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XIX: REGIONAL STATION, HABIGANJ

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Personnel (July 2022-June 2023)

Sl. no.	Name and designation	Man months
1	Partha S. Biswas, PhD post Doc, CSO and Head**	12
2	Md. Mamunur Rashid, <i>PhD</i> , PSO ⁺	06
3	Md. Abu Sayed, PhD, SSO	12
4	Avijit Biswas, MS, SO*	06
5	Most. Mahamuda Khatun, BScAg(Hons), SO	12
6	Md. Shahin Alam, MS, SO	12
7	Md. Abu Nayeem, BScAg (Hons), SO	12
8	Md Abul Hossain, Farm Manager	12
9	Abdullah, SA	12
10	Yousuf Ali, SA	12
11	Md. Feroj Kabir, SA	02

* Abroad for higher studies,

+ Transferred to BRRI Habiganj

** Transferred to BRRI HQ

SUMMARY

In B. Aman 2022 season, one RYT focused on the deep-water ecosystem, while three RYT were conducted during T. Aman 2022. A total of 12 crosses were made for the improvement of local popular cultivars during the Boro 2022-23 season. Additionally, two OYTs, fifteen RYTs, and one IIRON (Set#38) trial were carried out during Boro 2022-23.

Nine BRRI varieties were evaluated to identify suitable planting time and variety for Haor areas. BRRI dhan67 and Bangabandhu dhan100 had less spikelet sterility and higher grain yield than BRRI dhan28. Long duration varieties BRRI dhan29 BRRI dhan89 and BRRI dhan92 escaped cold stress at reproductive phase in early planting due to its longer growth duration.

Application of 140 kg N/ ha with 50 kg K/ ha had significantly higher grain yield than other combination of N and K fertilization. Result of long-term missing element trial revealed that N is the most yield limiting nutrient element followed by K in BRRI farm Habiganj.

Some 26 BRRI developed modern Boro varieties were evaluated for pre-harvest sprouting (PHS) tolerance. BRRI dhan96 was the most susceptible to PHP, with 76% germinated seed followed by BRRI dhan50 (51%) and BRRI dhan86 (36%). BRRI dha35, BRRI dha55, BRRI dhan92 and BRRI dhan97 showed tolerant to PHP.

Among the insect pests and their natural enemies recorded in light trap, BPH population was found highest followed by GLH, green mirid bug and YSB. Highest peak of BPH, GLH and YSB were recorded in October- November.

A total of eight ALARTs were conducted. Three blast resistant lines, a FBR (MD) line and a FBR (SD) line were recommended for PVT. BRRI regional station, Habiganj conducted 10 farmer's training and 10 field day. Produced 25,750 kg breeder seed during Boro2022-23, 900 kg, 6250 kg and 15,730 kg TLS in Aus 2022, T. Aman 2022 and Boro 2022-23 season, respectively.

USEFUL SCIENTIFIC INFORMATION

VARIETAL DEVELOPMENT

Expt. 1: Regional Yield Trial (Deep water rice), B. Aman 2022

MA Syed and PS Biswas

Specific objective: Evaluation of the breeding lines for specific and general adaptability test under deep water ecosystems.

Materials and Methods: Three genotypes along with one standard check BRRI dhan91 and one local check (Dud Laki, Balam, Lal laki, Hijaldigha) in each trial were evaluated at five locations of BRRI Habiganj, BRRI Cumilla, BRRI Bhanga, BRRI Gopalganj, and BRRI Gazipur during B. Aman 2022 (Table 1). Wet direct seeding was done in a unit plot size 5.0 m × 24 rows with 25 cm row spacing in RCB design with three replications. Fertilization with P:K:S:Zn @ 12:45:8:2.5 kg ha⁻¹ from TSP, MoP, Gypsum and ZnSO₄ were applied at final land preparation. Nitrogen @ 60 kg ha⁻¹ from urea was applied in two equal splits at 25 and 35 days after seed emergence. Crop management practices were done as and when necessary. Data were recorded on plant height, growth duration, and grain yield.

Results and discussion: Unfortunately, the trial at BRRI Habiganj was damaged due to an early flood. The data from the trials conducted at BRRI Bhanga and BRRI Gazipur have been omitted due to rat infestation. The advanced breeding line BR7730-1-1-2B (2.79 t/ha) produced the highest grain yield followed by genotypes BR7919-1-1-3B (2.32 t/ha) and BR7918-1-2-3B (2.09) than the standard check BRRI dhan91 (1.94 t/ha) and local checks (1.59 – 2.07 t/ha) (Table 1).

Table 1: Yield Performance of RYT deep water rice Genotypes, B. Aman 2022

Entry no.	Designation	Plant height (cm)			Growth duration (days)			Grain yield (t/ha)		
		L1	L2	Mean	L1	L2	Mean	L1	L2	Mean
1	BR7730-1-1-2B	153.7	233.7	193.7	163	168	166	2.42	3.17	2.79
2	BR7918-1-2-3B	164.7	189.3	177.0	159	167	163	1.24	2.93	2.09
3	BR7919-1-1-3B	167.4	217.7	192.6	167	169	168	1.40	3.23	2.32
4	BRRI dhan91	159.7	173.0	166.3	162	167	165	1.45	2.43	1.94
5	Ghigaj (L. ck)	155.8	-	155.8	165	-	165	1.59	-	1.59
6	Sada Jabra (L. ck)	-	223.0	223.0	-	171	171	-	2.07	2.07

L1=Cumilla (D/S:23/05/22, D/T: 24/06/22), L2=Gopalganj (D/S:04/06/22), Spacing: 25 cm

Expt. 2: Regional Yield Trial for Tall materials, T. Aman 2022

MA Syed, PS Biswas and ASM Masuduzzaman

Specific objective: Evaluation of high-yielding tall lines in representative shallow deep-water areas (50-90 cm water supply)/ tidal non-saline under early time transplanted conditions-

Materials and method: Five genotypes and the check BRRI dhan91 were examined at the BRRI Habiganj during T. Aman 2022 (Table 2). The unit plot size was 5.0 m x 4.0 m following RCB design with three replications. Twenty-nine days old seedlings of each genotype were transplanted @2-3 seedlings with a spacing of 25 cm x 15 cm. Fertilizers were applied @ 235:87:117:78:12 kg urea, triple super phosphate, muriate of potash, gypsum and zinc sulphate/ha, respectively. Urea was applied in three equal splits at 15-day intervals starting from 15 DAT. The total amount of TSP, MoP, Gypsum and zinc sulphate at final land preparation. Crop management practices were done as and when necessary. Data were recorded on the date of flowering and maturity, plant height (cm), panicle/hill, and grain yield (t/ha).

Results and discussion: Among these entries, the genotype BR10247-14-18-7-3B (5.56 t/ha) produced the highest grain yield followed by genotypes BR9892-8-2-2B (5.35 t/ha) and BR10238-5-1-9-3B (5.30) than the check BRRI dhan91 (3.42 t/ha) (Table 2).

Table 2: Yield and ancillary characters of RYT#Tall materials, T. Aman 2022

Entry no.	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BR9892-8-2-2B	124.7	10.7	134	5.35
2	BR10238-5-1-9-3B	132.7	9.2	135	5.30
3	BR10247-14-18-7-3B	137.5	8.4	137	5.56
4	BR9392-12-6-2-4B	160.4	9.5	143	4.96
5	BRRI dhan91 (ck)	174.7	7.8	141	3.42
LSD at 0.05		3.22	0.61	0.88	0.36
h²B		0.98	0.83	0.97	0.93

Expt. 3: Regional Yield Trial (Short Slender) under recommended management practices, T. Aman 2022

MA Syed, PS Biswas and ASM Masuduzzaman

Objectives: To evaluate the yield potential of short slender grain type materials in comparison with BRRI dhan49.

Materials and method: Three genotypes along with the check BRRI dhan49 were conducted at on-farm condition of the Habiganj (Table 3). The unit plot size was 4.0 m x 3.3 m following RCB design with three replications. Twenty-nine days old seedlings of each genotype were transplanted @2-3 seedlings with a spacing of 25 cm x 15 cm. Fertilizers were applied @ 235:87:117:78:12 kg urea, triple super phosphate, muriate of potash, gypsum and zinc sulphate/ha, respectively. Urea was applied in three equal splits at 15-day intervals starting from 15 DAT. The total amount of TSP, MoP, Gypsum and zinc sulphate at final land preparation. Crop management practices were done as and when necessary. Data were recorded on the date of flowering and maturity, plant height (cm), panicle/hill, and grain yield (t/ha).

Results and discussion: One genotype, namely BRH13-7-9-3-2B did not successfully grow in the main field due to germination failure. The genotype BRH13-2-14-2-1B (5.19 t/ha and 131 days) produced the highest grain yield and 5 days earlier growth duration than the check BRRI dhan49 (5.03 t/ha and 136 days) (Table 3).

Table 3: Yield and ancillary characters of RYT#Short slender genotypes, T. Aman 2022

Entry no.	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BRH13-2-14-2-1B	104.6	7.0	131	5.19
2	BRH17-23-8-2-7B	113.9	6.1	132	5.00
3	BRH13-7-9-3-2B	No germination			
4	BRRI dhan49 (ck)	102.4	7.1	136	5.03
LSD at 0.05		2.67	0.80	0.65	0.14
h²B		0.83	0.29	0.95	0.34

D/S: 21/07/22

D/T: 20/08/22

Spacing: 25 cm x 15 cm

Plot size: 4.0 m x 3.3 m

Expt. 4: Regional Yield Trial (Swarna and long slender type) under recommended management practices, T. Aman 2022

MA Syed, PS Biswas and ASM Masduzzaman

Objectives: To evaluate the yield potential of Swarna and long slender grain type materials in comparison with BRRi dhan94 and BRRi dhan87.

Materials and method: A total of five genotypes along with two checks BRRi dhan87 and BRRi dhan94 were grown at on-farm condition of the Habiganj during T. Aman 2022 (Table 4). The unit plot size was 4.0 m x 3.3 m following RCB design with three replications. Thirty days old seedlings of each genotype were transplanted @2-3 seedlings with a spacing of 25 cm x 15 cm. Fertilizers were applied @ 235:87:117:78:12 kg urea, triple super phosphate, muriate of potash, gypsum and zinc sulphate/ha, respectively. Urea was applied in three equal splits at 15-day intervals starting from 15 DAT. The total amount of TSP, MoP, Gypsum and zinc sulphate at final land preparation. Crop management practices were done as and when necessary. Data were recorded on the date of flowering and maturity, plant height (cm), panicle/hill, and grain yield (t/ha).

Results and discussion: Among the tested genotypes, genotype BR9392-6-2-3-4 (5.36 t/ha and 133 days) showed the highest grain yield with similar growth duration to the checks BRRi dhan94 (5.00 t/ha and 134 days) and BRRi dhan87 (5.05 t/ha and 136 days) (Table 4). Furthermore, the genotype BR10238-5-1-4-2 (5.01 t/ha and 135 days) produced a comparable grain yield and growth duration to the check BRRi dhan94 (5.00 t/ha and 134 days).

Table 4: Yield and ancillary characters of RYT#Swarna & long slender genotypes, T. Aman 2022

Entry no.	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BR9392-6-2-3-4	102.9	9.1	133	5.36
2	BR9392-6-2-2B	102.9	6.3	129	4.77
3	BR10238-5-1-4-2	106.6	8.6	135	5.01
4	BR9392-10-20-1B	106.1	8.1	129	4.80
5	BRH11-2-4-7B	104.8	8.0	130	4.73
6	BRRi dhan94 (ck)	105.6	8.7	134	5.00
7	BRRi dhan87 (ck)	108.1	9.0	136	5.05
LSD at 0.05		2.02	1.2	0.74	0.18
h²B		0.44	0.36	0.96	0.68

D/S: 21/07/22 D/T: 20/08/22 Spacing: 25 cm x 15 cm Plot size: 4.0 m x 3.3 m

Expt. 5: Improvement of local popular cultivars, Boro 2022-23

MA Syed and PS Biswas

Objectives: To develop high-yielding varieties with cold tolerance, acceptable grain & nutritional quality.

Materials and methods: Parents were grown in three sets at seven days interval to synchronize flowering times for achieving desired cross combinations. Thirty-day-old seedlings were transplanted in a 5.4 m x 4 rows plot with a spacing of 20 x 20 cm. Single seedling was used for transplanting. Fertilizer doses were 280-100-165-110-10 kg/ha Urea-TSP-MOP-Gypsum-ZnSO₄ with split application of urea (100+100+80) kg/ha. The total amount of P, K, S, and Zn were applied at the time of final land preparation. Crop management practices were done as and when necessary.

Results: A total of 12 crosses were made using seven indigenous cultivars (Pashushail, Tepi boro, Rata boro, Lal beruin, Kalo beruin, Pani beruin, & Mihi beruin) with two high-yielding varieties BRRi dhan88 and BRRi dhan92. A total of 1735 F₁ seeds were harvested during Boro 2022-23 (Table 5).

Table 5: List of F₁ seeds produced in Boro 2022-23

Sl#	Cross combination	No. of seeds	Sl#	Cross combination	No. of seeds
1	Pashushail x BRRRI dhan88	89	7	Lal beruin x BRRRI dhan88	242
2	Pashushail x BRRRI dhan92	245	8	Lal beruin x BRRRI dhan92	36
3	Tepi boro x BRRRI dhan88	137	9	Kalo beruin x BRRRI dhan88	111
4	Tepi boro x BRRRI dhan92	200	10	Kalo beruin x BRRRI dhan92	156
5	Rata boro x BRRRI dhan88	215	11	Pani beruin x BRRRI dhan92	99
6	Rata boro x BRRRI dhan92	172	12	Mihi beruin x BRRRI dhan92	33
Total					1735

Expt. 6: Observational Yield Trial (OYT#1-BPH), Boro 2022-23

MA Syed, MA Nayeem, MRA Sarkar, and PS Biswas

Objectives: To identify the BPH resistance line with higher grain yield, acceptable grain & nutritional quality.

Materials and Methods: A total of sixty-six entries along with the four checks BRRRI dhan28, BRRRI dhan67, BRRRI dhan89, and BRRRI dhan92 were evaluated at BRRRI Habiganj during boro 2022-23 (Table 6). The unit plot size was 1.0 m x 5.4 m following row-column design with two replications. Forty-nine-day-old seedlings of each genotype were transplanted @ single seedling with a spacing of 20 cm x 20 cm. Fertilizers were applied @ 260:100:120:110:10 kg urea, triple super phosphate, muriate of potash, gypsum, and zinc sulphate/ha, respectively. Urea was applied in three splits at 15-day intervals starting from 15 DAT. The total amount of TSP, MoP, Gypsum and zinc sulphate was applied at the time of final land preparation. Crop management practices were done as and when necessary. Data were recorded on the date of flowering and maturity, plant height (cm), panicle/hill, and grain yield (t/ha).

Results and discussion: None of the evaluated entries performed better than the check BRRRI dhan89 (7.62 t/ha) and BRRRI dhan92 (7.88 t/ha) (Table 6). Notably, the genotype BR12679-4R-111 (7.50 t/ha and 153 days) produced a higher grain yield but 8-11 days longer growth duration than the checks BRRRI dhan67 (6.33 t/ha and 145 days) and BRRRI dhan28 (5.52 t/ha and 142 days). Furthermore, the three genotypes BR12670-4R-93 (6.61 t/ha and 147 days), BR12679-4R-168 (6.62 t/ha and 147 days), and BR12682-4R-46 (6.71 t/ha and 148 days) produced a comparable grain yield and growth duration with the check BRRRI dhan67 (6.33 t/ha and 145 days).

Table 6: Yield and ancillary characters of OYT#BPH genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BR12667-4R-86	95.2	12.1	143	4.24
2	BR12669-4R-161	108.2	12.2	142	4.22
3	BR12676-4R-58	92.3	14.3	156	4.42
4	BR12676-4R-63	90.2	14.5	148	4.33
5	BR12676-4R-64	112.9	12.7	153	4.82
6	BR12676-4R-83	95.9	12.3	153	6.24
7	BR12676-4R-112	87.0	12.5	144	6.08
8	BR12676-4R-125	98.2	16.6	155	4.11
9	BR12676-4R-148	94.3	12.8	143	5.30
10	BR12676-4R-221	90.5	12.3	145	5.86
11	BR12676-4R-231	93.7	13.4	144	5.60
12	BR12676-4R-256	90.0	12.4	144	5.23
13	BR12676-4R-264	82.0	13.5	152	4.21

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
14	BR12676-4R-289	85.0	12.4	151	5.69
15	BR12676-4R-290	98.9	12.5	148	6.02
16	BR12676-4R-302	85.7	14.1	148	5.88
17	BR12676-4R-316	92.2	12.2	148	5.36
18	BR12676-4R-365	80.7	13.6	148	6.06
19	BR12676-4R-390	94.2	12.4	140	4.58
20	BR12676-4R-392	86.8	13.6	143	5.69
21	BR12676-4R-414	117.3	14.8	152	5.50
22	BR12679-4R-2	99.6	12.4	148	4.80
23	BR12679-4R-5	85.2	13.0	150	5.04
24	BR12679-4R-63	91.4	13.4	154	6.25
25	BR12679-4R-73	111.1	13.4	147	5.30
26	BR12679-4R-93	92.1	12.5	147	6.61
27	BR12679-4R-111	92.4	13.1	153	7.50
28	BR12679-4R-155	92.6	12.2	147	5.71
29	BR12679-4R-160	112.2	16.3	147	3.89
30	BR12679-4R-168	86.0	12.6	147	6.62
31	BR12679-4R-173	94.9	12.9	147	5.24
32	BR12679-4R-187	103.1	12.3	153	6.28
33	BR12679-4R-189	90.1	11.7	149	5.33
34	BR12681-4R-138	103.1	10.5	150	5.28
35	BR12682-4R-43	81.3	12.2	142	5.76
36	BR12682-4R-46	111.1	11.5	148	6.71
37	BR12684-4R-19	115.2	12.8	149	4.09
38	BR12685-4R-77	108.3	11.8	144	5.78
39	BR12685-4R-122	107.4	12.0	153	5.31
40	BR12208-5R-402	98.4	14.9	147	5.68
41	BR12279-4R-11	108.2	12.1	144	5.36
42	BR11994-4R-137	117.8	11.7	144	4.57
43	BR11997-4R-9	101.9	11.9	147	5.55
44	IR126952-29-12-103-8-2	106.8	10.6	151	5.33
45	IR126952-29-82-206-12-3	98.8	12.1	145	5.72
46	IR107736-7-1-2-1	83.8	11.4	155	6.17
47	IR101791-10-1-4-3-2-4	82.4	12.8	157	3.83
48	LT489	148.2	13.2	153	4.14
49	IRRI154-Pi9+Hd9 (N22)	93.3	13.3	152	4.82
50	IRRI154-Pikh	95.1	12.5	153	5.47
51	IRRI154-Pi35	96.2	14.5	152	5.35
52	IRRI154-Pi54	95.4	11.7	152	4.79
53	IRRI154-Pi54 (T+P)	96.1	12.9	149	5.45
54	IRRI154-Pi54 (T+P) x Pi35	94.5	13.7	148	4.29
55	IRRI154-xa13	97.4	13.0	151	4.39
56	IRRI154-rymv1-2	94.1	12.5	152	5.46
57	IRRI154-bph32 E-1	97.6	14.9	145	5.70
58	IRRI154-urw5	97.1	15.0	152	4.97
59	IRRI154-fgr-1	99.2	14.2	146	4.37
60	IRRI154-APK	93.2	11.8	146	5.00
61	IRRI154-Hd9 (N22)	93.1	14.6	149	5.11
62	IRRI154-Cold	96.5	12.8	152	5.52
63	IRRI154-qSES-1-2	95.5	13.1	151	4.81
64	IRRI154-Salinity pyramid	93.4	12.3	146	6.16
65	IRRI154-Pikh+A1K	95.9	14.7	145	5.83
66	IRRI154-TP25	95.0	11.2	146	5.95

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
67	BRRi dhan28 (ck)	103.6	10.8	142	5.52
68	BRRi dhan89 (ck)	103.9	12.5	154	7.62
69	BRRi dhan92 (ck)	105.0	13.4	157	7.88
70	BRRi dhan67 (ck)	115.0	14.2	145	6.33
LSD at 0.05		3.26	1.66	0.81	0.80
h²B		0.98	0.55	0.99	0.76

D/S: 04/12/22 D/T: 22/01/23 Spacing: 20 cm x 20 cm Plot size: 1.0 m x 5.4 m

Expt. 7: Observational Yield Trial (OYT#2-Barishal), Boro 2022-23

MA Syed, T Saha, PS Biswas, and MA Hossain

Objectives: To select the best performing advanced breeding lines with higher grain yield, acceptable grain & nutritional quality, and resistance to insect pests and diseases in field conditions.

Materials and Methods: A total of one hundred entries along with the four checks BRRi dhan88, BRRi dhan67, BRRi dhan89, and BRRi dhan92 were evaluated at BRRi Habiganj during boro 2022-23 (Table 7). The unit plot size was 1.2 m x 5.4 m following a row-column design with two replications. Forty-seven-day-old seedlings of each genotype were transplanted @ single seedling with a spacing of 20 cm x 20 cm. Fertilizers were applied @ 260:100:120:110:10 kg urea, triple super phosphate, muriate of potash, gypsum, and zinc sulphate/ha, respectively. Urea was applied in three splits at 15-day intervals starting from 15 DAT. The total amount of TSP, MoP, Gypsum and zinc sulphate was applied at the time of final land preparation. Crop management practices were done as and when necessary. Data were recorded on the date of flowering and maturity, plant height (cm), panicle/hill, and grain yield (t/ha).

Results and discussion: None of the evaluated entries performed better than the check BRRi dhan92 (7.58 t/ha) (Table 7). Notably, the two genotypes NGR 453-1 (6.97 t/ha and 139 days) and NGR 240-1 (7.28 t/ha and 138 days) produced a similar grain yield but 12 days earlier growth duration than the check BRRi dhan89 (6.93 t/ha and 151 days). The nine genotypes (6.28 – 6.63 t/ha), gave a higher grain yield than the check BRRi dhan67 (5.67 t/ha). Furthermore, the eighteen genotypes (5.69–6.26 t/ha and 138-145 days) produced comparable grain yield and growth duration with the check BRRi dhan67 (5.67 t/ha and 139 days).

Table 7: Yield and ancillary characters of OYT#Barishal genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	NGR 238-1	98.7	12.1	135	4.72
2	NGR 269-1	99.9	12.5	142	5.69
3	NGR 269-2	96.4	12.8	139	5.40
4	NGR 270-2	89.3	12.5	138	4.34
5	NGR 354-2	92.4	13.6	140	4.97
6	NGR 453-1	93.2	12.0	139	6.97
7	NGR 453-2	95.6	13.2	138	6.05
8	NGR 527-3	97.2	12.6	143	5.43
9	NGR 565-1	97.4	12.9	138	5.22
10	NGR 695-1	95.5	15.6	141	4.99
11	NGR 717-1	88.4	11.6	138	5.32
12	NGR 750-1	96.9	12.9	144	5.34
13	NGR 1161-1	98.4	12.8	138	5.00
14	NGR 1246-1	95.7	12.4	138	6.07
15	NGR 1246-2	94.3	14.4	138	4.96

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
16	NGR 1365-1	96.9	12.6	139	5.37
17	NGR 1365-2	93.1	14.6	141	5.61
18	NGR 1019-1	96.8	14.6	140	6.32
19	NGR 1019-3	96.6	9.0	149	2.31
20	NGR 1175-1	105.4	11.7	145	4.72
21	NGR 1318-2	105.3	12.3	147	4.87
22	NGR 744-2	94.4	12.9	141	5.03
23	NGR 763-1	89.1	13.5	142	4.94
24	NGR 902-3	94.7	12.0	149	3.52
25	NGR 955-3	93.8	11.4	136	6.41
26	NGR 1167-2	93.2	12.7	146	5.55
27	NGR 1274-2	97.3	13.0	146	5.06
28	NGR 1277-2	99.1	12.4	148	4.91
29	NGR 171-1	100.9	13.2	145	4.56
30	NGR 177-1	92.4	13.4	140	6.28
31	NGR 240-1	93.4	12.5	138	7.28
32	NGR 268-1	97.4	12.5	138	4.79
33	NGR 289-1	96.0	12.4	139	6.32
34	NGR 315-2	97.0	11.1	146	4.67
35	NGR 399-1	93.1	12.8	145	4.63
36	NGR 401-1	98.5	13.6	139	4.67
37	NGR 431-1	94.9	13.3	139	5.96
38	NGR 432-1	96.3	13.0	139	4.86
39	NGR 447-1	93.9	12.0	140	5.53
40	NGR 449-1	94.1	14.5	140	5.70
41	NGR 478-1	90.3	13.0	139	5.99
42	NGR 489-1	92.2	14.3	141	5.46
43	NGR 496-1	92.6	13.2	143	4.91
44	NGR 546-1	92.5	13.5	141	5.33
45	NGR 600-1	95.6	13.6	140	6.38
46	NGR 680-1	91.8	13.9	139	4.92
47	NGR 697-1	96.1	13.9	137	5.31
48	NGR 718-1	95.1	14.8	143	6.17
49	NGR 742-1	97.5	12.5	139	6.63
50	NGR 749-1	93.8	13.5	140	4.71
51	NGR 756-1	102.8	9.2	148	3.20
52	NGR 758-1	93.1	11.6	140	4.74
53	NGR 762-1	94.9	12.4	139	4.64
54	NGR 772-1	89.4	16.9	143	5.12
55	NGR 817-1	99.4	11.8	139	6.26
56	NGR 820-1	100.1	13.0	139	4.45
57	NGR 881-1	102.7	13.2	142	6.09
58	NGR 924-1	94.8	14.1	142	5.14
59	NGR 939-1	101.0	13.4	138	5.14
60	NGR 957-1	103.4	10.9	144	6.33
61	NGR 966-1	98.1	12.6	145	6.12
62	NGR 988-1	96.5	12.5	142	4.78
63	NGR 1017-1	93.9	13.1	143	5.09
64	NGR 1022-1	98.0	11.4	148	5.39
65	NGR 1159-1	95.4	13.1	147	4.61
66	NGR 1170-1	103.9	12.3	142	3.18
67	NGR 1174-1	95.5	14.2	139	4.77
68	NGR 1185-1	95.5	12.8	148	3.89
69	NGR 1189-1	101.3	13.0	147	5.64

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
70	NGR1195-1	96.2	14.0	143	5.44
71	NGR 1239-1	99.6	10.7	144	3.95
72	NGR 1240-1	101.7	13.2	147	6.57
73	NGR 1259-1	108.2	13.8	140	5.97
74	NGR 1264-1	96.7	13.9	137	5.14
75	NGR 1265-1	102.0	12.7	142	5.36
76	NGR 1310-1	101.2	13.2	138	5.05
77	NGR 1347-1	97.3	12.7	137	4.73
78	NGR 1366-1	92.9	12.5	141	4.67
79	NGR 1369-1	95.9	13.2	139	5.34
80	NGR 139-3	102.6	13.5	146	2.71
81	NGR 933-1	99.4	13.1	138	5.86
82	NGR 1168-1	100.3	14.2	151	5.39
83	NGR 1178-2	101.8	11.8	150	5.15
84	NGR 1179-1	109.0	11.7	147	3.57
85	NGR 1179-2	105.6	10.9	144	2.85
86	NGR 1179-3	103.0	9.2	137	2.12
87	NGR 1224-1	98.5	10.4	138	3.14
88	NGR 1233-1	102.7	11.8	137	3.23
89	NGR 246-1	106.6	14.4	137	5.90
90	NGR 297-1	98.9	12.2	139	5.60
91	NGR 315-3	103.3	10.3	140	3.86
92	NGR 329-2	97.1	11.0	139	5.98
93	NGR 336-2	97.1	13.0	141	6.12
94	NGR 353-2	94.8	12.9	140	5.81
95	NGR 424-2	96.9	15.3	138	6.09
96	NGR 470-2	96.1	14.0	138	5.90
97	NGR 476-2	108.8	12.3	139	3.92
98	NGR 706-2	100.8	11.5	139	4.68
99	NGR 732-2	101.1	13.4	147	5.65
100	NGR 853-2	95.1	15.8	139	6.37
101	BRRI dhan67 (ck)	115.4	13.5	139	5.67
102	BRRI dhan88 (ck)	98.6	11.9	137	4.33
103	BRRI dhan89 (ck)	96.8	13.5	151	6.93
104	BRRI dhan92 (ck)	102.2	14.1	151	7.58
LSD at 0.05		2.18	0.93	1.15	0.59
h2B		0.95	0.87	0.98	0.92

D/S: 14/12/22 D/T: 30/01/23 Spacing: 20 cm x 20 cm Plot size: 1.2 m x 5.4 m

Expt. 8: Regional yield trial (RYT) for favorable Boro rice (FBR), Boro 2022-23

MA Syed, PS Biswas, and MA Hossain

Objectives: To understand general and regional adaptability and select the best-performing breeding lines with the highest genetic merits.

Materials and Methods: Five regional yield trials of favorable boro rice (FBR) were conducted. Tested genotypes including the standard checks are mentioned in the table in each specific trial. The unit plot size was 5.4 m x 2.0 m following RCB design with three replications. 41-46 day-old- seedlings of each genotype were transplanted @2-3 seedlings with a spacing of 20 cm x 20 cm. Fertilizers were applied @ 260:100:120:110:10 kg urea, triple super phosphate, muriate of potash, gypsum and zinc sulphate/ha, respectively. Urea was applied in three equal splits at 15 days interval starting from 15 DAT. Total amount of TSP, MoP, Gypsum and zinc sulphate at final land preparation. Crop management practices were

done as and when necessary. Data were recorded on date of flowering and maturity, plant height (cm), panicle/hill and grain yield (t/ha).

Results and discussion:

RYT#FBR-LD: A total of five entries along with the three checks BRRi dhan81, BRRi dhan89, and BRRi dhan92 were evaluated (Table 8). Among all the tested entries, only the genotype BR11894-5R-260 (8.86 t/ha and 151 days) exhibited a significantly superior grain yield compared to all the check varieties (5.78-8.12 t/ha).

Table 8: Yield and ancillary characters of RYT#FBR-Long duration genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BR11894-5R-260	107.9	15.1	151	8.86
2	BR11660-5R-6	105.3	13.3	152	7.06
3	BR11318-5R-148	102.4	12.1	154	6.93
4	BR11318-5R-84	109.1	13.5	161	7.98
5	BR10301-5R-89	105.3	11.8	157	6.67
6	BRRi dhan81 (ck)	89.0	11.9	150	5.78
7	BRRi dhan89 (ck)	99.1	13.6	156	8.12
8	BRRi dhan92 (ck)	102.3	13.2	156	8.03
LSD at 0.05		2.35	1.27	1.31	0.26
h²B		0.97	0.62	0.98	0.98

D/S: 10/11/22 D/T: 21/12/22 Spacing: 20 cm x 20 cm Plot size: 2.0 m x 5.4 m

RYT#FBR-MD: A total of nine entries along with the two checks BRRi dhan81 and BRRi dhan89 were evaluated (Table 9). None of the evaluated entries performed better than the check BRRi dhan89. Notably, the genotype BR8899-14-4-1-2-2-1 (7.67 t/ha and 149 days) produced a similar grain yield but 8 days earlier growth duration than the check BRRi dhan89 (7.57 t/ha and 157 days).

Table 9: Yield and ancillary characters of RYT#FBR-Medium duration genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	IR17A1275	91.8	13.9	142	6.79
2	IR17A1694	92.5	15.3	152	7.07
3	IR17A1735	86.1	13.4	141	6.95
4	IR18A1398	110.2	12.7	152	7.55
5	IR18A1907	111.6	14.1	152	6.11
6	IR18A2119	90.6	12.5	147	7.55
7	BR8899-14-4-1-2-2-1	89.7	13.5	149	7.67
8	BR11342-5R-23	111.0	13.9	148	6.17
9	BR12177-5R-43	114.3	15.6	157	4.41
10	BRRi dhan81 (ck)	95.8	12.3	147	6.16
11	BRRi dhan89 (ck)	112.2	13.3	157	7.57
LSD at 0.05		3.55	1.57	1.02	0.25
h²B		0.97	0.36	0.99	0.98

D/S: 19/11/22 D/T: 30/12/22 Spacing: 20 cm x 20 cm Plot size: 2.0 m x 5.4 m

RYT#FBR-SD: A total of nine entries along with the two checks BRRi dhan28 and BRRi dhan96 were evaluated (Table 10). The tested entries did not exhibit superior performance in comparison to the check BRRi dhan96.

Table 10: Yield and ancillary characters of RYT#FBR-Short duration genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BR11637-5R-140	130.3	14.9	145	6.39
2	BR11894-5R-376	121.5	12.9	150	6.56
3	BR11900-5R-24	109.4	14.6	155	6.19
4	BR11903-5R-56	122.1	14.8	146	6.48
5	BR12180-5R-17	123.7	11.7	155	5.84
6	BR12180-5R-129	114.0	12.3	154	5.61
7	BR12208-5R-274	121.1	12.9	151	5.62
8	BR12208-5R-394	98.3	14.0	153	6.46
9	BR12208-5R-402	98.7	14.1	153	6.02
10	BRRi dhan28 (ck)	105.4	13.6	145	4.20
11	BRRi dhan96 (ck)	86.8	14.2	145	6.68
LSD at 0.05		4.29	1.43	1.15	0.24
h²B		0.98	0.53	0.98	0.97

D/S: 21/11/22 D/T: 04/01/23 Spacing: 20 cm x 20 cm Plot size: 2.0 m x 5.4 m

RYT#FBR-ELS: A total of six entries along with the three checks BRRi dhan50, BRRi dhan63, and BRRi dhan86 were assessed (Table 11). Among the genotypes, the four genotypes IR18A2102 (5.62 t/ha), BR10604-5R-58 (5.63 t/ha), BR7528-2R-19-16-RIL-55 (5.82 t/ha), and BR9994-5R-21 (6.31 t/ha) produced the highest grain yield than all the check varieties (4.80-5.28 t/ha).

Table 11: Yield and ancillary characters of RYT#Extra-long slender genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BR9994-5R-21	94.1	17.1	148	6.31
2	BR10604-5R-58	109.0	16.7	151	5.63
3	IR18A2102	108.3	16.7	155	5.62
4	BR7528-2R-19-16-RIL-52	102.1	16.2	152	5.28
5	BR7528-2R-19-16-RIL-55	99.5	15.6	150	5.82
6	BR7528-2R-19-16-RIL-59	111.3	16.7	152	5.23
7	BRRi dhan50 (ck)	99.9	17.3	153	4.80
8	BRRi dhan63 (ck)	88.3	17.1	148	5.17
9	BRRi dhan86 (ck)	96.3	16.5	151	5.28
LSD at 0.05		3.25	1.29	1.21	0.16
h²B		0.95	-	0.92	0.96

D/S: 21/11/22 D/T: 04/01/23 Spacing: 20 cm x 20 cm Plot size: 2.0 m x 5.4 m

RYT#FBR-Barishal: A total of nine genotypes along with the two checks BRRi dhan88 and BRRi dhan89 were assessed (Table 12). None of the genotypes performed better than the check BRRi dhan89. Although five genotypes, namely NGR 418-1 (6.80 t/ha), NGR 994-1 (6.84 t/ha), NGR 522-2 (7.02 t/ha), NGR 745-2 (7.39 t/ha) and NGR 590-2 (7.44 t/ha) produced the highest grain yield but took 4-8 days longer growth duration than the check BRRi dhan88 (6.48 t/ha).

Table 12: Yield and ancillary characters of RYT#FBR-Barishal genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	NGR 522-2	100.8	13.6	154	7.02
2	NGR 270-3	98.9	13.3	154	6.61
3	NGR 418-1	101.0	13.9	154	6.80

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
4	NGR 416-1	98.2	13.0	154	6.13
5	NGR 368-1	99.9	13.5	153	6.52
6	NGR 994-1	99.4	14.5	153	6.84
7	NGR 745-2	93.1	14.1	156	7.39
8	NGR 590-2	100.5	12.6	157	7.44
9	NGR 710-1	98.1	13.2	153	6.26
10	BRRi dhan88 (ck)	96.1	14.9	149	6.48
11	BRRi dhan89 (ck)	106.3	12.7	156	7.83
LSD at 0.05		1.72	1.07	0.84	0.23
h²B		0.93	0.47	0.97	0.95

D/S: 30/11/22 D/T: 15/01/23 Spacing: 20 cm x 20 cm Plot size: 2.4 m x 5.4 m

Expt. 9: Regional yield trial (RYT) for antioxidant-enriched rice black rice, Boro 2022-23

MA Syed, S Ghosal, and PS Biswas

Objectives: Evaluation of anthocyanin-enriched breeding lines for high yield potential and adaptability in different agro-climatic conditions.

Materials and Methods: The two RYT for antioxidant-enriched rice were conducted at BRRi Habiganj during boro 2022-23. The unit plot size was 2.4 m x 5.4 m following the RCB design with three replications. 36-41 day-old seedlings of each genotype were transplanted @2-3 seedlings with a spacing of 20 cm x 20 cm. Fertilizers were applied @ 260:100:120:110:11 kg urea, triple super phosphate, muriate of potash, gypsum, and zinc sulphate/ha, respectively. Urea was applied in three equal splits at 15-day intervals starting from 15 DAT. The total amount of TSP, MoP, Gypsum and zinc sulphate at the time of final land preparation. Crop management practices were done as and when necessary. Data were recorded on the date of flowering and maturity, plant height (cm), panicle/hill, and grain yield (t/ha).

Results and discussion:

RYT# Black rice for medium duration (BR-MD): A total of eight genotypes along with the two checks Indonesian black rice and BRRi dhan88 were evaluated (Table 13). The grain yield of the entries was reduced significantly as a result of severe infection by blast disease. That's why, no genotype exhibited superior performance compared to the check varieties Indonesian black rice and BRRi dhan88.

Table 13: Yield and ancillary characters of RYT#BR-MD genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BR12839-4R-157-2	106.4	15.3	147	3.18
2	BR12839-4R-5-2	107.7	12.1	146	3.08
3	BR12839-4R-93	100.5	14.1	146	2.65
4	BR12839-4R-47-1	104.9	14.0	148	3.07
5	BR12839-4R-90-1	101.4	12.7	140	2.74
6	BR12839-4R-138-4	98.9	15.5	150	3.10
7	BR12839-4R-78-1	102.4	15.6	149	4.23
8	BR12839-4R-21	106.9	12.7	146	4.24
9	Indonesian black rice (ck)	123.3	18.0	143	4.71
10	BRRi dhan88 (ck)	97.7	16.7	141	5.71
LSD at 0.05		2.0	1.7	0.80	0.27
h²B		0.98	0.78	0.99	0.98

D/S: 30/11/22 D/T: 05/01/23 Spacing: 20 cm x 20 cm Plot size: 2.0 m x 5.4 m

RYT#Black rice for short duration (BR-SD): A total of three genotypes along with the check BRRI dhan84 were evaluated (Table 14). The grain yield of the entries was reduced significantly as a result of severe infection by blast disease. That's why, no genotype exhibited superior performance compared to the check BRRI dhan84.

Table 14: Yield and ancillary characters of RYT#BR-SD genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BR12839-4R-73	98.3	12.9	150	3.23
2	BR12839-4R-137	92.7	13.3	146	3.75
3	BR12839-4R-72	80.3	14.5	150	2.97
4	BRRI dhan84 (ck)	112.7	13.9	145	4.46
LSD at 0.05		1.96	1.3	0.80	0.17
h²B		0.99	0	0.99	0.99

D/S: 30/11/22 D/T: 10/01/23 Spacing: 20 cm x 20 cm Plot size: 2.4 m x 5.4 m

Expt. 10: Regional yield trial (RYT) for water saving rice (WS), Boro 2022-23

Objectives: Evaluation of the water-saving breeding lines for yield potential and adaptability test in different agro-climatic conditions under AWD irrigation system.

Materials and Methods: Two genotypes along with the check BRRI dhan58 were evaluated at BRRI Habiganj during boro 2022-23 (Table 15). The unit plot size was 2.0 m x 5.4 m following the RCB design with three replications. Forty-day-old seedlings of each genotype were transplanted @2-3 seedlings with a spacing of 20 cm x 20 cm. Fertilizers were applied @ 300:125:150:100:12 kg urea, triple super phosphate, muriate of potash, gypsum, and zinc sulphate/ha, respectively. Urea was applied in three equal splits at 15-day intervals starting from 15 DAT. The total amount of TSP, MoP, Gypsum and zinc sulphate at the time of final land preparation. Crop management practices were done as and when necessary. Data were recorded on the date of flowering and maturity, plant height (cm), panicle/hill, and grain yield (t/ha).

Results and discussion: No genotype exhibited superior performance compared to the check BRRI dhan58 (Table 15).

Table 15: Yield and ancillary characters of RYT#WS rice genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BR11206-5B-351	94.1	1.9	153	6.72
2	BR11204-5B-224	100.6	15.3	146	7.34
3	BRRI dhan58 (ck)	98.6	13.5	150	7.54
LSD at 0.05		1.9	1.93	0.65	0.24
h²B		0.96	0.12	1.0	0.96

D/S: 06/11/22 D/T: 05/01/23 Spacing: 20 cm x 20 cm Plot size: 2.0 m x 5.4 m

Expt. 11: Regional yield trial (RYT-Tall) for haor areas, Boro 2022-23

MA Syed, PS Biswas and ASM Masuduzzaman

Objectives: Evaluation of high-yielding, tall, and lodging tolerant lines in representative low-lying haor areas as better substitutes for BR18.

Materials and Methods: The total six genotypes along with the check BR18 were assessed at BRRI Habiganj during boro 2022-23 (Table 16). The unit plot size was 3.75 m x 5.4 m following RCB design with three replications. Forty-one-day-old seedlings of each genotype were transplanted @2-3 seedlings with a spacing of 25 cm x 20 cm. Fertilizers were applied

@ 315:126:150:112:11 kg urea, triple super phosphate, muriate of potash, gypsum, and zinc sulphate/ha, respectively. Urea was applied in fourth splits at 15-day intervals starting from basal application. The total amount of TSP, $\frac{3}{4}$ th of the total MoP, Gypsum and zinc sulphate at final land preparation, and the rest $\frac{1}{4}$ th MoP was applied with the last top dress of urea application. Crop management practices were done as and when necessary. Data were recorded on the date of flowering and maturity, plant height (cm), panicle/hill, and grain yield (t/ha).

Results and discussion: The genotype BR9396-6-2-2B (5.60 t/ha and 146 days) exhibited the highest grain yield and 12 days earlier than the check BR18 (5.03 t/ha and 158 days) (Table 16). Furthermore, the genotype BR9392-6-2-1-3-4 (5.32 t/ha and 157 days) produced a higher grain yield coupled with a comparable growth duration to the check BR18 (5.03 t/ha and 158 days).

Table 16: Yield and ancillary characters of RYT#Tall genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BR9396-6-2-2B	101.6	14.9	146	5.60
2	BR9392-6-2-1B	164.2	13.7	175	4.24
3	BRH18-7-14B	103.2	12.5	150	4.12
4	BRH13-7-9-3-2B	113.3	12.7	155	4.53
5	BR9390-6-2-1B	116.0	13.7	145	4.17
6	BR9392-6-2-1-3-4	112.5	13.0	157	5.32
7	BR18 (ck)	113.5	13.4	158	5.03
LSD at 0.05		2.11	1.04	0.96	0.19
h²B		1.0	0.71	1.0	0.98

D/S: 02/12/22 D/T: 12/01/23 Spacing: 25 cm x 20 cm Plot size: 3.75 m x 5.4 m

Expt. 12: Regional yield trial (RYT) for zira type, Boro 2022-23

MA Syed, PS Biswas and ASM Masuduzzaman

Objectives: 1. To evaluate fine grain high-yielding breeding lines under integrated improved management practices in different agro-climatic conditions of Bangladesh

2. To maximize proper filling of grains in a panicle under integrated improved management practices and by harvesting crop at 95% maturity.

Materials and Methods: A total of five genotypes along with the two checks Zirashail and BRRI dhan28 were evaluated at BRRI Habiganj during boro 2022-23 (Table 17). The unit plot size was 3.0 m x 5.4 m following RCB design with three replications. Forty-one days old seedlings of each genotype were transplanted @2-3 seedlings with a spacing of 25 cm x 15 cm. Fertilizers were applied @ 300:126:150:112:11 kg urea, triple super phosphate, muriate of potash, gypsum, and zinc sulphate/ha, respectively. Urea was applied in fourth splits at 15-day intervals starting from basal application. The total amount of TSP, $\frac{3}{4}$ th of total MoP, Gypsum and zinc sulphate at final land preparation, and the rest $\frac{1}{4}$ th MoP was applied with the last top dress of urea application. Crop management practices were done as and when necessary. Data were recorded on the date of flowering and maturity, plant height (cm), panicle/hill, and grain yield (t/ha).

Results and discussion: Among these genotypes, the three genotypes BR10247-4-7-4B (5.13 t/ha), BRH9-3-1-14-2B (5.33 t/ha), and BRH13-9-5-3B (6.33 t/ha) produced the highest grain yield than the checks BRRI dhan28 (4.10 t/ha) and Zirashail (4.39 t/ha) (Table 17).

Table 17: Yield and ancillary characters of RYT#Zira types genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BRH13-9-5-3B	97.5	14.9	147	6.33
2	BRH9-3-1-14-2B	98.9	15.3	149	5.33

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
3	BRH12-1-7B-P1	105.6	11.9	151	4.20
4	BRH13-7-9-3-2B	112.6	13.6	153	4.17
5	BR10247-4-7-4B	101.1	12.7	148	5.13
6	Zirashail (ck)	96.9	15.9	142	4.39
7	BRRRI dhan28 (ck)	104.2	14.6	145	4.10
LSD at 0.05		2.56	1.46	0.96	0.18
h²B		0.95	0.71	0.98	0.99

D/S: 02/12/22 D/T: 12/01/23 Spacing: 25 cm x 20 cm Plot size: 3.75 m x 5.4 m

Expt. 13: Regional yield trial (RYT) for Salt tolerant rice (STR), Boro 2022-23

MA Syed, MA Rahman and PS Biswas

Objectives: To evaluate the specific and general adaptability of the advanced breeding lines compared to standard checks under on-station conditions.

Materials and Methods: Seven genotypes along with the three checks BRRRI dhan67, BRRRI dhan89, and BRRRI dhan99 were evaluated at BRRRI Habiganj during boro 2022-23 (Table 18). The unit plot size was 2.4 m x 5.4 m following the RCB design with three replications. Forty-six-day-old seedlings of each genotype were transplanted @2-3 seedlings with a spacing of 20 cm x 20 cm. Fertilizers were applied @ 300:100:165:112:11 kg urea, triple super phosphate, muriate of potash, gypsum, and zinc sulphate/ha, respectively. Urea was applied in three equal splits at 15-day intervals starting from 15 DAT. The total amount of TSP, MoP, Gypsum and zinc sulphate at the time of final land preparation. Crop management practices were done as and when necessary. Data were recorded on the date of flowering and maturity, plant height (cm), panicle/hill, and grain yield (t/ha).

Results and discussion: No genotype exhibited superior performance compared to the standard check BRRRI dhan89 (Table 18). Notably, the genotype BR11712-4R-12 (6.73 t/ha) gave a higher grain yield with similar growth duration compared to the tolerant check BRRRI dhan99 (6.51 t/ha). Similarly, the genotype BR11712-4R-6 (6.10 t/ha) produced a higher grain yield but 4 days longer growth duration than the tolerant check BRRRI dhan67 (5.77 t/ha).

Table 18: Yield and ancillary characters of RYT#STR genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BR11712-4R-44	119.8	12.1	155	4.85
2	BR11712-4R-93	105.5	13.5	151	5.53
3	BR11712-4R-12	108.7	16.2	162	6.73
4	BR11712-4R-6	91.4	17.5	157	6.10
5	BR11712-4R-346	95.4	13.9	161	5.62
6	BR11713-4R-70	114.2	16.3	155	5.06
7	BR11722-4R-398	83.6	16.3	161	5.07
8	BRRRI dhan67 (T. ck)	110.1	15.4	153	5.77
9	BRRRI dhan89 (S. ck)	104.3	13.5	156	7.24
10	BRRRI dhan99 (T. ck)	99.3	14.5	160	6.51
LSD at 0.05		2.52	1.9	0.80	0.20
h²B		0.99	0.68	0.99	0.98

D/S: 30/11/22 D/T: 10/01/23 Spacing: 20 cm x 20 cm Plot size: 2.4 m x 5.4 m

Expt. 14: Regional yield trial (RYT) for disease-resistant rice (DRR), Boro 2022-23

MA Syed, M Khatun, PS Biswas, and MA Latif

Objectives: To evaluate the specific and general adaptability of the advanced breeding lines compared to standard checks under on-station conditions.

Materials and Methods: The two RYT for disease-resistant rice (DRR) were conducted at BRRI Habiganj during boro 2022-23. The unit plot size was 2.0 m x 5.4 m following the row-column design with two replications for the DRR-BB trial and RCB design with three replications for the DRR-BB & Blast trial. Forty-one-day-old seedlings of each genotype were transplanted @2-3 seedlings with a spacing of 25 cm x 15 cm. Fertilizers were applied @ 300:100:165:112:11 kg urea, triple super phosphate, muriate of potash, gypsum, and zinc sulphate/ha, respectively. Urea was applied in three equal splits at 15-day intervals starting from 15 DAT. The total amount of TSP, MoP, Gypsum and zinc sulphate at the time of final land preparation. Crop management practices were done as and when necessary. Data were recorded on the date of flowering and maturity, plant height (cm), panicle/hill, and grain yield (t/ha).

Results and discussion:

RYT#DRR-BB: A total of eighteen entries along with the four checks BRRI dhan58 BRRI dhan89, BRRI dhan92, and BRRI dhan101 were evaluated (Table 19). None of the genotypes exhibited superior performance in comparison to the standard checks BRRI dhan89 and BRRI dhan92. However, the genotype BR(Path)13800-BC3-8-7 (7.17 t/ha and 154 days) produced a similar grain yield and 3 days earlier growth duration than the check BRRI dhan92 (7.17 t/ha and 157 days). The genotype BR(Path)13800-BC3-224-28 (6.90 t/ha and 153 days) gave a higher grain yield with comparable growth duration than the checks BRRI dhan58 (6.49 t/ha and 153 days) and BRRI dhan101 (6.53 t/ha and 153 days).

Table 19: Yield and ancillary characters of RYT#DRB-BB rice genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BR11604-4R-24	114.7	11.5	155	5.61
2	BR11607-4R-2	104.3	13.1	151	5.58
3	BR11607-4R-258	92.8	11.7	153	6.33
4	BR11866-5R-73	97.0	13.3	153	6.59
5	BR11866-5R-136	98.3	12.3	156	6.06
6	BR11866-5R-223	98.8	12.3	158	6.70
7	BR11866-5R-277	96.8	12.2	158	5.63
8	BR11867-5R-117	96.7	12.8	148	6.56
9	BR11867-5R-140	94.4	14.4	155	5.54
10	BR11867-5R-154	88.2	11.9	155	5.75
11	BR11867-5R-347	106.5	11.2	146	6.31
12	BR11868-5R-9	105.7	15.4	148	4.88
13	BR(Path)13800-BC3-8-1	99.9	12.4	155	6.72
14	BR(Path)13800-BC3-8-6	99.1	12.3	155	6.19
15	BR(Path)13800-BC3-109-10	100.5	13.7	152	6.26
16	BR(Path)13800-BC3-8-7	108.7	12.9	154	7.17
17	BR(Path)13800-BC3-8-9	102.9	14.3	154	6.49
18	BR(Path)13800-BC3-224-28	108.9	12.4	153	6.90
19	BRRI dhan58 (Std. ck)	97.8	12.7	153	6.49
20	BRRI dhan89 (Std. ck)	105.5	12.5	156	7.48
21	BRRI dhan92 (Std. ck)	111.0	12.7	157	7.17
22	BRRI dhan101 (Std. ck)	116.4	11.6	153	6.53
LSD at 0.05		2.2	0.99	1.0	0.23
h²B		0.97	0.75	0.97	0.96

D/S:02/12/22

D/T: 12/01/23

Spacing: 25 cm x 15 cm

Plot size: 2.0 m x 5.4 m

RYT#DRR-BB and Blast: A total of ten genotypes along with the two checks BRRi dhan89 and BRRi dhan92 were assessed (Table 20). None of the genotypes exhibited superior performance in comparison to the standard checks BRRi dhan92. The genotype BR(Path)13800-BC3-110-4 (7.26 t/ha and 152 days) exhibited a higher grain yield and 3 days earlier growth duration than the check BRRi dhan89 (7.02 t/ha and 155 days). Similarly, the genotype BR(Path)13800-BC3-8-11 (7.05 t/ha and 151 days) produced a comparable grain yield but 4 days earlier growth duration than the check BRRi dhan89 (7.02 t/ha and 155 days).

Table 20: Yield and ancillary characters of RYT#DRB-BB & Blast rice genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BR(Path)13800-BC3-8-5	102.6	12.6	149	6.42
2	BR(Path)13800-BC3-134-8	100.7	12.7	147	6.88
3	BR(Path)13800-BC3-8-11	103.5	12.5	151	7.05
4	BR(Path)13800-BC3-110-19	102.7	12.3	152	6.12
5	BR(Path)13800-BC3-12-13	105.6	13.2	148	6.47
6	BR(Path)13800-BC3-224-17	107.7	13.1	147	6.55
7	BR(Path)13800-BC3-134-25	102.4	13.4	148	6.92
8	BR(Path)13800-BC3-8-37	100.4	13.5	151	6.37
9	BR(Path)13800-BC3-110-4	102.7	13.4	152	7.26
10	BR(Path)13800-BC3-224-44	106.4	13.7	147	6.86
11	BRRi dhan89 (ck)	105.1	11.8	155	7.02
12	BRRi dhan92 (ck)	109.5	13.0	157	7.34
LSD at 0.05		1.38	1.02	0.96	0.17
h²B		0.93	0.15	0.97	0.95

D/S:02/12/22

D/T: 12/01/23

Spacing: 25 cm x 15 cm

Plot size: 2.0 m x 5.4 m

Expt. 15: Regional yield trial (RYT) for zinc enriched rice (ZER), Boro 2022-23

MA Syed, PS Biswas and MA Kader

Objectives: To evaluate the specific and general adaptability of the advanced breeding lines compared to standard checks in on-station conditions.

Materials and Methods: Three genotypes along with the three checks BRRi dhan29, BRRi dhan74, and BRRi dhan84 were evaluated at BRRi Habiganj during boro 2022-23 (Table 21). The unit plot size was 2.4 m x 5.4 m following the RCB design with three replications. Forty-day-old seedlings of each genotype were transplanted @2-3 seedlings with a spacing of 20 cm x 20 cm. Fertilizers were applied @ 300:100:165:112:11 kg urea, triple super phosphate, muriate of potash, gypsum, and zinc sulphate/ha, respectively. Urea was applied in three equal splits at 20 days interval starting from 10 DAT. The total amount of TSP, MoP, Gypsum and zinc sulphate at the time of final land preparation. Crop management practices were done as and when necessary. Data were recorded on the date of flowering and maturity, plant height (cm), panicle/hill, and grain yield (t/ha).

Results and discussion: The grain yield of BRRi dhan84 was reduced due to infection of blast disease. No genotype exhibited superior performance compared to the check BRRi dhan29. While the genotype BR9674-1-4-1-3-P1 (6.11 t/ha) produced a comparable grain yield but took 14 days longer to mature than the check BRRi dhan74 (6.03 t/ha) (Table 21).

Table 21: Yield and ancillary characters of RYT#ZER types genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	BR9674-1-4-1-3-P1	105.5	15.6	156	6.11
2	BR9674-1-4-1-3-P2	108.0	17.2	160	5.71
3	BR9674-7-3-2-1-P2	99.5	15.9	155	5.64
4	BRRRI dhan29 (ck)	98.6	18.5	156	6.16
5	BRRRI dhan74 (ck)	95.7	12.1	142	6.03
6	BRRRI dhan84 (ck)	111.7	15.3	140	4.79
LSD at 0.05		2.69	1.98	1.0	0.21
h²B		0.97	0.74	1.0	0.96

D/S: 26/11/22 D/T: 05/01/23 Spacing: 20 cm x 20 cm Plot size: 2.4 m x 5.4 m

Expt. 16: G x E interaction of Basmati rice on physio-chemical and cooking properties, Boro 2022-23

MA Syed, MA Kader, and PS Biswas

Objective: To find out the general and specific adaptability of Basmati rice in Bangladesh in relation to physio-chemical and cooking properties.

Materials and Methods: Twenty genotypes along with the six checks namely, BRRRI dhan50, BRRRI dhan63, BRRRI dhan81, BRRRI dhan104, Tepi boro, and Rata boro were assessed at BRRRI Habiganj during boro 2022-23 (Table 22). The unit plot size was 0.4 m x 5.4 m following the RCB design with three replications. Forty-one-day-old seedlings of each genotype were transplanted @2-3 seedlings with a spacing of 20 cm x 15 cm. Fertilizers were applied @ 260:90:150:112:11 kg urea, triple super phosphate, muriate of potash, gypsum, and zinc sulphate/ha, respectively. Urea was applied in three equal splits at 15-day intervals starting from 10 DAT. The total amount of TSP, MoP, Gypsum and zinc sulphate at the time of final land preparation. Crop management practices were done as and when necessary. Data were recorded on the date of flowering and maturity, plant height (cm), panicle/hill, and grain yield (t/ha).

Results and discussion: Among these entries, the entry Basmati (1230) (7.76 t/ha) produced the highest grain yield of all the checks (4.34-6.58 t/ha) (Table 22). Similarly, the genotype Indian Basmati (6.04 t/ha and 156 days) produced a significantly higher grain yield but 6 days longer growth duration than the check BRRRI dhan50 (5.38 t/ha and 150 days).

Table 22: Yield and ancillary characters of GxE interaction of basmati rice genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	Basmati (1230)	130.1	12.5	145	7.76
2	Basmati (D) (3928)	124.8	15.0	146	3.81
3	Basmati (4488)	162.5	13.6	149	3.84
4	Basmati 370 (4489)	134.5	14.0	147	3.89
5	Basmati 37 (4491)	143.6	13.4	148	5.61
6	Basmati (N13) (4493)	116.5	13.9	146	1.63
7	Basmati 370 (4494)	132.7	16.8	148	4.32
8	Basmati 107 (4501)	152.3	12.6	150	3.60
9	Basmati 377 (4507)	151.0	13.5	146	2.85
10	Basmati 406 (4508)	153.6	12.6	147	4.62
11	Basmati (4754)	128.5	12.2	149	5.28
12	Basmati (6614)	112.7	14.4	150	1.84
13	Super Basmati	110.4	13.5	149	1.78

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
14	Basmati Sufaid 187	No germination			
15	Indian Basmati	105.0	13.7	156	6.04
16	Basmati TAPL-90 (2517)	143.6	11.0	155	2.34
17	Basmati Nanot 439 (4496)	152.8	13.7	147	1.82
18	Basmati Pardnr 442 (4497)	116.2	12.0	147	3.21
19	Basmati-433 (4509)	141.9	12.1	148	1.82
20	Pusha Basmati	112.2	13.5	151	4.32
21	BRRRI dhan50 (ck)	81.4	14.6	150	5.38
22	BRRRI dhan63 (ck)	97.6	13.0	151	6.12
23	BRRRI dhan81 (Std. ck)	97.3	12.6	144	4.66
24	BRRRI dhan104 (ck)	94.4	13.9	152	6.58
25	Tepi Boro (ck)	146.1	13.4	146	5.06
26	Rata Boro (ck)	152.6	15.9	146	4.34
LSD at 0.05		3.9	1.5	1.0	0.44
h²B		0.99	0.63	0.98	0.98

D/S: 26/11/22

D/T: 06/01/23

Spacing: 20 cm x 15 cm

Plot size: 0.4 m x 5.4 m

Expt. 17: International Irrigated Rice Observational Nursery (IIRON), Boro 2022-23

MA Syed, S Ghosal, PS Biswas, and KM Iftekharuddaula

Objective: Evaluation of elite breeding lines and varieties under irrigated rice environments.

Materials and Methods: The IIRON (Set#38) trial consists of thirty-five advanced breeding lines along with the five checks BRRRI dhan28, BRRRI dhan67, BRRRI dhan92, BRRRI dhan101, and BRRRI dhan35 were grown at BRRRI Habiganj farm during Boro 2022-23 (Table 23). Forty-five-day-old seedlings were transplanted in 5.4 m × 1.0 m plot with single seedling/hill using 20 × 20 cm spacing following RCB design with three replications. Fertilizers were applied @ 260:100:120:110:10kg urea, triple super phosphate, muriate of potash, gypsum and zinc sulphate/ha, respectively. Urea was applied in three equal splits at 15 days interval starting from 15 DAT. Total amount of TSP, MoP, Gypsum and zinc sulphate at final land preparation. Crop management practices were done as and when necessary. Data were recorded on date of flowering and maturity, plant height (cm), panicle/hill, and grain yield (t/ha).

Results and discussion: None of the genotypes exhibited superior performance in comparison to the standard checks BRRRI dhan92 (Table 23). The seven entries SV0202, SV0806, SV0434, SV0436, SV0856, SV0147, and SV0193 (7.33-7.67 t/ha) exhibited a higher grain yield than the check BRRRI dhan101 (6.57 t/ha) but produced a similar grain yield with the check BRRRI dhan67 (7.12 t/ha). Similarly, the grain yield of eleven entries (6.58-7.01 t/ha) was on par with the check BRRRI dhan101 (6.57 t/ha). A total of seven entries were selected for advancement to the yield trial stage.

Table 23: Yield and ancillary characters of IIRON (Set#38) genotypes, Boro 2022-23

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
1	SV0434	95.2	13.6	153	7.47
2	SV0436	97.1	12.6	149	7.48
3	SV0438	103.2	14.5	152	7.01
4	SV0440	97.3	12.7	151	6.68
5	SV0442	93.8	13.5	151	6.40

Entry #	Designation	Plant height (cm)	Panicle/hill (no.)	Growth duration (days)	Grain yield (t/ha)
6	SV0444	94.3	13.1	152	6.56
7	SV0446	93.7	11.7	147	5.51
8	SV0448	98.1	12.6	151	6.36
9	SV0450	92.2	12.4	153	6.30
10	SV0452	93.9	12.8	151	6.85
11	SV0454	94.2	13.5	150	6.23
12	SV0456	94.0	12.5	149	6.86
13	SV0460	106.9	12.9	153	6.58
14	SV0462	94.3	12.5	150	5.97
15	SV1102	97.2	13.1	153	6.66
16	SV1107	91.1	13.3	152	6.32
17	SV0003	99.5	12.0	156	6.35
18	SV0664	88.3	11.7	154	6.41
19	SV0518	85.7	14.3	151	5.87
20	SV0147	100.4	13.8	149	7.51
21	SV0713	94.4	13.4	149	6.98
22	SV0185	92.2	14.0	152	6.92
23	SV0193	99.9	13.4	152	7.67
24	SV0195	102.8	13.2	150	6.97
25	SV0196	100.0	12.3	156	6.97
26	SV0198	87.5	12.7	155	6.46
27	SV0202	98.1	13.7	153	7.33
28	SV0806	103.0	12.6	149	7.44
29	SV0204	94.2	12.7	151	5.23
30	SV0206	96.7	14.2	155	7.00
31	SV0856	94.4	11.8	152	7.50
32	SV0861	87.6	9.1	151	5.36
33	SV0866	87.0	13.2	167	5.58
34	SV0842	111.8	13.0	152	6.11
35	SV0876	85.9	14.4	156	6.46
36	BRRi dhan28 (early ck)	101.8	13.2	149	5.55
37	BRRi dhan67 (medium ck)	106.0	12.7	152	7.12
38	BRRi dhan92 (Late ck)	116.5	13.0	156	7.72
39	BRRi dhan101 (BB Res. ck)	107.5	11.6	153	6.57
40	BRRi dhan35 (BPH Res. ck)	113.9	13.3	151	6.15
LSD at 0.05		3.27	0.93	1.24	0.57
h²B		0.96	0.77	0.96	0.80

D/S: 30/11/22 D/T: 14/01/23 Spacing: 20 cm x 20 cm Plot size: 1.0 m x 5.4 m

CROP SOIL WATER MANAGEMENT

Expt. 18: Effect of time of planting on Boro rice varieties at Haor region of Bangladesh

MM Rashid, MM Khatun, A Nayeem, MA Syed and MS Alam

Introduction: Rice crop is highly susceptible to cold at reproductive phase. Spikelet sterility occurs if air temperature prevails below critical low level (18-20° C) for more than five days at reproductive phase. Farmers of haor areas (Sylhet, Sunamganj, Habiganj, Moulvibazar, Netrokona, Kishoreganj and Brahmanbaria) have to transplant Boro rice seedlings earlier than usual planting time to utilize early recession of residual flood water and also to avoid flash

flood at maturity. But it has to face the risk of cold injury at reproductive phase during February to March. Boro crop in haor areas generally matures by last week of April. Flash flood usually comes in these areas after 2nd week of April as Boishakhi Dhall. Most of the farmers harvest their Boro rice by this time. But a flash flood by the 1st week of April might affect many of haor areas. Boro rice is submerged at premature stage, if flash flood occurs earlier (i.e. the 3rd or 4th week of March) as Chaitali Dhall. However, it is a very rare event. In March of 2017 a Chaitali Dhall created devastation in haor areas. The premature Boro rice was submerged in many parts of that areas causing a huge disaster. Farmers like to cultivate long duration (160 days) variety like BRRi dhan29, BRRi dhan89 and BRRi dhan92 for its higher yield that matures after 3rd week of April. But it has a high risk of flash flood at maturity. Growth duration of BRRi developed short duration Boro varieties (BRRi dhan28, BRRi dhan45, BRRi dhan84, BRRi dhan88 and BRRi dhan96) is around 145 days. Appropriate seeding date of such variety is 15 November. If 30-day-old seedling of BRRi dhan28 is transplanted, crop will be matured by 10 April and would not be able to avoid Chaitali Dhall. This study was undertaken to observe cold tolerance level of recently developed BRRi varieties and to optimize planting time for minimizing cold injury and avoiding flash flood.

Materials and methods: Nine BRRi varieties (BRRi dhan28, BRRi dhan29, BRRi dhan67, BRRi dhan84, BRRi dhan88, BRRi dhan89, BRRi dhan92, BRRi dhan96 and Bangabandhu dhan100) were evaluated in natural field condition at BRRi farm Habiganj to identify the suitable planting time and variety for Haor areas. There were five sets of seeding starting from 25 October at 10 days interval. Thirty-five-day-old seedlings were transplanted in the main field. Data on first heading, flowering, growth duration, plant height, panicle exertion, spikelet degeneration, grain yield and sterility were recorded. Panicle exertion was calculated as-

$$\text{Panicle exertion (\%)} = \frac{\text{Last internode length}}{\text{Last leafsheath length}} \times 100$$

Weather analysis: During the experimental period, the maximum, minimum and mean temperature were recorded and presented in Figure-1. Temperature was above critical level of different rice genotypes at reproductive phase in all sets of planting except first set. Reproductive phase in first set of different rice genotypes was from 2nd week of February to mid March.

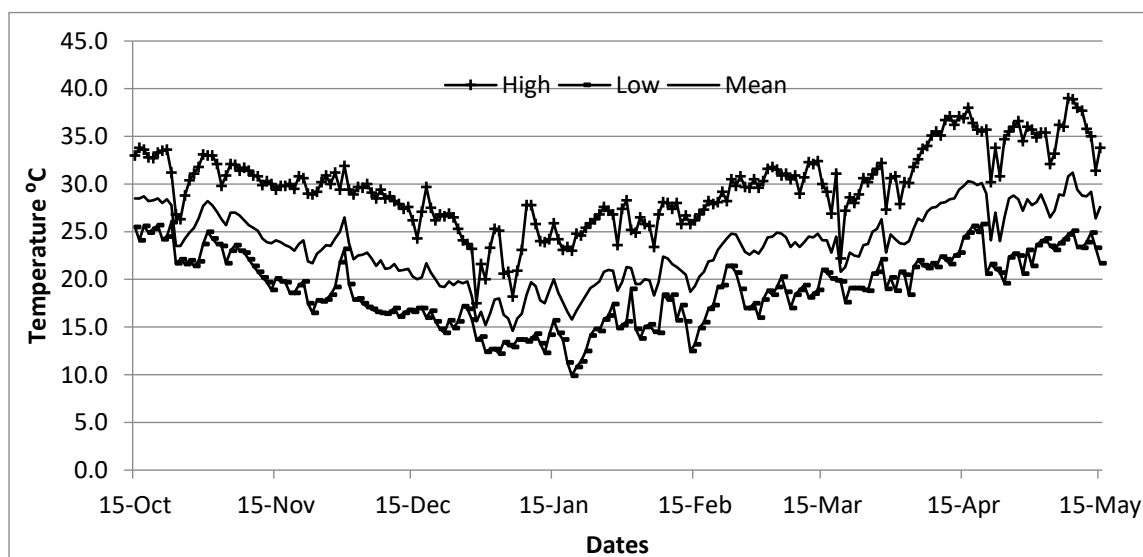


Fig 1: Temperature status of Habiganj during the experimental period (Oct 2022-May 2023)

Results: Growth duration increased significantly in all varieties at early planting than late planting one. Growth duration ranged from 154 to 169 days in first set, 151 to 162 days in second set, 148 to 158 days in third set, 146 to 155 days in fourth set and 141 to 151 days in fifth set. Irrespective of planting time BRRi dhan29, BRRi dhan89 and BRRi dhan92 had longer growth duration than the other tested varieties (Table 24). Plant height of all rice

varieties was reduced significantly in earlier two sets than other sets of planting. Irrespective of rice varieties 4th set (25 November sowing) had longest plant height (Table 24).

Table 24: Growth duration and plant height of nine BRR I varieties as affected by planting time

Variety	Growth duration (days)					Plant height (cm)				
	Set 1	Set 2	Set 3	Set 4	Set 5	Set 1	Set 2	Set 3	Set 4	Set 5
BRR I dhan28	155	152	148	146	141	93.06	95.93	101.73	106.3	97.13
BRR I dhan29	168	162	158	154	150	91.00	91.33	96.40	98.46	93.93
BRR I dhan67	160	155	151	151	145	103.6	105.33	107.2	115.5	107.0
BRR I dhan84	154	151	147	146	142	98.93	103.8	108.3	114.4	103.4
BRR I dhan88	156	153	147	147	141	82.53	87.06	89.86	94.33	83.40
BRR I dhan89	169	161	156	154	150	92.53	96.73	100.20	106.7	101.3
BRR I dhan92	169	162	158	155	151	98.66	100.4	102.60	110.2	101.0
BRR I dhan96	156	153	148	146	140	79.86	83.00	86.40	93.26	86.33
Bangabandhu dhan100	160	156	150	148	141	100.6	100.13	106.7	112.8	106.8
LSD _{5%} for Variety (G)	3.46					2.87				
LSD _{5%} for Set (S)	2.55					2.51				
LSD _{5%} for G*S	5.24					5.61				

Irrespective of rice varieties spikelet degeneration were recorded in first set of planting. BRR I dhan84 had spikelet degeneration up to 3rd set (sowing on 15 November), while it was up to 2nd set (05 November) for BRR I dhan28, BRR I dhan88, and BRR I dhan96. However, BRR I dhan29, BRR I dhan67, BRR I dhan89, BRR I dhan92 and Bangabandhu dhan100 had spikelet degeneration only in 1st set (Table 25).

Table 25: Spikelet degeneration of nine BRR I varieties as affected by planting time

Variety	Spikelet degeneration at panicle tip (%)				
	Set 1	Set 2	Set 3	Set 4	Set 5
BRR I dhan28	8.50	4.00	0.00	0.00	0.00
BRR I dhan29	5.00	0.00	0.00	0.00	0.00
BRR I dhan67	5.00	2.00	0.00	0.00	0.00
BRR I dhan84	10.00	6.00	4.00	0.00	0.00
BRR I dhan88	9.50	5.00	0.00	0.00	0.00
BRR I dhan89	6.00	0.00	0.00	0.00	0.00
BRR I dhan92	5.00	0.00	0.00	0.00	0.00
BRR I dhan96	7.50	5.00	0.00	0.00	0.00
Bangabandhu dhan100	6.00	4.00	0.00	0.00	0.00

It took significantly longer flowering period (first heading to 50% flowering) in earlier sets of planting than the other sets. In first set, the longest flowering duration (13.5 days) was recorded in BRR I dhan84 followed by BRR I dhan88, BRR I dhan28 and BRR I dhan96. BRR I dhan92 had shortest flowering duration (8.50 days). In second and third sets similar trend was observed. Flowering duration was around 7 days for all varieties in fourth and fifth sets (Table 26).

Poor panicle exertion was recorded in earlier set of planting for all varieties. Incomplete panicle exertion was recorded up to 3rd set for BRR I dhan84 and BRR I dhan84 while it was up to 2nd set for BRR I dhan28, BRR I dhan67, BRR I dhan96 and Bangabandhu dhan100. However, long duration varieties BRR I dhan29, BRR I dhan89 and BRR I dhan92 had incomplete panicle exertion in first set only (Table 26).

Table 26: Flowering duration and panicle exertion of nine BRRi varieties as affected by planting time

Variety	First heading to 50% flowering (days)					Panicle exertion (%)				
	Set 1	Set 2	Set 3	Set 4	Set 5	Set 1	Set 2	Set 3	Set 4	Set 5
BRRi dhan28	11.50	8.50	7.00	7.00	7.00	82.42	89.52	100.00	100.00	100.00
BRRi dhan29	8.90	8.00	7.50	7.50	7.00	96.31	100.00	100.00	100.00	100.00
BRRi dhan67	9.25	8.25	7.50	7.00	7.00	96.07	99.00	100.00	100.00	100.00
BRRi dhan84	13.50	11.00	9.25	7.25	7.50	80.36	84.66	93.00	100.00	100.00
BRRi dhan88	12.50	9.50	8.50	7.25	7.50	80.80	87.51	95.00	100.00	100.00
BRRi dhan89	8.75	8.50	8.00	7.50	7.00	96.91	100.00	100.00	100.00	100.00
BRRi dhan92	8.50	8.00	7.50	7.50	7.00	98.28	100.00	100.00	100.00	100.00
BRRi dhan96	10.25	8.50	7.50	7.00	7.00	82.42	89.31	100.00	100.00	100.00
Bangabandhu dhan100	9.50	8.50	7.50	7.00	7.00	95.31	98.71	100.00	100.00	100.00
LSD _{5%} for Variety (G)	2.04					5.57				
LSD _{5%} for Set (S)	1.53					3.62				
LSD _{5%} for G*S	3.42					8.36				

Irrespective of planting time long duration varieties (BRRi dhan29, BRRi dhan89 and BRRi dhan92) had higher grain yield than short duration varieties (Table 27). BRRi dhan84 had significantly higher spikelet sterility than BRRi dhan28 in first three sets of planting which indicating its reproductive stage cold susceptibility. In respect of grain yield and sterility BRRi dhan88 and BRRi dhan96 was more or less similar to BRRi dhan28. BRRi dhan67 and Bangabandhu dhan100 had less spikelet sterility and higher grain yield than BRRi dhan28. Long duration varieties BRRi dhan29 BRRi dhan89 and BRRi dhan92 escaped cold stress at reproductive phase in early planting due to its longer growth duration. However, BRRi dhan89 had slightly higher spikelet sterility in fifth set of planting than other tested varieties (Table 27).

Table 27: Grain yield and spikelet sterility of nine BRRi varieties as affected by planting time

Variety	Grain yield(t/ha)					Spikelet sterility (%)				
	Set 1	Set 2	Set 3	Set 4	Set 5	Set 1	Set 2	Set 3	Set 4	Set 5
BRRi dhan28	3.99	5.26	6.35	6.58	5.78	39.56	30.51	20.94	18.72	19.26
BRRi dhan29	7.40	8.08	8.48	7.97	7.84	27.48	18.15	15.99	16.72	16.74
BRRi dhan67	6.17	8.07	7.08	6.64	6.69	28.66	20.19	17.84	19.96	15.74
BRRi dhan84	3.62	5.49	5.60	6.09	7.60	45.58	38.55	34.76	20.29	18.79
BRRi dhan88	3.71	5.55	6.85	6.80	6.00	38.98	29.89	22.72	15.76	18.05
BRRi dhan89	7.34	9.24	9.09	8.01	8.12	30.00	24.55	19.13	20.44	21.73
BRRi dhan92	7.95	9.04	8.84	8.16	8.14	28.61	21.25	20.09	16.47	17.08
BRRi dhan96	3.29	5.98	5.68	6.80	5.74	36.20	28.34	22.10	15.54	15.75
Bangabandhu dhan100	6.38	7.02	7.50	7.81	7.75	29.67	25.93	18.88	14.44	16.62
LSD _{5%} for Variety (G)	0.29					5.22				
LSD _{5%} for Set (S)	0.21					3.89				
LSD _{5%} for G*S	0.64					11.68				

Expt. 19: Influence of nitrogen and potassium rates on performance of modern rice

A Nayeem, MS Alam, MM Khatun and M Mamunur Rashid

Introduction: Nitrogen and potassium play an important role on grain yield of rice. Soil K status has a considerable influence on N uptake. On the other hand, N fertilizer can affect K availability both in short- and long-term basis. Both ions are held by the same non-exchangeable sites in the interlayer and edges of interlayer of the 2:1 clay mineral.

Consequently, a simple competition where application of one ion should displace the other and increase its fraction in soil solution is to be expected. So, the objectives of present study are to find out suitable ratio of N and K for MV rice cultivation, and N and K dynamics in soil and plant.

Materials and methods: An experiment was conducted at BRRRI farm, Habiganj during Boro 2022-23. Five doses of K (0, 50, 100, 150 and 200 kg/ha) in the main plot and four doses of N (0, 100, 120 and 140 kg/ha) in the subplots were tested with BRRRI dhan92 in Boro season. The experimental design was split-plot with three replicates. Phosphorus and S was applied as blanket dose. Forty five days old seedlings in Boro season were transplanted maintaining 20cm × 20cm spacing. Standard cultural practices were followed for raising the crops. All plots were surrounded by 30 cm soil levee to avoid contamination between plots. At maturity the crop was harvested manually from 5 m² at 15 cm above ground level for grain yield. Grain yield was recorded at 14% moisture content.

Results: In K deficient (0 kg/ha) soil, rice grain yield increased with the application of N100 dose (7.96 t/ha) but it decreased significantly with the further increase of N rates (7.38-7.52 t/ha). Application of N at the rate 140 kg ha⁻¹ with 50 kg K ha⁻¹ produced significantly higher grain yield (8.87 t/ha) than other combination of N and K fertilization.

Table 28. Effect of N and K rates on grain yield (t ha⁻¹) of BRRRI dhan92, Boro 2022-23.

K doses (kg ha ⁻¹)	N doses (kg ha ⁻¹)			
	0	100	120	140
0	6.16bC	7.96 bA	7.52bAB	7.32cB
50	6.54aC	8.31aB	8.65aAB	8.87aA
100	6.50aB	8.58aA	8.62aA	8.64abA
150	6.42aB	8.48aA	8.40aA	8.50bA
200	6.60 aB	8.37aA	8.47aA	8.56abA
CV (%)	4.51			

Means with same lowercase letter in a column and same uppercase letter in a row are not significantly different at 5% level of probability.

Expt. 20: Long-term missing element trial for diagnosing yield limiting nutrient in soil of Habiganj

A Nayeem, MS Alam, MM Khatun, and M Mamunur Rashid

Introduction: Boro-fallow-fallow is the dominant cropping pattern of flash flooded haor area where soil fertility is different from any other soil. Some nutrients are limiting in this soil. Identification of limiting nutrients of soil is important for nutrient management. Missing element trial is an effective technique for soil fertility evaluation as well as crop productivity (Shah et al., 2008; Haque et al., 2019). This long-term missing element trial was conducted at BRRRI farm Habiganj to find out the yield limiting nutrients

Materials and Methods: The experiment was initiated in a permanent layout at the BRRRI regional station Habiganj farm in Boro 2007-08 season viewing missing element approach using 8 treatments in RCB design with 3 replications. The treatments were-T₁=NPKS (Complete), T₂=PKS (-N), T₃=NKS (-P), T₄=NPS (-K), T₅=NPK (-S), T₆=KS (-NP), T₇=PS (-NK) and T₈= all missing (-NPKS). Boro 2022-23 was the 13th year continuation of this experiment. There was a complete treatment consisting of the application of N, P, K and S fertilizer and other treatments “missing” the nutrient elements such as -N, -P, -K and -S. NPKSZn @ 120-38-50-9-3 kg ha⁻¹ respectively were used. N was applied in equal 3 splits i.e., one-third as basal, one third at active tillering stage and one third at 5-7 days before panicle initiation stage. Other fertilizers were applied during final land preparation. Tested cropping pattern was Boro-Fallow-Fallow. BRRRI dhan92 was used as a test crop. The unit plot size was

4m × 3m. Forty days old seedlings were transplanted using 2-3 seedlings hill⁻¹ with 20 cm × 20 cm spacing. Irrigation and other management practices were done as per needed. The crop was harvested from 5 m² area at the center of each plot and rice grain yield was adjusted to 14% moisture content.

Results and Discussion

The balance fertilizer treatment (NPKSZn) showed significantly higher grain yield and yield parameters of rice. The highest panicle m⁻² was obtained with balanced fertilized (T₁) plot followed by other omission plots. The highest grain yield was obtained in T₁ (8.15 t ha⁻¹) followed by T₅ (7.93 t ha⁻¹). The N and K omission treatment (T₂ and T₄) produced significantly lower yield (6.51-6.75 t ha⁻¹) than other treatments

Table 29. Effects of nutrient element omission from the complete treatment on grain yield of BRRI dhan92, Boro 2022-23, Habiganj.

Treatments	Panicle m ⁻²	Grain yield (t ha ⁻¹)
T ₁ (NPKSZn)	345	8.15
T ₂ (-N)	287	6.51
T ₃ (-P)	312	7.07
T ₄ (-K)	320	6.75
T ₅ (-S)	327	7.93
T ₆ (-NP)	315	7.68
T ₇ (-NK)	308	6.93
T ₈ (All missing)	253	6.01
LSD _{0.05}	4.91	0.26

T₁= NPKS (Complete), T₂= PKS (-N), T₃= NKS (-P), T₄= NPS (-K), T₅= NPK (-S), T₆= KS (-NP), T₇= PS (-NK) and T₈= All missing (-NPKS)

Conclusions

From the experiment it may be concluded that N is the most yield limiting nutrient element followed by K in BRRI RS, Habiganj farm.

Expt. 21: Screening for preharvest spouting of Boro rice

MM Rashid, MM Khatun and PS Biswas

Introduction: Seed dormancy is an important survival tool for plants since it allows them to weather conditions not conducive to survival. At the same time, excessive dormancy may lessen cultivation time. In response, farmers often plant low dormancy cultivars of rice in order to achieve a higher, more uniform emergence rate after sowing. Unfortunately, this practice has led to an unwanted worldwide production problem called pre-harvest sprouting (PHS), which severely reduces both grain yield and quality. Yield loss and quality deterioration of rice have been frequently reported due to PHS in Bangladesh. Water stands in the rice field at the time of harvest in lowland area of our country. As a result, mature rice panicles get contact with water and the seeds are prone to viviparous germination. PHS scenario become worse if mature panicles of susceptible rice variety get contact with water. Therefore, the cultivation of varieties with low viviparous is one of the prior considerations to minimize yield loss.

Materials and methods: An experiment was conducted to evaluate PHS tolerance of 26 BRRI developed modern Boro varieties in the field condition during Boro 2022-23 at BRRI farm Habiganj. The Seeds of all rice varieties were sown in nursery bed on 15 November 2022. Thirty five days-old healthy seedlings were transplanted in well puddle plots of 2m x 4m size on 20 December 2022 in randomized complete block design with three replications. Fertilizer was applied @ 120:60:60 of N: P: K kg ha⁻¹. The entire dose of P & K was applied as basal dose, while the N was applied in three equal split doses, at 15 and 30 days after transplanting

and before PI stage of the crop. Appropriate cultural practices like weeding and need based plant protection measures were undertaken in order to raise a healthy crop. The plants were tagged at the time of 50% flowering (anthesis) individually. Thirty days after anthesis (DAA), panicles were immersed into a plastic pot filled with water (IL) by bending without causing much strain to the plant. The germination count was taken 10 days after the above mentioned procedure. The emergence of coleoptiles was counted as germinated seed. The germination percentages of the seeds on the panicle were recorded by counting the number of germinated and un-germinated filled seeds on panicle. Seeds were considered germinated when the hull over the embryo ruptured. Three replications were taken for this study and each replication was taken with ten panicles from different hills. Experiment was conducted under normal temperature range prevailing at harvesting period of the season. The average temperature during test period was 29 0C.

Results: Preharvest sprouting varied among different varieties. BRRi dha35, BRRi dha55, BRRi dhan92 and BRRi dhan97 showed tolerant to pre-harvest sprouting (PHP= 0%). Other varieties which showed below 10% of pre-harvest sprouting were BRRi dhan28, BRRi dhan29, BRRi dhan58, BRRi dhan68 and BRRi dhan69. Some genotypes showing intermediate PHP (10 % – 20 % PHP) viz. BRRi dhan47, BRRi dhan59, BRRi dhan61, BRRi dhan63 BRRi dhan98, Bangabandhu dhan100 and BRRi dhan101. However, BRRi dhan96 was the most susceptible to pre-harvest sprouting, with 76% germinated seed in the panicle at 80% maturity stage followed by BRRi dhan50 (51%). BRRi dhan86 (36%), BRRi dhan74 (29%), BRRi dhan67 (28%), BRRi dhan84 (25%), BRRi dhan60 (22%) and BRRi dhan88 (22%) were also identified as susceptible to PHP. The experiment will be repeated again coming year (Table 30).

Table.30: Pre-harvest sprouting of 26 BRRi developed rice varieties

Sl no.	Name of varieties	Preharvest sprouting (%)
1	BRRi dhan28	9.4
2	BRRi dhan29	9.3
3	BRRi dhan35	0.0
4	BRRi dhan45	0.0
5	BRRi dhan47	10.89
6	BRRi dhan50	51.36
7	BRRi dhan55	0.0
8	BRRi dhan58	8.1
9	BRRi dhan59	15.0
10	BRRi dhan60	22.0
11	BRRi dhan61	11.69
12	BRRi dhan63	15.0
13	BRRi dhan67	28.0
14	BRRi dhan68	6.9
15	BRRi dhan69	8.99
16	BRRi dhan74	29.0
17	BRRi dhan81	10.75
18	BRRi dhan84	25.0
19	BRRi dhan86	35.0
20	BRRi dhan88	22.0
21	BRRi dhan92	0.0
22	BRRi dhan96	76.44
23	BRRi dhan97	0.0
24	BRRi dhan98	12.97
25	Bangabandhu dhan100	13.32
26	BRRi dhan101	12.82
LSD @5%		7.41
CV		12%

PEST MANAGEMENT

Expt. 22: Monitoring of insect pest and natural enemy incidence by using light trap

A Nayeem, MM Khatun, S Alam, MA Syed and MM Rashid

Materials and Methods: Rice insect pests and their natural enemies were monitored daily by using Pennsylvanian light traps from July 2021 to June 2022 at the BRRRI farm Habigonj. The traps were operated with 100 WATT white fluorescent tube light from dusk to dawn. Insect pests and natural enemies those were attracted to the light of the light trap slipped into the hole of the trap and caught behind in a pot attached with the hole of the trap. Then the insect pests and natural enemies were collected, stored, counted and the numbers were recorded in the data sheet every day.

Results : The abundance of insect pest and natural enemies in the light trap during the reporting period is presented in Figure 2 and Figure 3. Among the insect pests BPH population was found highest followed by GLH, green mirid bug and YSB. Highest peak of BPH, GLH and YSB were recorded in October- November. Green mirid bug population was also increased according to the increase of BPH population. Among the natural enemies Lady Bird Beetle (LBB) population were found highest followed by Carabid Beetle (CDB). Peak period of Lady Bird Beetle (LBB) and Carabid Beetle (CBB) was observed in May.

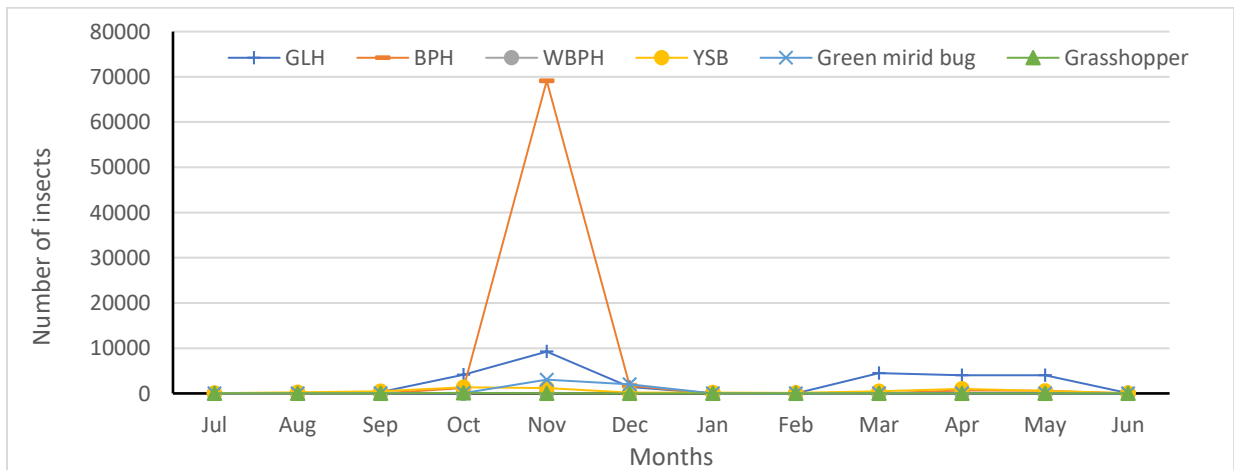


Fig.2. Incidence patterns of major insect pests in light trap. BRRRI R/S Habiganj. July 2022- June 2023

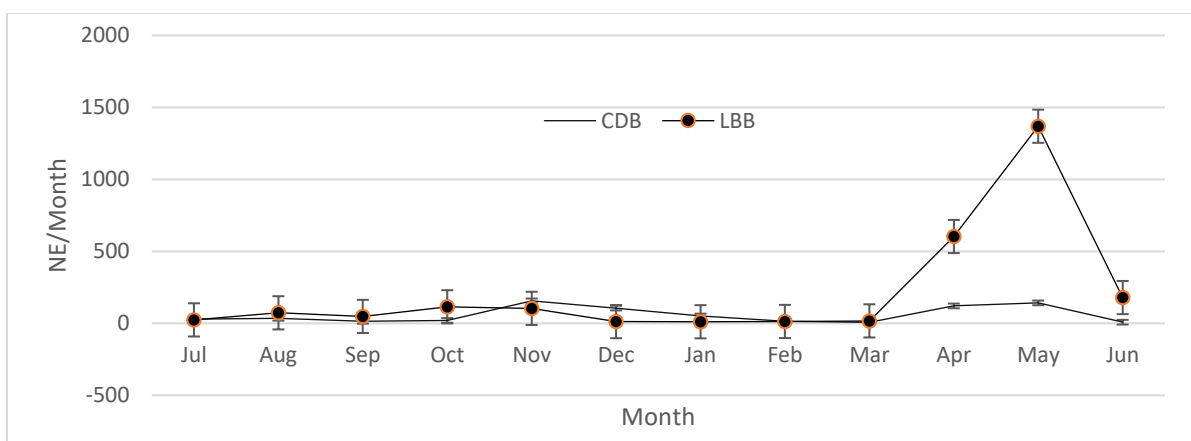


Fig 3. Incidence pattern of natural enemies of rice insect pests in light trap, BRRRI R/S, Habigonj, July 2022-jun 2023.

SOCIOECONOMIC POLICY

Expt. 23: Stability Analysis of BIRRI released Boro Varieties

A Nayeem¹, MA Syed¹, MM Rashid¹, I Hossain² and PS Biswas¹

¹ BIRRI Regional Station Habiganj and ² Head, Statistics Division, BIRRI

Objectives: To measure general and specific adaptability, and stability of the BIRRI-released rice varieties at BIRRI Regional Station, Habiganj.

Materials and Methods: An experiment was carried out in the research field of the BIRRI regional station Habiganj during Boro 2022–23. BIRRI released 49 rice varieties were tested in this experiment. using an RCBD design with three replications. The unit plot size was 5× 4 m with 20 × 20 cm spacing. Fertilizers at the rate of 100:60:60:10:10 kg/ha of NPKS and Zn were applied. All fertilizers were applied at final land preparation except N. N in the form of urea was top-dressed three times, 15, 30, and 45 days after transplanting. All other cultural management practices were done as and when necessary.

Results: The yield range for Boro varieties was 2.8 to 7.9 t/ha. Among the varieties, BIRRI hybrid dhan3 yielded the highest, which were 7.9 t/ha with a growth duration of 156. On the other hand, BIRRI dhan64 yielded the lowest, which were 2.8 t/ha. Stability analysis of 49 Boro varieties was done and presented in the Annual Research Review Reports, 2022-23 of Agricultural Statistics Division, BIRRI.

Table 31: Growth duration, plant height and grain yield of some BIRRI developed Boro varieties during Boro 2022-23 season.

Sl no	Variety	Growth duration	Plant height	Grain yield (t/ha)
1	BR1	164	77.8	5.5
2	BR2	156	104.0	3.1
3	BR3	159	83.0	5.7
4	BR6	154	101.2	6.0
5	BR7	162	110.2	4.7
6	BR8	158	114.8	4.7
7	BR9	160	113.6	5.1
8	BR12	161	81.0	5.4
9	BR14	156	104.6	5.5
10	BR15	162	97.5	6.0
11	BR16	160	89.6	5.7
12	BR17	152	120.0	3.1
13	BR18	160	111.8	5.1
14	BR19	161	106.0	5.5
15	BR26	146	111.1	3.5
16	BIRRI dhan27	151	138.4	4.6
17	BIRRI dhan28	146	104.0	4.6
18	BIRRI dhan29	161	96.2	6.4
19	BIRRI dhan35	160	108.4	5.8
20	BIRRI dhan36	154	85.4	5.9
21	BIRRI dhan45	142	102.8	4.2
22	BIRRI dhan47	154	99.7	5.2
23	BIRRI dhan50	157	97.0	4.4
24	BIRRI dhan55	156	101.0	6.6
25	BIRRI dhan58	156	103.1	6.3
26	BIRRI dhan59	153	84.6	5.9
27	BIRRI dhan60	147	96.8	6.5

28	BRRI dhan61	154	88.5	5.5
29	BRRI dhan63	151	86.2	4.3
30	BRRI dhan64	152	99.4	2.8
31	BRRI dhan67	150	110	5.8
32	BRRI dhan68	154	90.6	6.6
33	BRRI dhan69	154	98.2	5.6
34	BRRI dhan74	149	96.3	6.6
35	BRRI dhan81	152	93.5	3.4
36	BRRI dhan84	148	106.5	3.2
37	BRRI dhan86	146	91.2	3.9
38	BRRI dhan88	151	94.6	5.5
39	BRRI dhan89	160	105.0	6.7
40	BRRI dhan92	159	109.3	6.4
41	BRRI dhan96	147	89.5	4.5
42	BRRI dhan97	156	113.2	6.7
43	BRRI dhan99	158	105.2	6.7
44	Bangabandhu dhan100	151	110.8	6.7
45	BRRI dhan101	155	115.7	5.9
46	BRRI dhan102	161	107.6	6.8
47	BRRI Hybrid dhan2	154	98.2	7.3
48	BRRI hybrid dhan3	156	98.9	7.9
49	BRRI hybrid dhan5	158	99.86	6.4
LSD@5%		2.15	5.35	1.09

TECHNOLOGY TRANSFER

Advanced Line Adaptive Research Trail (ALART), 2022-23

Expt. 24: ALART (PQR), T. Aman 2022-23

MM Khatun, A Nayeem, S Alam, MA Syed, MM Rashid and PS Biswas

Materials and Methods: Two premium quality rice lines, namely BR8493-3-5-1-P1 and BR9590-45-1-2-3-P2, along with two standard check varieties BRRI dhan34 and BRRI dhan70 were evaluated in this experiment at Bahubol Upazila, in Habiganj during T. Aman 2022.

Result: The tested entry BR8493-3-5-1-P1 did not germinate and another tested entry V2=BR9590-45-1-2-3-P2 showed lower yield than check varieties. The tested entry gave 3.29 t ha⁻¹ (Table 32). So, the advanced lines were not recommended for PVT.

Table 32: Plant Height, Growth Duration and Grain Yield of ALART Premium Quality Rice (PQR), T. Aman 2022-23

Genotype	PH (cm)	GD	GY (tha ⁻¹)
V1=BR8493-3-5-1-P1	-	-	-
V2=BR9590-45-1-2-3-P2	110.06	131.33	3.29
V3=BRRI dhan34(CK)	127.43	126.33	3.18
V4=BRRI dhan70(CK)	124.7	137	3.64
CV	2.42	0.4	3.5
LSD	6.65	1.19	0.26

Expt. 25: ALART (BRR), Boro 2022-23

MM Khatun, A Nayeem, S Alam, MA Syed, MM Rashid and PS Biswas

Materials and Methods: Four blast resistant lines, namely BR12454-BC2-56-81-27-3-30, BR12454- BC2-69-97-39-5-44, BR12454- BC2-71-91-6-23-26 and BR12454- BC2-75-32-31-

39-7, along with two standard check varieties, BRRi dhan29 and BRRi dhan89, were evaluated in this experiment at the farmer's field of Baniachong upazila in Habiganj during Boro 2022-23.

Results: Grain yield of the tested entries ranged from 6.10 to 6.98 t ha⁻¹ (Table 33). All the tested entries had lower yield than the check variety BRRi dhan89. So, the advanced lines were not recommended for PVT.

Table 33 Plant Height, growth duration and Grain Yield of ALART Blast Resistant Rice (BRR), Boro 2021-22

Genotype	PH (cm)	GD	GY (tha ⁻¹)
V1= BR12454- BC2-56-81-27-3-30	106.0	157	6.10
V2= BR12454- BC2-69-97-39-5-44	97.9	156	6.59
V3= BR12454- BC2-71-91-6-23-26	104.3	159	6.68
V4= BR12454- BC2-75-32-31-39-7	112.0	159	6.98
V5= BRRi dhan29 (Std. & Sus. Ck)	97.7	156	6.88
V6= BRRi dhan89 (Std. & Sus. Ck)	107.8	155	7.23
CV	1.09	1.34	5.23
LSD	2.08	3.83	0.64

Expt. 26: Re ALART (BRR), Boro 2022-23

MM Khatun, A Nayeem, MS Alam, MA Syed, MM Rashid and PS Biswas

Materials and Methods: The experiment was conducted at the farmer's field at Baniachong upazila, in Habiganj. Four blast resistant lines, namely BR(Path)12452-BC3-42-22-11-4, BR(Path)12452-BC6-53-21-11, BR(Path)13784-BC3-61-1-6-HR3 and BR(Path)13784-BC3-63-6-4-HR6, along with two standard check varieties, BRRi dhan28 and BRRi dhan88, were evaluated in this experiment at the farmer's field of Baniachong upazila in Habiganj during Boro 2022-23.

Results: Grain yield of the tested entries ranged from 4.69 to 8.02 t ha⁻¹ (Table 34). The tested genotypes BR(Path)12452-BC6-53-21-11 and BR(Path)13784-BC3-63-6-4-HR6 performed better than the check varieties. So, the advanced lines BR(Path)12452-BC6-53-21-11 and BR(Path)13784-BC3-63-6-4-HR6 were recommended for PVT.

Table 34: Plant Height, Growth Duration and Grain Yield of ALART (BRR), Re-ALART Boro 2022-23

Genotype	PH (cm)	GD	GY (t ha ⁻¹)
V1= BR(Path)12452-BC3-42-22-11-4	114.53	142	7.51
V2= BR(Path)12452-BC6-53-21-11	117.43	142	8.02
V3= BR(Path)13784-BC3-61-1-6-HR3	104.97	140	4.69
V4= BR(Path)13784-BC3-63-6-4-HR6	101.20	144	7.70
V5=BRRi dhan28 (Ck)	115.07	140	3.32
V6=BRRi dhan88 (Ck)	95.20	142	7.95
CV	2.73	6.32	3.65
LSD	5.38	1.62	0.43

Expt. 27: ALART, (FBR Barishal), Boro 2022-23

MM Khatun, A Nayeem, MS Alam, MA Syed, MM Rashid and PS Biswas

Materials and Methods: The four genotypes namely BRBa 1-4-9, BRBa14-NGR414-1, BRBa 3-1-7 and BRBa40-NGR1255-1 along with two standard check varieties BRRi dhan58 and BRRi dhan89 were evaluated at the farmer's field of Baniachong upazila in Habiganj during Boro 2022-23.

Results: The tested entries gave statistically similar yield 8.24, 8.16, 7.86 and 8.04 t ha⁻¹ in 156, 153, 153 and 153 days respectively (Table 35). The tested lines had lower grain yield than the check variety BRRI dhan89. So, the advanced lines were not recommended for PVT (Table 35).

Table 35: Plant Height, growth duration and Grain Yield of ALART Favourable Boro Rice (FBR) Barishal, Boro 2022-23

Genotype	PH (cm)	GD	GY (t ha ⁻¹)
V1= BRBa 1-4-9	109.33	156	8.24
V2=BRBa14-NGR414-1	97.60	153	8.16
V3=BRBa 3-1-7	92.97	153	7.86
V4= BRBa40-NGR1255-1	105.53	153	8.04
V5=BRRRI dhan58 (Ck)	101.93	151	7.06
V6=BRRRI dhan89 (Ck)	107.00	156	8.44
CV	2.12	1.42	3.19
LSD	3.95	3.99	0.46

Expt. 28: ALART, (FBR SD) Boro 2022-23

MM Khatun, A Nayeem, MS Alam, MA Syed, MM Rashid and PS Biswas

Materials and Methods: The four genotypes namely BR11318-5R-63, BR11337-5R-72, SVIN109 and IR17A1723 along with two standard check varieties BRRRI dhan81 and BRRRI dhan96 were evaluated at the farmer's field of Baniachong upazila in Habiganj during Boro 2022-23.

Results: Grain yield of the tested entries ranged from 6.12 to 7.31 t ha⁻¹ (Table 36). The BR11337-5R-72 line had significantly higher grain yield than the check varieties. So, this advanced line was recommended for further testing (Table 36).

Table 36: Plant height, growth duration and grain yield of ALART Favourable Boro Rice (FBR SD), Boro 2022-23

Genotype	PH (cm)	GD	GY (tha ⁻¹)
V1=BR11318-5R-63	107.1	146	6.13
V2=BR11337-5R-72	104.2	150	7.31
V3=SVIN109	108.3	148	6.48
V4=IR17A1723	85.6	141	6.12
V5=BRRRI dhan81(Ck)	86.2	141	3.77
V6=BRRRI dhan96(Ck)	92.8	142	6.87
CV	1.1	2.39	5.42
LSD	3.5	3.42	0.58

Expt. 29: ALART (FBR MD), Boro 2022-23

MM Khatun, A Nayeem, MS Alam, MA Syed, MM Rashid and PS Biswas

Materials and Methods: The two genotypes namely IR12A173 and IR17A1694 along with two standard check varieties BRRRI dhan58 and BRRRI dhan96 were evaluated at the farmer's field of Baniachong upazila in Habiganj during Boro 2022-23.

Results: The tested entries IR12A173 and IR17A1694 had grain yield of 7.35 and 6.82 t ha⁻¹ in 153 and 146 days respectively (Table 37). The IR12A173 line performed better than the check varieties. So, this advanced line was recommended for PVT.

Table 37: Plant Height, growth duration and Grain Yield of ALART Favourable Boro Rice (FBR MD), Boro 2022-23

Genotype	PH (cm)	GD	GY (tha ⁻¹)
V1= IR12A173	103.9	153	7.35
V2= IR17A1694	95.5	146	6.82
V3=BRRI dhan58 (Ck)	97.9	151	6.08
V4=BRRI dhan96 (Ck)	89.6	146	6.93
CV	1.8	4.99	4.75
LSD	3.4	1.48	0.52

Expt. 30: ALART (SHR 1), Boro 2022-23

MM Khatun, A Nayeem, MS Alam, MA Syed, MM Rashid and PS Biswas

Materials and Methods: Three Superior High Yielding lines, namely BRH10-1-14-2-6, BRH13-2-4-7-2B and BRH15-24-7B along with one standard check variety, BRRI dhan81, were evaluated in this experiment at the farmer's field of Baniachong upazila in Habiganj during Boro 2022-23.

Results: Grain yield of the tested entries BRH10-1-14-2-6, BRH13-2-4-7-2B and BRH15-24-7B was 6.03, 4.79 and 4.81 t ha⁻¹ in 142, 148, and 138 days respectively (Table 38). Although the tested entries showed higher yield than the check variety, the tested genotypes were not attractive to the ALART monitoring team and the farmers due to their poor phenotypic acceptance, irregular flowering and maturity. So, none of the advanced lines was recommended for further testing.

Table 38: Plant Height, growth duration and Grain Yield of ALART Superior High Yielding (SHR 1), Boro 2022-23

Genotype	PH (cm)	GD	GY (tha ⁻¹)
V1=BRH10-1-14-2-6	95.7	142	6.03
V2=BRH13-2-4-7-2B	95.2	148	4.79
V3=BRH15-24-7B	84.2	138	4.81
V4=BRRI dhan 81 (ck)	77.6	135	1.94
CV	2.04	4.61	6.78
LSD	3.6	1.29	0.59

Expt. 31: ALART (SHR 2), Boro 2022-23

MM Khatun, A Nayeem, MS Alam, MA Syed, MM Rashid and PS Biswas

Materials and Methods: Three Superior High Yielding lines, namely BRH11-2-4-7B, BRH13-2-4-2-1B and BRH238-5-1-4-2 along with one standard check variety, BRRI dhan88, were evaluated in this experiment at the farmer's field of Baniachong upazila in Habiganj during Boro 2022-23.

Results: The tested entries BRH11-2-4-7B, BRH13-2-4-2-1B and BRH238-5-1-4-2 produced grain yield of 5.45, 5.72 and 4.87 t ha⁻¹ in 151, 153 and 155 days respectively (Table 39). All the tested entries had lower yield than the check variety. So, none of the advanced lines was recommended for PVT.

Table 39: Plant Height, growth duration and Grain Yield of ALART Superior High Yielding (SHR 2), Boro 2022-23

Genotype	PH (cm)	GD	GY (tha ⁻¹)
V1= BRH11-2-4-7B	97.93	151	5.45
V2= BRH13-2-4-2-1B	105.8	153	5.72
V3= BRH238-5-1-4-2	102.56	155	4.87
V4= BRRi dhan88 (ck)	88	151	6.18
CV	6.44	3.52	4.75
LSD	2.44	1.07	0.52

Expt. 32: Demonstration of newly released BRRi varieties

MM Khatun, A Nayeem, MS Alam, MA Syed, MM Rashid and PS Biswas

Objectives: To demonstrate the performance of newly released BRRi varieties and to motivate the farmers' for rapid dissemination of these varieties through quality seed production.

Materials and method: Demonstration of newly released BRRi varieties was established in different upazillas of Habiganj Sylhet, Sunamgang and Moulavibazar districts during T Aus 2022, T. Aman 2022 and Boro 2022-23 seasons. A total of 50, 100 and 300 different farmers' were selected for 50, 100 and 300 demonstration in T Aus, T Aman and Boro season respectively to conduct the program. BRRi dhan48, BRRi dhan98 and BRRi Hybrid dhan7 were selected for T. Aus 2022 season. BRRi dhan75, BRRi dhan79, BRRi dhan87, BRRi dhan90, BRRi dhan93, BRRi dhan94, BRRi dhan95, BRRi Hybrid dhan4 and BRRi Hybrid dhan6 were selected for T. Aman 2022 whereas, BRRi dhan67, BRRi dhan84, BRRi dhan88, BRRi dhan89, BRRi dhan92, BRRi dhan96, Bangabandhu dhan100, BRRi Hybrid dhan3 and BRRi Hybrid dhan5 were selected for Boro 2022-23 seasons. Each variety was cultivated in 33 decimals areas. Seeds of the selected varieties were sent to the respective DAE office with production packages. Cost of fertilizers and signboards were supplied. The scientists of BRRi Habiganj supervised time to time and collected data. For yield estimation, 10 sq.m samples from each plot were harvested at maturity and grain yields were adjusted to 14 % moisture content.

Results: In Aus 2022, average yield of BRRi dhan48, BRRi dhan98 and BRRi Hybrid dhan7 were 4.2 t/ha, 4.45 t/ha and 5.0 t/ha, respectively. Farmers were motivated to cultivate all the three varieties.

In T. Aman 2022, average yield of BRRi dhan75, BRRi dhan79, BRRi dhan87, BRRi dhan90, BRRi dhan93, BRRi dhan94, BRRi dhan95, BRRi Hybrid dhan4 and BRRi Hybrid dhan6 were 4.5 t/ha, 5.3 t/ha, 4.2 t/ha, 4.9 t/ha, 5.0 t/ha, 5.0 t/ha, 5.5 t/ha, 5.8 t/ha and 5.9 t/ha, respectively. Most of the farmers were motivated to cultivate BRRi dhan75, BRRi dhan90, BRRi dhan95 BRRi Hybrid dhan4 and BRRi Hybrid dhan6. BRRi dhan87 performed better in Habiganj and Moulavibazar but affected by tungro disease in Sylhet district. BRRi dhan93 and BRRi dhan94 were lodged in some areas.

In Boro 2022-23, average yield of BRRi dhan67, BRRi dhan84, BRRi dhan88, BRRi dhan89, BRRi dhan92, Bangabandhu dhan100, BRRi Hybrid dhan3 and BRRi Hybrid dhan5. were 6.3 t/ha, 3.3 t/ha, 6.2 t/ha, 6.9 t/ha, 7.0 t/ha, 6.2 t/ha, 6.4 t/ha, 7.5 t/ha, and 7.9 t/ha, respectively. Most of the farmers have chosen BRRi Hybrid dhan5, BRRi Hybrid dhan3, BRRi dhan92, BRRi dhan89, Bangabandhu dhan100 and BRRi dhan67 for Boro season due to their higher yield and less blast disease. Some farmers preferred BRRi dhan96 and BRRi dhan88 for their short duration. BRRi dhan84 was severely affected by neck blast resulting its poor yield in Haor areas.

Rice School (Farmers' training)

One-day Farmer's training called "Rice School" was conducted to train farmers on modern rice cultivation technologies and to encourage them to adopt modern rice varieties and associate technologies.

BIRRI regional station, Habiganj conducted 10 rice school at different locations of Sylhet region during the reporting period. These training programmes were conducted at Habiganj Sadar, Chunarughat, Baniachong, Madhobpur, Sylhet Sadar, Biswanath, Moulovibazar Sadar, Rajnagar, Goainghat, Shantiganj. In total 300 persons were trained. Rice school was conducted with the help of DAE where 30 farmers participated in each program. Modern rice varieties and associated technologies were discussed with the help of colorful transparencies and slides for easy understanding of the farmers. Awareness for adopting improved rice cultivation technologies and enhancing the dissemination of BIRRI Varieties was done through those trainings.

Farmer' Field day

BIRRI regional station, Habiganj conducted 10 field day in different location of Sylhet region during the reporting period (Aus season-01, Aman season-04, Boro season-05). More than 2,000 (average of 200 in each field day) farmers, extension personnel, administrative peoples, public leaders participated in these field days. Most of the farmers have preferred BIRRI dhan98 over BIRRI dhan48 due to its higher yield and slender grain in Aus season. In Aman season, farmers chosen BIRRI dhan75 for its short duration and BIRRI dhan95 for its non-lodging and higher yield. BIRRI dhan89, BIRRI dhan92 and Bangabandhu dhan100 have been chosen for Boro season due to their higher yield and less blast disease. Farmers showed their interest to cultivate the demonstrated varieties in the next season.

Seed Production

Breeder seed production

In Boro 2022-23, a total of 25,750 kg (BIRRI dhan28 = 6750 kg, BIRRI dhan29 = 2750 kg, BIRRI dhan89 = 8250 kg, BIRRI dhan92 = 5500 kg and Bangabandhu dhan100 = 2500 kg) breeder seed were produced

Table 40: Breeders Seed production, Boro 2022-23

Sl no.	Variety name	Amount of seeds (kg)
1	BIRRI dhan28	6750
2	BIRRI dhan29	2750
3	BIRRI dhan89	8250
4	BIRRI dhan92	5500
5	Bangabandhu dhan100	2500
Total		25,750

TLS seed production

In Aus 2022, a total of 900 kg BIRRI dhan98, in T. Aman 2022, a total 6250 kg (BR22 = 1150 kg, BIRRI dhan49 = 400 kg, BIRRI dhan75 = 250 kg, BIRRI dhan79 = 650 kg, BIRRI dhan87 =500 kg, BIRRI dhan90 =700kg, BIRRI dhan93 = 600kg, BIRRI dhan94 = 800 kg, BIRRI dhan95

= 1200 kg) and in Boro 2022-23, a total of 15,730 kg (BRRI dhan28 = 80 kg, BRRI dhan29 = 1000 kg, BRRI dhan67 = 3600 kg, BRRI dhan84 = 2600 kg, BRRI dhan88 = 4700, BRRI dhan89 = 300, BRRI dhan92 = 1500, BRRI dhan96 = 750 kg, Bangabandhu dhan100 = 1200 kg) TLS seed were produced. BRRI released varieties would be disseminated quickly to farmers by using these seeds.

Table 41: TLS Seed Production Aus 2022

Sl no.	Variety name	Amount of seeds(kg)
1	BRRI dhan98	900

Table 42: TLS Seed Production Aman 2021-2022

Sl no.	Variety name	Amount of seeds (kg)
1	BR22	1150
2	BRRI dhan49	400
3	BRRI dhan75	250
4	BRRI dhan79	650
5	BRRI dhan87	500
6	BRRI dhan90	700
7	BRRI dhan93	600
8	BRRI dhan94	800
9	BRRI dhan95	1200
Total		6,250/-

Table 43: TLS Seed Production Boro 2021-2022

Sl no.	Variety name	Amount of seeds (kg)
1	BRRI dhan28	80
2	BRRI dhan29	1000
3	BRRI dhan67	3600
4	BRRI dhan84	2600
5	BRRI dhan88	4700
6	BRRI dhan89	300
7	BRRI dhan92	1500
8	BRRI dhan96	750
9	Bangabandhu dhan100	1200
Total		15,730/-