability, homogeneity, adaptation under local climatic conditions and grain yield potential than the standard checks under on-station AWD condition.

Materials and Methods: In total, forty lines with two checks were evaluated (Table 16.6). Thirty-eight-day old seedlings were transplanted at a spacing of 20 × 20 cm with 2-3 seedlings per hill. The unit plot size was 5m². The field layout was augmented RCB design with two replications. Fertilizers were applied @ 300:125:150:90:10 kg/ha Urea, TSP, MoP, Gypsum and Zinc sulfate, respectively. All the fertilizers except urea were applied during final land preparation. Urea was applied in three splits at 15 and 40 days after transplanting and one week before PI. Weeding, pest control measures and other cultural practices were carried out as and when necessary. For water management, Alternate Wetting and Drying (AWD) technique was followed from one month after transplanting to flowering.

Results: A total of four, out of 40, genotypes were selected based on phenotypic acceptance, growth duration, grain quality and yield. Among all tested breeding lines, the highest yield (7.2 t/ha) was produced by the genotype BR13400-5R-16 followed by BR13399-5R-25 (7.0 t/ha) and BR13405-5R-15(6.9 t/ha). The individual heritability obtained from growth duration, plant height and grain yield were 84%, 89% and 51% respectively, indicating a high level of precision in this experiment, however, the F-test for plant height, growth duration, tiller number and PACp was non-significant (Table 16.6).

Table 16.6: Performance of the selected entries tested in Observational Yield Trial (OYT), Boro 2024-25

Ent.No	Designation	PAcp	PH (cm)	GD (days)	TN	Yield(t/ha)
20	BR13400-5R-16	5	115	143	10	7.2
11	BR13399-5R-25	5	96	144	14	7.0
34	BR13405-5R-15	5	112	143	15	6.9
7	BR13399-5R-18	5	126	141	13	6.8
41	BRRI dhan58(Ck)	7	110	130	17	6.8
42	BRRI dhan88 (Ck)	7	116	139	15	6.5
	P value	NS	NS	NS	NS	*
	LSD		3.04	5.82	1.51	0.80
	Heritability (%)		89	84	51	94

D/S: 14-12-2024

D/T: 23-01-2025

Experiment 16.7. Advanced Yield Trial (AYT)

Principal Investigator: Sharmistha Ghosal

Co-investigator: S Maniruzzaman, M M Yasmin and K M Iftekharuddaula

Specific objective: Advanced evaluation of promising breeding lines for their phenotypic acceptability, adaptation under local climatic condition and grain yield potential under on-station AWD condition.

Materials and Methods: Total nineteen genotypes with three checks were evaluated (Table 16.5) in west bayed BRRI. Forty-one days old seedlings were transplanted at a spacing of 20 × 20 cm with 2-3 seedlings per hill. The unit plot size was 5.5m². The field layout was RCB design with two replications. Fertilizers were applied @300:125:150:90:10 kg/ha Urea, TSP, MoP, Gypsum and Zinc sulfate, respectively. All the fertilizers except urea were applied during final land preparation. Urea was applied in three splits at 15 and 40 days after transplanting and one week before PI. Weeding, pest control measures and other cultural practices were carried out as and when necessary. Fot water management Alternate Wetting and Drying (AWD) technique was followed from one month after transplanting to flowering.

Results: Out of 19 genotypes, ten promising entries were selected based on phenotypic acceptance, growth duration, grain quality, Water use efficiency and yield. Among the selected entries, the genotype IR18R1133 gave highest yield (7.4 t/ha) with a growth duration of 145 days. The individual heritability obtained from growth duration, plant height, tiller number, PAcp and grain yield were 95%, 76%, 61%,39%, 48% and 44% respectively, indicating high level of precision in this experiment. The starred marked entries in the table showed highest Water Use efficiency in an experiment conducted by IWM division (Table 16.5).

Table 16.7: Performance of the entries in Advanced Yield Trial (AYT), Boro 2024-25

EntNo	Designation	PH (cm)	GD (days)	TN	PAcp	Yield (t/ha)	Trait markers
9	IR18R1133	117	145	10	5	7.4	Wx-A,Wx-A-NB, AG3_1,AG3_2
2	BR12837-5R-95	117	151	9	5	7.2	Wx-ex10,Wx-A,AG3_1,AG3_2
12	IR14L545 *	132	151	10	5	7	AG3_1,AG3_2
5	BR13316-5R-5	120	152	10	5	7	Wx-ex10,Wx-A,AG3_1,AG3_2
11	IR 121147-B-B-CMU 11-1-2	111	134	11	6	7	Wx-A, Wx-10, BADH2.1-7
15	IR 126968-B-23-2-1-3	119	141	13	6	6.9	AG3_1,AG3_2
17	IR93339129-B-7-7-B-B-B-16 *	124	152	10	5	6.8	Sub1,Wx-A,AG3_1, qSCT1, Saltol, qDTY1.1, qDTY2.2
20	BRRI dhan88 (Ck)	106	137	14	6	6.6	
21	BRRI dhan58 (Ck)	109	145	15	5	6.5	
	P value	**	****	NS	*	NS	
	LSD	11.4	4.9		1	0.56	
	Heritability (%)	76	95		61	48	

D/S: 14-12-2024

D/T: 23-01-2025

PROJECT 17: DEVELOPMENT OF TRANSGENIC HIGH BETA-CAROTENE RICE AND HIGH IRON & ZINC RICE (Healthier Rice)

General objectives: Ingression of *Zmpsy1* and *ApFer* gene into popular rice varieties through backcross breeding and evaluation of agronomic and product performance (carotenoids/beta-carotene as well as Iron & Zinc level) of the introgressed advanced breeding lines of BRRI dhan29-Golden Rice and High Iron and Zinc Rice (HIZR).

Project Leader: Dr. Md. Abdul Kader

Experiment 17a.1: Introgression of High Iron and Zinc (HIZR) trait into Aus, Aman and Boro varieties

Principal Investigator: M A Kader

Co-investigators: R R Majumder, T K Hore, U R Shaha, S S Chaity and M I H Joy

Specific objective: Ingression of ‘high iron and zinc gene’ into popular varieties/line BRRI dhan98 (Aus); BR11723-4R-27, BRRI dhan71, BRRI dhan87 and BRRI dhan103 (T. Aman); BR11712-4R-93, BRRI dhan81, BRRI dhan89, BRRI dhan105 and BRRI dhan107 (Boro) using marker-assisted selection (MAS) procedures.

Materials and Methods: In T. Aman 2024-25, one BC₂F₁ generation in the background of BRRI dhan87 were grown for confirmation of BC₂F₁ plants. At the same time four confirmed F₁ plants in the background of BR11712-4R-93, BRRI dhan98, BRRI dhan103 and BRRI dhan107 along with their respective recurrent parents were grown for the purpose of backcrossing. The recipient F₁ plants and recurrent plants were grown in the hybridization block of BRRI green house at five dates with an interval of seven days to synchronize flowering. Fertilizers @108 (234 kg Urea): 17.4 (87 kg TSP): 58.5 (117 kg MP): 14 (78 kg Gypsum): 4.3 (12 kg Zn SO₄) kg NPKSZn/ha were applied in the trial in T. Aman season.

In Boro 2024-25 season, three BC₁F₁ generations (BR11712-4R-93, BRRI dhan98 and BRRI dhan103 background) one BC₃F₁ generation (BRRI dhan87 background) and one F₁ confirmation of BRRI dhan105 background were grown for confirmation of the crosses. For backcrossing, three confirmed BC₂F₁ plants in the background of BR11712-4R-93, BRRI dhan98 and BRRI dhan103 along with their respective recurrent parents were grown in the hybridization block of BRRI green house at five dates with an interval of seven days to synchronize flowering. Fertilizers @ 138 (300 kg Urea): 20 (100 kg TSP): 83 (165 kg MP): 20 (112 kg Gypsum): 4 (11 kg Zn SO₄) kg/ha NPKSZn were applied in the trial. In both the seasons, all amounts of P, K, S and Zn were applied at the time of final land preparation and nitrogen were applied at three equal splits at 5-10, 20-25 and 35-40 days after transplanting (DAT). At flowering, emasculation was done on the day before anthesis using vacuum emasculator and emasculated panicles were bagged with glassine bag. Pollination was performed with just anthesis panicles of the donor parent by dusting pollens on the emasculated panicle of the recipient parent.

Results: In T. Aman 2024-25 season, leaf samples of BC₂F₁ plants were collected for identification of progenies which confirmed eleven hemizygous plants (H type) from the backcross in the background of BRRI dhan87 (Table 17a.1a). Four BC₁F₁’s were made with a view to develop high iron and zinc rice in the background of BR11712-4R-93, BRRI dhan98, BRRI dhan103 and BRRI dhan107 along with one BC₃F₁ which produced 137 seeds (Table 17a.1b). The Gel picture confirms the BC₂F₁ plants for zygosity detection of high iron and zinc gene in the background of BRRI dhan87 (Fig. 17a.1).

In Boro 2024-25, leaf samples of three BC₁F₁ generation (BR11712-4R-93, BRRI dhan98 and BRRI dhan103 background) one BC₃F₁ generation (BRRI dhan87 background) and one F₁ confirmation of BRRI dhan105 background were collected for identification of progenies which confirmed in total ten fixed lines (B type) and 34 hemizygous plants (H type) from the backcross (Table 17a.1c). Three BC₂F₁’s were made with a view to develop high iron and zinc rice in the background of BR11712-4R-93, BRRI dhan98 and BRRI dhan103 which produced 688 seeds

(Table 17a.1d). The Gel picture confirms the BC₃F₁ plants for zygoty detection of high iron and zinc genes in the background of BRRI dhan87 (Fig. 17a.2).

Table 17a.1a: Backcross confirmation and list of identified progenies, High Iron and Zinc Rice (HIZR), Healthier Rice, T. Aman 2024-25

S	BR No.	Parentage	No. of B type (fixed lines)	No. of H type (hemizygous)
BC ₂ F ₁ generation				
1	BR16935	BRRI dhan87*3/ IR 135160 TR-3-B-19	-	11
Total			-	11

Table 17a.1b: List of backcrosses, High Iron and Zinc rice (HIZR), Healthier Rice, T. Aman 2024-25

SN	Parentage	No of seeds harvested
1	BR11712-4R-93*2/ IR 135160 TR-3-B-19	30
2	BRRI dhan98*2/ IR 135160 TR-3-B-19	30
3	BRRI dhan103*2/ IR 135160 TR-3-B-19	12
4	BRRI dhan107*2/ IR 135160 TR-3-B-19	15
5	BRRI dhan87*4/ IR 135160 TR-3-B-19	50
Total		137

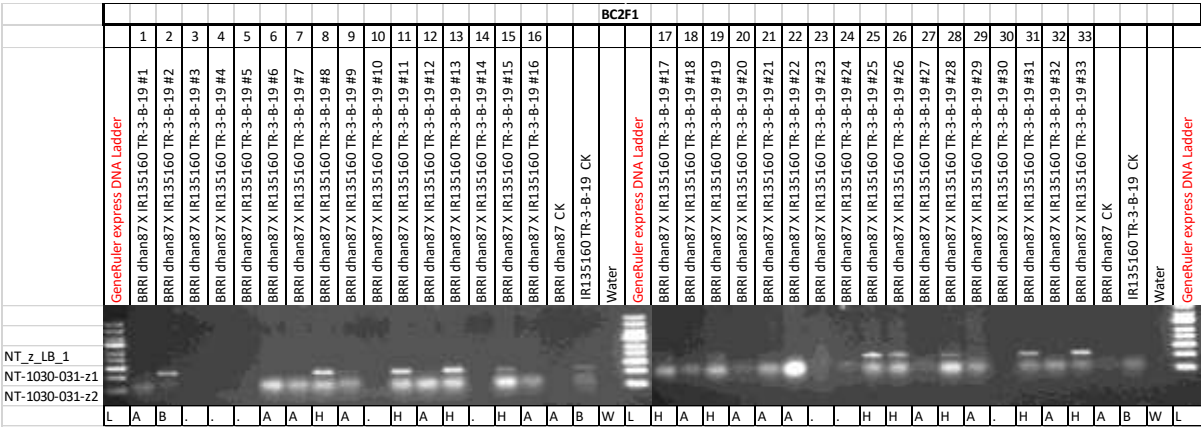


Fig. 17a.1: Gel picture showing the BC₂F₁ plants for zygoty detection of high iron and zinc gene in the background of BRRI dhan87

Table 17a.1c: F₁ confirmation and list of identified progenies from backcross, High Iron and Zinc Rice (HIZR), Healthier Rice, Boro 2024-25

SN	BR Reg. No.	Parentage	No. of B type (fixed lines)	No. of H type (hemizygous) identified
BC ₁ F ₁ generation				
1	BR16928	BR11712-4R-93*2/ IR 135160 TR-3-B-19	-	6
2	BR16929	BRRI dhan98*2/ IR 135160 TR-3-B-19	2	5
3	BR16930	BRRI dhan103*2/ IR 135160 TR-3-B-19	-	2
BC ₃ F ₁ generation				
1	BR17272	BRRI dhan87*4/ IR 135160 TR-3-B-19	8	11
F ₁ confirmation				
1	BR16633	BRRI dhan105/ IR 135160 TR-3-B-19	-	10
Total			10	34

Table 17a.1d: List of backcrosses, High Iron and Zinc Rice (HIZR), Healthier Rice, Boro 2024-25

SN	Parentage	No. of seeds harvested
1	BR11712-4R-93*3/ IR 135160 TR-3-B-19	57
2	BRRI dhan98*3/ IR 135160 TR-3-B-19	129
3	BRRI dhan103*3/ IR 135160 TR-3-B-19	502
Total		688

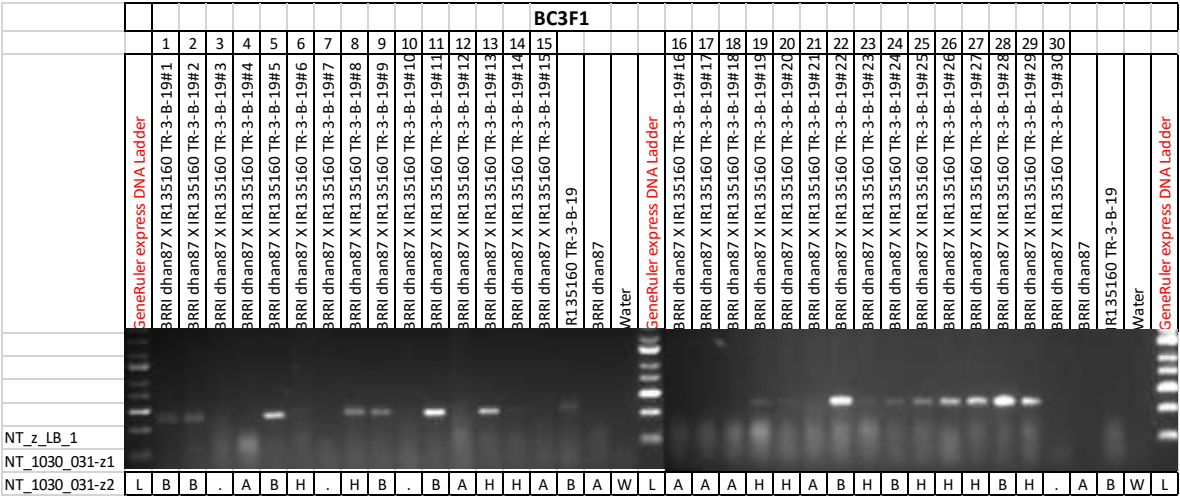


Fig. 17a.2: Gel picture of BC₃F₁ plants of high iron and zinc gene in the background of BRRI dhan87, Healthier Rice, Boro 2024-25

Experiment 17a.2: Seed multiplication of materials of confined Field Trial (CFT), High Iron and Zinc Rice (HIZR), Healthier Rice, Boro 2024-25

Principal Investigator: M A Kader

Co-investigators: R R Majumder, T K Hore, U R Shaha, S S Chaity and M I H Joy

Specific objective: Seed multiplication and preservation of seeds of CFT for varietal evaluation

Materials and Methods: In T. Aman 2024-25, eleven advanced breeding lines in the background of BRRI dhan28 containing high iron and zinc rice events (event IRS1030-031, IRS1030-039 and IRS1027-059) were grown in a 5.4 m × 4 rows plot at a spacing of 20 cm × 20 m with a view to multiplication of seeds. Fertilizers and crop management were done as per experiment 17a.1.

Results: In T. Aman 2024-25 season, the CFT evaluation of the eleven materials were completed in the season of Boro 2021-22. The seeds of CFT with the high iron and zinc gene were stored for future varietal evaluation trial as and when necessary (Table 17a.2).

Table 17a.2: Seed multiplication of materials, High Iron and Zinc Rice (HIZR), Healthier Rice, Boro 2024-25

SN	Event	Designation	Amount of seed (kg)
1	IRS1030-039	IR 135161 TR-4-B-35	3.72
2		IR 135161 TR-4-B-23	3.25
3		IR 135161 TR-4-B-2	3.50
4		IR 135161 TR-4-B-6	3.19
5		IR 135161 TR-4-B-4	3.89
6	IRS1030-031	IR 135160 TR-3-B-19	3.75
7		IR 135160 TR-3-B-14	3.12
8	IRS1027-059	IR 133904 TR-B-B 2-B-25	3.79
9		IR 133904 TR-B-B 3-B-17	3.92
10		IR 133904 TR-B-B 3-B-28	3.34
11		IR 133904 TR-B-B 1-B-3	3.66
12	BRRI dhan28 (Ck)	BRRI dhan28 (Ck)	4.00

Experiment 17b.1: Seed multiplication of materials of golden rice, Golden Rice (GR), Healthier Rice, T. Aman and Boro 2024-25

Principal Investigator: M A Kader

Co-investigators: R R Majumder, T K Hore, U R Shaha, S S Chaity and M I H Joy

Specific objective: Seed multiplication and preservation of seeds of Contained Trial (CT) and Confined Field Treial (CFT) for varietal evaluation

Materials and Methods: In T. Aman 2024-25, 54 advance breeding lines of CT in the background of BRRI dhan71 and BRRI dhan87 were grown in the transgenic net house of

BRRI at a 5.4 m × 2 rows plot at a spacing of 20 cm × 20 m with a view to multiplication of seeds. Seed multiplication of CFT was done in the CFT site of BRRI. Twelve advance breeding lines in the background of BRRI dhan49 and BRRI dhan62 containing GR2E gene (Golden Rice) were grown in a 5.4 m × 4 rows plot at a spacing of 20 cm × 20 m.

In Boro 2024-25 season, 85 advance breeding lines of GR2E gene in the background of BRRI dhan71 and BRRI dhan87 were grown in the transgenic net house of BRRI at a 5.4 m × 2 rows plot at a spacing of 20 cm × 20 m for multiplication of seeds. Seed multiplication of CFT of golden rice was done in the CFT site of BRRI. Ten advanced breeding lines in the background of BRRI dhan28 including the purelines of GR2E golden rice were grown in a 5.4 m × 4 rows plot at a spacing of 20 cm × 20 m.

Fertilizers @108 (234 kg Urea): 17.4 (87 kg TSP): 58.5 (117 kg MP): 14 (78 kg Gypsum): 4.3 (12 kg Zn SO₄) kg NPKSZn/ha were applied in the trial in T. Aman season. In Boro 2024-25 season fertilizers @ 138 (300 kg Urea): 20 (100 kg TSP): 83 (165 kg MP): 20 (112 kg Gypsum): 4 (11 kg Zn SO₄) kg/ha NPKSZn were applied in the trial. In both the seasons, all amounts of P, K, S and Zn were applied at the time of final land preparation and nitrogen were applied at three equal splits at 5-10, 20-25 and 35-40 days after transplanting (DAT).

Results: Lines derived from GR2E transformation events were developed at BRRI. GR2E genes are introgressed into BRRI dhan48, BRRI dhan67, BRRI dhan71, BRRI dhan84, BRRI dhan87 and BRRI dhan89 through MAS method. The 54 lines with BRRI dhan71 and BRRI dhan87 are multiplied to conduct CT in T. Aman 2024-25 season (Table 17b.1a). In Boro 2024-25 season, 85 lines with BRRI dhan67, BRRI dhan84 and BRRI dhan89 are multiplied to conduct CT (Table 17b.1b). The seeds of CFT with the high GR2E gene will be stored for future varietal evaluation trial as and when necessary (Table 17b.1c and Table 17b.1d). The CT and CFT are waiting to conduct upon the permission of Ministry of Environment, Forest and Climate Change (MoEF). Seed increase of BRRI dhan29 Golden rice was done in Boro 2024-25 season. The application was done in 2017 for the release of the variety but still awaiting for the permission of MoEF.

Table 17b.1a: List of seed increase of breeding materials for Contained Trial (CT), Golden Rice, Healthier Rice, T. Aman 2024-25

SN	Transgenic event	Designation	Background	Generation	Amount of seeds (g)
1	GR2E (Golden rice)	BR14670-GR2E:10-2	cv. BRRI dhan71	BC ₃ F ₅	456
2	GR2E (Golden rice)	BR14670-GR2E:10-3	cv. BRRI dhan71	BC ₃ F ₅	578
3	GR2E (Golden rice)	BR14670-GR2E:11-3	cv. BRRI dhan71	BC ₃ F ₅	498
4	GR2E (Golden rice)	BR14670-GR2E:12-2	cv. BRRI dhan71	BC ₃ F ₅	512
5	GR2E (Golden rice)	BR14670-GR2E:34-2	cv. BRRI dhan71	BC ₃ F ₅	489
6	GR2E (Golden rice)	BR14670-GR2E:35-1	cv. BRRI dhan71	BC ₃ F ₅	569
7	GR2E (Golden rice)	BR14670-GR2E:35-3	cv. BRRI dhan71	BC ₃ F ₅	574
8	GR2E (Golden rice)	BR14670-GR2E:36-1	cv. BRRI dhan71	BC ₃ F ₅	486
9	GR2E (Golden rice)	BR14670-GR2E:38-2	cv. BRRI dhan71	BC ₃ F ₅	551
10	GR2E (Golden rice)	BR14670-GR2E:38-3	cv. BRRI dhan71	BC ₃ F ₅	499
11	GR2E (Golden rice)	BR14670-GR2E:39-1	cv. BRRI dhan71	BC ₃ F ₅	587
12	GR2E (Golden rice)	BR14670-GR2E:46-1	cv. BRRI dhan71	BC ₃ F ₅	480
13	GR2E (Golden rice)	BR14670-GR2E:51-1	cv. BRRI dhan71	BC ₃ F ₅	558
14	GR2E (Golden rice)	BR14670-GR2E:54-1	cv. BRRI dhan71	BC ₃ F ₅	590
15	GR2E (Golden rice)	BR14670-GR2E:55-1	cv. BRRI dhan71	BC ₃ F ₅	470
16	GR2E (Golden rice)	BR14670-GR2E:70-2	cv. BRRI dhan71	BC ₃ F ₅	469
17	GR2E (Golden rice)	BR14670-GR2E:72-1	cv. BRRI dhan71	BC ₃ F ₅	586
18	GR2E (Golden rice)	BR14670-GR2E:83-1	cv. BRRI dhan71	BC ₃ F ₅	456
19	GR2E (Golden rice)	BR14670-GR2E:83-3	cv. BRRI dhan71	BC ₃ F ₅	564
20	GR2E (Golden rice)	BR14672-GR2E:1-3	cv. BR dhan87	BC ₃ F ₅	576
21	GR2E (Golden rice)	BR14672-GR2E:3-3	cv. BR dhan87	BC ₃ F ₅	482
22	GR2E (Golden rice)	BR14672-GR2E:5-1	cv. BR dhan87	BC ₃ F ₅	587
23	GR2E (Golden rice)	BR14672-GR2E:6-2	cv. BR dhan87	BC ₃ F ₅	555
24	GR2E (Golden rice)	BR14672-GR2E:7-3	cv. BR dhan87	BC ₃ F ₅	484
25	GR2E (Golden rice)	BR14672-GR2E:8-1	cv. BR dhan87	BC ₃ F ₅	586
26	GR2E (Golden rice)	BR14672-GR2E:8-3	cv. BR dhan87	BC ₃ F ₅	534
27	GR2E (Golden rice)	BR14672-GR2E:9-1	cv. BR dhan87	BC ₃ F ₅	493
28	GR2E (Golden rice)	BR14672-GR2E:9-2	cv. BR dhan87	BC ₃ F ₅	527
29	GR2E (Golden rice)	BR14672-GR2E:9-3	cv. BR dhan87	BC ₃ F ₅	439
30	GR2E (Golden rice)	BR14672-GR2E:10-2	cv. BR dhan87	BC ₃ F ₅	581

31	GR2E (Golden rice)	BR14672-GR2E:10-3	cv. BR dhan87	BC ₃ F ₅	576
32	GR2E (Golden rice)	BR14672-GR2E:12-1	cv. BR dhan87	BC ₃ F ₅	492
33	GR2E (Golden rice)	BR14672-GR2E:14-2	cv. BR dhan87	BC ₃ F ₅	463
34	GR2E (Golden rice)	BR14672-GR2E:20-1	cv. BR dhan87	BC ₃ F ₅	546
35	GR2E (Golden rice)	BR14672-GR2E:23-2	cv. BR dhan87	BC ₃ F ₅	498
36	GR2E (Golden rice)	BR14672-GR2E:26-3	cv. BR dhan87	BC ₃ F ₅	582
37	GR2E (Golden rice)	BR14672-GR2E:28-3	cv. BR dhan87	BC ₃ F ₅	419
38	GR2E (Golden rice)	BR14672-GR2E:31-1	cv. BR dhan87	BC ₃ F ₅	583
39	GR2E (Golden rice)	BR14672-GR2E:32-1	cv. BR dhan87	BC ₃ F ₅	446
40	GR2E (Golden rice)	BR14672-GR2E:32-3	cv. BR dhan87	BC ₃ F ₅	561
41	GR2E (Golden rice)	BR14672-GR2E:35-2	cv. BR dhan87	BC ₃ F ₅	429
42	GR2E (Golden rice)	BR14672-GR2E:36-1	cv. BR dhan87	BC ₃ F ₅	598
43	GR2E (Golden rice)	BR14672-GR2E:39-1	cv. BR dhan87	BC ₃ F ₅	512
44	GR2E (Golden rice)	BR14672-GR2E:40-2	cv. BR dhan87	BC ₃ F ₅	560
45	GR2E (Golden rice)	BR14672-GR2E:40-3	cv. BR dhan87	BC ₃ F ₅	444
46	GR2E (Golden rice)	BR14672-GR2E:47-3	cv. BR dhan87	BC ₃ F ₅	486
47	GR2E (Golden rice)	BR14672-GR2E:48-1	cv. BR dhan87	BC ₃ F ₅	473
48	GR2E (Golden rice)	BR14672-GR2E:48-2	cv. BR dhan87	BC ₃ F ₅	583
49	GR2E (Golden rice)	BR14672-GR2E:49-2	cv. BR dhan87	BC ₃ F ₅	434
50	GR2E (Golden rice)	BR14672-GR2E:54-3	cv. BR dhan87	BC ₃ F ₅	561
51	GR2E (Golden rice)	BR14672-GR2E:55-2	cv. BR dhan87	BC ₃ F ₅	426
52	GR2E (Golden rice)	BR14672-GR2E:57-2	cv. BR dhan87	BC ₃ F ₅	558
53	GR2E (Golden rice)	BR14672-GR2E:59-2	cv. BR dhan87	BC ₃ F ₅	494
54	GR2E (Golden rice)	BR14672-GR2E:59-3	cv. BR dhan87	BC ₃ F ₅	501
55	Check variety	BRRI dhan71 (Ck)			520
56	Check variety	BRRI dhan87 (Ck)			560

*line #01-19 crosses between BRRI dhan71 non-transgenic lines with GR2E BRRI dhan29 Golden Rice transgenic lines; and line #20-54 crosses between BRRI dhan87 non-transgenic lines with GR2E BRRI dhan29 Golden Rice transgenic lines

Table 17b.1b: List of seed increase of breeding materials for Contained Trial (CT), Golden Rice, Healthier Rice, Boro 2024-25

SN	Transgenic event	Designation	Background	Generation	Amount of seed (g)
1	GR2E (Golden rice)	BR14669-GR2E:1-1	cv. BRRI dhan67	BC ₃ F ₅	578
2	GR2E (Golden rice)	BR14669-GR2E:2-3	cv. BRRI dhan67	BC ₃ F ₅	786
3	GR2E (Golden rice)	BR14669-GR2E:11-3	cv. BRRI dhan67	BC ₃ F ₅	540
4	GR2E (Golden rice)	BR14669-GR2E:19-1	cv. BRRI dhan67	BC ₃ F ₅	800
5	GR2E (Golden rice)	BR14669-GR2E:27-2	cv. BRRI dhan67	BC ₃ F ₅	760
6	GR2E (Golden rice)	BR14669-GR2E:28-2	cv. BRRI dhan67	BC ₃ F ₅	655
7	GR2E (Golden rice)	BR14669-GR2E:36-1	cv. BRRI dhan67	BC ₃ F ₅	770
8	GR2E (Golden rice)	BR14669-GR2E:39-1	cv. BRRI dhan67	BC ₃ F ₅	635
9	GR2E (Golden rice)	BR14669-GR2E:40-3	cv. BRRI dhan67	BC ₃ F ₅	575
10	GR2E (Golden rice)	BR14669-GR2E:42-1	cv. BRRI dhan67	BC ₃ F ₅	765
11	GR2E (Golden rice)	BR14669-GR2E:42-3	cv. BRRI dhan67	BC ₃ F ₅	631
12	GR2E (Golden rice)	BR14669-GR2E:49-3	cv. BRRI dhan67	BC ₃ F ₅	569
13	GR2E (Golden rice)	BR14669-GR2E:50-2	cv. BRRI dhan67	BC ₃ F ₅	789
14	GR2E (Golden rice)	BR14669-GR2E:56-1	cv. BRRI dhan67	BC ₃ F ₅	754
15	GR2E (Golden rice)	BR14669-GR2E:58-3	cv. BRRI dhan67	BC ₃ F ₅	680
16	GR2E (Golden rice)	BR14669-GR2E:63-3	cv. BRRI dhan67	BC ₃ F ₅	793
17	GR2E (Golden rice)	BR14669-GR2E:65-3	cv. BRRI dhan67	BC ₃ F ₅	592
18	GR2E (Golden rice)	BR14671-GR2E:1-3	cv. BRRI dhan84	BC ₃ F ₅	516
19	GR2E (Golden rice)	BR14671-GR2E:2-2	cv. BRRI dhan84	BC ₃ F ₅	745
20	GR2E (Golden rice)	BR14671-GR2E:3-2	cv. BRRI dhan84	BC ₃ F ₅	693
21	GR2E (Golden rice)	BR14671-GR2E:4-2	cv. BRRI dhan84	BC ₃ F ₅	734
22	GR2E (Golden rice)	BR14671-GR2E:5-2	cv. BRRI dhan84	BC ₃ F ₅	660
23	GR2E (Golden rice)	BR14671-GR2E:6-1	cv. BRRI dhan84	BC ₃ F ₅	595
24	GR2E (Golden rice)	BR14671-GR2E:6-2	cv. BRRI dhan84	BC ₃ F ₅	531
25	GR2E (Golden rice)	BR14671-GR2E:7-1	cv. BRRI dhan84	BC ₃ F ₅	640
26	GR2E (Golden rice)	BR14671-GR2E:7-3	cv. BRRI dhan84	BC ₃ F ₅	725
27	GR2E (Golden rice)	BR14671-GR2E:10-1	cv. BRRI dhan84	BC ₃ F ₅	658
28	GR2E (Golden rice)	BR14671-GR2E:22-3	cv. BRRI dhan84	BC ₃ F ₅	736
29	GR2E (Golden rice)	BR14671-GR2E:23-2	cv. BRRI dhan84	BC ₃ F ₅	648
30	GR2E (Golden rice)	BR14671-GR2E:25-1	cv. BRRI dhan84	BC ₃ F ₅	776
31	GR2E (Golden rice)	BR14671-GR2E:28-3	cv. BRRI dhan84	BC ₃ F ₅	567
32	GR2E (Golden rice)	BR14671-GR2E:38-1	cv. BRRI dhan84	BC ₃ F ₅	678
33	GR2E (Golden rice)	BR14671-GR2E:38-3	cv. BRRI dhan84	BC ₃ F ₅	789
34	GR2E (Golden rice)	BR14671-GR2E:40-1	cv. BRRI dhan84	BC ₃ F ₅	876
35	GR2E (Golden rice)	BR14671-GR2E:42-2	cv. BRRI dhan84	BC ₃ F ₅	765
36	GR2E (Golden rice)	BR14671-GR2E:69-2	cv. BRRI dhan84	BC ₃ F ₅	685
37	GR2E (Golden rice)	BR14673-GR2E:4-3	cv. BRRI dhan89	BC ₃ F ₅	530

38	GR2E (Golden rice)	BR14673-GR2E:5-3	cv. BRRI dhan89	BC ₃ F ₅	658
39	GR2E (Golden rice)	BR14673-GR2E:7-1	cv. BRRI dhan89	BC ₃ F ₅	523
40	GR2E (Golden rice)	BR14673-GR2E:9-3	cv. BRRI dhan89	BC ₃ F ₅	743
41	GR2E (Golden rice)	BR14673-GR2E:10-2	cv. BRRI dhan89	BC ₃ F ₅	698
42	GR2E (Golden rice)	BR14673-GR2E:11-1	cv. BRRI dhan89	BC ₃ F ₅	730
43	GR2E (Golden rice)	BR14673-GR2E:11-3	cv. BRRI dhan89	BC ₃ F ₅	670
44	GR2E (Golden rice)	BR14673-GR2E:12-3	cv. BRRI dhan89	BC ₃ F ₅	720
45	GR2E (Golden rice)	BR14673-GR2E:13-3	cv. BRRI dhan89	BC ₃ F ₅	550
46	GR2E (Golden rice)	BR14673-GR2E:15-2	cv. BRRI dhan89	BC ₃ F ₅	690
47	GR2E (Golden rice)	BR14673-GR2E:16-3	cv. BRRI dhan89	BC ₃ F ₅	677
48	GR2E (Golden rice)	BR14673-GR2E:18-1	cv. BRRI dhan89	BC ₃ F ₅	595
49	GR2E (Golden rice)	BR14673-GR2E:19-1	cv. BRRI dhan89	BC ₃ F ₅	684
50	GR2E (Golden rice)	BR14673-GR2E:20-2	cv. BRRI dhan89	BC ₃ F ₅	758
51	GR2E (Golden rice)	BR14673-GR2E:23-3	cv. BRRI dhan89	BC ₃ F ₅	598
52	GR2E (Golden rice)	BR14673-GR2E:34-2	cv. BRRI dhan89	BC ₃ F ₅	781
53	GR2E (Golden rice)	BR14673-GR2E:35-1	cv. BRRI dhan89	BC ₃ F ₅	692
54	GR2E (Golden rice)	BR14673-GR2E:35-2	cv. BRRI dhan89	BC ₃ F ₅	676
55	GR2E (Golden rice)	BR14673-GR2E:36-3	cv. BRRI dhan89	BC ₃ F ₅	569
56	GR2E (Golden rice)	BR14673-GR2E:37-3	cv. BRRI dhan89	BC ₃ F ₅	783
57	GR2E (Golden rice)	BR14673-GR2E:38-2	cv. BRRI dhan89	BC ₃ F ₅	538
58	GR2E (Golden rice)	BR14673-GR2E:38-3	cv. BRRI dhan89	BC ₃ F ₅	682
59	GR2E (Golden rice)	BR14673-GR2E:40-1	cv. BRRI dhan89	BC ₃ F ₅	744
60	GR2E (Golden rice)	BR14673-GR2E:40-3	cv. BRRI dhan89	BC ₃ F ₅	527
61	GR2E (Golden rice)	BR14673-GR2E:45-1	cv. BRRI dhan89	BC ₃ F ₅	710
62	GR2E (Golden rice)	BR14673-GR2E:46-3	cv. BRRI dhan89	BC ₃ F ₅	669
63	GR2E (Golden rice)	BR14673-GR2E:51-3	cv. BRRI dhan89	BC ₃ F ₅	532
64	GR2E (Golden rice)	BR14673-GR2E:52-2	cv. BRRI dhan89	BC ₃ F ₅	751
65	GR2E (Golden rice)	BR14673-GR2E:53-1	cv. BRRI dhan89	BC ₃ F ₅	589
66	GR2E (Golden rice)	BR14673-GR2E:54-2	cv. BRRI dhan89	BC ₃ F ₅	749
67	GR2E (Golden rice)	BR14673-GR2E:56-1	cv. BRRI dhan89	BC ₃ F ₅	588
68	GR2E (Golden rice)	BR14673-GR2E:56-3	cv. BRRI dhan89	BC ₃ F ₅	678
69	GR2E (Golden rice)	BR14673-GR2E:57-2	cv. BRRI dhan89	BC ₃ F ₅	739
70	GR2E (Golden rice)	BR14673-GR2E:59-2	cv. BRRI dhan89	BC ₃ F ₅	645
71	GR2E (Golden rice)	BR14673-GR2E:63-1	cv. BRRI dhan89	BC ₃ F ₅	731
72	GR2E (Golden rice)	BR14673-GR2E:68-1	cv. BRRI dhan89	BC ₃ F ₅	573
73	GR2E (Golden rice)	BR14673-GR2E:69-2	cv. BRRI dhan89	BC ₃ F ₅	775
74	GR2E (Golden rice)	BR14673-GR2E:71-1	cv. BRRI dhan89	BC ₃ F ₅	543
75	GR2E (Golden rice)	BR14673-GR2E:75-3	cv. BRRI dhan89	BC ₃ F ₅	666
76	GR2E (Golden rice)	BR14673-GR2E:77-2	cv. BRRI dhan89	BC ₃ F ₅	712
77	GR2E (Golden rice)	BR14673-GR2E:77-1	cv. BRRI dhan89	BC ₃ F ₅	623
78	GR2E (Golden rice)	BR14673-GR2E:80-1	cv. BRRI dhan89	BC ₃ F ₅	534
79	GR2E (Golden rice)	BR14673-GR2E:82-2	cv. BRRI dhan89	BC ₃ F ₅	794
80	GR2E (Golden rice)	BR14673-GR2E:85-3	cv. BRRI dhan89	BC ₃ F ₅	777
81	GR2E (Golden rice)	BR14673-GR2E:86-2	cv. BRRI dhan89	BC ₃ F ₅	598
82	GR2E (Golden rice)	BR14673-GR2E:105-2	cv. BRRI dhan89	BC ₃ F ₅	672
83	GR2E (Golden rice)	BR14673-GR2E:106-3	cv. BRRI dhan89	BC ₃ F ₅	745
84	GR2E (Golden rice)	BR14673-GR2E:108-3	cv. BRRI dhan89	BC ₃ F ₅	555
85	GR2E (Golden rice)	BR14673-GR2E:109-1	cv. BRRI dhan89	BC ₃ F ₅	520
86	Check variety	BRRI dhan67 (Ck)			530
87	Check variety	BRRI dhan84 (Ck)			540
88	Check variety	BRRI dhan89 (Ck)			600

Table 17b.1c. List of materials for Confined Field Trial (CFT), Golden Rice, Healthier Rice, T. Aman 2024

SN	Designation	Background	Amount of seeds
1	BR13263-GR2E:24-1-1	GR2E BRRI dhan49 Golden rice introgression lines	1.48
2	BR13263-GR2E:36-1-1	GR2E BRRI dhan49 Golden rice introgression lines	1.71
3	BR13263-GR2E:12-1-1-3	GR2E BRRI dhan49 Golden rice introgression lines	1.68
4	BR13263-GR2E:17-1-1-3	GR2E BRRI dhan49 Golden rice introgression lines	1.72
5	BR13263-GR2E:64-1-1-3	GR2E BRRI dhan49 Golden rice introgression lines	1.52
6	BR13263-GR2E:66-1-1-3	GR2E BRRI dhan49 Golden rice introgression lines	1.68
7	BR13263-GR2E:85-1-1-3	GR2E BRRI dhan49 Golden rice introgression lines	1.57
8	BR13265-GR2E:10-1-1	GR2E BRRI dhan62 Golden rice introgression lines	1.65
9	BR13265-GR2E:32-1-1-3	GR2E BRRI dhan62 Golden rice introgression lines	1.49
10	BR13265-GR2E:68-1-1-3	GR2E BRRI dhan62 Golden rice introgression lines	1.75
11	BR13265-GR2E:87-1-1-3	GR2E BRRI dhan62 Golden rice introgression lines	1.51
12	BR13265-GR2E:107-1-1-3	GR2E BRRI dhan62 Golden rice introgression lines	1.56
13	BRRI dhan49 (Ck)		1.50
14	BRRI dhan62 (Ck)		1.58

15	BRRI dhan87 (Ck)	2.0

Table 17b.1d: List of materials of Confined Field Trial (CFT), Golden Rice, Healthier Rice, Boro 2024-25

SN	Designation	Background	Amount of seeds (Kg)
1	BR13261-GR2E:18-1-1	GR2E BRRI dhan28 Golden rice introgression lines	1.98
2	BR13261-GR2E:57-1-1		1.52
3	BR13261-GR2E:73-1-1		1.67
4	BR13261-GR2E:87-1-1		1.88
5	BR13261-GR2E:28-1-1-3		1.74
6	BR13261-GR2E:33-1-1-3		1.59
7	BR13261-GR2E:38-1-1-3		1.84
8	BR13261-GR2E:87-1-1-3		1.63
9	IR 112060 GR2-E:2-7-63-2-96-B1-HR9	Pure lines of GR2E BRRI dhan29	1.93
10	IR 112060 GR2-E:2-7-63-2-96-B1-HR12		1.75
11	BRRI dhan28 (Ck)	Check variety	2.0
12	BRRI dhan29 (Ck)	Check variety	2.5
13	BRRI dhan89 (Ck)	Check variety	2.6

Table 17b.1e: Seed increase of BRRI dhan29 Golden rice, Golden Rice, Healthier Rice, Boro 2024-25

SN	Designation	Amount of seeds (Kg)
1	IR 112060 GR2-E:2-7-63-2-96	35

PROJECT 18: DEVELOPMENT OF PHOTOSENSITIVE RICE FOR CHARLAND

General objectives: Development of high-yielding (4.5-5.5 t/ha) weak, medium, and strong photosensitive rice for northern, eastern, southern, and central regions of Bangladesh

Project Leader: Mohammad Rafiqul Islam

Experiment 19.1: Hybridization

Principal Investigator: M R Islam

Co-Investigators: A Rahman, S T Tuba, S Maniruzzaman, and K M Iftekharuddaula

Specific objective: Development of progenies having strong plant type, photosensitivity, and fine grain quality.

Materials and Methods: A total of 21 advanced lines or landraces under photosensitive rice were used for crossing (Table 18.1a). Parents were grown in the hybridization block of the Plant Breeding Division at three staggers with an interval of seven days to synchronize flowering among male and female parents. Around 30-day-old seedlings were transplanted in a 5.4 m × 2 rows plot with a spacing of 25 cm × 15 cm using a single seedling/hill. Fertilizers were applied at the rate of 83 (180 kg Urea): 15 (74 kg TSP): 50 (100 kg MP): 12 (67 kg Gypsum): and 3.6 (10 kg ZnSO4) kg N, P, K, S, and Zn, respectively, per hectare. All amounts of P, K, S, and Zn were applied at the time of final land preparation, and nitrogen was applied at three equal splits at 5-10, 20-25, and 35- 40 days after transplanting (DAT). Other cultural and pest management practices were carried out as and when necessary.

Results: A total of 22 single crosses were made. F₁ seeds were harvested, dried, and preserved in a glass container with silica gel (Table 18.1b).

Table 18.1a. List of parents grown for hybridization, Development of photosensitive rice for Charland T. Aman 2024-25

SN	Designation	Yield (pBLUP)
1	BR12154-5R-219	4
2	BR10212-20-1-3	4.4
3	IR13F478-3	5.3
4	IR15F1869-P3	5.5
5	BR11694-5R-101-PS1	3.4
6	BR12489-5R-32	4.3

SN	Designation	Yield (pBLUP)
7	BR12506-5R-174	5.8
8	BR12504-5R-158	6.1
9	Gainja	3.3
10	Malshira	3
11	Pauk Birun	4.8
12	Biroi	3.2
13	BR11607-4R-192	7
14	IR13F652-1-P3	6.5
15	IR16F1097-P1	6.6
16	Jesso Balam-TAPL-2454	5.3
17	DG349-GRS (CRCIL: 425/2035)	5.5
18	BR11694-5R-101-PS1	5.4
19	BR12489-5R-32Paja	5.3
19	BR22	5
20	BR23	5.5
21	IR20:1002: IRRI154-PI9+Hd9 (N22)	

DS: 31/07/2024-08/08/2024 DT: 22/08/2024-08/09/2024

Table 18.1b. List of crosses made for Premium Quality Rice, Development of photosensitive rice for Charland T. Aman 2024-25

SN	Cross Combination	Avg. BLUP Yield (t/ha)	No. of Seeds	Objective/ trait of interest
1	Malshira/BR12966-5R-81	5.00	4	Photosensitive, water and fertilizer use efficient, good taste
2	Swarna Shomridधि/Gainja	4.56	10	DTR+Sub1, photosensitive, low water and fertilizer use efficient, taste
3	BRRI dhan49/Gainja	4.37	230	Medium Photosensitive, low water and fertilizer use efficient, taste
4	Gainja/BR11694-5R-101-PS1	4.17	122	Medium Photosensitive, low water and fertilizer use efficient, taste
5	BR12506-5R-174/Gainja	4.37	225	Medium Photosensitive, low water and fertilizer use efficient, taste
6	Gainja/IR20*1002: IRRI154+PI9+Hd9(N22)	4.57	14	Medium Photosensitive, low water & fertilizer use efficient, taste, Blast
7	BR22/Biroi	4.00	100	Strong photosensitive with good taste
8	Biroi/SV0866	4.23	2	Strong photosensitive with good taste
9	BR23/Biroi	4.27	37	Strong photosensitive, Anaerobic tillering, good taste
10	Rosoulbhog/BR22	4.00	93	Strong photosensitive with good taste
11	BR23/Rosoulbhog	4.19	100	Strong photosensitive, Anaerobic tillering, good taste
12	BR22/BRRI dhan102	6.57	32	Strong photosensitive and Zinc enriched
13	BR23/IRRI 154-fgr1	5.23	120	Strong photosensitive, Anaerobic tillering and Aroma
14	BR22/IR13F478-3	5.19	92	Strong photosensitive, Submergence tolerant, good taste
15	BR12154-5R-219/IR13F478-3	5.87	123	Strong photosensitive, Submergence tolerant
16	DG349-GRS/IR13F478-3	5.00	115	Strong photosensitive, Submergence tolerant
17	DG349-GRS/BR22	4.41	73	Strong photosensitive
18	IR13F652-1-P3/BR12154-5R-219	5.87	500	Strong photosensitive, Submergence tolerant
19	BR11694-5R-101-PS1/Naizarsail	4.46	134	Strong photosensitive, Submergence tolerant
20	BR12506-5R-174/IRRI 154-frg1	5.70	142	Strong photosensitive and Aroma
21	IR16F1243-P2/Jesso BalamTAPL2454	4.11	135	Strong photosensitive, Submergence tolerant, good taste
22	IR21LT1449/Jesso Balam-TAPL-2454	4.22	165	Strong photosensitive, Submergence tolerant, good taste
Total			2,568	

Experiment 18.2: Confirmation of F1s

Principal Investigator: M R Islam

Co-Investigators: S T Tuba, S Maniruzzaman, M M Yasmin, A Rahman, and K M Iftekharuddaula

Specific Objective: To confirm the crosses as true hybrids.

Materials and Methods: 16 crosses, along with their respective parents, were grown in the net house of the Plant Breeding Division. The F₁ seeds were seeded in the earthen pots after germination. Thirty-day-old seedlings were transplanted at a spacing of 25 cm × 15 cm along with their respective parents using a single seedling/hill in the F₁ confirmation block. Crop management was done as described in Experiment 18.1. The leaf samples were collected from each of the 12 plants from each cross and respective parents for QC genotyping to determine true F₁. QC genotyping was performed using 10 QC SNPs at Intertek, Australia. Genotyping results were analyzed using a genotyping data analytical tool called Flapjack. After confirmation, promising F₁s were selected, harvested, dried, cleaned, and preserved in the cold room.

Results: A total of 13 crosses were confirmed as the plants with heterozygous alleles at two or more SNP loci were declared as true F₁s and selected as true hybrids. Selected F₁ plants were harvested and F₂ seeds were dried and stored in cold room (Table 18.2).

Table 18.2: List of confirmed and selected F₁s as true hybrids, Development of photosensitive rice for Charland T. Aman 2024-25

SN.	BR No.	Cross Combination	Cross Type	Objective/ trait of interest
1	BR16328	BRRI dhan23/BINA dhan13	single cross	Strong photosensitive, Anaerobic tillering, aroma
2	BR16329	IBR10212-17-3-2-2/BR23	single cross	Strong photosensitive, Anaerobic tillering, Submergence tol
3	BR16330	IR13F652-1-P3/BR23	single cross	Strong photosensitive, Anaerobic tillering, Submergence
4	BR16331	BR11712-4R-218/BR23	single cross	Strong photosensitive, Anaerobic tillering, Submergence tol
5	BR16332	BR10212-10-4-1/BR23	single cross	Strong photosensitive, Anaerobic tillering, Submergence tol
6	BR16333	BR11196-5R-5/BRRI dhan54	single cross	Medium photosensitive, Salinity and Sub tol
7	BR16334	BR10212-4-3-1/BRRI dhan54	single cross	Medium photosensitive, Salinity and Sub tol
8	BR16335	IR13F652-1-P3/BRRI dhan54	single cross	Medium photosensitive, Salinity and Sub tol
9	BR16336	BR10212-10-4-1/BRRI dhan54	single cross	Medium photosensitive, Salinity and Sub tol
10	BR16337	Bashful_PM /BR11712-4R-218	single cross	Photosensitive, aroma, Submergence tolerant
11	BR16338	Bashful_PM/ BR10212-17-3-2-2	single cross	Photosensitive, aroma, Submergence tolerant
12	BR16339	Bashful_PM/ BR10212-4-3-1	single cross	Photosensitive, aroma, Submergence tolerant
13	BR16340	BR23/ Bashful_PM	single cross	Strong photosensitive, Anaerobic tillering, Aroma

DS: 20/08/2025 DT:08/09/2025

Experiment 18.3: Rapid Generation Advance (RGA)

Principal Investigator: M R Islam

Co-Investigators: S T Tuba, S Maniruzzaman, M M Yasmin, A Rahman, and K M Iftekharuddaula

Specific objective: Rapid advancement of segregating population for shortening the breeding cycle and development of a large RIL population.

Materials and Methods: A total of 10 F₂, 23 F₃, 10 F₄, and five F₅ populations were grown in the T. Aman 2024 season. Single-seed progenies from a single panicle of one plant were grown in the RGA nursery in the field. The part of the panicles was sown directly on the soil. Thinning or pruning was not done. Fertilizer management was done using half of the dosages described in Expt. 18.1. Appropriate pest management practices were carried out as and when necessary. During harvesting at maturity, one panicle was collected from each plant of all the crosses at different times, and the plant was uprooted. Harvested seeds remaining in the panicles were dried and subjected to dormancy breakage to initiate the next cycle of RGA. For dormancy breaking, at first, sun-drying was done for three days, followed by oven drying at 50°C for 72 hours.

Results: A total of 6,869 progenies from 48 crosses (2,984 progenies of 10 F₂ crosses, 2,497 progenies of 23 F₃ crosses, 1,109 progenies of 10 F₄ crosses, 279 progenies of five F₅ crosses) were harvested for further advancement at the time of maturity and preserved and processed with proper labels (Table 18.3a & b).

Table 18.3a: Summary of populations advanced through RGA, Development of photosensitive rice for Charland T. Aman 2024-25

Generation	No. of crosses	Progenies grown	Progenies harvested
F ₂	10	5,000	2,984
F ₃	23	10,320	2,497
F ₄	10	2,812	1,109
F ₅	5	700	279
Total	48	18,832	6,869

Table 18.3b: List of F₂, F₃, F₄, and F₅ populations advanced through RGA, Development of photosensitive rice for Charland T. Aman 2024-25

SN	BR No.	Parentage	Progenies grown	Progenies harvested
F ₂ Population				
1	BR15348	BRRi dhan54/ BR23	500	198
2	BR15349	Nania/BR10212-7-5-1	500	123
3	BR15350	FBR376/BR23	500	38
4	BR15351	Nania/BRRi dhan54	500	397
5	BR15352	IR99285-1-1-1-P2 (Zn)/BR22	500	341
6	BR15353	IR99285-1-1-1-P2 (Zn)/BR23	500	452
7	BR15354	Rosulbhog/FBR-376	500	66
8	BR15355	Rosulbhog/Nania	500	294
9	BR15356	BR23/ Laffa	500	467
10	BR15357	BRRi dhan87/Nizersail// BRRi dhan87	500	608
Total			5,000	2,984
F ₃ Population				
1	BR14575	BR22/Beroi (Wrong)	460	195
2	BR14576	BR22/Chinisail	460	170
3	BR14577	BR22/Chiniatop	460	120
4	BR14578	BR22/BR9130-78-1-1-4	400	95
5	BR14579	BRRi dhan87/Malshira	450	103
6	BR14580	BRRi dhan87/Gouchi	470	52
7	BR14581	BRRi dhan87/Binasail	490	50
8	BR14582	BRRi dhan87/Rosulbhog	485	110
9	BR14583	BRRi dhan87/TL Aus-Gaz8-45-6-P2-1	465	180
10	BR14584	BRRi dhan87/TL Aus-Kustia3	455	115
11	BR14585	BR9130-78-1-1-4/Rosulbhog	412	25
12	BR14586	JaHua/Gainza	425	50
13	BR14587	JaHua/Nizersail	430	35
14	BR14588	BR12180-5R-1/TL Aus-Gaz8-45-6-P2-1	475	139
15	BR14589	Fatemadhan/Laffa	430	35
16	BR14590	Fatemadhan/BR22	402	175
17	BR14591	BRH11-9-11-45B-HR3/ BR22	418	190
18	BR14592	TL Aus-Gaz10-2-40-4-P8/Gainza	426	85
19	BR14593	TL Aus-Gaz10-2-40-4-P8/BR9130-78-1-1-4	444	45
20	BR14594	BR23/ Chinisail	455	144
21	BR14595	BR23/ Chini atop	473	109
22	BR14596	BR23/ Beroi	486	130
23	BR15357	BRRi dhan87/Nizersail/ BRRi dhan87	449	145
Total			10,320	2,497
F ₄ Population				
1	BR13947	BRRi dhan87/BR22	32	15
2	BR13949	BRRi dhan87/Gainza	272	145
3	BR13950	BRRi dhan95/BR22	148	72
4	BR13951	BRRi dhan95/BR23	140	60
5	BR13952	BRRi dhan95/Gainza	580	120
6	BR13953	BRRi dhan87/Nizersail	96	72
7	BR13955	BR22/BRRi dhan54	168	75
8	BR13956	Rosulbhog/BR22	200	140
9	BR13958	BRRi dhan87/Duksail	700	250
10	BR13959	BRRi dhan87/Mele	476	160
Total			2,812	1,109
F ₅ Population				
1	BR13744	BRRi dhan71*2 /Gainza	92	60
2	BR13747	NMKP102-3-2-1-1/Beroi	195	85
3	BR13748	NMKP102-3-2-1-1/TB Gura	300	90
4	BR13749	BR8845-21-1-5-4-10-4/BR22	25	29
5	BR13750	BR8845-21-1-5-4-10-4/BR23	88	15
Total			700	279
Grand Total			18,832	6,869

DS: 29/07/2024

Experiment 18.4: Line Stage Testing (LST)

Principal Investigator: M R Islam

Co-Investigators: S T Tuba, S Maniruzzaman, M M Yasmin, A Rahman, and K M Iftekharuddaula

Specific objective: Selection of uniform genotypes in terms of uniformity in flowering, plant height, amylose content, presence or absence of aroma with good plant type, and higher predicted yield indicated by key target trait markers.

Materials and Methods: A total of 1,749 fixed advanced lines from 13 crosses were grown in 12-hill single-row plots using systematic arrangement design with respective parents and check varieties. Thirty days old single seedling was transplanted at 20 cm × 20 cm spacing. Fertilizer management was done following the dosages described in Expt. 18.1. Crop management was done as recommended for modern rice cultivation practices. Leaf samples were collected from single plant of each entry for genotyping with specific trait markers using 10 trait-based SNP markers. At maturity, line selection was done considering uniformity in flowering and plant height, grain size and shape, lodging tolerance and tolerance to major disease and insect, presence and absence of aroma with good plant type, and higher predicted yield indicated by key target trait markers.

Results: A total of 62 lines were selected from 1,749 progenies from 13 crosses (Table 18.4) based on phenotypic acceptance, uniformity in flowering, plant height, grain size and shape, lodging tolerance and tolerance to major disease and insect, presence and absence of aroma with good plant type and higher predicted yield indicated by key target trait markers.

Table 18.4: List of superior fixed lines selected from LST populations, Development of photosensitive rice for Charland T. Aman 2024-25

SL No.	BR Reg.	Cross Combination	No. of lines Grown	No. of lines Selected
1	BR12844	SP21-1-6-1/Ganza	47	4
2	BR12845	Sylhet Balam/Habudhan	53	4
3	BR12847	TL Aus-Gaz-10-2-40-5/BR22	121	7
4	BR12848	BRRI dhan49 (UNK)/Gainza	41	10
5	BR12851	SP21-1-5-4-10-4/Sylhet Balam	91	2
6	BR13326	Gainza/BRRI dhan71	140	6
7	BR13327	BR23/NMKP102-3-2-1	93	3
8	BR13328	Gainza/TB Gura	265	1
9	BR13329	Nizersail/ TL Aus Gaz-10-2-40-5	112	11
10	BR13330	TL Aus Gaz-10-45 ph1/Gainza	168	7
11	BR14568	Ja Hua/Black rice (Sylhet)*	142	2
12	BR14572	BR8882-30-2-5-2/ Black rice (Sylhet)*	306	4
13	BR14574	BRRI dhan81/ Black rice (Sylhet)*	170	1
Total			1749	62

D/S: 24/07/2024 D/T: 15/08/2024

Experiment 18.5: Preliminary Yield Trial PYT (PYT)

Principal Investigator: M R Islam

Co-Investigators: S T Tuba, S Maniruzzaman, M M Yasmin, A Rahman, and K M Iftekharuddaula

Specific objective: Preliminary yield evaluation of advanced breeding lines with strong plant type, fine grain properties, and photosensitivity.

Materials and Methods: A total of eight fixed lines along with two checks were evaluated in an RCB design with two replications. Thirty-day-old seedlings were transplanted at a spacing of 20 cm × 20 cm using single seedling/hill. The plot size was 5.6m². Fertilizers were applied as described in experiment 18.1. Crop management was carried out as and when necessary.

Results: A total of four genotypes were selected out of eight genotypes based on homogeneity in the population, phenotypic acceptance, plant type, grain type, photosensitivity, and yield. The highest yielding genotype, BR11764-5R-124, gave 4.56 t/ha yields with a duration of 130

days (Table 18.5). The yield of the selected genotypes ranged from 1.57 t/ha to 4.56 t/ha, whereas that of the growth duration was 116 days to 141 days. The heritability obtained for plant height, growth duration, and yield were 96%, 98% and 35%, respectively, indicating a high level of precision in this experiment (Table 18.5).

Table 18.5: Performance of selected genotypes in Preliminary Yield Trial PYT (PYT), Development of photosensitive rice for Charland T. Aman 2024-25

Sl No.	Designation	PH (cm)	GD (days)	PAcp (M)	Yield (t/ha)
1	BR11766-5R-10-2	116	113	7	1.57
2	BR11764-5R-45	114.5	131	7	4.5
3	BR11764-5R-90	106	139	5	3.15
4	BR11764-5R-26	113.5	132	3	4.04
5	BR11764-5R-150	114	136	3	3.5
6	BR11764-5R-124	109.5	130	3	4.56
7	BR11766-5R-2	108	113	7	2.78
8	BR11764-5R-88	106	138	3	4.48
9	BR 22	108	130	5	3.46
10	BR23	110.5	131	5	4.29
	LSD (0.05)	4.453	3.641		0.448
	H2b	0.96	0.98		0.35

DS: 31 July 2024 DT: 19 August 2024

Experiment 18.6: Advanced Yield Trial (AYT)

Principal Investigator: M R Islam

Co-Investigators: S T Tuba, S Maniruzzaman, M M Yasmin, A Rahman, and K M Iftekharuddaula

Specific objective: Advanced yield evaluation of advanced breeding lines with strong plant type, fine grain properties, and photosensitivity.

Materials and Methods: Seven genotypes along with two checks were evaluated in RCB design with two replications. Twenty-five days old seedlings were transplanted at a spacing of 20 cm × 20 cm using two to three seedlings/hill. The plot size was 6.4m². Fertilizers were applied as described in experiment 18.1. Crop management was carried out as and when necessary.

Results: A total of four genotypes were selected out of seven genotypes based on phenotypic acceptance, plant type, grain type, photosensitivity, and higher yield. The genotype TL Aus-Gaz8-45-4-18 produced significantly higher yield (4.20 t/ha) with 126 days of growth (Table 18.6). The yield of the genotypes ranged from 2.86 t/ha to 4.20 t/ha. The heritability obtained for the plant height, growth duration, and yield was 99%, 92% and 52%, respectively, indicating a high level of precision in this experiment (Table 18.6).

Table 18.6: Performance of selected genotypes in Advanced Yield Trial (AYT), Development of photosensitive rice for Charland T. Aman 2024-25

SN	Designation	PH (cm)	GD (days)	PAcp (M)	Yield (t/ha)
1	BR8845-21-1-10-3-4	118	126	5	2.86
2	BR8515-8-7-8-2	119	125	5	3.88
3	TL Aus Kushtia-3 (PR-2)	107	125	5	3.99
4	BR8845-21-1-10-3-3	111	126	3	4.18
5	TL Aus-Gaz10-40-5-11	121	127	7	3.37
6	TL Aus-Gaz8-45-4-18	120	126	7	4.2
7	BR11768-10-4-6-P2	117	139	5	3.96
8	BR22 (Ck)	113	129	5	3.2
9	BR23 (Ck)	112	127	7	3.82
	LSD (0.05)	1.39	1.41		0.798
	H2b	0.99	0.92		0.52

DS: 31 July 2024 DT: 19 August 2024

Experiment 18.7: Advanced Lines Adaptive Research Trial (ALART)

Principal Investigator: M R Islam

Co-Investigators: A Rahman, S T Tuba, S Maniruzzaman, K M Iftekharuddaula and Scientist from ARD

Specific objective: To evaluate yield potential and specific adaptability of photosensitive advanced rice lines at farmer’s field.

Materials and Methods: Two genotypes along with two checks were evaluated in RCB design with three replications across 10 locations of Bangladesh. Twenty-five days old seedlings were transplanted at a spacing of 20 cm × 20 cm using two to three seedlings/hill. The plot size was 10.00 m². Fertilizers were applied as described in experiment 18.1. Crop management was carried out as and when necessary.

Results: A total of one genotype (BR10212-5-5-3) was selected for Proposed Variety Trial (PVT, T. Aman:2025-26) based on phenotypic acceptance, plant type, grain type, photosensitivity, farmers preference and higher yield. The selected genotypes produced significantly higher yield (4.86 t/ha) with 127 days of growth (Table 18.7). The CV (%) obtained for the growth duration, plant height, and grain yield was 1.8%, 1.7% and 8.1%, respectively, indicating a high level of precision in this experiment (Table 18.7).

Table 18.7: Performance of selected genotypes in Advanced Lines Adaptive Research Trial (ALART), Development of photosensitive rice, T. Aman 2024-25

Genotype	GD (day)	PH (cm)	Location specific (G×E) grain yield (t/ha)								Mean
			L1	L2	L3	L4	L5	L6	L7	L8	
V1= BR10212-17-3-2-2	133	124	3.98	4.29	5.55	4.03	3.62	4.95	4.98	4.84	4.53
V2= BR10212-5-5-3	132	127	4.10	4.35	5.55	4.35	4.37	5.49	5.72	4.94	4.86
V3= BR22 (Ck)	135	123	3.43	4.76	5.54	5.03	4.02	5.01	5.81	4.77	4.80
V4= BR23 (Ck)	142	122	2.68	4.09	5.43	3.95	3.47	5.30	5.57	4.05	4.32
LSD (0.05)	1.4	1.65					0.61				0.22
CV	1.8	1.7					8.1				

L1= Mithapukur, Rangpur; L2= BRRI, Gazipur; L3= Godagari, Rajshahi; L4= Sadar, Bogura; L5= Bhanga, Faridpur; L6= Sadar, Kushtia; L7: Sadar, Gopalganj and L8= Bahubal, Habiganj.