ANNUAL RESEARCH REVIEW WORKSHOP
2023- 2024

Program Area-I: Varietal Development Program
Hybrid Rice Division

Bangladesh Rice Research Institute
Gazipur 1701

BRRI Annual Report for

July 2023-June 2024

Hybrid Rice Division

Bangladesh Rice Research Institute

Gazipur 1701

List of scientific personnel

Md. Jamil Hasan, PhD
Chief Scientific Officer & Head
Md. Shafiqul Islam, PhD
Principal Scientific Officer
Ashish Kumar Paul, MSc Ag
Principal Scientific Officer
Mosammat Umma Kulsum, PhD
Senior Scientific Officer
Afsana Ansari, PhD
Senior Scientific Officer
Md. Hafizar Rahman, PhD
Senior Scientific Officer
Laila Ferdousi Lipi, MS*
Scientific Officer
Md. Ruhul Quddus, MS*
Scientific Officer
Mithun Chandra Dev Sharma MS
Scientific Officer
Farhana Rahman Surovi MS
Scientific Officer
Nazma Khatun
Senior Scientific Assistant
A B M Bashir Raihan
Senior Scientific Assistant
Md. Shamsul Alam
Scientific Assistant
Nurzahan Akter
Scientific Assistant
Anwar Hossain
Scientific Assistant
Md. Abdus Satter
Scientific Assistant
Kazi Badal
Lab Attendant

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

Project personnel entitled "High Yielding Hybrid Rice Variety Development through Modernization of Research" Project, Hybrid Rice Division, July 2023-June 2024

SN	Name & Designation	Working days
1	Md. Abdus Shovan Shuvo, *Asstt. Seed Technologist*	365
2	Mir Shefayet Hossain, *Asstt. Seed Technologist*	365
3	Shashi Rani, *Asstt. Seed Technologist*	365
4	Jutun Sarker, *Asstt. Seed Technologist*	365
5	Md. Aminul Islam Likhon, *Asstt. Seed Technologist*	365
6	Md. Rashel, *Asstt. Seed Technologist*	365
7	Md. Mehedi Hasan, *Office Asstt. Cum Computer Operator*	365
8	Md. Himel Mia, *Lab Attendant*	365
9	Marshal Alam Joshep, *Lab Attendant*	365

Hybrid Rice Division

SUMMARY

In T. Aman season 2023, a total of 95 test crosses and 696 (A × R) crosses were made from source nursery. Seventy-four test crosses (F_1s) were evaluated for their pollen fertility status of which three 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. One entry was found completely sterile and their corresponding male parent was regarded as suspected maintainer line. Ten backcross entries were advanced as new CMS lines. Other backcross generations were advanced to next generations except one BC_1 generation which was found unstable in terms of pollen sterility and hence discarded. One hundred-eleven CMS lines along with their respective maintainer lines were maintained by hand crossing.

A total of 124 test crosses and 321 (A × R) crosses were made using 13 CMS lines in Boro season 2023-24. Ninety-one test crosses (F_1s) were evaluated for their pollen fertility status. Among them eleven 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 one BC_1 generation was discarded due to pollen fertility fluctuation. One hundred fifty-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 430 test hybrids under observational trials, twelve (12) hybrid combinations were selected based on yield, duration and grain type and expressed more than 24-34% yield advantage over check variety BRRI hybrid dhan6, 13-22% over AZ7006 and 20-30 % over Dhanny Gold. The heritability obtained from growth duration and grain yield were 92%, and 74% respectively, indicating high level of precision in this experiment. In Boro, out of 489 test hybrids eleven hybrid combinations were selected based on yield, duration and grain type. The selected hybrid combinations expressed 4.2-10.8 % yield advantage over BRRI hybrid dhan8, 19-27% over SL8H, 19-27% over Heera and 28-37% over check variety Tej Gold. The heritability obtained from growth duration and grain yield was 84% and 82% respectively, indicating high level of precision in this experiment. Under parental line improvement program (B×B & R×R) fourteen B×B and 20 R×R crosses were confirmed based on different cyto-sources and amylose content and eleven B×B and 18 R×R crosses were made based on different cyto-sources, grain type and amylose content in T Aman 23. Under field rapid generation advancement program 58618 F_2, F_3, F_5 and F_6 progenies of B×B, R×R and A×R were advanced in T Aman 23. In Boro, eleven B×B and 18 R×R crosses were confirmed based on growth duration, grain type, cyto-sources and amylose content and twenty-nine R×R and 13 B×B crosses were made depending on grain type, growth duration, cyto-sources and amylose content in Boro 2023-24. 42331 progenies of F_2, F_3, F_4 and F_6 generations of B×B, R×R and A×R crosses were advanced in Boro 2023-24.

In T. Aman preliminary yield trials, two hybrids were selected out of 15 and showed yield advantage 16-19 % over BRRI hybrid dhan6, 21-24 % over AZ7006 and 16-19 % over Dhanny Gold. Under multi-location trials three hybrids were selected and expressed yield advantage 16-

19% over BRRI hybrid dhan6, 21-24 % over AZ7006 and 16-19 % over check variety Dhanny Gold. In Boro, under preliminary yield trials, thirteen hybrids were evaluated along with four hybrids as check variety. Out of 13 hybrids three hybrids were selected and gave 5-10 % yield advantage over BRRI hybrid dhan8, 15-20 % over SL8H, 13-18% over Heera-2 and 18-23% over check variety Tej Gold. In Boro, multi-location yield trials comprised fifteen hybrids with four checks. Three hybrids were selected based on average yield of five locations over check varieties and expressed 6-11% yield advantage over BRRI hybrid dhan8, 18-24 % over SL8H, 12-17% over Heera-2 and 18-24 % over Tej Gold.

Adaptability under saline condition of BRRI developed and popular company hybrids along with popular saline tolerant inbreed checks BRRI dhan67, local rice variety IT, Bina dhan-10 were cultivated at three coastal locations of Satkhira. We observed that the salinity levels of Debhata varies from 1.3 ds/m to 1.8 ds/m which is very low level where as the salinity levels of Dumuria varies from 4.1 ds/m to 6.1 ds/m which remains at medium level. On the other hand, salinity levels of Kaliganj varies from 7.3 ds/m to 21.9 ds/m which is very high hence yield is very poor. We found that the highest yielding genotypes of pooled (Debhata and Dumuria) were BRRI hybrid dhan8 (7.52 t ha^{-1}), BRRI hybrid dhan3 (6.14 t ha^{-1}), Heera-2 (6.02 t ha^{-1}) followed by check variety BRRI hybrid dhan6 (5.64 t ha^{-1}), IT (5.47 t ha^{-1}) and Bina dhan-10 (5.42 t ha^{-1}), respectively.

Twelve CMS lines including promising and released hybrids were multiplied during Boro 2023-24 and got total seed yield of 5.9 metric tons. It was ranging from 9.5 kg to 1897 kg/plot equivalent to 1.0 to 2.8 t/ha. Experimental F_1 seed production was made using thirteen CMS with six different restorer lines and seed yield was ranging 0.4 to 44 kg/plot from selected promising hybrid combinations during T. Aman 2023 which was equivalent to 0.08 to 1.5 t/ha. Sixty experimental hybrids were evaluated in augmented design during T Aman 2023 and selected three hybrids expressed around 20 % yield advantages over the highest yielded check variety. In Boro 2023-24, sixty-nine experimental hybrids were evaluated in augmented design and selected six hybrids based on yield, growth duration and grain quality and showed at least 7% yield advantage over best yielded check variety. In Boro 2023-24, a total of 500 kg (1.3 t/ha) from BRRI hybrid dhan5 and 581 kg (2.2 t/ha) from BRRI hybrid dhan6, 650 kg (2.2 t/ha) from BRRI hybrid dhan7 and 425 kg (1.7 t/ha) from BRRI hybrid dhan8 were obtained. From production side (Ishwardi and Barishal) 490 kg (1.2 t/ha) from BRRI hybrid dhan2, 4750 kg (1.7 t/ha) from BRRI hybrid dhna3, 2750 kg (1.7 t/ha) from BRRI hybrid dhan4, 4300 kg (1.3 t/ha) from BRRI hybrid dhan5, 6800 kg (2.4 t/ha) from BRRI hybrid dhan6, 6650 kg (2.4 t/ha) from BRRI hybrid dhan7 and 8920 kg (1.3 t/ha) of BRRI hybrid dhan8 F_1 seeds was obtained.

In T Aman 2023, hybrid rice division supplied 7117 kg F_1 seeds to 80 farmers, 12 seed companies, scientists, extension people, projects and staffs of BRRI. In Boro 2023-24, hybrid rice division supplied 19878 kg F_1 seeds to 135 farmers, 24 seed companies, scientists, extension people, projects and staffs of BRRI. In T Aus 2024, 4229 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. Thirty-five stake holders produced more than 500 MT F_1 seeds using BRRI developed hybrid rice parental lines during Boro 2023-24.

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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, extentionists, 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, 2023

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: Five hundred and thirty-six (536) entries were evaluated under this nursery comprising 420 restorer lines, 13 CMS lines, 103 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: Ninety-five **(**95) test crosses and 696 (A × R) crosses were made using 13 CMS lines during T. Aman season 2023. 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 2023

SL. No.	Designation	Seeds obtained	Remarks
01	BRRI97A/BR11716-4R-108	90	
02	BRRI97A/BR11723-4R-48	75	
03	BRRI97A/BR11723-4R-12	65	
04	BRRI97A/BR11716-4R-123	80	
05	BRRI97A/BR11716-4R-114	85	
06	BRRI97A/BR11716-4R-147	65	
07	BRRI97A/BR10672-1-3-7-12	90	
08	BRRI97A/BR11716-4R-102	70	
09	BRRI97A/BR11712-4R-218	65	
10.	BRRI97A/BR11723-4R-27	70	
11.	BRRI97A/BR11716-4R-129	80	
12.	BRRI97A/ASM-2	85	
13.	BRRI97A/MZ-2	55	
14.	BRRI97A/UKL-13	85	

SL. No.	Designation	Seeds obtained	Remarks
15.	BRRI97A/FFL-1	95	
16.	BRRI97A/FFL-2	75	
17.	BRRI97A/FFL-3	95	
18.	BRRI97A/FFL-4	75	
19.	BRRI97A/FFL-5	85	
20.	BRRI97A/PBM-8	90	
21.	BRRI97A/PBM-9	75	
22.	BRRI97A/BR11715-4R-48	65	
23.	BRRI97A/BR11712-4R-227	80	
24.	BRRI97A/BR11716-4R-102	85	
25.	BRRI97A/BR11715-4R-186	65	
26.	BRRI97A/BR11712-4R-218	90	
27.	BRRI99A/BR11716-4R-108	70	
28.	BRRI99A/BR11716-4R-120	65	
29.	BRRI99A/BR11723-4R-48	70	
30.	BRRI99A/BR11723-4R-12	85	
31.	BRRI99A/BR11716-4R-114	55	
32.	BRRI99A/BR11723-4R-172	65	
33.	BRRI99A/BR8415-2-3-Ran1-1-1-9	70	
34.	BRRI99A/BR Rang13-RGA5-2-3-5	85	
35.	BRRI99A/BR Rang13-RGA5-1-1-2	75	
36.	BRRI99A/New Line	90	
37.	BRRI99A/MZ-1	90	
38.	BRRI99A/ASM-3	85	
39.	BRRI99A/ASM-4	95	
40.	BRRI99A/ASM-6	75	
41.	BRRI99A/MZ-3	90	
42.	BRRI99A/ASM-7	75	
43.	BRRI99A/UKL-4	65	
44.	BRRI99A/UKL-13	80	
45.	BRRI99A/UKL-16	75	
46.	BRRI99A/UKL-32	65	
47.	BRRI99A/PBM-8	95	
48.	BRRI99A/PBM-9	95	
49.	BRRI99A/IR126072-91-1-2-B	75	
50.	BRRI99A/IR126037-20-1-1-B	85	
51.	BRRI99A/BR11712-4R-218	90	
52.	BRRI99A/BRBa3-1-7	75	
53.	BRRI99A/PB-1718-Basmati	65	
54.	BRRI109A/BR11716-4R-123	80	
55.	BRRI109A/BR11716-4R-114	85	
56.	BRRI109A/BR10672-1-3-7-12	65	
57.	BRRI109A/BR Rang13-RGA5-2-3-5	90	
58.	BRRI109A/BR Rang13-RGA5-1-1-2	110	
59.	BRRI109A/BR674-1-1-5-2P-4	70	
60.	BRRI109A/New Line	65	
61.	BRRI109A/IR126066-85-5-2-B	70	
62.	BRRI109A/IR126069-83-2-2-B	95	
63.	BRRI109A/IR126069-48-3-2-B	70	
64.	BRRI109A/IR126072-257-1-3-B	85	
65.	BRRI109A/IR126072-83-3-3-B	70	
66.	BRRI109A/IR126076-67-3-2-B	85	
67.	BRRI109A/PBM-4	75	
68.	BRRI109A/PBM-6	90	
69.	BRRI109A/PBM-7	90	
70.	BRRI109A/IR126069-3-1-1-B	85	
71.	BRRI109A/IR126072-91-1-2-B	95	
72.	BRRI109A/IR126037-20-1-1-B	75	
73.	BRRI109A/BR11715-4R-48	90	
74.	BRRI109A/BR11716-4R-123	75	
75.	BRRI109A/BR11712-4R-227	65	
76.	BRRI109A/BR10301-5R-89	80	
77.	BRRI109A/BR(Path)13800-BC3-8-5	75	
78.	BRRI110A/BR Rang13-RGA5-2-3-5	65	
79.	BRRI110A/BR Rang13-RGA5-1-1-2	95	
80.	BRRI110A/PBM-8	95	
81.	BRRI125A/BR8415-2-3-Ran1-1-1-9	75	

SL. No.	Designation	Seeds obtained	Remarks
82.	BRRI125A/ BR Rang13-RGA5-2-3-5	85	
83.	BRRI125A/ BR Rang13-RGA5-1-1-2	90	
84.	BRRI125A/BR674-1-1-5-2P-4	75	
85.	BRRI125A/New line	65	
86.	BRRI125A/IR127275-36-5-2B	80	
87.	BRRI125A/PBM-4	85	
88.	BRRI125A/PBM-8	65	
89.	IR79156A/BR8415-2-3-Ran1-1-1-9	90	
90.	IR79156A/ BR Rang13-RGA5-1-1-2	85	
91.	IR79156A/BR674-1-1-5-2P-4	95	
92.	IR79156A/IR127275-36-5-2-B	75	
93.	IR102758A/PBM-8	90	
94.	IR102758A/IR126069-3-1-1-B	95	
95.	IR102758A/ BR(Path)13800-BC3-8-5	80	

1st set: D/S: 02/7/23 D/T: 24/7/23; 2nd set: D/S: 10/7/23 D/T: 05/8/23

Table 2. List of A x R crosses made during T. Aman 2023

SL. No.	Designation	Seeds obtained	Remarks
01	BRRI11A/BRRI12R	100	
02	BRRI11A/BRRI13R	75	
03	BRRI11A/BRRI17R	85	
04	BRRI11A/BRRI50R	90	
05	BRRI11A/BRRI51R	80	
06	BRRI11A/BRRI52R	70	
07	BRRI11A/BRRI53R	85	
08	BRRI11A/BRRI54R	85	
09	BRRI11A/BRRI55R	50	
10	BRRI11A/BRRI56R	75	
11	BRRI11A/PR595R	95	
12	BRRI11A/PR862R	120	
13	BRRI11A/2017R-2-4	90	
14	BRRI11A/3018R	65	
15	BRRI11A/BU3R	85	
16	BRRI11A/BAU521R	70	
17	BRRI11A/GETCO18R	75	
18	BRRI11A/EL108R	90	
19	BRRI11A/CHH35R	75	
20	BRRI11A/CHH27R	60	
21	BRRI11A/CHH67R	80	
22	BRRI11A/EL139R	75	
23	BRRI11A/Babilon2R	70	
24	BRRI11A/R-2800	90	
25	BRRI11A/EL168R	100	
26	BRRI11A/PB1718 Basmati	95	
27	BRRI11A/IR02A149R	80	
28	BRRI11A/IR86417-26-1-1-1-1-1R	75	
29	BRRI11A/IR06N126R	85	
30	BRRI11A/IR05N162R	80	
31	BRRI11A/IR86555-16-1-1-1-1-1-1-1-1-1-1R	60	
32	BRRI11A/IR69712-154-23-1-3R	85	
33	BRRI11A/IR13V163R	70	
34	BRRI11A/IR83140-B-36-B (IRRI178)	90	
35	BRRI11A/IR84675-58-4-1-B (IRRI185)	85	
36	BRRI11A/IR101999-31-1-2R	80	
37	BRRI11A/IR112925-5-2-2R	60	
38	BRRI11A/IR98178-7-2-1-1-2-1-1R	80	
39	BRRI74A/BRRI12R	95	
40	BRRI74A/BRRI13R	70	
41	BRRI74A/BRRI17R	85	
42	BRRI74A/BRRI30R	110	
43	BRRI74A/BRRI34R	75	
44	BRRI74A/BRRI35R	70	
45	BRRI74A/BRRI41R	90	
46	BRRI74A/BRRI42R	80	
47	BRRI74A/BRRI48R	90	

SL. No.	Designation	Seeds obtained	Remarks
48	BRRI74A/BRRI49R	75	
49	BRRI74A/BRRI50R	60	
50	BRRI74A/BRRI51R	75	
51	BRRI74A/BRRI52R	65	
52	BRRI74A/BRRI53R	70	
53	BRRI74A/BRRI54R	70	
54	BRRI74A/BRRI55R	80	
55	BRRI74A/BRRI56R	80	
56	BRRI74A/PR595R	65	
57	BRRI74A/PR812R	60	
58	BRRI74A/PR828R	110	
59	BRRI74A/PR862R	75	
60	BRRI74A/2087R	80	
61	BRRI74A/2017R-2-4	95	
62	BRRI74A/3018R	80	
63	BRRI74A/HB09R	65	
64	BRRI74A/LP70R(20)	75	
65	BRRI74A/GoldR (16)	95	
66	BRRI74A/DoelR	80	
67	BRRI74A/BR7166-5B-1R	75	
68	BRRI74A/PAN809R	80	
69	BRRI74A/GETCO18R	70	
70	BRRI74A/EL108R	85	
71	BRRI74A/CHH35R	85	
72	BRRI74A/CHH27R	85	
73	BRRI74A/CHH67R	70	
74	BRRI74A/R line7	80	
75	BRRI74A/ BU2R	75	
76	BRRI74A/IR509R	65	
77	BRRI74A/EL139R	80	
78	BRRI74A/Bogura4R	60	
79	BRRI74A/Babilon2R	90	
80	BRRI74A/R-2800	75	
81	BRRI74A/BADC NewR	80	
82	BRRI74A/EL204R	65	
83	BRRI74A/EL144	70	
84	BRRI74A/MuktagachaR New	85	
85	BRRI74A/EL168R	80	
86	BRRI74A/BayerR New	65	
87	BRRI74A/LalTeerR	80	
88	BRRI74A/Collected from India	60	
89	BRRI74A/Gold LalteerR New	100	
90	BRRI74A/Win305R	85	
91	BRRI74A/PB1718 Basmati	95	
92	BRRI74A/IR86417-26-1-1-1-1-1R	85	
93	BRRI74A/IR06N126R	80	
94	BRRI74A/IR05N162R	65	
95	BRRI74A/IR86555-16-1-1-1-1-1-1-1-1-1-1R	90	
96	BRRI74A/IR90928-15-4-1-1-1R	85	
97	BRRI74A/IR85503-3-3-A-1-1-1-1-1R	90	
98	BRRI74A/IR85503-8-13-1-1-1-1-1-1R	85	
99	BRRI74A/IR69712-154-23-1-3R	70	
100	BRRI74A/IR13V163R	100	
101	BRRI74A/IR83140-B-36-B (IRRI178)	80	
102	BRRI74A/IR84675-58-4-1-B (IRRI185)	60	
103	BRRI74A/IR101999-31-1-2R	70	
104	BRRI74A/IR112925-5-2-2R	70	
105	BRRI74A/IR98178-7-2-1-1-2-1-1R	90	
106	BRRI97A/BRRI12R	95	
107	BRRI97A/BRRI13R	85	
108	BRRI97A/BRRI17R	65	
109	BRRI97A/BRRI23R	65	
110	BRRI97A/BRRI25R	80	
111	BRRI97A/BRRI27R	90	
112	BRRI97A/BRRI30R	70	
113	BRRI97A/BRRI34R	95	
114	BRRI97A/BRRI35R	90	

SL. No.	Designation	Seeds obtained	Remarks
115	BRRI97A/BRRI41R	85	
116	BRRI97A/BRRI42R	100	
117	BRRI97A/BRRI43R	80	
118	BRRI97A/BRRI45R	75	
119	BRRI97A/BRRI46R	90	
120	BRRI97A/BRRI47R	80	
121	BRRI97A/BRRI48R	85	
122	BRRI97A/BRRI49R	65	
123	BRRI97A/BRRI50R	85	
124	BRRI97A/BRRI51R	80	
125	BRRI97A/BRRI52R	85	
126	BRRI97A/BRRI53R	85	
127	BRRI97A/BRRI54R	75	
128	BRRI97A/BRRI55R	65	
129	BRRI97A/BRRI56R	90	
130	BRRI97A/PR542R	105	
131	BRRI97A/PR585R	85	
132	BRRI97A/PR595R	65	
133	BRRI97A/PR812R	80	
134	BRRI97A/PR828R	85	
135	BRRI97A/PR862R	85	
136	BRRI97A/BU3R	65	
137	BRRI97A/BAU521R	70	
138	BRRI97A/B.I.Rice	70	
139	BRRI97A/BasmatiR	85	
140	BRRI97A/GETCO9R	90	
141	BRRI97A/GETCO24R	100	
142	BRRI97A/EL108R	55	
143	BRRI97A/CHH35R	95	
144	BRRI97A/CHH27R	80	
145	BRRI97A/CHH32R	70	
146	BRRI97A/CHH67R	85	
147	BRRI97A/NewR Babla	100	
148	BRRI97A/Win3R	85	
149	BRRI97A/R-2800	65	
150	BRRI97A/S-1203R	80	
151	BRRI97A/EL215R	75	
152	BRRI97A/EL32R	80	
153	BRRI97A/Collected from India	85	
154	BRRI97A/PB1718 Basmati	75	
155	BRRI97A/IR86555-16-1-1-1-1-1-1-1-1-1-1R	100	
156	BRRI97A/IR90928-15-4-1-1-1R	60	
157	BRRI97A/IR85503-3-3-A-1-1-1-1-1R	60	
158	BRRI97A/IR85503-8-13-1-1-1-1-1-1R	75	
159	BRRI97A/IR69712-154-23-1-3R	95	
160	BRRI97A/IR13V163R	55	
161	BRRI97A/IR83140-B-36-B (IRRI178)	85	
162	BRRI97A/IR84675-58-4-1-B (IRRI185)	90	
163	BRRI97A/IR101999-31-1-2R	65	
164	BRRI97A/IR112925-5-2-2R	80	
165	BRRI97A/IR98178-7-2-1-1-2-1-1R	85	
166	BRRI99A/BRRI12R	70	
167	BRRI99A/BRRI13R	50	
168	BRRI99A/BRRI17R	100	
169	BRRI99A/BRRI23R	85	
170	BRRI99A/BRRI25R	55	
171	BRRI99A/BRRI27R	75	
172	BRRI99A/BRRI30R	60	
173	BRRI99A/BRRI34R	85	
174	BRRI99A/BRRI35R	85	
175	BRRI99A/BRRI41R	65	
176	BRRI99A/BRRI42R	65	
177	BRRI99A/BRRI43R	75	
178	BRRI99A/BRRI45R	70	
179	BRRI99A/BRRI46R	90	
180	BRRI99A/BRRI47R	60	
181	BRRI99A/BRRI48R	85	

SL. No.	Designation	Seeds obtained	Remarks
182	BRRI99A/BRRI49R	85	
183	BRRI99A/BRRI50R	95	
184	BRRI99A/BRRI51R	70	
185	BRRI99A/BRRI52R	75	
186	BRRI99A/BRRI54R	60	
187	BRRI99A/BRRI55R	65	
188	BRRI99A/BRRI56R	65	
189	BRRI99A/PR585R	80	
190	BRRI99A/PR595R	100	
191	BRRI99A/BU3R	70	
192	BRRI99A/BAU521R	85	
193	BRRI99A/BasmatiR	65	
194	BRRI99A/EL108R	85	
195	BRRI99A/CHH56R	75	
196	BRRI99A/CHH67R	65	
197	BRRI99A/R-2800	95	
198	BRRI99A/S-1203R	105	
199	BRRI99A/EL215R	95	
200	BRRI99A/EL32R	85	
201	BRRI99A/EL168R	55	
202	BRRI99A/Collected from India	95	
203	BRRI99A/BayerR New	85	
204	BRRI99A/PB1718 Basmati	85	
205	BRRI99A/IR85503-8-13-1-1-1-1-1-1R	100	
206	BRRI99A/IR69712-154-23-1-3R	85	
207	BRRI99A/IR13V163R	95	
208	BRRI99A/IR83140-B-36-B (IRRI178)	80	
209	BRRI99A/IR84675-58-4-1-B (IRRI185)	95	
210	BRRI99A/IR101999-31-1-2R	55	
211	BRRI99A/IR112925-5-2-2R	75	
212	BRRI99A/IR98178-7-2-1-1-2-1-1R	80	
213	BRRI109A/BRRI13R	95	
214	BRRI109A/BRRI17R	70	
215	BRRI109A/BRRI23R	80	
216	BRRI109A/BRRI25R	65	
217	BRRI109A/BRRI27R	85	
218	BRRI109A/BRRI41R	100	
219	BRRI109A/BRRI42R	65	
220	BRRI109A/BRRI43R	75	
221	BRRI109A/BRRI45R	80	
222	BRRI109A/BRRI46R	80	
223	BRRI109A/BRRI47R	70	
224	BRRI109A/BRRI48R	75	
225	BRRI109A/BRRI49R	80	
226	BRRI109A/BRRI50R	85	
227	BRRI109A/BRRI51R	85	
228	BRRI109A/BRRI52R	80	
229	BRRI109A/BRRI53R	95	
230	BRRI109A/BRRI54R	75	
231	BRRI109A/BRRI55R	90	
232	BRRI109A/BRRI56R	65	
233	BRRI109A/PR585R	90	
234	BRRI109A/PR595R	65	
235	BRRI109A/CHH32R	75	
236	BRRI109A/CHH56R	65	
237	BRRI109A/CHH67R	70	
238	BRRI109A/R-2800	80	
239	BRRI109A/S-1203R	75	
240	BRRI109A/EL215R	90	
241	BRRI109A/EL32R	85	
242	BRRI109A/EL168R	95	
243	BRRI109A/Collected from India	75	
244	BRRI109A/BayerR New	90	
245	BRRI109A/BR11712-4R-227	80	
246	BRRI109A/IR85503-8-13-1-1-1-1-1-1R	70	
247	BRRI109A/IR69712-154-23-1-3R	75	
248	BRRI109A/IR13V163R	80	

SL. No.	Designation	Seeds obtained	Remarks
249	BRRI109A/IR83140-B-36-B (IRRI178)	70	
250	BRRI109A/IR84675-58-4-1-B (IRRI185)	95	
251	BRRI109A/IR101999-31-1-2R	80	
252	BRRI109A/IR112925-5-2-2R	75	
253	BRRI109A/IR98178-7-2-1-1-2-1-1R	70	
254	BRRI110A/BRRI13R	60	
255	BRRI110A/BRRI17R	65	
256	BRRI110A/BRRI23R	60	
257	BRRI110A/BRRI25R	110	
258	BRRI110A/BRRI27R	65	
259	BRRI110A/BRRI32R	95	
260	BRRI110A/BRRI36R	80	
261	BRRI110A/BRRI37R	80	
262	BRRI110A/BRRI38R	95	
263	BRRI110A/BRRI39R	55	
264	BRRI110A/BRRI40R	85	
265	BRRI110A/BRRI41R	70	
266	BRRI110A/BRRI42R	75	
267	BRRI110A/BRRI43R	85	
268	BRRI110A/BRRI45R	70	
269	BRRI110A/BRRI46R	100	
270	BRRI110A/BRRI47R	60	
271	BRRI110A/BRRI48R	90	
272	BRRI110A/BRRI49R	100	
273	BRRI110A/BRRI50R	55	
274	BRRI110A/BRRI51R	65	
275	BRRI110A/BRRI52R	85	
276	BRRI110A/BRRI53R	80	
277	BRRI110A/BRRI54R	70	
278	BRRI110A/BRRI55R	100	
279	BRRI110A/BRRI56R	85	
280	BRRI110A/PR595R	90	
281	BRRI110A/PR867R	75	
282	BRRI110A/F2277R	75	
283	BRRI110A/MitaliR	80	
284	BRRI110A/PAN802R	110	
285	BRRI110A/PAN809R	55	
286	BRRI110A/BU3R	65	
287	BRRI110A/BAU329R	80	
288	BRRI110A/BAU521R	80	
289	BRRI110A/B.I. Rice	95	
290	BRRI110A/BasmatiR	60	
291	BRRI110A/GETCO15R	70	
292	BRRI110A/GETCO18R	85	
293	BRRI110A/EL108R	65	
294	BRRI110A/CHH32R	75	
295	BRRI110A/CHH56R	90	
296	BRRI110A/CHH67R	100	
297	BRRI110A/R-2800	95	
298	BRRI110A/Basmati Line India	80	
299	BRRI110A/S-1203R	80	
300	BRRI110A/EL193	65	
301	BRRI110A/EL208	80	
302	BRRI110A/EL144	60	
303	BRRI110A/EL168	70	
304	BRRI110A/BayerR (S)	85	
305	BRRI110A/Collected from India	90	
306	BRRI110A/BayerR New	55	
307	BRRI110A/PB1718 Basmati	80	
308	BRRI110A/IR86555-16-1-1-1-1-1-1-1-1-1-1R	90	
309	BRRI110A/IR90928-15-4-1-1-1R	100	
310	BRRI110A/IR85503-3-3-A-1-1-1-1-1R	70	
311	BRRI110A/IR85503-8-13-1-1-1-1-1-1R	60	
312	BRRI110A/IR69712-154-23-1-3R	80	
313	BRRI110A/IR13V163R	70	
314	BRRI110A/IR83140-B-36-B (IRRI178)	100	
315	BRRI110A/IR84675-58-4-1-B (IRRI185)	55	

SL. No.	Designation	Seeds obtained	Remarks
316	BRRI110A/IR101999-31-1-2R	90	
317	BRRI110A/IR112925-5-2-2R	80	
318	BRRI110A/IR98178-7-2-1-1-2-1-1R	85	
319	BRRI120A/BRRI17R	70	
320	BRRI120A/BRRI23R	70	
321	BRRI120A/BRRI25R	80	
322	BRRI120A/BRRI27R	55	
323	BRRI120A/BRRI32R	80	
324	BRRI120A/BRRI36R	75	
325	BRRI120A/BRRI37R	90	
326	BRRI120A/BRRI38R	90	
327	BRRI120A/BRRI39R	60	
328	BRRI120A/BRRI40R	65	
329	BRRI120A/BRRI41R	70	
330	BRRI120A/BRRI42R	110	
331	BRRI120A/BRRI43R	70	
332	BRRI120A/BRRI45R	85	
333	BRRI120A/BRRI46R	60	
334	BRRI120A/BRRI47R	80	
335	BRRI120A/BRRI48R	85	
336	BRRI120A/BRRI49R	100	
337	BRRI120A/BRRI50R	80	
338	BRRI120A/BRRI51R	55	
339	BRRI120A/BRRI52R	60	
340	BRRI120A/BRRI53R	70	
341	BRRI120A/BRRI54R	70	
342	BRRI120A/BRRI55R	80	
343	BRRI120A/BRRI56R	100	
344	BRRI120A/PR585R	65	
345	BRRI120A/PR595R	60	
346	BRRI120A/CHH32R	80	
347	BRRI120A/CHH56R	70	
348	BRRI120A/CHH67R	70	
349	BRRI120A/R-2800	80	
350	BRRI120A/S-1203R	85	
351	BRRI120A/EL215R	70	
352	BRRI120A/EL32R	75	
353	BRRI120A/EL168R	60	
354	BRRI120A/Collected from India	55	
355	BRRI120A/BayerR New	100	
356	BRRI120A/PB1718 Basmati	55	
357	BRRI120A/IR85503-8-13-1-1-1-1-1-1R	85	
358	BRRI120A/IR69712-154-23-1-3R	90	
359	BRRI120A/IR13V163R	90	
360	BRRI120A/IR83140-B-36-B (IRRI178)	65	
361	BRRI120A/IR84675-58-4-1-B (IRRI185)	60	
362	BRRI120A/IR101999-31-1-2R	85	
363	BRRI120A/IR112925-5-2-2R	85	
363	BRRI120A/IR98178-7-2-1-1-2-1-1R	80	
364	BRRI125A/BRRI25R	65	
365	BRRI125A/BRRI27R	85	
366	BRRI125A/BRRI32R	60	
367	BRRI125A/BRRI36R	80	
368	BRRI125A/BRRI37R	85	
369	BRRI125A/BRRI38R	80	
370	BRRI125A/BRRI39R	70	
371	BRRI125A/BRRI40R	100	
372	BRRI125A/BRRI41R	70	
373	BRRI125A/BRRI42R	65	
374	BRRI125A/BRRI43R	70	
375	BRRI125A/BRRI45R	60	
376	BRRI125A/BRRI46R	70	
377	BRRI125A/BRRI47R	85	
378	BRRI125A/BRRI48R	100	
379	BRRI125A/BRRI49R	70	
380	BRRI125A/BRRI49R	80	
381	BRRI125A/BRRI50R	60	

SL. No.	Designation	Seeds obtained	Remarks
382	BRRI125A/BRRI51R	65	
383	BRRI125A/BRRI52R	80	
384	BRRI125A/BRRI53R	80	
385	BRRI125A/BRRI54R	60	
386	BRRI125A/BRRI55R	70	
387	BRRI125A/BRRI56R	70	
388	BRRI125A/PR416R	100	
389	BRRI125A/PR448R	55	
390	BRRI125A/PR506R	75	
391	BRRI125A/PR585R	60	
392	BRRI125A/PR595R	80	
393	BRRI125A/PR867R	70	
394	BRRI125A/F2277R	75	
395	BRRI125A/MitaliR	90	
396	BRRI125A/PAN802R	85	
397	BRRI125A/PAN809R	60	
398	BRRI125A/BU3R	80	
399	BRRI125A/BAU329R	85	
400	BRRI125A/BAU521R	70	
401	BRRI125A/B. I. Rice	70	
402	BRRI125A/BasmatiR	55	
403	BRRI125A/GETCO15R	120	
404	BRRI125A/GETCO18R	80	
405	BRRI125A/EL108R	85	
406	BRRI125A/CHH32R	70	
407	BRRI125A/CHH56R	65	
408	BRRI125A/CHH67R	60	
409	BRRI125A/R-2800	70	
410	BRRI125A/Basmati Line India	80	
411	BRRI125A/S-1203R	95	
412	BRRI125A/EL193	100	
413	BRRI125A/EL168R	65	
414	BRRI125A/Collected from India	60	
415	BRRI125A/BayerR New	70	
416	BRRI125A/PB1718 Basmati	70	
417	BRRI125A/IR85503-8-13-1-1-1-1-1-1R	55	
418	BRRI125A/IR69712-154-23-1-3R	85	
419	BRRI125A/IR13V163R	85	
420	BRRI125A/IR83140-B-36-B (IRRI178)	100	
421	BRRI125A/IR84675-58-4-1-B (IRRI185)	80	
422	BRRI125A/IR101999-31-1-2R	65	
423	BRRI125A/IR112925-5-2-2R	60	
424	BRRI125A/IR98178-7-2-1-1-2-1-1R	65	
425	BRRI128A/BRRI25R	90	
426	BRRI128A/BRRI27R	80	
427	BRRI128A/BRRI32R	85	
428	BRRI128A/BRRI36R	55	
429	BRRI128A/BRRI37R	70	
430	BRRI128A/BRRI38R	70	
431	BRRI128A/BRRI39R	80	
432	BRRI128A/BRRI40R	110	
433	BRRI128A/BRRI41R	90	
434	BRRI128A/BRRI42R	65	
435	BRRI128A/BRRI43R	70	
436	BRRI128A/BRRI45R	95	
437	BRRI128A/BRRI46R	60	
438	BRRI128A/BRRI47R	65	
439	BRRI128A/BRRI48R	80	
440	BRRI128A/BRRI49R	80	
441	BRRI128A/BRRI50R	60	
442	BRRI128A/BRRI51R	70	
443	BRRI128A/BRRI52R	70	
444	BRRI128A/BRRI53R	80	
445	BRRI128A/BRRI54R	60	
446	BRRI128A/BRRI55R	65	
447	BRRI128A/BRRI56R	70	
448	BRRI128A/PR595R	60	

SL. No.	Designation	Seeds obtained	Remarks
449	BRRI128A/BU3R	60	
450	BRRI128A/BAU329R	70	
451	BRRI128A/BAU521R	80	
452	BRRI128A/B. I. Rice	75	
453	BRRI128A/BasmatiR	70	
454	BRRI128A/CHH32R	60	
455	BRRI128A/CHH56R	65	
456	BRRI128A/R-2800	60	
457	BRRI128A/Basmati Line India	100	
458	BRRI128A/S-1203R	80	
459	BRRI128A/Collected from India	70	
460	BRRI128A/BayerR New	60	
461	BRRI128A/PB1718 Basmati	60	
462	BRRI128A/IR86555-16-1-1-1-1-1-1-1-1-1-1R	65	
463	BRRI128A/IR90928-15-4-1-1-1R	70	
464	BRRI128A/IR85503-3-3-A-1-1-1-1-1R	60	
465	BRRI128A/IR69712-154-23-1-3R	65	
466	BRRI128A/IR83140-B-36-B (IRRI178)	70	
467	BRRI128A/IR84675-58-4-1-B (IRRI185)	80	
468	BRRI128A/IR101999-31-1-2R	60	
469	BRRI128A/IR112925-5-2-2R	65	
470	BRRI128A/IR98178-7-2-1-1-2-1-1R	60	
471	IR79156A/BRRI32R	80	
472	IR79156A/BRRI36R	85	
473	IR79156A/BRRI37R	60	
478	IR79156A/BRRI38R	70	
479	IR79156A/BRRI39R	80	
480	IR79156A/BRRI41R	60	
481	IR79156A/BRRI42R	65	
482	IR79156A/BRRI43R	80	
483	IR79156A/BRRI46R	85	
484	IR79156A/BRRI47R	70	
485	IR79156A/BRRI52R	65	
486	IR79156A/BRRI53R	60	
487	IR79156A/BRRI54R	80	
488	IR79156A/BRRI55R	110	
489	IR79156A/BRRI56R	90	
490	IR79156A/BasmatiR	80	
491	IR79156A/CHH32R	85	
492	IR79156A/CHH56R	80	
493	IR79156A/CHH67R	90	
494	IR79156A/R-2800	110	
495	IR79156A/Basmati Line India	85	
496	IR79156A/S-1203R	65	
497	IR79156A/Bogra-4R	70	
498	IR79156A/BayerR New	85	
499	IR79156A/PB1718 Basmati	100	
500	IR79156A/IR90928-15-4-1-1-1R	65	
501	IR79156A/IR85503-3-3-A-1-1-1-1-1R	70	
502	IR79156A/IR85503-8-13-1-1-1-1-1-1R	80	
503	IR79156A/IR69712-154-23-1-3R	65	
504	IR79156A/IR13V163R	70	
505	IR79156A/IR83140-B-36-B (IRRI178)	70	
506	IR79156A/IR101999-31-1-2R	80	
507	IR79156A/IR112925-5-2-2R	95	
508	IR79156A/IR98178-7-2-1-1-2-1-1R	65	
509	IR79125A/BRRI32R	85	
510	IR79125A/BRRI36R	90	
511	IR79125A/BRRI37R	100	
512	IR79125A/BRRI38R	60	
513	IR79125A/BRRI39R	60	
514	IR79125A/BRRI41R	80	
515	IR79125A/BRRI42R	70	
516	IR79125A/BRRI43R	60	
517	IR79125A/BRRI46R	80	
518	IR79125A/BR827R	70	
519	IR79125A/BR168R	75	

SL. No.	Designation	Seeds obtained	Remarks
520	IR79125A/BRRI53R	85	
521	IR79125A/BRRI18R	90	
522	IR79125A/BRRI55R	80	
523	IR79125A/BRRI56R	70	
524	IR79125A/BU3R	70	
525	IR79125A/BAU329R	65	
526	IR79125A/BU3R	90	
527	IR79125A/BRRI25R	110	
528	IR79125A/BAU521R	90	
529	IR79125A/B. I. Rice	65	
530	IR79125A/BasmatiR	60	
531	IR79125A/CHH32R	65	
532	IR79125A/CHH56R	70	
533	IR79125A/CHH67R	80	
534	IR79125A/R-2800	95	
535	IR79125A/Basmati Line India	60	
536	IR79125A/S-1203R	65	
537	IR79125A/Collected from India	70	
538	IR79125A/BayerR New	70	
539	IR79125A/PB1718 Basmati	75	
540	IR79125A/IR86555-16-1-1-1-1-1-1-1-1-1-1R	70	
541	IR79125A/IR90928-15-4-1-1-1R	60	
542	IR79125A/IR85503-3-3-A-1-1-1-1-1-1R	80	
543	IR79125A/IR85503-8-13-1-1-1-1-1-1-1R	100	
544	IR79125A/IR69712-154-23-1-3R	60	
545	IR79125A/IR13V163R	65	
546	IR79125A/IR83140-B-36-B (IRRI178)	70	
547	IR79125A/IR84675-58-4-1-B (IRRI185)	70	
548	IR79125A/IR101999-31-1-2R	65	
549	IR79125A/IR112925-5-2-2R	80	
550	IR79125A/IR98178-7-2-1-1-2-1-1R	80	
551	IR102758A/BRRI32R	70	
552	IR102758A/BRRI36R	75	
553	IR102758A/BRRI37R	100	
554	IR102758A/BRRI38R	85	
555	IR7102758A/BRRI39R	80	
556	IR102758A/BRRI41R	85	
557	IR102758A/BRRI42R	80	
558	IR102758A/BRRI43R	70	
559	IR102758A/BRRI46R	60	
560	IR102758A/BRRI47R	100	
561	IR102758A/BRRI52R	65	
562	IR102758A/BRRI53R	80	
563	IR102758A/BRRI54R	70	
564	IR102758A/BRRI55R	65	
565	IR102758A/BRRI56R	80	
566	IR102758A/BU3R	100	
567	IR102758A/BAU329R	60	
568	IR102758A/BRRI25R	70	
569	IR102758A/BAU329R	80	
570	IR102758A/BAU521R	80	
571	IR102758A/B. I. Rice	85	
572	IR102758A/BasmatiR	70	
573	IR102758A/CHH32R	60	
574	IR102758A/CHH56R	85	
575	IR102758A/CHH67R	60	
576	IR102758A/R-2800	65	
577	IR102758A/Basmati Line India	70	
578	IR102758A/S-1203R	70	
579	IR102758A/Collected from India	80	
580	IR102758A/BayerR New	65	
581	IR102758A/PB1718 Basmati	70	
583	IR102758A/IR86555-16-1-1-1-1-1-1-1-1-1-1R	70	
584	IR102758A/IR90928-15-4-1-1-1R	80	
585	IR102758A/IR85503-3-3-A-1-1-1-1-1-1R	80	
586	IR102758A/IR85503-8-13-1-1-1-1-1-1-1R	90	
587	IR102758A/IR69712-154-23-1-3R	100	

SL. No.	Designation	Seeds obtained	Remarks
588	IR102758A/IR83140-B-36-B (IRRI178)	65	
589	IR102758A/IR84675-58-4-1-B (IRRI185)	60	
590	IR102758A/IR101999-31-1-2R	60	
591	IR102758A/IR112925-5-2-2R	70	
592	IR102758A/IR98178-7-2-1-1-2-1-1R	70	
593	IR58025A/BRRI42R	85	
594	IR58025A/BRRI43R	65	
595	IR758025A/BRRI47R	60	
596	IR58025A/BRRI52R	70	
597	IR58025A/BRRI53R	80	
598	IR58025A/BRRI54R	80	
599	IR58025A/BRRI55R	85	
600	IR58025A/BRRI56R	60	
601	IR58025A/BU3R	65	
602	IR58025A/BAU329R	60	
603	IR58025A/BAU521R	80	
604	IR58025A/BasmatiR	80	
605	IR58025A/CHH32R	90	
606	IR158025A/CHH56R	100	
607	IR58025A/CHH67R	65	
608	IR58025A/R-2800	75	
609	IR58025A/Basmati Line India	75	
610	IR58025A/S-1203R	80	
611	IR58025A/Collected from India	80	
612	IR58025A/BayerR New	60	
613	IR58025A/PB1718 Basmati	60	
614	IR58025A/IR86555-16-1-1-1-1-1-1-1-1-1-1R	90	
615	IR58025A/IR90928-15-4-1-1-1R	90	
616	IR58025A/IR85503-3-3-A-1-1-1-1-1R	85	
617	IR58025A/IR85503-8-13-1-1-1-1-1-1R	70	
618	IR58025A/IR69712-154-23-1-3R	70	
619	IR58025A/IR13V163R	65	
620	IR58025A/IR83140-B-36-B (IRRI178)	80	
621	IR58025A/IR84675-58-4-1-B (IRRI185)	80	
622	IR58025A/IR101999-31-1-2R	90	
623	IR58025A/IR112925-5-2-2R	85	
624	IR58025A/IR98178-7-2-1-1-2-1-1R	90	
625	BRRI108A/BRRI36R	60	
626	BRRI108A/BRRI37R	60	
627	I3A/BRRI15R	90	
628	I3A/BRRI19R	60	
629	I3A/BRRI36R	70	
630	I3A/BRRI37R	70	
631	I3A/BRRI44R	85	
632	BRRI63A/BRRI19R	80	
633	BRRI63A/BRRI36R	60	
634	BRRI63A/BRRI32R	55	
635	BRRI63A/KBPMR	65	
636	BRRI43A/PR595R	70	
637	BRRI43A/PR812R	80	
638	BRRI43A/PR828R	80	
639	BRRI43A/2087R	85	
640	BRRI43A/2017R-2-4	100	
641	BRRI43A/3018R	70	
642	BRRI43A/LP70R	60	
643	BRRI43A/GoldR	65	
644	BRRI43A/DoelR	60	
645	BRRI43A/CHH67R	70	
646	BRRI43A/BU2R	65	
647	BRRI40A/BRRI14R	80	
648	BRRI40A/BRRI15R	80	
649	BRRI40A/BRRI19R	100	
650	BRRI40A/BRRI36R	110	
651	BRRI40A/BRRI37R	85	
652	BRRI40A/BRRI44R	60	
653	BRRI40A/KBPMR	55	
654	IR79155A/BRRI44R	85	

SL. No.	Designation	Seeds obtained	Remarks
655	IR79155A /BRRI19R	70	
656	IR79155A /BRRI32R	60	
657	IR79155A /BRRI36R	65	
658	IR79155A /BRRI37R	60	
659	IR62829A /BRRI19R	85	
660	IR62829A /BRRI32R	55	
661	IR62829A /BRRI36R	70	
662	IR62829A /BRRI37R	60	
663	IR62829A /BRRI44R	85	
664	IR62829A /KBPMR	100	
665	IR80151A/BRRI32R	80	
666	IR80151A /BRRI19R	70	
667	IR80151A /BRRI36R	60	
668	IR80151A /BRRI37R	60	
669	IR80151A /BRRI44R	65	
670	IR102571A /BRRI15R	70	
671	IR102571A /BRRI32R	95	
672	IR102571A /BRRI36R	80	
673	IR102571A /BRRI37R	85	
674	IR102571A /BRRI43R	80	
675	IR102571A /BRRI44R	85	
676	IR102571A /KBPMR	90	
677	IR78369A /BRRI15R	55	
678	IR78369A /BRRI19R	60	
679	IR78369A /BRRI32R	60	
680	IR78369A /BRRI36R	70	
681	IR78369A /BRRI37R	80	
682	IR78369A /BRRI43R	80	
683	IR78369A /BRRI44R	85	
684	IR78369A /KBPMR	90	
685	IR79125A/BR9159-8-5-40-13-8R	55	
686	IR79125A/KashempurR	100	
687	IR79125A/CQR	85	
688	IR79125A/Chachua N-2R	100	
689	IR102758A/BR827R	85	
690	IR102758A /BR168R	80	
691	IR102758A /BRRI18R	70	
692	IR102758A/BR9159-8-5-40-13-8R	80	
693	IR102758A/KashempurR	60	
694	IR102758A/CQR	85	
695	IR102758A/GoldenR	80	
696	IR102758A/Chachua N-2R	70	

1st set: D/S: 03/7/23 D/T: 23/7/23; 2nd set: D/S: 09/7/23 D/T: 317/23; 3rd set: D/S: 16/7/23; D/T: 06/8/23

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 & methods: Seventy-four (74) 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 2023, out of 74 testcrosses (F_1s) three entries have been found heterotic over check varieties expressing 24-30% yield advantage over check BRRI hybrid dhan6, 21-26 % over AZ7006 and 37-44% over Dhanny Gold **(Table 3)** and one entry was 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 2023

Test Entries	PHT (cm)	DTM (days)	Yield		Grain Size & shape	Yield adv. over checks (%)	Suspected as restorer
			kg/plot	t/ha			
BRRI11A/ASM2	109	118	1.73	8.7	LB	24-30	ASM2
BRRI48A/UKL-32	106	109	1.68	8.4	LB	21-26	UKL-32
BRRI109A/BR11716-4R-147	109	115	1.91	9.6	LB	37-44	BR11716-4R-147
BRRI hybrid dhan6 (Ck-1)	111	111	1.36	6.8	MS		
A Z-7006 (Ck-2)	114	120	1.33	6.7	MS		
Dhanny Gold (Ck-3)	117	122	1.39	6.9	LB		
CV (%)	0.66	0.85	0.04	0.2			
LSD (0.05)	4.16	5.39	0.25	1.2			

Plot size= $2m^2$, MS= Medium Slender, LB = Long Bold
D/S: P_1= 04.07.23; P_2/F_1= 07.07.23; P_3= 10.07.23; D/T: 03.08.23

Table 4. List of entry found completely sterile from Test cross nursery during T Aman, 2023

SL no	Cross combination	Proposed to be maintainer	Pollen sterility status	PHT (cm)		DTM (Days)	
				F_1	Parent	F_1	Parent
1	BRRI48A/ UKL-17	UKL-17	CS	102	109	100	110

D/S: P_1= 04.07.23; P_2/F_1= 07.07.23; P_3= 10.07.23; D/T: 03.08.23; CS= Completely sterile

Experiment 1.1.3: Backcross Nursery

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

Materials: 10 BC_6, 07 BC_5, 10 BC_3, 06 BC_2 and 11 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: Ten 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 one BC_1 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 2023

SL. No.	BC gen	Designation	Sterility status	DTM	Grain size & shape	Base color	Designated as
01.	BC_6	BRRI7A/UKL-11	CS	115	MB	Purple	BRRI57A/B

02.	BC_6	BRRI7A/UKL-21	CS	110	MB	Purple	BRRI58A/B
03.	BC_6	BRRI13A/3145B	CS	107	MS	Green	BRRI59A/B
04.	BC_6	BRRI13A/ UKL-22	CS	101	LB	Green	BRRI60A/B
05.	BC_6	BRRI97A/3089B	CS	111	SB	Purple	BRRI61A/B
06.	BC_6	BRRI97A/205B-20-9	CS	111	SB	Purple	BRRI62A/B
07.	BC_6	BRRI99A/3171B	CS	110	MS	Green	BRRI63A/B
08.	BC_6	BRRI99A/208B-6-8	CS	107	MS	Green	BRRI64A/B
09.	BC_6	BRRI99A/217B-20-3	CS	105	MS	Green	BRRI65A/B
10.	BC_6	BRRI99A/217B-26-6	CS	106	MS	Green	BRRI66A/B

D/S: P_1 =05.07.23; P_2/F_1=08.07.23; P_3 =11.07.23; D/T: 01.08.23; CS = completely sterile; DTM= Days to maturity; MS= Medium slender; MB= Medium bold; LB= Long bold; SB= Short bold

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 eleven (111) 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 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 developed 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 2023

SL.No	Designation	Sterility status (%)	Seed amount	Plant type	Remarks
01	IR68890A/B	100	70	Modern	
02	IR69802A/B	100	85	Modern	
03	PMS 8A/B	98	75	Modern	
04	IR77801A/B	100	60	Modern	
05	IR77803A/B	100	70	Modern	
06	IR77805A/B	100	55	Modern	
07	IR78355A/B	100	60	Modern	
08	IR75595A/B	100	80	Modern	
09	IR77808A/B	100	55	Modern	
10	IR77809A/B	100	65	Modern	
11	IR78361A/B	100	60	Modern	
12	IR78362A/B	100	70	Modern	
13	IR77811A/B	100	60	Modern	
14	IR73328 A/B	100	55	Modern	
15	IR79128A/B	100	70	Modern	
16	IR80151A/B	100	60	Modern	
17	IR80154A/B	99	50	Modern	
18	IR80156A/B	100	60	Modern	
19	IR62829A/B	100	85	Modern	
20	IR70960A/B	100	50	Modern	
21	IR78354A/B	98	50	Modern	
22	IR79155A/B	100	80	Modern	
23	BRRI2A/B	100	70	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	80	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	
79	BRRI147A/B	100	55	Modern	
80	BRRI148A/B	100	85	Modern	
81	BRRI149A/B	100	50	Modern	
82	BRRI150A/B	100	55	Modern	
83	BRRI151A/B	100	55	Modern	Pollen fertile
84	BRRI152A/B	100	70	Modern	
85	BRRI153A/B	100	50	Modern	
86	BRRI154A/B	100	65	Modern	
87	BRRI155A/B	100	50	Modern	
88	BRRI156A/B	100	55	Modern	
HRDC materials					
89	IR 93558 A/B	100	70	Modern	
90	IR105687A/B	100	60	Modern	
91	IR102760A/B	100	50	Modern	
92	IR102758A/B	100	55	Modern	
93	IR102573A/B	100	90	Modern	
94	IR102572A/B	100	55	Modern	
95	IR102571A/B	100	70	Modern	
96	IR102569A/B	100	65	Modern	
97	IR105688A/B	100	100	Modern	
98	IR102757A/B	100	60	Modern	

99	IR58025A/B	100	50	Modern
100	IR75596A/B	100	55	Modern
101	IR78369A/B	100	80	Modern
102	IR79125A/B	100	70	Modern
103	IR93559A/B	100	90	Modern
104	IR93560A/B	100	50	Modern
105	IR73328A/B	100	60	Modern
106	IR80559A/B	100	55	Modern
107	IR99792A/B	100	70	Modern
108	IR93562A/B	100	55	Modern
109	IR99791A/B	100	50	Modern
110	IR102561A/B	100	60	Modern
111	IR102759A/B	100	70	Modern

D/S: B_1= 08.07.23; B_2/A =11.07.23; B_3= 14.07.23; D/T: 02.08.23

Experiment 1.1.5: Observational Trial (OT) of experimental hybrids

Objective: Selection of promising hybrids

Materials and Methods: Variety: 430 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 430 hybrids 12 hybrid combinations performed well **(Table 7).** The selected hybrid combinations expressed more than 24-34 % yield advantage over check variety BRRI hybrid dhan6, 13-22% over AZ7006 and 20-30 % over Dhanny Gold. The heritability obtained from growth duration and grain yield were 92 % and 74 % 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: Umma Kulsum; Co-Investigator: M.J. Hasan

Table 7. List of experimental hybrids found heterotic over check variety during T. Aman, 2023

Sl. No.	Trial No.	Designation	DTM	GSS	Plot Yield (kg/plot)	Yield (t/h)	Heterosis (%)		
							Ck-1	Ck-2	Ck-3
1	OT-104	BRRI99A/BRRI32R	108	LS	1.58	7.9	27	16	23
2	OT-147	BRRI109A/BRRI32R	106	LS	1.54	7.7	24	13	20
3	OT-166	BRRI109A/CHH6R	107	LS	1.64	8.2	32	21	28
4	OT-247	BRRI125A/EL168R	114	MS	1.64	8.2	32	21	28
5	OT-306	BRRI125A/IR86522-15-2-1-1-1-1-1R	121	MS	1.66	8.3	34	22	30
6	OT-307	BRRI125A/IR86612-31-3-2-1-1-1-1-1R	119	MS	1.66	8.3	34	22	30
7	OT-310	BRRI125A/IR98206-4-2-2-1-1-1-1R	117	MS	1.64	8.2	32	21	28
8	OT-327	BRRI125A/IR86526-15-10-1-1-2-1-1R	120	MS	1.6	8.0	29	18	25
9	OT-357	IR79156A/EL220R	126	LS	1.64	8.2	32	21	28
10	OT-365	IR79125A/BRRI33R	125	LS	1.58	7.9	27	16	23
11	OT-375	IR79125A/KashempurR	126	MS	1.62	8.1	31	19	27
12	OT-378	IR79125A/IR86526-10-6-1-1-1-1-1-1	126	LS	1.56	7.8	26	15	22
	Ck-1	BRRI hybrid dhan6	110	MS	1.24	6.2			
	CK-2	AZ7006	119	MS	1.36	6.8			
	CK-3	Dhanny Gold	118	MS	1.28	6.4			

Heritability	0. 92	-	0.74
$LSD_{(0.05)}$	15.9	-	2.09

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

D/S: 14.07.23; D/T: 06.08.23; **Legend:** DTM = Days to maturity; GSS= Grain size & shape

Experiment 1.1.6: Evaluation of experimental hybrids

Objective: Selection of promising hybrids

Materials and Methods: Variety: 69 hybrids (Fine grain, high yield with medium grain) along with 3 checks. Twenty- one days old seedlings were transplanted in 10.5 m^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 69 hybrids three hybrid combinations performed well **(Table 8).** The selected hybrid combinations expressed more than 19-25 % yield advantage over check variety BRRI hybrid dhan6, similar yield advantage observed over AZ-7006 and 14-20 % over Dhanny Gold. 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.J. Hasan; Co-Investigator: Umma Kulsum

Table 8. Selected entries from experimental hybrids during T. Aman, 2023

SL. No	Combination	PHT (cm)	E/T	SF (%)	Yld (t/ha)	GD	GSS	Amylose (%)	Yield adv over cks		
									Ck-1	Ck-2	Ck-3
EH-1	BRRI11A/BRRI54R	110	12	86	8.2	121	M	23.5	20.9	20.9	15.5
EH-16	BRRI99A/BRRI38R	108	13	88	8.5	123	LS	23.3	25	25	19.7
EH-42	BRRI110A/BRRI32R	108	13	87	8.1	127	M	23.6	19.1	19.1	14.1
Ck-1	BRRI hybrid dhan6	111	13	86	6.8	118	LS				
CK-2	AZ-7006	110	11	84	6.8	130	M				
Ck-3	Dhanny Gold	113	11	83	7.1	132	LS				
Mean		110	12.2	85.7	7.6	125.2					
CV (%)		1.7	8.1	2.2	10.1	4.3					
LSD (0.05%)		2.0	1.0	2.0	0.8	5.7					

D/S: 10.07.23; D/T: 03/08/23; **Legend:** PHT (cm) = Plant height; E/T= No. of effective tillers; SF (%) = Spikelet fertility; Yld (t/ha) = Yield; GD= Growth duration; GSS = Grain shape & size

Experiment No.1.1.7: Preliminary Yield Trials (PYT)

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

Materials: Thirteen hybrids (13) 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 23, two hybrids were selected out of 13 and it showed yield advantage 16-19 % over BRRI hybrid dhan6, 21-24 % over AZ7006 and 16-19 % over Dhanny Gold. **(Table 9).**

Table 9. Results of preliminary yield trials in T. Aman 2023

Sl. No.	Designation	PHT (cm)	GD (days)	GSS	SF (%)	Amy (%)	Yield (t/h)	Heterosis (%)		
								Ck-1	Ck-2	Ck-3
01	IR58025A/BRRI32R	112	116	MS	78.3	23.4	7.8	13	18	13
02	BRRI11A/BRRI38R	110	121	S	82.2	23.6	8.2	19	24	19
03	BRRI99A/BRRI38R	105	123	S	80.5	23.5	8.0	16	21	16
04	IR79125A/BRRI38R	107	105	S	77.6	24.1	7.4	7.0	12	7.0
05	IR79156A/BRRI42R	111	107	S	76.5	23.7	7.2	4.0	9.0	4.0
06	IR79156A/BRRI43R	110	110	S	83.3	23.7	6.6	-	-	-
07	BRRI109A/BRRI46R	115	118	S	77.6	23.5	7.4	7.0	12	7.0
08	IR105688A/BRRI46R	112	120	S	80.2	22.8	7.5	9.0	14	9.0
09	IR102758A/BRRI53R	106	104	S	76.3	23.6	6.6	-	-	-
10	BRRI48A/BRRI54R	113	112	S	75.4	23.3	6.8	-	3.0	-
11	BRRI109A/IR85551-9-1-1-1-2-1-1-1R	111	111	S	74.4	22.8	6.1	-	-	-
12	BRRI110A/IR85551-9-1-1-1-2-1-1-1R	115	110	S	74.0	24.0	5.8	-	-	-
13	IR102758A/IR85551-9-1-1-1-2-1-1-1R	104	106	S	73.6	23.3	5.8	-	-	-
14	BRRI hybrid dhan6	109	118	S	76.0	24.0	6.9			
15	AZ7006	112	131	S	76.5	-	6.6			
16	Dhanny Gold	108	135	MS	77.1	-	6.9			
	Mean	110	115.4		77.5	23.5	7.0			
	CV (%)	3.0	7.9		3.7	1.7	10.4			
	LSD (0.05%)	2.1	5.9		1.8	0.3	0.5			

D/S: 14/7/2023; D/T: 04/8/2023; Plot size=10 m^2; PHT (cm) = Plant height (cm); GD = Growth duration; GSS= Grain shape & size; S=Slender, MS=Medium slender; SF (%) = Spikelet fertility; Amy (%) = Amylose.

Experiment No.1.1.8: Multi-location Yield Trials (MLT).

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

Materials: Fourteen hybrids (14) along with three checks (BRRI hybrid dhan6, AZ 7006 & Dhanny Gold) were evaluated.

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 2023, under multi-location yield trials three hybrids were selected based on yield, grain type and growth duration. The selected entries expressed yield advantage 16-19 % over BRRI hybrid dhan6, 21-24 % over AZ7006 and 16-19 % over Dhanny Gold **(Table 10)**.

Table 10. Results of multi-location yield trials during T Aman 2023

Sl. No.	Hybrids	PH (cm)	DTM	Yield (t/ha)						SF (%)	GT	Amy (%)	Aver yield Advantage over Ck (%)		
				Gaz	Ish	Bari	Ran	Son	Av				Ck-1	Ck-2	Ck-3
1	IR79156A/BRRI32R	108	111	7.4	7.6	5.8	6.4	5.8	6.6	76.3	S	-	-	-	-
2	BRRI109A/BRRI37R	110	110	7.2	7.0	8.9	6.1	5.6	7.0	78.6	MS	23.4	1.4	6.1	1.4
3	BRRI48A/BRRI38R	106	113	5.9	7.3	7.4	6.4	6.3	6.7	76.0	S	23.2	-	1.5	-

4	BRRI109A/BRRI38R	108	114	8.6	8.8	8.7	6.5	7.9	8.1	75.2	S	23.5	17.4	22.7	17.4
5	BRRI97A/BRRI38R	107	114	6.8	7.7	6.9	6.0	6.7	6.8	80.3	MS	23.6	-	3.0	-
6	BRRI109A/BRRI42R	111	115	8.4	8.5	8.3	7.1	7.8	8.0	82.5	MS	24.2	15.9	21.2	15.9
7	IR79156A/BRRI42R	110	110	6.0	7.9	6.9	6.5	6.3	6.7	77.8	MS	23.4	-	1.5	-
8	IR58025A/BRRI42R	107	114	6.5	7.1	6.12	6.1	5.8	6.3	75.0	MS	23.4	-	-	-
9	BRRI97A/BRRI42R	103	110	6.8	7.5	7.3	6.6	6.3	6.9	77.6	S	24.0	-	4.5	-
10	IR102758A/BRRI54R	111	118	7.4	7.1	7.8	5.8	7.0	7.0	79.8	S	23.7	1.4	6.1	1.4
11	BRRI99A/BRRI54R	113	119	6.7	6.8	7.2	5.5	6.8	6.6	78.7	MS	23.6	-		-
12	BRRI11A/BRRI54R	109	116	8.6	8.8	8.5	7.1	8	8.2	83.3	M	24.0	18.8	24.2	18.8
13	IR79156A/BRRI54R	115	118	6.4	6.7	6.2	5.8	6.6	6.3	75.2	MS	23.6	-	-	-
14	IR58025A/BRRI54R	112	121	6.6	7.0	6.8	6.3	6.7	6.7	76.8	MS	23.0	-	1.5	-
Ck-1	BRRI hybrid dhan6	112	116	5.8	7.3	5.8	6.1	6.2	6.9	75.0	S	24.0			
Ck-2	AZ 7006 (CK-2)	116	123	5.6	7.8	6.2	6.4	5.4	6.6	75.1	S				
Ck-3	Dhanny Gold (CK-3)	118	127	6.3	7.0	7.8	6.5	5.6	6.9	75.8	S				
Mean		110.4	115.8	6.9	7.5	7.2	6.3	6.5	7.0	77.6					
CV (%)		3.5	4.1	13.7	8.8	14.0	6.7	12.3	8.4	3.4					
LSD (0.05%)		2.4	3.0	0.6	0.4	0.6	0.3	0.5	0.4	1.6					

D/S: 17/7/2023; D/T: 08/08/2023; 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.1.1.9: Demonstrational trials of BRRI released and promising hybrids with Dhanny Gold

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

Materials and Methods: Eight hybrids were evaluated in that trial. Among them two hybrids were released (BRRI hybrid dhan4 and BRRI hybrid dhan6), five promising hybrids (BRRI11A/BRRI54R, IR79156A/BRRI54R, IR79156A/BRRI54R, IR102758A/IR85551-9-1-1-1-2-1-1-1R and BRRI110A/ IR85551-9-1-1-1-2-1-1-1R) along with Bayer most popular hybrid Dhanny Gold. Twenty one days old seedlings were transplanted in 16 m^2 plot 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.

Result and Discussion: Highest yield was observed in promising hybrid-3 (6.46 t/ha) followed by promising hybrid -4 (6.45 t/ha) and all the promising hybrid expressed at least 0.5 ton yield advantage over Dhanny Gold **(Table 11).**

Location: BRRI, Gazipur

Principle Investigator: A K Paul

Co-investigator: M J Hasan

Table 11. Results of demonstration trials during T Aman, 2023

Entry No	Designation	PHT (cm)	E/T	PL (cm)	D50%F (days)	DTM (Days)	SF (%)	Yield (t/ha)
1	BRRI hybrid dhan4	125	7.8	26.2	77	108	75.60	5.65
2	BRRI hybrid dhan6	128	8.2	27.6	75	107	80.81	5.76
3	Dhany Gold	128	8.4	26.6	87	118	75.55	5.63
4	Promising hybrid-1(BRRI11A/BRRI54R)	120	7.0	25.0	77	108	75.13	6.14
5	Promising hybrid-2 (IR79156A/BRRI54R)	120	7.8	27.8	76	107	73.88	6.20
6	Promising hybrid-3(IR79156A/BRRI32R)	131	7.6	27.8	79	111	78.43	6.46
7	Promising hybrid-4 (IR102758A/IR85551-9-1-1-1-2-1-1-1R)	114	9.2	25.8	74	106	61.98	6.45
8	Promising hybrid-5 (BRRI110A/IR85551-9-1-1-1-2-1-1-1R)	105	7.6	26.4	72	105	73.20	6.23
Mean		121.4	7.95	26.65	77.13	108.75	74.32	6.07
CV (%)		0.071	0.083	0.038	0.059	0.038	0.075	0.096
LSD(0.05)		7.861	0.599	0.929	4.121	3.769	5.073	0.438

D/S: 16.07.23; D/T: 01.08.23

Experiment No.1.1.10: 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: Eighteen well characterized B lines were grown in T. Aman 2023. 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: Mithun Chandra Debsharma; Co-Investigator: MJ Hasan

Location: BRRI, Gazipur

Date of initiation: July 2023

Date of termination: November 2023

Results and discussion: Eleven crosses were made using 18 parents. Selection of parents made based on: - i) phenotypic value that improves breeding value ii) Cyto-source iii) genetic distance **(Table 12).**

Table 12. Crosses made for B×B improvement (Based on different cyto-sources) during T. A 2023

Sl No.	Cross Combination	Seed obtained
01.	IR7780B (Gam) × IR80151B (WA)	80
02.	IR79155B (Mutagen)× BRRI40B (Gambiaca)	85
03.	BRRI40B (Gam)× IR7780B (Gambisca)	10
04.	BRRI73B × IR102760B	80
05.	BRRI127B × IR78369B	25
06.	IR102760B × BRRI73B	20
07.	IR102571B × BRRI81B	15
08.	BRRI20B × IR102760B	15
09.	IR68890B (WA) × IR78355B (Gambiaca)	150
10.	BRRI128B × BRRI17B	30
11.	BRRI129B × BRRI126B	65

DS: 11.07.2023; DT: 28.07.2023; Inside parenthesis indicates cyto-sources

Experiment No.1.1.11: 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: Thirty well characterized R lines were grown in T. Aman 2023. Twenty-one-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: Mithun Chandra Debsharma; Co-Investigator: MJ Hasan

Location: BRRI, Gazipur

Date of initiation: July 2023

Date of termination: November 2023

Results and discussion: Eighteen crosses were made using 30 parents. Parents selection were made on the basis of such criteria: - i) phenotypic value that improves breeding value, ii) genetic distance, iii) High amylose (> 25%) **(Table 13)**

Table 13. Crosses made for R×R improvement (based on amylose content) during T Aman 2023

Sl No.	Cross Combination	Seed obtained
01.	BRRI12R × IR05N162R	10
02.	BRRI17R × IR90928-15-4-1-1-1R	65
03.	BRRI56R × IR85503-3-3-A-1-1-1-1-1R	15
04.	PR595R × IR85503-8-13-1-1-1-1-1-1R	15
05.	PR812R × IR 86417-26-1-1-1-1-1R	10
06.	PR828R × IR69712-154-2-3-1-3R	20
07.	EL144R × BRRI56R	20
08.	EL220R × GETCO23R	95
09.	IR85503-8-11-1-1-1-2-1-1-1R × Getco-13R	10
10.	EL160R × IR96532-29-1-1-1-1-2-1-1R	20
11.	IR 86526-11-6-2-1-1-1-1R × Supreme New R (S)	15
12.	BRRI28R × New R Hafizar	15
13.	PR344R × Getco-22R	30
14.	PR326R × RFSR	20
15.	BRRI38R × BRRI33R	70
16.	EL220R × Getco-22R	165
17.	BR7011-37-1-2R × Muktagasha-4R	15
18.	Basmati Line India × BR6839-41-5-1R	15

DS: 11.07.2023; DT: 28.07.2023

Experiment No.1.1.12: 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: Twenty R×R and fourteen 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: Mithun Chandra Debsharma; Co-Investigator: MJ Hasan

Location: BRRI, Gazipur

Date of initiation: July 2023

Date of termination: November 2023

Results and discussion: True F_1 plants were selected comparing with respective parents. 200g disease free seeds from each cross were harvested in R x R improvement experiment **(Table 14)** whereas, 150g seeds per cross was collected from B×B improvement experiment **(Table 15).**

Table 14. F_1 Confirmation for (R x R) improvement, T. Aman 2023

SL No	Genotype	F_2 seeds harvested
1	BRRI34R x BRRI42R	200g
2	BRRI42R x BRRI34R	200g
3	PR506R x PR862R	200g
4	PR862R x PR506R	200g
5	PR867R x 2087R	200g
6	2087R x PR867R	200g
7	2017R-2-4R x KBPSR	200g
8	KBPSR x 2017R-2-4	200g
9	ACI1R x LP70R	200g
10	LP70R x ACI1R	200g
11	LP106R x GETCO24R	200g
12	GETCO24R x LP106R	200g
13	CHH32R x Bogura1R	200g
14	Bogura1R x CHH32R	200g
15	Tangail2R x SynR-N-1	200g

16	SynR-N-1x Tangail2R	200g
17	IR 86417-26-1-1-1-1-1R x IR86555-16-1-1-1-1-1-1-1-1-1-1	200g
19	IR90928-15-4-1-1-1R x IR69712-154-2-3-1-3R	200g
20	IR69712-154-2-3-1-3R x IR90928-15-4-1-1-1R	200g

DS: 12.07.2023; DT: 29.07.2023

Table 15. F_1 Confirmation for (B x B) improvement, T. Aman 2023

SL No.	Genotype	Amount of harvested F2 seeds
1	IR69802B x IR77811B	150g
2	IR77811B x IR69802B	150g
3	BRRI23B x BRRI152B	150g
4	IR102760B x IR102573B	150g
5	IR102573B x IR102760B	150g
6	IR77808B x BRRI105B	150g
8	BRRI26Bx IR73328B	150g
9	BRRI105B x BRRI150B	150g
10	BRRI150B x PMS 8B	150g
11	BRRI150B x BRRI105B	150g
12	IR102757B x BRRI105B	150g
13	BRRI105B x IR102760B	150g
14	IR102760B x BRRI105B	150g

DS: 12.07.2023; DT: 29.07.2023

Experiment-1.1.13: 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 2023

Date of termination: November 2023

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

Table 16. Performance of segregating Fatema dhan during T Aman 2023

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: 10.07.2023; D/T: 28.07.2023

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

Experiment-1.1.14: 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 2023

Date of termination: November 2023

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

Table 17. List of F_6 Population advanced during T Aman, 2023

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: 05.07.2023; D/T: 30.07.2023

Experiment No.1.1.15: 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-four R×R, forty B×B and fourteen (A×R) crosses derived F_2-F_6 progenies and

eight LST (Line Stage Testing entries) 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: Mithun Chandra Debsharma

Co-Investigator: Ruhul Quddus

Location: BRRI, Gazipur

Date of initiation: July 2023

Date of termination: November 2023

Results and discussion: 58618 progenies from 96 crosses (34 R × R, 14 A × R, 40 B × B and 8 LST) were advanced to F_3-F_7 generation using field rapid generation advance (FRGA) technique **(Table 18).**

Table 18. Progenies selected through Field RGA during T. Aman, 2023

SL No.	Cross type	No. of Crosses				Transplanted	Harvested
		F_2	F_3	F_5	F_6		
1	B ×B	5	7	13	15		
2	R × R	10	11	7	6	68900	58618
3	A × R			14			
4	Test cross forwarding			8			
Total				96			

D/S: 12/7/23; D/T: 17/8/23

Experiment No.1.1.16: F_1 confirmation of Blast resistant B and R lines development

Specific objective: Confirmation of F_1s and discarded the crosses not possess desired pollen

Materials and methods: Ten crosses along with their respective parents were grown 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.

Results and discussion: Nine crosses were confirmed out of ten and collected necessary seeds **(Table 19).**

Location: BRRI, Gazipur

Date of initiation: July 2023

Date of termination: November 2023

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

Table 19. F_1 Confirmation of blast tolerant parental line development T Aman 2023

SL. No	Crosses	F_2 seeds harvested (g)
01.	BRRI74B/IR64-Pi9L-NILs	150
02	BRRI74B/IRRI154-Pi9+Dd9 (N22)	150
03	BRRI74B/BR12416-6R-215 (Pi9+)	150
04	BRRI74B/BRRI dhan74	150
05.	IR90928-15-4-1-1-1R /IR64-Pi9L-NILs	150
06.	IR90928-15-4-1-1-1R /BRRI dhan33	150
07.	IR90928-15-4-1-1-1R /IRRI154-Pi9+Dd9 (N22)	150
08.	IR90928-15-4-1-1-1R /BR12416-6R-215 (Pi9+)	150
09.	IR90928-15-4-1-1-1R /BRRI dhan74	150

D/S: 07/07/23; D/T: 30/07/23

Experiment No.1.1.17: Test cross with blast tolerant lines

Specific objective: Identification of blast tolerant B & R line.

Materials: Nine blast tolerant lines and one CMS line

Methods: Nine blast tolerant lines and one CMS line were grown in Field at BRRI, Gazipur. Twenty-one days old seedlings were transplanted at a spacing of 20 cm x 20 cm. These lines were planted in three seeding dates with an interval of 7 days for proper synchronization at flowering time. Hand crosses were made to produce 115-150 F_1 seeds from each cross.

Results and discussion: Nine (9) test crosses were made using one CMS line with nine blast tolerant lines. These harvested seeds were properly dried and preserved for next season evaluation **(Table 20).**

Location: BRRI, Gazipur.

Principal investigator: Mosammat Umma Kulsum

Co-Investigator: Md. Jamil Hasan

Table 20. Test crosses were made with blast tolerant line T Aman 2023

SL No	Designation	Amount of F_1 seeds (no.) harvested
1	BRRI110A/IR64-Pi9L-NILs	120
2	BRRI110A/BRRI dhan33	115
3	BRRI110A/IRBL ta2	130
4	BRRI110A/ IRRI154-Pi9	150
5	BRRI110A/ BR12416-6R-215 (Pi9+)	145
6	BRRI110A/ BRRI dhan74	150
7	BRRI110A/NERICAL-19	140
8	BRRI110A/AO1	135
9	BRRI110A/AO2	125

D/S: 01/07/23; 07/07/23; 14/07/23 D/T: 21/07/23; 28/07/23; 05/08/23

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 released hybrid BRRI hybrid dhan3 (BRRI11A) and BRRI hybrid dhan6 (IR79156A) during T. Aman, 2023

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

Materials and methods: Two CMS (BRRI11A and IR79156A) 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 324 kg/plot (0.65 t/ha) and 1100 kg/plot (1.1 t/ha) was obtained from BRRI11A and IR79156A respectively in T. Aman season 2023 **(Table 21).** Seed yield was very poor due to pollen washed out for continuous heavy rain during supplementary pollination period.

Location: BRRI, Gazipur

Principal investigator: M H Rahman; A k Paul

Co-investigator: M J Hasan and M U Kulsum

Table 21. CMS lines multiplication of BRRI11A and IR79156A in T. Aman 2023

Combinations	Plant height (cm)		50% flowering date		PER (%)	OCR (%)	Yield		Remarks
							Kg /plot	(t/ha)	
	A line	B line	A line	B line					
BRRI11A/B	89	93	79	81	77	29	324	0.65	Poor seed yield due to rainfall during supplementary pollination
IR79156A/B	96	98	85	87	77	34	1100	1.1	

D/S: B_1=01/7/2023, A/B_2=04/7/2023, B_3=07/7/2023; D/T: A/B=24/07/2023
D/S: B_1= 02/7/2023, A/B_2=05/7/2023, B_3=08/7/2023; D/T: A/B=28/7/2023
PER=Panicle Exertion Rate, OCR= Out Crossing Rate.

Experiment 2.2: Medium scale seed production of promising CMS lines during T. Aman, 2023

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

Materials and methods: Two CMS (BRRI110A and IR102758A) 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 55 kg/plot (0.92 t/ha) and 14.0 kg/plot (0.4 t/ha) was obtained from BRRI110A and IR102758A respectively in T. Aman season 2023 **(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. Seed production of promising CMS lines during T Aman 2023

Designation	PHT (cm)		D50%F		PER (%)	OCR (%)	Plot area (m^2)	Yield (kg /plot)	Seed Yield (t/ha)
	A Line	B Line	A Line	B Line					
BRRI110A/B	97	99	81	80	72.3	23.2	600	55	0.92
IR102758A/B	101.0	103.0	84	82	76.0	26.5	400	14	0.4

Average	99	101	82.5	81	74.15	24.85	500	34.5	0.66
$Lsd_{(0.05)}$	5.2	5.2	3.9	2.6	4.8	4.3		52.9	0.7
CV (%)	2.9	2.8	2.6	1.7	3.5	9.4		84.0	55.7

D/S:B_1=08.06.23, B_2/A=11.06.23, B_3=14.06.23; D/T: A/B=02.07.2023.
D/S:B_1=15.06.23, B_2/A=18.06.23, B_3=21.06.23; D/T: A/B=13.07.2023.
PER=Panicle Exertion Rate, OCR= Out Crossing Rate.

Experiment 2.3: Experimental F_1 seed production of promising hybrids during T Aman, 2023

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

Materials and methods: Thirteen CMS lines (BRRI11A, BRRI48A, BRRI74A, BRRI97A, BRRI99A, BRRI109A, BRRI110A, BRRI120A, BRRI125A, IR79156A, IR79125A, IR102758A and IR58025A) along with six restorer lines (BRRI32R, BRRI38R, BRRI42R, BRRI54R, BRRI55R and BRRI56R) 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 0.4 to 44 kg/plot from selected promising hybrid combinations during T. Aman 2023 which was equivalent to 0.02 to 2.2 t/ha. Some combinations did not produce sufficient seeds due to lack of flowering synchronization and frequent rain during flowering time **(Table 23).**

Location: BRRI, Gazipur.

Principal investigator M. J Hasan; M S Islam; A K Paul and M H Rahman

Co-investigator: M U Kulsum and A Ansari

Table 23. Experimental F_1 seed obtained from different hybrid combinations during T Aman 2023

SL.	Designation	Seed amount (kg)	Yield (t/ha)	OCR (%)	Remarks
1	BRRI11A/BRRI32R	44.0	2.2	49.3	Lack of proper synchronization and continuous raining during pollination time was the main reason for poor seed yield
2	BRRI48A/BRRI32R	9.5	0.48	19.4	
3	BRRI74A/BRRI32R	4.7	0.24	10.2	
4	BRRI97A/BRRI32R	8.4	0.42	16.5	
5	BRRI99A/BRRI32R	6.2	0.31	14.3	
6	BRRI109A/BRRI32R	4.2	0.21	9.7	
7	BRRI110A/BRRI32R	4.3	0.22	9.8	
8	BRRI120A/BRRI32R	16.1	0.81	24.5	
9	BRRI125A/BRRI32R	10.5	0.53	15.1	
10	IR79156A/BRRI32R	37.5	1.9	44.6	
11	IR102758A/BRRI32R	2.6	0.13	5.4	
12	IR58025A/BRRI32R	19.7	0.99	30.1	
13	BRRI74A/BRRI38R	13.7	0.69	17.2	
14	BRRI97A/BRRI38R	1.5	0.075	1.5	
15	BRRI99A/BRRI38R	17.1	0.86	25.9	
16	BRRI109A/BRRI38R	23.7	1.16	33.8	
17	BRRI110A/BRRI38R	6.5	0.33	13.3	

18	BRRI120A/BRRI38R	22.4	1.12	32.5
19	BRRI125A/BRRI38R	16.1	0.81	24.5
20	IR102758A/BRRI38R	12.1	0.61	16.5
21	IR58025A/BRRI38R	15.5	0.78	23.4
22	BRRI74A/BRRI42R	17.7	0.89	28.7
23	BRRI97A/BRRI42R	2.8	0.13	4.8
24	BRRI99A/BRRI42R	12.5	0.63	18.3
25	BRRI109A/BRRI42R	12.5	0.63	18.3
26	BRRI110A/BRRI42R	3.24	0.16	6.4
27	BRRI120A/BRRI42R	12.03	0.6	17.7
28	BRRI125A/BRRI42R	7.09	0.35	14.3
29	IR79156A/BRRI42R	30.7	1.5	36.3
30	IR79125A/BRRI42R	7.09	0.35	14.3
31	IR102758A/BRRI42R	6.92	0.35	14.3
32	IR58025A/BRRI42R	16.4	0.82	28.7
33	BRRI11A/BRRI54R	14.9	0.75	27.3
34	BRRI48A/BRRI54R	30.3	1.5	35.6
35	BRRI74A/BRRI54R	19.0	0.95	29.6
36	BRRI97A/BRRI54R	26.4	1.32	32.7
37	BRRI99A/BRRI54R	28.4	1.42	34.5
38	BRRI109A/BRRI54R	22.6	1.13	31.5
39	BRRI110A/BRRI54R	4.1	0.21	9.3
40	BRRI120A/BRRI54R	9.4	0.5	15.1
41	BRRI125A/BRRI54R	3.2	0.16	7.4
42	IR79156A/BRRI54R	6.5	0.33	13.2
43	IR79125A/BRRI54R	0.4	0.02	1.4
44	IR102758A/BRRI54R	0.5	0.03	1.6
45	IR58025A/BRRI54R	0.9	0.05	2.6
46	BRRI11A/BRRI55R	11.7	0.59	16.3
47	BRRI48A/BRRI55R	9.3	0.47	14.3
48	BRRI74A/BRRI55R	8.8	0.44	13.7
49	BRRI97A/BRRI55R	4.1	0.21	9.2
50	BRRI99A/BRRI55R	10.2	0.51	15.3
51	BRRI109A/BRRI55R	8.5	0.43	14.6
52	BRRI110A/BRRI55R	5.2	0.3	13.0
53	BRRI120A/BRRI55R	9.7	0.49	14.8
54	BRRI125A/BRRI55R	3.8	0.19	8.6
55	IR79156A/BRRI55R	12.2	0.61	16.7
56	IR79125A/BRRI55R	15.0	0.75	25.3
57	IR102758A/BRRI55R	7.3	0.37	13.8
58	IR58025A/BRRI55R	8.8	0.44	14.5
59	BRRI11A/ BRRI56R	10.0	0.50	15.0
60	BRRI48ABRRI56R	5.1	0.26	10.4
61	BRRI74A/BRRI56R	9.85	0.49	14.9
62	BRRI97A/BRRI56R	0.5	0.03	1.6
63	BRRI99A/BRRI56R	5.5	0.28	12.8
64	BRRI109A/BRRI56R	2.8	0.14	6.9
65	BRRI110A/BRRI56R	3.4	0.17	7.3
66	BRRI120A/BRRI56R	7.6	0.38	14.0
67	BRRI125A/BRRI56R	3.8	0.19	8.6
68	IR79156A/BRRI56R	2.4	0.12	5.5
69	IR79125A/BRRI56R	5.0	0.25	7.6
70	IR102758A/BRRI56R	2.3	0.12	5.3
71	IR58025A/BRRI56R	5.7	0.29	13.1

Each plot area was 200 Sqm; D/S: R_1 = 12/07/2023; R_2 =17/07/2023 D/T: R= 05/08/2023; A = 12/08/2023

Experiment 2.4: Performance evaluation of BRRI developed new promising hybrids

Objective: Selection of promising hybrids

Materials and Methods: Sixty hybrids with three hybrids (BRRI hybrid dhan6, AZ7006, and Dhanny Gold) checks. Twenty-one 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 @ 150:100:70:60:10 kg/ha of urea-TSP-MP-gypsum and zinc, respectively.

Results and discussion: A total of 60 hybrids were evaluated along with three checks. Among these hybrids three hybrids were selected having yield potentiality more than 8 ton/ha (**Table 24**).

Location: BRRI, Gazipur.

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

Table 24. Experimental hybrids evaluation during T Aman 2023

SL. No.	Cross combination	PHT (cm)	N/T	Pan L (cm)	FLL (cm)	SF (%)	D50% F	DTM	TGW (g)	Yield (t/ha)
01.	BRRI11A/BRRI54R	112	12	27.5	26.2	79.5	94	121	24.3	8.2
02.	BRRI48A/BRRI54R	105	11	24.5	24.1	73.2	85	111	24.5	6.2
03.	BRRI97A/ BRRI54R	101	10	25.3	25.2	75.2	90	116	24.8	6.4
04.	BRRI99A/ BRRI54R	108	12	24.0	28.5	76.6	92	119	24.5	7.3
05.	BRRI109A/BRRI54R	112	10	25.5	26.4	74.0	85	110	24.3	6.8
06.	BRRI110A/BRRI54R	112	12	25.7	25.2	76.6	87	117	25.5	7.4
07.	BRRI125A/BRRI54R	110	11	25.6	25.8	74.5	86	116	24.2	6.8
08.	IR79156A/BRRI54R	114	10	25.3	26.7	78.0	88	117	25.5	7.3
09.	IR79125A/BRRI54R	110	13	24.5	24.9	74.2	97	124	24.3	5.8
10.	IR105687A/BRRI54R	107	11	26.3	27.4	74.8	82	106	25.5	5.8
11.	IR102758A/BRRI54R	107	12	23.6	24.7	76.5	90	117	24.0	7.0
12.	IR58025A/BRRI54R	112	11	23.8	25.4	76.1	89	116	24.3	7.2
13.	BRRI11A/BRRI38R	111	13	25.3	23.7	75.5	87	114	24.6	6.9
14.	BRRI48A/BRRI38R	108	14	26.7	25.6	74.7	83	107	25.2	5.9
15.	BRRI97A/BRRI38R	111	11	25.5	27.0	78.3	93	120	25.3	7.3
16.	BRRI99A/BRRI38R	108	10	26.5	26.3	83.4	95	123	26.5	8.5
17.	BRRI109A/BRRI38R	115	11	25.8	24.3	78.6	90	117	24.7	7.5
18.	BRRI110A/BRRI38R	108	12	25.8	25.8	77.3	87	115	25.6	7.0
19.	BRRI125A/BRRI38R	109	11	27.1	25.3	74.5	88	117	25.3	6.8
20.	IR79156A/BRRI38R	114	10	26.3	26.3	73.8	85	113	24.8	6.5
21.	IR79125A/BRRI38R	110	13	24.7	24.3	78.1	92	119	25.1	7.0
22.	IR105687A/BRRI38R	114	10	24.4	26.5	73.4	82	108	25.3	5.8
23.	IR102758A/BRRI38R	112	10	23.8	25.7	77.4	91	118	24.7	7.0
24.	IR58025A/BRRI38R	113	11	24.7	26.3	78.7	92	119	24.5	7.2
25.	BRRI11A/BRRI42R	106	11	24.5	23.7	77.5	93	121	24.8	7.3
26.	BRRI48A/BRRI42R	108	11	24.7	26.4	76.7	83	110	24.6	6.3
27.	BRRI97A/BRRI42R	108	10	25.7	27.2	76.6	87	116	25.2	7.1
28.	BRRI99A/BRRI42R	111	10	25.5	27.5	77.1	89	118	25.1	7.4
29.	BRRI109A/BRRI42R	112	12	24.7	22.5	76.0	87	114	24.6	6.3
30.	BRRI110A/BRRI42R	112	13	25.8	25.8	75.6	86	115	25.1	6.2
31.	BRRI125A/BRRI42R	115	11	26.3	25.3	74.5	83	112	25.8	6.0
32.	IR79156A/BRRI42R	110	10	26.5	24.7	77.2	91	118	25.7	7.2
33.	IR79125A/BRRI42R	110	12	25.3	23.8	78.3	96	123	24.8	7.4
34.	IR105687A/BRRI42R	109	10	25.4	23.8	74.0	81	107	25.6	5.8
35.	IR102758A/BRRI42R	112	11	25.7	26.5	77.1	87	117	24.9	7.0
36.	IR58025A/BRRI42R	114	12	24.6	27.6	77.1	89	116	24.6	7.3
37.	BRRI11A/BRRI32R	112	10	25.2	26.4	77.3	89	117	24.8	7.0
38.	BRRI48A/BRRI32R	111	12	26.3	23.3	75.1	83	112	25.6	6.8
39.	BRRI97A/BRRI32R	106	10	23.7	23.8	78.8	89	117	24.2	7.5
40.	BRRI99A/BRRI32R	108	11	25.9	26.4	77.6	91	120	24.5	7.4
41.	BRRI109A/BRRI32R	111	10	24.7	25.3	76.0	90	119	23.8	7.0
42.	BRRI110A/BRRI32R	108	12	26.3	27.5	79.5	99	127	24.3	8.1
43	BRRI125A/BRRI32R	112	11	26.1	26.2	74.5	86	115	23.7	6.7
44	IR79156A/BRRI32R	115	10	24.3	25.6	79.1	93	121	24.2	7.5
45	IR79125A/BRRI32R	117	10	24.5	25.4	78.6	97	125	24.7	7.5
46	IR105687A/BRRI32R	107	11	23.6	20.2	74.5	82	111	23.5	6.3
47	IR102758A/BRRI32R	111	12	25.6	26.8	77.5	88	118	24.2	7.3
48	IR58025A/BRRI32R	113	13	24.7	27.6	75.8	92	121	23.7	6.8
49	BRRI11A/IR85551-9-1-1-1-2-1-1-1R	109	12	23.7	24.7	74.3	84	115	24.1	6.4
50	BRRI48A/IR85551-9-1-1-1-2-1-1-1R	106	13	22.9	21.5	74.2	82	110	23.7	5.7

SL. No.	Cross combination	PHT (cm)	N/T	Pan L (cm)	FLL (cm)	SF (%)	D50% F	DTM	TGW (g)	Yield (t/ha)
51	BRRI97A/IR85551-9-1-1-1-2-1-1-1R	108	11	23.0	22.7	77.3	86	114	23.6	7.1
52	BRRI99A/IR85551-9-1-1-1-2-1-1-1R	112	12	25.7	27.5	78.5	94	122	24.1	7.6
53	BRRI109A/IR85551-9-1-1-1-2-1-1-1R	113	11	23.8	26.5	76.2	91	119	23.8	7.0
54	BRRI110A/IR85551-9-1-1-1-2-1-1-1R	110	11	24.3	25.8	76.4	90	118	24.4	7.1
55	BRRI125A/IR85551-9-1-1-1-2-1-1-1R	116	11	23.8	27.3	75.4	88	116	24.3	6.9
56	IR79156A/IR85551-9-1-1-1-2-1-1-1R	115	12	22.7	25.5	77.8	92	119	24.2	7.3
57	IR79125A/IR85551-9-1-1-1-2-1-1-1R	112	10	23.5	24.9	75.6	95	122	23.8	6.9
58	IR105687A/IR85551-9-1-1-1-2-1-1-1R	106	11	22.7	21.5	74.7	82	109	22.8	6.3
59	IR102758A/IR85551-9-1-1-1-2-1-1-1R	110	13	25.6	25.7	76.4	88	115	23.8	7.0
60	IR58025A/IR85551-9-1-1-1-2-1-1-1R	114	10	23.2	21.6	77.8	92	121	24.1	7.4
Ck-1	BRRI hybrid dhan6	111	13	25.3	26.3	75.8	90	118	25.7	6.8
Ck-2	AZ-7006	110	11	23.8	25.3	75.6	102	130	23.6	6.8
Ck-3	Dhanny Gold	113	11	24.5	24.7	76.7	105	132	24.8	7.1
Mean		110.6	11.2	25.0	25.4	76.5	89.2	117	24.6	6.9
SD		3.0	1.1	1.1	1.7	1.9	5.0	5.2	0.7	0.6
CV (%)		2.7	9.4	4.5	6.6	2.4	5.6	4.4	2.8	8.6
Lsd 0.05%		1.0	0.3	0.4	0.5	0.6	1.6	1.7	0.2	0.2

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 7117 kg F_1 seeds along with 95 kg parental line seeds to 80 farmers, 13 seed companies, scientists, extension people, projects and staffs of BRRI and during T Aus 2023 7980 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 2023

Sl. No	Recipient	Nos.	F_1 (kg)	A line (kg)	B line (kg)	R line (kg)
01	Seed Companies	13	807	70	-	25
02	Farmers	80	1470	-	-	-
03	BRRI Scientists + staffs	30	1150	-	-	-
04	BRRI, R/S(5) +DAE	25	3690	-	-	-
Total		148	7117	70	-	25
T Aus (BRRI hybrid dhan7)						
01	BRRI, R/S(5) +DAE		7980			

Investigator: All staff of hybrid rice division.

B. Experiments conducted during Boro season 2023-24.

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 (568) entries were included in this nursery comprising 462 restorers, 13 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 321 (A × R) crosses were made using 13 CMS lines during Boro season 2023-24. 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 2023-24

SL. No.	Designation	Seed obtained	SL. No.	Designation	Seed obtained
01	BRRI74A/ BRRang13-RGA5-2-3-5	90	64.	BRRI110A / ASM4	95
02	BRRI74A/ ASM1	75	65.	BRRI110A / ASM5	75
03.	BRRI74A/ ASM2	65	66.	BRRI110A / ASM6	85
04.	BRRI74A/ MZ-1	80	67.	BRRI110A / MZ-3	90
05.	BRRI74A/ BR11894-5R-260	85	68.	BRRI110A / ASM7	75
06.	BRRI74A/ BRBa3-1-7	65	69.	BRRI110A / UKL-20	65
07.	BRRI74A/ PB-1718 Basmati	90	70.	BRRI110A / FFL1	80
08.	BRRI74A/ BRRI dhan81	70	71.	BRRI110A/ FFL2	85
09.	BRRI74A/ BRRI dhan88	65	72.	BRRI110A / FFL6	65
10.	BRRI74A/ BRRI dhan96	70	73.	BRRI110A /FFL8	90
11.	BRRI74A/ BRRI dhan97	80	74.	BRRI110A / Japanese black rice 2	70
12.	BRRI74A/ Bangabandhu dhan100	85	75.	BRRI120A/ MZ-2	65
13.	BRRI74A/ BRRI dhan101	55	76.	BRRI120A/ UKL-32	70
14.	BRRI74A/ BRRI dhan102	85	77.	BRRI120A/ H-1518R F4	95
15.	BRRI74A/ BRRI dhan104	95	78.	BRRI120A/ FFL1	70
16.	BRRI74A/ HRB 501-5R-2	75	79.	BRRI120A/ FFL3	85
17.	BRRI74A/ HRB 504-5R-49	95	80.	BRRI120A/ FFL13	70
18.	BRRI74A/ HRB 506-5R-64	75	81.	BRRI120A/ IR127278-114-3-3-B	85
19.	BRRI74A/ HRB 507-5R-67	85	82.	BRRI120A/ IR126037-20-1-1-B	75
20.	BRRI74A/ HRB 503-5R-24	90	83.	BRRI120A/ BR10301-5R-89	90
21.	BRRI74A/ HRB 505-5R-55	75	84.	BRRI120A/ BR(Path)13800-BC3-8-5	90
22.	BRRI74A/ HRB 508-5R-14	65	85.	BRRI120A/ BR11713-4R-70	85
23.	BRRI74A/ HRB 509-5R-62	80	86.	BRRI120A/ BRBa3-1-7	95
24.	BRRI74A/ HRB 510-5R-94	85	87.	BRRI120A/ BRRI dhan89	75
25.	BRRI74A/ HRB 511-5R-117	65	88.	BRRI120A/ BRRI dhan92	90
26.	BRRI74A/ HRB 513-5R-157	90	89.	BRRI120A/ BRRI dhan97	75
27.	BRRI74A/ HRB 514-5R-178	70	90.	BRRI120A/ BRRI dhan99	65
28.	BRRI74A/ HRB 515-5R-198	65	91.	IR79156A/ BR11716-4R-120	65
29.	BRRI74A/ HRB 516-5R-203	70	92.	IR79156A/ BR11723-4R-48	80
30.	BRRI74A/ HRB 517-5R-12	85	93.	IR79156A/ BR11716-4R-114	75
31.	BRRI74A/ HRB 518-5R-32	55	94.	IR79156A/ BR11716-4R-147	65
32.	BRRI74A/ HRB 519-5R-47	65	95.	IR79156A/ BR11723-4R-172	95
33.	BRRI74A/ HRB 520-5R-5	70	96.	IR79156A/ BR11716-4R-102	95
34.	BRRI74A/ HRB 523-5R-128	85	97.	IR79156A/ BR11715-4R-186	75
35.	BRRI74A/ HRB 524-5R-201	75	98.	IR79156A/ BR11712-4R-218	85
36.	BRRI74A/ HRB 525-5R-228	90	99.	IR79156A/ BR11712-4R-227	90
37.	BRRI109A/ BR8415-2-3-Ran1-1-1-9	90	100.	IR79156A/ BR11723-4R-27	75
38.	BRRI109A/ BR674-1-1-5-2P-4	85	101.	IR79156A/ BR11716-4R-129	65
39.	BRRI109A/ MZ-2	95	102.	IR79156A/ BR11716-4R-105	120
42.	BRRI109A/ UKL-32	75	103.	IR79125A/ BR11723-4R-48	85
43.	BRRI109A/ H-1518R F4	90	104.	IR79125A/ BR11716-4R-123	115
44.	BRRI109A/ FFL1	75	105.	IR79125A/ BR11716-4R-114	90
45.	BRRI109A/ FFL5	65	106.	IR79125A/ BR11716-4R-147	70
46.	BRRI109A/ FFL9	80	107.	IR79125A/ BR10672-1-3-7-12	95
47.	BRRI109A/ FFL11	95	108.	IR79125A/ BR11723-4R-172	55
48.	BRRI109A/ FFL12	100	109.	IR79125A/ BR11716-4R-102	65
49.	BRRI109A/ IR126072-83-3-3-B	85	110.	IR79125A/ BR11715-4R-186	85
50.	BRRI109A/ IR127275-36-5-2-B	65	111.	IR79125A/ BR11712-4R-218	70
51.	BRRI109A/ PBM7	70	112.	IR79125A/ BR11712-4R-227	100
52.	BRRI109A/ PBM8	85	113.	IR79125A/ BR11723-4R-27	85
53.	BRRI109A/ BR10301-5R-89	90	114.	IR79125A/ BR11716-4R-129	90
54.	BRRI109A/ BR(Path)13800-BC3-8-5	70	115.	IR102758A/ BR11723-4R-12	125
55.	BRRI109A/ BR11713-4R-70	80	116.	IR102758A/ BR11716-4R-123	80
56.	BRRI109A/ BRRI dhan89	75	117.	IR102758A/ BR11716-4R-147	65
57.	BRRI109A/ BRRI dhan92	95	118.	IR102758A/ BR10672-1-3-7-12	70
58.	BRRI109A/ BRRI dhan97	100	119.	IR102758A/ BR11723-4R-172	80
59.	BRRI109A/ HRB 506-5R-64	65	120.	IR102758A/ BR11716-4R-102	100
60	BRRI109A/ HRB 503-5R-24	70	121.	IR102758A/ BR11715-4R-186	55
61.	BRRI110A/ BR11716-4R-108	90	122.	IR102758A/ BR11712-4R-218	85
62.	BRRI110A / BRRang13-RGA5-1-2-2	100	123.	IR192758A/ BR11712-4R-227	70

63.	BRRI110A / ASM3	65	124.	IR102758A/ BR11723-4R-27	65

D/S: A_1=12.12.223; A_2= 17.12.23; A_3=22.12.23; D/T: A_1=14.01.24; A_2= 20.01.24; A_3=24.01.24
D/S: R_1=01.12.23; R_2= 07.12.23; R_3=14.12.23; D/T: R_1=02.01.24; R_2= 10.01.24; R_3=18.01.24

Table 27. List of A x R crosses made during Boro season 2023-24

SL. No.	Cross combination	Seed obtained	SL. No.	Cross combination	Seed obtained
01	BRRI11A/BRRI54R	105	162.	BRRI110A/IR96479-66-4-1-1-1-1-1R	80
02	BRRI11A/BRRI55R	90	163.	BRRI110A/IR96532-29-1-1-1-1-2-1-1R	90
03	BRRI11A/BRRI56R	65	164.	BRRI110A/IR96581-4-1-4-1-1-2-1-1R	90
04	BRRI11A/PR595R	70	165.	BRRI110A/IR112867-28-1-1R	60
05	BRRI11A/3014R-7-2	110	166.	BRRI110A/IR112899-11-2-1R	100
06	BRRI11A/BU3R	75	167.	BRRI110A/IR101999-25-2-2R	90
07	BRRI11A/BAU329R	80	168.	BRRI110A/IR112924-4-1-1R	110
08	BRRI11A/BAU521R	90	169.	BRRI110A/IR98206-25-1-1-1-3-1-1R	110
09	BRRI11A/GETCO13R	60	170.	BRRI110A/ASM-1R	165
10	BRRI11A/GETCO18R	85	171.	BRRI110A/MZ-3R	100
11	BRRI11A/EL108R	120	172.	BRRI120A/PR595R	75
12	BRRI11A/R-2800	85	173.	BRRI120A/GETCO13R	90
13	BRRI11A/EL-168R	80	174.	BRRI120A/GETCO15R	80
14	BRRI11A/IR58443-6B-10-3	85	175.	BRRI120A/GETCO18R	65
15	BRRI11A/BR11712-4R-1	95	176.	BRRI120A/GETCO21R	65
16	BRRI11A/BR11723-4R-27	95	177.	BRRI120A/CHH35R	95
17	BRRI11A/BR11723-4R-12	100	178.	BRRI120A/EL220R	100
18	BRRI11A/BR11716-4R-105	90	179.	BRRI120A/S-1203R	65
19	BRRI11A/BR11715-4R-186	85	180.	BRRI120A/EL215R	80
20	BRRI11A/BR11712-4R-227	120	181.	BRRI120A/EL-193R	100
21	BRRI11A/LST-1	75	182.	BRRI120A/EL241R	75
22	BRRI11A/LST-2	90	183.	BRRI120A/Chachua7R	95
23	BRRI11A/LST-3	70	184.	BRRI120A/EL170R	65
24	BRRI72A/BRRI17R	70	185.	BRRI120A/Win305R	120
25	BRRI72A/BRRI34R	90	186.	BRRI120A/LST-1	80
26	BRRI72A/BRRI35R	75	187.	BRRI120A/LST-2	80
27	BRRI72A/BRRI41R	85	188.	BRRI120A/LST-3	135
28	BRRI72A/BRRI42R	105	189.	BRRI120A/IR112867-28-1-1R	75
29	BRRI72A/BRRI56R	100	190.	BRRI120A/IR112899-11-2-1R	80
30	BRRI72A/PR595R	75	191.	BRRI120A/IR101999-25-2-2R	100
31	BRRI72A/2017R-2-4	75	192.	BRRI120A/IR112924-4-1-1R	75
32	BRRI72A/GETCO18R	95	193.	BRRI120A/IR98206-25-1-1-1-3-1-1R	100
33	BRRI72A/CHH67R	85	194.	BRRI120A/ASM-1R	110
34	BRRI72A/EL-144R	80	195.	BRRI120A/MZ-1R	95
35	BRRI72A/IR58443-6B-10-3	70	196.	BRRI120A/ASM-3R	70
36	BRRI72A/BR11712-4R-1	80	197.	BRRI120A/MZ-3R	70
37	BRRI72A/BR11723-4R-27	120	198.	BRRI125A/PR585R	170
38	BRRI72A/BR11723-4R-12	60	199.	BRRI125A/PR595R	85
39	BRRI72A/BR11716-4R-105	80	200.	BRRI125A/PR812R	75
40	BRRI72A/BR11715-4R-186	80	201.	BRRI125A/PR862R	75
41	BRRI72A/BR11712-4R-227	95	202.	BRRI125A/PR867R	80
42	BRRI72A/IR86417-26-1-1-1-1-1R	100	203.	BRRI125A/PR2087R	80
43	BRRI72A/IR85503-3-3-A-1-1-1-1-1R	90	204.	BRRI125A/PR2017R-2-4	95
44	BRRI72A/IR69712-154-2-3-1-3R	95	205.	BRRI125A/BU3R	85
45	BRRI74A/PR595R	80	206.	BRRI125A/BAU329R	75
46	BRRI74A/F2277R	90	207.	BRRI125A/BAU521R	65
47	BRRI74A/3017R-2-4	85	208.	BRRI125A/BasmatiR	125
48	BRRI74A/GETCO18R	120	209.	BRRI125A/GETCO9R	85
49	BRRI74A/GETCO23R	75	210.	BRRI125A/CHH35R	95
50	BRRI74A/CHH67R	100	211.	BRRI125A/CHH27R	80
51	BRRI74A/EL139R	75	212.	BRRI125A/Bashmati Line India	85
52	BRRI74A/Bogura4R	95	213.	BRRI125A/S-1203R	70
53	BRRI74A/BADC NewR	85	214.	BRRI125A/EL-203R	60
54	BRRI74A/GoldenR	95	215.	BRRI125A/Win305R	75
55	BRRI74A/EL-144R	85	216.	BRRI125A/ BR11712-4R-1	80
56	BRRI74A/IR58443-6B-10-3	80	217.	IR79156A/EL108R	85
57	BRRI74A/BR11712-4R-1	110	218.	IR79156A/CHH67R	90
58	BRRI74A/BR11723-4R-27	90	219.	IR79156A/NewR Babla	50
59	BRRI74A/BR11723-4R-12	70	220.	IR79156A/Win3R	90
60	BRRI74A/BR11716-4R-105	90	221.	IR79156A/Basmati Line India	100
61	BRRI74A/BR11715-4R-186	95	222.	IR79156A/EL204R	85
62	BRRI74A/BR11712-4R-227	70	223.	IR79156A/EL208R	100
63	BRRI74A/IR86417-26-1-1-1-1-1R	75	224.	IR79156A/EL144R	95
64	BRRI74A/IR85503-3-3-A-1-1-1-1-1R	85	225.	IR79156A/EL168R	80
65	BRRI74A/IR69712-154-2-3-1-3R	90	226.	IR79156A/Win305R	55
66	BRRI74A/BU3R	95	227.	IR79156A/IR58443-6B-10-3	70

67	BRRI74A/BAU329R	130	228.	R79156A/BR11712-4R-1	75
68	BRRI74A/BAU521R	75	229.	R79156A/BR11723-4R-27	100
69	BRRI74A/GETCO13R	100	230.	R79156A/BR11723-4R-12	45
70	BRRI74A/LPH14R	80	231.	IR79156A/IR85503-3-3-A-1-1-1-1-1R	65
71	BRRI74A/EL220R	90	232.	IR79156A/IR85503-8-13-1-1-1-1-1-1R	75
72	BRRI74A/Win3R	115	233.	IR79156A/IR86411-2-1-1-1-2-1R	65
73	BRRI74A/BabilonR-2	75	234.	IR79156A/IR69712-154-2-3-1-3R	70
74	BRRI74A/R-2800	90	235.	IR79156A/IR112899-11-2-1R	70
75	BRRI74A/EL91R	75	236.	IR79156A/IR98206-25-1-1-1-3-1-1R	65
76	BRRI74A/EL192R	50	237.	IR102758A/BRRI47R	120
77	BRRI74A/EL208R	70	238.	IR102758A/BRRI49R	65
78	BRRI74A/IshpahaniR New	105	239.	IR102758A/BRRI50R	55
79	BRRI74A/EL175R	90	240.	IR102758A/BRRI51R	50
80	BRRI74A/EL168R	120	241.	IR102758A/BRRI52R	65
81	BRRI74A/LST-1	75	242.	IR102758A/BRRI53R	55
82	BRRI74A/LST-2	85	243.	IR102758A/PR448R	100
83	BRRI74A/LST-3	85	244.	IR102758A/PR595R	55
84	BRRI97A/PR368R	110	245.	IR102758A/BU3R	65
85	BRRI97A/PR595R	85	246.	IR102758A/BAU329R	85
86	BRRI97A/GETCO21R	95	247.	IR102758A/BAU521R	60
87	BRRI97A/EL108R	85	248.	IR102758A /GETCO13R	65
88	BRRI97A/MST-13R	105	249.	IR102758A /GETCO15R	85
89	BRRI97A/LST-1	75	250.	IR102758A /GETCO21R	80
90	BRRI97A/LST-2	80	251.	IR102758A /GETCO21R	85
91	BRRI97A/LST-3	100	252.	IR102758A /CHH35R	115
92	BRRI97A/IR96581-4-1-4-1-1-2-1-1R	65	253.	IR102758A /CHH27R	50
93	BRRI97A/IR112899-11-2-1R	95	254.	IR102758A /CHH67R	45
94	BRRI97A/IR101999-25-2-2R	65	255.	IR102758A /EL215R	70
95	BRRI97A/IR112924-4-1-1R	80	256.	IR102758A /EL192R	70
96	BRRI97A/ASM-1R	60	257.	IR102758A /EL168R	95
97	BRRI99A/BRRI53R	85	258.	IR102758A /BR11723-4R-12	55
98	BRRI99A/PR595R	85	259.	IR102758A /BR11716-4R-105	190
99	BRRI99A/GETCO13R	110	260.	IR102758A /BR11715-4R-186	60
100	BRRI99A/GETCO15R	90	261.	IR102758A /BR11712-4R-227	75
101	BRRI99A/GETCO18R	75	262.	IR102758A/IR85503-3-3-A-1-1-1-1-1R	90
102	BRRI99A/EL108R	90	263.	IR102758A/IR85503-8-13-1-1-1-1-1-1R	110
103	BRRI99A/CHH67R	115	264.	IR102758A /IR86411-2-1-1-1-2-1R	85
104	BRRI99A/EL220R	80	265.	IR102758A /IR69712-154-2-3-1-3R	75
105	BRRI99A/Win3R	105	266.	IR102758A /IR112899-11-2-1R	75
106	BRRI99A/S-1203R	85	267.	IR102758A /IR98206-25-1-1-1-3-1-1R	45
107	BRRI99A/EL160R	75	268.	IR58025A/PR448R	55
108	BRRI99A/EL175R	100	269.	IR58025A/PR595R	75
109	BRRI99AWin305R	95	270.	IR58025A/BU3R	70
110	BRRI99A/LST-1	80	271.	IR58025A/BAU329R	85
111	BRRI99A/LST-2	85	272.	IR58025A/BAU521R	150
112	BRRI99A/LST-3	70	273.	IR58025A/CHH35R	120
113	BRRI99A/IR112899-11-2-1R	70	274.	IR58025A/CHH27R	100
114	BRRI99A/IR101999-25-2-2R	95	275.	IR58025A/CHH67R	85
115	BRRI99A/IR112924-4-1-1R	65	276.	IR58025A/Basmati line India	55
116	BRRI99A/ASM-3R	90	277.	IR58025A/EL241R	120
117	BRRI99A/MZ-3R	165	278.	IR58025A/EL208R	65
118	BRRI109A/PR595R	85	279.	IR58025A/EL144R	70
119	BRRI109A/BAU329R	85	280.	IR58025A/EL203R	70
120	BRRI109A/BAU521R	75	281.	IR58025A/EL168R	75
121	BRRI109A/BasmatiR	120	282.	IR58025A /BR11712-4R-227	85
122	BRRI109A/GETCO13R	95	283.	IR58025A /IR85503-3-3-A-1-1-1-1-1R	100
123	BRRI109A/GETCO15R	75	284.	IR58025A /IR85503-8-13-1-1-1-1-1-1R	95
124	BRRI109A/GETCO18R	75	285.	IR58025A/IR86411-2-1-1-1-2-1R	85
125	BRRI109A/EL108R	80	286.	IR58025A/IR69712-154-2-3-1-3R	80
126	BRRI109A/CHH67R	90	287.	IR58025A/IR112899-11-2-1R	70
127	BRRI109A/NewR Babla	75	288.	IR58025A/IR98206-25-1-1-1-3-1-1R	65
128	BRRI109A/Straw col R (S)	110	289.	BRRI11A/ASM1R	65
129	BRRI109A/Basmati line India	85	290.	BRRI11A/ASM2R	150
130	BRRI109A/LST-1	115	291.	BRRI11A/MZ-1R	55
131	BRRI109A/LST-2	85	292.	BRRI11A/MZ-2R	85
132	BRRI109A/LST-3	95	293.	BRRI11A/ASM-3R	75
133	BRRI109A/IR112867-28-1-1R	95	294.	BRRI72A/MZ-2R	70
134	BRRI109A/IR112899-11-2-1R	70	295.	BRRI72A/ASM-4R	60
135	BRRI109A/IR101999-25-2-2R	85	296.	BRRI72A/ASM-6R	55
136	BRRI109A/IR112924-4-1-1R	90	297.	BRRI72A/MZ-3R	120
137	BRRI109A/IR98206-25-1-1-1-3-1-1R	65	298.	BRRI72A/ASM-7R	120
138	BRRI109A/ASM-1R	80	299.	BRRI74A/IR96542-100-5-1-1-2-1-1-1R	85
139	BRRI109A/MZ-3R	90	300.	BRRI74A/IR96572-239-1-1-1-1-2-1-1R	80
140	BRRI110A/CHH67R	75	301.	BRRI74A/ASM-1R	85
141	BRRI110A/R line7	65	302.	BRRI74A/MZ-1R	70

142	BRRI110A/Win3R	80	303.	BRRI74A/MZ-2R	75
143	BRRI110A/S-1203R	115	304.	BRRI99A/IR98220-3-2-1-1-2-1-1R	120
144	BRRI110A/EL-160R	80	305.	BRRI99A/IR96542-20-1-2-2-1-1-1-1R	70
145	BRRI110A/EL-204R	85	306.	BRRI99A/IR96542-100-5-1-1-2-1-1-1R	65
146	BRRI110A/LST-1	75	307.	BRRI99A/IR96572-239-1-1-1-1-2-1-1R	55
147	BRRI110A/LST-2	150	308.	BRRI99A/MZ-2R	115
148	BRRI110A/LST-3	100	309.	BRRI109A/IR98172-16-2-1-1-1-1-1R	150
149	BRRI110A/IR86526-11-6-2-1-1-1-1R	55	310.	BRRI109A/IR98201-16-2-1-1-2-1-1R	50
150	BRRI110A/IR72889-46-3-2-1R	165	311.	BRRI109A/IR98206-13-1-1-1-1-1-1R	55
151	BRRI110A/IR86522-11-1-1-3-1R	80	312.	BRRI109A/IR98206-25-1-1-1-3-1-1R	75
152	BRRI110A/IR86612-12-10-1-1-2-1R	75	313.	BRRI109A/MZ-2R	85
153	BRRI110A/IR86527-27-1-1-1-1R	85	314.	BRRI110A/IR98145-3-2-1-1-2-1-1R	55
154	BRRI110A/IR85503-3-3-A-1-1-1-1-1R	85	315.	BRRI110A/IR98153-15-1-1-1-1-1-1R	50
155	BRRI110A/IR85503-8-13-1-1-1-1-1-1R	70	316.	BRRI110A/IR98155-75-1-1-1-1-1-1R	65
156	BRRI110A/IR85551-9-1-1-1-2-1-1-1R	120	317.	BRRI110A/IR98156-9-1-1-1-1-1R	85
157	BRRI110A/IR101999-31-1-2R	95	318.	BRRI110A/MZ-2R	100
158	BRRI110A/IR112925-5-2-2R	85	319.	BRRI74A/IR85593-23-2-1-3-1-3-1-1R	50
159	BRRI110A/IR101921-BK-BK-BK-17-1-1R	95	320.	BRRI74A/IR85593-23-2-1-3-1-2-1-1R	65
160	BRRI110A/IR98184-27-1-1-1-1-1-1R	100	321.	BRRI74A/IR86403-5-5-2-1-1-1-1-1R	65
161	BRRI110A/IR98206-51-2-1-1-1-1-1R	80			85

D/S: A_1=12.12.23; A_2= 17.12.23; A_3=22.12.23; D/T: A_1=21.01.24; A_2= 24.01.24; A_3=25.01.24
D/S: R_1=01.12.23; R_2= 07.12.23; R_3=14.12.23; D/T: R_1=01.01.24; R_2= 09.01.24; R_3=16.01.24

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: Ninety-one testcrosses (F_1s) along with their parents and BRRI hybrid dhan8, 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 2023-24, eleven (11) 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 restorers.

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

Table 28. List of Completely Sterile (CS) entries from TCN, Boro 2023-24

SL No.	Test entries	Pollen sterility status (%)	Seed amount	Duration
1	BRRI97A/ ASM5	CS	90	147
2	BRRI97A/ UKL-30	CS	80	136
3	BRRI97A/ UKL-31	CS	120	144
4	BRRI97A/ PBM9	CS	65	137
5	BRRI97A/ IR126037-20-1-1-B	CS	70	145
6	BRRI110A/ ASM5	CS	60	140
7	BRRI110A/ PBM4	CS	80	139
8	IR105687A/ UKL-17	CS	80	140
9	IR105687A/ UKL-25	CS	80	138
10	IR105687A/ UKL-31	CS	65	142
11	IR105687A/ PBM9	CS	60	137

D/S: P_1= 05.12.23; P_2/F_1= 08.12.23; P_3= 11.12.23; D/T:09.01.2024

Table 29. List of entries found heterotic over check varieties from TCN, Boro 2023-24

Test Entries	DTM (DAS)	PHT (cm)	Yield /plot	Yield (t/ha)	GSS	Yield adv. over cks (%)	Suspected as good restorer
BRRI109A/ IR126066-85-5-2-B	145	104	1.88	9.4	MS	5-11	IR126066-85-5-2-B
BRRI125A/ FFL4	135	132	1.98	9.9	MS	5-17	FFL4
BRRI125A/ FFL8	136	104	1.92	9.6	LS	2-14	FFL8
IR105687A/ IR126069-3-1-1-B	142	90	1.82	9.1	LS	2-8	IR126069-3-1-1-B
BRRI hybrid dhan8	145	113	1.89	9.45	LS		
SL8H	148	113	1.73	8.65	MB		
Heera-2	147	110	1.79	8.95	MS		
Tej Gold	147	114	1.69	8.45	MS		
CV (%)	0.63	1.49	0.01	0.06			
LSD (0.05)	4.61	10.9	0.09	0.45			

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: $6BC_6$, $9BC_4$, $6BC_3$, $9BC_2$, and $1BC_1$ 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 2023-24, 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)**.

Location: BRRI, Gazipur.

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

Table 30. Performance of Backcross entries during Boro 2023-24

SL. No.	BC gen	Designation	Sterility status	DTM	GSS	Base color	Remarks
01.	BC_6	BRRI7A/3076B	CS	144	MB	Purple	Advanced as New CMS lines
02.	BC_6	IR105688A/3088B	CS	141	MB	Green	Advanced as New CMS lines
03.	BC_6	IR102572A/3143B-2-4	CS	140	MR	Purple	Advanced as New CMS lines
04.	BC_6	IR102572A/3148B-1-8	CS	141	SB	Purple	Advanced as New CMS lines
05.	BC_6	IR102572A/3150B-1-5	CS	140	SB	Purple	Advanced as New CMS lines
06.	BC_6	IR105688A/3166B	CS	141	MR	Purple	Advanced as New CMS lines
07.	BC_4	IR105687A/UKL-2	CS	136	SB	Green	Advanced as BC_5
08.	BC_4	IR105687A/UKL-3	CS	136	SB	Green	Advanced as BC_5
09.	BC_4	BRRI109A/UKL-5	CS	137	SB	Green	Advanced as BC_5
10.	BC_4	BRRI109A/UKL-6	CS	138	SB	Green	Advanced as BC_5
11.	BC_4	IR105687A/UKL-9	CS	134	MS	Purple	Advanced as BC_5
12.	BC_4	IR105687A/UKL-19	CS	139	MS	Green	Advanced as BC_5
13.	BC_4	BRRI109A/UKL-26	CS	134	SS	Green	Advanced as BC_5
14.	BC_4	BRRI99A/UKL-28	CS	146	MS	Green	Advanced as BC_5
15.	BC_4	BRRI99A/IR75608B-MASP4	CS	145	MS	Green	Advanced as BC_5
16.	BC_3	BRRI109A/15. HRB998-145-36-88	CS	147	LS	Green	Advanced as BC_4
17.	BC_3	BRRI110A/9. HRB998-127-66-51	CS	151	MS	Green	Advanced as BC_4
18.	BC_3	BRRI110A/10. HRB998-177-51-64	CS	151	MS	Green	Advanced as BC_4
19.	BC_3	BRRI110A/14. HRB998-30-16-87	CS	149	MS	Green	Advanced as BC_4
20.	BC_3	BRRI110A/17. HRB998-140-54-96	CS	144	LS	Green	Advanced as BC_4
21.	BC_3	IR78369A/2. HRB998-100-11-15	CS	153	LS	Green	Advanced as BC_4
22.	BC_2	BRRI109A/6. HRB998-130-43-39	CS	154	LS	Green	Advanced as BC_3

23.	BC_2	BRRI109A/12. HRB998-62-31-72	CS	151	LS	Green	Advanced as BC_3
24.	BC_2	IR105688A/7. HRB998-115-60-40	CS	151	LS	Green	Advanced as BC_3
25.	BC_2	IR105687A/UKL-8	CS	146	MS	Green	Advanced as BC_3
26.	BC_2	BRRI74A/BRAC B line	CS	146	LS	Green	Advanced as BC_3
27.	BC_2	IR79156A/BRAC B line	CS	147	LS	Green	Advanced as BC_3
28.	BC_2	IR79125A/BRAC B line	CS	145	LS	Green	Advanced as BC_3
29.	BC_2	IR102758A/BRAC B line	CS	146	LS	Green	Advanced as BC_3
30.	BC_2	IR58025A/BRAC B line	CS	148	LS	Green	Advanced as BC_3
31.	BC_1	BRRI48A/UKL17	CS	139	MS	Green	Advanced as BC_2

D/S: P_1 =02.12.2023; P_2/F_1=07.12.2023; P_3 =12.12.2023; D/T: 16.01.2024;
Legend: CS=Completely sterile, DTM=Days to maturity, GSS= Grain size & shape, MB=Medium bold, MS=Medium slender, MR=Medium round, SB=Short bold, SS=Short slender, LS=Long 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: One hundred and fifty-six (156) 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, 2023-24

SL.No	Designation	Sterility status (%)	Seed amount	Plant type/Remarks
01	IR68886A/B	100	85	Modern
02	IR68888A/B	100	75	Modern
03	IR68897A/B	100	70	Modern
04	II 32A/B	100	100	Modern
05	Jin 23 A/B	100	80	Modern
06	V_{20} A/B	99	85	Modern
07	Z.S 97A/B	100	160	Modern
08	Gan46 A/B	98	65	Modern
09	D.ShanA A/B	100	90	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	120	Modern
15	BRRI 4A/B	100	80	Modern
16	BRRI 6A/B	100	75	Modern
17	BRRI7A/B	100	65	Modern
18	BRRI8A/B	100	70	Modern
19	BRRI 9A/B	100	70	Modern
20	BRRI10A/B	100	95	Modern
21	BRRI11A/B	100	100	Modern
22	BRRI12A/B	100	95	Modern
23	BRRI13A.B	100	90	Modern
24	BRRI14A/B	100	70	Modern
25	BRRI15A/B	100	85	Modern
26	BRRI16A/B	100	80	Modern
27	GuiA/B	100	65	Modern
28	BRRI28A/B	99	130	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	90	Modern

34	BRRI34A/B	98	85	Modern
35	BRRI35A/B	100	85	Modern
36	BRRI36A/B	100	80	Modern
37	BRRI38A/B	100	80	Modern
38	BRRI39A/B	100	85	Modern
39	BRRI44A/B	100	55	Modern
40	BRRI45A/B	100	100	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	75	Modern
47	BRRI53A/B	100	95	Modern
48	BRRI54A/B	100	65	Modern
49	BRRI56A/B	100	85	Modern
50	BRRI57A/B	100	100	Modern
51	BRRI58A/B	100	80	Modern
52	BRRI59A/B	100	85	Modern
53	BRRI61A/B	100	70	Modern
54	BRRI62A/B	100	85	Modern
55	BRRI64A/B	100	95	Modern
56	BRRI65A/B	100	85	Modern
57	BRRI66A/B	100	60	Modern
58	BRRI68A/B	100	85	Modern
59	BRRI72A/B	99	100	Modern
60	BRRI74A/B	100	65	Modern
61	BRRI75A/B	100	55	Modern
62	BRRI77A/B	100	70	Modern
63	BRRI78A/B	100	80	Modern
64	BRRI80A/B	100	85	Modern
65	BRRI83A/B	100	120	Modern
66	BRRI84A/B	100	65	Modern
67	BRRI86A/B	100	60	Modern
68	BRRI87A/B	100	95	Modern
69	BRRI88A/B	100	85	Modern
70	BRRI89A/B	100	120	Modern
71	BRRI90A/B	100	85	Modern
72	BRRI91A/B	100	85	Modern
73	BRRI92A/B	100	60	Modern
74	BRRI93A/B	100	85	Modern
75	BRRI94A/B	100	70	Modern
76	BRRI95A/B	100	85	Modern
77	BRRI96A/B	100	90	Modern
78	BRRI97A/B	100	70	Modern
79	BRRI98A/B	100	75	Modern
80	BRRI99A/B	100	100	Modern
81	BRRI100A/B	100	80	Modern
82	BRRI101A/B	100	55	Modern
83	BRRI102A/B	100	85	Modern
84	BRRI103A/B	100	80	Modern
85	BRRI104A/B	100	120	Modern
86	BRRI109A/B	100	80	Modern
87	BRRI110A/B	100	85	Modern
88	CTA/B-1	100	90	Modern
89	CTA/B-2	100	70	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	60	Modern
101	BRRI128A/B	100	70	Modern
102	BRRI129A/B	100	130	Modern
103	BRRI130A/B	100	80	Modern
104	BRRI131A/B	100	60	Modern
105	BRRI132A/B	100	80	Modern
106	BRRI133A/B	100	80	Modern
107	BRRI134A/B	100	120	Modern
108	BRRI135A/B	100	70	Modern

109	BRRI136A/B	100	80	Modern
110	BRRI137A/B	100	80	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	80	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	100	Modern
121	BRRI148A/B	100	70	Modern
122	BRRI149A/B	100	80	Modern
123	BRRI150A/B	100	60	Modern
124	BRRI157A/B	100	80	Modern
125	BRRI158A/B	100	100	Modern
126	BRRI159A/B	100	65	Modern
127	BRRI160A/B	100	80	Modern
128	BRRI161A/B	100	75	Modern
129	BRRI162A/B	100	50	Modern
130	BRRI163A/B	100	65	Modern
131	BRRI164A/B	100	95	Modern
132	BRRI165A/B	99	60	Modern
133	BRRI166A/B	100	60	Modern
HRDC materials				
134	IR 93558 A/B	100	60	Modern
135	IR105687A/B	100	100	Modern
136	IR102760A/B	100	70	Modern
137	IR102758A/B	100	75	Modern
138	IR102573A/B	100	60	Modern
139	IR102572A/B	100	80	Modern
140	IR102571A/B	100	75	Modern
141	IR102569A/B	100	85	Modern
142	IR105688A/B	100	95	Modern
143	IR102757A/B	100	65	Modern
144	IR58025A/B	100	110	Modern
145	IR75596A/B	100	70	Modern
146	IR78369A/B	100	85	Modern
147	IR79125A/B	100	75	Modern
148	IR93559A/B	100	75	Modern
149	IR93560A/B	100	70	Modern
150	IR73328A/B	100	65	Modern
151	IR80559A/B	100	70	Modern
152	IR99792A/B	100	55	Modern
153	IR93562A/B	100	80	Modern
154	IR99791A/B	100	60	Modern
155	IR102561A/B	100	80	Modern
156	IR102759A/B	100	65	Modern

D/S: B_1=07.12.23; B_2/A =10.12.23; B_3 =13.12.23 D/T: 14.01.2024

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: Sixty (60) different restorer lines having different cyto-sources, plant type and grain quality.

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: Md. Jamil Hasan

Location: BRRI, Gazipur

Date of initiation: November 2023

Date of termination: May 2024

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

Table 32. List of R x R crosses made during Boro, 2023-24

SL. No	Designation	No. of seeds obtained
01	BRRI32R×BRRI37R	30
02	BRRI38R×CHH6	40
03	EL175R×BR9942-1-2-1-1-B2	45
04	BRRI43R×BRRI45R	30
05	BU3R×BAU521R	65
06	EL108R×Win3R	15
07	EL144R×EL168R	25
08	BRRI36R×BRRI49R	50
09	BRRI44R×R-2800	35
10	BRRI54R×PR595R	25
11	EL220R×IR69712-154-2-3-1-3R	30
12	Basmati L Ind × R Line7	25
13	B.I. Rice × BasmatiR	15
14	BRRI43R×BRRI32R	30
15	BRRI56R×CHH67R	20
16	Bogura4R×BADC NewR	15
17	IR86417-26-1-1-1-1-1×IR06N162R	10
18	IR05N162R×IR69712-154-2-3-1-3R	20
19	BRRI35R×BRRI12R	30
20	IR112899-3-1-1-R x IR84675-58-4-1-B-B	25
21	IR17M1656R x IR86526-1-8-1-1-2-1-1-1-R	45
22	IR85503-3-3-7-1-1-1-1-1R x IR86526-23-1-1-1-1-1-1-1R	40
23	IR86522-12-12-1-1-1-1-1Rx BRRI115R	55
24	IR86522-15-2-1-1-1-1-1R x BRRI21R	15
25	BRRI50R x BRRI27R	20
26	IR85538-2-1-1-1-1-1-1-1R x BRRI18R	15
27	IR85538-3-1-1-1-1-1-1-1-1-1R x BRRI37R	15
28	IR86403-22-3-1-1-1-1-1-1R x BR7011-37-1-2R	30
29	CHH67R x BR1736R	35

D/S: 1/12/2023 (1st set); 07/12/2023 (2nd set); 17/12/2023 (3rd set); D/T: 01/01/2024; 07/01/2024

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: Twenty-six 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: Md. Jamil Hasan

Location: BRRI, Gazipur

Date of initiation: November 2023

Date of termination: May 2024

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

Table 33. List of B x B crosses made during Boro, 2023-24

SL. No.	Designation	No. of seeds obtained
01.	IR68888B × You1B	25
02.	D ShanB × BRRI32B	15
03.	BRRI72B × BRRI74B	30
04.	BRRI75B × BRRI101B	15
05.	BRRI94B × BRRI95B	25
06.	BRRI103B × IR68888B	35
07.	IR102571B × IR102760B	45
08.	Jin23B × IR79156B	20
09.	IR75608B × IR102759B	20
10.	BRRI147B × BRRI148B	25
11.	IR102758B × IR75596B	20
12.	BRRI159B × BRRI143B	25
13.	IR68897B × IR79125B	30

D/S: 7/12/2023 (1st set); 12/12/2023 (2nd set); 17/12/2023 (3rd set); D/T: 07/01/2024; 10/01/2024

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: Eleven B×B and Eighteen R×R 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: Mithun Chandra Devsharmma

Co-Investigator: MJ Hasan

Location: BRRI, Gazipur

Date of initiation: November 2023

Date of termination: May 2024

Results and discussion: Eleven (B×B) and eighteen (R×R) crosses were confirmed as true hybrid. True F_1 Plants were selected comparing with respective parents. Disease free seeds were collected from (B×B) and (R×R) crosses **(Table 34 & 35).**

Table 34. F_1 Confirmation of (B×B) crosses, Boro, 2023-24

SL No.	Cross combination	Code	Amount of harvested F_2 seeds
1	IR77808B×IR80151B	(9 CMSB) × (16 CMSB)	200g
2	IR79155B×BRRI40B	(22 CMSB) × (39 CMSB)	200g
3	BRRI40B×IR77808B	(39 CMSB) × (9 CMSB)	200g
4	BRRI73B×IR102760B	(51 CMSB) × (3 HRDCB)	200g
5	BRRI127B×IR78369B	(76 CMSB) × (13 HRDCB)	200g
6	IR102760B×BRRI73B	(3 HRDCB) × (51 CMSB)	200g
7	IR102571B×BRRI81B	(7HRDCB) × (54CMSB)	200g
8	BRRI20B×IR102760B	(29 CMSB) × (3HRDCB)	200g
9	IR68890B×IR78355B	(1CMSB) × (7CMSB)	200g
10	BRRI128B×BRRI17B	(77CMSB) × (26CMSB)	200g
11	BRRI129B×BRRI126B	(78CMSB) × (75CMSB)	200g

D/S: 8/12/2023; D/T: 10.01.2024

Table 35. F_1 Confirmation of (R×R) crosses Boro, 2023-24

SL No	Cross combination	Code	Amount of harvested F_2 seeds
1	BRRI12R×IR05N162R	(10 SNR) × (63 HRDCR)	200g
2	BRRI17R×IR 90928-4-1-1-1R	(15 SNR) × (69 HRDCR)	200g
3	BRRI56R×IR 85503-3-3-A-1-1-1-1-1R	(54 SNR) × (84 HRDCR)	200g
4	PR595R×IR85503-8-1-1-1-1-1-1R	(73 SNR) × (85 HRDCR)	200g
5	PR812R×IR86417-26-1-1-1-1-1R	(74 SNR) × (53 HRDCR)	200g
6	PR828R×IR69712-154-2-3-1-3R	(75 SNR) × (87 HRDCR)	200g
7	EL144×BRRI56R	(243 SNR) × (54 SNR)	200g
8	EL220R×GETCO23R	(168 SNR) × (145 SNR)	200g
9	IR85503-8-11-1-1-1-2-1-1-1R×GETCO13R	(67HRDC) × (135 SNR)	200g
10	EL160R×IR96532-29-1-1-1-1-2-1-1R	(227 SNR) × (125HRDCR)	200g
11	IR86526-11-6-2-1-1-1- 1R×Supreme New R (S)	(11 HRDCR) × (283 SNR)	200g
12	BRRI28R×NR Hafizar	(26SNR) × (151SNR)	200g
13	PR344R×GETCO22R	(62SNR) × (144SNR)	200g
14	PR326R×RFSR	(60SNR) ×(55SNR)	200g
15	BRRI38R×BRRI33R	(36SNR) ×(31SNR)	200g
16	EL220R×GETCO22R	(168SNR) ×(144SNR)	200g
17	BR7011-37-1-2R×Muktagacha4R	(7SNR) ×(176SNR)	200g
18	Basmati Line India× BR6839-41-5-1R	(190SNR) ×(5SNR)	200g

D/S: 8/12/2023; D/T: 10.01.2024

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. Forty-eight R×R, thirty-eight B×B, fourteen (A×R) and eight test cross forwarded crosses were derived segregating progenies 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: Mithun Chandra debsharmma

Co-Investigator: M J Hasan

Location: BRRI, Gazipur

Date of initiation: November 2023

Date of termination: May 2024

Results and discussion: 42331 progenies from 108 crosses were advanced to next generation using field rapid generation advance (FRGA) technique **(Table 36).**

Table 36. Progenies selected through Field RGA, during Boro, 2023-24

SL No.	Cross Type	No. of Crosses				Transplanted	Harvested
		F_2	F_3	F_4	F_6		
1	B×B	13	5	7	13		42331

2	R×R	20	10	11	7	48600
3	A×R				14	
4	Testcross forwarding				8	
	Total			**108**		

D/S: 11/12/2023; D/T: 17.01.2024

Experiment No.1.1.9: Advancement of HRDC (Hybrid Rice Development Consortium) F_4 population

Specific Objectives: To select progenies with emphasize on plant type uniformity, phenotypic acceptability and yield contributing characters such as grain number per panicle, panicle length, spikelet fertility, insect and disease free etc.

Materials and Methods: In total, 23 HRDC F_4 populations were grown. The plant populations were 5520 in total 6 crosses. Thirty days old seedling was transplanted at a spacing of 20cm×15cm. Single seedling was used for transplanting. Fertilizers doses were applied as recommended dose. Crop management such as weeding, irrigation was done in time. Insects, disease and other pests were controlled properly.

Location: BRRI, Gazipur

Principal Investigator: Mithun Chandra Devsharmma

Co-Investigator: Md. Jamil Hasan

Results: Out of 5520 population, 2613 hills were selected from six crosses derived 34 entries **(Table 37).**

Table 37. Results of HRDC F_4 population, during Boro-2023-24

SL No	Genotypes	Selected hills
1.	IR 146173-B-B-268-22	22
2.	IR 146173-B-B-268-68	68
3	IR 146173-B-B-268-94	94
4.	IR 146173-B-B-529-134	134
5.	IR 146173-B-B-529-178	178
6.	IR 146173-B-B-527-24	24
7.	IR 146173-B-B-527-90	90
8.	IR 146154-B-B-430-188	188
9.	IR 146154-B-B-430-209	209
10.	IR 146154-B-B-141-10	10
11.	IR 146154-B-B-141-174	174
12.	IR 146154-B-B-547-168	168
13.	IR 146154-B-B-793-7	7
14.	IR 146172-B-B-21-86	86
15.	IR 146172-B-B-136-81	81
16.	IR 146172-B-B-236-87	87
17.	IR 146172-B-B-596-8	8
18.	IR 146164-B-B-54-9	9
19.	IR 146164-B-B-54-52	52
20.	IR 146164-B-B-191-15	15
21.	IR 146164-B-B-191-47	47

22.	IR 146164-B-B-191-86	86
23.	IR 146164-B-B-44-122	122
24.	IR 146164-B-B-543-5	5
25.	IR 146164-B-B-543-165	165
26.	IR 146168-B-B-317-122	122
27.	IR 146168-B-B-15-2	2
28.	IR 146168-B-B-89-41	41
29.	IR 146168-B-B-214-81	81
30.	IR 146151-B-B-439-83	83
31.	IR 146151-B-B-584-44	44
32.	IR 146151-B-B-584-82	82
33.	IR 146151-B-B-1253-16	16
34.	IR 146151-B-B-1266-13	13
Total		**2613**

Experiment No.1.1.10: Blast tolerant parental line development.

Specific objective: Generation advancement of F_2 population.

Materials: Nine F2 populations

Methods: Nine F2 populations were grown which were previously confirmed F1 plants from each cross were grown in Field at BRRI, Gazipur. Thirty days old seedlings were transplanted at a spacing of 20 cm x 20 cm. Fertilizer management was done, weeding and other intercultural operations was when it is necessary. At maturity, single mature tiller was harvested from each plant under field condition

Results and discussion: In total, 1643 plants were harvested from nine crosses. This harvested plant used on modified single seed descent method **(Table 38).**

Location: BRRI, Gazipur.

Principal investigator: Mosammat Umma Kulsum

Co-Investigator: Md. Jamil Hasan

Date of initiation: November 2023

Date of termination: May 2024

Table 38. List of F_2 Population of B & R line improvement with blast tolerant line Boro 2023-24

Sl	Cross Combination	Traits	Harvested plant
1	BRRI74B/ IR64-Pi9L-NILs	Salinity, blast	174
2	BRRI74B/ IRRI154-Pi9+Dd9	Salinity, blast	200
3	BRRI74B/ BR12416-6R-215 (Pi9+)	Salinity, blast	176
4	BRRI74B/ BRRI dhan74	Salinity, blast	190
5	IR90928-15-4-1-1-1R/ IR64-Pi9L-NILs	High amylose, blast	210
6	IR90928-15-4-1-1-1R / BRRI dhan33	High amylose, blast	154
7	IR90928-15-4-1-1-1R / IRRI154-Pi9+Dd9	High amylose, blast	149
8	IR90928-15-4-1-1-1R / BR12416-6R-215 (Pi9+)	High amylose, blast	215
9	IR90928-15-4-1-1-1R / BRRI dhan74	High amylose, blast	175
	Total		1643

D/S: 9/12/2023; D/T: 10/01/2024

Experiment No.1.1.11: 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 39**). 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 39. List of testcrosses made with blast tolerant elite lines Boro, 2023-24

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: 9/12/2023; D/T: 10/01/2024

Experiment No.1.1.12: Test cross with Blast & Submergence tolerant lines

Specific objective:

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: Thirty-four (34) testcrosses (F_1s) along with their parents and BRRI hybrid dhan8, SL8H, Heera-2 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. Test cross F_1's was evaluated at flowering stage for their pollen sterility.

Results and discussion: Among the 34 test crosses most of the cross showed fully fertile (FF) pollen under microscope but their heterosis level was not remarkable. So, none of the crosses were selected as a hybrid for further evaluation **(Table 40).** Three entry was found completely sterile (CS). Pollen parent of completely sterile combination was regarded as suspected maintainer line.

Location: BRRI, Gazipur.

Principal investigator: Mosammat Umma Kulsum

Co-Investigator: Md. Jamil Hasan

Table 40. Testcrosses evaluation with blast and submergence tolerant lines Boro 2023-24

SL No	Designation	Pollen sterility status
1	BRRI110A/IR64-Pi9L-NILs	PS

2	BRRI110A/BRRI dhan33	CS
3	BRRI110A/IRBL ta2	PS
4	BRRI110A/ IRRI154-Pi9	S
5	BRRI110A/ BR12416-6R-215 (Pi9+)	PS
6	BRRI110A/ BRRI dhan74	S
7	BRRI110A/NERICAL-19	PF
8	BRRI110A/AO1	CS
9	BRRI110A/AO2	CS
10	BRRI97A/20. HRB999-95-40-18	F
11	BRRI97A/21. HRB999-124-54-23	F
12	BRRI97A/22. HRB999-200-85-24	PF
13	BRRI97A/23. HRB999-61-35-33	F
14	BRRI97A/24. HRB999-146-85-35	PF
15	BRRI97A/25. HRB999-33-13-36	PF
16	BRRI97A/26. HRB999-79-43-40	F
17	BRRI97A/27. HRB999-112-41-42	F
18	BRRI97A/28. HRB999-156-34-50	F
19	BRRI97A/29. HRB999-87-39-54	F
20	BRRI97A/30. HRB999-135-44-55	FF
21	BRRI97A/31. HRB999-126-33-60	FF
22	BRRI97A/32. HRB999-176-21-62	FF
23	BRRI97A/33. HRB999-188-93-64	FF
24	BRRI97A/34. HRB999-69-28-75	FF
25	BRRI97A/35. HRB999-47-19-77	F
26	BRRI97A/1. ASM1	FF
27	BRRI97A/2. ASM2	FF
28	BRRI97A/3. MZ-1	FF
29	BRRI97A/5. ASM3	FF
30	BRRI97A/6. ASM4	PF
31	BRRI97A/7. ASM5	PS
32	BRRI97A/8. ASM6	PF
33	BRRI97A/9. MZ-3	F
34	BRRI97A/10. ASM7	FF
Ck-1	BRRI hybrid dhan8	FF
Ck-2	SL8H	FF
Ck-3	Heera-2	FF
Ck-4	Tej Gold	FF

D/S: 9/12/2023; D/T: 10/01/2024

Experiment No.1.1.13: Test cross with Fatema dhan

Specific objective: Identification of B & R line from Fatema dhan.

Materials and methods: Twenty-three lines from Fatema dhan and one CMS line were grown in Field at BRRI, Gazipur. Thirty days old seedlings were transplanted at a spacing of 20 cm x 20 cm. These lines were planted in three seeding dates with an interval of 7 days for proper synchronization at flowering time. Hand crosses were made to produce 90-170 F_1 seeds from each cross.

Results and discussion: Seventeen (17) test crosses were made using one CMS line and twenty-three lines from Fatema dhan. These harvested seeds were properly dried and preserved for next season evaluation **(Table 41).**

Location: BRRI, Gazipur.

Principal investigator: Mosammat Umma Kulsum

Co-Investigator: Md. Jamil Hasan

Table 41. Test Cross made with Fatema dhan Boro 2023-24

SL No	Designation	Harvested F_1 seeds (no.)
1	BRRI109A/5. Abtaf5 (3) (Red tip)	150
2	BRRI109A/6. Abtaf5 (3) (Red tip)	170
3	BRRI109A/7. Abtaf5 (3) (White tip)	120
4	BRRI109A/9. Abtaf5 (5) (White tip)	140
5	BRRI109A/11. Segregating line of syngenta 1201H (white tip)	120
6	BRRI109A/12. Segregating line of syngenta 1201H (White tip)	160
7	BRRI109A/14. Fatema-1 (White tip)	110
8	BRRI109A/15. Fatema-2 (Red tip)	130
9	BRRI109A/16. Fatema-2 (White tip)	140
10	BRRI109A/17. Fatema-3 (Red tip)	90
11	BRRI109A/18.Fatema-3 (Red tip)	110
12	BRRI109A/19.Fatema-3 (White tip)	160
13	BRRI109A/21.Fatema-3 (Red tip)	125
14	BRRI109A/22. Fatema-3 (White tip)	100
15	BRRI109A/23. Fatema-4 (Red tip)	95
16	BRRI72A/I-65	125
17	BRRI72A/ZER	135

D/S: 1/12/2023; 7/12/23; 14/12/23; D/T: 14/01/2024

Experiment No.1.1.14: Development of Iso-cytoplasmic restorer lines

Specific objective: Iso-cytoplasmic restorer line development.

Materials and methods: Six F_2 populations were grown in Field at BRRI, Gazipur. Thirty days old seedlings were transplanted at a spacing of 20 cm x 20 cm. Fertilizer management was done, weeding and other intercultural operations was when it is necessary. At maturity, single mature tiller was harvested from each plant under field condition

Results and discussion: In total, 933 plants were harvested from six F_2 populations. This harvested plant used on single seed descent method **(Table 42).**

Location: BRRI, Gazipur.

Principal investigator: Mosammat Umma Kulsum

Co-Investigator: Md. Jamil Hasan

Table 42. List of F_2 Population for development of Iso-cytoplasmic R lines Boro 2023-24

SL	Cross Combination	Traits	Harvested plant
1	BRRI99A/BRRI32R	High yield	183
2	BRRI125A/BRRI41R	High yield	128
3	BRRI125A/IR86526-10-6-1-1-1-1-1-1	High yield, High amylose	165
4	BRRI hybrid dhan6	High yield	142
5	AZ7006	High yield	155
6	Dhanny Gold	High yield	160
	Total		**933**

D/S: 1/12/23; D/T: 5/01/24

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, 2023- 24

Objective: Selection of promising hybrids

Materials and Methods: Variety: 489 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 489 hybrids eleven hybrid combinations were selected based on yield, growth duration and other desired characters. The selected entries showed yield potentiality at least 9.6 t/ha **(Table 43).** The selected hybrid combinations expressed 4-11% yield advantage over BRRI hybrid dhan8, 19-27% over SL8H and Heera-2 and 28-37% over Tej Gold. 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 82 % indicating high level of precision in this experiment.

Location: BRRI, Gazipur.

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

Table 43. Performance of test hybrids under observational nursery (OT) during Boro, 2023-24

SL no	Trial no	Designation	DTM	GSS	Plot Yield (kg/plot)	Yield (t/ha)	Yield adv over cks			
							Ck-1	Ck-2	Ck-3	Ck-4
1	20	BRRI74A/BRRI49R	144	MB	1.94	9.7	4.3	19.8	19.8	29.3
2	112	BRRI99A/BRRI50R	145	MS	1.96	9.8	5.4	20.8	20.8	30.3
3	147	BRRI109A/BRRI32R	140	LS	1.92	9.6	4.2	18.5	18.5	28.3
4	149	BRRI109A/BRRI36R	143	MS	1.94	9.7	4.3	19.8	19.8	29.3
5	178	BRRI109A/IR85503-3-3-A-1-1-1-1-1R	149	MS	2.06	10.3	10.8	27.2	27.2	37.3
6	284	BRRI125A/BRRI20R	155	MB	1.96	9.8	5.4	20.8	20.8	30.3
7	298	BRRI125A/BRRI44R	156	MS	1.96	9.8	5.4	20.8	20.8	30.3
8	361	IR105687A /Bayer R New	138	LS	1.92	9.6	4.2	18.5	18.5	28.3
9	369	IR105687A /IR98184-27-1-1-1-1-1-1R	146	LS	1.92	9.6	4.2	18.5	18.5	28.3
10	433	IR102758A /BRRI41R	152	LS	1.98	9.9	6.5	22.2	22.2	32.0
11	456	IR102758A /IR101999-31-1-2R	150	LS	1.92	9.6	4.2	18.5	18.5	28.3
	Ck-1	BRRI hybrid dhan8	150	LS	1.86	9.3				
	Ck-2	SL8H	151	MS	1.62	8.1				
	Ck-3	Heera-2	152	MB	1.62	8.1				
	Ck-4	Tej Gold	148	LS	1.5	7.5				
		Heritability	0.84		0.82					
		$LSD_{(0.05)}$	8.05		2.09					

D/S: 10/12/2023; D/T: 10/01/2024; Unit plot size= $2m^2$

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

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 dhan8, 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, 2023-24. Highest yield was obtained from BRRI199A/BRRI54R (11.20 t/ha) which had 9.8 % yield advantage over BRRI hybrid dhan8 with similar growth duration followed by BRRI109A/BRRI54R (10.9 t/ha) and BRRI97A/BRRI54R (10.7 t/ha) having 5-7% yield advantage over BRRI hybrid dhan8 with similar growth duration. The heritability obtained from yield was 83 % indicating high level of precision in this experiment **(Table 44).**

Location: BSRI, Gazipur.

Principal Investigator: Md. Shafiqul Islam

Co-Investigator: Md. Jamil Hasan

Table 44. Result of Preliminary Yield Trial (PYT) during Boro, 2023-24

SL. no.	Designation	PHT (cm)	GD (days)	GSS	Yield (t/h)	AC%	Heterosis (%)			
							Ck-1	Ck-2	Ck-3	Ck-4
01	BRRI97A/BRRI32R	110	145	MS	9.10	23.5	-	-	-	-
02	BRRI99A/BRRI32R	115	143	MS	9.20	23.3	-			1.1
03	BRRI110A/BRRI38R	118	144	MS	8.10	24.1	-	-	-	-
04	IR102758A/BRRI38R	118	143	S	8.60	23.7	-	-	-	-
05	BRRI125A/BRRI42R	115	139	S	8.80	23.2	-	-	-	-
06	BRRI97A/BRRI54R	109	142	S	10.70	23.5	4.9	15.1	12.6	17.6
07	BRRI99A/BRRI54R	112	142	S	11.20	23.6	9.8	20.4	17.9	23.1
08	BRRI109A/BRRI54R	113	140	S	10.90	23.7	6.9	17.2	14.7	19.8
09	BRRI11A/BRRI55R	108	140	M	8.63	24.0				
10	BRRI99A/BRRI55R	115	143	S	8.80	23.3				
11	BRRI109A/BRRI55R	116	142	S	8.60	23.4				
12	BRRI99A/BRRI56R	117	142	S	8.43	23.5				
13	BRRI120A/BRRI56R	105	141	M	9.70	23.5	-	4.3	2.1	6.6
Ck-1	BRRI hybrid dhan8	115	142	S	10.2	23.3				
Ck-2	SL-8H	118	141	S	9.30					
Ck-3	Heera-2	105	139	M	9.50					
Ck-4	Tej Gold	104	140	S	9.10					
Mean		112.5	141.6		9.3					
CV (%)		4.3	1.2		9.8					
LSD (0.05%)		3.0	1.1		0.6					
Heritability		0.93	0.78		0.83					

D/S: 8.12.2023; D/T: 16.01.2024 Plot size = 20m^2

Legend: PH=Plant height (cm), GD= Growth duration (days), AC (%) = Amylose content, GSS= Grain size and shape, MS= Medium slender, S = Slender, M = Medium

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

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

Materials: Fifteen hybrids along with four checks (BRRI hybrid dhan8, 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 yield advantage over checks across location. All the selected hybrids showed yield advantage ranging from 6-11 % over BRRI hybrid dhan8, 18–24 % over SL8H, 12-17 % over Heera-2 and 18-24 % over Tej Gold **(Table 45).**

Table 45. Results of Multi-location yield trials during Boro, 2023-24

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	Ck-4
1	BRRI11A/BRRI32R	108	146	8.7	9.5	10.5	7.9	8.5	9.02	83.3	S	23.6	-	2.5	-	2.5
2	BRRI125A/BRRI32R	110	139	9.2	9.6	8.9	8.5	8.3	8.9	82.6	MS	23.4	-	1.1	-	1.1
3	BRRI99A/BRRI38R	108	113	11.5	11.4	11.4	9.5	10.6	10.9	87.6	S	23.6	11.2	23.7	17.2	23.7
4	BRRI109A/BRRI38R	104	147	10.1	10.6	10.3	8.7	9.6	9.9	85.2	S	24.0	-	1.1	6.5	1.1
5	BRRI120A/BRRI38R	107	144	11.4	11.5	10.8	9.4	10.7	10.8	86.3	M	24.0	10.2	22.7	16.1	22.7
6	BRRI125A/BRRI38R	111	145	10.7	10.3	9..8	8.5	9.4	9.7	84.5	S	24.2	-	10.2	4.3	10.2
7	BRRI74A/BRRI42R	110	146	10.8	10.5	10.8	9.2	10.6	10.4	84.8	M	23.5	6.1	18.2	11.8	18.2
8	BRRI109A/BRRI42R	109	144	8.9	10.1	9.7	8.5	8.8	9.2	83.0	S	23.4	-	4.5	-	4.5
9	BRRI120A/BRRI42R	107	140	8.1	8.5	9.3	8.1	8.3	8.5	77.6	S	24.0	-	-	-	-
10	BRRI11A/BRRI54R	111	143	8.4	8.8	9.7	8,1	9.0	8.8	79.8	S	23.7	-	-	-	-
11	BRRI48A/BRRI54R	113	147	9.7	9.4	10.2	7.4	7.8	8.9	80.7	MS	23.6	-	1.1	-	1.1
12	BRRI74A/BRRI54R	112	144	8.5	9.1	9.2	8.2	7.8	8.6	78.1	M	23.3	-	-	-	-
13	BRRI120A/BRRI54R	107	139	8.7	9.5	9.3	8.4	8.7	8.9	81.0	MS	23.4	-	1.1	-	1.1
14	BRRI120A/BRRI55R	110	144	9.6	10.0	10.3	8.6	8.9	9.5	84.6	M	23.6	-	7.9	2.2	7.9
15	BRRI74A/BRRI56R	113	145	8.9	9.3	9.5	8.2	8.8	8.9	80.5	M	23.4	-	1.1	-	1.1
Ck-1	BRRI hybrid dhan8	108	145	10.3	10.5	9.7	9.4	9.3	9.8	86.3	MS	24.0				
Ck-2	SL8H	108	143	9.3	8.8	9.4	8.2	8.4	8.8	80.4	MS					
Ck-3	Heera-2	113	148	9.6	9.4	10.4	8.6	8.5	9.3	83.6	M					
Ck-4	Tej Gold	115	141	8.4	9.3	8.8	8.2	9.4	8.8	79.7	S					
Mean		109.7	142.3	9.5	9.8	9.9	8.5	9.0	9.3	82.6						
CV (%)		2.5	5.3	10.9	8.7	7.3	6.5	9.7	7.7	3.5						
LSD (0.05%)		1.6	4.5	0.6	0.5	0.4	0.3	0.5	0.4	1.7						

D/S: 04/12/2023; D/T: 08/01/2024; 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, 2023-24

Objective: Selection of promising hybrids

Materials and Methods: Five (5) hybrid rice varieties along with four 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, IR138867H and IR138840H performed better and expressed 3-10 % yield advantage over check variety Heera-2 and Tej Gold, respectively. The heritability obtained from plant height, No. of effective tillers/plant, spikelet fertility, 1000 grain weight, days to maturity and yield were 89%, 61%, 71%, 93%, 86% and 79% respectively indicating high level of precision in this experiment **(Table 46).**

Location: BRRI, Gazipur.

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

Table 46. Performance of HRDC hybrids during Boro 2023-24

SL No	Variety	PHT	ET/hill	SF (%)	1000GW	DTM	Yield (t/h)
1	IR138867H	100	8	86.7	22.15	145	8.47
2	IR138840H	102	7	87.9	22.07	144	8.20

3	IR138982H	102	7	80.7	23.73	144	7.76
4	IR138758H	76	7	86.2	19.28	139	7.55
5	IR139072H	96	7	90.0	21.92	145	7.83
6	BRRI hybrid dhan8 (Ck-1)	105	7	88.7	23.03	151	8.76
7	SL8H (Ck-2)	105	7	91.3	25.63	148	8.33
8	Tej Gold (Ck-3)	100	7	84.7	22.25	139	7.71
9	Heera-2 (Ck-4)	110	6	93.5	26.95	147	8.22
	Lsd (0.5)	3.21	0.91	16.23	2.21	5.34	2.03
	Heritability	0.89	0.61	0.71	0.93	0.86	0.79

D/S: 10/12/2023; D/T: 12/01/2024; Unit plot size: 30 m^2

Legend: PHT=Plant height (cm); ET/hills = No. of effective tillers/hill; 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: Fifteen rice genotype (seven BRRI released hybrids, two BRRI promising hybrids, one BRRI released salinity tolerant inbred rice BRRI dhan67, locally cultivated salinity tolerant inbred IT, BADC hybrid SL8H, two popular company hybrids (Heera and Tej Gold) were grown. BRRI dhan67, BINA dhan10 and IT were used as salinity tolerant check and SL-8H, Heera and Tej Gold 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 and Dumuria in Khulna

Principal Investigator: Mithun Chandra Debsharmma

Co-Investigators: Md. Jamil Hasan; Tahmina Akter and M Mamunur Rahman

Results: Adaptability under saline condition of BRRI developed and popular company hybrids along with popular saline tolerant inbreed checks BRRI dhan67, local rice variety IT, BINA dhan-10 were cultivated at three coastal locations of Satkhira and Khulna. We observed that the salinity levels of Debhata varies from 1.3 ds/m to 1.8 ds/m which is very low level where as the salinity levels of Dumuria varies from 4.1 ds/m to 6.1 ds/m which remains at medium level. On the other hand, salinity levels of Kaliganj varies from 7.3 ds/m to 21.9 ds/m which is very high levels. We found that the highest yielding genotypes of pooled (Debhata and Dumuria) were BRRI hybrid dhan8 (7.52 t ha^{-1}), BRRI hybrid dhan3 (6.14 t ha^{-1}), Heera-2 (6.02 t ha^{-1}) followed by check variety BRRI hybrid dhan6 (5.64 t ha^{-1}), IT (5.47 t ha^{-1}) and Bina dhan-10 (5.42 t ha^{-1}), respectively. Here the experimental result of Kaliganj was not satisfactory due to high salinity levels and high temperature. That is why this result was not considered as average. In spite of medium salinity levels of Dumuria, the yield is not also satisfactory due to the water stress, high temperature during flowering stage and lodging cause of heavy storm just before harvesting period. Therefore, we can conclude that BRRI hybrid dhan8, BRRI hybrid dhan3 and Heera-2 can be cultivated

profitably in those locations where the water salinity level of the paddy field remains from 1.3 ds/m to 6.1 ds/m in Debhata and Dumuria **(Table 47 and Fig. 1).**

Table 47. Yield and agronomic performance of fifteen genotypes from adaptive trial in Boro 2023-24

Genotypes	GD (days)	PH (cm)	ET	Yield (t/ha)			
				Debhata	Dumuria (Water stress+High temp stress+salinity+ Lodging due to heavy Storm)	Kaliganj (High temp stress+salinity stress)	Pooled (Deb+Dum)
BRRI hybrid dhan8	137	100	9	10.4	4.64	1.09	7.52
BRRI hybrid dhan3	134	100	9	8.35	3.92	0.96	6.14
BRRI hybrid dhan6	139	111	9	7.74	3.54	0.77	5.64
Tej Gold	135	106	9	7.23	3.50	0.82	5.36
BRRI hybrid dhan4	140	106	10	6.76	3.26	0.79	5.01
BRRI74A/BRRI56R	133	101	9	7.10	3.15	1.36	5.12
SL8H	131	97	9	7.48	3.28	0.75	5.38
BRRI74A/BRRI42R	133	93	9	6.48	2.99	1.22	4.74
BRRI hybrid dhan5	137	101	9	5.90	3.03	1.07	4.46
Heera-2	135	102	9	8.31	3.73	1.26	6.02
BRRI hybrid dhan7	142	112	9	6.20	2.89	0.89	4.55
BRRI hybrid dhan2	137	104	9	7.10	3.28	1.27	5.19
Bina dhan-10 (cv)	135	108	9	7.35	3.49	2.24	5.42
BRRI dhan67 (cv)	129	106	9	6.24	2.95	0.65	4.60
IT (cv)	129	92	9	2.5067*	3.51	1.39	5.47
LSD	5.05	7.29	0.97	0.34	0.26	0.59	
CV	0.56	0.61	6.22	2.78	4.50	32.28	
Heritability	0.80	0.82	0.00	0.99	0.96	0.73	

D/S: 12/12/2023; D/T: 21/01/2024

Legend: GD= Growth duration (days); PH=Plant height (cm); ET= Effective Tiller; *= 60-70% Rat Damage

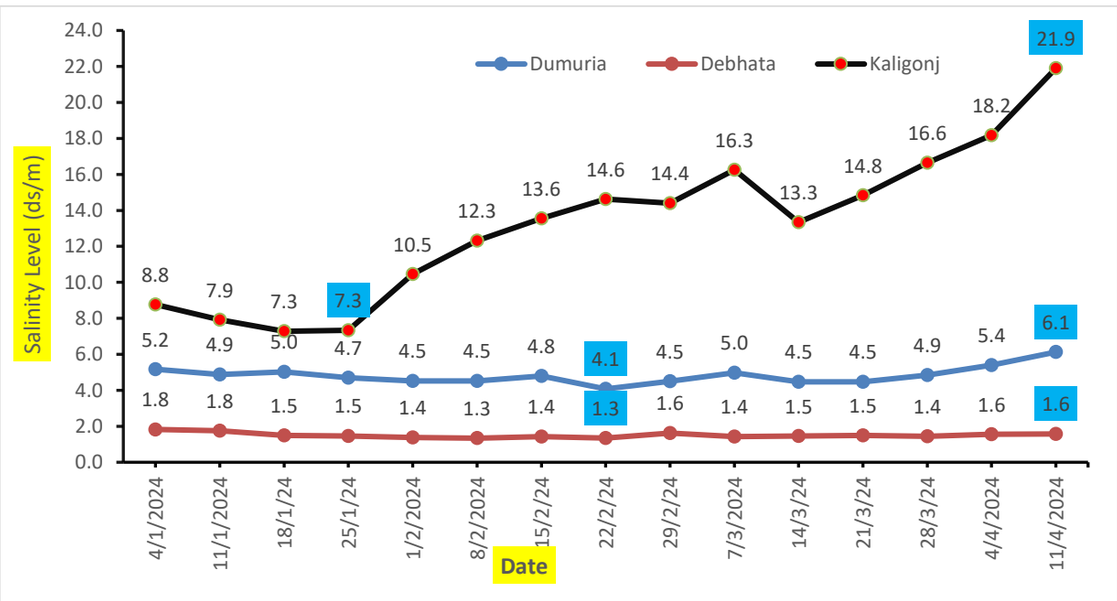

Fig.1. Water salinity levels of different experimental plots in Boro 2023-24 at Debhata (Satkhira), Dumuria (Khulna) and Kaliganj Upazila in Satkhira.

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 (BRRI120A/BRRI32R, BRRI74A/BRRI55R and BRRI109A/BRRI56R) 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 (11.70 t/ha) followed by BRRI hybrid dhan3 (10.89 t/ha) and promising hybrid-1(10.70 t/ha) with excellent spikelet fertility **(Table 48).**

Location: BRRI, Gazipur

Principle Investigator: A K Paul

Co-investigator: M J Hasan

Table 48. Results of demonstration trials during Boro, 2023-24

Entry No	Designation	Plant height (cm)	Tiller/ plant (No)	Panicle length (cm)	50% flowering Date(days)	Maturity Date (Days)	Spikelet Fertility (%)	Yield (t/ha)
1	BRRI hybrid dhan2	119	7.0	27.4	120	147	84.88	8.63
2	BRRI hybrid dhan3	117	8.0	27.2	118	144	88.16	10.89
3	BRRI hybrid dhan5	115	6.4	25.4	119	145	87.92	10.25
4	BRRI hybrid dhan8	111	9.2	25.8	121	148	90.26	11.70
5	SL8H	115	8.2	23.2	121	148	88.82	9.80
6	Promising hybrid-1	118	8.4	26.6	122	150	86.46	10.70
7	Promising hybrid-2	111	9.6	25.4	121	148	82.12	8.50
8	Promising hybrid-3	113	8.6	24.4	120	146	85.74	9.80
	Mean	114.88	8.18	25.68	120.25	147.00	86.80	10.03
	CV (%)	2.65	12.97	5.52	1.07	1.31	2.95	10.94
	LSD (0.5%)	0.62	0.22	0.29	0.26	0.40	0.53	0.23

D/S: 12.12.2023; D/T: 13.01.2024

Experiment 2.7: Performance evaluation of BRRI developed new promising hybrids

Objective: Selection of promising hybrids

Materials and Methods: Sixty-nine hybrids along with four hybrids (BRRI hybrid dhan8, SL8H, Heera and Tej Gold) as check variety. Thirty days old seedlings were transplanted in 10.5 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 69 hybrids were evaluated including four checks. Among these hybrids six hybrids were selected based on yield at least 11.7 t/ha and at per or lower growth duration compared to check varieties (**Table 49**).

Location: BRRI, Gazipur.

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

Table 49. Experimental hybrids evaluation during Boro 2023-24

SL. No.	Cross combination	PHT (cm)	N/T	Pan L (cm)	FLL (cm)	SF (%)	D50% F	DTM	TGW (g)	Yield (t/ha)
01.	BRRI11A/BRRI32R	108	12	27.5	26.2	83.5	123	148	24.3	11.59
02.	BRRI48A/BRRI32R	105	11	24.5	24.1	82.5	124	149	24.5	11.91
03.	BRRI74A/BRRI32R	98	10	25.3	25.2	85.2	120	145	24.8	11.82

SL. No.	Cross combination	PHT (cm)	N/T	Pan L (cm)	FLL (cm)	SF (%)	D50% F	DTM	TGW (g)	Yield (t/ha)
04.	BRRI97A/BRRI32R	97	12	24.0	28.5	83.6	110	136	24.5	12.52
05.	BRRI99A/BRRI32R	96	10	25.5	26.4	83.0	119	144	24.3	11.82
06.	BRRI109A/BRRI32R	97	12	25.7	25.2	85.6	120	146	25.5	12.00
07.	BRRI110A/BRRI32R	102	11	25.6	25.8	86.9	119	144	24.2	10.88
08.	BRRI120A/BRRI32R	105	10	25.3	26.7	91.3	121	147	25.5	11.14
09.	BRRI125A/BRRI32R	110	13	24.5	24.9	82.3	122	148	24.3	11.33
10.	IR79156A/BRRI32R	107	11	26.3	27.4	83.8	121	148	25.5	11.21
11.	IR102758A/BRRI32R	98	12	23.6	24.7	83.5	111	137	24.0	9.94
12.	IR58025A/BRRI32R	102	11	23.8	25.4	84.1	117	143	24.3	9.70
13.	BRRI74A/BRRI38R	111	13	25.3	23.7	85.5	125	150	24.6	9.73
14.	BRRI97A/BRRI38R	108	14	26.7	25.6	87.7	122	149	25.2	11.22
15.	BRRI99A/BRRI38R	111	11	25.5	27.0	84.0	126	151	25.3	10.13
16.	BRRI109A/BRRI38R	112	10	26.5	26.3	83.4	119	145	26.5	12.2
17.	BRRI110A/BRRI38R	109	11	25.8	24.3	83.6	125	150	24.7	8.95
18.	BRRI120A/BRRI38R	98	12	25.8	25.8	87.3	120	146	25.6	8.84
19.	BRRI125A/BRRI38R	109	11	27.1	25.3	83.5	120	145	25.3	9.21
20.	IR102758A/BRRI38R	114	10	26.3	26.3	83.5	126	153	24.8	9.88
21.	IR58025A/BRRI38R	110	13	24.7	24.3	88.1	120	146	25.1	11.90
22.	BRRI74A/BRRI42R	114	10	24.4	26.5	83.4	121	147	25.3	9.20
23.	BRRI99A/BRRI42R	102	10	23.8	25.7	82.4	112	138	24.7	10.89
24.	BRRI109A/BRRI42R	99	11	24.7	26.3	83.7	120	146	24.5	10.43
25.	BRRI110A/BRRI42R	106	11	24.5	23.7	84.5	127	154	24.8	10.3
26.	BRRI120A/BRRI42R	110	11	24.7	26.4	82.7	125	151	24.6	10.22
27.	BRRI125A/BRRI42R	108	10	25.7	27.2	84.6	121	147	25.2	10.67
28.	IR79156A/BRRI42R	111	10	25.5	27.5	83.1	121	147	25.1	10.92
29.	IR79125A/BRRI42R	102	12	24.7	22.5	83.0	118	144	24.6	10.05
30.	IR102758A/BRRI42R	112	13	25.8	25.8	87.6	120	146	25.1	10.34
31.	IR58025A/BRRI42R	105	11	26.3	25.3	87.5	122	148	25.8	10.06
32.	BRRI11A/BRRI54R	110	10	26.5	24.7	87.2	122	148	25.7	9.62
33.	BRRI48A/BRRI54R	110	12	25.3	23.8	86.3	121	147	24.8	11.75
34.	BRRI74A/BRRI54R	92	10	25.4	23.8	86.0	122	148	25.6	10.31
35.	BRRI97A/BRRI54R	112	11	25.7	26.5	87.1	126	153	24.9	11.07
36.	BRRI99A/BRRI54R	107	12	24.6	27.6	84.1	120	147	24.6	13.20
37.	BRRI109A/BRRI54R	112	10	25.2	26.4	83.3	121	148	24.8	12.50
38.	BRRI110A/BRRI54R	111	12	26.3	23.3	87.1	128	155	25.6	11.37
39.	BRRI120A/BRRI54R	101	10	23.7	23.8	83.8	113	139	24.2	12.23
40.	BRRI125A/BRRI54R	108	11	25.9	26.4	87.6	121	147	24.5	12.04
41.	IR79156A/BRRI54R	111	10	24.7	25.3	86.0	120	146	23.8	12.30
42.	IR79125A/BRRI54R	110	12	26.3	27.5	89.5	121	148	24.3	11.23
43	IR102758A/BRRI54R	112	11	26.1	26.2	88.5	122	149	23.7	11.44
44	IR58025A/BRRI54R	115	10	24.3	25.6	84.3	127	155	24.2	11.05
45	BRRI11A/BRRI55R	117	10	24.5	25.4	82.0	122	148	24.7	11.33
46	BRRI48A/BRRI55R	107	11	23.6	20.2	84.5	116	143	23.5	11.30
47	BRRI74A/BRRI55R	111	12	25.6	26.8	87.5	121	148	24.2	10.18
48	BRRI99A/BRRI55R	113	13	24.7	27.6	85.8	120	147	23.7	11.70
49	BRRI109A/BRRI55R	109	12	23.7	24.7	83.3	120	146	24.1	10.76
50	BRRI110A/BRRI55R	106	13	22.9	21.5	84.2	117	143	23.7	10.91
51	BRRI120A/BRRI55R	108	11	23.0	22.7	84.3	117	142	23.6	9.72
52	BRRI125A/BRRI55R	112	12	25.7	27.5	88.5	120	147	24.1	10.0
53	IR79156A/BRRI55R	113	11	23.8	26.5	84.2	117	143	23.8	10.86
54	IR79125A/BRRI55R	110	11	24.3	25.8	83.4	118	144	24.4	10.59
55	IR102758A/BRRI55R	116	11	23.8	27.3	84.4	121	148	24.3	9.52
56	IR58025A/BRRI55R	115	12	22.7	25.5	84.8	122	148	24.2	10.53
57	BRRI11A/BRRI56R	112	10	23.5	24.9	85.6	124	151	23.8	8.70
58	BRRI48A/BRRI56R	106	11	22.7	21.5	83.7	117	143	22.8	9.15
59	BRRI74A/BRRI56R	110	13	25.6	25.7	88.4	121	148	23.8	8.81
60	BRRI97A/BRRI56R	114	10	23.2	21.6	81.8	117	144	24.1	9.79
61	BRRI99A/BRRI56R	110	11	23.7	24.5	87.5	118	145	23.7	10.70
62	BRRI109A/BRRI56R	111	12	24.2	23.7	88.0	119	146	24.3	9.84
63	BRRI110A/BRRI56R	105	11	24.7	24.2	86.3	117	143	24.5	10.57
64	BRRI120A/BRRI56R	108	12	23.8	25.5	86.7	120	147	24.2	8.91
65	BRRI125A/BRRI56R	113	11	24.5	25.7	85.3	122	149	25.3	10.98
66	IR79156A/BRRI56R	111	13	24.7	24.7	84.7	122	148	23.8	9.91
67	IR79125A/BRRI56R	110	12	25.6	25.7	86.3	121	148	24.8	10.77
68	IR102758A/BRRI56R	108	13	24.6	24.8	86.4	123	150	24.5	10.39
69	IR58025A/BRRI56R	112	11	25.2	25.7	83.4	121	148	23.8	9.75
Ck-1	BRRI hybrid dhan8	108	13	25.3	26.3	89.4	121	148	25.7	10.9
Ck-2	SL8H	107	11	23.8	25.3	86.6	122	149	23.6	9.7
Ck-3	Heera-2	109	11	24.5	24.7	85.7	124	153	24.8	10.3
Ck-4	Tej Gold	109	12	23.8	24.6	84.3	118	145	23.5	9.7
Mean		108.0	11.3	24.9	25.3	85.2	120.5	146.8	24.6	10.6
SD		5.2	1.0	1.1	1.6	2.1	3.4	3.6	0.7	1.0

SL. No.	Cross combination	PHT (cm)	N/T	Pan L (cm)	FLL (cm)	SF (%)	D50% F	DTM	TGW (g)	Yield (t/ha)
CV (%)		4.8	9.2	4.3	6.3	2.4	2.8	2.5	2.8	9.5
Lsd 0.05%		1.6	0.3	0.3	0.5	0.6	1.0	1.1	0.2	0.3

D/S: 06.12.23; D/T: 09.01.24

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

Experiment 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 2023-24

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 276 kg (1.73 t/ha), 1193 kg (1.70 t/ha), 178 kg (1.78 t/ha), 344 (1.0 t/ha), 1897 kg (2.8 t/ha) and 1546 (2.21 t/ha) were obtained from BRRI10A, BRRI11A, IR58025A, BRRI7A, IR79156A and BRRI99A, respectively **(Table 50).** Some CMS lines 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 50. CMS multiplication of BRRI hybrid dhan2, BRRI hybrid dhan3, BRRI hybrid dhan4, BRRI hybrid dhan5, BRRI hybrid dhan6 and BRRI hybrid dhan8 during Boro, 2023-24

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	87	89	124	121	77.0	38.0	1600	276	1.73
BRRI11A/B	97	99	121	118	76.5	37.0	7000	1193	1.70
IR58025A/B	92	95	123	120	78.0	38.4	1000	178	1.78
BRRI7A/B	94	97	120	117	78.0	31.1	3200	344	1.00
IR79156A/B	100	103	123	121	83.0	53.5	6800	1897	2.80
BRRI99A/B	87	90	124	121	84.3	45.4	7000	1546	2.21
Mean	92.8	95.5	122.5	119.7	79.5	40.6	4433.3	905.7	1.9
SD	5.3	5.4	1.6	1.8	3.3	7.8	2832.4	737.1	0.6
CV (%)	5.7	5.6	1.3	1.5	4.2	19.2	63.9	81.4	32.0

Lsd 0.05%	5.6	5.6	1.7	1.8	3.5	8.2	2983.3	776.4	0.6

D/S: B_1 =02/12/2023; A/B_2 = 05/12/2023; B_3 = 08/12/2023; D/T: A/B = 13/01/2024; D/S: B_1 =07/12/2023; A/B_2 =10/12/2023; B_3 =13/12/2023; D/T: A/B =11/01/2024; D/S: B_1 =05/12/2023; A/B_2 =08/12/2023; B_3 =11/12/2023; D/T:A/B=08/01/2024;D/S:B_1=30/11/2023;A/B_2=03/12/2023;B_3=06/12/2023;D/T:A/B=05/01/2024;
D/S: B_1=10/12/2023; B_2/A =13/12/2023; B_3=16/12/2023; D/T: A/B= 17/01/2024; PER=Panicle Exertion Rate, OCR= Out Crossing Rate.

Experiment 3.2: F_1 seed production of BRRI hybrid dhan5, BRRI hybrid dhan6, BRRI hybrid dhan7 and BRRI hybrid dhan8 during Boro, 2023-24

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 (BRRI20R), CMS line (IR75608A) with its restorer (BRRI31R) and CMS line (BRRI99A) with its restorer (BRRI37R) 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, in case of BRRI hybrid dhan6, restorer line was sown in two different dates at five days interval where CMS line was sown nine days after second set of its restorer, 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 and in case of BRRI hybrid dhan8, restorer line was sown in two different dates at five days interval where CMS line was sown five 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 @ 270:150:150:70:10 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 442 kg (1.47 t/ha) from BRRI hybrid dhan5, 581 kg (2.32 t/ha) from BRRI hybrid dhan6, 684 kg (1.73 t/ha) from BRRI hybrid dhan7 and 354 kg (1.77 t/ha) from BRRI hybrid dhan8 was obtained **(Table 51).** Seed set was poor due to high temperature (> 38°C) at flowering time hampered pollination.

Location: BRRI, Gazipur.

Principal Investigator: Dr. Md. H. Rahman and A K Paul

Co-investigator: Dr. M J Hasan

Table 51. F_1 seed production of BRRI hybrid dhan5, BRRI hybrid dhan6, BRRI hybrid dhan7 and BRRI hybrid dhan8 during Boro, 2023-24

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	74	37.5	442	1.47
BRRI hybrid dhan6	90	100	124	131	87	48.3	581	2.32
BRRI hybrid dhan7	92	104	123	129	80.3	43.5	684	1.73
BRRI hybrid dhan8	97	106	125	132	85.5	44.0	354	1.77
Mean	91.5	102	123.8	132.8	81.7	43.3	515.3	1.8
SD	4.2	3.7	1.0	4.3	5.9	4.4	146.2	0.4
CV (%)	4.6	3.6	0.8	3.3	7.2	10.3	28.4	19.6
Lsd 0.05%	5.4	4.7	1.2	5.6	7.6	5.7	188.7	0.5

D/S: R_1 = 26/11/2023; R_2 = 03/12/2023; A = 22/12/2023; D/T: R = 02/01/2024; A = 21/01/2024.
D/S: R_1 = 28/11/2023; R_2 = 03/12/2023; A = 12/12/2023; D/T: R & A = 11/01/2024
D/S: R_1 = 27/11/2023; R_2 = 30/11/2023; A = 06/12/2023; D/T: R=02/01/2024; A = 09/01/2024
D/S: R_1 = 27/11/2023; R_2 = 02/12/2023; A = 07/12/2023; D/T: R & A = 05/01/2024
PER (%) = panicle exertion rate, OCR (%) = Out crossing rate

Experiment 3.3: CMS seed multiplication of selected promising CMS lines during Boro season 2023-24

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

Materials and methods: Six CMS lines (BRRI72A, BRRI97A, IR102758A, IR105687A, IR102571A and IR99792A) 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 1.19 to 2.8 t/ha during Boro 2023-24 **(Table 52).** Out of six four CMS entries for breeder seed production. 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 52. Seed amount got from selected promising CMS lines during Boro, 2023-24

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					
BRRI72A/B	98.0	101	121	118	75.0	53.7	50	14	2.8
BRRI197A/B	95.0	97.0	119	116	77.3	47.2	50	9.5	1.9
IR102758A/B	104.0	107.0	120	117	68.5	34.3	2000	237	1.19
IR105687A/B	91.0	94.0	117	114	76.0	43.5	1000	213	2.13
IR102571A/B	105.0	108.0	127	124	71.6	41.2	50	10.5	2.10
IR99792A/B	93.0	96.0	125	122	76.5	35.3	100	12.5	1.25
Average	97.7	100.5	121.5	118.5	74.2	42.5	541.7	82.8	1.9
SD	5.8	5.9	3.8	3.8	3.4	7.3	807.1	110.5	0.6
Lsd $_{(0.05)}$	6.1	6.2	4.0	4.0	3.6	7.7	850.1	116.3	0.6
CV (%)	5.9	5.9	3.1	3.2	4.6	17.3	149.0	133.5	31.9

D/S: B_1/A=10/12/2023; B_2 =13/12/2023; B_3=16/12/2023; D/T: 14/01/2024; D/S: B_1/A=10/12/2023; B_2=13/12/2023; B_3=16/12/2023; D/T: 19/01/2024; D/S: B_1/A=01/12/2023; B_2 =04/12/2023; B_3=07/12/2023; D/T: 11/01/2024; D/S: B_1/A=07/12/2023; B_2=10/12/2023; B_3=13/12/2023; D/T: 22/01/2024; D/S: B_1/A=01/12/2023; B_2 =04/12/2023; B_3=07/12/2023; D/T: 03/01/2024; B_1/A=10/12/2023; B_2=13/12/2023; B_3=16/12/2023; D/T: 12/01/2024; PER (%) = panicle exertion rate, OCR (%) = Out crossing rate

Experiment 3.4: Experimental F_1 seed production of promising and Saltol hybrids during Boro 2023-24.

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

Materials & methods: One CMS line (BRRI74A) with its restorer (BRRI31R, BRRI42R and BRRI56R) lines were grown as parental materials. The CMS line BRRI74Aand restorer lines BRRI42R and BRRI56R was salinity tolerant. Two restorer lines were sown in two different dates at five days interval and CMS line was sown nine and 13 days after second set of their restorers. In case of other hybrid combination, difference between two sets of restorer line was four days and CMS line was sown 13 days after second set of restorer line. 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 130 kg/plot (1.0 t/ha), 100 kg (1.7 t/ha) and 106 kg/plot (1.8 t/ha) from BRRI74A /BRRI31R, BRRI74A/BRRI42R and BRRI74A/BRRI56R combinations **(Table 53**). Seed yield was poor due to high temperature at flowering time (>38°C) hampered pollination.

Location: BRRI, Gazipur

Principle Investigator: M H Rahman and A K Paul

Co-investigator: M J Hasan

Table 53: Experimental F_1 seed production of promising and Saltol hybrids during Boro 2023-24.

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
BRRI74A/BRRI31R (Promising hybrid)	98	108	118	130	77	30	130	1300	1.0
BRRI74A/BRRI42R (Saltol hybrid)	97	110	119	124	81	47	100	600	1.7
BRRI74A/BRRI56R (Saltol hybrid)	97	109	120	133	81.5	31	106	600	1.8

D/S: R_1 =27/11/2023; R_2 = 02/12/2023; A = 15/12/2023; D/T: R = 02/01/2024; A=14/01/2024

D/S: R_1 =03/12/2023; R_2 = 08/12/2023; A = 13/12/2023; D/T: R/A=17/01/2024

D/S: R_1 =03/12/2023; R_2 = 07/12/2023; A = 20/12/2023; D/T: R/A=17/01/2024

Experiment 3.5: Multiplication of Released Hybrid Restorer lines during Boro 2023-24.

Objective: To increase good quality seeds of restorer lines for subsequent use in seed production.

Materials & Methods: BRRI10R, BRRI15R, BRRI 20R, BRRI 31R, BRRI 37R, BRRI 42R and BRRI56R 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 of 130 kg (7.2 t/ha), 125 kg (6.9 t/ha), 115 kg (6.3 t/ha), 128 kg (7.1 t/ha), 125 kg (6.9 t/ha), 132 kg (7.3 t/ha) and 118 kg (6.5 t/ha) were obtained from BRRI10R, BRRI15R, BRRI20R, BRRI31R, BRRI37R, BRRI42R and BRRI56R respectively **(Table 54**).

Location: BRRI, Gazipur.

Principal Investigator: A K Paul

Co-investigator: Md. Jamil Hasan

Table 54: Yield and ancillary characters of Restorer Lines in Boro 2023-24

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	112	7.2	27.8	127	155	180	130	7.2
2	BRRI15R	108	7.0	27.0	126	154	180	125	6.9
3	BRRI20R	107	8.2	26.4	126	154	180	115	6.3
4	BRRI31R	109	7.4	25.8	128	157	180	128	7.1
5	BRRI37R	97	8.8	24.4	124	152	180	125	6.9
6	BRRI42R	104	7.8	25.6	124	152	180	132	7.3
7	BRRI56R	103	8.0	22.8	128	156	180	118	6.5
	Mean	105.71	7.77	25.69	126.14	154.29	180.00	124.71	6.89
	CV	4.62	8.06	6.50	1.33	1.22	0.00	4.98	5.33
	LSD 0.05%	1.07	0.14	0.37	0.37	0.41	0.00	1.36	0.08

D/S: 10.12.2023; D/T: 14.01.2024

Experiment 3.6: F_1 seed production through contract grower during Boro, 2023-24

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 and Monzil seed 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 2023-24, we got 490 kg (1.23 t/ha) of BRRI hybrid dhan2, 4750 kg (1.69 t/ha) of BRRI hybrid dhan3, 2750 kg (1.72 t/ha) of BRRI hybrid dhan4, 6680 kg (1.13 t/ha) of BRRI hybrid dhan5, 6800 kg (2.43 t/ha) of BRRI hybrid dhan6, 6650 kg (2.37 t/ha) of BRRI hybrid dhan7 and 8020 kg (1.4 t/ha) seeds of BRRI hybrid dhan8 from Ishwardi, Pabna **(Table 55).** From Barishal 500 kg (1.25 t/ha) of BRRI hybrid dhan5 and 1000 kg (1.0 t/ha) of BRRI hybrid dhan8 seeds received **(Table 56**).

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 55. F_1 seed production of BRRI developed hybrids through contract grower during Boro 2023-24

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	490	4000	1.23	Less seed due to high temperature at flowering stage & shattering for hail storm
02	BRRI hybrid dhan3	AUS Bangla Agro	Ishwardi	4750	28000	1.69	Less seed due to high temperature at flowering stage & shattering for hail storm
03	BRRI hybrid dhan4	AUS Bangla Agro	Ishwardi	2750	16000	1.72	Good
04	BRRI hybrid dhan5	AUS Bangla Agro +Mazil seed	Ishwardi	6680	60000	1.13	Less seed due to high temperature at flowering stage & shattering for hail storm
05	BRRI hybrid dhan6	AUS Bangla Agro	Ishwardi	6800	28000	2.43	Good
06	BRRI hybrid dhan7	AUS Bangla Agro	Ishwardi	6650	28000	2.37	Good
07	BRRI hybrid dhan8	AUS Bangla Agro+ Mazil seed	Ishwardi	8020	58000	1.00	Less seed due to high temperature at flowering stage & shattering for hail storm
	Total =			**36140**	**222000 (55.5 Acre)**		

Table 56. F_1 seed production of BRRI developed hybrids through contract grower during Boro 2023-24 from Barishal

SL. No	Combinations	Contract growers	Location	Seed Yield (kg)	Area (m^2)	Seed yield (t/ha)	Remarks
01	BRRI hybrid dhan5	Md. Jalal Akand	Babuganj, Barishal	500	4000	1.25	Less seeds due to high temperature at flowering stage
02	BRRI hybrid dhan8	Md. Jalal Akand	Babuganj, Barishal	1000	10000	1.00	
	Total =			**1500**	**14000 (3.5 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 2023-24, hybrid rice division supplied 27703 kg of parental lines and F_1 seeds to 135 farmers, 24 seed companies, scientists, extension people, projects and staffs of BRRI **(Table 57).** Thirty-five stake holders produced more than 508 MT F_1 seeds using BRRI developed hybrid rice parental lines **(Table 58).**

Table 57. 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	5770	-	1842
02	Farmers	135	1800.0	1578	-	55
03	BRRI Scientists + staffs	25	2028.0	-	-	-

04	BRRI R/S (11) +DAE	14	14800.0	-	-	-
Total		198	19878	5928	0.00	1897
Grand Total				27703.0		

Investigator: All staff of hybrid rice division.

Table 58. Seed production activities of BRRI developed hybrids during Boro, 2023-24 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 BHD5 BHD6	120 100 100	45 30 30	15 10 10	12.0 7.0 9.0	Experienced
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 BHD8	600 300	180 100	60 30	45 24	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	BHD6 BHD7	160 40	75 15	20 05	21.0 4.0	Experienced
06.	M/S Agriculture crop seeds. Tatalpur, Sherpur Md. Moklesur Rahman	Muktaghacha, Mymensingh	BHD3 BHD4 BHD5	14 14 14	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 BHD6 BHD7	14 14 14 16 16	06 06 06 06 06	02 02 02 02 02	1.5 1.4 1.5 1.5 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	1200	300	120	100	Experienced
09.	Thailand Agro Seeds Vite Proprietor: Md.Alamin Hoque. Kandi, Fulpur, Mymensingh Mob. 01719464815	Muktaghacha, Mymensingh	BHD2 BHD6	45 45	15 15	5 5	4.5 4.5	Experienced
10.	Abdur Rahman Agro Company. Muktagasha Proprietor: Md. Abdur Barek Mob.01978424141/ 01766688323	Muktaghacha, Mymensingh	BHD3	96	36	12	10	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	500	150	60	50	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	08 08	03 03	01 01	0.7 0.8	Experimental

17.	Mr. Jalal Akand Babuganj Mob. 01770674655	Babuganj Barishal	BHD3 BHD5	32 40	12 15	04 05	3.6 2.5	Experienced
18.	Monjil Seed Company Ishwardi, Pabna Mob. 01733137743	Ishwardi Pabna	BHD5 BHD8	80 80	30 30	10 10	3.5 5.0	Experienced
19.	Aus Bangla Agro Gohail Road, Mission gate, Bogura. Mob. 01716444502 Contract growers	Patirajpur, Ishwardi, Pabna	BHD2 BHD3 BHD4 BHD5 BHD6 BHD7 BHD8	10 56 20 56 56 56 56	03 21 08 21 21 21 21	1 07 2.5 07 07 07 07	0.5 4.5 2.0 3.7 5.7 6.5 4.5	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	BHD8	100	30	10	8.0	Experienced
23.	Uddipon Agro Ltd. H# 09, R#01, B#F, Janata Cooperative Housing Society, Adabar, Dhaka-1207. Dr. M A Matin, Managing Director Mobile: 01711875715	Bazitpur Kishoreganj	BHD3 BHD6 BHD8	200 50 50	60 15 15	20 05 05	15.0 4.5 4.0	Experienced
24.	Agricas Seeds Private Ltd, Dholpur, Ashulia, Savar, Dhaka. Kbd. Mosharoff Hossain, Managing Director, Mob: 01711738135	Muktaghacha	BHD3 BHD5	03 03	01 02	0.33 0.33	0.2 0.2	Experimental
25.	Rupom Seeds, Proprietor: Md. Shadad Hossain Bhuiyan, Feni, Mob: 01716755531	Feni	BHD8	20	06	2.0	1.2	Experimental
26.	Apu Agro Farms, 48/B Jail Road (Police line), Mymensingh. Md. Abdur Rashid Sarkar, Managing Director, Mob: 01615565662	Muktaghacha	BHD6	300	100	30	24.5	Experienced
27.	Md. Sabuz Hossain, Gupirpara, Songacha bazar, Sirajganj, Mob: 01783819700	Sirajganj	BHD6 BHD8	06 06	1.5 1.6	0.66 0.66	0.3 0.3	Experimental
28.	BRRI R/S Sonagazi	Sonagazi	BHD5	30	09	03	1.5	Experienced
29.	BRRI R/S Gopalganj	Gopalganj	BHD8	10	03	01	0.7	Experienced
30.	Sugandha Agri Industries, Jamalpur Sadar	Jamalpur	BHD6	140	45	15	11.5	Experienced
31.	Proprietor: M R Ibna Aziz M/S Sayada Biz Vander, Gayra Bazar, Kolaroya, Satkhira. Md. Azharul Islam Mob: 01740981056	Satkhira	BHD2 BHD3 BHD8	20 20 20	06 06 06	02 02 02	1.0 1.0 1.0	Experimental
32.	Md. Saiful Azam Khan, Professor, ATI, Sherpur	Sherpur	BHD3	10	03	01	0.5	Experimental
33.	Modern Crop Care Ltd.	Mymensingh	BHD6 BHD8	08 08	03 03	01 01	0.5 0.5	Experimental
34.	J R Agro, Choto Koloni, Mahiganj, Rangpur, Mob: 01950224466	Rangpur	BHD3 BHD8	16 16	06 06	02 02	1.0 1.0	Experimental
35.	Rifa Trading, Chankanda, Milon Bazar, Fulbaria, Mymensingh, Mob: 01733934426	Mymensingh	BHD6	40	15	05	3.5	Experimental
Total =				**5928**	**1897.1**	**648.08**	**508.9**	

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, BHD8= BRRI hybrid dhan8