ANNUAL RESEARCH REVIEW WORKSHOP
2022- 2023

Program Area-I: Varietal Development Program
Hybrid Rice Division

Bangladesh Rice Research Institute
Gazipur 1701

BRRI Annual Report for

July 2022-June 2023

Hybrid Rice Division

Bangladesh Rice Research Institute

Gazipur 1701

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**** Deputation for in-country PhD program***

Hybrid Rice Division

SUMMARY

In T. Aman season 2022, a total of 74 test crosses and 430 (A × R) crosses were made from source nursery. Eighty test crosses (F_1s) were evaluated for their pollen fertility status of which two entry has been found heterotic over check varieties. Pollen parent of this combination was regarded as suspected restorer and selected for fertility restoration ability with other CMS lines in the next season. Two entry was found completely sterile and their corresponding male parent was regarded as suspected maintainer line. Twenty-one backcross entries were advanced as new CMS lines. Other backcross generations were advanced to next generations except four BC_6 generations which were found unstable in terms of pollen sterility and hence discarded. Ninety-four CMS lines along with their respective maintainer lines were maintained by hand crossing.

A total of 91 test crosses and 513 (A × R) crosses were made using 14 CMS lines in Boro season 2022-23. Eighty-three test crosses (F_1s) were evaluated for their pollen fertility status. Among them two entries showed complete sterility and immediately backcrossed with their corresponding male parents for conversion. On the other hand, four entries have been selected for their high yielding ability compared with check varieties. Six BC_6 generations were advanced as new CMS lines and shifted to CMS maintenance and evaluation nursery. Other entries were advanced for next generations except three BC_2 and one BC_1 generations due to pollen fertility fluctuation. One hundred forty-six CMS lines along with their respective maintainer lines were maintained by hand crossing in CMS maintenance and evaluation nursery for their genetic purity.

In T. Aman, out of 205 test hybrids under observational trials, ten (10) hybrid combinations were selected based on yield, duration and grain type and expressed more than 15-18% yield advantage over check variety BRRI hybrid dhan6, 9-12% over AZ7006 and 6-9 % over Dhanny Gold. The heritability obtained from growth duration and grain yield were 87%, and 82% respectively, indicating high level of precision in this experiment. In Boro, out of 135 test hybrids 17 hybrid combinations were selected based on yield, duration and grain type. The selected hybrid combinations expressed 4-21% yield advantage over BRRI hybrid dhan5, 7-24% over SL8H and 15-34% over Tej Gold, 4-21% over Heera and BRRI hybrid dhan8. The heritability obtained from growth duration and grain yield was 94% and 75% respectively, indicating high level of precision in this experiment.

Under parental line improvement program (B×B & R×R) seven B×B and 11 R×R crosses were confirmed based on different cyto-sources and amylose content in T Aman 22 and seven B×B and 10 R×R crosses were made based on different cyto-sources, grain type and amylose content in Boro 2022-23. Under field rapid generation advancement program 30986 F_3, F_4 and F_5 progenies of B×B, R×R and A×R were advanced in T Aman 22 and 59256 progenies of F_2, F_4, F_5 and F_6 generations of B×B, R×R and A×R crosses were advanced in Boro 2022-23.

In T. Aman preliminary yield trials, two hybrids were selected out of 15 and showed yield advantage 3-25 % over BRRI hybrid dhan6, 6-20 % over AZ7006 and 3-14 % over Dhanny Gold. In T. Aman under multi-location trials one hybrid out of eleven gave 29% yield advantage over BRRI hybrid dhan6, 27% over AZ7006 and 19% over Dhanny Gold under Set-I. In set-II,

one hybrid out of 10 hybrids gave 21% yield advantage over BRRI hybrid dhan6 and AZ7006 and 13% over Dhanny Gold. In Boro, under preliminary yield trials, thirteen hybrids were evaluated along with four hybrids as check variety. Out of 13 hybrids two hybrids were selected and gave 4-6% yield advantage over BRRI hybrid dhan5, 14-18% over SL8H, 24-28% over Heera-2 and 11-14% over check variety Tej Gold. In Boro, multi-location yield trials comprised fourteen hybrids with four checks. Three hybrids were selected based on average yield of five locations over check varieties and expressed 6-10% yield advantage over BRRI hybrid dhan5, 18-23 % over SL8H, 12-16% over Heera-2 and 18-23% over Tej Gold.

Adaptability under saline condition of BRRI developed and popular company hybrids along with popular saline tolerant inbred checks BRRI dhan 67 and locally cultivated rice IT was done at two coastal locations of Satkhira (Debhata and Kaliganj). None of the tested entries performed well at kaliganj and Debhata of Satkhira due to very high-water salinity (13.81 ds/m and 9.4 ds/m, respectively). We found that the top highest yielding genotypes were BRRI hybrid dhan3 (5.88 t ha^{-1}), BRRI hybrid dhan6 (5.65 t ha-^{1}), BRRI hybrid dhan2 (4.61 t ha-^{1}) followed by BRRI hybrid dhan67 (4.53 t ha^{-1}), BRRI hybrid dhan7 (4.44 t ha^{-1}), Heera (4.30 t ha^{-1}). Therefore, we can conclude that BRRI hybrid dhan3, BRRI hybrid dhan6, BRRI hybrid dhan2 and BRRI dhan67 can be cultivated profitably in areas where water salinity level of the paddy field remains 3.77 ds/m to 9.4 ds/m.

Eleven CMS lines including promising and released hybrids were multiplied during Boro 2022-23 and got total seed yield of 3. 7 metric tons. It was ranging from 2.8 kg to 1352 kg/plot equivalent to 0.3 to 1.99 t/ha. Experimental F_1 seed production was made using twelve CMS with five different restorer lines and seed yield was ranging 0.5 to 60 kg/plot from selected promising hybrid combinations during T. Aman 2022 which was equivalent to 0.03 to 1.9 t/ha. Sixty-four experimental hybrids were evaluated in augmented design during Boro 2022-23 and selected 12 hybrids expressed more than 5% yield advantages over the highest yielded check varieties. In Boro 2022-23, a total of 208 kg (1.04 t/ha) from BRRI hybrid dhan5 and 295 kg (1.5 t/ha) from BRRI hybrid dhan6, 370 kg (1.5 t/ha) from BRRI hybrid dhan7 and 325 kg (1.63 t/ha) from BRRI hybrid dhan8 were obtained. From production side (Ishwardi and Barishal) 962 kg (0.96 t/ha) from BRRI hybrid dhan2, 7150 kg (1.5 t/ha) from BRRI hybrid dhna3, 1500 kg (1.5 t/ha) from BRRI hybrid dhan4, 3628 kg (1.05 t/ha) from BRRI hybrid dhan5, 5700 kg (2.04 t/ha) from BRRI hybrid dhan6, 4620 (2.31 t/ha) from BRRI hybrid dhan7 and 3872 kg (1.94 t/ha) of BRRI hybrid dhan8 F_1 seeds was obtained.

In T Aman 2022, hybrid rice division supplied 8046 kg of parental lines and F_1 seeds to 90 farmers, 10 seed companies, scientists, extension people, projects and staffs of BRRI. In Boro 2022-23, hybrid rice division supplied 21606 kg of parental lines and F_1 seeds to 130 farmers, 24 seed companies, scientists, extension people, projects and staffs of BRRI. In T Aus 2023, 7980 kg F_1 seeds of BRRI hybrid dhan7 was distributed free of cost among farmers through different regional stations of BRRI and department of agricultural extension. Twenty-three stake holders produced more than 450 MT F_1 seeds using BRRI developed hybrid rice parental lines during Boro 2022-23.

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USEFUL SCIENTIFIC INFORMATION

Hybrid Rice Research and Development Program, Hybrid Rice Division, BRRI

General Objectives of the Program:

1. Development of hybrid rice varieties from the varieties/lines adapted to Bangladesh conditions and takes necessary measure for its use by the farmers,
2. Development, optimization and/or refinement of hybrid rice seed production and cultivation technologies suitable for Bangladesh,
3. Impart training to researchers, extensionists, farmers and seed producers on hybrid rice seed production and cultivation technologies,
4. Production of nucleus and breeder's seed and meet the demand of hybrid rice seed in the country.

Sub-project 1. Development of parental lines and hybrids

A. Experiments conducted during T. Aman season, 2022

Sub-sub-project-1.1: Breeding for high yielding hybrid rice variety

General Objectives:
i) Developing CMS lines from the adaptable varieties/lines suitable for Bangladesh,
ii) Maintenance & evaluation of exotic/locally developed CMS lines,
iii) Selection of heterotic rice hybrids & usable parental materials.

Experiment 1.1.1 Source Nursery

Specific objective: Identification of prospective maintainers and restorers of diversified origin for making experimental rice hybrids.

Materials and methods: Four hundred and sixty-eight (468) entries were evaluated under this nursery comprising 384 restorer lines, 13 CMS lines, 71 elite advance lines from BRRI, IRRI and other exotic sources. Parents were grown in three (3) sets with the spacing of 20 × 20 cm. The CMS lines were planted in 3 seeding dates with an interval of 5 days to synchronize with the early, medium and late source nursery entries. Hand crosses were made to produce 50-150 F_1 seeds from each cross.

Results and discussion: Seventy-four **(**74) test crosses and 430 (A × R) crosses were made using 13 CMS lines during T. Aman season 2022. List of crosses have been shown in **Table 1 & 2.**

Location: BRRI, Gazipur.

Principal investigator: Md Jamil Hasan

Co-Investigator: Afsana Ansari

Table 1. List of testcrosses made during T. Aman season 2022

SL. No.	Designation	Seeds obtained	Remarks
01	BRRI11A/ ASM2	90	
02	BRRI11A/ MZ-1	75	
03	BRRI11A/ ASM3	65	
04	BRRI11A/ ASM4	80	
05	BRRI11A/ ASM6	85	
06	BRRI11A/ MZ-3	65	
07	BRRI11A/ ASM7	90	
08	BRRI11A/ UKL-4	70	
09	BRRI48A/ BR11716-4R-108	65	
10.	BRRI48A/ ASM1	70	
11.	BRRI48A/ ASM2	80	

SL. No.	Designation	Seeds obtained	Remarks
12.	BRRI48A/ MZ-1	85	
13.	BRRI48A/ ASM3	55	
14.	BRRI48A/ ASM4	85	
15.	BRRI48A/ ASM5	95	
16.	BRRI48A/ ASM6	75	
17.	BRRI48A/ MZ-3	95	
18.	BRRI48A/ ASM7	75	
19.	BRRI48A/ UKL-8	85	
20.	BRRI48A/ UKL-16	90	
21.	BRRI48A/ UKL-17	75	
22.	BRRI48A/ UKL-31	65	
23.	BRRI48A/ UKL-32	80	
24.	BRRI97A/ BR11716-4R-108	85	
25.	BRRI97A/ ASM1	65	
26.	BRRI97A/ ASM2	90	
27.	BRRI97A/ MZ-1	70	
28.	BRRI97A/ ASM3	65	
29.	BRRI97A/ ASM4	70	
30.	BRRI97A/ ASM5	85	
31.	BRRI97A/ ASM6	55	
32.	BRRI97A/ MZ-3	65	
33.	BRRI97A/ ASM7	70	
34.	BRRI97A/ UKL-4	85	
35.	BRRI99A/ BR11716-4R-108	75	
36.	BRRI99A/ BR11723-4R-172	90	
37.	BRRI99A/ ASM1	90	
38.	BRRI99A/ ASM3	85	
39.	BRRI99A/ ASM4	95	
40.	BRRI99A/ ASM5	75	
41.	BRRI99A/ ASM6	90	
42.	BRRI109A/ BR11716-4R-147	75	
43.	BRRI109A/ BR11723-4R-172	65	
44.	BRRI109A/ BR11712-4R-227	80	
45.	BRRI109A/ ASM3	75	
46.	BRRI109A/ ASM4	65	
47.	BRRI109A/ MZ-3	95	
48.	BRRI109A/ ASM7	95	
49.	BRRI125A/ ASM1	75	
50.	BRRI125A/ ASM2	85	
51.	BRRI125A/ MZ-1	90	
52.	BRRI125A/ ASM3	75	
53.	BRRI125A/ ASM4	65	
54.	BRRI125A/ ASM5	80	
55.	BRRI125A/ ASM6	85	
56.	BRRI125A/ MZ-3	65	
57.	BRRI125A/ ASM7	90	
58.	BRRI125A/ UKL-4	70	
59.	IR105688A/ MZ-3	65	
60.	IR105688A/ ASM7	70	
61.	IR105688A/ UKL-4	95	
62.	IR105688A/ UKL-32	70	
63.	IR102758A/ BR11716-4R-120	85	
64.	IR102758A/ BR11723-4R-48	70	
65.	IR102758A/ BR11723-4R-12	85	
66.	IR102758A/ BR11716-4R-123	75	
67.	IR102758A/ BR11716-4R-114	90	
68.	IR102758A/ BR11716-4R-147	90	
69.	IR102758A/ BR10672-1-3-7-12	85	
70.	IR102758A/ BR11723-4R-172	95	
71.	IR102758A/ BR11716-4R-102	75	
72.	IR102758A/ BR11715-4R-186	90	
73.	IR102758A/ BR11712-4R-218	75	
74.	IR102758A/ BR11712-4R-227	65	

1st set: D/S: 30/6/22 D/T: 01/822; 2nd set: D/S: 07/7/22 D/T: 01/8/22

Table 2. List of A x R crosses made during T. Aman 2022

SL. No.	Designation	Seeds obtained	Remarks
01	BRRI11A/BR827R	100	
02	BRRI11A/BR168R	75	
03	BRRI11A/BRRI18R	85	
04	BRRI11A/BRRI25R	90	
05	BRRI11A/BRRI34R	80	
06	BRRI11A/BRRI35R	70	
07	BRRI11A/BRRI50R	85	
08	BRRI11A/BRRI32R	85	
09	BRRI11A/BRRI33R	50	
10	BRRI11A/BRRI48R	75	
11	BRRI11A/2017R-2-4	95	
12	BRRI11A/GoldR	120	
13	BRRI11A/BU3R	90	
14	BRRI11A/BU7R	65	
15	BRRI11A/BAU329R	85	
16	BRRI11A/BAU521R	70	
17	BRRI11A/GETCO15R	75	
18	BRRI11A/EL108R	90	
19	BRRI11A/Babilon-2	75	
20	BRRI11A/EL203R	60	
21	BRRI11A/EL168R	80	
22	BRRI11A/IR86555-16-1-1-1-1-1-1-1-1-1-1	75	
23	BRRI11A/IR86522-25-3-1-1-1-1-1-1	70	
24	BRRI11A/IR86526-10-6-1-1-1-1-1-1	90	
25	BRRI11A/IR60829-34-2R	100	
26	BRRI11A/IR86526-11-9-1-1-1-1R	95	
27	BRRI11A/IR85503-8-13-1-1-1-1-1-1R	80	
28	BRRI11A/IR69712-154-2-3-1-3R	75	
29	BRRI11A/IR17M1643R	85	
30	BRRI11A/IR13V163R	80	
31	BRRI11A/IR83140-B-36-B (IRRI178)	60	
32	BRRI11A/IR84675-58-4-1-B-B (IRRI185)	85	
33	BRRI48A/BRRI32R	70	
34	BRRI48A/PR448R	90	
35	BRRI48A/BU3R	85	
36	BRRI48A/BAU521R	80	
37	BRRI48A/GETCO15R	60	
38	BRRI48A/GETCO21R	80	
39	BRRI48A/CHH35R	95	
40	BRRI48A/CHH6R	70	
41	BRRI48A/CHH27R	85	
42	BRRI48A/CHH32R	110	
43	BRRI48A/CHH67R	75	
44	BRRI48A/BU2R	70	
45	BRRI48A/EL215R	90	
46	BRRI48A/EL193R	80	
47	BRRI48A/EL241R	90	
48	BRRI48A/EL203R	75	
49	BRRI48A/EL168R	60	
50	BRRI48A/IR86555-16-1-1-1-1-1-1-1-1-1-1	75	
51	BRRI48A/IR86522-25-3-1-1-1-1-1-1	65	
52	BRRI48A/IR86526-10-6-1-1-1-1-1-1	70	
53	BRRI48A/IR60829-34-2R	70	
54	BRRI48A/IR86526-11-9-1-1-1-1R	80	
55	BRRI48A/IR85503-8-13-1-1-1-1-1-1R	80	
56	BRRI48A/IR69712-154-2-3-1-3R	65	
57	BRRI48A/IR17M1643R	60	
58	BRRI48A/IR13V163R	110	
59	BRRI48A/IR83140-B-36-B (IRRI178)	75	
60	BRRI48A/IR84675-58-4-1-B-B (IRRI185)	80	
61	BRRI97A/BRRI32R	95	
62	BRRI97A/BRRI33R	80	
63	BRRI97A/BRRI41R	65	
64	BRRI97A/BRRI45R	75	
65	BRRI97A/BRRI48R	95	
66	BRRI97A/BRRI50R	80	
67	BRRI97A/BRRI51R	75	
68	BRRI97A/PR595R	80	
69	BRRI97A/BU3R	70	
70	BRRI97A/BAU521R	85	

71	BRRI97A/GETCO10R	85
72	BRRI97A/CHH35R	85
73	BRRI97A/CHH6R	70
74	BRRI97A/CHH27R	80
75	BRRI97A/CHH32R	75
76	BRRI97A/CHH67R	65
77	BRRI97A/BU2R	80
78	BRRI97A/EL228	60
79	BRRI97A/EL86R	90
80	BRRI97A/R2800	75
81	BRRI97A/Basmati L-14	80
82	BRRI97A/SL8H	65
83	BRRI97A/EL215R	70
84	BRRI97A/EL193R	85
85	BRRI97A/EL241R	80
86	BRRI97A/ZYB-1	65
87	BRRI97A/GT-22	80
88	BRRI97A/EL203R	60
89	BRRI97A/EL168R	100
90	BRRI97A/NR India	85
91	BRRI97A/IR86555-16-1-1-1-1-1-1-1-1-1-1	95
92	BRRI97A/IR86522-25-3-1-1-1-1-1-1	85
93	BRRI97A/IR86526-10-6-1-1-1-1-1-1	80
94	BRRI97A/IR60829-34-2R	65
95	BRRI97A/IR86526-11-9-1-1-1-1R	90
96	BRRI97A/IR85503-8-13-1-1-1-1-1-1R	85
97	BRRI97A/IR69712-154-2-3-1-3R	90
98	BRRI97A/IR17M1643R	85
99	BRRI97A/IR13V163R	70
100	BRRI97A/IR83140-B-36-B (IRRI178)	100
101	BRRI97A/IR84675-58-4-1-B-B (IRRI185)	80
102	BRRI99A/BRRI23R	60
103	BRRI99A/BRRI27R	70
104	BRRI99A/BRRI32R	70
105	BRRI99A/BRRI33R	90
106	BRRI99A/BRRI41R	95
107	BRRI99A/BRRI42R	85
108	BRRI99A/BRRI46R	65
109	BRRI99A/BRRI50R	65
110	BRRI99A/BRRI51R	80
111	BRRI99A/BU3R	90
112	BRRI99A/BAU521R	70
113	BRRI99A/GETCO10R	95
114	BRRI99A/BI Rice	90
115	BRRI99A/BasmatiR	85
116	BRRI99A/MongolR	100
117	BRRI99A/CHH35R	80
118	BRRI99A/CHH6R	75
119	BRRI99A/CHH27R	90
120	BRRI99A/CHH32R	80
121	BRRI99A/CHH67R	85
122	BRRI99A/BU2R	65
123	BRRI99A/EL228R	85
124	BRRI99A/EL86R	80
125	BRRI99A/R2800	85
126	BRRI99A/Basmati L-14	85
127	BRRI99A/SL8H	75
128	BRRI99A/EL215R	65
129	BRRI99A/EL193R	90
130	BRRI99A/EL241R	105
131	BRRI99A/ZYB-1	85
132	BRRI99A/GT-22	65
133	BRRI99A/EL203R	80
134	BRRI99A/EL168R	85
135	BRRI99A/NR India	85
136	BRRI99A/IR86555-16-1-1-1-1-1-1-1-1-1-1	65
137	BRRI99A/IR86522-25-3-1-1-1-1-1-1	70
138	BRRI99A/IR86526-10-6-1-1-1-1-1-1	70
139	BRRI99A/IR60829-34-2R	85
140	BRRI99A/IR86526-11-9-1-1-1-1R	90
141	BRRI99A/IR85503-8-13-1-1-1-1-1-1R	100
142	BRRI99A/IR69712-154-2-3-1-3R	55
143	BRRI99A/IR17M1643R	95
144	BRRI99A/IR13V163R	80
145	BRRI99A/IR83140-B-36-B (IRRI178)	70

146	BRRI99A/IR84675-58-4-1-B-B (IRRI185)	85
147	BRRI109A/BRRI32R	100
148	BRRI109A/BRRI33R	85
149	BRRI109A/BRRI41R	65
150	BRRI109A/BRRI42R	80
151	BRRI109A/BRRI46R	75
152	BRRI109A/BRRI53R	80
153	BRRI109A/PR448R	85
154	BRRI109A/PR585R	75
155	BRRI109A/PR595R	100
156	BRRI109A/F2277R	60
157	BRRI109A/PAN802R	60
158	BRRI109A/BAU329R	75
159	BRRI109A/BAU521R	95
160	BRRI109A/B.I.Rice	55
161	BRRI109A/BasmatiR	85
162	BRRI109A/GETCO10R	90
163	BRRI109A/GETCO20R	65
164	BRRI109A/GETCO21R	80
165	BRRI109A/CHH35R	85
166	BRRI109A/CHH6R	70
167	BRRI109A/CHH27R	50
168	BRRI109A/CHH32R	100
169	BRRI109A/CHH67R	85
170	BRRI109A/EL86R	55
171	BRRI109A/S-1203R	75
172	BRRI109A/EL215R	60
173	BRRI109A/EL193R	85
174	BRRI109A/EL241R	85
175	BRRI109A/ZYB-1	65
176	BRRI109A/GT-22	65
177	BRRI109A/EL203R	75
178	BRRI109A/EL168R	70
179	BRRI109A/NR India	90
180	BRRI109A/IR86555-16-1-1-1-1-1-1-1-1-1-1	60
181	BRRI109A/IR86522-25-3-1-1-1-1-1-1	85
182	BRRI109A/IR86526-10-6-1-1-1-1-1-1	85
183	BRRI109A/IR60829-34-2R	95
184	BRRI109A/IR86526-11-9-1-1-1-1R	70
185	BRRI109A/IR85503-8-13-1-1-1-1-1-1R	75
186	BRRI109A/IR69712-154-2-3-1-3R	60
187	BRRI109A/IR17M1643R	65
188	BRRI109A/IR13V163R	65
189	BRRI109A/IR83140-B-36-B (IRRI178)	80
190	BRRI109A/IR84675-58-4-1-B-B (IRRI185)	100
191	BRRI110A/BRRI32R	70
192	BRRI110A/BRRI33R	85
193	BRRI110A/BRRI42R	65
194	BRRI110A/BRRI46R	85
195	BRRI110A/BRRI53R	75
196	BRRI110A/F2277R	65
197	BRRI110A/BAU329R	95
198	BRRI110A/BAU521R	105
199	BRRI110A/CHH27R	95
200	BRRI110A/CHH67R	85
201	BRRI110A/EL228	55
202	BRRI110A/EL86R	95
203	BRRI110A/EL193R	85
204	BRRI110A/EL241R	85
205	BRRI110A/ZYB-1	100
206	BRRI110A/GT-22	85
207	BRRI110A/EL203R	95
208	BRRI110A/EL168R	80
209	BRRI110A/IR86555-16-1-1-1-1-1-1-1-1-1-1	95
210	BRRI110A/IR86522-25-3-1-1-1-1-1-1	55
211	BRRI110A/IR86526-10-6-1-1-1-1-1-1	75
212	BRRI110A/IR60829-34-2R	80
213	BRRI110A/IR86526-11-9-1-1-1-1R	95
214	BRRI110A/IR85503-8-13-1-1-1-1-1-1R	70
215	BRRI110A/IR69712-154-2-3-1-3R	80
216	BRRI110A/IR17M1643R	65
217	BRRI110A/IR13V163R	85
218	BRRI110A/IR83140-B-36-B (IRRI178)	100
219	BRRI110A/IR84675-58-4-1-B-B (IRRI185)	65
220	BRRI125A/BRRI24R	75

221	BRRI125A/BRRI29R	80
222	BRRI125A/BRRI32R	80
223	BRRI125A/BRRI33R	70
224	BRRI125A/BRRI37R	75
225	BRRI125A/BRRI39R	80
226	BRRI125A/BRRI40R	85
227	BRRI125A/BRRI41R	85
228	BRRI125A/BRRI42R	80
229	BRRI125A/BRRI43R	95
230	BRRI125A/BRRI46R	75
231	BRRI125A/BRRI53R	90
232	BRRI125A/BAU329R	65
233	BRRI125A/BAU521R	90
234	BRRI125A/CHH35R	65
235	BRRI125A/CHH6R	75
236	BRRI125A/CHH27R	65
237	BRRI125A/CHH32R	70
238	BRRI125A/CHH67R	80
239	BRRI125A/EL228	75
240	BRRI125A/EL86R	90
241	BRRI125A/R2800	85
242	BRRI125A/EL193R	95
243	BRRI125A/EL241R	75
244	BRRI125A/ZYB-1	90
245	BRRI125A/GT-22	80
246	BRRI125A/EL203R	70
247	BRRI125A/EL168R	75
248	BRRI125A/NR India	80
249	BRRI125A/IR86555-16-1-1-1-1-1-1-1-1-1-1	70
250	BRRI125A/IR86522-25-3-1-1-1-1-1-1	95
251	BRRI125A/IR86526-10-6-1-1-1-1-1-1	80
252	BRRI125A/IR60829-34-2R	75
253	BRRI125A/IR85503-8-13-1-1-1-1-1-1R	70
254	BRRI125A/IR69712-154-2-3-1-3R	60
255	BRRI125A/IR17M1643R	65
256	BRRI125A/IR13V163R	60
257	BRRI125A/IR83140-B-36-B (IRRI178)	110
258	BRRI125A/IR84675-58-4-1-B-B (IRRI185)	65
259	IR105687A/CHH35R	95
260	IR105687A/CHH6R	80
261	IR105687A/CHH27R	80
262	IR105687A/CHH32R	95
263	IR105687A/CHH67R	55
264	IR105687A/EL228	85
265	IR105687A/EL86R	70
266	IR105687A/R2800	75
267	IR105687A/EL193R	85
268	IR105687A/EL241R	70
269	IR105687A/ZYB-1	100
270	IR105687A/GT-22	60
271	IR105687A/EL203R	90
272	IR105687A/EL168R	100
273	IR105687A/NR India	55
274	IR105687A/IR86555-16-1-1-1-1-1-1-1-1-1-1	65
275	IR105687A/IR86522-25-3-1-1-1-1-1-1	85
276	IR105687A/IR86526-10-6-1-1-1-1-1-1	80
277	IR105687A/IR60829-34-2R	70
278	IR105687A/IR86526-11-9-1-1-1-1R	100
279	IR105687A/IR85503-8-13-1-1-1-1-1-1R	85
280	IR105687A/IR69712-154-2-3-1-3R	90
281	IR105687A/IR17M1643R	75
282	IR105687A/IR13V163R	75
283	IR105687A/IR83140-B-36-B (IRRI178)	80
284	IR105687A/IR84675-58-4-1-B-B (IRRI185)	110
285	IR105688A/BRRI32R	55
286	IR105688A/BRRI33R	65
287	IR105688A/BRRI42R	80
288	IR105688A/BRRI46R	80
289	IR105688A/CHH35R	95
290	IR105688A/CHH6R	60
291	IR105688A/CHH27R	70
292	IR105688A/CHH32R	85
293	IR105688A/CHH67R	65
294	IR105688A/EL228	75
295	IR105688A/EL86R	90

296	IR105688A/R2800	100
297	IR105688A/EL203R	95
298	IR105688A/EL168R	80
299	IR105688A/NR India	80
300	IR105688A/IR85503-8-13-1-1-1-1-1-1R	65
301	IR105688A/IR69712-154-2-3-1-3R	80
302	IR105688A/IR17M1643R	60
303	IR105688A/IR13V163R	70
304	IR105688A/IR83140-B-36-B (IRRI178)	85
305	IR105688A/IR84675-58-4-1-B-B (IRRI185)	90
306	BRRI125A/IR86522-15-2-1-1-1-1-1R	55
307	BRRI125A/IR86612-31-3-2-1-1-1-1-1R	80
308	BRRI125A/IR86522-29-4-2-1-1-1-1-1-1-1R	90
309	BRRI125A/IR98222-44-1-2-1-1-1-1R	100
310	BRRI125A/IR98206-4-2-2-1-1-1-1R	70
311	BRRI125A/IR96479-81-7-1-1-B-1-1-1R	60
312	BRRI125A/IR86612-13-1-1-1-1R	80
313	BRRI125A/IR86522-11-1-1-3-1R	70
314	BRRI125A/IR86404-8-1-1-1-1R	100
315	BRRI125A/IR86427-15-5-1-1-1-2-1-1R	55
316	BRRI125A/IR86526-21-2-2-1-1-1-1-1R	90
317	BRRI125A/IR86403-22-3-1-1-1-1-1-1R	80
318	BRRI125A/IR86417-27-7-1-1-1-1-1-1R	85
319	BRRI125A/IR86522-25-3-1-1-1-1-1-1R	70
320	BRRI125A/IR85538-2-1-1-1-1-1-1-1R	70
321	BRRI125A/IR86526-10-4-1-1-1-1R	80
322	BRRI125A/IR90926-29-7-1R	55
323	BRRI125A/Minghui63R	80
324	BRRI125A/IR98067-32-1-1-1-1-1-1R	75
325	BRRI125A/IR85503-3-3-A-1-1-1-1-1R	90
326	BRRI125A/IR86526-1-1-2-1-1-1R	90
327	BRRI125A/IR86526-15-10-1-1-2-1-1R	60
328	BRRI125A/IR86612-13-1-1-1-1R	65
329	BRRI125A/IR86526-10-6-1-1-1-1-1-1-1R	70
330	BRRI125A/IR86522-25-10-1-1-2-1-1R	110
331	BRRI125A/IR86526-23-1-1-1-1-1-1-1R	70
332	BRRI125A/IR86522-38-2-1-1-1-1-1R	85
333	BRRI125A/IR86526-28-4-1-3-1-1-1R	60
334	BRRI125A/IR86522-12-29-10-1-1-1-1-1-1R	80
335	BRRI125A/IR86526-8-8-2-2-1-1-1-1R	85
336	IR79156A/CHH35R	100
337	IR79156A/CHH6R	80
338	IR79156A/CHH32R	55
339	IR79156A/CHH67R	60
340	IR79156A/EL228	70
341	IR79156A/EL86R	70
342	IR79156A/R2800	80
343	IR79156A/EL203R	100
344	IR79156A/EL168R	65
345	IR79156A/NR India	60
346	IR79156A/IR86555-16-1-1-1-1-1-1-1-1-1-1	80
347	IR79156A/IR86522-25-3-1-1-1-1-1-1	70
348	IR79156A/IR86526-10-6-1-1-1-1-1-1	70
349	IR79156A/IR60829-34-2R	80
350	IR79156A/IR86526-11-9-1-1-1-1R	85
351	IR79156A/IR85503-8-13-1-1-1-1-1-1R	70
352	IR79156A/IR69712-154-2-3-1-3R	75
353	IR79156A/IR17M1643R	60
354	IR79156A/IR13V163R	55
355	IR79156A/IR83140-B-36-B (IRRI178)	100
356	IR79156A/IR84675-58-4-1-B-B (IRRI185)	55
357	IR79156A/EL220R	85
358	IR79156A/BR9151-8-5-40-13-8	90
359	IR79156A/KashempurR	90
360	IR79156A/BR827R	65
361	IR79156A/BR168R	60
362	IR79156A/BRRI35R	85
363	IR79156A/BRRI43R	85
363	IR79125A/BRRI32R	80
364	IR79125A/BRRI33R	65
365	IR79125A/BRRI39R	85
366	IR79125A/BRRI40R	60
367	IR79125A/BRRI41R	80
368	IR79125A/BRRI46R	85
369	IR79156A/IR85503-8-13-1-1-1-1-1-1R	80

370	IR79125A/GETCO6R	70
371	IR79125A/LPH47R	100
372	IR79125A/CHH56R	70
373	IR79125A/IR509R	65
374	IR79125A/EL220R	70
375	IR79125A/KashempurR	60
376	IR79125A/IR86555-16-1-1-1-1-1-1-1-1-1	70
377	IR79125A/IR86522-25-3-1-1-1-1-1-1	85
378	IR79125A/IR86526-10-6-1-1-1-1-1-1	100
379	IR79125A/IR60829-34-2R	70
380	IR79125A/IR85503-8-13-1-1-1-1-1-1R	80
381	IR79125A/IR69712-154-2-3-1-3R	60
382	IR79125A/IR17M1643R	65
383	IR79125A/IR13V163R	80
384	IR79125A/IR83140-B-36-B (IRRI178)	80
385	IR79125A/IR84675-58-4-1-B-B (IRRI185)	60
386	IR102758A/BRRI32R	70
387	IR102758A/BRRI33R	70
388	IR102758A/BRRI37R	100
389	IR102758A/BRRI39R	55
390	IR102758A/BRRI40R	75
391	IR102758A/BRRI42R	60
392	IR102758A/BRRI46R	80
393	IR102758A/BAU329R	70
394	IR102758A/BAU521R	75
395	IR102758A/CHH35R	90
396	IR102758A/CHH6R	85
397	IR102758A/CHH27R	60
398	IR102758A/CHH32R	80
399	IR102758A/CHH67R	85
400	IR102758A/EL228	70
401	IR102758A/R2800	70
402	IR102758A/EL203R	55
403	IR102758A/IR86555-16-1-1-1-1-1-1-1-1-1	120
404	IR102758A/IR86522-25-3-1-1-1-1-1-1	80
405	IR102758A/IR86526-10-6-1-1-1-1-1-1	85
406	IR102758A/IR60829-34-2R	70
407	IR102758A/IR86526-11-9-1-1-1-1R	65
408	IR102758A/IR85503-8-13-1-1-1-1-1-1R	60
409	IR58025A/BRRI46R	70
410	IR58025A/BAU329R	80
411	IR58025A/BAU521R	95
412	IR58025A/CHH35R	100
413	IR58025A/CHH6R	65
414	IR58025A/CHH27R	60
415	IR58025A/CHH32R	70
416	IR58025A/CHH67R	70
417	IR58025A/R2800	55
418	IR58025A/EL203R	85
419	IR58025A/IR86555-16-1-1-1-1-1-1-1-1-1	85
420	IR58025A/IR86522-25-3-1-1-1-1-1-1	100
421	IR58025A/IR86526-10-6-1-1-1-1-1-1	80
422	IR58025A/IR60829-34-2R	65
423	IR58025A/IR86526-11-9-1-1-1-1R	60
424	IR58025A/IR85503-8-13-1-1-1-1-1-1R	65
425	IR58025A/IR69712-154-2-3-1-3R	90
426	IR58025A/IR17M1643R	80
427	IR58025A/IR13V163R	85
428	IR58025A/IR83140-B-36-B (IRRI178)	55
429	IR58025A/IR84675-58-4-1-B-B (IRRI185)	70
430	BRRI110A/IR16M1618R	70

1st set: D/S: 03/7/22 D/T: 27/7/22; 2nd set: D/S: 09/7/22 D/T: 02/8/22; 3rd set: D/S: 16/7/22; D/T: 06/8/22

Experiment 1.1.2: Testcross Nursery

Specific objectives:

1. Confirmation of maintainers and restorers from the crossed entries.
2. Selection of heterotic rice hybrids.
3. Conversion of prospective maintainers into new CMS lines.

Materials & methods: Eighty (80) testcrosses (F_1s) along with their parents and Dhanny Gold, AZ7006 and BRRI hybrid dhan6 were used as standard check variety. The testcross F_1s and their respective male parents were grown side by side in a single row of 15 plants with a single

seedling/ hill. Standard check variety was grown after every 40 test cross F_1s. Test cross F_1's were evaluated at flowering stage for their pollen sterility.

Results and discussion: During T. Aman season 2022, out of 80 testcrosses (F_1s) two entries have been found heterotic over check varieties expressing 17-18% yield advantage over check Dhanny Gold, 24-25 % over AZ7006 and 20-22% over BRRI hybrid dhan6 **(Table 3)** and two entries were found completely sterile **(Table 4)**. Pollen parent of selected heterotic combination was regarded as suspected restorer and pollen parent of completely sterile combination was regarded as suspected maintainer line.

Location: BRRI, Gazipur.

Principal investigator: Afsana Ansari

Co-Investigator: Md. Jamil Hasan

Table 3. List of heterotic entries over check varieties from TCN during T. Aman 2022

Test Entries	PHT (cm)	DTM (days)	Yield		Grain size & shape	Yield adv. over checks (%)	Suspected as restorer
			kg/plot	t/ha			
IR105687A/ IR126055-46-3-2-1-B	122	122	1.66	8.3	LB	17-24	IR126055-46-3-2-1-B
IR105687A/ IR126069-83-2-2-2-B	122	122	1.68	8.4	LB	18-25	IR126069-83-2-2-2-B
Dhanny Gold (Ck-1)	121	125	1.42	7.1	MS		
A Z-7006 (Ck-2)	117	125	1.34	6.7	MS		
BRRI hybrid dhan6 (Ck-3)	114	108	1.38	6.9	LB		
CV (%)	3.2	5.83	10.79	10.8			
Lsd (0.05%)	4.3	8.09	1.29	0.26			

Plot size= $2m^2$, MS= Medium Slender, LB = Long Bold
D/S: P_1= 30.06.22; P_2/F_1= 04.07.22; P_3= 08.07.22; D/T: 31.07.22

Table 4. List of entry found completely sterile from Test cross nursery during T Aman, 2022

SL no.	Cross combination	Proposed to be maintainer	Pollen sterility status	PHT (cm)		DTM (Days)	
				F_1	Parent	F_1	Parent
1	BRRI97A/ IR127270-40-6-2-2-B	IR127270-40-6-2-2-B	CS	112	115	100	120
2	BRRI97A/IR75608B-MASP$_3$	IR75608B-MASP$_3$	CS	109	112	98	125

D/S: P_1= 30.06.22; P_2/F_1= 04.07.22; P_3= 08.07.22; D/T: 31.07.22; CS= Completely sterile

Experiment 1.1.3: Backcross Nursery

Specific objective: Developing CMS lines from identified maintainer by back crossing.

Materials: 25 BC_6, 06 BC_5, 10 BC_4, 07 BC_3 and 13 BC_1 generations

Methods: Successive backcross progenies ranging from BC_1-BC_6 were grown along with their corresponding suspected maintainer lines. Pollen fertility of each of the plant in a line was evaluated. Completely sterile plants were immediately crossed with its corresponding male parents for generation advancement.

Results and discussion: Twenty-one BC_6 generations were stable in terms of pollen sterility and other desired agronomic traits and hence shifted to CMS maintenance and evaluation nursery as new CMS lines **(Table 5).** Other generations were advanced for next generation except for four BC_6 generations. It was discarded due to fluctuation in pollen fertility and disease susceptibility.

Location: BRRI, Gazipur.

Principal investigator: Umma Kulsum

Co-Investigator: Md. Jamil Hasan

Table 5. List of backcross entries advanced for new CMS lines during T. Aman 2022

SL. No.	BC gen	Designation	Sterility status	DFF	D50 %F	DTM	Grain shape & size	Base color	Remarks
01.	BC_6	BRRI7A/3071B-2-1	CS	70	73	98	M	Purple	Discarded due to pollen fertility & disease susceptibility
02.	BC_6	BRRI7A/3155B-1-10	CS	72	76	100	B	Purple	Advanced as New CMS line
03.	BC_6	BRRI7A/3159B-1-1	CS	68	72	98	B	Purple	Advanced as New CMS line
04.	BC_6	BRRI7A/209B-13-1	CS	71	75	102	MS	Green	Discarded due to pollen fertility & disease susceptibility
05.	BC_6	BRRI7A/215B-26-6	CS	72	76	103	M	Green	Discarded due to pollen fertility & disease susceptibility
06.	BC_6	BRRI13A/3020B	CS	65	68	94	MB	Light purple	Advanced as New CMS line
07.	BC_6	BRRI13A/3021B	CS	63	66	91	MB	Light purple	Advanced as New CMS line
08.	BC_6	BRRI13A/3085B	CS	64	67	92	B	Purple	Advanced as New CMS line
09.	BC_6	BRRI13A/3096B	CS	62	66	90	M	Purple	Advanced as New CMS line
10.	BC_6	BRRI13A/3099B	CS	70	73	98	M	Purple	Advanced as New CMS line
11.	BC_6	BRRI13A/3105B	CS	67	71	98	M	Purple	Advanced as New CMS line
12.	BC_6	BRRI13A/3108B	CS	59	64	89	MB	Green	Advanced as New CMS line
13.	BC_6	BRRI13A/3122B	CS	59	64	89	B	Light Purple	Advanced as New CMS line
14.	BC_6	BRRI13A/3129B	CS	74	78	100	M	Light Purple	Advanced as New CMS line
15.	BC_6	BRRI13A/3137B	CS	72	76	99	MB	Purple	Advanced as New CMS line
16.	BC_6	BRRI13A/3142B	CS	68	72	98	M	Green	Advanced as New CMS line
17.	BC_6	BRRI13A/3166B	CS	67	72	93	M	Light Purple	Advanced as New CMS line
18.	BC_6	BRRI13A/206B-7-2	CS	57	61	87	MS	Green	Advanced as New CMS line
19.	BC_6	BRRI13A/206B-20-2	CS	58	62	88	MS	Green	Advanced as New CMS line
20.	BC_6	BRRI13A/209B-13-1	CS	60	64	89	MB	Green	Advanced as New CMS line
21.	BC_6	BRRI48A/204B-15-7	CS	75	78	107	MS	Green	Advanced as New CMS line
22.	BC_6	BRRI53A/3061B-1-2	CS	77	80	108	M	Purple	Advanced as New CMS line
23.	BC_6	BRRI72A/3017B	CS	71	74	99	MS	Green	Discarded due to pollen fertility & disease susceptibility
24.	BC_6	BRRI13A/3062B	CS	76	80	107	M	Deep Purple	Advanced as New CMS line
25.	BC_6	IR79156A/305B-11-5	CS	77	81	104	M	Green	Advanced as New CMS line

D/S: P_1 =08.07.22; P_2/F_1=12.07.22; P_3 =15.07.22; D/T: 01.08.22; CS = completely sterile; PS = partially sterile; PF = partially fertile; DFF= Days to first flowering; D50%F= Days to 50% flowering; DTM= Days to maturity; M= Medium; MS= Medium slender; MB= Medium bold; B= Bold; S= Slender

Experiment 1.1.4: CMS Maintenance and Evaluation Nursery

Specific objective: Evaluation of locally developed and exotic CMS lines and their maintainer lines.

Materials and methods: Ninety-four (94) CMS lines along with their respective maintainer lines. Two-three pair of each CMS and maintainer lines obtained from paired crosses were planted side by side in a single row plot having 15 hills / row and maintaining row to row spacing of 20 cm ×

20 cm. Each pair of A and B lines were covered with a net to protect out crossing from neighboring plants.

Results and discussion: All the CMS lines were maintained by hand crossing for seed increasing and genetic purity. Overall performance of the experiment was good and expected number of seeds was obtained except one locally collected CMS line. It was discarded due to severe fluctuation in pollen sterility **(Table 6).**

Location: BRRI, Gazipur.

Principal investigator: M.J.Hasan; **Co-Investigator:** Umma Kulsum

Table 6. List of the CMS lines maintained by hand cross during T. Aman season 2022

SL.No	Designation	Sterility status (%)	Seed amount	Plant type	Remarks
01	IR68890A/B	100	90	Modern	
02	IR69802A/B	100	75	Modern	
03	PMS 8A/B	98	75	Modern	
04	IR77801A/B	100	100	Modern	
05	IR77803A/B	100	90	Modern	
06	IR77805A/B	100	75	Modern	
07	IR78355A/B	100	60	Modern	
08	IR75595A/B	100	70	Modern	
09	IR77808A/B	100	75	Modern	
10	IR77809A/B	100	65	Modern	
11	IR78361A/B	100	60	Modern	
12	IR78362A/B	100	60	Modern	
13	IR77811A/B	100	80	Modern	
14	IR73328 A/B	100	50	Modern	
15	IR79128A/B	100	50	Modern	
16	IR80151A/B	100	60	Modern	
17	IR80154A/B	99	45	Modern	
18	IR80156A/B	100	60	Modern	
19	IR62829A/B	100	65	Modern	
20	IR70960A/B	100	50	Modern	
21	IR78354A/B	98	50	Modern	
22	IR79155A/B	100	80	Modern	
23	BRRI2A/B	100	100	Modern	
24	BRRI3A/B	100	55	Modern	
25	BRRI5A/B	100	70	Modern	
26	BRRI17A/B	100	70	Modern	
27	BRRI18A/B	100	70	Modern	
28	BRRI19A/B	100	50	Modern	
29	BRRI20A/B	100	55	Modern	
30	BRRI21A/B	100	75	Modern	
31	BRRI22A/B	100	65	Modern	
32	BRRI23A/B	100	50	Modern	
33	BRRI24A/B	100	50	Modern	
34	BRRI25A/B	100	65	Modern	
35	BRRI26A/B	100	70	Modern	
36	WanA/B	100	85	Modern	
37	BRRI27A/B	100	75	Modern	
38	BRRI37A/B	100	65	Modern	
39	BRRI40A/B	100	50	Modern	
40	BRRI41A/B	100	60	Modern	
41	BRRI42A/B	100	50	Modern	
42	BRRI43A/B	100	60	Modern	
43	BRRI52A/B	100	70	Modern	
44	BRRI55A/B	100	65	Modern	
45	BRRI60A/B	100	55	Modern	
46	BRRI63A/B	100	65	Modern	
47	BRRI67A/B	99	75	Modern	
48	BRRI69A/B	100	60	Modern	
49	BRRI70A/B	100	65	Modern	
50	BRRI71A/B	100	55	Modern	
51	BRRI73A/B	100	90	Modern	
52	BRRI76A/B	100	50	Modern	
53	BRRI79A/B	100	65	Modern	
54	BRRI81A/B	100	75	Modern	
55	BRRI82A/B	100	50	Modern	
56	BRRI85A/B	100	70	Modern	
57	UKA/B-1	98	55	Modern	
58	UKA/B-2	99	75	Modern	
59	13A/13B	98	65	Modern	

60	BRRI105A/B	100	80	Modern	Pollen microscopic view black but no seed set
61	BRRI106A/B	100	65	Modern	
62	BRRI107A/B	100	70	Modern	
63	BRRI108A/B	100	100	Modern	Pollen microscopic view black but no seed set
64	BRRI111A/B	100	80	Modern	
65	BRRI112A/B	100	60	Modern	
66	BRRI113A/B	100	75	Modern	
67	BRRI114A/B	100	55	Modern	
68	Trisal-1A/B	99	50	Modern	
69	Trisal-2A/B	99	80	Modern	
70	Trisal-3A/B	100	75	Modern	
71	BRRI122A/B	100	60	Modern	
72	BRRI123A/B	100	50	Modern	
73	BRRI124A/B	100	55	Modern	
74	BRRI125A/B	100	70	Modern	
75	BRRI126A/B	100	65	Modern	
76	BRRI127A/B	100	60	Modern	
77	BRRI128A/B	100	90	Modern	
78	BRRI129A/B	100	65	Modern	
HRDC materials					
79	IR 93558 A/B	100	70	Modern	
80	IR105687A/B	100	60	Modern	
81	IR102760A/B	100	50	Modern	
82	IR102758A/B	100	55	Modern	
83	IR102573A/B	100	90	Modern	
84	IR102572A/B	100	55	Modern	
85	IR102571A/B	100	70	Modern	
86	IR102569A/B	100	65	Modern	
87	IR105688A/B	100	100	Modern	
88	IR102757A/B	100	60	Modern	
89	IR58025A/B	100	50	Modern	
90	IR75596A/B	100	55	Modern	
91	IR78369A/B	100	80	Modern	
92	IR79125A/B	100	70	Modern	
93	IR93559A/B	100	90	Modern	
94	IR93560A/B	100	50	Modern	

D/S: B_1= 01.07.22; B_2/A =04.07.22; B_3= 07.07.22; D/T: 28.07.22

Experiment 1.1.5: Observational Trial (OT) of experimental hybrids

Objective: Selection of promising hybrids

Materials and Methods: Variety: 205 hybrids (Fine grain, high yield with medium grain) along with 3 checks. Twenty one days old seedlings were transplanted in $2m^2$ area plot following augmented design with 3 checks using single seedling per hill at a spacing of 20 cm × 15 cm. Fertilizer dose was applied 150:100:70:60:10 Urea-TSP-MP- Gypsum- $ZnSO_4$ kg/ha respectively.

Results and discussion: Out of 205 hybrids ten hybrid combinations performed well **(Table 7).** The selected hybrid combinations expressed more than 15-18% yield advantage over check variety BRRI hybrid dhan6, 9-12% over AZ7006 and 6-9 % over Dhanny Gold. The heritability obtained from growth duration and grain yield were 87%, and 82% respectively indicating high level of precision in this experiment. Upon commercial seed production feasibility of these selected hybrid combinations, PYT and MLT trials will be conducted and based on satisfactory yield advantage over check, hybrid combination will be submitted to SCA trials.

Location: BRRI, Gazipur.

Principal investigator: M Umma Kulsum; Co-Investigator: M.J. Hasan

Table 7. List of experimental hybrids found heterotic over check variety during T. Aman, 2022

Sl. No.	Designation	DTM	GSS	Plot Yield (kg/plot)	Yield (t/h)	Heterosis (%)		
						Ck-1	Ck-2	Ck-3
1	BRRI99A/BRRI32R	104	LS	1.5	7.5	15	9	6
2	BRRI109A/IR86526-11-9-1-1-1-1R	104	LS	1.5	7.5	15	9	6
3	BRRI109A/IR86515-19-1-2-1-1-1-1R	109	MS	1.5	7.5	15	9	6
4	IR102758A /BRRI55R	111	MS	1.5	7.5	15	9	6
5	BRRI110A/208R	118		1.5	7.5	15	9	6
6	IR102758A / IR86526-15-10-1-1-2-1-1R	121	LS	1.52	7.6	16	10	8
7	BRRI110A/EL220R	115	MS	1.54	7.7	18	12	9
8	BRRI110A/EL32R	111	MS	1.52	7.6	16	10	8
9	BRRI110A/BRRI50R	112		1.54	7.7	18	12	9
10	IR102758A/IR86404-8-1-1-1-1R	121		1.54	7.7	18	12	9
	BRRI hybrid dhan6 (Ck-1)	108	MS	1.31	6.6			
	AZ7006 (Ck-2)	120	MS	1.38	6.9			
	Dhanny Gold (Ck-3)	122	MS	1.41	7.1			
	Heritability	0. 87	-		0.82			
	$LSD_{(0.05)}$	10.5	-		3.7			

Yield data counted from 30 hills per entry, spacing was 20cm×15cm (R × P)

D/S: 14.07.22; D/T: 10.08.22; Legend: PHT (cm) = Plant height; GD= Growth duration; GSS= Grain size & shape

Experiment No.1.1.6: Preliminary Yield Trials (PYT).

Objectives: To assess the yield of promising rice hybrids compared with check variety

Materials: Fifteen hybrids (15) along with three checks (BRRI hybrid dhan6, AZ7006 and Dhanny Gold)

Methods : Twenty one days old seedlings were transplanted in 30 m^2 plot in three replication using single seedling per hill at a spacing of 20 × 15 cm. Fertilizers was applied @ with 150:100:70:60:10 kg/ha Urea, TSP, MP, gypsum and ZnSO4 respectively. Intercultural and agronomic practices were made when necessary.

Principal investigator: Md. Shafiqul Islam; Co-Investigator: MJ Hasan

Location: Gazipur

Results and discussion: In T. Aman 22, two hybrids were selected out of 15 and showed yield advantage 3-25 % over BRRI hybrid dhan6, 6-20 % over AZ7006 and 3-14 % over Dhanny Gold. **(Table 8).**

Table 8. Results of preliminary yield trials in T. Aman 2022

Sl. No.	**Designation**	**PHT (cm)**	**GD (days)**	**GSS**	**SF (%)**	**Amy (%)**	**Yield (t/h)**	**Heterosis (%)**		
								Ck-1	**Ck-2**	**Ck-3**
01	IR102758A/IR77498-45-1-2-2R	112	116	MS	78.3	23.4	7.8	19.0	13.9	7.6
02	BRRI99A/IR86526-11-6-2-1-1-1-1R	110	111	S	76.2	23.3	6.79	2.6	-	-
03	IR105688A/BRRI46R	105	103	S	75.5	23.4	6.50	-	-	-
04	BRRI97A/BRRI46R	107	105	S	77.6	24.1	7.43	12.2	8.5	2.5
05	BRRI99A/BRRI46R	111	107	S	76.5	23.7	7.22	9.0	5.4	-
06	BRRI110A/BRRI42R	110	110	S	83.3	23.7	6.64	0.3	-	-
07	IR79156A/BRRI42R	115	118	S	77.6	23.5	7.39	11.6	7.9	1.9
08	IR58025A/BRRI42R	112	120	S	80.2	22.8	8.06	21.8	17.7	11.2
09	IR105688A BRRI37R	106	104	S	76.3	23.6	6.60			
10	IR78369A BRRI37R	113	112	S	75.4	23.3	6.75	2.0	-	-
11	IR58025A/BRRI37R	111	111	S	74.4	22.8	6.10	-	-	-
12	IR79156A/BRRI36R	115	110	S	74.0	24.0	5.80	-	-	-
13	IR105687A/BRRI36R	104	106	S	73.6	23.3	5.75	-	-	-
14	IR79125A/BRRI43R	110	122	S	80.6	24.0	8.25	24.6	20.4	13.8
15	IR78369A/BRRI43R	112	121	MS	76.8	23.5	7.35	11.0	7.3	1.4

16	BRRI hybrid dhan6	109	113	S	76.0	24.0	6.62
17	AZ7006	112	130	S	76.5	-	6.85
18	Dhanny Gold	108	133	MS	77.1	-	7.25
Mean		110.1	114.0		77.0	23.5	7.0
CV (%)		2.9	7.5		3.2	1.7	10.2
LSD (0.05%)		1.9	5.2		1.5	0.2	0.4

D/S: 14/7/2022; D/T: 05/8/2022; Plot size=10 m^2; PHT (cm) = Plant height (cm); GD = Growth duration; GSS= Grain shape & size; S=Slender, M=Medium, MS=Medium slender; SF (%) = Spikelet fertility; Amy (%) = Amylose.

Experiment No.1.1.7: Multi-location Yield Trials (MLT).

Objectives: To assess the yield of promising rice hybrids at different location for better adaptability

Materials: Twenty-one hybrids (21) along with three checks (BRRI hybrid dhan6, AZ 7006 & Dhanny Gold) were evaluated under two sets.

Methods : Twenty one days old seedlings were transplanted in 30 m^2 plot in three replication using single seedling per hill at a spacing of 20 × 15 cm. Fertilizers was applied @ with 150:100:70:60:10 kg/ha Urea, TSP, MP, gypsum and ZnSO4 respectively. Intercultural and agronomic practices were made when necessary.

Principal investigator: Md. Jamil Hasan (Gazipur); Md. Hafizar Rahman (Barishal); M S Islam (Ishwardi); Anowara Akter (Rangpur); Afsana Ansari (Sonagazi) Co-Investigator: A K Paul

Location: Gazipur, Barishal, Rangpur, Sonagazi and Ishwardi

Results and discussion: In T. Aman under multi-location trials one hybrid out of eleven gave 29% yield advantage over BRRI hybrid dhan6, 27% over AZ7006 and 19% over Dhanny Gold under Set-I **(Table 9).** In set-II, one hybrid out of 10 hybrids gave 21% yield advantage over BRRI hybrid dhan6 and AZ7006 and 13% over Dhanny Gold **(Table 10)**.

Table 9. Results of multi-location yield trials during T Aman 2022 (Set-I)

Sl. No.	Hybrids	PH (cm)	DTM	Yield (t/ha)						SF (%)	GSS	Amy (%)	Aver yield Advantage over Ck (%)		
				Gaz	Ish	Bari	Ran	Son	Av				Ck-1	Ck-2	Ck-3
1	IR79156A/BRRI46R	108	111	7.4	7.6	5.8	7.4	5.8	6.8	76.3	S	24.2	8	6.3	-
2	BRRI97A/BRRI53R	110	110	7.2	7.0	8.9	6.4	5.6	7.02	78.6	MS	23.4	11.4	9.7	3.2
3	IR79156A/BRRI53R	106	113	5.9	7.3	7.4	6.9	6.3	6.8	76.0	S	23.2	8	6.3	-
4	IR105688A/BRRI53R	104	110	6.1	6.9	7.4	6.04	5.8	6.4	75.2	S	23.5	1.6	-	-
5	BRRI97A/BRRI42R	107	114	6.8	8.7	8.4	7.7	6.7	7.7	80.3	MS	23.6	22.2	20.3	13.2
6	BRRI99A/BRRI42R	111	115	8.3	9.2	8.5	7.3	7.0	8.1	84.5	MS	24.2	28.6	26.6	19.1
7	BRRI99A/BRRI37R	110	110	6.0	7.9	6.9	7.2	6.3	6.9	77.8	MS	23.4	9.5	7.8	1.5
8	IR102758A/BRRI36R	109	114	6.5	7.1	6.12	6.32	5.8	6.4	75.0	MS	23.4	1.6	-	-
9	BRRI97A/BRRI43R	107	110	6.1	7.5	7.3	7.1	6.3	6.9	77.6	S	24.0	9.5	7.8	1.5
10	BRRI99A/BRRI43R	111	118	7.4	8.8	7.8	7.05	7.0	7.6	79.8	S	23.7	20.6	18.8	11.8
11	IR79156A/BRRI43R	113	119	6.7	8.4	7.2	7.4	6.8	7.3	78.7	MS	23.6	15.9	14.1	7.4
Ck-1	BRRI hybrid dhan6	112	116	5.8	7.3	5.8	6.4	6.2	6.3	75.0	S	24.0			
Ck-2	AZ 7006 (CK-2)	116	123	5.6	7.8	6.2	6.9	5.4	6.4	75.1	S				
Ck-3	Dhanny Gold (CK-3)	118	127	6.3	7.0	7.8	7.4	5.6	6.8	75.8	S				
Mean		110.1	115.0	6.6	7.8	7.3	7.0	6.2	7.0	77.6					
CV (%)		3.5	4.6	11.7	9.7	13.8	7.1	8.7	7.8	3.5					
LSD (0.05%)		2.6	3.6	0.5	0.5	0.7	0.3	0.4	0.4	1.9					

D/S: 07/7/2022; D/T: 26/7/2022; Unit plot size: 30 m^2

Legend: PH (cm) = Plant height; DTM= Days to maturity; SF (%) = Spikelet fertility; GSS= Grain size and shape; Amy (%) = Content of amylose in percentage; Gaz = Gazipur; Ish = Ishwardi; Bari = Barishal; Ran = Rangpur; Son = Sonagazi

Table 10. Results of multi-location yield trials during T Aman 2022 (Set-II)

Sl. No.	Hybrids	PH (cm)	DTM	Yield (t/ha)						SF (%)	GSS	Amy (%)	Aver yield Advantage over Ck (%)		
				Gaz	Ish	Bari	Ran	Son	Av				Ck-1	Ck-2	Ck-3
1	IR58025A/BRRI46R	111	120	7.4	7.8	8.1	6.4	5.8	7.1	78	S	23.2	12.7	12.7	6.0
2	IR102758A/BRRI53R	110	116	7.2	7.7	7.9	5.8	5.6	6.8	77.5	MS	23.5	7.9	7.9	1.5
3	IR79125A/BRRI53R	114	119	6.8	6.4	7.4	6.4	5.8	6.6	76	S	24.2	4.8	4.8	-
4	IR78369A/BRRI53R	116	123	6.1	7.5	7.4	6.2	5.8	6.6	75.6	M	23.5	4.8	4.8	-
5	IR102758A/BRRI42R	107	114	6.8	8.7	7.4	6.6	6.7	7.4	75.8	MS	23.6	17.5	17.5	10.4
6	IR78369A/BRRI42R	111	115	6.3	7.0	7.5	6.2	5.8	6.6	79.1	M	24.2	4.8	4.8	-
7	IR58025A/BRRI36R	110	118	6.0	7.9	6.9	6.0	5.8	6.5	75.1	S	22.4	3.2	3.2	-
8	IR105688A/BRRI43R	109	114	6.5	7.1	6.12	6.32	5.8	6.4	75	MS	23.4	1.6	1.6	-
9	IR102758A/BRRI43R	112	118	8.1	7.9	8.3	7.4	6.3	7.6	79.4	S	24.0	20.6	20.6	13.4
10	IR58025A/BRRI43R	111	118	5.8	7.1	6.7	6.5	5.7	6.4	75.1	S	22.7	1.6	1.6	-
Ck-1	BRRI hybrid dhan6	112	116	6.3	7.0	5.8	6.0	6.2	6.3	74.8	S	24.0			
Ck-2	AZ 7006 (CK-2)	116	124	5.6	7.5	6.2	6.7	5.6	6.3	77.3	S				
Ck-3	Dhanny Gold (CK-3)	118	128	6.3	7.6	7.0	6.8	5.8	6.7	78	S				
Mean		112.1	118.7	6.6	7.5	7.1	6.4	5.9	6.7	76.7					
CV (%)		2.8	3.5	10.6	7.6	10.8	6.5	5.3	6.1	2.1					
LSD (0.05%)		2.2	3.0	0.5	0.4	0.6	0.3	0.2	0.3	1.2					

D/S: 08/7/2022; D/T: 27/7/2022; Unit plot size: 30 m^2

Legend: PH (cm) = Plant height; DTM= Days to maturity; SF (%) = Spikelet fertility; GSS= Grain size and shape; Amy (%) = Content of amylose in percentage; Gaz = Gazipur; Ish = Ishwardi; Bari = Barishal; Ran = Rangpur; Son = Sonagazi

Experiment No.1.1.8: Development of maintainer lines through (B×B) crosses

Objectives: To broaden the genetic base of maintainer lines and develop new recombinant lines for emphasizing yield and cyto-sources.

Materials and methods: Fifteen well characterized B lines were grown in T. Aman 2022. Twenty-five-day-old seedlings were transplanted @ single seedling/hill with a spacing of 20 cm × 15 cm in a 5.4 m × 2 rows plot in the hybrid rice breeding field, Gazipur. Fertilizers @ 80:60:40:20 kg N, P_2O_5, K_2O, S/ha were used with split application of N at 15, 30, 50 days after transplanting (DAT). Total amount of P, K, S were applied at the time of final land preparation. Crop management such as weeding, irrigation etc. was done in time. Insects, diseases and other pests were controlled properly.

Principal investigator: Md. Ruhul Quddus; Co-Investigator: MJ Hasan

Location: BRRI, Gazipur

Date of initiation: July 2022

Date of termination: November 2022

Results and discussion: Seventeen crosses were made using 15 parents. Selection of parents made based on: - i) phenotypic value that improves breeding value ii) Cyto-source iii) genetic distance **(Table 11).**

Table 11. Crosses made for B×B improvement (Based on different cyto-sources) during T. Aman 2022

SL. No.	Designation	No. of F_1seed harvested
01.	IR78362B (Dissi)×IR80156B (Kalinga)	15
02.	IR80156B (Kalinga)×IR78362B (Dissi)	30
03.	IR73328B (Mutagenized IR62829B)×IR80154B (Gambiaca)	20

04.	IR80154B (Gambiaca) × IR73328B (Mutagenized IR62829B)	55
05.	IR79128B (WA)×IR77803B (Gambiaca)	80
06.	IR77803B (Gambiaca)×IR79128B (WA)	75
07.	IR78361B (Dissi)×IR79155B (Mutagen)	15
08.	IR79155B (Mutagen)×IR78361B (Dissi)	15
09.	WanB (Gabmiaca)×IR62829B (WA)	20
10.	IR62829B (WA)×WanB (Gabmiaca)	15
11.	IR79155B (Mutagen)×PMS8B (WA)	30
12.	PMS8B (WA)× IR79155B (Mutagen)	20
13.	IR77811B (Kalinga) × IR75595B (Gambiaca)	90
14.	IR75595B (Gambiaca) × IR77811B (Kalinga)	25
15.	IR77803B (Gambiaca) ×IR78362B (Dissi)	15
16.	IR77811B (Kalinga) × BRRI dhan87	95
17.	PMS8B (WA) × BRRI dhan87	Insect damage

DS: 11.07.2022; DT: 28.07.2022

Inside parenthesis indicates cyto-sources

Experiment No.1.1.9: Development of restorer lines through (R×R) crosses

Objectives: To broaden the genetic base of restorer lines and develop new recombinant lines emphasizing on high amylose content and yield.

Materials and methods: Sixteen well characterized R lines were grown in T. Aman 2022. Twenty-five-day-old seedlings were transplanted @ single seedling/hill with a spacing of 20 cm × 15 cm in a 5.4 m × 2 rows plot in the hybrid rice breeding field, Gazipur. Fertilizers @ 80:60:40:20 kg N, P_2O_5, K_2O, S/ha were used with split application of N at 15, 30, 50 days after transplanting (DAT). Total amount of P, K, S were applied at the time of final land preparation. Crop management such as weeding, irrigation etc. was done in time. Insects, diseases and other pests were controlled properly.

Principal investigator: Md. Ruhul Quddus; Co-Investigator: MJ Hasan

Location: BRRI, Gazipur

Date of initiation: July 2022

Date of termination: November 2022

Results and discussion: Ten crosses were made using 16 parents. Parents selection was made on the basis of such criteria :- i) phenotypic value that improves breeding value, ii) genetic distance, iii) High amylose (> 25%) **(Table 12)**

Table 12. Crosses made for R×R improvement (based on amylose content) during T Aman 2022

SL. No.	Designation	No. of F_1 seed harvested
1	Q101R (23.2) × IR85503-8-11-1-1-1-2-1-1-1(24.7)	15
2	BRRI26R (23) ×IR86508-4-2-3-2-1-1-2-1R (24.5)	30
3	PR454R (23.1)×IR86526-4-7-1-1-1-1-1R (24)	45
4	BRRI31R (23.4) × IR85553-18-2-1-14-1-1-1R (26.8)	15
5	BasmatiR (21.7) × IR85553-18-2-1-14-1-1-1R (26.8)	15
6	IR86612-13-1-1-1-1R (24.6) ×PR342R (24.7)	24
7	IR86526-14-3-2-2-1-1-1-1R (24) ×PR454R (23.1)	20
8	IR06N126 (25.7) × PR342R (23)	50
9	IR86522-29-10-1-1-1-1-1-1 (25.2) ×PR874R (24)	45
10	IR90928-15-4-1-1-1 (27.2) ×101R (24.3)	Insect damage

DS: 11.07.2022; DT: 28.07.2022. Inside parenthesis indicate amylose content of R lines

Experiment No.1.1.10: F_1 confirmation of R×R and B×B crosses

Specific objective: Confirmation of F_1s and exclusion of crosses due to undesired pollen load

Materials and methods: Eleven R×R and seven B×B cross derived F_1s'were grown along with their respective parents in the hybridization block at Gazipur. Seventeen-day-old seedlings were transplanted @ single seedling/hill with a spacing of 20 cm × 15 cm. Fertilizers and crop management was followed as hybridization experiment. Crop management such as weeding, irrigation etc. was done in time. Insects, diseases and other pests were controlled properly.

Principal investigator: Md. Ruhul Quddus; Co-Investigator: MJ Hasan

Location: BRRI, Gazipur

Date of initiation: July 2022

Date of termination: November 2022

Results and discussion: True F_1 plants were selected comparing with respective parents. 21-35g disease free seeds from each cross were harvested in R x R improvement experiment **(Table 13)** whereas, 18-33g seeds per cross was collected from B×B improvement experiment **(Table 14).**

Table 13. F_1 Confirmation for (R x R) improvement, T. Aman 2022

Sl. No.	Genotype	Amount of F_2 seed harvested (5 panicles)
1	IR 85593-23-2-1-3-1-2-1-1-1 × RFSR	35 g
2	IR 86612-12 -10-1 -1 -2-1R × BRRI30R	18 g
3	IR86522-11-1-1-3-1R × BR6723-1-1-2R	23 g
4	BRRI29R × LP70R	26 g
5	IR86526-14-3-2-2-1-1-1-1R × BRRI29R	30 g
6	IR69712-154-2-3-1-3R × IR86522-29-10-1-1-1-1-1-1R	24 g
7	IR86522-29-10-1-1-1-1-1-1R × IR 86403-5-5-2-1-1-1-1-1R	33 g
8	IR85553-18-2-1-14-1-1-1R × IR86522-29-10-1-1-1-1-1-1R	22 g
9	IR85503-3-3-A-1-1-1-1-1R × BRRI50R	33 g
10	IR86522-29-10-1-1-1-1-1-1R × SL8R	24 g
11	IR90928-15-4-1-1-1R × BRRI31R	21 g

DS: 12.07.2022; DT: 29.07.2022

Table 14. F_1 Confirmation for (B x B) improvement, T. Aman 2022

Sl. No.	Genotype	Amount of F_2 seed harvested (5 panicles)
1	IR75596B × IR102571B	18 g
2	BRRI111B × BRRI126B	23g
3	BRRI129B × BRRI112B	20 g
4	BRRI2B× BRRI 25B	23 g
5	IR80154B × BRRI125B	33 g
6	IR80156B× IR77809B	20 g
7	IR80154B× BRRI112B	30 g

DS: 12.07.2022; DT: 29.07.2022

Experiment No.1.1.11: Generation Advancement of Parental Lines having multi stress genes (HRDC materials) at Restorer (R) and Maintainer (M) background.

Objective: Selection of progenies for the development of restorers and maintainers with high yield potential and multi stress resistance.

Materials and methods: A total of 34 progenies of F_6 generations from ten crosses were grown at BRRI, Gazipur. Each progeny were grown in a $5m^2$ plot using single seedling per hill at a spacing of 20 × 15 cm.

Principal investigator: Laila Ferdousi Lipi; Co-Investigator: MJ Hasan

Location: BRRI, Gazipur

Date of initiation: July 2022

Date of termination: November 2022

Results: In total, 36 progenies were selected from pedigree generations based on the better performance with phenotypic acceptability, insect and disease reaction, grain type and growth duration **(Table 15).**

Table 15. Selected progenies for the development of restorers and maintainers having multi stress gene/s

SL No	Pedigree	No. of selected progenies	Gene/s								
			SKC	Sub1	Xa5 Xa7 Xa13 Xa21	Pita	Bph3B ph18	hd1	Rf3 Rf4	GW2 GW8	Chalk5 alk GS3 GS5 WX
1	IR126044	4 progenies	√	-	√	-	-	√	√	-	√
2	IR126055	4 progenies	√	√	√	√	-	√	√	-	√
3	IR126066	4 progenies	√	-	-	√	Bph18	-	Rf4	-	√
4	IR126069	5 progenies	√	√	-	√	-	√	√	-	√
5	IR126072	5 progenies	√	√	-	-	-	√	RF3	-	√
6	IR126076	2 progenies	√	√	-	√	-	√	Rf3	-	√
7	IR127275	3 progenies	√	-	-	-	-	√	Rf4	-	√
8	IR127278	4 progenies	√	-	Xa13 Xa21	-	-	√	√	-	√
9	IR127270	3 progenies	-	-	-	-	Bph18	√	Rf4	-	√
10	IR126037	2 progenies	√	√	-	-	Bph18	√	Rf4	GW2	√
	Total	**36 progenies**									

D/S: 07/07/2022; D/T: 30/07/2022

Legend: √- Gene/s Present; Salinity tolerance (SKC); Submergence (Sub1); Bacterial leaf blight (Xa21, Xa13, Xa7 & xa5);Brown Plant Hopper (Bph3, Bph18); Blast (Pita); Gelatinization temperature (alk); Grain chalkiness (Chalk5); Grain Width (GW8); Grain Width (GW2); Grain Shape (GS3, GS5); Heading date (hd1); waxy (wx); Fertility Restorer (Rf3, Rf4)

Experiment-1.1.12: Generation advancement of Fatema dhan

Specific objective: Fixed line selection from Fatema dhan

Materials and methods: Twenty-one segregating lines were grown in this experiment. Single seedling was used for transplanting. Hand weeding was done in time. Plant protection measure was taken for only disease infestation.

Results and discussion: Among the 21 lines seven (Sl no. 5, 6, 9, 10, 11, 12 & 21) lines were perform better based on yield estimation and other agronomic features **(Table 16).**

Location: BRRI, Gazipur

Date of initiation: July 2022

Date of termination: November 2022

Principal investigator: Mosammat Umma Kulsum; **Co-Investigator:** Md. Jamil Hasan

Table 16. Performance of segregating Fatema dhan during T Aman 2022

SL No.	Designation	PH	ET /hill	DTM	PL (cm)	SF%	Yield (t/h)	Remarks
1	Abtaf5 (1) (White tip)	114	5	118	24	82.0	3.3	No awn
2	Abtaf5 (1) (White tip)	134	5	120	30	78.4	4.4	No awn
3	Abtaf5 (2) (Red tip)	132	4	115	32	79.7	4.8	awn present
4	Abtaf5 (2) (White tip)	133	5	122	31	71.3	4.5	awn present
5	Abtaf5 (3) (Red tip)	133	6	121	36	70.0	5.7	Small awn

6	Abtaf5 (3) (Red tip)	134	6	117	37	77.7	5.8	Very small awn, appearance good
7	Abtaf5 (3) (White tip)	136	5	118	35	78.3	4.8	Small awn, Panicle exertion low
8	Abtaf5 (4) (White tip)	136	4	116	36	75.2	4.7	Small awn, Panicle enclosed by leaf sheath
9	Abtaf5 (5) (White tip)	131	5	119	38	79.9	6.4	Very small awn, appearance good
10	Segregating line of Syngenta 1201H (Red tip)	134	4	112	33	80.2	5.6	No awn, fine grain
11	Segregating line of Syngenta 1201H (White tip)	135	5	119	34	77.3	5.5	No awn
12	Segregating line of Syngenta 1201H (White tip)	130	4	116	28	70.3	5.2	No awn, appearance good
13	Fatema-1 (Red tip)	137	4	123	26	64.3	2.2	Long awn present, panicle exertion rate very low
14	Fatema-1 (White tip)	137	3	117	34	72.4	4.0	awn present
15	Fatema-2 (Red tip)	138	4	116	28	76.3	5.0	awn present
16	Fatema-2 (White tip)	140	5	119	26	62.4	3.7	awn present
17	Fatema-3 (Red tip)	136	5	111	32	76.3	4.4	No awn
18	Fatema-3 (Red tip)	139	4	106	31	74.8	4.8	No awn
19	Fatema-3 (Red tip)	136	3	118	30	74.7	4.2	No awn
20	Fatema-3 (White tip)	138	4	120	33	67.5	2.8	Long awn
21	Fatema (Red tip)	137	6	114	37	84.6	6.6	Small awn

D/S: 10.07.2022; D/T: 28.07.2022

Legend: PH (cm) = Plant height; ET/hill= N0. Of effective tiller/hill; DTM= Days to maturity; PL (cm) = Panicle length; SF (%) = Spikelet fertility.

Experiment-1.1.13: Improvement of restorer lines using Fatema dhan

Specific objective: New recombinant restorer lines development.

Materials and methods: Thirty (30) plants from nine (9) crosses of F_6 population were grown in this season. Twenty days old seedlings were transplanted at 20 × 20 cm spacing in main field. Fertilizer management was done as per recommended dosages. At maturity selected hills was harvested from each cross. Harvested seed were dried and preserved for next season.

Results: A total 25 plants were selected from 9 crosses **(Table 17).**

Location: BRRI, Gazipur

Date of initiation: July 2022

Date of termination: November 2022

Principal investigator: Mosammat Umma Kulsum; **Co-Investigator:** Md. Jamil Hasan

Table 17. List of F_6 Population advanced during T Aman, 2022

SL No	Cross combination	No of plants selected
1	BaliaR /Fatema1	5
2	Fatema1/ EL253R	-
3	ShaktiR /Fatema1 (White stigma)	1
4	ShaktiR /Fatema1 (Red stigma)	3
5	BRRI20R/Fatema1	2
6	Fatema2/ BRRI20R	3
7	Fatema3/ BRRI20R	3
8	Fatema3/ BRRI15R	5
9	BRRI15R/Fatema3	3
Total		**25**

D/S: 05.07.2022; D/T: 30.07.2022

Experiment-1.1.14: Evaluation of Multi-stress tolerant lines of HRDC (Hybrid Rice Development Consortium)

Specific objective: Identification of prospective maintainers and restorers from MST materials.

Materials and methods: (15) MST lines from hybrid rice development consortium (HRDC) were grown in this experiment. Single seedling was used for transplanting. Hand weeding was done in time. No plant protection measure was taken in this experiment.

Results and discussion: The tested lines were evaluated based on plant height, days to 50% flowering, anther color, pollen grain, panicle length, spikelet fertility (%), phenotypic acceptability and pollen load during T Aman 2022. Among these lines MST3 and MST15 were shown segregation and based on uniformity and superiority ten (10) from MST3 and two (2) plants from MST15 were selected for next generation **(Table 18).** MST8 & MST9 will be transferred to source nursery as restorer line.

Location: BRRI, Gazipur.

Date of initiation: July 2022

Date of termination: November 2022

Principal investigator: M U Kulsum

Co-Investigator: Md Jamil Hasan

Table 18. Evaluation of MST (Multi stress tolerant) line from HRDC, T Aman 2022

SL No	Designation	Plant height	DTM	Anther color	Pollen grain	Panicle length	SF (%)	PAcp (Mat)	Pollen load	Remarks
01	MST1	121	122	LY & P	F	23	64	4	Medium	
02	MST2	108	121	LY& P	F	22	70	3	Medium	
03	MST3(1-10)									10plants selected
04	MST4	113	118	Y & P	F	26	71	3	Medium	uneven flowering
05	MST5	117	134	LY & R	F	25	69	4	Medium	Late
06	MST6	114	125	Y & P	F	26	78	3	High	
07	MST7	112	126	Y & P	F	26	77	3	High	uneven flowering
08	MST8	115	130	Y & P	F	27	83	3	High	
09	MST9	110	123	Y & P	F	27	79	3	High	
10	MST10	117	129	LY & P	F	24	77	4	High	uneven flowering
11	MST11	120	122	LY & P	F	25	76	4	High	
12	MST12	122	120	Y & P	F	26	80	3	High	
13	MST13	119	124	Y & P	F	30	79	3	Medium	
14	MST14	116	125	Y & P	F	28	77	3	Medium	
15	MST15(1-2)	113	125	Y & P	F	24	81	4		2 plants selected

D/S: 05.07.2022; D/T:29.07.2022

DTM= Days to maturity; PAcp (Mat) = Phenotypic acceptability at maturity; Y & P= Yellow & Plumpy; LY & P = Light Yellow & Plumpy, LY & R = Light Yellow & Robust; SF (%) = Spikelet fertility

Experiment-1.1.15: Screening of rice hybrid parental lines against Blast disease and Genome Wide Association Study (GWAS) using diverse panel of hybrid rice parental lines against differential isolates of blast pathogen.

Specific objective: To identify Blast resistant sources in parental lines and genome-wide association studies from a diverse panel of hybrid rice parental lines.

Materials and methods: A total of 383 rice hybrid parental lines with susceptible check US-2 and 25 monogenic lines were used for screening under in vivo conditions following uniform blast nursery (UBN) method at Plant Pathology division of BRRI, Bangladesh. Pre-germinated seeds of each line were sown on soil by using (17x27) square hole iron frame. In addition, other procedures will be carried out step by step to execute the screening.

Results and discussion: Out of 383 parental lines 51 (30 maintainer & 21 restorer lines) showed moderate (5) to resistant (3) scores under 12 ds/m at seedling stage.

Location: BRRI, Gazipur.

Date of initiation: August 2022

Date of termination: November 2022

Principal investigator: Laila Ferdousi & Md. Ruhul Quddus

Co-Investigator: MAI Khan

Experiment No.1.1.16: Field Rapid Generation Advance (FRGA) for B and R line improvement.

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

Materials and methods: Hybrid rice researchers of BRRI used the pedigree breeding method since its commencement. Now we are using quicker and effective methods compared to the former. Single seed descent (SSD) method with the collaboration of FRGA was applied to fulfill this purpose. Twenty-six R×R, thirty-four B×B and twenty-two (A×R) crosses derived F_3 progenies were subjected to field rapid generation advancement. Five weeks old seedlings were transplanted at the rate of single seedling/hill with a spacing of 5 cm × 5 cm. In transplanted method, each progeny was grown in a raised bed of 1.25 m width. Half dose of the normal recommended fertilizers were applied as per needed. Weeding, tiller cutting and other cultural operations were done in time. At maturity, single panicle was harvested from each plant of each cross.

Principal investigator: Md. Ruhul Quddus

Co-Investigator: L F Lipi

Location: BRRI, Gazipur

Date of initiation: July 2022

Date of termination: November 2022

Results and discussion: 30986 progenies from 82 crosses (26 R × R, 22 A × R and 34 B × B) were advanced to F_4-F_6 generation using field rapid generation advance (FRGA) technique **(Table 19).**

Table 19. Progenies selected through Field RGA during T. Aman, 2022

SL No.	Cross Type	No. of Crosses			Transplanted	Harvested
		F_3	F_4	F_5		
1	B×B	14	15	5		
2	R×R	7	6	13	72574	30986
3	A×R	22	-	-		
Total			82			

D/S: 12/7/22; D/T: 17/8/22

Sub-project 2: Seed Production of Parental lines & Hybrids

General Objectives:

i) Optimization and refinement of hybrid rice seed production and cultivation technologies for Bangladesh conditions

ii) Increase availability of parental lines seed to the public and private sectors

Experiment 2.1: CMS seed multiplication of BRRI11A, IR79156A BRRI74A and BRRI120A during T. Aman, 2022

Specific objective: To produce pure and good quality seed of CMS lines for subsequent use.

Materials and methods: Four CMS (BRRI11A, IR79156A, BRRI74A and BRRI120A) along with its maintainers were grown as parental materials. Maintainer lines were sown in three different dates at three days interval and CMS lines were sown along with second set of its respective maintainer line. 20gm/m^2 seeds were sown in the seed bed. Twenty one days old seedlings were transplanted at a spacing of 15 × 15 cm having ratio 2: 6 of B and A line. Fertilizers @ 150:100:70:60:10 kg/ha of Urea-TSP-MP-gypsum and zinc sulphate were used of which ¼ urea, full dose of TSP, Gypsum, Zn SO_4, $^2/_3$MP were applied as basal. Remaining urea with equal splits was applied at 15-20 DAT, 35-40 DAT and booting stage, respectively. Rest of 1/3 MP was applied with 2nd top dress of urea. Intercultural operations, rouging, GA_3 application and supplementary pollination were performed.

Results and discussion: Seed yield of 470 kg/plot (0.94 t/ha), 315 kg/plot (0.93 t/ha), 10.3 kg/plot (1.03 t/ha) and 7.8 kg/plot (1.3 t/ha) were obtained from BRRI11A, IR79156A, BRRI74A and BRRI120A respectively in T. Aman season 2022 **(Table 20).** Seed yield was very poor due to pollen was washed out for continuous heavy rain during supplementary pollination period.

Location: BRRI, Gazipur

Principal investigator: M J Hasan; M H Rahman; A k Paul

Co-investigator: M U Kulsum and L. F. Lipi

Table 20. CMS lines multiplication of BRRI11A, IR79156A, BRRI74A and BRRI120A in T. Aman 2022

Combinations	Plant height (cm)		50% flowering date		PER (%)	OCR (%)	Yield		Remarks
	A line	B line	A line	B line			Kg /plot	(t/ha)	
BRRI11A/B	90	94	82	80	78	30	470	0.94	Poor seed yield due to rainfall during supplementary pollination
IR79156A/B	93	97	85	83	79	31	315	0.93	
BRRI74A/B	98	103	80	77	80	33	10.3	1.03	
BRRI120A/B	97	100	79	77	80	32	7.8	1.30	

D/S: B_1=08/7/2022, A/B_2=11/7/2022, B_3=14/7/2022; D/T: A/B=01/08/2022
D/S: B_1= 03/7/2022, A/B_2=06/7/2022, B_3=09/7/2022; D/T: A/B=27/7/2022
D/S: B_1= 05/7/2022, A/B_2=08/7/2022, B_3=11/7/2022; D/T: A/B=29/7/2022
D/S: B_1= 15/7/2022, A/B_2=18/7/2022, B_3=21/7/2022; D/T: A/B=14/8/2022
PER=Panicle Exertion Rate, OCR= Out Crossing Rate.

Experiment 2.2: Foundation CMS seed production of BRRI hybrid dhan5

Specific objective: To produce pure and good quality seed of CMS line for subsequent use.

Materials and methods: CMS line BRRI7A along with its maintainer was grown as parental materials. Maintainer lines were sown in three different dates at three days interval and CMS

lines were sown along with second set of its respective maintainer line. 20 gm/m^2 seeds were sown in the seed bed. Twenty one days old seedlings were transplanted at a spacing of 15 × 15 cm having ratio 2: 6 of B and A line. Fertilizers @ 150:100:70:60:10 kg/ha of Urea-TSP-MP-gypsum and zinc sulphate were used of which ¼ urea, full dose of TSP, Gypsum, Zn SO_4, $^2/_3$MP were applied as basal. Remaining urea with equal splits was applied at 15-20 DAT, 35-40 DAT and booting stage, respectively. Rest of 1/3 MP was applied with 2^{nd} top dress of urea. Intercultural operations, rouging, GA_3 application and supplementary pollination were performed.

Results and discussion: Seed yield of 24.1 kg/plot (0.28 t/ha) was obtained from BRRI7A in T. Aman season 2022 **(Table 21).** Seed yield was very poor due to pollen was washed out for continuous heavy rain during supplementary pollination period.

Location: BRRI, Gazipur

Principal investigator: M J Hasan; A k Paul

Co-investigator: M U Kulsum and L. F. Lipi

Table 21. Foundation CMS seed production of BRRI hybrid dhan5 during T Aman 2022

Designation	Plant height (cm)		50% flowering (days)		PER (%)	OCR (%)	Plot area (m^2)	Yield (kg/ plot)	Seed yield (t/ha)	Remarks
	A line	B line	A line	B line	A line	A line				
BRRI7A/B	85	87	78	75	81	23.5	1200	24.1	0.28	Pollination was hampered by continuous rain

D/S: B_1 =03/07/2022; A/B_2 = 06/07/2022; B_3 = 09/07/2022; D/T: A/B = 27/07/2022.
PER=Panicle Exertion Rate, OCR= Out Crossing Rate.

Experiment 2.3: Small scale breeder seed production of promising CMS lines duing T. Aman, 2022

Specific objective: To produce pure and good quality breeder seed of CMS lines for subsequent use.

Materials and methods: Three CMS (IR58025A, IR102758A and IR78369A) along with its maintainers were grown as parental materials. Maintainer lines were sown in three different dates at three days interval and CMS lines were sown along with second set of its respective maintainer line. 20gm/m^2 seeds were sown in the seed bed. Twenty one days old seedlings were transplanted at a spacing of 15 × 15 cm having ratio 2: 6 of B and A line. Fertilizers @ 150:100:70:60:10 kg/ha of Urea-TSP-MP-gypsum and zinc sulphate were used of which ¼ urea, full dose of TSP, Gypsum, Zn SO_4, $^2/_3$MP were applied as basal. Remaining urea with equal splits was applied at 15-20 DAT, 35-40 DAT and booting stage, respectively. Rest of 1/3 MP was applied with 2^{nd} top dress of urea. Intercultural operations, rouging, GA_3 application and supplementary pollination were performed.

Results and discussion: Seed yield of 1.0 kg/plot (0.2 t/ha), 1.3 kg/plot (0.26 t/ha) and 3.0 kg/plot (0.4 t/ha) were obtained from IR58025A, IR102758A and IR78369A respectively in T. Aman season 2022 **(Table 22).** Seed yield was very poor due to pollen was washed out for continuous heavy rain during supplementary pollination period.

Location: BRRI, Gazipur

Principal investigator: M J Hasan; A k Paul

Co-investigator: M H Rahman and A Ansari

Table 22. Breeder seed production of promising CMS lines during T Aman 2022

Designation	PHT (cm)		D50%F		PER (%)	OCR (%)	Plot area (m²)	Yield (kg /plot)	Seed Yield (t/ha)
	A Line	B Line	A Line	B Line					
IR58025A/B	95.5	97.5	81	80	72.3	23.2	50	1.0	0.2
IR102758A/B	101.0	103.0	84	82	76.0	26.5	50	1.3	0.26
IR78369A/B	97.6	100.0	87	85	69.7	28.3	75	3.0	0.4
Average	98.03	100.17	84.00	82.33	72.67	26.00	58.33	1.77	0.29
$Lsd_{(0.05)}$	4.13	4.10	4.47	3.75	4.72	9.78		1.61	0.15
CV (%)	2.83	2.75	3.57	3.06	4.36	16.41		61.05	35.80

D/S:B_1=08.06.22, B_2/A=11.06.22, B_3=14.06.22; D/T: A/B=02.07.2022.
D/S:B_1=15.06.22, B_2/A=18.06.22, B_3=21.06.22; D/T: A/B=13.07.2022.
D/S:B_1=22.06.22, B_2/A=25.06.22, B_3=28.06.22; D/T: A/B=16.07.2022
PER=Panicle Exertion Rate, OCR= Out Crossing Rate.

E**xperiment 2.4: F_1 seed production of released and promising hybrids during T Aman, 2022**

Objective: To produce sufficient quantity of F_1 hybrid seeds for demonstration, distribution for released hybrid and PYT & MLT for promising hybrid

Materials and methods: Two CMS lines (BRRI99A and BRRI97A) along with common restorer line BRRI37R was grown as parental line. Two sets of restorer line was used maintaining an interval of 5 days between them and two CMS lines were sown in same date after 5 days after 2nd set of restorer line sowing. Twenty-one days old seedlings were transplanted at a spacing of 15 × 15 cm with ratio 2:12 of A and R line. Fertilizers @ 150:100:70:60:10 kg/ha of urea-TSP-MP-gypsum and zinc were applied. Intercultural operations, irrigation, rouging, GA_3 application and supplementary pollination were performed as per need basis.

Results & discussion: Seed yield of 1024 kg/plot (2.05 t/ha) and 910 kg/plot (1.82 t/ha) was obtained from BRRI hybrid dhan8 and promising hybrid **(Table 23).**

Table 23. F_1 seed production of released and promising hybrid during T Aman, 2022

Combinations	Plant height (cm)		50% flowering date		PER (%)	OCR (%)	Yield	
	A line	R line	A line	R line			Kg /plot	t/ha
BRRI99A/BRRI37R (BRRI hybrid dhan8)	91	112	72	82	83	51	1024	2.05
BRRI 97A/BRRI37R (Promising hybrid)	93	111	70	80	80	49	910	1.82

D/S: R1 =16/07/2022; R2 = 21/07/2022; A =26/07/2022; D/T: R = 16/08/2022; A=18/08/2022. D/S: R1 =16/07/2022; R2 = 21/07/2022; A =26/07/2022; D/T: R = 16/08/2022; A=18/08/2022. PER (%) = panicle exertion rate, OCR (%) = Out crossing rate

E**xperiment 2.5: Experimental F_1 seed production of promising hybrids during T Aman, 2022**

Objective: To produce sufficient quantity of F_1 hybrid seeds for PYT & MLT

Materials and methods: Twelve CMS lines (BRRI11A, BRRI48A, BRRI97A, BRRI99A, BRRI109A, BRRI110A, BRRI125A IR79156A, IR79125A, IR105687A, IR102758A and IR58025A) along with five restorer lines (IR85551-9-1-1-1-2-1-1-1R, BRRI38R, BRRI42R, BRRI54R and BRRI32R) were grown as parental lines. Two sets of restorer lines were used maintaining an interval of 5 days between them and twelve CMS lines were sown in different date maintaining actual duration interval with restorer lines after 2nd set of restorer lines. Twenty-one days old seedlings were transplanted at a spacing of 15 × 15 cm with ratio 2:8 of A and R line. Unit plot size was 50 m^2. Fertilizers @ 150:100:70:60:10 kg/ha of urea-TSP-MP-gypsum and zinc were applied. Intercultural operations, irrigation, rouging, GA_3 application and supplementary pollination were performed as per need basis.

Results & discussion: Experimental F_1 seed production ranging 0.5 to 60.7 kg/plot from selected promising hybrid combinations during T. Aman 2022 which was equivalent to 0.02 to 2.02 t/ha. Some combinations did not produce sufficient seeds due to lack of flowering synchronization and frequent raining during flowering time **(Table 24).**

Location: BRRI, Gazipur.

Principal investigator M. J Hasan; M S Islam; A K Paul and P L Biswas

Co-investigator: M R Quddus and M U Kulsum

Table 24. Experimental F_1 seed obtained from different hybrid combinations during T Aman 2022

SL.	Designation	Seed amount (kg)	Yield (t/ha)	OCR (%)	Remarks
1	BRRI11A/BRRI54R	26.0	0.45	29.6	
2	BRRI48A/BRRI54R	14.0	0.56	19.4	
3	BRRI97A/BRRI54R	8.0	0.18	13.8	
4	BRRI99A/BRRI54R	13.0	0.41	16.5	
5	BRRI109A/BRRI54R	10.0	0.25	22.3	
6	BRRI110A/BRRI54R	4.0	0.35	7.1	
7	BRRI125A/BRRI54R	8.0	0.13	14.3	
8	IR79156A/BRRI54R	19.0	0.21	24.5	
9	IR79125A/BRRI54R	4.0	0.11	8.2	
10	IR105687A/BRRI54R	15.0	0.22	17.6	
11	IR102758A/BRRI54R	6.0	0.25	9.4	Lack of proper synchronization and continuous raining during pollination time was the main reason for poor seed yield
12	IR58025A/BRRI54R	10.5	0.23	17.2	
13	BRRI11A/BRRI38R	12.8	0.75	20.2	
14	BRRI48A/BRRI38R	9.2	0.54	12.3	
15	BRRI97A/BRRI38R	10.7	0.63	16.9	
16	BRRI99A/BRRI38R	13.6	0.80	17.4	
17	BRRI109A/BRRI38R	7.2	0.42	13.3	
18	BRRI110A/BRRI38R	4.2	0.25	11.6	
19	BRRI125A/BRRI38R	7.0	0.41	15.4	
20	IR79156A/BRRI38R	26.1	1.54	30.2	
21	IR79125A/BRRI38R	3.1	0.18	10.4	
22	IR105687A/BRRI38R	3.3	0.19	9.2	
23	IR102758A/BRRI38R	2.8	0.16	7.8	
24	IR58025A/BRRI38R	4.9	0.29	10.3	
25	BRRI11A/BRRI42R	4.0	0.33	10.7	
26	BRRI48A/BRRI42R	3.0	0.25	9.4	
27	BRRI97A/BRRI42R	9.0	0.5	17.3	
28	BRRI99A/BRRI42R	8.0	0.44	14.3	

29	BRRI109A/BRRI42R	5.0	0.2	11.3
30	BRRI110A/BRRI42R	2.0	0.08	5.6
31	BRRI125A/BRRI42R	0.5	0.02	2.1
32	IR79156A/BRRI42R	18.0	0.99	25.7
33	IR79125A/BRRI42R	4.0	0.33	9.1
34	IR105687A/BRRI42R	5.0	0.27	11.4
35	IR102758A/BRRI42R	5.0	0.41	12.3
36	IR58025A/BRRI42R	4.0	0.33	10.5
37	BRRI11A/BRRI32R	12.0	0.27	23.5
38	BRRI48A/BRRI32R	11.0	0.27	22.4
39	BRRI97A/BRRI32R	5.0	0.08	13.3
40	BRRI99A/BRRI32R	4.0	0.05	12.7
41	BRRI109A/BRRI32R	1.5	0.40	4.4
42	BRRI110A/BRRI32R	3.0	0.07	8.4
43	BRRI125A/BRRI32R	5.0	0.08	13.4
44	IR79156A/BRRI32R	11.0	0.21	23.4
45	IR79125A/BRRI32R	1.0	0.14	4.6
46	IR105687A/BRRI32R	8.0	0.30	14.3
47	IR102758A/BRRI32R	1.0	0.22	5.1
48	IR58025A/BRRI32R	1.0	0.66	6.2
49	BRRI11A/IR85551-9-1-1-1-2-1-1-1R	35.1	1.17	42.4
50	BRRI48A/ IR85551-9-1-1-1-2-1-1-1R	21.8	0.73	24.3
51	BRRI97A/ IR85551-9-1-1-1-2-1-1-1R	27.1	0.90	28.6
52	BRRI99A/ IR85551-9-1-1-1-2-1-1-1R	41.9	1.40	44.4
53	BRRI109A/ IR85551-9-1-1-1-2-1-1-1R	36.2	1.21	41.2
54	BRRI110A/ IR85551-9-1-1-1-2-1-1-1R	17.5	0.58	27.6
55	BRRI125A/ IR85551-9-1-1-1-2-1-1-1R	14.6	0.49	26.3
56	IR79156A/ IR85551-9-1-1-1-2-1-1-1R	60.7	2.02	52.3
57	IR79125A/ IR85551-9-1-1-1-2-1-1-1R	25.10	0.84	30.6
58	IR105687A/ IR85551-9-1-1-1-2-1-1-1R	21.6	0.72	20.3
59	IR102758A/ IR85551-9-1-1-1-2-1-1-1R	27.2	0.91	26.9
60	IR58025A/ IR85551-9-1-1-1-2-1-1-1R	31.2	1.04	39.4

Each plot area was 200 Sqm; D/S: R_1 = 12/07/2022; R_2 =17/07/2022 D/T: R= 05/08/2022; A = 12/08/2022

Sub-project-3: Dissemination of Hybrid rice technology

Activity.1: Supply of hybrid seeds and parental lines to public, private seed companies and farmers.

Objective: To expand and popularize BRRI developed hybrid rice varieties.

Output: In the reporting year (T Aman season), hybrid rice division supplied 8446 kg of parental lines and F_1 seeds to 90 farmers, 13 seed companies, scientists, extension people, projects and staffs of BRRI and during Aus 2022 4370 kg hybrid seeds of BRRI hybrid dhan7 distributed among BRRI R/S, department of agricultural extension and farmers **(Table 25).**

Table 25. Amount of parental line and hybrid seeds supplied to different organization during T Aman 2022

Sl. No	Recipient	Nos.	F_1 (kg)	A line (kg)	B line (kg)	R line (kg)
01	Seed Companies	13	800	80	-	30
02	Farmers	90	1510	-	-	-
03	BRRI Scientists + staffs	25	1250	-	-	-
04	BRRI, R/S (5)+DAE	27	4886	-	-	-
Total		155	8446	80	-	30
Aus 2022						
01	BRRI, R/S (5)+DAE		4370			
Grand Total				12916 Kg		

Investigator: All staff of hybrid rice division.

B. Experiments conducted during Boro season 2022-23.

Experiment 1.1.1 Source Nursery

Specific objective: Identification of prospective maintainers and restorers of diversified origin for making experimental rice hybrids.

Materials and methods: Five hundred and eighteen (518) entries were included in this nursery comprising 411 restorers, 14 CMS and 93 elite advance lines collected from conventional breeding program and exotic sources. Parents were grown in three (3) sets with the spacing of 20 × 20 cm. The CMS lines were planted in 3 seeding dates with an interval of 7 days to synchronize with the early, medium and late source nursery entries. Hand crosses were made to produce 50-150 F_1 seeds from each cross.

Results and discussion: Nineteen **(**91) test crosses and 513 (A × R) crosses were made using 14 CMS lines during Boro season 2022-23. List of crosses have been shown in **Table 26 & 27.**

Location: BRRI, Gazipur.

Principal investigator: M J Hasan

Co-Investigator: M U Kulsum

Table 26. List of the Test crosses made during Boro season 2022-23

SL. No.	Designation	Seed obtained	SL. No.	Designation	Seed obtained
01	BRRI97A/ BR8415-2-3-Ran1-1-1-9	90	48.	BRRI110A/ PBM3	95
02	BRRI97A/ BRRang13-RGA5-2-3-5	75	49.	BRRI110A/ PBM4	75
03.	BRRI97A/ BRRang13-RGA5-1-2-2	65	50.	BRRI110A/ IR126072-91-1-2-B	85
04.	BRRI97A/ ASM1	80	51.	BRRI125A/ BR11716-4R-108	90
05.	BRRI97A/ ASM2	85	52.	BRRI125A/ MZ-2	75
06.	BRRI97A/ MZ-1	65	53.	BRRI125A/ FFL2	65
07.	BRRI97A/ ASM5	90	54.	BRRI125A/ FFL4	80
08.	BRRI97A/ ASM6	70	55.	BRRI125A/ FFL6	85
09.	BRRI97A/ MZ-3	65	56.	BRRI125A/ FFL8	65
10.	BRRI97A/ ASM7	70	57.	BRRI125A/ FFL11	90
11.	BRRI97A/ UKL-16	80	58.	BRRI125A/ FFL12	70
12.	BRRI97A/ UKL-30	85	59.	BRRI125A/ Philippine black rice	65
13.	BRRI97A/ UKL-31	55	60.	BRRI125A/ IR127278-114-3-3-B	70
14.	BRRI97A/ Japanese black rice 1	85	61.	IR105687A/ BR8415-2-3-Ran1-1-1-9	95
15.	BRRI97A/BR12836-4R-69 (Antioxi rice)	95	62.	IR105687A/ BRRang13-RGA5-2-3-5	70
16.	BRRI97A/ IR126055-46-3-2-B	75	63.	IR105687A/ BRRang13-RGA5-1-2-2	85
17.	BRRI97A/ IR126055-22-4-1-B	95	64.	IR105687A/ ASM1	70
18.	BRRI97A/ PBM4	75	65.	IR105687A/ ASM2	85
19.	BRRI97A/ PBM9	85	66.	IR105687A/ MZ-1	75
20.	BRRI97A/ IR126072-91-1-2-B	90	67.	IR105687A/ ASM3	90
21.	BRRI97A/ IR126037-20-1-1-B	75	68.	IR105687A/ ASM4	90
22.	BRRI109A/ BR8415-2-3-Ran1-1-1-9	65	69.	IR105687A/ ASM5	85

23.	BRRI109A/ FFL1	80	70.	IR105687A/ ASM6	95
24.	BRRI109A/ IR126055-46-3-2-B	85	71.	IR105687A/ MZ-3	75
25.	BRRI109A/ IR126055-22-4-1-B	65	72.	IR105687A/ ASM7	90
26.	BRRI109A/ IR126066-85-5-2-B	90	73.	IR105687A/ UKL-4	75
27.	BRRI109A/ IR126069-83-2-2-B	70	74.	IR105687A/ UKL-8	65
28.	BRRI109A/ IR126072-91-1-2-B	65	75.	IR105687A/ UKL-13	65
29.	BRRI109A/ IR126037-20-1-1-B	70	76.	IR105687A/ UKL-16	80
30.	BRRI110A/ BR8415-2-3-Ran1-1-1-9	85	77.	IR105687A/ UKL-17	75
31.	BRRI110A/ BRRang13-RGA5-2-3-5	55	78.	IR105687A/ UKL-25	65
32.	BRRI110A/ ASM5	65	79.	IR105687A/ UKL-30	95
33.	BRRI110A/ ASM6	70	80.	IR105687A/ UKL-31	95
34.	BRRI110A/ MZ-3	85	81.	IR105687A/BR12836-4R-69 (Antioxi rice)	75
35.	BRRI110A/ ASM7	75	82.	IR105687A/ IR126055-30-5-1-B	85
36.	BRRI110A/ UKL-16	90	83.	IR105687A/ IR126066-85-5-2-B	90
37.	BRRI110A/ UKL-31	90	84.	IR105687A/ IR126069-83-2-2-B	75
38.	BRRI110A/ FFL1	85	85.	IR105687A/ IR126069-48-3-2-B	65
39.	BRRI110A/ Japanese black rice 1	95	86.	IR105687A/ IR126072-257-1-3-B	120
42.	BRRI110A/ Japanese black rice 2	75	87.	IR105687A/ IR126037-59-3-2-B	85
43.	BRRI110A/ IR126055-46-3-2-B	90	88.	IR105687A/ PBM3	115
44.	BRRI110A/ IR126055-30-5-1-B	75	89.	IR105687A/ PBM6	90
45.	BRRI110A/ IR126055-22-4-1-B	65	90.	IR105687A/ PBM9	70
46.	BRRI110A/ IR126066-85-5-2-B	80	91	IR105687A/ IR126069-3-1-1-B	95
47.	BRRI110A/ IR126072-257-1-3-B	95			

D/S: A_1=12.12.22; A_2= 17.12.22; A_3=22.12.22; D/T: A_1=14.01.23; A_2= 20.01.23; A_3=24.01.23
D/S: R_1=01.12.22; R_2= 07.12.22; R_3=14.12.22; D/T: R_1=02.01.23; R_2= 10.01.23; R_3=18.01.23

Table 27. List of A x R crosses made during Boro season 2022-23

SL. No.	Cross combination	Seed obtained	SL. No.	Cross combination	Seed obtained
01	BRRI74A/BRRI10R	85	258	BRRI120A/BRRI53R	80
02	BRRI74A/BRRI15R	75	259	BRRI120A/PR828R	90
03	BRRI74A/BRRI20R	95	260	BRRI120A/PR862R	90
04	BRRI74A/BRRI26R	100	261.	BRRI120A/PR812R	60
05	BRRI74A/BRRI29R	80	262.	BRRI120A/GETCO5R	100
06	BRRI74A/BRRI31R	75	263.	BRRI120A/GETCO13R	90
07	BRRI74A/BRRI32R	80	264.	BRRI120A/GETCO23R	110
08	BRRI74A/BRRI33R	90	265.	BRRI120A/EL108R	110
09	BRRI74A/BRRI35R	75	266.	BRRI120A/CHH67R	165
10	BRRI74A/BRRI36R	85	267.	BRRI120A/R line7	100
11	BRRI74A/BRRI37R	120	268.	BRRI120A/NewR Babla	75
12	BRRI74A/BRRI38R	85	269.	BRRI120A/Win3R	90
13	BRRI74A/BRRI39R	80	270.	BRRI120A/EL86R	80
14	BRRI74A/BRRI40R	85	271.	BRRI120A/Straw col R line	65
15	BRRI74A/BRRI41R	110	272.	BRRI120A/R-2800	65
16	BRRI74A/BRRI43R	95	273.	BRRI120A/Basmati L-14 Ind	95
17	BRRI74A/BRRI44R	65	274.	BRRI120A/EL32R	100
18	BRRI74A/BRRI45R	90	275.	BRRI120A/SN93R offtype	65
19	BRRI74A/BRRI46R	85	276.	BRRI120A/National AgricareR-2	80
20	BRRI74A/BRRI48R	120	277.	BRRI120A/SyngentaR-N-2	100
21	BRRI74A/BRRI49R	75	278.	BRRI120A/EL-168R	75
22	BRRI74A/BRRI50R	90	279.	BRRI120A/SyngentaR (S)	95
23	BRRI74A/BRRI51R	70	280.	BRRI120A/Collected from Ind	65
24	BRRI74A/BRRI52R	70	281.	BRRI120A/BayerR New	120
25	BRRI74A/BRRI53R	90	282.	BRRI120A/Supreme New R	80
26	BRRI74A/PR867R	75	283.	BRRI120A/IR86526-11-6-2-1-1-1-1R	80
27	BRRI74A/F2277R	85	284.	BRRI120A/IR72889-46-3-2-1R	135
28	BRRI74A/BU3R	105	285.	BRRI120A/IR86522-11-1-1-3-1R	75
29	BRRI74A/BAU521R	100	286.	BRRI120A/IR86612-12-10-1-1-2-1R	80
30	BRRI74A/GETCO15R	75	287.	BRRI120A/IR86527-27-1-1-1-1R	100
31	BRRI74A/EL108R	75	288.	BRRI120A/IR86522-12-3-1-1-1-1-1R	75
32	BRRI74A/CHH35R	95	289.	BRRI120A/IR85503-3-3-A-1-1-1-1-1R	100
33	BRRI74A/CHH56R	85	290.	BRRI120A/IR85503-8-13-1-1-1-1-1-1R	110
34	BRRI74A/EL86R	80	291.	BRRI120A/IR85551-9-1-1-1-2-1-1-1R	95
35	BRRI74A/MST-8	70	292.	BRRI120A/IR101999-31-1-2R	70
36	BRRI74A/MST-9	80	293.	BRRI120A/IR112925-5-2-2R	70
37	BRRI74A/S-1203R	120	294.	BRRI120A/IR101921-BK-BK-BK-17-1-1R	170
38	BRRI74A/M-R-1	60	295.	BRRI120A/IR98184-27-1-1-1-1-1-1R	85
39	BRRI74A/EL32R	80	296.	BRRI120A/IR98206-51-2-1-1-1-1-1R	75
40	BRRI74A/EL-204	80	297.	BRRI120A/IR96479-66-4-1-1-1-1-1R	75
41	BRRI74A/ZYB-1	95	298.	BRRI120A/IR96532-29-1-1-1-1-2-1-1R	80
42	BRRI74A/GT-22	100	299.	BRRI120A/IR96581-4-1-4-1-1-2-1-1R	80
43	BRRI74A/Collected from Ind	90	300.	BRRI125A/BRRI10R	95
44	BRRI74A/IR85503-3-3-A-1-1-1-1-1R	95	301.	BRRI125A/BRRI15R	85

45	BRRI74A/IR86526-11-6-2-1-1-1-1R	80	302.	BRRI125A/BRRI20R	75
46	BRRI74A/IR86515-19-1-2-1-1-1-1R	90	303.	BRRI125A/BRRI26R	65
47	BRRI74A/IR85538-59-1-1-1-1-2-1-1-1R	65	304.	BRRI125A/BRRI29R	125
48	BRRI74A/IR85508-6-1-1-1-1-2-1-1-1R	120	305.	BRRI125A/BRRI31R	85
49	BRRI74A/IR86522-12-3-1-1-1-1-1R	75	306.	BRRI125A/BRRI32R	95
50	BRRI74A/IR85503-3-3-A-1-1-1-1-1R	100	307.	BRRI125A/BRRI33R	80
51	BRRI74A/IR85503-8-13-1-1-1-1-1-1R	75	308.	BRRI125A/BRRI35R	85
52	BRRI74A/IR85551-9-1-1-1-2-1-1-1R	95	309.	BRRI125A/BRRI36R	70
53	BRRI74A/IR101999-31-1-2R	85	310.	BRRI125A/BRRI37R	60
54	BRRI74A/IR101921-BK-BK-BK-17-1-1R	95	311.	BRRI125A/BRRI38R	75
55	BRRI74A/IR98184-27-1-1-1-1-1-1R	85	312.	BRRI125A/BRRI39R	80
56	BRRI74A/IR98206-51-2-1-1-1-1-1R	80	313.	BRRI125A/BRRI40R	85
57	BRRI97A/BRRI33R	110	314.	BRRI125A/BRRI41R	90
58	BRRI97A/BRRI35R	90	315.	BRRI125A/BRRI43R	50
59	BRRI97A/BRRI36R	70	316.	BRRI125A/BRRI44R	90
60	BRRI97A/BRRI39R	90	317.	BRRI125A/BRRI45R	100
61	BRRI97A/BRRI40R	95	318.	BRRI125A/BRRI46R	85
62	BRRI97A/BRRI41R	120	319.	BRRI125A/BRRI48R	100
63	BRRI97A/BRRI43R	75	320.	BRRI125A/BRRI49R	95
64	BRRI97A/BRRI45R	85	321.	BRRI125A/BRRI50R	80
65	BRRI97A/BRRI46R	75	322.	BRRI125A/BRRI51R	55
66	BRRI97A/BRRI48R	95	323.	BRRI125A/BRRI52R	70
67	BRRI97A/BRRI49R	130	324.	BRRI125A/BRRI53R	75
68	BRRI97A/BRRI50R	75	325.	BRRI125A/GETCO23R	100
69	BRRI97A/BRRI51R	100	326.	BRRI125A/EL108R	45
70	BRRI97A/BRRI52R	80	327.	BRRI125A/CHH67R	65
71	BRRI97A/BRRI53R	90	328.	BRRI125A/Win3R	75
72	BRRI97A/PR862R	115	329.	BRRI125A/EL86R	65
73	BRRI97A/BAU329R	75	330.	BRRI125A/R-2800	70
74	BRRI97A/GETCO9R	90	331.	BRRI125A/Basmati L-14 Ind	70
75	BRRI97A/EL108R	75	332.	BRRI125A/EL32R	65
76	BRRI97A/CHH35R	50	333.	BRRI125A/SN93R offtype	120
77	BRRI97A/CHH32R	70	334.	BRRI125A/National AgricareR-2	65
78	BRRI97A/EL220R	105	335.	BRRI125A/SyngentaR-N-2	55
79	BRRI97A/Win3R	90	336.	BRRI125A/EL-168R	50
80	BRRI97A/EL86R	120	337.	BRRI125A/SyngentaR (S)	65
81	BRRI97A/R-2800	75	338.	BRRI125A/Collected from Ind	55
82	BRRI97A/S-1203R	85	339.	BRRI125A/BayerR New	100
83	BRRI97A/M-R-2	85	340.	BRRI125A/Supreme New R	55
84	BRRI97A/EL-215R	110	341.	BRRI125A/IR86526-11-6-2-1-1-1-1R	65
85	BRRI97A/EL-241R	85	342.	BRRI125A/IR86522-11-1-1-3-1R	85
86	BRRI97A/MST-13	95	343.	BRRI125A/IR86612-12-10-1-1-2-1R	60
87	BRRI97A/EL-32R	85	344.	BRRI125A/IR86527-27-1-1-1-1R	65
88	BRRI97A/EL-160R	105	345.	BRRI125A/IR86522-12-3-1-1-1-1-1R	85
89	BRRI97A/EL-204R	75	346.	BRRI125A/IR85503-8-13-1-1-1-1-1-1R	80
90	BRRI97A/GectoR New	80	347.	BRRI125A/IR85551-9-1-1-1-2-1-1-1R	85
91	BRRI97A/EL-144R	100	348.	BRRI125A/IR101999-31-1-2R	115
92	BRRI97A/EL-175R	65	349.	BRRI125A/IR112925-5-2-2R	50
93	BRRI97A/EL-168R	95	350.	BRRI125A/IR101921-BK-BK-BK-17-1-1R	45
94	BRRI97A/Collected from Ind	65	351.	BRRI125A/IR98184-27-1-1-1-1-1-1R	70
95	BRRI97A/BayerR New	80	352.	BRRI125A/IR98206-51-2-1-1-1-1-1R	70
96	BRRI97A/Supreme New R	60	353.	BRRI125A/IR96479-66-4-1-1-1-1-1R	95
97	BRRI97A/IR85503-3-3-A-1-1-1-1-1R	85	354.	BRRI125A/IR96532-29-1-1-1-1-2-1-1R	55
98	BRRI97A/IR73013-95-1-3-2R	85	355.	BRRI125A/IR96581-4-1-4-1-1-2-1-1R	190
99	BRRI97A/IR98222-44-1-2-1-1-1-1R	115	356.	IR105687A/BRRI36R	60
100	BRRI97A/IR86612-31-3-2-1-1-1-1-1R	90	357.	IR105687A /BRRI37R	75
101	BRRI97A/IR86522-12-3-1-1-1-1-1R	75	358.	IR105687A /BRRI38R	90
102	BRRI97A/IR85503-3-3-A-1-1-1-1-1R	90	359.	IR105687A /BRRI39R	110
103	BRRI97A/IR85503-8-13-1-1-1-1-1-1R	115	360.	IR105687A /BRRI41R	85
104	BRRI97A/IR85551-9-1-1-1-2-1-1-1R	80	361.	IR105687A /BRRI45R	75
105	BRRI97A/IR101999-31-1-2R	105	362.	IR105687A /BRRI46R	75
106	BRRI97A/IR101921-BK-BK-BK-17-1-1R	85	363.	IR105687A /BRRI48R	45
107	BRRI97A/IR98184-27-1-1-1-1-1-1R	75	364.	IR105687A /BRRI50R	55
108	BRRI97A/IR98206-51-2-1-1-1-1-1R	100	365.	IR105687A /BRRI51R	75
109	BRRI99A/BRRI35R	95	366.	IR105687A /PR595R	70
110	BRRI99A/BRRI36R	80	367.	IR105687A /PAN809R	85
111	BRRI99A/BRRI38R	85	368.	IR105687A /GETCO13R	150
112	BRRI99A/BRRI39R	70	369.	IR105687A /GETCO17R	120
113	BRRI99A/BRRI40R	70	370.	IR105687A /GETCO18R	100
114	BRRI99A/BRRI41R	95	371.	IR105687A /Win3R	85
115	BRRI99A/BRRI43R	65	372.	IR105687A /R-2800	55
116	BRRI99A/BRRI44R	90	373.	IR105687A /EL32R	120
117	BRRI99A/BRRI45R	165	374.	IR105687A /SN93R off type	65
118	BRRI99A/BRRI46R	85	375.	IR105687A /National AgricareR-2	70

119	BRRI99A/BRRI48R	85	376.	IR105687A /SyngentaR-N-2	70
120	BRRI99A/BRRI49R	75	377.	IR105687A /EL-168R	75
121	BRRI99A/BRRI50R	120	378.	IR105687A /SyngentaR (S)	85
122	BRRI99A/BRRI51R	95	379.	IR105687A /Collected from Ind	100
123	BRRI99A/BRRI52R	75	380.	IR105687A /BayerR New	95
124	BRRI99A/PR812R	75	381.	IR105687A /Supreme New R	85
125	BRRI99A/PR828R	105	382.	IR105687A /IR86522-12-3-1-1-1-1-1R	80
126	BRRI99A/PR862R	90	383.	IR105687A /IR85503-8-13-1-1-1-1-1-1R	70
127	BRRI99A/PR812R	75	384.	IR105687A /IR85551-9-1-1-1-2-1-1-1R	65
128	BRRI99A/F2277R	110	385.	IR105687A /IR101999-31-1-2R	65
129	BRRI99A/BAU521R	85	386.	IR105687A /IR112925-5-2-2R	150
130	BRRI99A/GETCO5R	65	387.	IR105687A /IR101921-BK-BK-BK-17-1-1R	55
131	BRRI99A/EL86R	85	388.	IR105687A /IR98184-27-1-1-1-1-1-1R	85
132	BRRI99A/Straw col R line	95	389.	IR105687A /IR98206-51-2-1-1-1-1-1R	75
133	BRRI99A/R-2800	145	390.	IR105687A /IR96479-66-4-1-1-1-1-1R	70
134	BRRI99A/Basmati L-15 Ind	70	391.	IR105687A /IR96532-29-1-1-1-1-2-1-1R	60
135	BRRI99A/EL32R	85	392.	IR79156A /PR595R	55
136	BRRI99A/SN93R offtype	90	393.	IR79156A /GETCO13R	120
137	BRRI99A/National AgricareR-2	65	394.	IR79156A /GETCO17R	120
138	BRRI99A/SyngentaR-N-2	80	395.	IR79156A /GETCO18R	85
139	BRRI99A/EL-168R	100	396.	IR79156A /Win3R	80
140	BRRI99A/SyngentaR (S)	70	397.	IR79156A /EL86R	85
141	BRRI99A/Collected from Ind	85	398.	IR79156A /R-2800	70
142	BRRI99A/BayerR New	70	399.	IR79156A /EL32R	75
143	BRRI99A/Supreme New R	115	400.	IR79156A /SN93R off type	120
144	BRRI99A/IR86526-11-6-2-1-1-1-1R	80	401.	IR79156A /National AgricareR-2	70
145	BRRI99A/IR72889-46-3-2-1R	85	402.	IR79156A /SyngentaR-N-2	65
146	BRRI99A/IR86522-11-1-1-3-1R	75	403.	IR79156A /EL-168R	55
147	BRRI99A/IR86612-12-10-1-1-2-1R	150	404.	IR79156A /SyngentaR (S)	115
148	BRRI99A/IR86527-27-1-1-1-1R	100	405.	IR79156A /Collected from Ind	150
149	BRRI99A/IR85503-3-3-A-1-1-1-1-1R	55	406.	IR79156A /BayerR New	50
150	BRRI99A/IR85503-8-13-1-1-1-1-1-1R	165	407.	IR79156A /Supreme New R	55
151	BRRI99A/IR85551-9-1-1-1-2-1-1-1R	80	408.	IR79156A /IR86522-12-3-1-1-1-1-1R	75
152	BRRI99A/IR101999-31-1-2R	75	409.	IR79156A /IR85503-8-13-1-1-1-1-1-1R	85
153	BRRI99A/IR112925-5-2-2R	85	410.	IR79156A /IR85551-9-1-1-1-2-1-1-1R	55
154	BRRI99A/IR101921-BK-BK-BK-17-1-1R	85	411.	IR79156A /IR101999-31-1-2R	50
155	BRRI99A/IR98184-27-1-1-1-1-1-1R	70	412.	IR79156A /IR112925-5-2-2R	65
156	BRRI99A/IR98206-51-2-1-1-1-1-1R	120	413.	IR79156A/IR101921-BK-BK-BK-17-1-1R	85
157	BRRI99A/IR96479-66-4-1-1-1-1-1R	95	414.	IR79156A /IR98184-27-1-1-1-1-1-1R	100
158	BRRI99A/IR96532-29-1-1-1-1-2-1-1R	85	415.	IR79156A /IR98206-51-2-1-1-1-1-1R	50
159	BRRI99A/IR96581-4-1-4-1-1-2-1-1R	95	416.	IR79156A /IR96479-66-4-1-1-1-1-1R	65
160	BRRI109A/BRRI32R	100	417.	IR79156A /IR96532-29-1-1-1-1-2-1-1R	65
161	BRRI109A/BRRI33R	80	418.	IR79125A/BRRI36R	85
162	BRRI109A/BRRI36R	95	419.	IR79125A /BRRI37R	80
163	BRRI109A/BRRI37R	85	420.	IR79125A /BRRI38R	75
164	BRRI109A/BRRI38R	65	421.	IR79125A /BRRI39R	70
165	BRRI109A/BRRI39R	65	422.	IR79125A /BRRI41R	120
166	BRRI109A/BRRI40R	120	423.	IR79125A /BRRI45R	135
167	BRRI109A/BRRI41R	90	424.	IR79125A /BRRI46R	85
168	BRRI109A/BRRI43R	85	425.	IR79125A /BRRI48R	65
169	BRRI109A/BRRI44R	55	426.	IR79125A /GETCO18R	85
170	BRRI109A/BRRI45R	90	427.	IR79125A /Win3R	80
171	BRRI109A/BRRI46R	115	428.	IR79125A /EL86R	75
172	BRRI109A/BRRI48R	85	429.	IR79125A /R-2800	70
173	BRRI109A/BRRI49R	95	430.	IR79125A /Basmati Line Ind	120
174	BRRI109A/BRRI51R	65	431.	IR79125A /Basmati L-15 India	55
175	BRRI109A/BRRI53R	120	432.	IR79125A /EL32R	60
176	BRRI109A/CHH35R	115	433.	IR79125A /SN93R off type	65
177	BRRI109A/CHH32R	80	434.	IR79125A /National AgricareR-2	70
178	BRRI109A/Win3R	80	435.	IR79125A /SyngentaR-N-2	65
179	BRRI109A/EL86R	105	436.	IR79125A /EL-168R	75
180	BRRI109A/R-2800	85	437.	IR79125A /SyngentaR (S)	85
181	BRRI109A/EL32R	90	438.	IR79125A /Collected from Ind	95
182	BRRI109A/SN93R offtype	65	439.	IR79125A /BayerR New	90
183	BRRI109A/National AgricareR-2	85	440.	IR79125A /Supreme New R	55
184	BRRI109A/SyngentaR-N-2	90	441.	IR79125A /IR86522-12-3-1-1-1-1-1R	65
185	BRRI109A/EL-168R	90	442.	IR79125A /IR85503-8-13-1-1-1-1-1-1R	70
186	BRRI109A/SyngentaR (S)	105	443.	IR79125A /IR85551-9-1-1-1-2-1-1-1R	70
187	BRRI109A/Collected from Ind	80	444.	IR79125A /IR101999-31-1-2R	85
188	BRRI109A/BayerR New	85	445.	IR79125A /IR112925-5-2-2R	110
189	BRRI109A/Supreme New R	70	446.	IR79125A /IR101921-BK-BK-BK-17-1-1R	65
190	BRRI109A/IR98222-44-1-2-1-1-1-1R	85	447.	IR79125A /IR98184-27-1-1-1-1-1-1R	75
191	BRRI109A/IR86612-31-3-2-1-1-1-1-1R	120	448.	IR79125A /IR98206-51-2-1-1-1-1-1R	70
192	BRRI109A/IR86522-12-3-1-1-1-1-1R	100	449.	IR79125A /IR96479-66-4-1-1-1-1-1R	80
193	BRRI109A/IR85503-3-3-A-1-1-1-1-1R	85	450.	IR79125A /IR96532-29-1-1-1-1-2-1-1R	80

194	BRRI109A/IR85503-8-13-1-1-1-1-1-1R	90	451.	IR102758A/BRRI36R	90
195	BRRI109A/IR85551-9-1-1-1-2-1-1-1R	65	452.	IR102758A /BRRI37R	105
196	BRRI109A/IR101999-31-1-2R	60	453.	IR102758A /BRRI38R	55
197	BRRI109A/IR112925-5-2-2R	55	454.	IR102758A /BRRI39R	75
198	BRRI109A/IR101921-BK-BK-BK-17-1-1R	65	455.	IR102758A /BRRI41R	60
199	BRRI109A/IR98184-27-1-1-1-1-1-1R	120	456.	IR102758A /BRRI45R	80
200	BRRI109A/IR98206-51-2-1-1-1-1-1R	100	457.	IR102758A /BRRI46R	100
201	BRRI109A/IR96479-66-4-1-1-1-1-1R	75	458.	IR102758A A /BRRI48R	130
202	BRRI109A/IR96532-29-1-1-1-1-2-1-1R	70	459.	IR102758A /GETCO18R	85
203	BRRI109A/IR96581-4-1-4-1-1-2-1-1R	85	460.	IR102758A /Win3R	70
204	BRRI110A/BRRI32R	90	461.	IR102758A /EL86R	70
205	BRRI110A/BRRI33R	90	462.	IR102758A /R-2800	90
206	BRRI110A/BRRI36R	80	463.	IR102758A /Basmati Line Ind	100
207	BRRI110A/BRRI37R	85	464.	IR102758A /Basmati L-15 India	95
208	BRRI110A/BRRI38R	65	465.	IR102758A /EL32R	55
209	BRRI110A/BRRI39R	100	466.	IR102758A /SN93R off type	60
210	BRRI110A/BRRI40R	65	467.	IR102758A /National AgricareR-2	70
211	BRRI110A/BRRI41R	75	468.	IR102758A /SyngentaR-N-2	70
212	BRRI110A/BRRI43R	70	469.	IR102758A /EL-168R	85
213	BRRI110A/BRRI44R	90	470.	IR102758A /SyngentaR (S)	120
214	BRRI110A/BRRI45R	100	471.	IR102758A /Collected from Ind	85
215	BRRI110A/BRRI46R	70	472.	IR102758A /BayerR New	55
216	BRRI110A/BRRI48R	65	473.	IR102758A /Supreme New R	60
217	BRRI110A/BRRI49R	70	474.	IR102758A /IR86612-12-10-1-1-2-1R	60
218	BRRI110A/BRRI51R	95	475.	IR102758A /IR86527-27-1-1-1-1R	70
219	BRRI110A/BRRI53R	110	476.	IR102758A /IR86522-12-3-1-1-1-1-1R	55
220	BRRI110A/CHH35R	60	477.	IR102758A /IR85503-8-13-1-1-1-1-1-1R	80
221	BRRI110A/CHH32R	60	478.	IR102758A /IR85551-9-1-1-1-2-1-1-1R	95
222	BRRI110A/Win3R	55	479.	IR102758A /IR101999-31-1-2R	110
223	BRRI110A/EL86R	80	480.	IR102758A /IR112925-5-2-2R	65
224	BRRI110A/R-2800	90	481.	IR102758A /IR101921-BK-BK-BK-17-1-1R	80
225	BRRI110A/EL32R	100	482.	IR102758A /IR98184-27-1-1-1-1-1-1R	110
226	BRRI110A/SN93R offtype	75	483.	IR102758A /IR98206-51-2-1-1-1-1-1R	100
227	BRRI110A/National AgricareR-2	70	484.	IR102758A /IR96479-66-4-1-1-1-1-1R	75
228	BRRI110A/SyngentaR-N-2	60	485.	IR102758A /IR96532-29-1-1-1-1-2-1-1R	60
229	BRRI110A/EL-168R	60	486.	IR58025A/BRRI46R	60
230	BRRI110A/SyngentaR (S)	90	487.	IR58025A /BRRI48R	70
231	BRRI110A/Collected from Ind	80	488.	IR58025A /BRRI49R	55
232	BRRI110A/BayerR New	60	489.	IR58025A /BRRI50R	70
233	BRRI110A/Supreme New R	75	490.	IR58025A /BRRI51R	60
234	BRRI120A/BRRI10R	80	491.	IR58025A /BRRI52R	85
235	BRRI120A/BRRI15R	60	492.	IR58025A /BRRI53R	100
236	BRRI120A/BRRI20R	60	493.	IR58025A /Win3R	55
237	BRRI120A/BRRI26R	70	494.	IR58025A /EL86R	60
238	BRRI120A/BRRI29R	80	495.	IR58025A /R-2800	65
239	BRRI120A/BRRI31R	110	496.	IR58025A /Basmati Line Ind	80
240	BRRI120A/BRRI32R	70	497.	IR58025A /Basmati L-15 India	60
241	BRRI120A/BRRI33R	55	498.	IR58025A /EL32R	70
242	BRRI120A/BRRI35R	55	499.	IR58025A /SN93R off type	60
243	BRRI120A/BRRI36R	65	500.	IR58025A /National AgricareR-2	65
244	BRRI120A/BRRI37R	95	501.	IR58025A /SyngentaR-N-2	80
245	BRRI120A/BRRI38R	80	502.	IR58025A /EL-168R	70
246	BRRI120A/BRRI39R	75	503.	IR58025A /SyngentaR (S)	50
247	BRRI120A/BRRI40R	80	504.	IR58025A /Collected from Ind	65
248	BRRI120A/BRRI41R	75	505.	IR58025A /BayerR New	80
249	BRRI120A/BRRI43R	80	506.	IR58025A /Supreme New R	100
250	BRRI120A/BRRI44R	100	507.	IR58025A /IR101999-31-1-2R	65
251	BRRI120A/BRRI45R	55	508.	IR58025A /IR112925-5-2-2R	60
252	BRRI120A/BRRI46R	65	509.	IR58025A /IR101921-BK-BK-BK-17-1-1R	70
253	BRRI120A/BRRI48R	85	510.	IR58025A /IR98184-27-1-1-1-1-1-1R	85
254	BRRI120A/BRRI49R	70	511.	IR58025A /IR98206-51-2-1-1-1-1-1R	80
255	BRRI120A/BRRI50R	80	512.	IR58025A /IR96479-66-4-1-1-1-1-1R	95
256	BRRI120A/BRRI51R	70	513.	IR58025A /IR96532-29-1-1-1-1-2-1-1R	110
257	BRRI120A/BRRI52R	60			

D/S: A_1=12.12.22; A_2= 17.12.22; A_3=22.12.22; D/T: A_1=14.01.23; A_2= 20.01.23; A_3=24.01.23
D/S: R_1=01.12.22; R_2= 07.12.22; R_3=14.12.23; D/T: R_1=02.01.23; R_2= 10.01.23; R_3=18.01.23

Experiment 1.1.2: Testcross Nursery

Specific objectives:

1. Confirmation of maintainers and restorers from the crossed entries.
2. Selection of heterotic rice hybrids.
3. Conversion of prospective maintainers into new CMS lines.

Materials and methods: Eighty-three testcrosses (F_1s) along with their parents and BRRI hybrid dhan5, SL8H, Heera and Tej Gold were used as standard check variety. The testcross F_1s and their respective male parents were grown side by side in a single row of 15 plants with a single seedling/ hill. Fertilizer dose was applied @ 270:130:120:70:10 Urea-TSP-MP-Gypsum- Zn SO4 kg/ha respectively. Standard check variety was grown after every 40-test cross F_1s. Test cross F_1's was evaluated at flowering stage for their pollen sterility.

Results and discussion: During Boro 2022-23, two (02) entries showed complete sterility **(Table 28)** and four (04) entries have been found heterotic over check varieties **(Table 29)**. Pollen parent of completely sterile combinations were regarded as suspected maintainer lines and pollen parent of heterotic combinations were regarded as suspected restorer.

Principal investigator: A Ansari
Co-investigator: M J Hasan
Location: BRRI, Gazipur.

Table 28. List of Completely Sterile (CS) entries from TCN, Boro 2022-23

SL No.	Test entries	Pollen sterility status (%)	Seed amount	Duration
1	BRRI105687A/ UKL-8	CS	90	147
2	BRRI105687A/ UKL-17	CS	80	143

D/S: P_1= 05.12.22; P_2/F_1= 08.12.22; P_3= 11.12.22; D/T:12.01.2023

Table 29. List of entries found heterotic over check varieties from TCN, Boro 2022-23

Test Entries	DTM (DAS)	PHT (cm)	Tiller /hill	Yield (t/ha)	Grain size & shape	Yield adv. over checks (%)	Suspected as good restorer
IR105688A/BR9942-1-2-1-1-B2	136	95	11	8.5	LS	3-14	BR9942-1-2-1-1-B2
IR79156A/BRRI31R-MASP2	153	108	11	12.8	LB	42-72	BRRI31R-MASP2
IR79156A/IR127278-114-3-3-B-1	151	105	12	10.4	MS	15-40	IR127278-114-3-3-B-1
IR79156A/2110R	151	107	11	11.7	MB	30-58	2110R
BRRI hybrid dhan5	146	103	11	9.0	LB		
SL-8	148	105	10	8.3	MB		
Hera	150	110	10	7.6	MS		
Tej Gold	146	110	13	7.4	MS		
CV (%)	3.60	4.70	7.49	20.85			
LSD (0.05%)	4.85	4.51	0.74	1.8			

Plot size= $2m^2$, LS= Long slender, MS= Medium Slender, LB = Long Bold

D/S: P1= 05.12.22; P2/F1= 08.12.22; P3= 11.12.22; D/T: 12.01.2023

Experiment 1.1.3: Backcross Nursery

Specific objective: Developing CMS lines from identified maintainer by back crossing.

Materials: $6BC_6$, $10BC_5$, $7BC_4$, $13BC_2$, and $7BC_1$ generations.

Methods: Successive backcross progenies ranging from BC_1-BC_6 were grown along with their corresponding male parents. Pollen sterility of each of the F_1 plants were evaluated under microscope. Completely sterile plants were immediately crossed with its corresponding male parents for generation advancement.

Results and discussion: In Boro 2022-23, six BC_6 generations were advanced as new CMS lines and shifted to CMS maintenance and evaluation nursery. Other entries were advanced for next generations **(Table 30)** except three BC_2 and one BC_1 generations due to pollen fertility fluctuation.

Location: BRRI, Gazipur.

Principal investigator: M Umma Kulsum; **Co-Investigator:** M Jamil Hasan

Table 30. Performance of Backcross entries during Boro 2022-23

SL. No.	BC gen	Designation	Sterility status	DTM	Grain size & shape	Base color	Remarks
01.	BC_6	BRRI13A/3115B	CS	139	SB	Purple	
02.	BC_6	BRRI48A/AsadB Susp2	CS	131	MS	Green	
03.	BC_6	BRRI53A/3043B-1-10	CS	140	MB	Purple	Advanced as
04.	BC_6	BRRI53A/3137B	CS	132	MB	Purple	New CMS lines
05.	BC_6	BRRI53A/208B-6-8	CS	144	MS	Green	
06.	BC_6	BRRI53A/217B-20-3	CS	136	LS	Green	
07.	BC_5	BRRI7A/UKL-11	CS	134	MB	Purple	
08.	BC_5	BRRI7A/UKL-21	CS	126	MS	Purple	
09.	BC_5	BRRI13A/3145B	CS	143	MS	Green	
10.	BC_5	BRRI13A/ UKL-22	CS	124	MS	Green	
11.	BC_5	BRRI97A/3089B	CS	144	MS	Purple	Advanced as
12.	BC_5	BRRI97A/205B-20-9	CS	143	MB	Purple	BC_6
13.	BC_5	BRRI99A/3171B	CS	141	MS	-	
14.	BC_5	BRRI99A/208B-6-8	CS	140	MS	Green	
15.	BC_5	BRRI99A/217B-20-3	CS	136	SS	Green	
16.	BC_5	BRRI99A/217B-26-6	CS	135	MS	Green	
17.	BC_4	BRRI7A/3076B	CS	139	SB	Purple	
18.	BC_4	BRRI7A/3088B	CS	131	MS	Green	
19.	BC_4	IR105688A/3088B	CS	133	MS	Green	
20.	BC_4	IR102572A/3143B-2-4	CS	126	MB	Purple	Advanced as
21.	BC_4	IR102572A/3148B-1-8	CS	123	SB	Purple	BC_5
22.	BC_4	IR102572A/3150B-1-5	CS	128	MS	Purple	
23.	BC_4	IR105688A/3166B	CS	130	MB	Light Purple	
24.	BC_2	IR105687A/UKL-2	CS	124	MS	Green	
25.	BC_2	IR105687A/UKL-3	CS	123	SB	Green	
26.	BC_2	BRRI109A/UKL-5	CS	127	SB	Green	Advanced as
27.	BC_2	BRRI109A/UKL-6	CS	128	MB	Green	BC_3
28.	BC_2	IR105687A/UKL-9	CS	122	MS	Light Purple	
29.	**BC_2**	**BRRI99A/ UKL-10**	**S**	**128**	**MS**	**Green**	**Discarded**
30.	**BC_2**	**BRRI99A/ UKL-12**	**PS**	**122**	**MS**	**Green**	**Discarded**
31.	BC_2	IR105687A/UKL-19	CS	126	MS	Green	
32.	BC_2	BRRI109A/UKL-26	CS	134	MS	Mixed	
33.	BC_2	BRRI99A/UKL-28	CS	129	MS	Green	
34.	**BC_2**	**BRRI7A/IR75608B-MASP1**	**PF**	**134**	**MS**	**Green**	**Discarded**
35.	BC_2	BRRI7A/IR75608B-MASP4	CS	138	MS	Green	Advanced as
36.	BC_2	BRRI99A/IR75608B-MASP4	CS	138	MS	Green	BC_3. Traits of interest **Xa5, Xa13, Xa21**
37.	BC_1	BRRI109A/15. HRB998-145-36-88	CS	136	MS	Green	
38.	BC_1	BRRI110A/9. HRB998-127-66-51	CS	132	MS	Mixed	Advanced as BC_2
39.	BC_1	BRRI110A/10. HRB998-177-51-64	CS	135	MS	Mixed	Traits of interest
40.	BC_1	BRRI110A/14. HRB998-30-16-87	CS	130	MS	Green	**Sub1, Wx-A_g,**
41.	BC_1	BRRI110A/17.HRB998-140-54-96	CS	129	LS	Green	**Wx-A-NB**
42.	BC_1	IR78369A/2. HRB998-100-11-15	CS	139	MS	Green	
43.	**BC_1**	**IR78369A/6. HRB998-130-43-39**	**CS**	**135**	**MS**	**Green**	**Discarded**

D/S: P_1 =02.12.2022; P_2/F_1=07.12.2022; P_3 =12.12.2022; D/T: 16.01.2023;

Legend: CS = completely sterile; S = sterile; PS = partially sterile; PF = partially fertile; DTM= Days to maturity; SS= Short slender; MS= Medium slender; MB= Medium bold; SB= Short Bold; LS= Long Slender; Xa5+Xa13+ Xa20= BLB; Sub1=Submergence; Wx-A_g, Wx-A-NB= Amylose

Experiment 1.1.4: CMS Maintenance and Evaluation Nursery

Specific objective: Evaluation of locally developed and exotic CMS lines and their maintainer lines.

Materials and methods: One hundred and forty-six (146) CMS lines along with their respective maintainer lines. Two-three pair of each CMS and maintainer lines obtained from paired crosses were planted side by side in a single row plots having 15 hills / row and spacing of 20 × 20 cm. Each pair of A and B lines were covered with a net to protect out crossing from neighboring plants.

Results and discussion: All the CMS lines were maintained by hand crossing for seed increasing and genetic purity. Overall performance of the experiment was good and expected number of seeds was obtained from each entries. Seeds were produced from the crosses are given in **Table 31.**

Location: BRRI, Gazipur.

Principal investigator: M J Hasan

Co-Investigator: M U Kulsum & A Ansari

Table 31. List of CMS lines were maintained by hand crossing during Boro, 2022-23

SL.No	Designation	Sterility status (%)	Seed amount	Plant type/Remarks
01	IR68886A/B	100	65	Modern
02	IR68888A/B	100	75	Modern
03	IR68897A/B	100	90	Modern
04	II 32A/B	100	80	Modern
05	Jin 23 A/B	100	115	Modern
06	V_{20} A/B	99	85	Modern
07	Z.S 97A/B	100	130	Modern
08	Gan46 A/B	98	85	Modern
09	D.ShanA A/B	100	110	Modern
10	IR 75608 A/B	100	85	Modern
11	IR 79156A/B	100	80	Modern
12	IR 58025A/B	100	60	Modern
13	You 1A/B	100	70	Modern
14	BRRI1A/B	100	70	Modern
15	BRRI 4A/B	100	80	Modern
16	BRRI 6A/B	100	75	Modern
17	BRRI7A/B	100	130	Modern
18	BRRI8A/B	100	70	Modern
19	BRRI 9A/B	100	70	Modern
20	BRRI10A/B	100	95	Modern
21	BRRI11A/B	100	155	Modern
22	BRRI12A/B	100	75	Modern
23	BRRI13A.B	100	110	Modern
24	BRRI14A/B	100	70	Modern
25	BRRI15A/B	100	85	Modern
26	BRRI16A/B	100	80	Modern
27	GuiA/B	100	100	Modern
28	BRRI28A/B	99	100	Modern
29	BRRI29A/B	100	85	Modern
30	BRRI30A/B	99	85	Modern
31	BRRI31A/B	100	80	Modern
32	BRRI32A/B	100	85	Modern
33	BRRI33A/B	100	70	Modern
34	BRRI34A/B	98	85	Modern
35	BRRI35A/B	100	120	Modern
36	BRRI36A/B	100	80	Modern
37	BRRI38A/B	100	80	Modern
38	BRRI39A/B	100	85	Modern
39	BRRI44A/B	100	120	Modern
40	BRRI45A/B	100	80	Modern
41	BRRI46A/B	100	75	Modern
42	BRRI47A/B	100	100	Modern
43	BRRI48A/B	100	85	Modern
44	BRRI49A/B	100	70	Modern

45	BRRI50A/B	100	80	Modern
46	BRRI51A/B	100	120	Modern
47	BRRI53A/B	100	95	Modern
48	BRRI54A/B	100	120	Modern
49	BRRI56A/B	100	85	Modern
50	BRRI57A/B	100	70	Modern
51	BRRI58A/B	100	80	Modern
52	BRRI59A/B	100	85	Modern
53	BRRI61A/B	100	100	Modern
54	BRRI62A/B	100	85	Modern
55	BRRI64A/B	100	120	Modern
56	BRRI65A/B	100	85	Modern
57	BRRI66A/B	100	120	Modern
58	BRRI68A/B	100	85	Modern
59	BRRI72A/B	99	85	Modern
60	BRRI74A/B	100	65	Modern
61	BRRI75A/B	100	55	Modern
62	BRRI77A/B	100	70	Modern
63	BRRI78A/B	100	120	Modern
64	BRRI80A/B	100	85	Modern
65	BRRI83A/B	100	75	Modern
66	BRRI84A/B	100	65	Modern
67	BRRI86A/B	100	100	Modern
68	BRRI87A/B	100	95	Modern
69	BRRI88A/B	100	85	Modern
70	BRRI89A/B	100	70	Modern
71	BRRI90A/B	100	120	Modern
72	BRRI91A/B	100	85	Modern
73	BRRI92A/B	100	60	Modern
74	BRRI93A/B	100	85	Modern
75	BRRI94A/B	100	120	Modern
76	BRRI95A/B	100	85	Modern
77	BRRI96A/B	100	90	Modern
78	BRRI97A/B	100	65	Modern
79	BRRI98A/B	100	75	Modern
80	BRRI99A/B	100	80	Modern
81	BRRI100A/B	100	80	Modern
82	BRRI101A/B	100	70	Modern
83	BRRI102A/B	100	85	Modern
84	BRRI103A/B	100	80	Modern
85	BRRI104A/B	100	75	Modern
86	BRRI109A/B	100	80	Modern
87	BRRI110A/B	100	85	Modern
88	CTA/B-1	100	110	Modern
89	CTA/B-2	100	75	Modern
90	PA/BP-1	100	70	Modern
91	HA/HB	100	60	Modern
92	BRRI115A/B	100	85	Modern
93	BRRI116A/B	100	90	Modern
94	BRRI117A/B	100	65	Modern
95	BRRI118A/B	100	110	Modern
96	BRRI119A/B	100	80	Modern
97	BRRI120A/B	100	65	Modern
98	BRRI121A/B	100	90	Modern
99	BRRI126A/B	100	65	Modern
100	BRRI127A/B	100	55	Modern
101	BRRI128A/B	100	70	Modern
102	BRRI129A/B	100	75	Modern
103	BRRI130A/B	100	80	Modern
104	BRRI131A/B	100	60	Modern
105	BRRI132A/B	100	100	Modern
106	BRRI133A/B	100	80	Modern
107	BRRI134A/B	100	55	Modern
108	BRRI135A/B	100	70	Modern
109	BRRI136A/B	100	80	Modern
110	BRRI137A/B	100	120	Modern
111	BRRI138A/B	100	60	Modern
112	BRRI139A/B	100	100	Modern
113	BRRI140A/B	100	80	Modern
114	BRRI141A/B	100	70	Modern
115	BRRI142A/B	100	55	Modern
116	BRRI143A/B	100	70	Modern
117	BRRI144A/B	100	80	Modern
118	BRRI145A/B	100	55	Modern
119	BRRI146A/B	100	80	Modern

120	BRRI147A/B	100	65	Modern
121	BRRI148A/B	100	70	Modern
122	BRRI149A/B	100	80	Modern
123	BRRI150A/B	100	60	Modern
HRDC materials				
124	IR 93558 A/B	100	60	Modern
125	IR105687A/B	100	100	Modern
126	IR102760A/B	100	70	Modern
127	IR102758A/B	100	75	Modern
128	IR102573A/B	100	60	Modern
129	IR102572A/B	100	80	Modern
130	IR102571A/B	100	75	Modern
131	IR102569A/B	100	85	Modern
132	IR105688A/B	100	95	Modern
133	IR102757A/B	100	65	Modern
134	IR58025A/B	100	110	Modern
135	IR75596A/B	100	70	Modern
136	IR78369A/B	100	85	Modern
137	IR79125A/B	100	75	Modern
138	IR93559A/B	100	75	Modern
139	IR93560A/B	100	70	Modern
140	IR73328A/B	100	65	Modern
141	IR80559A/B	100	70	Modern
142	IR99792A/B	100	55	Modern
143	IR93562A/B	100	80	Modern
144	IR99791A/B	100	60	Modern
145	IR102561A/B	100	80	Modern
146	IR102759A/B	100	65	Modern

D/S: B_1=07.12.22; B_2/A =10.12.22; B_3 =13.12.22 D/T: 16.01.2023

Experiment No.1.1.5: Development of restorer lines through (R×R) crosses

Objectives: To broaden the genetic base of restorer lines and develop new recombinant lines

Materials: 16 promising restorer lines

Methods: Thirty days old seedlings were transplanted containing 100 plants per entry with single seedling per hill at a spacing of 20×15 cm. Fertilizers were applied @ 270:130:120:70:10 kg/ha Urea, TSP, MP, gypsum and ZnSO4 respectively. Intercultural and agronomic practices were made when necessary. Emasculation was done at afternoon of selected plants of each entry of restorer lines and hand crosses were made in the next morning with desired male parents with proper bagging and tagging.

Principal investigator: Farhana Rahman Surovi

Co-Investigator: M U Kulsum

Location: BRRI, Gazipur

Date of initiation: November 2022

Date of termination: May 2023

Results and discussion: Eleven R×R crosses were made for new recombinant restorer lines development **(Table 32).**

Table 32. List of R x R crosses made during Boro, 2022-23

SL. No.	Designation	Seeds obtained
1	BU3R × BRRI35R	30
2	BAU521R × BRRI42R	25
3	SyngentaR Slender × Basmati line Ind	45
4	BRRI37R × BRRI39R	35
5	BRRI35R × BAU521R	20
6	BAU521R × BRRI39R	50
7	Basmati line Ind × BRRI33R	25
8	BRRI33R × BR6723-1-1-2R	30
9	BRRI43R × IR86522-12-3-1-1-1-1-1R	40

10	EL262R × Minghui63R	50
11	BRRI45R × BRRI38R	45

D/S: 12/12/2022; D/T: 15/01/2023

Experiment No.1.1.6: Development of maintainer lines through (B×B) crosses

Objectives: To broaden the genetic base of maintainer lines for developing new recombinant lines with high amylose, new plant type and desired grain type.

Materials: 15 different maintainer lines having different cyto-sources, plant type and grain quality.

Methods: Three sets of materials were sown maintaining five days interval from each set for proper flowering synchronization. Thirty days old seedlings were transplanted containing 100 plants per entry with single seedling per hill at a spacing of 20×15 cm. Fertilizers was applied @ 270:130:120: 70:10 kg/ha Urea, TSP, MP, gypsum and ZnSO4 respectively. Intercultural and agronomic practices were made when necessary. Emasculation was done at afternoon of selected plants of each entry of maintainer lines and hand crosses were made in the next morning with desired male plant with proper bagging and tagging.

Principal investigator: Farhana Rahman Surovi

Co-Investigator: M U Kulsum

Location: BRRI, Gazipur

Date of initiation: November 2022

Date of termination: May 2023

Results and discussion: Fourteen (B×B) crosses were made **(Table 33).**

Table 33. List of B x B crosses made during Boro, 2022-23

SL. No.	Designation	No. of seeds obtained
01.	II32B (ID)×Jin23B (WA)	30
02.	Jin23B (WA) × II32B (ID)	40
03.	BRRI102B×BRRI110B (NPT)	20
04.	BRRI110B (NPT) ×BRRI102B	25
05.	BRRI97B×BRRI116B	50
06.	BRRI116B × BRRI97B	75
07.	BRRI121B × IR102758B	60
08.	IR102758B × BRRI121B	40
09.	IR79156B BRRI11B (High amylose)	30
10.	BRRI11B × IR79156B (High amylose)	20
11.	IR78369B × BRRI109B (Grain type)	25
12.	BRRI109B × IR78369B (Grain type)	40
13.	IR105687B × BRRI 116B	45
14.	BRRI 100B × IR105687B	30

D/S: 7/12/2022 (1st set); 12/12/2022 (2nd set); 17/12/2022 (3rd set); D/T: 07/01/2023; 15/01/2023

Experiment No.1.1.7: F_1 confirmation of R×R and B×B crosses

Specific objective: Confirmation of F_1s and exclusion of crosses due to undesired pollen load

Materials and methods: Ten R×R and Seven B×B crosses derived F_1's was grown along with their respective parents in the hybridization block at Gazipur. Twenty- five- day-old- seedlings were transplanted @ single seedling/ hill with a spacing of 20cm x 15cm at the Hybrid Rice breeding field, Gazipur. Crop management such as fertilization, weeding, irrigation etc. was done in time. Insects, diseases and other pests were controlled properly.

Principal investigator: Farhana Rahman Surovi

Co-Investigator: MJ Hasan

Location: BRRI, Gazipur

Date of initiation: November 2022

Date of termination: May 2023

Results and discussion: Seven (BxB) and ten (RxR) crosses were confirmed as true hybrid. True F_1 Plants were selected comparing with respective parents. Disease free seeds were collected from (BxB) and (RxR) crosses **(Table 34 & 35).**

Table 34. F_1 Confirmation of (B×B) crosses, Boro, 2022-23

SL No.	Cross combination	Code	Amount of harvested F_2 seeds
1	BRRI96B× BRRI94B	77 CMSB x 75 CMSB	200g
2	IR68886B × BRRI94B	1 CMSB x 75 CMSB	200g
3	BRRI97B × BRRI91B	78 CMSB x 72 CMSB	200g
4	BRRI97B × IR68886B	78 CMSB x 1 CMSB	200g
5	Z.S 97B × BRRI45B	7 CMSB x 40 CMSB	200g
6	BRRI91B × BRRI96B	72 CMSB x 77 CMSB	200g
7	BRRI89B × Z.S 97B	70 CMSB x 7 CMSB	200g

D/S: 8/12/2022; D/T: 10.01.2023

Table 35. F_1 Confirmation of (R×R) crosses Boro, 2022-23

SL No	Cross combination	Code	Amount of harvested F_2 seeds
1	Chachua5R (N) × IR96479-81-7-1-1-B-1-1-1R	EN 279R x HRDC32R	200g
2	BAU521R× IR86522-29-4-2-1-1-1-1-1-1-1	EN 110R x HRDC37R	200g
3	IR86522-15-2-1-1-1-1-1R×IR86526-21-2-2-1-1-1-1-1R	HRDC55R x HRDC77R	200g
4	Collected from India× EL220R	EN 281R x EN 165R	200g
5	IR 86612-31-3-2-1 -1-1 -1-1 R×IR86526-10-6-1-1-1-1-1-1R	HRDC48R x HRDC78R	200g
6	EL220R× IR86612-13-1-1-1-1R	EN 165R x HRDC80R	200g
7	IR86612-13-1-1-1-1R× LP108R	HRDC11R x EN 93R	200g
8	IR 86522-25-3-1-1-1-1-1-1R× LP70R	HRDC10R x EN 91R	200g
9	IR73971-87-1-1-1-1R(IR01N200)× F2277	HRDC20R x EN 75R	200g
10	Collected from India× IR06N126R	EN 281R x HRDC61R	200g

D/S: 8/12/2022; D/T: 10.01.2023

Experiment No.1.1.8: Field Rapid Generation Advance (FRGA) for B and R line improvement.

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

Materials and methods:

Hybrid rice researchers of BRRI used the pedigree breeding method since its commencement. Now we are using quicker and effective methods compared to the former. Single seed descent (SSD) method with the collaboration of FRGA was applied to fulfill this purpose. Thirty-seven R×R, forty-one B×B and Twenty-two (A×R) crosses derived segregating progenies were subjected to field rapid generation advancement. Six weeks old seedlings were transplanted at the rate of single seedling/hill with a spacing of 5 cm × 5 cm. In transplanted method, each progeny was grown in a raised bed of 1.25 m width. Half dose of the normal recommended fertilizers were applied as per needed. Weeding, tiller cutting and other cultural operations were done in time. At maturity, single panicle was harvested from each plant of each cross.

Principal investigator: Farhana Rahman Surovi

Co-Investigator: M J Hasan

Location: BRRI, Gazipur

Date of initiation: November 2022

Date of termination: May 2023

Results and discussion: Out of 90895 progenies, 59256 from 100 crosses were advanced to next generation using field rapid generation advance (FRGA) technique **(Table 36).**

Table 36. Progenies selected through Field RGA, during Boro, 2022-23

SL No.	Cross Type	No. of Crosses				Transplanted	Harvested
		F_2	F_4	F_5	F_6	90895	59256
1	B×B	7	14	15	5		
2	R×R	11	7	6	13		
3	A×R		22				
	Total			100			

D/S: 11/12/2022; D/T: 17.01.2023

Experiment No.1.1.9: Blast tolerant parental line development.

Specific objective: Blast tolerant B and R line development

Materials and methods: One maintainer line BRRI74B, one restorer line IR90928-15-4-1-1-1R as recipient parent and five donor parent IR64-Pi9L-NILs, BRRI dhan33, IRRI154-Pi9+Dd9 (N22), BR12416-6R-215 (Pi9+), BRRI dhan74 were used in this experiment. Thirty days old seedlings were transplanted @ single seedling/hill with a spacing of 20 cm × 15 cm. Fertilizers were applied @ 270:130:120:70:10 kg/ha Urea, TSP, MP, gypsum and ZnSO4 respectively. Intercultural and agronomic practices were made when necessary. During flowering stage pollens of these genotypes were used to make cross with CMS lines.

Principal investigator: M Umma Kulsum

Co-Investigator: M Ashik Iqbal Khan and M Jamil Hasan

Location: BRRI, Gazipur

Date of initiation: November 2022

Date of termination: May 2023

Results and discussion: A total of 10 crosses were made (**Table 37**). Mature F_1 seeds were harvested, sun dried and stored separately in bags with proper labeling.

Table 37. List of crosses for development of blast tolerant parental lines of hybrid rice, Boro 2022-23

Sl no	Crosses	No. of seeds
1	BRRI74B/IR64-Pi9L-NILs	145
2	BRRI74B/BRRI dhan33	120
3	BRRI74B/IRRI154-Pi9+Dd9 (N22)	90
4	BRRI74B/BR12416-6R-215 (Pi9+)	115
5	BRRI74B/BRRI dhan74	125
6	IR90928-15-4-1-1-1R /IR64-Pi9L-NILs	110
7	IR90928-15-4-1-1-1R /BRRI dhan33	100
8	IR90928-15-4-1-1-1R /IRRI154-Pi9+Dd9 (N22)	105
9	IR90928-15-4-1-1-1R /BR12416-6R-215 (Pi9+)	125
10	IR90928-15-4-1-1-1R /BRRI dhan74	85

D/S: 9/12/2022; D/T: 10/01/2023

Experiment No.1.1.10: Blast tolerant parental lines and test hybrid development.

Specific objectives:

1. Confirmation of maintainers and restorers from the crossed entries.
2. Selection of heterotic rice hybrids.
3. Conversion of prospective maintainers into new CMS lines.

Materials and methods: Three CMS lines and five blast tolerant elite lines were used in this crossing program. Thirty days old seedlings were transplanted @ single seedling/hill with a spacing of 20 cm × 15 cm. Fertilizers were applied @ 270:130:120:70:10 kg/ha Urea, TSP, MP, gypsum and ZnSO4 respectively. Intercultural and agronomic practices were made when necessary. During flowering stage pollens of these genotypes were used to make cross with CMS lines.

Results and discussion: A total of 15 crosses were made (**Table 38**). Mature F_1 seeds were harvested, sun dried and stored separately in bags with proper labeling.

Location: BRRI, Gazipur.

Principal investigator: M Umma Kulsum; **Co-Investigator:** M Ashik Iqbal Khan, M Jamil Hasan

Table 38. List of testcrosses made with blast tolerant elite lines Boro, 2022-23

Sl no	Designation	No. of Seeds	Remarks
1	BRRI74A/ IR64-Pi9L-NILs	150	
2	BRRI74A/BRRI dhan33	130	
3	BRRI74A/ IRRI154-Pi9+Dd9 (N22)	125	
4	BRRI74A/BR12416-6R-215 (Pi9+)	95	
5	BRRI74A/ BRRI dhan74	95	
6	BRRI110A/ IR64-Pi9L-NILs	135	
7	BRRI110A/ BRRI dhan33	110	
8	BRRI110A/ IRRI154-Pi9+Dd9 (N22)	130	
9	BRRI110A/ BR12416-6R-215 (Pi9+)	110	
10	BRRI110A/ BRRI dhan74	85	
11	BRRI125A/ IR64-Pi9L-NILs	130	
12	BRRI125A/ BRRI dhan33	120	
13	BRRI125A/ IRRI154-Pi9+Dd9 (N22)	115	
14	BRRI125A/ BR12416-6R-215 (Pi9+)	105	
15	BRRI125A/ BRRI dhan74	80	

D/S: 9/12/2022; D/T: 10/01/2023

Experiment No.1.1.11: Generation advancement of Fatema dhan

Specific objective: Fix line selection from Fatema dhan

Materials and methods: Thirty (30) segregating lines were grown in this experiment. Single seedling was used for transplanting. Hand weeding was done in time. Plant protection measure was taken for only disease infestation.

Results and discussion: Among the 30 lines, three (Sl no. 24, 6 & 9) lines were perform better based on yield estimation. MKBF-1, MKBF-2, MKBF-3, MKBF-4, MKBF-5 and H1552F_3 generation advanced through single Seed Descent (SSD) method **(Table 39).**

Location: BRRI, Gazipur

Principal investigator: M Umma Kulsum; **Co-Investigator:** M Jamil Hasan

Table 39. Performance of segregating Fatema dhan during Boro, 2022-23

Sl No.	Designation	PH	ET /hill	DTM	PL	SF%	Yield (t/h)	Remarks
1	Abtaf5 (1) (White tip)	112	7	146	23	80.0	3.5	No awn
2	Abtaf5 (1) (White tip)	131	5	148	28	75.5	4.5	No awn
3	Abtaf5 (2) (Red tip)	129	5	147	31	76.7	4.6	awn present
4	Abtaf5 (2) (White tip)	130	5	148	29	70.7	4.7	awn present
5	Abtaf5 (3) (Red tip)	130	6	150	34	70.0	5.8	Small awn
6	Abtaf5 (3) (Red tip)	133	6	153	36	78.2	6.0	Very small awn, appearance good
7	Abtaf5 (3) (White tip)	135	4	152	33	74.2	3.7	Small awn, Panicle exertion low
8	Abtaf5 (4) (White tip)	134	5	148	34	73.5	3.9	Small awn, Panicle enclosed by leaf sheath
9	Abtaf5 (5) (White tip)	131	6	147	37	80.1	6.6	Very small awn, appearance good
10	Segregating line of Syngenta 1201H (Red tip)	135	5	146	34	78.4	5.7	No awn, fine grain
11	Segregating line of Syngenta 1201H (White tip)	136	4	147	33	79.2	5.8	No awn
12	Segregating line of Syngenta 1201H (White tip)	132	5	146	30	76.4	5.5	No awn, appearance good
13	Fatema-1 (Red tip)	138	4	153	28	65.4	2.3	Long awn present, panicle exertion rate very low
14	Fatema-1 (White tip)	136	3	152	31	71.2	3.0	awn present
15	Fatema-2 (Red tip)	138	4	154	30	76.5	4.0	awn present
16	Fatema-2 (White tip)	139	4	156	29	66.5	3.6	awn present
17	Fatema-3 (Red tip)	136	5	153	33	77.5	4.2	No awn
18	Fatema-3 (Red tip)	140	4	151	29	74.8	4.7	No awn
19	Fatema-3 (Red tip)	136	4	155	32	73.8	4.0	No awn
20	Fatema-3 (White tip)	138	4	148	33	65.5	3.2	Long awn
21	Fatema-3 (White tip)	137	3	151	34	62.6	3.4	awn
22	Fatema-3 (Red tip)	138	4	151	32	58.7	3.1	
23	Fatema-3 (White tip)	136	4	154	31	60.9	3.5	
24	Fatema-4 (Red tip)	137	5	152	36	83.9	7.3	Small awn
25	MKBF-1	-	-	-	-	-	-	SSD
26	MKBF-2	-	-	-	-	-	-	SSD
27	MKBF-3	-	-	-	-	-	-	SSD
28	MKBF-4	-	-	-	-	-	-	SSD
29	MKBF-5	-	-	-	-	-	-	SSD
30	$H1552F_3$	-	-	-	-	-	-	SSD

D/S: 02/12/2022; D/T: 16/01/2023;

Legend: DTM=Days to maturity, PH= Plant height; ET/hill= Effective tiller per hill; PL= Panicle length; SF%= Spikelet fertility percentage; SSD = Single seed descent method

Experiment No.1.1.12: Improvement of restorer lines using Fatema dhan

Specific objective: New recombinant restorer lines development.

Materials and methods: Twenty-five (25) plants from eight (8) crosses were grown in this season. They were grown in lines, every line containing 13 plants. Thirty days old seedlings were transplanted at 20 × 20 cm spacing in main field. Fertilizer management was done as per recommended dosages. At maturity selected lines was harvested for next season.

Results: Twenty-five (25) lines were showed good performance based on plant type, tillering ability, panicle size, phenotypic acceptability and reaction of disease **(Table 40).** Serial no 1-14 lines were transferred to source nursery for making test crosses.

Location: BRRI, Gazipur

Principal investigator: M Umma Kulsum; **Co-Investigator:** M Jamil Hasan

Table 40. List of selected advanced lines during Boro, 2022-23

SL No	Cross combination	Selected lines	No of lines selected
1	BaliaR /Fatema1	L1	5
2		L2	
3		L3	
4		L4	
5		L5	
6	ShaktiR /Fatema1 (White stigma)	L1	1
7	ShaktiR /Fatema1 (Red stigma)	L1	3
8		L2	
9		L3	
10	BRRI20R/Fatema1	L1	2
11		L2	
12	Fatema2/ BRRI20R	L1	3
13		L2	
14		L3	
15	Fatema3/ BRRI20R	L1	3
16		L2	
17		L3	
18	Fatema3/ BRRI15R	L1	5
19		L2	
20		L3	
21		L4	
22		L5	
23	BRRI15R/Fatema3	L1	3
24		L2	
25		L3	
Total			**25**

D/S: 02.12.2022; D/T: 16.01.2023

Experiment No.1.1.13: Evaluation of MST (Multi stress tolerant) line from HRDC

Specific objective: Identification of prospective maintainers and restorers from MST materials.

Materials and methods: Fifteen (15) MST lines from hybrid rice development consortium (HRDC) were grown in this experiment. Single seedling was used for transplanting. Hand weeding was done in time. No plant protection measure was taken in this experiment.

Results and discussion: The tested lines were evaluated based on plant height, days to 50% flowering, anther color, pollen grain, panicle length, spikelet fertility (%), phenotypic acceptability and pollen load during Boro 2022-23. Among these lines MST3 and MST15 were shown segregation and based on uniformity and superiority ten (10) from MST3 and two (2) plants from MST15 were selected for next generation **(Table 41).** MST8 & MST9 were transferred to source nursery restorer line.

Location: BRRI, Gazipur.

Principal investigator: M Umma Kulsum; **Co-Investigator:** M Jamil Hasan

Table 41. Evaluation of MST (Multi stress tolerant) line from HRDC, Boro 2022-23

SL No	Designation	Plant height	DTM	Anther color	Pollen grain	Panicle length	SF (%)	PAcp (Mat)	Pollen load	Remarks
01	MST1	117	136	Y & P	F	25	63	3	M	
02	MST2	105	140	LY& P	F	24	72	4	M	

03	MST3(1-10)									10 plants selected
04	MST4	111	138	LY & P	F	27	73	4	M	uneven flowering
05	MST5	115	144	LY & R	F	26	70	3	M	Late
06	MST6	116	145	Y & P	F	25	76	3	H	
07	MST7	110	146	Y & P	F	27	76	4	H	uneven flowering
08	MST8	113	141	Y & R	F	26	79	3	H	
09	MST9	108	143	Y & R	F	27	81	3	H	
10	MST10	115	140	LY & P	F	25	78	3	H	uneven flowering
11	MST11	118	142	LY & P	F	25	77	3	H	
12	MST12	120	140	Y & P	F	27	81	4	H	
13	MST13	117	143	Y & R	F	29	80	4	M	
14	MST14	114	146	Y & P	F	27	74	3	M	
15	MST15(1-2)	114	145	Y & P	F	26	78	4		2 plants selected

D/S: 08.12.2022; D/T: 09.01.2023

Legend: DTM= Days to maturity; PAcp (Mat) = Phenotypic acceptability at maturity; Y & P= Yellow & Plumpy; LY & P = Light Yellow & Plumpy; LY & R = Light Yellow & Robust; F= Fertile; M= Medium; H =High

Experiment No.1.1.14: Generation advancement of parental lines having multi stress genes (HRDC materials) with Restorer (R) and Maintainer (B) background.

Objective: Progenies selection of restorers and maintainers having multi stress genes

Materials and methods: Thirty-four (34) progenies of F_7 generation were grown at BRRI, Gazipur. Each progeny was grown in a $5m^2$ plot using single seedling per hill at a spacing of 20 × 15 cm. 34 progenies were screened against 20 SNP markers.

Results: Out of 34 screened progenies, 30 progenies having one or more QTL's whereas four progenies having no QTL's **(Table 42**). A total of 43 progenies were selected from F_7 generation, among them 15 progenies were harvested as a single plant basis and 28 progenies bulked through pedigree method **(Table 43).**

Principal investigator: M Umma Kulsum

Co-investigator: M J Hasan

Table 42. Selected progenies of restorers and maintainers having multi stress gene/s during Boro. 2022-23

SL No	Pedigree	Identified Trait Marker
1	IR126044-76-2-2-B	xa5 + Waxy + Chalk5
2	IR126044-76-2-1-B	xa13 + Waxy + Chalk5
3	IR126044-15-5-1-B	xa13 + Waxy + Chalk5
4	IR126055-82-2-2-B	qPi33 + Chalk5 + Gn1a
5	IR126055-46-3-2-B	qPi33
6	IR126055-30-5-1-B	Chalk5
7	IR126055-22-4-1-B	Waxy + Chalk5 + Gn1a
8	IR126066-15-1-2-B	-
9	IR126066-21-2-2-B	-
10	IR126066-85-5-2-B	Pita
11	IR126069-100-3-2-B	-
12	IR126069-83-2-2-B	-
13	IR126069-56-1-2-B	Gn1a
14	IR126069-48-3-2-B	Pita + Gn1a
15	IR126069-3-1-1-B	Pita + Gn1a
16	IR126072-257-1-3-B	Gn1a
17	IR126072-115-6-1-B	Gn1a
18	IR126072-91-1-2-B	Gn1a + qNa1L + Saltol
19	IR126072-83-3-3-B	Chalk5 + qNa1L+ Saltol

20	IR126072-83-3-1-B	Chalk5 + Gn1a+ qNa1L+ Saltol
21	IR126076-122-1-1-B	Gn1a + Saltol
22	IR126076-67-3-2-B	Pita + qPi33
23	IR127275-36-5-2-B	Chalk5 + Gn1a
24	IR127275-14-2-2-B	qPi33 + Gn1a
25	IR127275-9-1-2-B	qPi33 + Chalk5 + Gn1a
26	IR127278-152-1-3-B	xa5 + xa13 + Gn1a + qNa1L
27	IR127278-114-3-3-B	waxy + Gn1a + qNa1L
28	IR127278-55-2-2-B	waxy + Gn1a + qNa1L
29	IR127278-102-3-1-B	Pita + Gn1a + qNa1L
30	IR127270-80-2-1-B	Gn1a
31	IR127270-65-2-4-B	waxy + Gn1a
32	IR127270-40-6-2-B	Pi9 + waxy + Gn1a
33	IR126037-59-3-2-B	Pita + waxy + Gn1a
34	IR126037-20-1-1-B	waxy + Gn1a

Legend: Blast (Pb1, Pi9, Pita & qPi33); Bacterial leaf blight (Xa21, xa13 & xa5); Amylose (waxy); Chalkiness (Chalk5); Grain number (Gn1a); Salinity seedling (qNa1L & Saltol)
D/S: 05/12/2022; D/T: 08/01/2023

Table 43. List of harvested F_8 population of restorers and maintainers having multi stress gene/s during Boro 2022-23

SL No	Pedigree	No. of harvested progenies
1	IR 126044	4 progenies
2	IR 126055	4 progenies
3	IR 126066	4 progenies
4	IR 126069	5 progenies
5	IR 126072	5 progenies
6	IR 126076	2 progenies
7	IR127275	3 progenies
8	IR127278	4 progenies
9	IR127270	3 progenies
10	IR 126037	2 progenies
	Total	**43 progenies**

D/S: 05/12/2022; D/T: 08/01/2023

Sub-project-2: Evaluation of Parental lines & Hybrids

General Objective:

i) Find out suitable and adaptable parental lines and hybrids through evaluation

Experiment 2.1: Observational Trial (OT) of experimental hybrids during Boro, 2022- 23

Objective: Selection of promising hybrids

Materials and Methods: Variety: 135 hybrids (Fine grain, high yield with medium grain) along with 5 checks. Thirty days old seedlings were transplanted in $2m^2$ area plot following augmented design using single seedling per hill at a spacing of 20 cm × 15 cm. Fertilizer dose was applied 270:130:120:70:10 Urea-TSP-MP- Gypsum- $ZnSO_4$ kg/ha respectively.

Results and discussion: Out of 135 hybrids seventeen hybrid combinations performed well but finally selected seven upon yield range at least 12.5 t/ha **(Table 44).** The selected hybrid combinations expressed 18-21% yield advantage over BRRI hybrid dhan5, 21-24% over SL8H, 305-34% Tej Gold, 18-21% Heera and 18-21% BRRI hybrid dhan8. Upon commercial seed production feasibility of these selected hybrid combinations, PYT and MLT trials will be conducted and based on satisfactory yield advantage over check, hybrid combination will be submitted to SCA trials. The heritability obtained from yield was 75% indicating high level of precision in this experiment.

Location: BRRI, Gazipur.

Principal investigator: M Umma Kulsum; **Co-Investigator**: M Jamil Hasan

Table 44. Performance of test hybrids under observational nursery (OT) during Boro, 2022-23

Sl no	SL no	Designation	DTM	GSS	PY (kg)	Yield (t/h)	Ck-1	Ck-2	Ck-3	Ck-4	Ck-5
1	OT-5	BRRI11A/EL-40	140	MB	2.21	11.04	4	7	15	4	4
2	OT-6	BRRI11A/EL-203	137	MB	2.50	12.48	18	21	30	18	18
3	OT-21	BRRI97A/BRRI42R	139	LS	2.53	12.65	20	22	32	19	19
4	OT-22	BRRI97A/BRRI44R	140	MS	2.50	12.51	18	21	31	18	18
5	OT-24	BRRI97A/BRRI56R	138	MS	2.42	12.08	14	17	26	14	14
6	OT-25	BRRI97A/EL175R	140	MS	2.57	12.84	21	24	34	21	21
7	OT-35	BRRI99A/CHH67R	139	MS	2.56	12.79	21	24	34	21	20
8	OT-44	BRRI99A/IR90928-15-4-1-1-1R	144	LS	2.44	12.18	15	18	27	15	15
9	OT-54	BRRI109A/Getco17R	135	LS	2.54	12.72	20	23	33	20	20
10	OT-56	BRRI109A/CHH56R	141	LS	2.41	12.05	14	17	26	14	13
11	OT-60	BRRI109A/BRRI56R	137	MS	2.39	11.93	13	15	25	13	12
12	OT-72	BRRI110A/BRRI37R	141	LS	2.27	11.34	7	10	19	7	7
13	OT-76	BRRI110A/BRRI44R	145	MS	2.46	12.29	16	19	28	16	16
14	OT-93	BRRI110A/IR86522-12-12-2-1-1-1-1R	136	MS	2.41	12.06	14	17	26	14	14
15	OT-115	IR105688A/BRRI44R	142	SS	2.48	12.40	17	20	30	17	17
16	**OT-125**	**IR102758A/GoldR**	**139**	**MS**	**2.51**	**12.55**	**19**	**21**	**31**	**18**	**18**
17	OT-132	IR102758A/IR85503-3-3-A-1-1-1-1-1R	142	MS	2.44	12.20	15	18	27	15	15
	Ck-1	BRRI hybrid dhan5	143	LB	2.11	10.57					
	Ck-2	SL8H	141	MB	2.07	10.34					
	Ck-3	Tej Gold	138	LS	1.91	9.57					
	Ck-4	Heera	144	MB	2.12	10.60					
	Ck-5	BRRI hybrid dhan8	145	LS	2.12	10.62					
		Heritability	0.94			0.75					
		LSD $_{(0.05)}$	5.24			3.71					

D/S: 11/12/2022; D/T: 14/01/2023; Unit plot size= 2m^2

Legend: DTM=Days to maturity, PY= Plot yield, GSS= Grain size & shape; MS=Medium Slender; LS= Long Slender; LB=Long Bold; MB= Medium Bold; SS=Short Slender

Experiment 2.2: Preliminary yield trial (PYT).

Objective: To conduct preliminary evaluation for yield of promising rice hybrids

Materials: Thirteen (13) promising hybrids along with 4 checks (BRRI hybrid dhan5, SL8H, Heera-2 and Tej Gold).

Methods: Thirty old seedlings were transplanted in 30 m^2 plot following RCB design using single seedling per hill at a spacing of 20 × 15 cm with three replications. Fertilizers were applied @ 270:130:120:70:10 kg/ha Urea, TSP, MP, gypsum and ZnSO4 respectively. Intercultural and agronomic practices were applied when necessary.

Results: Thirteen hybrids along with 4 checks were evaluated in Boro 22-2023. Highest yield was obtained from BRRI125A/BRRI38R (11.24 t/ha) which had 6.43% yield advantage over BRRI hybrid dhan5 with similar growth duration. IR79156/BRRI42R and BRRI97A/EL86R also gave 2nd & 3rd highest yield with same growth duration **(Table 45).**

Location: BSRI, Gazipur.

Principal Investigator: Md. Shafiqul Islam

Co-Investigator: Md. Jamil Hasan

Table 45. Result of Preliminary Yield Trial (PYT) during Boro, 2022-23

Sl. no.	Designation	PHT (cm)	GD (days)	GSS	AC (%)	Yield (t/h)	Heterosis (%)			
							Ck-1	Ck-2	Ck-3	Ck-4
01	BRRI97A/EL86R	105.4	141	MS	23.3	10.78	2.08	12.87	22.50	9.59
02	BRRI99A/EL86R	112.2	144	MS	22.8	10.75	1.79	12.56	22.15	9.25
03	BRRI109A/EL86R	109.1	143	MS	23.5	10.67	1.04	11.72	21.25	8.43
04	BRRI125A/BRRI38R	109.0	141	S	24.0	11.24	6.43	17.70	27.73	14.23
05	IR79156A/BRRI42R	103.3	142	S	23.4	10.93	3.50	14.45	24.20	11.08
06	IR105687A/BRRI42R	95.8	139	S	23.3	10.42	-	9.11	18.40	5.89
07	IR102758A/BRRI42R	107.5	147	S	24.1	10.60	0.38	10.99	20.45	7.72
08	BRRI48A/BRRI32R	110.6	147	S	23.4	10.64	0.76	11.41	20.90	8.13
09	BRRI97A/BRRI32R	110.8	145	S	23.6	9.73	-	-	10.57	
10	IR79156A/BRRI32R	111.9	144	S	24.2	9.50	-	-	7.95	
11	BRRI97A/IR85551-9-1-1-1-2-1-1-1R	92.4	146	S	23.3	10.40	-	-	18.18	5.69
12	BRRI99A/IR85551-9-1-1-1-2-1-1-1R	102.3	145	S	22.8	10.51	-	10.05	19.43	6.81
13	IR58025A/IR85551-9-1-1-1-2-1-1-1R	104.5	146	S	23.4	10.53	-	10.26	19.65	7.01
14	BRRI hybrid dhan5 (Ck-1)	110.7	144	S	24.0	10.56	-	10.57	20.00	7.31
15	SL8H(Ck-2)	108.4	147	S		9.55				
16	Heera-2(Ck-3)	109.3	145	S		8.80				
17	Tej Gold (Ck-4)	113.8	146	S		9.84				
	LSD (0.05)	3.16	2.82			0.53				
	Heritability	0.99	0.98			0.91				

D/S: 8.12.2022; D/T: 14.01.2023 Plot size = 20m^2

Legend: PH=Plant height (cm), GD= Growth duration (days), AC (%) = Amylose content, GSS= Grain size and shape, MS= Medium slender, LS = Long slender, SS= Short slender, MB = Medium bold, LB= Long bold

Experiment 2.3: Multi-location Yield Trials (MLT).

Objectives: To assess the yield of promising rice hybrids at different location for better adaptability

Materials: Fourteen hybrids along with four checks (BRRI hybrid dhan5, SL8H, Heera-2 and Tej Gold).

Methods: Thirty old seedlings were transplanted in 20 m^2 plot following RCB design using single seedling per hill at a spacing of 20 × 15 cm with three replications. Fertilizers were applied @ 270:130:120:70:10 kg/ha Urea, TSP, MP, gypsum and ZnSO4 respectively. Intercultural and agronomic practices were applied when necessary.

Principal investigator: Md. Jamil Hasan; Md. Shafiqul Islam, Md. Hafizar Rahman, Anowara Akter and Afsana Ansari

Co-Investigator: A K Paul and M U Kulsum

Location: Gazipur, Ishwardi, Barishal, Rangpur and Sonagazi

Results: Three hybrids were selected based on stable yield performance and advantage over checks across location. All the selected hybrids showed yield advantage ranging from 6-10 % over BRRI hybrid dhan5, 18–23 % over SL8H, 12-16 % over Heera-2 and 18-23 % over Tej Gold **(Table 46).**

Table 46. Results of multi-location yield trials during Boro, 2022-23

Sl. No	Hybrids	PH (cm)	DTM	Yield (t/ha)						SF (%)	GSS	AC (%)	Aver yield Advantage over Ck (%)			
				Gaz	Ish	Bari	Ran	Son	Av				Ck-1	Ck-2	Ck-3	Ck-4
1	BRRI125A/EL86R	108	146	11.0	11.5	11.5	9.7	10.5	10.8	87.3	S	23.6	10.2	22.7	16.1	22.7
2	IR105687A/EL86R	110	139	9.2	9.6	8.9	8.5	8.3	8.9	82.6	MS	23.4	-	1.1	-	1.1

3	BRRI97A/BRRI38R	108	113	8.9	9.3	8.4	7.9	9.0	8.7	79.6	MS	23.2	-	-	-	-
4	BRRI109A/BRRI38R	104	147	10.7	11.4	11.3	9.7	10.1	10.6	85.2	S	24.0	8.2	20.5	14.0	20.5
5	BRRI97A/BRRI42R	107	144	8.8	9.7	8.4	7.7	9.7	8.9	81.3	MS	23.6	-	1.1	-	1.1
6	BRRI99A/BRRI42R	111	145	10.7	11.2	11.0	9.6	9.4	10.4	84.5	S	24.2	6.1	18.2	11.8	18.2
7	BRRI11A/BRRI32R	110	146	9.0	9.6	8.9	9.2	9.4	9.2	83.2	MS	23.4	-	4.5	-	4.5
8	BRRI125A/BRRI32R	109	144	8.9	10.1	9.7	8.5	8.8	9.2	83.0	S	23.4	-	4.5	-	4.5
9	IR105687A/BRRI32R	107	140	8.1	8.5	9.3	8.1	8.3	8.5	77.6	S	24.0	-	-	-	-
10	BRRI109A/IR85551-9-1-1-1-2-1-1-1R	111	143	8.4	8.8	9.7	8,1	9.0	8.8	79.8	S	23.7	-	-	-	-
11	BRRI110A/IR85551-9-1-1-1-2-1-1-1R	113	147	9.7	9.4	10.2	7.4	7.8	8.9	80.7	MS	23.6	-	1.1	-	1.1
12	BRRI125A/IR85551-9-1-1-1-2-1-1-1R	112	144	8.5	9.1	9.2	8.2	7.8	8.6	78.1	M	23.3	-	-	-	-
13	IR105687A/IR85551-9-1-1-1-2-1-1-1R	107	139	8.7	9.5	9.3	8.4	8.7	8.9	81.0	MS	23.4	-	1.1	-	1.1
14	IR102758A/IR85551-9-1-1-1-2-1-1-1R	110	144	9.6	10.0	10.3	8.6	8.9	9.5	84.6	M	23.6	-	8.0	2.2	8.0
	BRRI hybrid dhan5 (Ck-1)	108	145	10.3	10,5	9.7	9.4	9.3	9.8	86.3	MS	24.0	-	11.4	5.4	11.4
	SL8H (Ck-2)	108	143	9.3	8.8	9.4	8.2	8.4	8.8	80.4	MS					
	Heera-2 (Ck-3)	113	148	9.6	9.4	10.4	8.6	8.5	9.3	83.6	M					
	Tej Gold (Ck-4)	115	141	8.4	9.3	8.8	8.2	9.4	8.8	79.7	S					
Mean		109.5	142.1	9.3	9.7	9.7	8.6	9.0	9.3	82.1	-	23.6				
CV (%)		2.47	5.44	9.33	9.13	10.07	7.77	8.17	7.55	3.38	-	1.26				
LSD (0.05%)		1.65	4.71	0.53	0.54	0.60	0.40	0.44	0.43	1.69	-	0.18				

D/S: 04/12/2022; D/T: 07/01/2023; Unit plot size: 30 m^2

Legend: PH (cm)= Plant height (cm); DTM= Days to maturity; SF (%) = Spikelet fertility (%); GSS= Grain shape & size; S=Slender; MS= Medium Slender; M=Medium; AC (%) = Amylose (%)

Experiment 2.4: Evaluation of exotic hybrids from Hybrid Rice Development Consortium (HRDC) during Boro, 2022-23

Objective: Selection of promising hybrids

Materials and Methods: Five (5) hybrid rice varieties along with 5 checks. Thirty days old seedlings were transplanted in 16m^2 area plot following RCB design using single seedling per hill at a spacing of 20 cm × 15 cm. Fertilizer dose was applied @ 270:130:120: 70:10 Urea-TSP-MP- Gypsum- $ZnSO_4$ kg/ha respectively.

Results and discussion: Out of 5 hybrids from HRDC, IR138766H perform well and expressed 7.5% and 2.03% yield advantage over check variety SL8H and Heera, respectively. The heritability obtained from plant height, spikelet fertility, 1000 grain weight, days to maturity and yield were 96%, 93%, 97%, 96%, and 81% respectively indicating high level of precision in this experiment **(Table 47).**

Location: BRRI, Gazipur.

Principal investigator: M Umma Kulsum; **Co-Investigator**: M Jamil Hasan

Table 47. Performance of HRDC hybrids during Boro 2022-23

Sl no.	Variety	PHT (cm)	SF (%)	TGW (g)	DTM	Yield (t/ha)	Disease reaction at 1-9 scale	Remarks
1	IR 138901 H	98	77.7	22.5	144	9.40	3	
2	IR 138766 H	99	92.6	23.8	146	10.05	3	Good crop
3	IR 139568 H	106	80.4	23.2	153	8.80	3	
4	IR 139526 H	113	72.2	23.1	154	6.08	3	
5	IR 139010 H	113	60.6	24.0	154	7.65	3	
6	BRRI hybrid dhan5 (Ck-1)	108	81.4	30.8	148	11.07	3	
7	Tej Gold (Ck-2)	105	78.7	23.1	145	10.63	3	
8	SL8H (Ck-3)	96	85.0	26.2	147	9.35	3	
9	Heera (Ck-4)	98	84.3	27.0	153	9.85	3	
10	BRRI hybrid dhan8 (Ck-5)	105	74.9	24.2	153	10.65	3	

CV (%)	5.9	10.9	10.3	2.7	16.3
Lsd (0.5)	1.57	4.39	1.27	2.16	1.66
Heritability	0.96	0.93	0.97	0.96	0.81

D/S: 10/12/2022; D/T: 12/01/2023; Unit plot size: 30 m^2

Legend: PHT=Plant height (cm); SF (%) =Spikelet fertility (%); TGW=1000 grain weight (g); DTM=Days to maturity

Experiment 2.5: Assessment of specific and general adaptability for selection of suitable rice hybrids under saline prone areas for Boro season

Objective: To find out suitable hybrid rice genotypes suitable for saline prone areas for Boro season

Materials and Methods: Twelve rice genotype (six BRRI released hybrids, one BRRI released salinity tolerant inbred rice BRRI dhan67, locally cultivated salinity tolerant inbred IT, BADC hybrid SL8H, three popular company hybrids (Heera, Tej Gold and Tia) were grown. BRRI dhan67 and IT were used as salinity tolerant check and SL-8H, Heera, Tej Gold and Tia were used as standard checks. Forty-days-old seedlings of each genotype were transplanted @ 2 seedlings/hill with a spacing of 20 cm × 15 cm for Boro season. The unit plot size was 10 m^2. Fertilizers @ 270:150:150:70:10:4 kg urea, TSP, MoP, Gypsum, Zinc sulphate, borax per hectare were used with split application of N at 15, 40, and 60 DAT. Total amount of TSP, MoP, Gypsum, Zinc sulphate, borax were applied at the time of final land preparation. Crop management such as weeding, controlling disease was done in time. The experiment was laid out in randomized complete block (RCB) design with three replications.

Location/ site: Debhata and Kaliganj in Satkhira

Principal Investigator: Mithun Chandra Debsharma

Co-Investigators: Md. Jamil Hasan; Md. Amanut Ullah Raju and Md. T H Ansari

Results: Adaptability under saline condition of BRRI developed and popular company hybrids along with popular saline tolerant inbred checks BRRI dhan 67 and locally cultivated rice IT was done at two coastal locations of Satkhira (Debhata and Kaliganj). None of the tested entries performed well at kaliganj and Debhata of Satkhira due to very high-water salinity (13.81 ds/m and 9.4 ds/m, respectively). We found that the top highest yielding genotypes were BRRI hybrid dhan3 (5.88 t ha^{-1}), BRRI hybrid dhan6 (5.65 t ha-^{1}), BRRI hybrid dhan2 (4.61 t ha-^{1}) followed by BRRI hybrid dhan67 (4.53 t ha^{-1}), BRRI hybrid dhan7 (4.44 t ha^{-1}), Heera (4.30 t ha^{-1}). Therefore, we can conclude that BRRI hybrid dhan3, BRRI hybrid dhan6, BRRI hybrid dhan2 and BRRI dhan67 can be cultivated profitably in areas where water salinity level of the paddy field remains 3.77 ds/m to 9.4 ds/m **(Table 48 and Figure-1)**

Table 48. Yield and agronomic performance of twelve genotypes from adaptive trial in Boro 2022-23

Genotypes	GD	PH	Yield (t/ha)			SF	PAcp	
	(days)	(cm)	Debhata	Kaliganj	Average	(%)	Veg	Mat
BRRI hybrid dhan2	136	88	4.61	4.01	4.31	84	5	5
BRRI hybrid dhan3	138	90	5.88	4.21	5.04	76	5	5
BRRI hybrid dhan5	134	91	2.57	4.03	3.30	63	3	3
BRRI hybrid dhan6	141	97	5.65	2.42	4.03	71	3	3
BRRI hybrid dhan7	142	95	4.53	2.68	3.60	83	3	3
BRRI hybrid dhan8	140	94	4.44	2.04	3.24	54	3	3
Heera	137	87	3.70	3.73	3.71	55	3	3

Tejgold	136	88	4.30	3.50	3.90	93	5	5
SL-8	138	90	3.63	1.90	2.76	67	3	3
BRRI dhan67	131	88	4.19	1.91	3.05	76	3	3
IT	130	92	3.03	*	3.03	60	3	3
Tia	132	77	2.95	*	2.95	86	3	3
LSD (0.5) %	3.46	12	1.26	0.49		31		
CV (%)	0.73	2.42	18.09	9.39		1		
Heritability (%)	0.94	0.50	0.82	0.97		0.50		

D/S: 12/12/2022; D/T: 21/01/2023

Legend: GD=Growth duration (days), PH=Plant height (cm), SF=Spikelet fertility (%), PAcp = Phenotypic acceptability *=All the entries died,

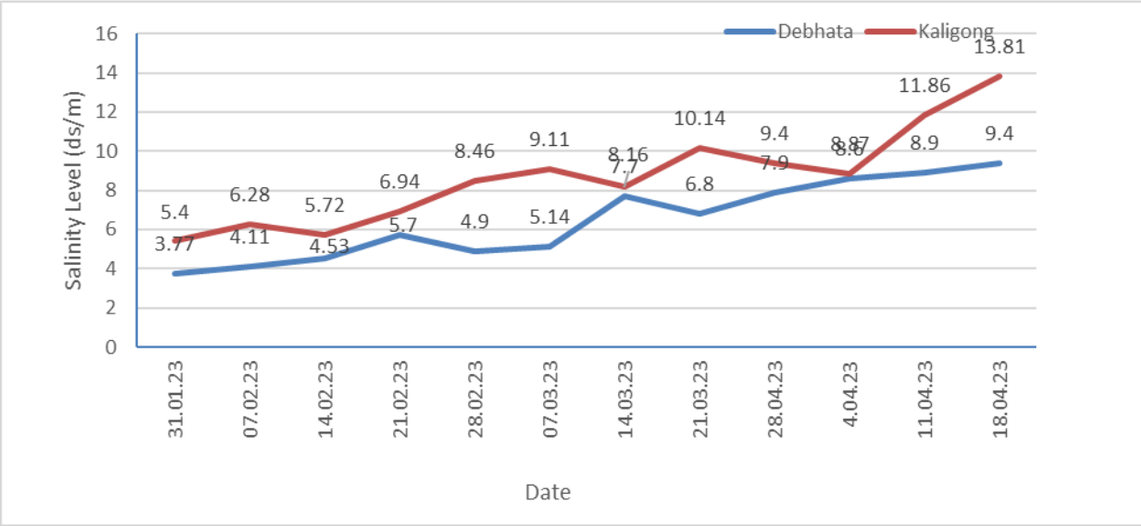

Fig. 1. Water salinity levels of different experimental plots in Boro 2022-23 at Debhata and Kaliganj Upazila in Satkhira

Experiment 2.6: Demonstrational trials of BRRI released and promising hybrids with SL8H

Objective: Yield comparison and demonstration of BRRI released and promising hybrids with SL8H.

Materials and Methods: Eight hybrids were evaluated in that trial. Among them four hybrids were released (BRRI hybrid dhan2, BRRI hybrid dhan3, BRRI hybrid dhan5 and BRRI hybrid dhan8), three promising hybrids (BRRI97A/BRRI37R, IR102758A/BRRI54R and BRRI110A/BRRI32R) along with BADC hybrid (SL8H). Thirty days old seedlings were transplanted in the plot with a spacing of 15 cm × 20 cm. Fertilizers were applied @ 270:150:150: 70:10 kg/ha Urea, TSP, MP, and gypsum and zinc sulphate respectively. Full dose of TSP, MP, gypsum and zinc sulphate were the basal dose. Urea was applied as four splits. Intercultural operations, irrigation, rouging was done whenever necessary.

Result and Discussion: Highest yield was found in BRRI hybrid dhan8 (11.96 t/ha) followed by promising hybrid 3 (11.86 t/ha) with excellent spikelet fertility **(Table 49).**

Location: BRRI, Gazipur

Principle Investigator: A K Paul

Co-investigator: M J Hasan

Table 49. Results of demonstration trials during Boro, 2022-23

Entry No	Designation	Plant height (cm)	Tiller/ plant (No)	Panicle length (cm)	Days to 50% flowering	Maturity Date (Days)	Spikelet Fertility (%)	Yield (t/ha)
1	BRRI hybrid dhan2	111	8.2	25.6	114	142	86.4	9.51
2	BRRI hybrid dhan3	104	7.6	24.4	115	144	84.5	9.48
3	BRRI hybrid dhan5	105	8.4	24.2	115	144	83.1	10.08
4	BRRI hybrid dhan8	110	8.6	26.2	116	145	86.2	11.96
5	SL 8H	108	8.8	23.0	115	145	83.2	9.56
6	Promising hybrid-1	103	8.4	24.6	114	143	86.9	10.69
7	Promising hybrid-2	108	7.4	24.0	118	148	86.2	10.58
8	Promising hybrid-3	112	7.6	25.4	116	144	88.2	11.86
	Mean	107.63	8.13	24.68	115.38	144.38	85.59	10.47
	CV (%)	0.03	0.06	0.04	0.01	0.01	0.02	0.09
	Lsd (0.05)	3.04	0.48	0.93	1.19	1.61	1.65	0.92

D/S: 12.12.2022; D/T: 10.01.2023

Experiment 2.7: Performance evaluation of BRRI developed new promising hybrids

Objective: Selection of promising hybrids

Materials and Methods: Sixty-four hybrids with four hybrid (BRRI hybrid dhan5, SL8H, Heera and Tej Gold) checks. Thirty days old seedlings were transplanted in 10 m^2 area plot following Augmented design using single seedling per hill at a spacing of 20 cm × 15 cm. Fertilizer dose was applied @ 270:130:120: 70:10 Urea- TSP-MP-Gypsum-$ZnSO_4$ kg/ha, respectively.

Results and discussion: A total of 64 hybrids were evaluated including four checks. Among these hybrids 12 hybrids were selected based on yield at least 11.5 t/ha and lower growth duration compared to check varieties (**Table 50**).

Location: BRRI, Gazipur.

Principal investigator: Md. Jamil Hasan; **Co-Investigator:** Md. Hafizar Rahman

Table 50. Experimental hybrids evaluation during Boro 2022-23

SL. No.	Cross combination	PHT (cm)	N/T	Pan L (cm)	FLL (cm)	SF (%)	D50% F	DTM	TGW (g)	Yield (t/ha)
01.	BRRI11A/EL86R	108	12	27.5	26.2	83.5	123	148	24.3	13.65
02.	BRRI48A/EL86R	105	11	24.5	24.1	82.5	124	149	24.5	12.46
03.	BRRI97A/EL86R	98	10	25.3	25.2	85.2	120	145	24.8	10.35
04.	BRRI99A/EL86R	97	12	24.0	28.5	83.6	110	136	24.5	10.84
05.	BRRI109A/EL86R	96	10	25.5	26.4	83.0	119	144	24.3	10.04
06.	BRRI110A/EL86R	97	12	25.7	25.2	85.6	120	146	25.5	11.56
07.	BRRI125A/EL86R	102	11	25.6	25.8	86.9	119	144	24.2	11.22
08.	IR79156A/EL86R	105	10	25.3	26.7	91.3	121	147	25.5	11.53
09.	IR79125A/EL86R	110	13	24.5	24.9	82.3	122	148	24.3	11.59
10.	IR105687A/EL86R	107	11	26.3	27.4	83.8	121	148	25.5	11.17
11.	IR102758A/EL86R	98	12	23.6	24.7	83.5	111	137	24.0	11.77
12.	IR58025A/EL86R	102	11	23.8	25.4	84.1	117	143	24.3	10.65
13.	BRRI11A/BRRI38R	111	13	25.3	23.7	85.5	125	150	24.6	10.35
14.	BRRI48A/BRRI38R	108	14	26.7	25.6	87.7	122	149	25.2	10.40
15.	BRRI97A/BRRI38R	111	11	25.5	27.0	84.0	126	151	25.3	11.40
16.	BRRI99A/BRRI38R	112	10	26.5	26.3	83.4	126	152	26.5	11.34
17.	BRRI109A/BRRI38R	109	11	25.8	24.3	83.6	125	150	24.7	11.90
18.	BRRI110A/BRRI38R	98	12	25.8	25.8	87.3	120	146	25.6	11.38
19.	BRRI125A/BRRI38R	109	11	27.1	25.3	83.5	120	145	25.3	11.36
20.	IR79156A/BRRI38R	114	10	26.3	26.3	83.5	126	153	24.8	7.71
21.	IR79125A/BRRI38R	110	13	24.7	24.3	88.1	120	146	25.1	7.47
22.	IR105687A/BRRI38R	114	10	24.4	26.5	83.4	121	147	25.3	9.85
23.	IR102758A/BRRI38R	102	10	23.8	25.7	82.4	112	138	24.7	10.86
24.	IR58025A/BRRI38R	99	11	24.7	26.3	83.7	120	146	24.5	11.30
25.	BRRI11A/BRRI42R	106	11	24.5	23.7	84.5	127	154	24.8	9.78
26.	BRRI48A/BRRI42R	110	11	24.7	26.4	82.7	125	151	24.6	8.88
27.	BRRI97A/BRRI42R	108	10	25.7	27.2	84.6	121	147	25.2	10.03
28.	BRRI99A/BRRI42R	111	10	25.5	27.5	83.1	121	147	25.1	11.56
29.	BRRI109A/BRRI42R	102	12	24.7	22.5	83.0	118	144	24.6	11.56
30.	BRRI110A/BRRI42R	112	13	25.8	25.8	87.6	120	146	25.1	10.10
31.	BRRI125A/BRRI42R	105	11	26.3	25.3	87.5	122	148	25.8	8.83
32.	IR79156A/BRRI42R	110	10	26.5	24.7	87.2	122	148	25.7	12.54

33.	IR79125A/BRRI42R	110	12	25.3	23.8	86.3	121	147	24.8	10.37
34.	IR105687A/BRRI42R	92	10	25.4	23.8	86.0	122	148	25.6	11.24
35.	IR102758A/BRRI42R	112	11	25.7	26.5	87.1	126	153	24.9	10.81
36.	IR58025A/BRRI42R	107	12	24.6	27.6	84.1	126	153	24.6	11.91
37.	BRRI11A/BRRI32R	112	10	25.2	26.4	83.3	128	155	24.8	10.95
38.	BRRI48A/BRRI32R	111	12	26.3	23.3	87.1	128	155	25.6	10.42
39.	BRRI97A/BRRI32R	101	10	23.7	23.8	83.8	113	139	24.2	10.38
40.	BRRI99A/BRRI32R	108	11	25.9	26.4	87.6	121	147	24.5	11.38
41.	BRRI109A/BRRI32R	111	10	24.7	25.3	86.0	120	146	23.8	10.24
42.	BRRI110A/BRRI32R	110	12	26.3	27.5	89.5	121	148	24.3	11.78
43	BRRI125A/BRRI32R	112	11	26.1	26.2	88.5	122	149	23.7	11.73
44	IR79156A/BRRI32R	115	10	24.3	25.6	84.3	127	155	24.2	10.14
45	IR79125A/BRRI32R	117	10	24.5	25.4	82.0	122	148	24.7	7.63
46	IR105687A/BRRI32R	107	11	23.6	20.2	84.5	116	143	23.5	9.14
47	IR102758A/BRRI32R	111	12	25.6	26.8	87.5	121	148	24.2	10.35
48	IR58025A/BRRI32R	113	13	24.7	27.6	85.8	122	150	23.7	9.69
49	BRRI11A/IR85551-9-1-1-1-2-1-1-1R	109	12	23.7	24.7	83.3	120	146	24.1	9.42
50	BRRI48A/IR85551-9-1-1-1-2-1-1-1R	106	13	22.9	21.5	84.2	117	143	23.7	8.73
51	BRRI97A/IR85551-9-1-1-1-2-1-1-1R	108	11	23.0	22.7	84.3	117	142	23.6	9.10
52	BRRI99A/IR85551-9-1-1-1-2-1-1-1R	112	12	25.7	27.5	88.5	120	147	24.1	11.05
53	BRRI109A/IR85551-9-1-1-1-2-1-1-1R	113	11	23.8	26.5	84.2	117	143	23.8	9.60
54	BRRI110A/IR85551-9-1-1-1-2-1-1-1R	110	11	24.3	25.8	83.4	118	144	24.4	8.55
55	BRRI125A/IR85551-9-1-1-1-2-1-1-1R	116	11	23.8	27.3	84.4	121	148	24.3	8.97
56	IR79156A/IR85551-9-1-1-1-2-1-1-1R	115	12	22.7	25.5	84.8	122	148	24.2	9.14
57	IR79125A/IR85551-9-1-1-1-2-1-1-1R	112	10	23.5	24.9	85.6	124	151	23.8	9.83
58	IR105687A/IR85551-9-1-1-1-2-1-1-1R	106	11	22.7	21.5	83.7	117	143	22.8	8.39
59	IR102758A/IR85551-9-1-1-1-2-1-1-1R	110	13	25.6	25.7	88.4	121	148	23.8	11.01
60	IR58025A/IR85551-9-1-1-1-2-1-1-1R	114	10	23.2	21.6	81.8	117	144	24.1	7.81
61	CN-1	110	11	23.7	24.5	87.5	118	145	23.7	10.96
62	CN-2	111	12	24.2	23.7	88.0	119	146	24.3	10.92
63	CN-3	105	11	24.7	24.2	86.3	117	143	24.5	10.55
64	CN-4	108	12	23.8	25.5	86.7	120	147	24.2	10.68
Ck-1	BRRI hybrid dhan5	108	13	25.3	26.3	89.4	121	148	25.7	11.00
Ck-2	SL8H	107	11	23.8	25.3	86.6	122	149	23.6	9.67
Ck-3	Heera-2	109	11	24.5	24.7	85.7	124	153	24.8	9.59
Ck-4	Tej Gold	109	12	23.8	24.6	84.3	118	145	23.5	9.63
Mean		107.8	11.3	24.9	25.3	85.2	120.8	147.1	24.6	10.4
SD		5.30	1.03	1.11	1.64	2.12	3.75	4.00	0.69	1.25
CV (%)		4.92	9.15	4.46	6.48	2.49	3.11	2.72	2.83	11.98
Lsd 0.05%		1.71	0.33	0.36	0.53	0.68	1.21	1.29	0.22	0.40

D/S: 10.12.22; D/T: 15.01.23

Legend: PHT = Plant height (cm); N/T = No. of effective tillers; Pan L = Panicle length (cm); FLL= Flag leaf length (cm); SF (%) = Spikelet fertility (%); D 50%F = Days to 50% flowering; DTM = Days to maturity; TGW (g) = Thousand grain weight

Sub-project-3: Seed Production of Parental lines & Hybrids

General Objective:

i) Optimization and refinement of hybrid rice seed production and cultivation technologies for Bangladesh conditions

E**xperiment 3.1: CMS seed multiplication of BRRI hybrid dhan2, BRRI hybrid dhan3, BRRI hybrid dhan4, BRRI hybrid dhan5, BRRI hybrid dhan6 and BRRI hybrid dhan8 during Boro season 2022-23**

Objective: To produce pure and good quality seed of CMS lines for subsequent use.

Materials and methods: Six CMS (BRRI10A, BRRI11A, IR58025A, BRRI7A, IR79156A and BRRI99A) along with their maintainers (B) were grown as parental materials. Maintainers were sown in three different date at three days interval and CMS line was sown along with second set of its respective maintainer. Seeds were sown in the seed bed@ 30 gm per square meter. Thirty-days- old seedlings were transplanted at a spacing of 15 cm × 15 cm having ratio 2: 6 of A and B line. Fertilizers @ 270:130:120:70:10 kg/ha Urea-TSP-MP-gypsum and zinc sulphate were applied. Intercultural operations, irrigation, rouging, GA3 application and supplementary pollination were performed as per need basis.

Results & discussion: CMS seed yield of 58 kg (0.45 t/ha), 598 kg (1.40 t/ha), 244 kg (1.16 t/ha), 419 (1.23 t/ha), 1352 kg (1.99 t/ha) and 421 (1.91 t/ha) were obtained from BRRI10A, BRRI11A, IR58025A, BRRI7A, IR79156A and BRRI99A, respectively **(Table 51).** Seed yield was poor due to high temperature at flowering time.

Location: BRRI, Gazipur.

Principal Investigator: M J Hasan; M S Islam; A K Paul & M H Rahman

Co-investigator: M U Kulsum, A Ansari & F R Surovi

Table 51. CMS multiplication of BRRI hybrid dhan2, BRRI hybrid dhan3, BRRI hybrid dhan4, BRRI hybrid dhan5, BRRI hybrid dhan6 and BRRI hybrid dhan8 during Boro, 2022-23

Designation	Plant height (cm)		50% flowering (days)		PER (%)	OCR (%)	Plot area (m^2)	Yield (kg/ plot)	Seed yield (t/ha)
	A line	B line	A line	B line	A line	A line			
BRRI10A/B	86	88	125	122	78.0	38.0	1300	58	0.45
BRRI11A/B	95	99	120	118	82.34	39.9	4000	598	1.40
IR58025A/B	84	87	123	120	77.3	38.0	1500	244	1.16
BRRI7A/B	94	97	120	117	78.0	38.3	3400	419	1.23
IR79156A/B	88	91	123	121	83.0	43.5	6800	1352	1.99
BRRI99A/B	85	89	126	123	84.3	42.4	2200	421	1.91

D/S: B_1 =02/12/2022; A/B_2 = 05/12/2022; B_3 = 08/12/2022; D/T: A/B = 13/01/2023;D/S: B_1 =07/12/2022; A/B_2 =10/12/2022; B_3 =13/12/2022; D/T: A/B =11/01/2023; D/S: B_1 =05/12/2022; A/B_2 =08/12/2022; B_3 =11/12/2022; D/T:A/B=08/01/2023;D/S:B_1=30/11/2022;A/B_2=03/12/2022;B_3=06/12/2022;D/T:A/B=05/01/2023;D/S: B_1=10/12/2022; B_2/A =13/12/2022; B3=16/12/2022; D/T:A/B= 17/01/2023; PER=Panicle Exertion Rate, OCR= Out Crossing Rate.

Experiment 3.2: F_1 seed production of BRRI hybrid dhan5 and BRRI hybrid dhan7 during Boro, 2022-23

Objective: To produce sufficient quantity of F_1 seeds for subsequent use

Materials and Methods: CMS line (BRRI7A) with its restorer (BRRI31R), CMS line (IR79156A) with its restorer (BRRI31R) were grown as parental materials. In case of BRRI hybrid dhan5, restorer line was sown in two different dates at seven days interval and CMS line was sown nineteen days after second set of restorer line sowing and in case of BRRI hybrid dhan7, restorer line was sown in two different dates at three days interval where CMS line was sown six days after second set of its restorer. Thirty days old seedlings were transplanted at a spacing of 15cm × 15cm with ratio 2:10 for all the hybrids. Fertilizers @ 270: 270:150:150: 70:10 kg/ha urea, TSP, MP, Gypsum and Zinc sulphate were applied. Intercultural operations,

irrigation, rouging, GA3 application and supplementary pollination were performed as per need basis.

Results: A total of 208 kg (0.800 t/ha) from BRRI hybrid dhan5 and 370 kg (1.40 t/ha) from BRRI hybrid dhan7 **(Table52).** Seed set was poor due to high temperature (> 37°C) at flowering time hampered pollination.

Location: BRRI, Gazipur.

Principal Investigator: Dr. Md. H. Rahman

Co-investigator: Dr. M J Hasan

Table 52. F_1 seed production of BRRI hybrid dhan5 and BRRI hybrid dhan7 during Boro, 2022-23

Hybrids	Plant height (cm)		50% flowering date		PER (%)	OCR (%)	Yield	
	A line	R line	A line	R line			kg/plot	t/ha
BRRI hybrid dhan5	87	98	123	139	80	28	208	0.80
BRRI hybrid dhan7	90	100	124	131	87	27	370	1.40

D/S: R_1 = 16/11/2022; R_2 = 23/11/2021; A = 12/12/2022; D/T: R = 21/12/2022; A = 12/01/2023.
D/S: R_1 = 27/11/2022; R_2 = 30/11/2022; A = 06/12/2022; D/T: R & A = 06/01/2023
PER (%) = panicle exertion rate, OCR (%) = Out crossing rate

Experiment 3.3: CMS seed multiplication of selected promising CMS lines during Boro season 2022-23

Specific objective: To produce pure and good quality seed of selected promising CMS lines for subsequent use.

Materials and methods: Five CMS lines (BRRI74A, BRRI109A, BRRI120A, BRRI125A and IBRRI128A) along with its maintainers were grown as parental materials. Maintainer lines were sown in three different dates at three days interval and CMS lines were sown along with second set of its respective maintainer line. 20gm/m^2 seeds were sown in the seed bed. Thirty days old seedlings were transplanted at a spacing of 15 × 15 cm having ratio 2: 6 of B and A line. Fertilizers @ 270:130:120:70:10 kg/ha of Urea-TSP-MP-gypsum and zinc sulphate were used of which ¼ urea, full dose of TSP, Gypsum, $ZnSO_4$, $^2/_3$MP were applied as basal. Remaining urea with equal splits was applied at 15-20 DAT, 35-40 DAT and booting stage, respectively. Rest of 1/3 MP was applied with 2nd top dress of urea. Intercultural operations, rouging, GA_3 application and supplementary pollination were performed.

Results and discussion: Seed amount got from selected promising CMS lines ranging from 0.3 to 1.5 t/ha during Boro 2022-23 **(Table 53).** Seed amount varied CMS line to CMS line due to high temperature at supplementary pollination time and it was happened in particular entries due to sowing time difference for making time isolation in flowering.

Location: BRRI, Gazipur

Principal investigator M. J Hasan; M H Rahman

Co-investigator: A K Paul and M Umma Kulsum

Table 53. Seed amount got from selected promising CMS lines during Boro, 2022-23

Designation	Plant height (cm)		D50% flowering		PER (%)	OCR (%)	Plot area (m^2)	Yield (kg/plot)	Seed yield (t/ha)
	A Line	B line	A Line	B line					
BRRI74A/B	98	101	121	118	70.0	33.3	1800	180	1.0

BRRI109A/B	95.0	97.0	119	116	77.3	40.2	1400	209	1.5
BRRI120A/B	104.0	107.0	120	117	68.5	30.3	1000	85	0.9
BRRI125A/B	102.0	105.0	123	120	76.0	39.5	1000	136	1.4
BRRI128A/B	105.0	108.0	131	128	71.6	51.2	100	2.8	0.3
Average	100.8	103.6	122.8	119.8	72.68	38.9	1060	122.56	1.02
Lsd $_{(0.05)}$	4.85	5.26	5.56	5.56	4.40	9.28		94.28	0.55
CV (%)	4.17	4.40	3.92	4.02	5.25	20.67		66.67	46.71

D/S: B_1=30/11/2022; B_2/A =03/12/2022; B_3=06/12/2022; D/T: 07/01/2023; D/S: B_1=01/12/2022; B_2/A =04/12/2022; B_3=07/12/2022; D/T: 11/01/2023; D/S: B_1=10/12/2022; B_2/A =13/12/2022; B_3=16/12/2022; D/T: 18/01/2023; D/S: B_1=30/11/2022; B_2/A =03/12/2022; B_3=06/12/2022; D/T: 04/01/2023;
D/S: B_1=10/12/2022; B_2/A =13/12/2022; B_3=16/12/2022; D/T: 16/01/2023; PER (%) = panicle exertion rate, OCR (%) = Out crossing rate

E**xperiment 3.4: Foundation CMS seed production of BRRI hybrid dhan4 and BRRI hybrid dhan5**

Specific objective: To produce pure and good quality seed of CMS line for subsequent use.

Materials and methods: CMS line IR58025A and BRRI7A along with its maintainer was grown as parental materials. Maintainer lines were sown in three different dates at three days interval and CMS lines were sown along with second set of its respective maintainer line. 20 gm/m^2 seeds were sown in the seed bed. Twenty one days old seedlings were transplanted at a spacing of 15 × 15 cm having ratio 2: 6 of B and A line. Fertilizers @ 270:130:120:70:10 kg/ha of Urea-TSP-MP-gypsum and zinc sulphate were used of which ¼ urea, full dose of TSP, Gypsum, $ZnSO_4$, $^2/_3$MP were applied as basal. Remaining urea with equal splits was applied at 15-20 DAT, 35-40 DAT and booting stage, respectively. Rest of 1/3 MP was applied with 2nd top dress of urea. Intercultural operations, rouging, GA_3 application and supplementary pollination were performed

Results and discussion: Seed yield of 63 kg/plot (1.6 t/ha) and 111 kg/plot (0.74 t/ha) was obtained from IR58025A and BRRI7A, respectively **(Table 54).** Seed yield was very poor in case of BRRI7A due to continuous heavy rain during supplementary pollination time that washed out pollen grains.

Location: BRRI, Gazipur

Principal investigator: M J Hasan; M S Islam

Co-investigator: M H Rahman

Table 54. Foundation CMS seed production of BRRI hybrid dhan4 and BRRI hybrid dhan5 during Boro, 2022-23

Designation	Plant height (cm)		50% flowering (days)		PER (%)	OCR (%)	Plot area (m^2)	Yield (kg/ plot)	Seed yield (t/ha)	Remarks
	A line	B line	A line	B line	A line	A line				
IR58025A	89	93	124	121	77.3	42.3	400	63	1.6	
BRRI7A/B	98	101	122	118	78.0	38.3	1500	111	0.74	Pollination was hampered by continuous rain

D/S: B_1 =05/12/2022; A/B_2 = 08/12/2022; B_3 = 11/12/2022; D/T: A/B = 18/01/2023.
D/S: B_1 =30/11/2022; A/B_2 = 03/12/2022; B_3 = 06/12/2022; D/T: A/B = 05/01/2023.
PER=Panicle Exertion Rate, OCR= Out Crossing Rate.

Experiment 3.5: F_1 seed production of BRRI hybrid dhan6 and BRRI hybrid dhan8 during Boro 2022-23.

Objective: To produce sufficient quantity of F_1 seeds for subsequent use

Materials & methods: Two CMS line (IR 79156A and BRRI 99A) with their restorer (BRRI 20R and BRRI37R) lines were grown as parental materials. BRRI hybrid dhan6 and BRRI hybrid dhan8 restorers was sown in two different dates at five days interval and CMS lines were sown 14 days and ten days after first set of their restorers. Thirty days old seedlings were transplanted at a spacing of 15 × 15 cm having row ratio 2: 10 of R & A line. Fertilizers @ 270: 150: 150:70: 10 kg/ha of urea-TSP-MP-gypsum and zinc sulphate were used of which 1/4 urea, full dose of TSP, gypsum, ZnSO4, 2/3 MP were applied as basal. Remaining urea with three equal splits was applied at 15-20 DAT, 30-35 DAT and booting stage, respectively. Rest of 1/3 MP was applied with 2nd top dress of urea. Intercultural operations. rouging, GA_3 application were made in appropriate time.

Results and Discussion: Seed yields were obtained 295 kg/plot (1.18 t/ha) and 313 kg/plot (1.30 t/ha) from IR79156A /BRRI20R and BRRI99A/BRRI37R combinations **(Table 55**). Seed yield was poor due to high temperature at flowering time (>37°C) hampered pollination.

Location: BRRI, Gazipur

Principle Investigator: Dr. M. H. Rahman

Co-investigator: Dr. M J Hasan

Table 55: F_1 seed production of BRRI hybrid6 and BRRI hybrid dhan8, Boro 2022-23.

Combinations	Plant height (cm)		50% flowering date		PER (%)	OCR (%)	Yield		
	A line	R line	A line	R line			Kg /plot	Plot size (m^2)	t/ha
IR79156A/BRRI20R	98	102	18	130	77	40	295	2500	1.18
BRRI99A/BRRI37R	97	102	119	129	81	47	313	2400	1.30

D/S: R_1 =28/11/2022; R_2 = 03/12/2022; A = 12/12/2022; D/T: R = 04/01/2023; A=14/01/2023

D/S: R_1 =27/11/2022; R_2 = 02/12/2022; A = 07/12/2022; D/T: R = 03/01/2023; A=07/01/2023

Experiment 3.6: Multiplication of Released Hybrid Restorer lines during Boro 2022-23.

Objective: To increase good quality seeds of restorer lines.

Materials & Methods: BRRI10R, BRRI15R, BRRI20R and BRRI37R were the restorer lines. Thirty days old seedlings were transplanted in the plot with a spacing of 15cm x 20cm. Fertilizers were applied @ 270:150:150: 70:10 kg/ha Urea, TSP, MP, gypsum and zinc sulphate respectively. Full dose of TSP, MP, gypsum and zinc sulphate were the basal dose. Urea was applied as four splits. Intercultural operations, irrigation, rouging was done whenever necessary.

Results & discussion: Seed yield was 95 kg (6.33 t/ha), 130 kg (6.5 t/ha), 260 kg (6.5 t/ha) and 500 kg (8.33 t/ha) were obtained from BRRI10R, BRRI15R, BRRI20R and BRRI37R, respectively **(Table 56**).

Location: BRRI, Gazipur.

Principal Investigator: A K Paul

Co-investigator: Md. Jamil Hasan

Table 56: Yield and ancillary characters of Restorer Lines in Boro 2022-23

SL	Restorer Lines	Plant height (cm)	Tiller/ plant (no.)	Panicle length (cm)	50% flowering (days)	DM (days)	Plot size (m^2)	Plot yield (kg)	Seed yield (t/ha)
1	BRRI10R	110	7.4	25.6	124	152	150	95	6.33
2	BRRI15R	108	8.2	25.2	122	151	200	130	6.50
3	BRRI20R	106	8.3	25.0	124	152	400	260	6.50
4	BRRI37R	103	7.2	22.0	121	150	600	500	8.33
	Mean	106.75	7.78	24.45	122.75	151.25	337.50	246.25	6.92
	CV	0.024	0.062	0.059	0.011	0.005	0.528	0.645	0.119
	LSD 0.05%	3.852	0.717	2.131	1.935	1.235	265.288	236.659	1.221

D/S: 12.12.2022; D/T: 23.01.2023

Experiment 3.7: F_1 seed production through contract grower during Boro, 2022-23

Objective: To produce sufficient quantity of F_1 hybrid seed for subsequent use

Materials and Methods: Parental lines of BRRI released hybrids supplied to the contract growers according to production schedule. Aus-Bangla Agro acted as our contract grower. Growers maintained proper seed production schedule provided by Hybrid Rice Division of BRRI. Necessary funding was provided by the project entitled "High Yielding Hybrid Rice Variety Development through Modernization of Research" under Hybrid Rice Division of BRRI. Frequent visit for monitoring seed production activities were maintained by project staffs and divisional scientists.

Results & discussion: During Boro 2022-23, we got 962 kg (0.96 t/ha) of BRRI hybrid dhan2, 3510 kg (1.3 t/ha) of BRRI hybrid dhan3, 1500 kg (1.5 t/ha) of BRRI hybrid dhan4, 2728 kg (0.97 t/ha) of BRRI hybrid dhan5, 5700 kg (2.04 t/ha) of BRRI hybrid dhan6, 4620 kg (2.31 t/ha) of BRRI hybrid dhan7 and 3872 kg (1.94 t/ha) seeds of BRRI hybrid dhan8 from Ishwardi, Pabna **(Table 57).** From Barishal 3640 kg (1.82 t/ha) of BRRI hybrid dhan3 and 900 kg (1.13 t/ha) of BRRI hybrid dhan5 seeds received **(Table 58**).

Location: Ishwardi, Pabna and Babuganj, Barishal

Principal Investigator: M J Hasan and M H Rahman

Co-investigator: M S Islam; A K Paul; M U Kulsum; A Ansari

Table 57. F_1 seed production of BRRI developed hybrids through contract grower during Boro 2022-23

SL. No	Combinations	Contract growers	Location	Seed Yield (kg)	Area (m^2)	Seed yield (t/ha)	Remarks
01	BRRI hybrid dhan2	AUS Bangla Agro	Ishwardi	962	10000	0.96	Less seed due to high temperature at flowering stage & shattering for hail storm
02	BRRI hybrid dhan3	AUS Bangla Agro	Ishwardi	3510	28000	1.25	Less seed due to high temperature at flowering stage & shattering for hail storm
03	BRRI hybrid dhan4	AUS Bangla Agro	Ishwardi	1500	10000	1.50	Good

04	BRRI hybrid dhan5	AUS Bangla Agro	Ishwardi	2728	28000	0.97	Less seed due to high temperature at flowering stage & shattering for hail storm
05	BRRI hybrid dhan6	AUS Bangla Agro	Ishwardi	5700	28000	2.04	Good
06	BRRI hybrid dhan7	AUS Bangla Agro	Ishwardi	4620	20000	2.31	Good
07	BRRI hybrid dhan8	AUS Bangla Agro	Ishwardi	3872	20000	1.94	Good
	Total=			**22892**	**144000 (36 Acre)**		

Table 58. F_1 seed production of BRRI developed hybrids through contract grower during Boro 2022-23 from Barishal

SL. No	Combinations	Contract growers	Location	Seed Yield (kg)	Area (m^2)	Seed yield (t/ha)	Remarks
01	BRRI hybrid dhan3	Md. Jalal Akand	Babuganj, Barishal	3640	20000	1.82	Less seeds due to high temperature at flowering stage
02	BRRI hybrid dhan5	Md. Jalal Akand	Babuganj, Barishal	900	8000	1.13	
	Total =			**4540**	**28000 (7 Acre)**		

Sub-project-4: Dissemination of Hybrid rice technology

Activity.1: Supply of hybrid seeds and parental lines to public, private seed companies and farmers.

Objective: To expand and popularize BRRI developed hybrid rice varieties.

Output: In Boro 2022-23, hybrid rice division supplied 21606 kg of parental lines and F_1 seeds to 130 farmers, 24 seed companies, scientists, extension people, projects and staffs of BRRI **(Table 59).** Twenty-four stake holders produced more than 334 MT F_1 seeds using BRRI developed hybrid rice parental lines **(Table 60).**

Table 59. Amount of parental line and hybrid seeds supplied to different organization

Sl. No.	Recipient	Nos.	F_1 (kg)	A line (kg)	B line (kg)	R line (kg)
01	Seed Companies	24	1250.0	3290	-	1222
02	Farmers	130	1500.0	130	-	35
03	BRRI Scientists + staffs	19	2000.0	-	-	-
04	BRRI R/S (5) +DAE	6	12000.0	-	-	-
Total		179	16750	3420	0.00	1257
Grand Total				21606.0		

Investigator: All staff of hybrid rice division.

Table 60. Seed production activities of BRRI developed hybrids during Boro, 2022-23 both at private and public sectors

SL	Name of the organization/ person	Location	Var	Supplied Parental lines (Kg)		Area (acre)	Yield achieved (ton)	Remarks
				A Line	R Line			
01	JF Agro Private Ltd. Savar, Dhaka. Md. Jamaluddin, Chairman. Mob. 0196877336	Sherpur, Bogura	BHD3	120	45	15	12.0	Experienced
			BHD5	100	30	10	7.0	
			BHD6	100	30	10	9.0	

02	Seed Care Crop Science Proprietor: Md. Juwel, D-09, Bank Colony, Savar Mob. 01968773337	Sherpur Bogura	BHD3 BHD5 BHD6	40 50 50	15 15 15	05 05 05	4.0 3.5 4.3	Experienced
03	Babylon Agro & Dairy Ltd. 2B/1, Darussalam Road, Mirpur, Dhaka-1216. Mob. 01710327720	Ishwardi, Pabna	BHD3 BHD7	400 10	150 03	50 01	45 0.7	Experienced
04.	Supreme Seed Company	Muktagasha, Mymensingh	BHD5	50	15	05	3.5	Experienced
05.	American advanced Agro Ltd. Proprietor Kbd Kamrul Haque Mouchak Tower, Malibagh Mob. 01720053768	Muktaghacha, Mymensingh	BHD3 BHD6 BHD7	100 200 50	45 75 18	15 25 06	12.0 25.5 6.5	Experienced
06.	M/S Agriculture crop seeds. Tatalpur, Sherpur Proprietor: Md. Moklesur Rahman	Muktaghacha, Mymensingh	BHD3 BHD4 BHD5	20 16 20	06 06 06	02 02 02	1.5 1.4 1.5	Experienced
07.	M/S Champion Seeds Md. Alimul Raji; Sreebordi; Sherpur. Mob. 01710257702	Madhapur	BHD3 BHD4 BHD5	20 16 20	06 06 06	02 02 02	1.5 1.4 1.5	Experienced
08.	Bagro Company Ltd. House No# 17, R#09, Uttra Proprietor: M R Ibne Aziz Managing Director Mob. 01711479884	Muktaghacha, Mymensingh	BHD6	200	70	25	23.5	Experienced
09.	Thailand Agro Seeds Vite Proprietor: Md.Alamin Hoque. Kandi, Fulpur, Mymensingh Mob. 01719464815	Muktaghacha, Mymensingh	BHD2	45	15	5	4.5	Experienced
10.	Abdur Rahman Agro Company. Muktagasha Proprietor: Md. Abdur Barek Mob.01978424141/ 01766688323	Muktaghacha, Mymensingh	BHD3 BHD6 BHD2	80 120 24	30 45 09	10 15 03	9.0 13.5 2.5	Experienced
11.	Mirtika Agro Vision Proprietor: Mirthonjoy Roy Executive Director Rangpur. Mob. 01752084181	Sherpur, Bogura	BHD3	40	15	05	4.2	Experienced
12.	Aus Bangla Agro Gohail Road, Mission gate, Bogura. Kbd. Mosharrof Hossain, PM Mob. 01716444502	Ishwardi, Pabna	BHD3	160	60	20	18.0	Experienced
13.	Bangladesh Agricultural Development Corporation	Meherpur Chaudanga	BHD7 BHD5 BHD2	240 50 18	90 21 06	30 07 02	27.3 3.2 1.5	Experienced
14.	Ahasan seeds & Agrotech Gaffargaon, Mymensingh Mob. 01734414647	Muktaghacha, Mymensingh	BHD3 BHD4 BHD6 BHD7	18 09 150 09	06 03 45 03	02 01 15 01	2.2 0.5 13.5 0.8	Experience
15.	Usha Agro Ltd. Proprietor: Md. A Khaleque	Muktaghacha, Mymensingh	BHD3	40	15	05	3.0	Experimental
16.	Raja Seed Company Md. Aminul Islam Razzak Pirghacha, Rangpur Mob. 01713792560	Rangpur	BHD2 BHD6	09 09	03 03	01 01	0.7 0.8	Experimental
17.	Mr. Jalal Akand Babuganj Mob. 01770674655	Babuganj Barishal	BHD3 BHD5	40 18	15 06	05 02	3.6 0.9	Experienced
18.	Monjil Seed Company Ishwardi, Pabna Mob. 01733137743	Ishwardi Pabna	BHD3 BHD5	80 80	30 30	10 10	6.5 6.0	Experienced
19.	Aus Bangla Agro Gohail Road, Mission gate, Bogura. Mob. 01716444502 Contract growers	Patirajpur, Ishwardi, Pabna	BHD2 BHD3 BHD4 BHD5 BHD6 BHD7 BHD8	20 56 20 56 56 40 40	08 21 08 21 21 15 15	2.5 07 2.5 07 07 05 05	0.96 3.5 1.5 2.7 5.7 4.6 3.9	Experienced

20.	Hybrid Rice Division, BRRI	Gazipur	BHD5 BHD6 BHD7 BHD8	07 07 07 07	03 03 03 03	0.6 0.3 0.3 0.4	0.2 0.3 0.3 0.4	Experienced
21.	Explore Business Ltd. Proprietor: Kbd. Md. Abbas Ali. H#16, R#04, B#B, Kaderabad Housing, Mohammadpur. Mob. 01713041395	Sherpur Bogura	BHD6	80	30	10	8.0	Experienced
22.	Metal Seeds Ltd. PBL Tower; Gulshan, Circle-2, Dhaka-1212	Sreepur, Gazipur	BHD6 BHD7	24 80	09 30	03 10	2.5 8.0	Experienced
23.	Aftab Bhumukhi Farms Ltd. Banani, Dhaka Mob. 01755532275	Bazitpur Kishoreganj	BHD3 BHD5 BHD7	08 08 08	03 03 03	01 01 01	0.7 0.6 0.8	Experienced
24.	Wazuddin, Chokoria, Cox's Bazar. Mob. 01300041321	Chokoria	BHD3	24	09	03	2.5	Experienced
Tota l=				**3369**	**1220**	**405.6**	**334.66**	

Legend: BHD1= BRRI hybrid dhan1, BHD2 = BRRI hybrid dhan2, BHD3 = BRRI hybrid dhan3, BHD4 = BRRI hybrid dhan4, BHD5 = BRRI hybrid dhan5, BHD6 = BRRI hybrid dhan6, BHD7= BRRI hybrid dhan7