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**Competitive Research Grant (CRG)**  
**Sub-Project Completion Report**

**on**

**Characterization of Important Rice Germplasm of  
Bangladesh**

**Project Duration**

**May 2016 to September 2018**

**Genetic Resources and Seed Division  
Bangladesh Rice Research Institute, Gazipur-1701**

**Submitted to  
Project Implementation Unit-BARC, NATP-2  
Bangladesh Agricultural Research Council  
Farmgate, Dhaka-1215**



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## Acronyms

BARC	Bangladesh Agricultural Research Council
BIRRI	Bangladesh Rice Research Institute
DNA	Deoxyribose Nucleic Acid
GRSD	Genetic Resources and Seed Division
HCl	Hydro Chloric Acid
IPR	Intellectual Property Rights
KCl	Potassium Chloride
MgCl <sub>2</sub>	Magnesium Chloride
NARS	National Agricultural Research System
NATP	National Agricultural Technology Program
PAGE	Polyacrylamide Gel Electrophoresis
PCR	Polymerase Chain Reaction
PIC	Polymorphism Information Content
PIU	Project Implementation Unit
SSR	<i>Simple Sequence Repeat</i>
TGW	Thousand Grain Weight
UPGMA	Unweighted Pair Group Method using Arithmetic Average

## Table of Contents

Sl No.	Subject	Page No.
	Acronyms	i
	Table of Contents	ii
	List of Tables	iii
	List of Figures	iii
	Executive Summary	iv
A.	Sub Project Description	
1.	Title of the CRG sub-project	01
2.	Implementing organization	01
3.	Name and full address with phone, cell and E-mail of PI/Co-PI (s)	01
4.	Sub-project budget (Tk)	01
	4.1. Total	01
	4.2. Revised (if any)	01
5.	Duration of the sub-project	01
	5.1. Start date (based on LoA signed)	01
	5.2. End date	01
6.	Justification of undertaking the sub-project	01
7.	Sub-project goal	02
8.	Sub-project objective (s)	02
9.	Implementing location (s)	02
10.	Methodology	02
11.	Results and discussion	08
12.	Research highlight/findings	19
B.	Implementaion Position	20
1	Procurement	20
2	Establishment/renovation facilities	20
3	Training/studytour/seminar/workshop/conference organized	20
C.	Financial and physical progress	21
D.	Achievement of Sub-project by objectives	21
E.	Materials Development/Publication made under the Sub-project	21
F.	Technology/Knowledge generation/Policy Support	22
G.	Information regarding Desk and Field Monitoring	22
I.	Lesson Learned	23
J.	Challenges (if any)	23
K.	References	24
	Appendices	
	Appendix-A. Photographic view of morphological and molecular characterization of rice germplasm during T. Aman, 2017	25
	Appendix-B. Photographic view of morphological and molecular characterization of rice germplasm during Boro-2017-18	27
	Appendix–C. Photographic view of different monitoring activities of CRG project	28
	Appendix–D. Qualitative and quantitative descriptors and descriptor states, photographs and variability in characterized T. Aman rice germplasm	29
	Appendix–E. Qualitative and quantitative descriptors and descriptor states, photographs and variability in characterized Boro rice germplasm	125
	Appendix–F. Morphological characters studied according to standard rice germplasm descriptors and evaluation form	221

## List of Tables

Table no.	Title	Page no.
1.	List of rice germplasm characterized during T. Aman, 2017	3
2	List of rice germplasm characterized during Boro 2017-18	4
3.	List of SSR markers used for diversity analysis of T. Aman germplasm	6
4.	List of SSR markers used for diversity analysis of Boro germplasm	7
5.	Variability in different quantitative characters in 48 T. Aman rice germplasm	9
6.	Variability in different quantitative characters in 48 Boro rice germplasm	10
7.	Number of alleles, allele size range, frequency, gene diversity and polymorphism information content (PIC) found among 48 T. Aman rice germplasm for 69 microsatellite markers	12
8.	Number of alleles, allele size range, frequency, gene diversity and polymorphism information content (PIC) found among 48 Boro rice germplasm for 65 microsatellite markers	16

## List of Figures

Figure no.	Title	Page no.
1	DNA profile of 48 T. Aman rice germplasm using RM447 marker	13
2	NJ tree of 48 T. Aman rice germplasm based on 69 SSR markers	14
3	STRUCTURE estimation of the number of groups for the $K$ values ranging from 1 to 10, by delta $K$ ( $\Delta K$ ) values	14
4	Assignment of 48 T. Aman germplasm to two groups (GI and GII) using STRUCTURE 2.3.4 software	15
5	DNA profile of 48 Boro rice germplasm using RM209 marker	18
6	A UPGMA cluster dendrogram of 48 Boro rice germplasm based on 65 SSR markers using Ward's method	18
7	STRUCTURE estimation of the number of groups for the $K$ values ranging from 1 to 10, by delta $K$ ( $\Delta K$ ) values.	19
8	Assignment of 48 Boro germplasm to three groups (GI, GII and GIII) using TRUCTURE 2.3.4 software	19

## Executive Summary

A CRG sub-project entitled “Characterization of Important Rice Germplasm of Bangladesh” Implemented through Bangladesh Rice Research Institute funded by National Agricultural Technology Program phase II project (NATP-2) of PIU, BARC. The main objectives of the project were to characterize local rice germplasm both at morphological and molecular levels and to analyze the genetic diversity of the rice germplasm. A total of 96 local rice germplasm of which 48 T. Aman in 2017 and 48 Boro in 2017-18 were morphologically characterized on the basis of 33 qualitative and 20 quantitative traits using the international rice germplasm descriptor and evaluation form. Considerable variations were observed among the germplasm for qualitative and quantitative characters. It revealed from the morpho-agronomic characters that most of the test germplasm are different from each other showing their identical nature.

Molecular characterization of 96 same rice germplasm was conducted using SSR markers. Forty eight (48) T. Aman germplasm were characterized with 90 primers of which 69 found polymorphic. Similarly, 48 Boro germplasm were characterized using 87 primers revealed 65 as polymorphic.

The germplasm were analyzed for diversity using the polymorphic markers and three to four clusters were formed Aman and Boro season, respectively. Among these, 48 T. Aman rice germplasm were grouped into three clusters and 48 Boro rice germplasm were grouped into four clusters. Again, forty eight (48) T. Aman and 48 Boro rice germplasm were formed two and three groups by structure analysis, respectively. It was also observed from the molecular characterization that RM206 (0.87) was supposed to be the best marker for characterizing the 48 T. Aman rice germplasm for higher PIC value. Similarly, RM 302 (0.88) for Boro rice germplasm was the best marker. It is expected that the newly developed data on morphological and molecular would be used as source materials for the future breeding program. Moreover, these data could be efficiently used in establishing sovereignty of Bangladesh rice germplasm.

## CRG Sub-Project Completion Report (PCR)

### A. Sub-project Description

**1. Title of the CRG sub-project:** Characterization of Important Rice Germplasm of Bangladesh

**2. Implementing organization:** Bangladesh Rice Research Institute

**3. Name and full address with phone, cell and E-mail of PI/Co-PI (s):**

**Principal Investigator:** Dr. Mohammad Zahidul Islam, Scientific Officer, Genetic Resources and Seed Division, Bangladesh Rice Research Institute, Gazipur-1701, Bangladesh, Cell phone: 01818819295, E-mail: [zahid.grs@gmail.com](mailto:zahid.grs@gmail.com)

**Co-principal Investigator:** Dr. Mohammad Khalequzzaman, Chief Scientific Officer and Head, Genetic Resources and Seed Division, Bangladesh Rice Research Institute, Gazipur-1701, Bangladesh, Cell phone: 01715752595, E-mail: [zamanmk64@yahoo.co.uk](mailto:zamanmk64@yahoo.co.uk)

**4. Sub-project budget (Tk):**

**4.1 Total:** 14, 99,860.00/-

**4.2. Revised (if any):** Not applicable

**5. Duration of the sub-project:**

**5.1 Start date (based on LoA signed):** 15 May 2017

**5.2 End date:** 30 September, 2018

**6. Justification of undertaking the sub-project:**

Rice (*Oryza sativa* L.) is a staple food crop in Bangladesh's economy and agriculture, accounting for nearly 18 per cent of the gross domestic product (BBS, 2017). Rice production area in Bangladesh is about 11.4 million hectares (ha) of land in which 33.80 million tons of rice is produced (BBS, 2017). It constitutes over 91% of the food grain production in Bangladesh. About 76% of the total cropped land is covered by rice and more than 66% of the total agriculture labour force is employed in rice production, processing, marketing and distribution. It provides about 62% of the calorie and 46% of the protein in the average daily diet for the people of the country (HIES, 2010).

Bangladesh possessed the abundance of indigenus rice varieties. Still farmers are selecting and maintaining a vast germplasm over thousands of year due to great significance and local ways of life and culture. More than 8400 rice germplasm have been registered in accession book of BRRI genebank (BRRI, 2017). Some of them have very nice grain quality, fineness, aroma, taste and protein contents. Moreover, local varieties contain genes resistant/tolerant to salinity/drought/submergence and many biotic stresses but their yield is low. Over the last few centuries, rice has faced diversity loss especially, after the green revolution due to replacement of native varieties with high yielding varieties. The rapid rate of disappearance or extinction of landraces of local rice are in danger of narrowing of genetic base

and calls for serious attention to their conservation with appropriate information, generation of data both for morphological and molecular traits. With the advent of PCR based molecular marker technology, simple sequence repeats (SSRs) is a marker of choice for molecular characterization as it is co-dominant, distributed throughout the genome, highly reproducible, variable, reliable, easily scorable, abundant and multiallelic in nature (Islam *et al.*, 2018a; Islam *et al.*, 2018b). These markers become particularly useful for developing unique DNA profiles of rice germplasm. Such profiles would be especially valuable to unambiguously distinguish rice cultivars in order to obtain plant variety protection. Moreover, scenario of molecular characterization is very discrete and fragmentary. Previous study revealed that about 1050 germplasm have so far been characterized at molecular level in BRRI Genebank (Rahman *et al.*, 2007, 2008 and 2010; Rahman *et al.*, 2009; Khalequzzaman, M and MA Siddique, 2014; Islam *et al.*, 2018a; Islam *et al.*, 2018b). Based on that experience, the present study was designed with 48 T. Aman and 48 Boro rice germplasm excluding the previous studies accessions using morphological and molecular traits along with photo documentation.

**7. Sub-project goal:** Identification of diverse genotypes and safeguard of local rice germplasm from biopiracy

**8. Sub-project objectives:**

- i. To characterize local rice germplasm both morphological and at molecular level
- ii. To study the genetic diversity and population structure of Bangladeshi rice germplasm

**9. Implementing location:** Bangladesh Rice Research Institute, Gazipur-1701

**10. Methodology in brief:**

#### **Morphological Characterization**

A total of 48 T. Aman accessions in 2017 and 48 Boro accessions in 2017-18 were grown for characterization using the standard rice germplasm descriptors and evaluation form. Seedlings were transplanted in single row of 5.4 m long with a spacing of 20 x 20 cm between rows and plants, respectively. Fertilizers were applied @ 60:20:40 kg NPK/ha in T. Aman and @ 80:20:40 kg NPK/ha in Boro seasons, respectively. Appropriate control measures were taken for pests, diseases and weeds whenever needed. The data recorded on 53 morpho-agronomic characters are presented in Appendix-F.

#### **Molecular characterization**

##### **Plant materials**

Forty eight (48) T. Aman (Table 1) and 48 Boro rice germplasm (Table 2) were used as test materials for this study. Five grams germinated seeds from each of the accession was sown in the earthen pots. Young leaves were used for DNA isolation.

**Table 1. List of rice germplasm characterized during T. Aman, 2017**

<b>Sl. No.</b>	<b>Name</b>	<b>Acc. No.</b>	<b>Place of collection</b>
1	Nagra	980	Khulna
2	Rajasail	1061	Jessore
3	Muctahar	156	Tangail
4	Sitabhog	1109	Jashore
5	Moyna moti	1222	Faridpur
6	Mogi balam	1223	Faridpur
7	Tepu sail	1224	Faridpur
8	Fakirmoni	1297	Kushtia
9	Sailkali	1298	Kushtia
10	Indusail	1329	Pabna
11	Jotagainja	1330	Pabna
12	Mugi	1331	Pabna
13	Laitasail	1408	Dhaka
14	Boot bazal	1411	Dhaka
15	Mohishdol	1535	Dinajpur
16	Shalmukut	1537	Dinajpur
17	Modhubash	1538	Dinajpur
18	Nilkumur	1544	Dinajpur
19	Chapras	1577	Patuakali
20	Sita bhog	1579	Patuakali
21	Beti	1585	Patuakali
22	Rangamoni	1666	Chittagong
23	Basanti	1927	Kishoreganj
24	Nadisail	1928	Kishoreganj
25	Biruin	7357	Sylhet
26	Chakmedi	1931	Kishoreganj
27	Chafal	1973	Mymensingh
28	Binni	4707	Mymensingh
29	Kalijira	4862	Mymensingh
30	Chapail	2018	Khulna
31	Radunipagol	7955	Rajshahi
32	Kasra	2020	Khulna
33	Laxmilata	2325	Jamalpur
34	Muktahar	2327	Jamalpur
35	Ful kumari	3475	Joypurhat
<b>Sl. No.</b>	<b>Name</b>	<b>Acc. No.</b>	<b>District</b>
36	Dudhshor	3477	Joypurhat
37	Indursail	3661	Sherpur
38	Kartiksail	3662	Sherpur
39	Natisail	3663	Sherpur
40	Dadkhani	7973	Rajshahi
41	Halo	3665	Sherpur
42	Khud balam	3668	Sherpur

43	Achra	3847	Barisal
44	Sadamota	7923	Perojpur
45	Baulam	3850	Barisal
46	Bashful	3852	Barisal
47	Chinisail	3901	Tangail
48	Aloi	3904	Tangail

**Table 2. List of rice germplasm characterized during Boro 2017-18**

<b>Sl. No.</b>	<b>Name</b>	<b>Acc. No.</b>	<b>Place of collection</b>
1	Khaia boro	38	Habiganj
2	Pashusail	54	Habiganj
3	Ghugu boro	181	Tangail
4	Jagli boro	256	Mymensingh
5	Baran boro	259	Mymensingh
6	Jagli	645	Noakhali
7	Lahi boro	734	Cumilla
8	Kali boro	735	Cumilla
9	Tepi boro	930	Sylhet
10	Chaite boro	1280	Faridpur
11	Kali boro	1281	Faridpur
12	Manik muda	1282	Faridpur
13	Lahi boro	1469	Dhaka
14	Tupa	2257	Kishorganj
15	Jagoli	1476	Dhaka
16	Elachi boro	1648	Dhaka
17	Kalo boro	1649	Sylhet
18	Local boro	1652	Cumilla
19	Sonali chikan	1653	Cumilla
20	Jagli	1703	Faridpur
21	Khoia	1710	Faridpur
22	Tepisail	1712	Faridpur
23	Sada boro	1715	Faridpur
24	Jhora dhan	7362	Dinajpur
25	Deshi boro	1754	Khulna
26	Sada boro	1791	Jashore
27	Kharma dhan	1797	Kishorganj
<b>Sl. No.</b>	<b>Name</b>	<b>Acc. No.</b>	<b>District</b>
28	Mugal sail	1798	Kishorganj
29	Patri	1799	Kishorganj
30	Bogra	1803	Kishorganj
31	Jagli	1807	Kishorganj
32	Sada tupa	1812	Kishorganj
33	Banajira	1814	Kishorganj
34	Kunal boro	1860	Dinajpur

35	Deshi boro	1862	Dinajpur
36	Sada boro	1863	Dinajpur
37	Jagly	1864	Dinajpur
38	Boraya	1865	Dinajpur
39	Topa	2256	Kishorganj
40	Chhola boro	2259	Kishorganj
41	Goabish	2262	Kishorganj
42	Lafai	2269	Kishorganj
43	Gobirsail	3447	Sylhet
44	Bashful	3954	Kishorganj
45	Gul tepi	3958	Kishorganj
46	Banajira	1470	Dhaka
47	Rata	3987	Sunamganj
48	Bachi boro	3988	Habiganj

### **SSR Markers**

Ninety (90) SSR markers were used for molecular characterization. Based on polymorphism, sixty nine (69) SSR markers for T. Aman and 65 for Boro with clear amplifications were used for genetic diversity analysis and the position (cM), repeat motifs and chromosomal positions (Table 3, 4) these markers can be found in the rice genome database (<http://www.gramene.org>).

### **Genomic DNA isolation and PCR amplification**

DNA was extracted from young leaves of 14-day-old plants following the Miniscale method of Zheng *et al.*, 1995. The total PCR reaction volume was 10  $\mu$ L, composed of 3.0  $\mu$ L genomic DNA, 1.0  $\mu$ L of 10  $\times$  PCR buffer (MgCl<sub>2</sub> free), 1.35  $\mu$ L of 25 mmol/L MgCl<sub>2</sub>, 0.2  $\mu$ L of 10 mmol/L dNTPs, 0.5  $\mu$ L of 10  $\mu$ mol/L forward and reverse primers, 0.02  $\mu$ L of 5 U/ $\mu$ L *Taq* DNA polymerase and 3.43  $\mu$ L sterile deionized water. The temperature profile was an initial denaturation step for 5 min at 94°C, followed by 35 cycles of denaturation (94°C) for 45 s, annealing (55°C or 61°C) for 45 s and primer elongation (72°C) for 1.3 min and then a final extension at 72°C for 7 min.

### **Electrophoresis and visualization of amplified products**

The 10  $\mu$ L of PCR product with 2  $\mu$ L of a loading dye was analyzed using 8% polyacrylamide gel electrophoresis in 1  $\times$  TBE buffer at 75 V for about 2.0–2.5 h depending upon the allele size. The gels were stained with ethidium bromide solution (0.5 mg/mL) for 25 min and exposed to UV light using the molecular Imager gel documentation unit (XR System, Uvitec Cambridge, France) for visualization.

### **Allele scoring and data analysis**

The size of the band for each marker was scored by AlphaEaseFC 4.0 software. The average number of alleles per locus, major allele frequency, gene diversity, and polymorphism information content (PIC) were calculated using Power Marker V3.25 (Liu and Muse, 2005) and the dendrogram was constructed using MEGA 5.1 software (Tamura *et al.*, 2011). Population structure was examined using the Bayesian model-based approach implemented in STRUCTURE V2.3.4 (Pritchard *et al.*, 2000). The number of sub-populations was classified based on the true K value. The number of clusters (K) evaluated here

ranged from 1 to 10. The analysis was performed using five replicate runs per K value, a burn-in period length of 5000, a run length of 50000, and admixture model was followed. ‘Structure harvester’ programme (<http://taylor0.biology.ucla.edu>) was used to determine the final K value (K = 2 for T. Aman and K=3 for Boro was optimum for population structure analysis) based on both the LnP(D) and Evanno’s  $\Delta K$  (Evanno *et al.*, 2005).

**Table 3. List of SSR markers used for diversity analysis of T. Aman germplasm.**

Sl. No.	Primer Name	Chro. No.	Forward primer (5’-3’)	Reverse primer (5’-3’)	Annealing Temp.
1	RM1	1	GCGAAAACACAATGCAAAAA	GCGTTGGTTGGACCTGAC	55
2	RM5	1	TGCAACTTCTAGCTGCTCGA	GCATCCGATCTTGATGGG	55
3	RM212	1	CCACTTTCAGCTACTACCAG	CACCCATTTG	55
4	RM302	1	TCATGTCATCTACCATCACAC	ATGGAGAAGATGGAATACTTGC	55
5	RM472	1	CCATGGCCTGAGAGAGAGAG	AGCTAAATGGCCATACGGTG	55
6	RM283	1	GTCTACATGTACCCTTGTGGG	CGGCATGAGAGTCTGTGATG	55
7	RM145	2	CCGGTAGGCGCCCTGCAGTTC	CAAGGACCCCATCCTCGGCGTC	56
8	RM208	2	TCTGCAAGCCTTGTCTGATG	TAAGTCGATCATTGTGTGGACC	55
9	RM213	2	ATCTGTTTGCAGGGGACAAG	AGGTCTAGACGATGTCGTGA	55
10	RM262	2	CATTCCGTCTCGGCTCAACT	CAGAGCAAGGTGGCTTGC	55
11	RM263	2	GCGCTGGTGGAAAATGAG	GGCATCCCTCTTTGATTCCTC	55
12	RM452	2	CTGATCGAGAGCGTTAAGGG	GGGATCAAACCACGTTTCTG	55
13	RM207	2	CCATTTCGTGAGAAGATCTGA	CACCTCATCCTCGTAACGCC	55
14	RM530	2	GCACTGACCACGACTGTTTG	ACCGTAACCCGGATCTATCC	55
15	RM411	3	ACACCAACTCTTGCCTGCAT	TGAAGCAAAAACATGGCTAGG	55
16	RM520	3	AGGAGCAAGAAAAGTTCCCC	GCCAATGTGTGACGCAATAG	55
17	RM3646	3	ACTAGAGCACCCCTCGTGAG	CTCAGCCACCCCATCAAC	55
18	RM338	3	CACAGGAGCAGGAGAAGAGC	GGCAAACCGATCACTCAGTC	55
19	RM7	3	TTCGCCATGAAGTCTCTCG	CCTCCCATCATTTTCGTTGTT	55
20	RM517	3	GGCTTACTGGCTTCGATTTG	CGTCTCCTTTGGTTAGTGCC	55
21	RM16	3	CGCTAGGGCAGCATCTAAA	AACACAGCAGGTACGCGC	55
22	RM252	4	TTCGCTGACGTGATAGGTTG	ATGACTGATCCCCGAGAACG	55
23	RM273	4	GAAGCCGTCGTGAAGTTACC	GTTTCCTACCTGATCGCGAC	55
24	RM303	4	GCATGGCCAAATATTAAGG	GGTTGGAAATAGAAGTTCGGT	55
25	RM124	4	ATCGTCTGCGTTGCGGCTGCTG	CATGGATCACCGAGCTCCCCC	67
Sl. No.	Primer Name	Chro. No.	Forward primer (5’-3’)	Reverse primer (5’-3’)	Annealing Temp.
26	RM317	4	CATACTTACCAGTTCACCGCC	CTGGAGAGTGTGAGCTAGTTGA	55
27	RM551	4	AGCCCAGACTAGCATGATTG	GAAGGCGAGAAGGATCACAG	55
28	RM26	5	GAGTCGACGAGCGGCAGA	CTGCGAGCGACGGTAACA	55
29	RM289	5	TTCCATGGCACACAAGCC	CTGTGCACGAACTTCCAAAG	55
30	RM413	5	GGCGATTCTTGGATGAAGAG	TCCCCACCAATCTTGCTTC	55
31	RM159	5	GGGGCACTGGCAAGGGTGAAGG	GCTTGTGCTTCTCTCTCTCTCTCTC	55
32	RM305	5	TACTGCCAAAGGCGAGCTTC	GTGAGAGGCTACAGCTAACC	55
33	RM190	6	CTTTGTCTATCTCAAGACAC	TTGCAGATGTTCTTCTGATG	55
34	RM170	6	TCGCGTCTTCTCCTCGTCGACG	CCCGTTGCAGAGGAAGCAGCC	55
35	RM162	6	GCCAGCAAAACCAGGGATCCGG	CAAGGTCTGTGCGGCTTGC	61
36	RM133	6	TTGGATTGTTTGTGCTGGCTCGC	GGAACACGGGGTCGGAAGCGAC	61
37	RM253	6	TCCTTCAAGAGTGCAAAACC	GCATTGTCATGTCGAAGCC	55
38	RM539	6	GAGCGTCTTGTAAAACCG	AGTAGGGTATCACGCATCCG	55
39	RM320	7	CAACGTGATCGAGGATAGATC	GGATTTGCTTACCACAGCTC	55
40	RM455	7	AACAACCCACCACCTGTCTC	AGAAGGAAAAGGGCTCGATC	55
41	RM234	7	ACAGTATCCAAGGCCCTGG	CACGTGAGACAAAGACGGAG	55
42	RM429	7	TCCCTCCAGCAATGTCTTTC	CCTTCATCTTGCTTTCCACC	55

43	RM560	7	GCAGGAGGAACAGAATCAGC	AGCCCGTGATACGGTGATAG	55
44	RM223	8	GAGTGAGCTTGGGCTGAAAC	GAAGGCAAGTCTTGGCACTG	55
45	RM342	8	CCATCCTCCTACTTCAATGAAG	ACTATGCAGTGGTGTACACC	55
46	RM515	8	TAGGACGACCAAAGGGTGAG	TGGCCTGTCTCTCTCTCTC	55
47	RM447	8	CCCTTGTGCTGTCTCCTCTC	ACGGGCTTCTTCTCCTTCTC	55
48	RM38	8	ACGAGCTCTCGATCAGCCTA	TCGGTCTCCATGTCCCAC	55
49	RM201	9	CTCGTTTATTACCTACAGTACC	CTACCTCCTTTCTAGACCGATA	55
50	RM205	9	CTGGTTCTGTATGGGAGCAG	CTGGCCCTTCACGTTTCAGTG	55
51	RM566	9	ACCCAACACTACGATCAGCTCG	CTCCAGGAACACGCTCTTTC	55
52	RM316	9	CTAGTTGGGCATACGATGGC	ACGCTTATATGTTACGTCAAC	55
53	RM321	9	CCAACACTGCCACTCTGTTC	GAGGATGGACACCTTGATCG	55
54	RM228	10	CTGGCCATTAGTCTTGG	GCTTGC GGCTCTGCTTAC	55
55	RM304	10	TCAAACCGGCACATATAAGAC	GATAGGGAGCTGAAGGAGATG	55
56	RM591	10	CTAGCTAGCTGGCACCAGTG	TGGAGTCCCGTGTGTAGTCCG	55
57	RM484	10	TCTCCCTCCTCACCATTGTC	TGCTGCCCTCTCTCTCTCTC	55
58	RM536	11	TCTCTCCTCTTGTTTGGCTC	ACACACCAACACGACCACAC	55
59	RM202	11	CAGATTGGAGATGAAGTCCTCC	CCAGCAAGCATGTCAATGTA	55
60	RM206	11	CCCATGCGTTTAACATTCT	CGTCCATCGATCCGATATGG	55
61	RM209	11	ATATGAGTTGCTGTCTGTGCG	CAACTTGCATCCTCCCCTCC	55
62	RM144	11	TGCCCTGGCGCAAAATTTGATCC	GCTAGAGGAGATCAGATGGTAGTGCATG	55
63	RM224	11	ATCGATCGATCTTCACGAGG	TGCTATAAAAAGGCATTCCGGG	55
64	RM167	11	GATCCAGCGTGAGGAACACGT	AGTCCGACCACAAGGTGCGTTGTC	55
65	RM229	11	CACTCACACGAACGACTGAC	CGCAGGTTCTTGTGAAATGT	55
66	RM19	12	CAAAAACAGAGCAGATGAC	CTCAAGATGGACGCCAAGA	55
67	RM277	12	CGGTCAAAATCATCACCTGAC	CAAGGCTTGC AAGGGAAG	55
68	RM1337	12	GTGCAATGCTGAGGAGTATC	CTGAGAATCTGGAGTGCTTG	55
69	RM12	12	TGCCCTGTTATTTTCTTCTCTC	GGTGATCCTTTCCCATTTCA	55

**Table 4. List of SSR markers used for diversity analysis of Boro germplasm.**

Sl. No.	Primer Name	Chro. No.	Forward primer (5'-3')	Reverse primer (5'-3')	Annealing Temp.
1	RM1	1	GCGAAAACACAATGCAAAAA	GCGTTGGTTGGACCTGAC	55
2	RM5	1	TGCAACTTCTAGCTGCTCGA	GCATCCGATCTTGATGGG	55
3	RM212	1	CCACTTTCAGCTACTACCAG	CACCCATTGTCTCTCATTATG	55
4	RM302	1	TCATGTCATCTACCATCACAC	ATGGAGAAGATGGAATACTTGC	55
5	RM472	1	CCATGGCCTGAGAGAGAGAG	AGCTAAATGGCCATACGGTG	55
6	RM283	1	GTCTACATGTACCCTTGTGGG	CGGCATGAGAGTCTGTGATG	55
7	RM145	2	CCGGTAGGCGCCCTGCAGTTTC	CAAGGACCCCATCTCGGCGTC	-
8	RM208	2	TCTGCAAGCCTTGTCTGATG	TAAGTCGATCATTGTGTGGACC	55
Sl. No.	Primer Name	Chro. No.	Forward primer (5'-3')	Reverse primer (5'-3')	Annealing Temp.
9	RM213	2	ATCTGTTTGCAGGGGACAAG	AGGTCTAGACGATGTCGTGA	55
10	RM262	2	CATCCGTCTCGGCTCAACT	CAGAGCAAGGTGGCTTGC	55
11	RM263	2	GCGCTGGTGGAAAATGAG	GGCATCCCTCTTTGATTCTC	55
12	RM452	2	CTGATCGAGAGCGTTAAGGG	GGGATCAAACCACGTTTCTG	55
13	RM207	2	CCATTCGTGAGAAGATCTGA	CACCTCATCCTCGTAACGCC	55
14	RM530	2	GCACAGCACCAGACTGTTG	ACCGTAACCCGATCTATCC	55
15	RM411	3	ACACCAACTCTTGCCTGCAT	TGAAGCAAAAACATGGCTAGG	55
16	RM520	3	AGGAGCAAGAAAAGTTCCCC	GCCAATGTGTGACGCAATAG	55
17	RM3646	3	ACTAGAGCACCCCTCGCTGAG	CTCAGCCACCCCATCAAC	55
18	RM338	3	CACAGGAGCAGGAGAAGAGC	GGCAAACCGATCACTCAGTC	55
19	RM7	3	TTCGCCATGAAGTCTCTCG	CCTCCCATCATTTCTGTTGTT	55
20	RM16	3	CGCTAGGGCAGCATCTAAA	AACACAGCAGGTACGCGC	55
21	RM252	4	TTCGCTGACGTGATAGGTTG	ATGACTTGATCCCAGAGAACG	55
22	RM273	4	GAAGCCGTCGTGAAGTTACC	GTTTCTACCTGATCGCGAC	55
23	RM303	4	GCATGGCCAAATATTAAGG	GGTTGGAAAATAGAAGTTCCGT	55
24	RM124	4	ATCGTCTGCGTTGCGGCTGCTG	CATGGATCACCGAGCTCCCCC	67
25	RM317	4	CATACTACCAGTTCACCGCC	CTGGAGAGTGTGAGCTAGTTGA	55



On the other hand, in Boro season, maximum estimates of co-efficient of variation were observed for the characters, unfilled grain per panicle, filled grains per panicle, total tiller number, effective tillar number, ligule length (mm) and yield per hill (g) (Table 7). Such variation indicates the scope of selection for improvement for the characters.

**Table 5. Variability in different quantitative characters in 48 T. Aman rice germplasm**

Characters	Range	Mean	SE	CV%
Seedling height (cm)	37.8-53.00	45.27	0.54	12.50
Ligule length (mm)	11.20-17.80	14.39	0.23	11.70
Leaf blade length (cm)	24.47-52.87	37.43	0.87	17.04
Leaf blade width (cm)	1.03-2.08	1.39	0.04	22.48
Culm diameter (mm)	3.30-8.59	5.68	0.15	19.34
Culm length (cm)	58.87-133.40	108.12	2.02	13.71
Total tiller number	9-15	12	0.19	11.45
Effective tiller number	7-13	10	0.17	12.02
Plant height (cm)	82.93-161.20	132.49	2.11	11.68
Days to flowering	72-120	102	1.52	10.88
Days to maturity	99-146	130	1.48	8.36
Panicle length (cm)	20.73-28.73	24.46	0.26	7.68
Filled grains per panicle	71-157	103	3.03	21.55
Unfilled grains per panicle	14-76	35	1.63	33.95
Grain length (mm)	6.23-11.16	8.49	0.12	10.75
Grain breadth (mm)	2.04-3.45	2.69	0.04	11.92
Brown rice length (mm)	4.11-8.35	5.90	1.10	12.52
Brown rice breadth (mm)	1.65-2.97	2.36	0.04	12.36
Brown rice L/B	1.71-3.69	2.54	0.06	18.61
1000 grain weight (g)	11.37-31.00	21.97	0.62	20.72
Yield per hill (g)	6.34-13.29	9.21	0.24	19.27

**Table 6. Variability in different quantitative characters in 48 Boro rice germplasm**

Characters	Range	Mean	SE	CV%
Seedling height (cm)	26.20-43.20	38.12	0.56	10.82
Ligule length (mm)	10.37-28.23	14.49	0.39	19.88
Leaf blade length (cm)	32.47-62.47	47.33	0.94	14.56
Leaf blade width (cm)	0.63-1.51	1.09	0.02	14.90
Culm diameter (mm)	3.50-6.42	4.47	0.08	12.47
Culm length (cm)	50.20-107.70	90.37	1.45	11.77
Total tiller number	9-24	14	0.43	22.82
Effective tiller number	7-20	12	0.35	21.44
Plant height (cm)	88.00-133.27	113.25	1.38	8.97

Days to flowering	102-136	124.22	0.83	4.91
Days to maturity	128-163	152.79	0.82	3.94
Panicle length (cm)	17.70-26.60	22.51	0.32	10.52
Filled grains per panicle	57-251	103.96	4.43	21.30
Unfilled grains per panicle	4-36	15.85	1.08	40.03
Grain length (mm)	5.20-8.72	7.49	0.09	9.11
Grain breadth (mm)	2.57-3.54	2.91	0.03	8.66
Brown rice length (mm)	3.36-6.30	5.25	0.08	11.04
Brown rice breadth (mm)	2.30-3.42	2.60	0.03	9.16
Brown rice L/B	1.34-2.49	2.04	0.04	13.13
1000 grain weight (g)	12.60-24.92	20.37	0.36	13.16
Yield per hill (g)	3.57-19.04	11.95	0.42	16.09

## **Molecular characterization**

### **SSR Diversity (T.Aman)**

The DNA profiles of 48 T. Aman rice germplasm with RM447 are shown in Figure 1. In this study, 69 SSR markers distributed all over the 12 chromosomes of rice were genotyped in 48 T. Aman germplasm of Bangladesh. The summary statistics of the 69 SSR markers are given in Table 7. A total of 328 alleles varied from 2 to 11 with an average of 4.75 per locus were detected at 69 microsatellite loci across the 48 T. Aman rice germplasm. The major allele size ranged from 70 bp (RM413) to 306 bp (RM472) and the frequency ranged from 18.75 % to 97.92%. On an average, 61.18% of the 48 T. Aman germplasm shared a common major allele at any given locus. The gene diversity varied from 0.04 (RM455) to 0.88 (RM206) with an average of 0.52 and the PIC value from 0.04 (RM455) to 0.87 (RM206) with an average of 0.48. The results also revealed that SSR marker namely RM206 (0.87) was supposed to be the best marker for characterizing the 48 T. Aman rice germplasm due to its higher PIC value.

### **Genetic distance-based analysis**

The genetic distance-based results seen in the unrooted neighbor-joining tree revealed that the 48 T. Aman rice germplasm were grouped into three major clusters using Mega software (Figure 2). The highest numbers of germplasm (21) were found in cluster II followed by cluster III (18) and the lowest in cluster I (9).

### **Population structure analysis**

Population structure of the 48 T. Aman rice germplasm was analysed by Bayesian based approach. Admixture model-based simulations were carried out by varying K from 1 to 10 with 5 interactions which showed that the highest log likelihood is at K = 2 (Figure 3) suggesting two major groups

corresponding to two distinct clusters (GI and GII). The population group namely GI (green colour, Figure 4) and GII (red colour, Figure 4) representing 87.5% (42) and 12.5 % (6) of T. Aman rice germplasm used in structure analysis, respectively.

**Table 7. Number of alleles, allele size range, frequency, gene diversity and polymorphism information content (PIC) found among 48 T. Aman rice germplasm for 69 microsatellite markers**

SL. No.	Marker	Chro. No.	Position (cM)	Motif*	Allele No.	Unique allele and size (bp)	Size range (bp)	Size (bp)	Freq (%)	Gene diversity	PIC
1	RM1	1	29.7	(GA)26	5	-	84-125	125	39.58	0.75	0.71
2	RM5	1	94.9	GA)14	4	-	108-130	108	41.67	0.69	0.63
3	RM283	1	31.4	(GA)18	4	1 (172 bp)	150-172	172	85.42	0.26	0.25
4	RM302	1	147.8	(GT)30(AT)8	3	-	123-168	168	64.58	0.50	0.43
5	RM212	1	148.7	(CT)24	5	-	115-142	142	77.08	0.39	0.37
6	RM472	1	171.6	(GA)21	4	1 (276 bp)	276-306	306	54.17	0.61	0.54
7	RM208	2	186.4	(CT)17	6	1 (170 bp)	170-197	170	54.17	0.64	0.61
8	RM213	2	186.4	(CT)17	5	2(139bp, 157 bp)	139-157	139	64.58	0.52	0.46
9	RM530	2	158	(GA)23	4	-	168-179	168	39.58	0.68	0.62
10	RM262	2	103.3	(CT)16	3	-	146-160	160	39.58	0.65	0.57
11	RM263	2	127.5	(CT)34	4	-	180-201	180	52.08	0.64	0.58
12	RM207	2	191.2	(CT)25	9	-	75-152	152	27.08	0.83	0.81
13	RM145	2	49.8	-	5	2 (172, 207 bp)	172-207	172	85.42	0.26	0.25
14	RM452	2	58.4	(GTC)9	3	-	194-210	210	79.17	0.35	0.32
15	RM411	3	127.9	(GTT)7	2	-	110-117	110	83.33	0.28	0.24
16	RM16	3	131.5	(TCG)5(GA)16	6	3(175,182 ,195 bp)	168-195	168	81.25	0.33	0.32
17	RM338	3	108.4	(CTT)6	2	-	186-191	186	95.83	0.08	0.08
18	RM3646	3	6.32	(GA)14	5	1 (162 bp)	139-162	139	45.83	0.70	0.65
19	RM520	3	191.6	(AG)10	5	-	222-252	252	39.58	0.69	0.64
20	RM7	3	64	(GA)19	5	1 (162 bp)	162-190	190	50.00	0.66	0.61
21	RM517	3	42.9	(CT)15	5	-	249-272	272	43.75	0.71	0.66
22	RM252	4	99	(CT)19	9	-	193-263	193	18.75	0.87	0.85
23	RM273	4	94.4	(GA)11	3	-	200-214	214	85.42	0.26	0.24
24	RM124	4	150.1	(TC)10	3	1 (265 bp)	251-265	265	91.67	0.16	0.15
25	RM303	4	116.9	[AC(AT)210]9( GT)7(ATGT)6	8	5(163,169 ,191,197, 230 bp)	163-230	230	39.58	0.71	0.66
26	RM317	4	118.3	(GC)4(GT)18	4	-	161-175	161	75.00	0.41	0.38
27	RM551	4	8.5	(AG)18	5	1 (212 bp)	175-219	175	87.50	0.23	0.22
28	RM26	5	118.8	(GA)15	5	-	100-121	121	73.75	0.67	0.61
29	RM413	5	26.7	(AG)11	8	1 (118 bp)	70-118	70	50.00	0.70	0.67
30	RM289	5	56.7	G11(GA)16	4	-	83-115	115	75.00	0.41	0.38
31	RM159	5	2.3	(GA)19	2	-	237-244	244	64.54	0.46	0.35
32	RM305	5	96.9	(GT)4	3	-	205-211	205	77.05	0.37	0.32
33	RM170	6	2.2-7.4	(CCT)7	5	-	109-150	109	50.00	0.68	0.64
34	RM253	6	37	(GA)25	6	-	121-153	153	52.00	0.67	0.63
35	RM190	6	7.4	(CT)11	6	1 (130 bp)	105-130	124	75.00	0.42	0.40
36	RM133	6	0	(CT)8	2	-	218-224	224	79.17	0.33	0.28
37	RM162	6	108.3	(AC)20	2	-	212-232	232	91.67	0.15	0.14
38	RM539	6	45.1	(TAT)21	6	-	257-302	257	45.83	0.72	0.69
39	RM455	7	65.7	(TTCT)5	2	1 (134 bp)	128-134	134	97.92	0.04	0.04
40	RM320	7	62.4	(AT)11GTAT (GT)13	6	-	157-255	255	58.33	0.62	0.59
41	RM234	7	88.2	(CT)25	6	1 (137 bp)	137-171	171	68.75	0.50	0.47
42	RM429	7	96.9	(TG)10	3	-	151-166	166	64.58	0.48	0.40
43	RM560	7	54.2	(CT)12	4	-	229-250	250	66.67	0.50	0.46
44	RM447	8	124.6	(CTT)8	4	1 (145 bp)	105-141	105	72.92	0.44	0.40
45	RM342	8	78.4	(CAT)12	7	-	127-167	127	22.92	0.82	0.80
46	RM223	8	80.5	(CT)25	6	1 (185 bp)	150-185	185	47.92	0.67	0.62
47	RM515	8	80.5	(GA)11	7	1 (197 bp)	197-254	197	52.08	0.68	0.65

48	RM38	8	103.7	(TCT)25	3	-	210-224	224	58.33	0.57	0.51
49	RM205	9	114.7	(CT)25	6	-	121-165	122	52.08	0.65	0.60
50	RM316	9	1.8	(GT)8(TG)9(TT TG)4(TG)4	3	1(222 bp)	203-222	203	87.50	0.22	0.21
51	RM566	9	47.7	(AG)15	5	1 (265 bp)	237-277	237	64.58	0.53	0.49
52	RM201	9	81.2	(CT)17	5	1 (144 bp)	144-166	166	47.92	0.67	0.62
<b>SL. No.</b>	<b>Marker</b>	<b>Chro. No.</b>	<b>Position (cM)</b>	<b>Motif*</b>	<b>Allele No.</b>	<b>Unique allele and size bp</b>	<b>Size range (bp)</b>	<b>Size (bp)</b>	<b>Freq (%)</b>	<b>Gene diversity</b>	<b>PIC</b>
53	RM321	9	32.1	(CAT)5	3	-	196-202	200	83.33	0.29	0.27
54	RM228	10	130.3	(CA)6(GA)36	5	-	110-160	160	70.83	0.47	0.44
55	RM591	10	118.3	(AC)10	6	1 (263 bp)	231-263	263	41.67	0.64	0.58
56	RM484	10	97.3	(AT)9	4	1 (304 bp)	281-304	304	47.92	0.56	0.46
57	RM304	10	73	(GT)2(AT)10GT )33	7	1 (134 bp)	134-172	172	47.92	0.70	0.67
58	RM202	11	54	(CT)30	4	-	168-189	189	41.67	0.69	0.64
59	RM144	11	123.2	(ATT)11	8	2 (183, 243 bp)	183-243	243	45.83	0.71	0.68
60	RM206	11	102.9	(CT)21	<b>11</b>	2 (182, 191bp)	125-191	125	18.75	<b>0.88</b>	<b>0.87</b>
61	RM209	11	73.9	(CT)18	5	1 (180 bp)	133-180	133	58.33	0.59	0.54
62	RM224	11	120.1	(AAG)8(AG)13	4	-	156-173	156	37.50	0.70	0.65
63	RM536	11	55.1	(CT)16	3	-	223-243	243	75.00	0.39	0.34
64	RM167	11	37.5	(GA)16	5	-	112-149	149	77.04	0.39	0.37
65	RM229	11	77.8	(TC)11(CT)5C3 (CT)5	5	1 (114 bp)	1144-133	114	52.08	0.62	0.56
66	RM277	12	57.2	(GA)11	3	-	120-132	120	87.50	0.23	0.21
67	RM12	12	109.1	(GA)21	4	1 (162 bp)	162-190	190	87.50	0.23	0.22
68	RM19	12	20.9	(ATC)10	4	1 (235 bp)	211-246	211	58.33	0.58	0.52
69	RM1337	12	0	(AG)21	5	1 (213 bp)	180-213	213	52.08	0.65	0.61
	<b>Max.</b>				<b>11</b>	<b>1</b>		<b>306</b>	<b>97.92</b>	<b>0.88</b>	<b>0.87</b>
	<b>Min.</b>				<b>2</b>	<b>2</b>		<b>70</b>	<b>18.75</b>	<b>0.04</b>	<b>0.04</b>
	<b>Total</b>				<b>328</b>	<b>41</b>		<b>12508</b>	<b>4221.44</b>	<b>36.15</b>	<b>33.45</b>
	<b>Mean</b>				<b>4.75</b>			<b>181.28</b>	<b>61.18</b>	<b>0.52</b>	<b>0.48</b>

## RM 447

200 bp

75 bp

**Figure 1. DNA profile of 48 T. Aman rice germplasm using RM447 marker**

**Legend:** 1. Nagra, 2. Rajasail, 3. Muctahar, 4. Sitabhog, 5. Moyna moti, 6. Mogi balam, 7. Tepusail, 8. Fakirmoni, 9. Saikali, 10. Indusail, 11. Jotagainja, 12. Mugi, 13. Laitasail, 14. Boot bazal, 15. Mohishdol, 16. Shalmukut, 17. Modhubash, 18. Nilkumur, 19. Chapras, 20. Sita bhog, 21. Beti, 22. Rangamoni, 23. Basanti, 24. Nadisail, 25. Biruin, 26. Chakmedi, 27. Chafal, 28. Binni, 29. Kalijira, 30. Chapail, 31. Radunipagol, 32. Kasra, 33. Laxmilata, 34. Muktahar, 35. Ful kumari, 36. Dudhshor, 37. Indursail, 38. Kartiksail, 39. Natisail, 40. Dadkhani, 41. Haloi, 42. Khud balam, 43. Achra, 44. Sadamota, 45. Baulam, 46. Bashful, 47. Chinisail, 48. Alo

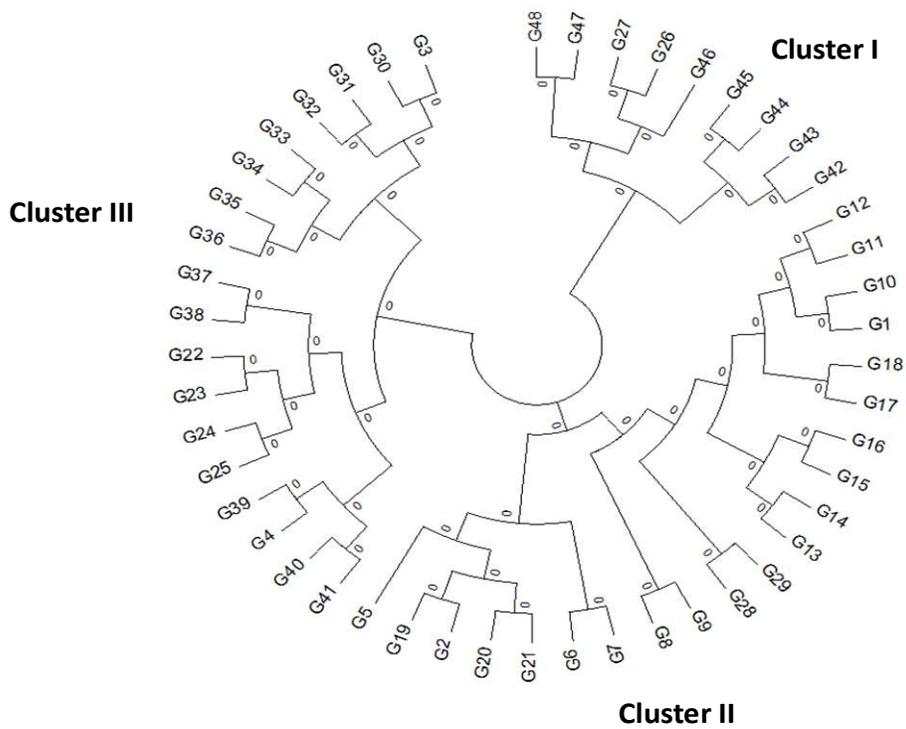


Figure 2. NJ tree of 48 T. Aman rice germplasm based on 69 SSR markers

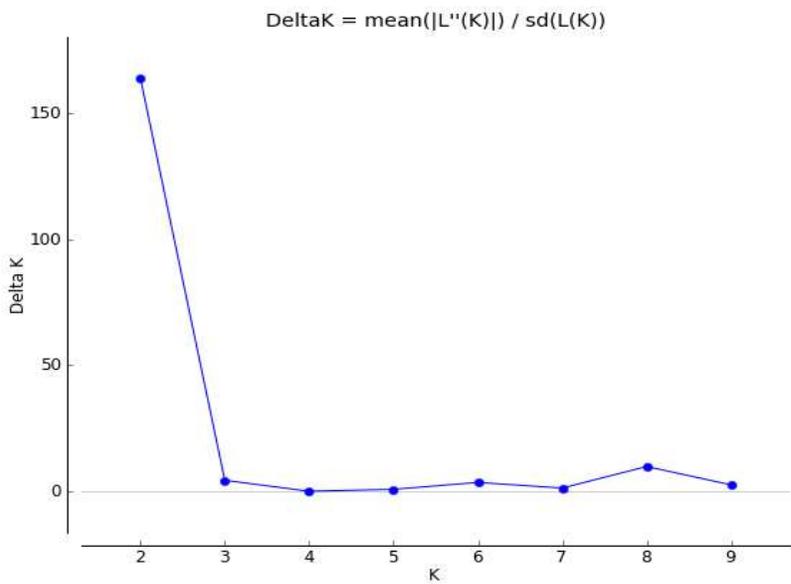
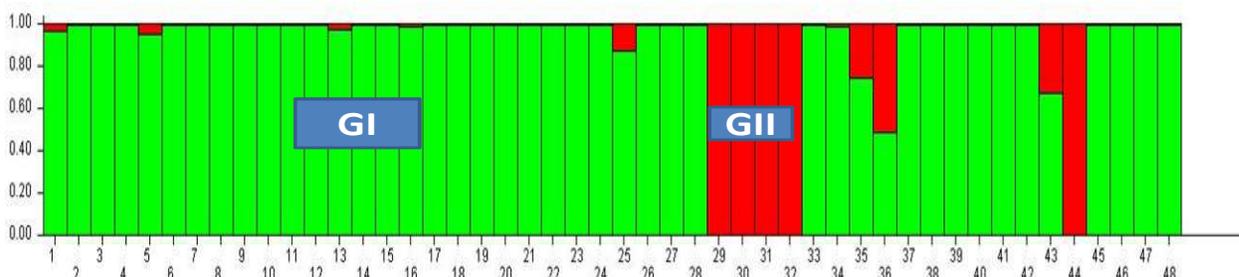


Figure 3. STRUCTURE estimation of the number of groups for the K values ranging from 1 to 10, by delta K ( $\Delta K$ ) values.



**Figure 4. Assignment of 48 T. Aman germplasm to two groups (GI and GII) using STRUCTURE 2.3.4 software**

***SSR Diversity (Boro)***

All the 48 Boro rice germplasm were genotyped using 69 SSR markers which produced a total of 255 alleles. The number of alleles per loci varied from 2 to 11 with an average of 3.92 alleles per locus. The highest number of alleles were detected for the loci RM302 (11) and the lowest (2) was detected for a group of markers viz., RM277, RM411, RM316, RM455, RM124, RM162, RM484 and RM38 (Table 8). The gene diversity ranged from 0.08 (RM455) to 0.89 (RM302), with an average was 0.49. The polymorphism information content (PIC) values ranged from 0.08 (RM455) up to 0.88 (RM302) with an average of 0.44. PIC value revealed that RM302 was considered as the best marker for 48 Boro rice germplasm. The DNA profiles of 48 Boro rice germplasm using SSR marker RM209 are shown in Figure 5.

**Table 8. Number of alleles, allele size range, highest frequency allele, gene diversity and polymorphism information content (PIC) found among 48 Boro rice germplasm for 65 microsatellite markers**

SL. No.	Marker	Chro. No.	Position (cM)	Motif*	Allele No.	Unique allele and size bp	Size range (bp)	Size (bp)	Freq (%)	Gene diversity	PIC
1	RM 1	1	29.7	(GA)26	5	1 (130 bp)	72-130	130	77.08	0.39	0.37
2	RM 170	6	2.2-7.4	(CCT)7	4	1 (150 bp)	112-150	112	39.58	0.65	0.58
3	RM 205	9	114.7	(CT)25	5	-	130-174	130	75.00	0.42	0.40
4	RM 208	2	186.4	(CT)17	3	-	173-191	173	64.58	0.48	0.40
5	RM 213	2	186.4	(CT)17	3	-	138-150	138	80.43	0.33	0.31
6	RM 253	6	37	(GA)25	4	-	132-151	151	64.58	0.53	0.49
7	RM 262	2	103.3	(CT)16	3	-	149-165	149	79.17	0.35	0.32
8	RM 263	2	127.5	(CT)34	4	-	187-207	207	52.08	0.65	0.60
9	RM 277	12	57.2	(GA)11	2	-	126-132	126	76.60	0.36	0.29
10	RM 342	8	78.4	(CAT)12	5	1 (134 bp)	134-158	134	79.17	0.36	0.34
11	RM 411	3	127.9	(GTT)7	2	-	110-118	110	60.87	0.48	0.36
12	RM 447	8	124.6	(CTT)8	3	1 (146 bp)	111-146	111	72.92	0.41	0.34
13	RM 5	1	94.9	GA)14	3	-	113-132	113	62.50	0.52	0.44
14	RM 16	3	131.5	(TCG)5(GA)16	3	-	181-224	181	87.50	0.23	0.21
15	RM 26	5	118.8	(GA)15	4	-	107-125	107	81.25	0.33	0.31
16	RM 202	11	54	(CT)30	3	-	174-194	194	60.42	0.56	0.50
17	RM 207	2	191.2	(CT)25	4	1 (140 bp)	72-140	140	84.78	0.27	0.26
18	RM 223	8	80.5	(CT)25	4	-	154-170	170	71.74	0.45	0.42
19	RM 252	4	99	(CT)19	5	1 (196 bp)	196-269	196	68.75	0.50	0.47
20	RM 273	4	94.4	(GA)11	3	-	195-207	207	63.83	0.53	0.47
21	RM 283	1	31.4	(GA)18	4	-	157-174	157	37.50	0.73	0.68
22	RM 302	1	147.8	(GT)30(AT)8	11	1 (252 bp)	133-290	133	19.57	0.89	0.88
23	RM 316	9	1.8	(GT)8(TG)9 (TTG)4(TG)4	2	-	216-208	216	85.42	0.25	0.22
24	RM 338	3	108.4	(CTT)6	3	-	183-196	183	89.58	0.19	0.18
25	RM 413	5	26.7	(AG)11	4	-	75-121	75	68.75	0.48	0.44
26	RM 452	2	58.4	(GTC)9	3	-	198-211	211	59.57	0.56	0.50
27	RM 455	7	65.7	(TTCT)5	2	-	131-137	131	95.83	0.08	0.08
28	RM 3646	3	6.32	(GA)14	3	-	139-153	139	70.21	0.45	0.40
29	RM 12	12	109.1	(GA)21	5	1 (199 bp)	171-199	171	47.92	0.66	0.60
30	RM 19	12	20.9	(ATC)10	3	-	225-245	225	62.50	0.51	0.43
31	RM 124	4	150.1	(TC)10	2	-	257-267	267	68.75	0.43	0.34
32	RM 144	11	123.2	(ATT)11	7	2 (220 bp, 271 bp)	214-271	214	43.75	0.73	0.69
33	RM 133	6	0	(CT)8	2	-	227-234	234	85.42	0.25	0.22
34	RM 145	2	49.8	-	3	1 (206bp)	185-206	185	91.67	0.16	0.15
35	RM 162	6	108.3	(AC)20	2	-	222-228	228	87.50	0.22	0.19
36	RM 206	11	102.9	(CT)21	7	-	136-193	136	50.00	0.70	0.68
37	RM 209	11	73.9	(CT)18	7	1 (149 bp)	123-171	123	50.00	0.67	0.63
38	RM 212	1	148.7	(CT)24	3	-	117-132	132	70.83	0.45	0.41
39	RM 224	11	120.1	(AAG)8(AG)13	4	1 (150 bp)	144-169	144	62.50	0.52	0.45
40	RM 228	10	130.3	(CA)6(GA)36	5	1 (151 bp)	112-151	158	70.83	0.47	0.44
41	RM 289	5	56.7	G11(GA)16	5	-	93-173	93	33.33	0.76	0.72
42	RM 303	4	116.9	[AC(AT)210]9( GT)7(ATGT)6	6	-	191-233	191	35.42	0.78	0.75
43	RM 304	10	73	(GT)2(AT)10 (GT)33	6	1 (144 bp)	144-182	144	53.19	0.65	0.60
44	RM 320	7	62.4	(AT)11GTAT (GT)13	9	1 (183 bp)	183-326	326	19.57	0.86	0.84
45	RM 472	1	171.6	(GA)21	4	-	288-314	288	58.33	0.59	0.54
46	RM 484	10	97.3	(AT)9	2	-	292-298	298	85.42	0.25	0.22
47	RM 515	8	80.5	(GA)11	5	2 (204bp, 263 bp)	204-263	204	58.33	0.57	0.52
48	RM 520	3	191.6	(AG)10	3	-	229-252	252	60.42	0.52	0.44
49	RM 536	11	55.1	(CT)16	3	-	229-243	243	56.25	0.56	0.48
50	RM 591	10	118.3	(AC)10	4	-	235-264	264	56.25	0.61	0.57
51	RM 566	9	47.7	(AG)15	5	-	242-286	242	31.82	0.78	0.74
52	RM 1337	12	0	(AG)21	5	1 (181 bp)	181-222	222	64.58	0.54	0.50
53	RM 7	3	64	(GA)19	3	-	180-194	180	66.67	0.47	0.39

SL. No.	Marker	Chro. No.	Position (cM)	Motif*	Allele No.	Unique allele and size bp	Size range (bp)	Size (bp)	Freq (%)	Gene diversity	PIC
54	RM 38	8	103.7	(TCT)25	2	-	229-238	238	77.08	0.35	0.29
55	RM 159	5	2.3	(GA)19	3	-	247-259	247	75.00	0.40	0.36
56	RM 167	11	37.5	(GA)16	4	-	133-169	133	46.81	0.66	0.60
57	RM229	11	77.8	(TC)11(CT)5C3(CT)5	4	-	123-147	123	71.74	0.45	0.42
58	RM 234	7	88.2	(CT)25	5	-	149-177	149	68.89	0.50	0.47
59	RM 305	5	96.9	(GT)4	3	-	200-214	200	79.55	0.35	0.32
60	RM 317	4	118.3	(GC)4(GT)18	3	-	155-170	155	87.50	0.23	0.21
61	RM 528	6	121.6	(AGAT)9	3	-	240-262	240	68.89	0.47	0.42
62	RM 530	2	158	(GA)23	3	-	170-182	170	74.42	0.41	0.36
63	RM 539	6	45.1	(TAT)21	5	-	272-311	272	43.75	0.72	0.69
64	RM 551	4	8.5	(AG)18	3	-	192-220	192	79.17	0.34	0.31
65	RM 560	7	54.2	(CT)12	3	-	242-258	242	55.56	0.56	0.47
	<b>Max.</b>				11	2		326.00	95.83	0.89	0.88
	<b>Min.</b>				2	1		75.00	19.57	0.08	0.08
	<b>Total</b>				255	19		11749.00	4228.86	31.56	28.73
	<b>Mean</b>				3.92			180.75	65.06	0.49	0.44

### Genetic distance-based analysis

The genetic distance-based results seen in the UPGMA clustering system revealed that the 48 Boro rice germplasm were grouped into four major clusters using ward's method (Figure 6). The highest numbers of germplasm (21) were found in cluster II followed by cluster I (20), IV (4) and the lowest in cluster III (3).

### Population structure analysis

Population structure of the 48 Boro rice germplasm was analysed by Bayesian based approach. Admixture model-based simulations were carried out by varying K from 1 to 10 with 5 interactions which showed that the highest log likelihood is at K = 3 (Figure 7) suggesting three major groups corresponding to three distinct clusters (GI, GII and GIII). The population group namely GI (red colour, Figure 8), GII (green colour, Figure 8) and GIII (Blue colour, Figure 8) representing 54.17% (26), 31.25% (15) and 14.58% (7) of Boro rice germplasm used in structure analysis, respectively.

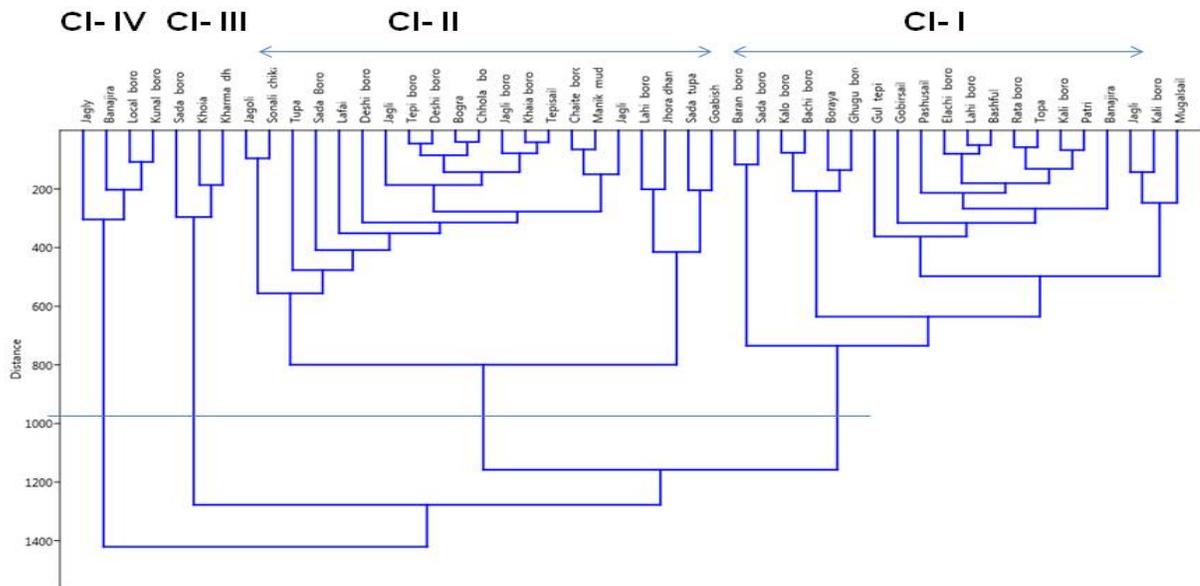
# RM209

200 bp

75 bp

**Figure 5 . DNA profile of 48 Boro rice germplasm using RM209 marker**

**Legend:** 1. Khaia boro 2. Pashusail, 3. Ghugu boro, 4. Jagli boro, 5. Baran boro , 6. Jagli,7. Lahi boro , 8. Kali boro ,9. Tepi boro , 10. Chaite boro , 11. Kali boro, 12. Manik muda, 13. Lahi boro , 14. Tupa ,15. Jagoli ,16. Elachi boro ,17. Kalo boro ,18. Local boro , 19. Sonali chikan, 20. Jagli ,21. Khoia , 22. Tepisail ,23. Sada Boro, 24. Jhora dhan , 25. Deshi boro, 26. Sada boro ,27. Kharma dhan, 28. Mugalsail ,29. Patri, 30. Bogra, 31. Jagli,32. Sada tupa, 33. Banajira,34. Kunal boro,35. Deshi boro,36. Sada boro,37. Jagly,38. Boraya,39. Topa,40. Chhola boro,41. Goabish,42. Lafai,43. Gobirsail, 44. Bashful,45. Gul tepi,46. Banajira,47. Ratal,48. Bachi boro



**Figure 6. A UPGMA cluster dendrogram of 48 Boro rice germplasm based on 65 SSR markers using Ward's method.**

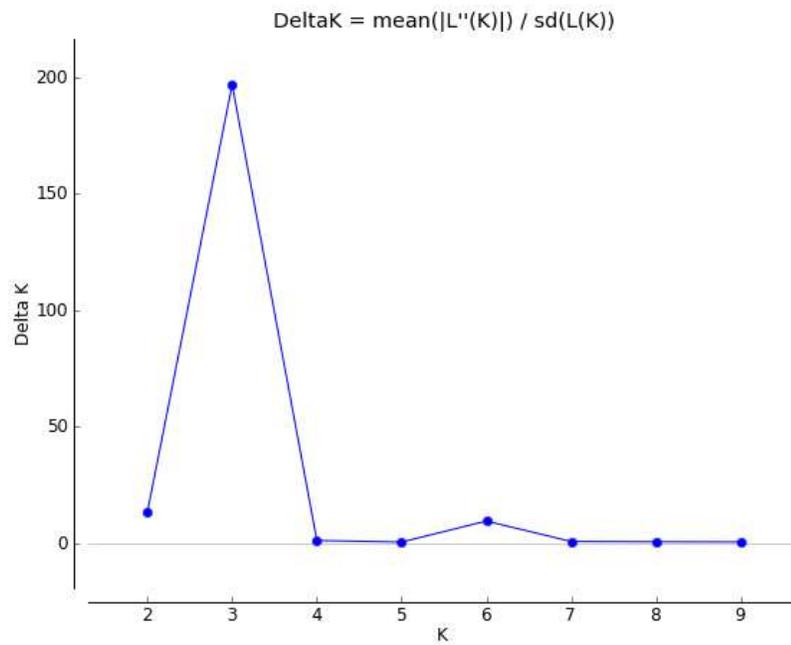


Figure 7. STRUCTURE estimation of the number of groups for the  $K$  values ranging from 1 to 10, by delta  $K$  ( $\Delta K$ ) values.

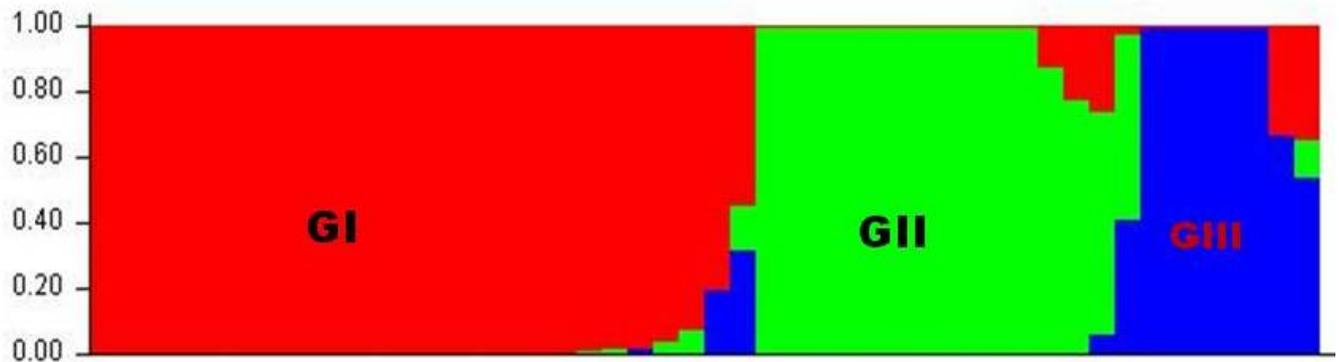


Figure 8. Assignment of 48 Boro germplasm to three groups (GI, GII and GIII) using STRUCTURE 2.3.4 software

## 12. Research highlight

- Morphological characterization of 48 T. Aman germplasm was completed. Among the T. Aman germplasm, 05 accessions (acc.1109, 1535, 1579, 3475 and 3477) had short growth duration (<120 days), 09 germplasm had long slender grain and 2 germplasm namely Chapail (acc.1408) and Laitasail (acc.2018) had high thousand grain weight (>30 g). The highest brown rice length-breadth ratio (4.62) was observed in Beruin (acc. 7357) and considered as a long slender type.
- Similarly, characterization of 48 Boro germplasm have been completed of which Gobirsail (Acc. 3447) had short growth duration (<135 days), Elachi Boro (Acc.1648) had higher filled grains per panicle (250) and another landrace namely Jagli (Acc. 545) was the highest yielder (19.04 g/h).
- Molecular characterization of the same 48 T. Aman and 48 Boro was completed. Moreover, T. Aman rice germplasm characterized at a molecular level using 90 primers, 69 identified as polymorphic. Similarly, 87 primers used for 48 Boro of which 65 was found polymorphic.
- The test germplasm was grouped into three (48 T. Aman) to four (48 Boro) clusters after analysis of polymorphic markers. Among these, 48 T. Aman rice germplasm were grouped into two clusters and 48 Boro rice germplasm grouped into three clusters using sturcture analysis.
- From the molecular characterization, it was observed that RM206 (0.87) was the best primer to identify T. Aman rice germplasm and RM302 (0.88) for Boro rice.
- A total of 41 and 19 unique alleles were found in T. Aman and Boro rice germplasm, respectively for specific landraces identification; for instance, the popular local rice germplasm “Rajasail” was uniquely identified using RM16 (175bp,182 bp and 195 bp), “Jotagainja” with RM455 (134bp), “Kalo Boro” with RM145 (206bp) and “Jagli” with RM447 (146bp).
- It was clear that diversity prevailed in the germplasm both in morpho-agromonic and at molecular levels. Based on the habitats of rice germplasm and data generated through morphological and molecular characterization by this project would be helpful to establish IPR of Bangladeshi rice germplasm.

## **B. Implementation Position**

### **1. Procurement:**

Description of equipment and capital items	PP Target		Achievement		Remarks
	Phy (#)	Fin (Tk)	Phy (#)	Fin (Tk)	
(a) Office equipment					
i. Laptop computer	1	60000.00	1	60000.00	Completed
ii. Digital camera	1	25000.00	1	24900.00	Completed
(b) Lab & field equipment					
i. Lab chemicals and accessories		610000.00		609147.00	Completed
(c) Other capital items	nil	nil	nil	nil	

### **2. Establishment/renovation facilities: Not applicable**

Description of facilities	Newly established		Upgraded/refurbished		Remarks
	PP Target	Achievement	PP Target	Achievement	

### **3. Training/study tour/ seminar/workshop/conference organized: Not applicable**

Description	Number of participant			Duration (Days/weeks/ months)	Remarks
	Male	Female	Total		
(a) Training					
(b) Workshop					

## **C. Financial and physical progress**

**Fig in Tk**

Items of expenditure/activities	Total approved budget	Fund received	Actual expenditure	Balance/ unspent	Physical progress (%)	Reasons for deviation
A. Contractual staff salary	244860.00	244860.00	237360.00	7500.00	15.83	
B. Field research/lab expenses and supplies	864000.00	864159.00	863069.00	1090.00	57.54	
C. Operating expenses	126000.00	125525.00	99858.00	25667.00	6.66	
D. Vehicle hire and fuel, oil & maintenance	25000.00	23613.00	18950.00	4663.00	1.26	
E. Training/workshop/seminar etc.	0.00	0.00	0.00	0.00	-	
F. Publications and printing	120000.00	25042.00	0.00	25042.00	-	
G. Miscellaneous	35000.00	33588.00	33588.00	0.00	2.24	
H. Capital expenses	85000.00	84995.00	84900.00	95.00	5.66	

**D. Achievement of Sub-project by objectives: (Tangible form)**

Specific objectives of the sub-project	Major technical activities performed in respect of the set objectives	Output(i.e. product obtained, visible, measurable)	Outcome(short term effect of the research)
i. to characterize rice germplasm both morphological and at molecular levels	a.Morphological study  b. Molecular study	a.Morphological characterization of 96 (48 T.Aman and 48 Boro) germplasm was completed.  b. T. Aman rice germplasm characterized at molecular level using 90 primers, 69 identified as polymorphic. Similarly, 48 Boro rice using 87 primers, revealed 65 as polymorphic.	a. Newly developed data/information would be used as source materials for the future breeding program.  b. The data/information generated through molecular characterization would be used in breeding programme.
ii. to study the genetic diversity and population structure of Bangladeshi rice germplasm	Data analysis	Diversity analysis was carried out and revealed several clusters that would be useful to select elite genotypes for hybridization to develop high yielding varieties (HYVs).	The DNA fingerprinting results would be useful for establishment of sovereignty of Bangladeshi rice germplasm.

**E. Materials Development/Publication made under the Sub-project: Not applicable**

Publication	Number of publication		Remarks (e.g. paper title, name of journal, conference name, etc.)
	Under preparation	Completed and published	
Technology bulletin/ booklet/leaflet/flyer etc.			
Journal publication			
Information development			
Other publications, if any			

**F. Technology/Knowledge generation/Policy Support (as applied):**

**i. Generation of technology (Commodity & Non-commodity)**

- The data/information on morphological and molecular characterization would help in variety development like parent selection for hybridization programme and also in Intellectual Property Rights (IPRs) related issue.

**ii. Generation of new knowledge that help in developing more technology in future**

- Newly developed data on morphological (some special qualitative and quantitative traits), molecular (unique allele, rare allele, PIC value) and documented with photographs would be used as source materials for the future breeding program.
- Diversity analysis was carried out and revealed several clusters that would be useful to select elite genotypes for hybridization to develop high yielding varieties (HYVs).
- A database/repository will be developed with all morphological and/or molecular characterization data which will ultimately used by rice breeder/ researcher as and when necessary.

**iii. Technology transferred that help increased agricultural productivity and farmers' income**

- This project does not relate directly with dissemination of technology. But it would help in variety development and also protection of local and developed varieties.

**iv. Policy Support**

- The government may take necessary steps to support such findings in future so that rice germplasm can effectively be recognized and protected against bio-piracy.

**G. Information regarding Desk and Field Monitoring**

**i) Desk Monitoring [description & output of consultation meeting, monitoring workshops/seminars etc.):**

- Technical Division/ Unit, BARC visited on 14.05. 2018

**ii) Field Monitoring (time & No. of visit, Team visit and output):**

- BRRI authority and divisional head visited on 02.11.2017, 05.04.2018 and 10.04.2018

**H. Lesson Learned/Challenges (if any)**

**J. Lesson Learned:**

- The primer RM206 is best for T. Aman in molecular characterization and primer RM302 for Boro. Diversity exists in local landraces of rice.

**K. Challenges (if any)**

- Knowledge gained from this project may be utilized in characterization and documentation of the rest of the rice germplasm (about 7000 acc.) at BIRRI genebank smoothly in near future.
- To identify primer, unique allele, allele number, polymorphic information etc. were the challenges. To prevent biopiracy through characterization is also a challenge and availability of characterized data to end users.

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Signature of the Principal Investigator

Date .....

Seal

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Counter signature of the Head of the  
organization/authorized representative

Date .....

Seal

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## Appendices

### Appendix-A. Photographic view of morphological and molecular characterization of rice germplasm during T. Aman, 2017



Fig. A1. Germplasm sowing on seedbed



Fig. A2. Leaf collection for molecular characterization



Fig. A3. Germplasm transplanting on field



Fig. A4. Characterization plot



Fig. A5. Data collation of rice germplasm



Fig. A6. Harvesting of rice germplasm



Fig. A7. Dr. M Khalequzzaman, CSO and Head, GRS Division, BIRRI visited characterization field



Fig.A8. Honorable Director (Research) Dr. Tamal Lata Aditya, BIRRI visited characterization field on 2 November, 2017



Fig. A9. Preparation of stock solution

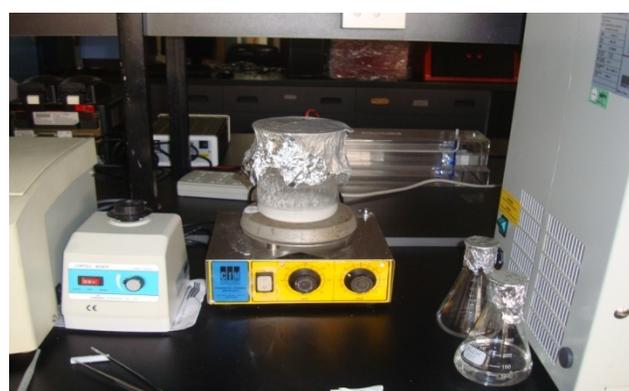


Fig. A10. Preparation of stock solution



Fig. A11. Leaf crushing in grinding plate

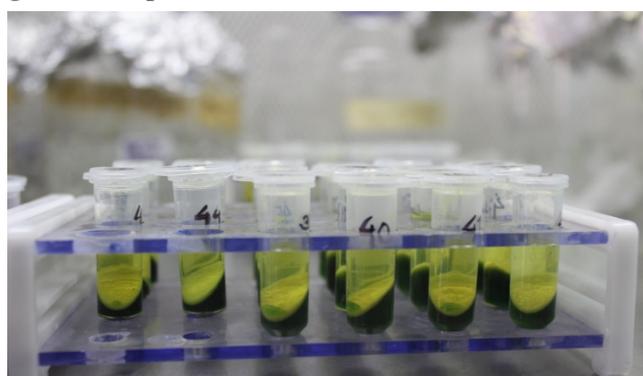


Fig.A12. Three layers after centrifuging



Fig.A13. Air drying of DNA pellets keeping the tubes

## Appendix-B. Photographic view of morphological and molecular characterization of rice germplasm during Boro-2017-18



**Fig.B1. Characterization of rice germplasm field Fig.B2. Collecting data from expt. field**



**Fig. B3. Leaf crushing in grinding plate**



**Fig.B4. Adding chloroform mix**



**Fig. B5. Adding TBE buffer**



**Fig.B6. Loading DNA**



**Fig. B7. Preparation for gel documentation**



**Fig. B8. Taking gel image**

**Appendix-C. Photographic view of different monitoring activities of CRG project**



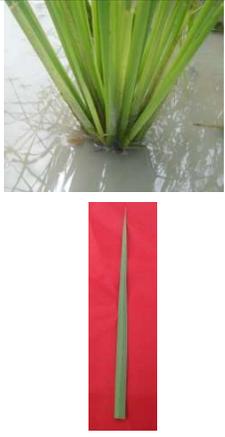
Fig.C1. 5 and 10 April, 2018, Honorable Director General of BIRRI Dr. Md. Shahjahan Kabir, Director (Research) Dr. Tamal Lata Aditya, Scientists of GRS Division along with Divisional Head Dr. Mohammad Khalequzzaman visited characterization field.



Fig.C2. Honorable member director (crops) of BARC Dr. Md. Aziz Jilani Chowdhury visited molecular laboratory of GRS Division, BIRRI on 14 May, 2018

**Appendix-D. Qualitative and quantitative descriptors and descriptor states, photographs and variability in characterized T. aman rice germplasm**

Accession no. 980, Name: Nagra, Variety group: Aman

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	46.2 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	27.11 cm 1.11 cm intermediate green absent green horizontal horizontal (<46-90°)	2 2 1 1 5 5	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	12.60 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	94 days, medium(86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	107.40 cm, long, (81-110 cm) absent 12 open (≈60°) 4.40 mm, small (<5 mm) green weak	7 1 5 1 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24.2 cm, medium (21-25 cm) 10, medium (6-10) open heavy well exerted droopy low (1-5 %) intermediate (6-25%)	5 5 9 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) fertile (75-90%) 18, low (16-19g) 8.82, long (8.1-9mm) 2.40 6.36, medium (5.6-6.5mm) 1.72, slender (L:W=>3.0) red glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 3 3 7  3 9 5  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	121 days, medium (116-135 days)	5	
09	<b>Yield</b>	8.80 g/hill		

**Accession no. 1061, Name: Rajasail, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	43.8 cm		
02	<b>LEAF(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	36.80 cm 1.09 cm intermediate green absent  green erect intermediate(<30-45°)	  2 2 1  1 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.07 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	86 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	100.20 cm, long, (81-110 cm) absent 15 intermediate (≈30°) 4.78 mm, small (<5 mm) green strong	 7 1  3 1 1 1	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	20.73 cm, short (<20 cm) 13, many (>10) open heavy well exerted droopy low (1-5 %) intermediate (6-25%)	 3 7 9 2 1 2 3 5	

07	<b>Grain (spikelet)</b>  a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) fertile (75-90%) 13.73, very low (<15g) 7.47, medium (7.1-8mm)  2.40  5.15, medium (5.6-6.5mm) 1.48, slender (L:W=>3.0) speckled brown  glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 3 1 5    3 9 3  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	121 days, medium (116-135 days)	5	
09	<b>Yield</b>	8.80 g/hill		

Accession no. 156, Name: Muktahar, Variety group: Aman

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	52.8 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	37 cm 1.09 cm intermediate purple margins present  light purple drooping descending (>90°)	2 5 9  3 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	17.87 mm purple 2-cleft purple purple	3 2 3 2	
04	<b>Days after 50% heading</b>	112 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	119.93 cm, very long, (>110 cm) present 10 intermediate (≈30°) 4.20 mm, small (<5 mm) purple intermediate	9  9  3 1 4 5	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24.67 cm, medium (21-25 cm) 9, medium (6-10) open heavy just exerted droopy moderate (6-25 %) easy (51-100%)	5 5 9 2 5 2 5 9	

07	<b>Grain (spikelet)</b>  a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent purple purple high (41-60%) purple furrows on straw short hairs purple medium (1.6-2.5mm) fertile (75-90%) 23, medium (20-23g) 8.30, long (8.1-9mm)  2.93  5.6, medium (5.6-6.5mm) 1.70, slender (L:W=>3.0) variable purple  glutinous (waxy) nonscented intermediate	1 6 5 7 7 4 4 3 3 5 7    3 9 6  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	139 days, late (136-150 days)	7	
09	<b>Yield</b>	13.29g/hill		

**Accession no. 1109, Name: Sitabhog, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	37.8 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	27.03 cm 1.03 cm intermediate dark green absent  green erect intermediate(<30-45°)	2 3 1  1 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.53 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	80 days, early (70-85 days)	3	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	58.87 cm, short (41-60 cm) absent 110 intermediate (≈30°) 3.94 mm, small (<5 mm) green strong	3 1  3 1 1 1	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24.40 cm, medium (21-25 cm) 9, medium (6-10) intermediate heavy moderately well exerted droopy low (1-5 %) intermediate (6-25%)	5 5 5 2 3 2 3 3	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent white white low (5-20%) straw short hairs straw medium (1.6-2.5mm) partly sterile (50-74%) 21.33, medium (20-23g) 9.12,very long (>9mm) 2.32 6.09, medium (5.6-6.5mm) 1.74, slender (L:W=>3.0) white glutinous (waxy) nonscented intermediate	1 1 1 3 0 4 1 3 5 5 7   3 9 1 2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	106 days, early (101-115 days)	3	
09	<b>Yield</b>	7.51g/hill		

**Accession no. 1222, Name: Moynamoti, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	44.6 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	35.33 cm 1.31 cm intermediate green absent  green drooping descending (>90°)	 2 2 1  1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.2 mm white 2-cleft Pale green Pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	96 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length  b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	120.20 cm, very long, (>110 cm)  absent 12 intermediate (≈30°) 3.9mm, small (<5 mm) green weak	 9  1  3 1 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24.33 cm, medium (21-25 cm) 9, medium (6-10) intermediate heavy just exerted droopy low (1-5 %) intermediate (6-25%)	 5 5 5 2 5 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw short (<1.5mm) fertile (75-90%) 21.3, medium (20-23g) 7.01, short (6.1-.7mm) 2.58 4.61, short (<5.5mm) 2.04 mm medium (L:W=2.1-2.5) red glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 1 3 5 3    1  5 5 2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	122 days, medium (116-135 days)	5	
09	<b>Yield</b>	8.85g/hill		

**Accession no. 1223, Name: Mogi balam, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	50.4 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	35.87 cm 1.22 cm intermediate green absent green drooping descending(>90°)	2 2 1 1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.13 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	103 days, medium(86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	116.33 cm, very long, (>110 cm) absent 10 intermediate (≈30°) 6.28 mm, large (6.1-7 mm) green weak	9 1 3 5 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	26.33 cm, long (26-30 cm) 9, medium (6-10) open heavy just exerted droopy low (1-5 %) intermediate (6-25%)	7 5 9 2 5 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) fertile (75-90%) 19.67, low (16-19g) 8.93, long (8.1-9mm) 2.23 5.9, medium (5.6-6.5mm) 1.66, slender (L:W=>3.0) speckled brown glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 3 3 7 3 9 3 2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	131 days, medium (116-135 days)	5	
09	<b>Yield</b>	9.16g/hill		

**Accession no. 1224, Name: Tepu sail, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	49.2 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	28.73 cm 1.14 cm intermediate green absent green drooping intermediate(<30-45°)	2 2 1 1 9 3	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	17.27 mm white 2-cleft pale green purple	1 2 1 2	
04	<b>Days after 50% heading</b>	111 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	119.8 cm, very long, (>110 cm) absent 12 open (≈60°) 6.39 mm, large (6.1-7 mm) green weak	9 1 5 5 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25 cm, medium (21-25 cm) 9, medium (6-10) open heavy moderately well exerted droopy low (1-5 %) intermediate (6-25%)	9 5 9 2 3 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) brown furrows on straw short hairs straw medium (1.6-2.5mm) fertile (75-90%) 28.13,very high (>27g) 9.22, very long (>9mm) 3.06 6.21, medium (5.6-6.5mm) 1.93, slender (L:W=>3.0) red indeterminate nonscented intermediate	1 2 1 3 3 4 1 3 3 3 9  3 9 5 3 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	135 days, medium (116-135 days)	5	
09	<b>Yield</b>	7.90 g/hill		

**Accession no. 1297, Name: Fakirmoni, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	41.4 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	34.6 cm 1.45 cm intermediate green absent  green erect erect(<30°)	 2 2 1  1 1 1	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	16.40 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	107 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	107 cm, long, (81-110 cm) absent 13 open (≈60°) 6.58 mm, large (6.1-7 mm) green strong	 7 1  5 5 1 1	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.80 cm, medium (21-25 cm) 11, many (>10) compact heavy moderately well exerted droopy low (1-5 %) intermediate (6-25%)	 5 7 1 2 3 2 3 5	

07	<b>Grain (spikelet)</b>  a. Spikelet: awn b.Length of the longest awn c. Distribution of awn d.Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present medium (5-10 mm) tip only straw straw white low (5-20%) gold and/or gold furrows on straw short hairs straw medium (1.6-2.5mm) fertile (75-90%) 26.10, high (24-27g) 9.87, very long (>9mm)  2.53  6.65, long (6.6-7.5mm) 1.77, slender (L:W=>3.0) speckled brown  glutinous (waxy) nonscented intermediate	9 5 1 1 2 1 3 1 4 1 3 3 7 9  5 9 3 2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	133 days, medium (116-135 days)	5	
09	<b>Yield</b>	11.84g/hill		

**Accession no. 1298, Name: Saikali, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	50 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	40 cm 1.80 cm intermediate purple margins present  light purple drooping descending(>90°)	2 5 9  3 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	17.80 mm white 2-cleft purple purple	1 2 3 2	
04	<b>Days after 50% heading</b>	019 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	107 cm, long, (81-110 cm) absent 11 open (≈60°) 5.84 mm, medium (5.1-6 mm) green moderately strong	7 1  5 3 1 3	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	27.33cm, long 26-30 cm) 9, medium (6-10) open heavy just exerted droopy low (1-5 %) intermediate (6-25%)	7 5 9 2 5 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	Present medium (5-10 mm) tip only purple purple purple no or few (<5%) brown (tawny) short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 28.43, very high (>27g) 8.78, long (8.1-9 mm) 3.24 6.11, medium (5.6-6.5 mm) 2.11, Medium slender (L:W= 2.6-3.0) light brown glutinous (waxy) nonscented intermediate	9 5 1 5 6 5 1 4 4 1 3 3 9 7    3 7 2  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	136 days, late (136-150 days)	7	
09	<b>Yield</b>	11.64g/hill		

**Accession no. 1329, Name: Indusail, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	47 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	52.87 cm 2.08 cm intermediate dark green present  light purple drooping descending(>90°)	 2 3 9  3 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.93 mm Purple lines 2-cleft purple purple	 2 2 3 2	
04	<b>Days after 50% heading</b>	101 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	133 cm, very long, (>110 cm) present 10 intermediate (≈30°) 7.87 mm, very large (>7 mm) Purple lines weak	 9 9 3 7 3 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	27.80 cm, long (26-30 cm) 08, medium (6-10) open heavy just exerted droopy low (1-5 %) intermediate (6-25%)	 7 5 9 2 5 2 3 5	

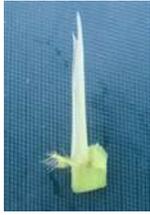


**Accession no. 1330, Name: Jotagainja, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	45.4 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	46.07 cm 1.82 cm intermediate green absent green drooping intermediate (<30-45°)	2 2 1 1 9 3	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	96 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	116.80 cm, very long, (>110 cm) absent 12 intermediate (≈30°) 6.49 mm, large (6.1-7 mm) green weak	9 1 3 5 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24 cm, medium (21-25 cm) 10, medium (6-10) open heavy just exerted droopy low (1-5 %) intermediate (6-25%)	5 5 9 2 5 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) fertile (75-90%) 21.50, medium (20-23g) 8.36, long (8.1-9mm) 2.67 6.08, medium (5.6-6.5mm) 1.70, slender (L:W=>3.0) white glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 3 5 7  3 9 1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	123 days, medium (116-135 days)	5	
09	<b>Yield</b>	8.26g/hill		

**Accession no. 1331, Name: Mugi, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	42 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	42.8 cm 1.09 cm intermediate green absent  green horizontal horizontal (<46-90°)	 2 2 1  1 5 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	16.87 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	102 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	113.47 cm, very long, (>110 cm) absent 12 intermediate (≈30°) 5.97 mm, medium (5.1-6 mm) green weak	7 1  3 3 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25.87 cm, medium (21-25 cm) 10, medium (6-10) open heavy moderately well exerted droopy low (1-5 %) easy (51-100%)	5 5 9 2 3 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present long (11-20 mm) tip only gold red apex white low (5-20%) reddish to light purple short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 20.20, medium (20-23g) 8.68, long (8.1-9 mm) 2.67 6.03, medium (5.6-6.5 mm) 1.72, slender (L:W= >3.0) white glutinous (waxy) nonscented intermediate	9 7 1 2 5 1 3 5 4 1 3 3 5 7   3 9 1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	130 days, medium (116-135 days)	5	
09	<b>Yield</b>	8.28g/hill		

**Accession no. 1408, Name: Laitasail, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	42 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	47.60 cm 1.93 cm intermediate green absent green drooping descending(>90°)	2 2 1 1 9 7	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.47 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	114 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	126 cm, very long, (>110 cm) absent 11 intermediate (≈30°) 6.93 mm, large (6.1-7 mm) green strong	9 1 3 5 1 1	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	28.13 cm, long (26-30 cm) 09, medium (6-10) intermediate heavy well exerted droopy low (1-5 %) intermediate (6-25%)	7 5 5 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) highly fertile (>90%) 29.97, very high (>27g) 10.75, very long (>9mm)  2.54  7.86, very long (7.5mm) 1.83, slender (L:W=>3.0) white  glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 1 9 9   7 9 5  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	141 days, late (136-150 days)	7	
09	<b>Yield</b>	12.59g/hill		

**Accession no. 1411, Name: Boot bazal, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	43.80 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	35.33 cm 1.71 cm intermediate green absent  green drooping intermediate(30-45°)	2 2 1  1 9 3	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.93 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	114 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	115.93 cm, very long, (>110 cm) absent 11 intermediate (≈30°) 7.92 mm, very large (>7 mm) green strong	9 1  3 7 1 1	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25.93 cm, medium (21-25 cm) 08, medium (6-10) open heavy well exerted droopy low (1-5 %) easy (51-100%)	5 5 9 2 1 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent red apex white low (5-20%) gold short hairs straw medium (1.6-2.5mm) highly fertile (>90%) 21.87, medium (20-23g) 7.91, medium (7.1-8mm)  2.71  5.70, medium (5.6-6.5mm) 1.69, slender (L:W=>3.0) red  glutinous (waxy) nonscented intermediate	1 5 1 3 1 4 1 3 1 5 5   3 9 5  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	141 days, late (136-150 days)	7	
09	<b>Yield</b>	12.54g/hill		

Accession no. 1535, Name: Mohishdol

Variety group: Aman

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	49.2 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	35.37 cm 1.12 cm intermediate green absent green drooping horizontal (<46-90°)	2 2 1 1 9 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	16.20 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	87 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	118.80 cm, very long, (>110 cm) absent 10 open (≈60°) 5 mm, small (<5 mm) green strong	9 1 5 1 1 1	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24.60 cm, medium (21-25 cm) 07, medium (6-10) open heavy well exerted droopy low (1-5 %) intermediate (6-25%)	5 5 9 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) fertile (75-90%) 21.63, medium (20-23g) 9.40, verylong (>9mm)  2.52  6.44, medium (5.6-6.5mm) 1.68, slender (L:W=>3.0) White  glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 3 5 9      3 9 1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	114 days, early (101-115 days)	3	
09	<b>Yield</b>	9.29g/hill		

**Accession no. 1537, Name: Shalmukut, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	44.6 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	42.13 cm 1.79 cm intermediate green absent  green drooping descending(>90°)	  2 2 1  1 9 7	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.60 mm white 2-cleft pale green pale green	  1 2 1 1	
04	<b>Days after 50% heading</b>	101 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	123.12 cm, very long, (>110 cm) absent 14 Intermediate (≈30°) 8.35 mm, very large (>7 mm) green weak	9 1  3 7 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.80 cm, medium (21-25 cm) 12, many (>10) open heavy moderately well exerted droopy low (1-5 %) intermediate (6-25%)	5 7 9 2 3 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) fertile (75-90%) 22.97, medium (20-23g) 9.39, very long (>9mm)  2.47  6.71, long (6.6-7.5mm) 1.78, slender (L:W=>3.0) white  glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 3 5 9     5  9 1 2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	130 days, medium (116-135 days)	5	
09	<b>Yield</b>	8.72g/hill		

**Accession no. 1538, Name: Modhubash, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	42.2 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	42.40 cm 1.08 cm intermediate purple margins present  light purple erect intermediate(<30-45°)	2 5 9  3 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	17.80 mm white 2-cleft purple purple	1 2 3 2	
04	<b>Days after 50% heading</b>	105 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	105.60 cm, long, (81-110 cm) absent 13 intermediate (≈30°) 6.37 mm, large (6.1-7 mm) green weak	7 1  3 5 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	27.27 cm, long (26-30 cm) 10, medium (6-10) intermediate heavy well exerted droopy low (1-5 %) intermediate (6-25%)	7 5 5 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	Present Very long (>20 mm) Whole length red purple white low (5-20%) purple spots on straw short hairs purple medium (1.6-2.5 mm) fertile (75-90%) 21.33, medium (20-23g) 8.42, long (8.1-9 mm) 2.78 5.72, medium (5.6-6.5 mm) 1.82, slender (L:W= >3.0) white glutinous (waxy) nonscented intermediate	9 9 5 4 6 1 3 6 4 4 3 3 5 7   3 9 1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	132 days, medium (116-135 days)	5	
09	<b>Yield</b>	7.23g/hill		

**Accession no. 1544, Name: Nilkumur, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	50.4 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	34.60 cm 1.24 cm intermediate green absent  green erect intermediate(<30-45°)	 2 2 1  1 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	16.13 mm white 2-cleft Pale green Pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	103 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	103.93 cm, long, (81-110 cm) absent 12 open (≈60°) 5.64 mm, medium (5.1-6 mm) green weak	 7 1  5 3 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	26.07 cm, long (26-30 cm) 10, medium (6-10) compact heavy moderately well exerted droopy low (1-5 %) easy (51-100%)	 7 5 1 2 3 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color f. Stigma color g. Stigma exertion: h. Lemma & palae color i. Lemma & palae pubescence j. Sterile lemma color k. Sterile lemma length l. Spikelet sterility m. 1000 grain weight n. Length (mm) (without dehulling) o. Width (mm) (without dehulling) p. Decorticated grain length q. Decorticated grain width r. Decorticated grain shape s. Seed coat color (Decorticated grain) t. Endosperm type u. Decorticated grain, scent v. Leaf senescence	Present medium (5-10 mm) Whole length gold straw white low (5-20%) gold short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 24.10, high (24-27g) 8.63, long (8.1-9 mm) 2.82 6.15, medium (5.6-6.5 mm) 1.72, slender (L:W= >3.0) red glutinous (waxy) nonscented intermediate	9 5 5 2 2 1 3 1 4 1 3 3 57 7  3 9 5 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	130 days, medium (116-135 days)	5	
09	<b>Yield</b>	9.62g/hill		

**Accession no. 1577, Name: Chapras, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	49 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	37.20 cm 1.16 cm intermediate green absent  green drooping horizontal (<46-90°)	 2 2 1  1 9 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.20 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	105 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	107.60 cm, long, (81-110 cm) absent 12 intermediate (≈30°) 5.50 mm, medium (5.1-6 mm) green weak	 7 1  3 3 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	56.5 cm, long (26-30 cm) 10, medium (6-10) open heavy moderately well exerted droopy low (1-5 %) easy (51-100%)	 7 5 9 2 3 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) fertile (75-90%) 22.73, medium (20-23g) 9.28, very long (>9mm) 2.70 6.74, long (6.6-7.5mm) 1.66, slender (L:W=>3.0) white glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 3 5 9   5 9 1 2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	132 days, medium (116-135 days)	5	
09	<b>Yield</b>	7.90 g/hill		

**Accession no. 1579, Name: Sitabhog, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	44.6 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	34.53 cm 1.07 cm intermediate dark green absent  green erect erect(<30°)	 2 3 1  1 1 1	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.33 mm white 2-cleft pale green purple	 1 2 1 2	
04	<b>Days after 50% heading</b>	76 days, medium (70-85days)	3	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	107.60 cm, long, (81-110 cm) absent 11 intermediate (≈30°) 3.30 mm, small (<5 mm) green strong	 7 1  3 1 1 1	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24.33 cm, medium (21-25 cm) 09, medium (6-10) intermediate heavy well exerted droopy low (1-5 %) intermediate (6-25%)	 5 5 5 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) partly sterile (50-74%) 20.60, medium (20-23g) 9.09, very long (>9mm)  2.21  6.29, medium (5.6-6.5mm) 1.68, slender (L:W=>3.0) white  glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 5 5 9    3  9 1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	105 days, early (101-115 days)	3	
09	<b>Yield</b>	7.26g/hill		

**Accession no. 1585, Name: Beti, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	50.2 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	35.93 cm 1.96 cm intermediate green absent  green drooping descending(>90°)	 2 2 1  1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	15.27 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	112 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	106.33 cm, long, (81-110 cm) absent 14 open (≈60°) 6.24 mm, large (6.1-7 mm) green strong	 7 1  5 5 1 1	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23 cm, medium (21-25 cm) 12, many (>10) open heavy just exerted droopy low (1-5 %) intermediate (6-25%)	 5 7 9 2 5 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	Present short (2-5 mm) tip only straw straw white low (5-20%) gold furrows on straw short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 24.73, high (24-27g) 8.49, long (8.1-9 mm) 2.70 6.14, medium (5.6-6.5 mm) 1.86, slender (L:W= >3.0) red indeterminate nonscented intermediate	9 3 1 1 2 1 3 1 4 1 3 3 7 7  3 9 5 3 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	139 days, late (136-150 days)	7	
09	<b>Yield</b>	9.50g/hill		

**Accession no. 1666, Name: Rangamoni, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	51 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	35.47 cm 1.57 cm intermediate green absent  green drooping descending(>90°)	 2 2 1  1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	12.67 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	115 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	102.20 cm, long, (81-110 cm) absent 11 open (≈60°) 6.36 large (6.1-7 mm) green strong	 7 1  5 5 1 1	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	22.73 cm, medium (21-25 cm) 09, medium (6-10) open heavy just exerted droopy low (1-5 %) intermediate (6-25%)	 5 5 9 2 5 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) brown furrows on straw short hairs straw short (<1.5mm) highly fertile (>90%) 28.57, very high (>27g) 7.90, medium (7.1-8mm)  3.30  5.60, medium (5.6-6.5mm) 2.22, Medium (L:W= 2.1-2.5) white  glutinous (waxy) nonscented intermediate	1 2 1 3 3 4 1 1 1 9 5     3 5 1 2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	142 days, late (136-150 days)	7	
09	<b>Yield</b>	11.70 g/hill		

**Accession no. 1927, Name: Basanti, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	49.20 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	28.60 cm 1.25 cm intermediate green absent  green drooping intermediate(<30-45°)	 2 2 1  1 9 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.20 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	115 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	113 cm, very long, (>110 cm) absent 12 open (≈60°) 5.69 mm, medium (5.1-6 mm) green moderately strong	 9 1  5 3 1 3	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.53 cm, medium (21-25 cm) 10, medium (6-10) open heavy moderately well exerted droopy low (1-5 %) intermediate (6-25%)	 5 5 9 2 3 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) fertile (75-90%) 22.50, medium (20-23g) 7.77, medium (7.1-8mm)  2.90  5.38, short (<5.5mm) 1.87, Medium slender (L:W= 2.6-3.0) white  indeterminate nonscented intermediate	1 2 1 3 0 4 1 3 3 5 5      1 7 1 3 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	142 days, late (136-150 days)	7	
09	<b>Yield</b>	9.23g/hill		

**Accession no. 1928, Name: Nadisail, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	45.80 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	34.20 cm 1.07 cm intermediate green absent  green drooping descending (>90°)	 2 2 1  1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.60 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	105 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	101.47 cm, long, (81-110 cm) absent 11 intermediate (≈30°) 5.69 mm, medium (5.1-6 mm) green weak	 7 1  3 3 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.87 cm, medium (21-25 cm) 10, medium (6-10) open heavy just exerted droopy low (1-5 %) intermediate (6-25%)	 5 5 9 2 5 2 3 5	

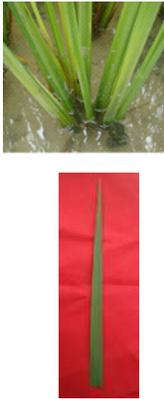
07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) gold furrows on straw short hairs straw medium (1.6-2.5mm) fertile (75-90%) 20.77, medium (20-23g) 8.67, long (8.1-9mm) 2.87 5.92, medium (5.6-6.5mm) 1.74, slender (L:W=>3.0) red glutinous (waxy) nonscented intermediate	1 2 1 3 1 4 1 3 3 5 7  3 9 5 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	133 days, medium (116-135 days)	5	
09	<b>Yield</b>	8.30 g/hill		

**Accession no. 7357, Name: Biruin, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	47.80 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	41.53 cm 1.73 cm intermediate green absent green drooping descending(>90°)	2 2 1 1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.87 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	104 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	110.93 cm, very long, (>110 cm) absent 11 erect (<30°) 6.10 mm, large (6.1-7 mm) green weak	7 1 1 5 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	27.87 cm, long (26-30 cm) 10, medium (6-10) open heavy just exerted droopy low (1-5 %) intermediate (6-25%)	7 5 9 2 5 2 3 5	



**Accession no. 1931, Name: Chakmedi, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	48.60 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	24.47 cm 1.85 cm intermediate green present  light purple drooping descending(>90°)	  2 2 9  3 9 7	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	12.07 mm white 2-cleft pale green pale green	  1 2 1 1	
04	<b>Days after 50% heading</b>	106 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	121.40 cm, very long, (>110 cm) absent 12 intermediate (≈30°) 5.54 mm, medium (5.1-6 mm) green weak	7 1  3 3 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24.33 cm, medium (21-25 cm) 10, many (>10) open heavy just exerted droopy low (1-5 %) intermediate (6-25%)	5 7 9 2 5 2 3 5	



**Accession no. 1973, Name: Chafal, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	46 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	44 cm 1.07 cm intermediate green absent green horizontal descending(>90°)	2 2 1 1 5 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.13 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	106 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	101.60 cm, long, (81-110 cm) absent 12 open (≈60°) 5.39 mm, medium (5.1-6 mm) green weak	7 1 5 3 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.13 cm, medium (21-25 cm) 11, many (>10) open heavy just exerted droopy low (1-5 %) intermediate (6-25%)	5 7 9 2 5 2 3 5	



**Accession no. 4707, Name: Binni, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	45.40 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	37.47 cm 1.15 cm intermediate green absent green drooping descending(>90°)	2 2 1 1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	12.93 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	105 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	103.20 cm, long, (81-110 cm) absent 13 intermediate (≈30°) 5.71 mm, medium (5.1-6 mm) green intermediate	7 1 3 3 1 5	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24.47 cm, medium (21-25 cm) 11, many (>10) open heavy just exerted droopy low (1-5 %) easy (51-100%)	5 7 9 2 5 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent red white low (5-20%) reddish to light purple short hairs straw medium (1.6-2.5mm) fertile (75-90%) 22.77, medium (20-23g) 8.60, long (8.1-9mm)  2.78  5.79, medium (5.6-6.5mm) 1.65, slender (L:W=>3.0) white  glutinous (waxy) nonscented intermediate	1 4 4 1 3 5 4 1 3 3 5 7     3 9 1 2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	133 days, medium (116-135 days)	5	
09	<b>Yield</b>	8.0 g/hill		

**Accession no. 4862, Name: Kalijira, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	42 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	43.67 cm 1.10 cm intermediate purple margins absent  green drooping descending(>90°)	2 5 1  1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	12.33 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	105 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	123.07 cm, very long, (>110 cm) absent 11 intermediate (≈30°) 5.55 mm, medium (5.1-6 mm) green moderately strong	9 1  3 3 1 3	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	26.80 cm, long (26-30 cm) 09, medium (6-10) intermediate heavy well exerted droopy low (1-5 %) easy (51-100%)	7 5 5 2 1 2 3 9	

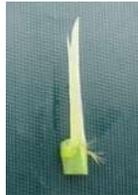
07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent purple apex white medium (21-40%) black short hairs purple short (<1.5mm) highly fertile (>90%) 11.37, very low (<15g) 6.23, short (6.1-7mm)  2.10  4.24, short (<5.5mm) 1.49, medium slender (L:W= 2.6-3.0) white  glutinous (waxy) scented early and fast	 1 7 1 1 5 9 4 4 1 1 1 3  1 7 1 2 2 9	  
08	<b>Maturity</b> a. Days to maturity from seedling	132 days, medium (116-135 days)	5	
09	<b>Yield</b>	7.37g/hill		

**Accession no. 2018, Name: Chapail, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	53 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	48.87 cm 1.14 cm intermediate green absent  green drooping descending(>90°)	 2 2 1  1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.13 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	120 days, late (106-120 cm)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	93.87 cm, long (81-110 cm) absent 12 intermediate (≈30°) 5.83 mm, medium (5.1-6 mm) green strong	 7 1  3 3 1 1	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.87 cm, medium (21-25 cm) 09, medium (6-10) intermediate heavy well exerted droopy low (1-5 %) intermediate (6-25%)	 5 5 5 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent purple apex white low (5-20%) purple spots on straw short hairs purple medium (1.6-2.5mm) fertile (75-90%) 31, very high (>27g) 8.55, long (8.1-9mm)  3.31  5.89, medium (5.6-6.5mm) 2.14, medium slender (L:W= 2.6-3.0) white  glutinous (waxy) nonscented intermediate	1 7 1 3 6 4 4 3 3 9 7     3 7 1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	146 days, late(136-150 days)	7	
09	<b>Yield</b>	10g/hill		

Accession no. 7955, Name: Radunipagol, Variety group: Aman

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	47 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	27.33 cm 1.06 cm intermediate dark green absent  green drooping horizontal(<46-90°)	 2 3 1  1 9 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	16.93 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	98 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	125.87 cm, very long, (>110 cm) absent 12 erect (<30°) 4.59 mm, small (<5 mm) green intermediate	 9 1  1 1 1 5	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.07 cm, medium (21-25 cm) 10, medium (6-10) intermediate heavy well exerted droopy low (1-5 %) easy (51-100%)	 5 5 5 2 1 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present short (2-5 mm) tip only red purple apex white medium (21-40%) brown spots on straw short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 13.97, very low (<15g) 8.56, long (8.1-9 mm) 2.04 6.34, medium (5.6-6.5 mm) 1.58, slender (L:W= >3.0) white glutinous (waxy) lightly scented intermediate	9 3 1 4 7 1 5 2 4 1 3 3 1 7  3 9 1 2 1 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	126 days, medium (116-135 days)	5	
09	<b>Yield</b>	8.24g/hill		

**Accession no. 2020, Name: Kasra, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	52.25 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	48.20 cm 1.13 cm intermediate green absent green drooping intermediate(<30-45°)	2 2 1 1 9 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	15.87 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	119 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	110 cm, long, (81-110 cm) absent 13 intermediate (≈30°) 5.55 mm, medium (5.1-6 mm) green strong	7 1 3 3 1 1	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24.20 cm, medium (21-25 cm) 11, many (>10) open heavy moderately well exerted droopy low (1-5 %) intermediate (6-25%)	5 7 9 2 3 2 3 5	



**Accession no.2325, Name: Laxmilata, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	47 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	41.60 cm 1.23 cm intermediate green absent  green drooping descending (>90°)	 2 2 1  1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	11.60 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	101 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	102.73 cm, long, (81-110 cm) absent 13 spreading (>60°) 5.62 mm, medium (5.1-6 mm) green weak	 7 1  7 3 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25.40 cm, medium (21-25 cm) 11, many (>10) open heavy moderately well exerted droopy low (1-5 %) easy (51-100%)	 5 7 9 2 3 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) partly sterile (50-74%) 17.03, low (16-19g) 7.36, medium (7.1-8mm) 2.42 5.02, short (<5.5mm) 1.60, slender (L:W=>3.0) red glutinous (waxy) nonscented intermediate	 1 2 1 3 0 4 1 3 5 3 5  1  9 5 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	129 days, medium (116-135 days)	5	
09	<b>Yield</b>	7.58g/hill		

**Accession no.2327, Name: Muktahar, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	51.6 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	41.60 cm 1.71 cm intermediate green absent  green drooping descending (>90°)	 2 2 1  1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.53 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	96 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	86 cm, long, (81-110 cm) absent 13 spreading (>60°) 5.62 mm, medium (5.1-6 mm) green weak	 7 1  7 3 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	22.47 cm, medium (21-25 cm) 10, medium (6-10) open heavy well exerted droopy low (1-5 %) easy (51-100%)	 5 5 9 2 1 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) partly sterile (50-74%) 19.30, low (16-19g) 7.52, medium (7.1-8mm)  2.58  5.47, short (<5.5mm) 1.68, slender (L:W=>3.0) red  glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 5 3 5      1 9 5  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	124 days, medium (116-135 days)	5	
09	<b>Yield</b>	8.32g/hill		

**Accession no.3475, Name: Fulkumari, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	46.2 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	30.87 cm 1.39 cm intermediate green absent  green drooping descending (>90°)	 2 2 1  1 9 7	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	11.20 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	72 days, early (70-85days)	3	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	75.13 cm, medium, (61-80 cm) absent 10 open (≈60°) 4.83 mm, small (<5 mm) green strong	 5 1  5 1 1 1	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	22.33 cm, medium (21-25 cm) 08, medium (6-10) intermediate heavy well exerted droopy low (1-5 %) intermediate (6-25%)	 5 5 5 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) fertile (75-90%) 18.43, low (16-19g) 7.18, medium (7.1-8mm) 2.18 5.41, short (<5.5mm) 1.84, Medium slender (L:W= 2.6-3.0) Speckled brown glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 3 5    1 7 3 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	99 days, very early (<100 days)	1	
09	<b>Yield</b>	11.23g/hill		

**Accession no. 3477, Name: Dudhshor, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	46.2 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	32.20 cm 1.17 cm intermediate dark green absent  green drooping horizontal(<46-90°)	2 3 1  1 9 5	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	12.67 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	77 days, early (70-85days)	3	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	118.27 cm, very long, (>110 cm) absent 13 spreading (>60°) 5.04 mm, small (<5 mm) green moderately strong	7 1  7 1 1 3	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.53 cm, medium (21-25 cm) 11, many (>10) intermediate heavy well exerted droopy low (1-5 %) intermediate (6-25%)	5 7 5 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very short (<2 mm) tip only straw straw white low (5-20%) gold short hairs straw medium (1.6-2.5 mm) partly sterile (50-74%) 19.05, low (16-19g) 8.22, long (8.1-9 mm) 2.42 5.87, medium (5.6-6.5 mm) 1.69, slender (L:W= >3.0) speckled brown glutinous (waxy) nonscented intermediate	9 1 1 1 2 1 3 1 4 1 3 5 3 7  3 9 3 2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	106 days, early (101-115 days)	3	
09	<b>Yield</b>	7.42g/hill		

**Accession no.3661, Name: Indursail, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	43.8 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	35.33 cm 1.86 cm intermediate green absent  green drooping horizontal(<46-90°)	 2 2 1  1 9 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	12.80 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	97 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	122.13 cm, very long (>110 cm) absent 14 open (≈60°) 5.50 mm, medium (5.1-6 mm) green weak	9 1  5 3 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25 cm, medium (21-25 cm) 12, many (>10) open heavy just exerted droopy low (1-5 %) easy (51-100%)	5 7 9 2 5 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) partly sterile (50-74%) 18.63, low (16-19g) 7.88, medium (7.1-8mm) 2.64 5.10, short (<5.5mm) 1.69, Medium slender (L:W= 2.6-3.0) red glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 5 3 5   1 7 5  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	126 days, medium(116-135 days)	1	
09	<b>Yield</b>	6.34g/hill		

**Accession no.3662, Name: Kartiksail, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	43.4 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	31.13 cm 1.23 cm intermediate green absent  green drooping horizontal(<46-90°)	2 2 1  1 9 5	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	12.47 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	99 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	112.87 cm, very long (>110 cm) absent 13 intermediate (≈30°) 5.15 mm, medium (5.1-6 mm) green weak	9 1  3 3 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	22.67 cm, medium (21-25 cm) 11, many (>10) open heavy well exerted droopy low (1-5 %) intermediate (6-25%)	5 7 9 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw short (<1.5mm) partly sterile (50-74%) 21.13, medium (20-23g) 8.28, medium (8.1-9mm)  2.70  5.68, medium (5.6-6.5mm) 1.67, slender (L:W=>3.0) red  glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 1 5 5 7    3 9 5  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	130 days, medium(116-135 days)	1	
09	<b>Yield</b>	7.56g/hill		

**Accession no. 3663, Name: Natisail, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	45.4 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	37.67 cm 1.22 cm intermediate green absent  green horizontal horizontal(<46-90°)	 2 2 1  1 5 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	15.13 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	102 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	107.47 cm, long (81-110 cm) absent 11 open (≈60°) 7.11 mm, very large (>7 mm) green weak	 7 1  3 7 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.80 cm, medium (21-25 cm) 09, medium (6-10) open light well exerted droopy low (1-5 %) intermediate (6-25%)	 5 7 9 1 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color f. Stigma color g. Stigma exertion h. Lemma & palae color i. Lemma & palae pubescence j. Sterile lemma color k. Sterile lemma length l. Spikelet sterility m. 1000 grain weight n. Length (mm) (without dehulling) o. Width (mm) (without dehulling) p. Decorticated grain length q. Decorticated grain width r. Decorticated grain shape s. Seed coat color (Decorticated grain) t. Endosperm type u. Decorticated grain, scent v. Leaf senescence	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) fertile (75-90%) 19.40, low (16-19 g) 8.16, medium (8.1-9mm)  2.58  5.67, medium (5.6-6.5mm) 1.62, slender (L:W=>3.0) red  indeterminate nonscented intermediate	1 2 1 3 0 4 1 3 3 3 7     3 9 5  3 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	130 days, medium(116-135 days)	1	
09	<b>Yield</b>	8.65g/hill		

**Accession no. 7973, Name: Dadkhani, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	42 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	42.47 cm 1.14 cm intermediate green absent  green drooping descending(>90°)	 2 2 1  1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	12.47 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	99 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	108.67 cm, long, (81-110 cm) absent 13 intermediate (≈30°) 6.30 mm, large (6.1-7 mm) green weak	 7 1  3 5 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.07 cm, medium (21-25 cm) 11, many (>10) open heavy well exerted droopy low (1-5 %) intermediate (6-25%)	 5 7 9 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present medium (5-10 mm) tip only straw straw white low (5-20%) straw short hairs straw short (<1.5 mm) fertile (75-90%) 15.13, very low (<15g) 8.42, long (8.1-9 mm) 2.40 5.75, medium (5.6-6.5 mm) 1.56, slender (L:W= >3.0) red glutinous (waxy) nonscented intermediate	9 5 1 1 2 1 3 0 4 1 1 3 1 7  3 9 5 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	126 days, medium (116-135 days)	5	
09	<b>Yield</b>	9.05g/hill		

**Accession no. 3665, Name: Haloi, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	46.6 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	41.47 cm 1.81 cm intermediate green absent  green drooping horizontal(<46-90°)	 2 2 1  1 9 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14 mm white 2-cleft pale green purple	 1 2 1 2	
04	<b>Days after 50% heading</b>	99 days, medium (86-105 days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	108.67 cm, long, (81-110 cm) absent 14 open (≈60°) 6.1 mm, large (6.1-7 mm) green weak	 7 1  5 5 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.27 cm, medium (21-25 cm) 11, many (>10) open heavy well exerted droopy low (1-5 %) intermediate (6-25%)	 5 7 9 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present medium (5-10 mm) tip only purple purple white low (5-20%) brown furrows on straw short hairs straw medium (1.6-2.5 mm) highly fertile (>90%) 20.87, medium (20-23g) 8.33, long (8.1-9 mm) 3.05 5.88, medium (5.6-6.5 mm) 1.88, slender (L:W= >3.0) red glutinous(waxy) nonscented intermediate	9 5 1 5 6 1 3 3 4 1 3 1 5 7  3 9 5 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	128 days, medium (116-135 days)	5	
09	<b>Yield</b>	8.32g/hill		

**Accession no. 3668, Name: Khudbalam, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	43 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	34.17 cm 1.43 cm intermediate green absent  green drooping horizontal (<46-90°)	 2 2 1  1 9 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.53 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	105 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	97.47 cm, long (81-110 cm) absent 12 intermediate (≈30°) 3.84 mm, small (<5 mm) green weak	 7 1  3 1 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	22.35 cm, medium (21-25 cm) 10, medium (6-10) open heavy just exerted droopy low (1-5 %) intermediate (6-25%)	 5 5 9 2 5 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) gold short hairs straw short (<1.5mm) fertile (75-90%) 15.97, very low (<15g) 6.56, short (6.1-7mm) 2.66 4.11, short (<5.5mm) 1.55, Medium slender (L:W= 2.6-3.0) white glutinous (waxy) nonscented intermediate	1 2 1 3 1 4 1 1 3 1 3  1 7 5 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	133 days, medium (116-135 days)	5	
09	<b>Yield</b>	7.36g/hill		

**Accession no. 3847, Name: Achra, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	52 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	42.83 cm 1.73 cm intermediate green absent  green drooping descending(>90°)	 2 2 1  1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.77 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	109 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	113.33 cm, very long (>110 cm) absent 12 intermediate (≈30°) 5.95 mm, medium (5.1-6 mm) green weak	9 1  3 3 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.13 cm, medium (21-25 cm) 10, medium (6-10) open heavy well exerted droopy low (1-5 %) intermediate (6-25%)	5 5 9 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent purple apex white low (5-20%) black short hairs purple medium (1.6-2.5mm) fertile (75-90%) 28.33, very high (>27g) 9.88, very long (>9 mm)  2.66  6.83, long (6.6-7.5mm) 1.90, slender (L:W=>3.0) brown  glutinous (waxy) nonscented intermediate	1 7 1 3 9 4 4 3 3 9 9     5 9 4  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	137 days, late (136-150 days)	7	
09	<b>Yield</b>	10.69g/hill		

**Accession no.7923, Name: Sadamota, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	49.6 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	34.67 cm 1.21 cm intermediate dark green absent  green drooping descending(>90°)	2 3 1  1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.53 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	115 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	106.13 cm, long (81-110 cm) present 10 open (≈60°) 4.52 mm, small (<5 mm) purple moderately strong	7 9 10 5 1 4 3	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23 cm, medium (21-25 cm) 09, medium (6-10) intermediate heavy well exerted droopy low (1-5 %) intermediate (6-25%)	5 5 5 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5mm) fertile (75-90%) 23.80, medium (20-23g) 8.29, long (8.1-9 mm)  2.95  5.67, medium (5.6-6.5mm) 1.88, slender (L:W=>3.0) white  glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 3 5 7   3 9 1 2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	143 days, late (136-150 days)	7	
09	<b>Yield</b>	10.15g/hill		

**Accession no.3850, Name: Baulam, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	48.8 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	27.30 cm 1.15 cm intermediate purple tips present  light purple drooping descending(>90°)	2 4 9  3 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	12.73 mm white 2-cleft purple pale green	1 2 3 1	
04	<b>Days after 50% heading</b>	119 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	106.13 cm, long (81-110 cm) present 14 open (≈60°) 5.20 mm, medium (5.1-6 mm) purple lines strong	7 9  5 3 3 1	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	22.73 cm, medium (21-25 cm) 11, many (>10) intermediate heavy well exerted droopy low (1-5 %) intermediate (6-25%)	5 7 5 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent purple white low (5-20%) straw short hairs purple medium (1.6-2.5mm) fertile (75-90%) 23.75, medium (20-23g) 8.25, long (8.1-9 mm) 2.75 5.57, medium (5.6-6.5mm) 1.78, slender (L:W=>3.0) white glutinous (waxy) nonscented intermediate	1 6 1 3 0 4 4 3 3 5 7   3 9 1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	145 days, late(136-150 days)	7	
09	<b>Yield</b>	10.12g/hill		

**Accession no.3852, Name: Bashful, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	49.6 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	44.20 cm 1.80 cm intermediate green absent  green erect intermediate(>30-45°)	 2 2 1  1 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	115 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	102 cm, long (81-110 cm) absent 13 intermediate (≈30°) 5.40 mm, medium (5.1-6 mm) green strong	 7 1  3 3 1 1	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	22.40 cm, medium (21-25 cm) 11, many (>10) compact heavy well exerted droopy low (1-5 %) intermediate (6-25%)	 5 7 1 2 1 2 3 5	



**Accession no.3901, Name: Chinisail, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	50.04 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	38.33 cm 1.54 cm intermediate dark green absent  green drooping descending(>90°)	2 3 1  1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	15.20 mm white 2-cleft purple pale green	1 2 3 1	
04	<b>Days after 50% heading</b>	95 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	129.40 cm, very long (>110 cm) absent 09 open (≈60°) 5.35 mm, medium (5.1-6 mm) green weak	9 1  5 3 1 7	
06	<b>Panicle length</b> a.Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	27.40 cm, long (26-30 cm) 7, medium (6-10) compact heavy well exerted droopy low (1-5 %) intermediate (6-25%)	7 5 1 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) brown spots on straw short hairs straw medium (1.6-2.5mm) partly sterile (50-74%) 16.40, low (16-19g) 8.34, long (8.1-9 mm)  2.30  5.74, medium (5.6-6.5mm) 1.71, slender (L:W=>3.0) red  glutinous (waxy) nonscented intermediate	1 2 1 3 2 4 1 3 5 3 7      3 9 5  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	123 days, medium (116-135 days)	5	
09	<b>Yield</b>	7.47g/hill		

**Accession no. 3904, Name: Aloï, Variety group: Aman**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	46.4 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	36.93 cm 1.53 cm Intermediate green absent  green horizontal descending(>90°)	 2 2 1  1 5 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	16.07 mm white 2-cleft purple purple	 1 2 3 2	
04	<b>Days after 50% heading</b>	105 days, medium (86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	111.40 cm, very long (>110 cm) absent 14 intermediate (≈30°) 5.56 mm, medium (5.1-6 mm) green moderately strong	 9 1  3 3 1 3	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25 cm, medium (21-25 cm) 11, many (>10) open heavy just exerted droopy low (1-5 %) intermediate (6-25%)	 5 7 9 2 5 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent purple apex purple low (5-20%) straw hairs on lemma keel straw medium (1.6-2.5mm) fertile (75-90%) 28.50, very high (>27g) 8.60, long (8.1-9 mm)  3.13  5.64, medium (5.6-6.5mm) 1.80, slender (L:W=>3.0) red  glutinous (waxy) nonscented intermediate	1 7 5 3 0 2 1 3 3 9 7     3 9 5  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	133 days, medium (116-135 days)	5	
09	<b>Yield</b>	11.50g/hill		

**Appendix-E. Qualitative and quantitative descriptors and descriptor states, photographs and variability in characterized Boro rice germplasm**

**Accession no. 038, Name: Khaia boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	34 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	45.07 cm 1.22 cm intermediate purple tips present  purple lines horizontal intermediate (<30-45°)	2 4 9  2 5 3	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.30 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	116 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	100.73 cm, long (81-110 cm) present 16 open (≈60°) 5.22 mm, medium (5.1-6 mm) Purple lines strong	7 9  5 3 3 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.27 cm, medium (21-25 cm) 13, many (>10) compact heavy well exerted droopy low (1-5 %) easy (51-100%)	5 7 1 2 1 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling):  p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) whole length purple purple white low (5-20%) gold and/or gold furrows on straw short hairs straw medium (1.6-2.5 mm) highly fertile (>90%) 21.17, medium (20-23g) 7.72, medium (7.1-8 mm)  3.12  5.51, short (<5.5 mm) 2.71, bold (L:W= 1.5-2) red  indeterminate nonscented intermediate	 9 9 5 5 6 1 3 1 4 1 3 1 5 5  1 3 5  3 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	147 days, late (136-150 days)	7	
09	<b>Yield</b>	13.86 g/hill		

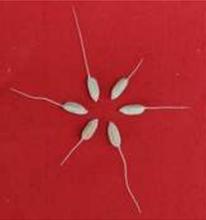
**Accession no. 054, Name: Pashu sail, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	33.87 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	51.60 cm 1.05 cm intermediate green absent  green erect erect (<30°)	 2 2 1  1 1 1	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.20 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	126 days, very late (>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	87.80 cm, long (81-110 cm) absent 12 intermediate (≈30°) 4.56 mm, small (<5.0 mm) Green strong	 7 1  3 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24.80 cm, medium (21-25 cm) 11, many (>10) open heavy just exerted droopy low (1-5 %) intermediate (6-25%)	 5 7 9 2 5 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling):  p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	Present Very short (<2 mm) tip only straw straw white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) highly fertile (>90%) 24.43, high (24-27g) 7.21, medium (7.1-8 mm)  3.52  4.78, short (<5.5 mm) 3.06, bold (L:W= 1.5-2) white  glutinous (waxy) nonscented intermediate	9 1 1 1 2 1 3 0 4 1 3 1 7 5    1 3 1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	152 days, very late (>150 days)	9	
09	<b>Yield</b>	18.02 g/hill		

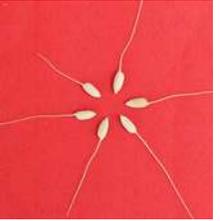
**Accession no. 0181, Name: Ghugu boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	29.40 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	44.10 cm 1.06 cm intermediate green present  light purple erect erect (<30°)	  2 2 9  3 1 1	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.33 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	119 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	80.93 cm, medium (61-80 cm) absent 15 open (≈60°) 3.86 mm, small (<5 mm) green strong	5 1  5 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	19.77 cm, short (<20 cm) 12, many (>10) intermediate heavy well exerted droopy low (1-5 %) intermediate (6-25%)	3 7 5 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present long (11-20 mm) Whole length straw red apex white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 22.24, medium (20-23g) 7.67, medium (7.1-8 mm)  2.81 5.50, short (<5.5 mm) 2.19, medium (L:W= 2.1-2.5) red  glutinous (waxy) nonscented intermediate	9 7 5 1 5 1 3 0 4 1 3 3 5 5  1 5 5  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	147 days, late (136-150 days)	7	
09	<b>Yield</b>	9.68 g/hill		

**Accession no. 0256, Name: Jagli boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	40.07 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	49.20 cm 1.51 cm intermediate green absent green erect erect (<30°)	2 2 1 1 1 1	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.62 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	118 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	91.76 cm, long (81-110 cm) absent 25 open (≈60°) 4.25 mm, small (<5 mm) green strong	7 1 5 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	21.93 cm, medium (21-25 cm) 21, many (>10) open heavy well exerted droopy low (1-5 %) easy (51-100%)	5 7 9 2 1 2 3 9	

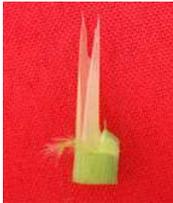
07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling):  p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	Present long (11-20 mm) Whole length straw straw white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) highly fertile (>90%) 21.13, medium (20-23g) 7.18, medium (7.1-8 mm) 2.63  5.15, short (<5.5 mm) 2.35, medium (L:W= 2.1-2.5) red  indeterminate nonscented intermediate	9 7 5 1 2 1 3 0 4 1 3 1 5  5  1 5 5  3 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	147 days, late (136-150 days)	7	
09	<b>Yield</b>	12.74 g/hill		

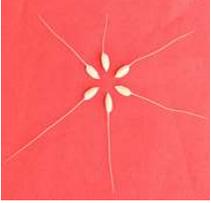
**Accession no. 0259, Name: Baran Boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	26.20 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	50.73 cm 1.09 cm intermediate purple margins present  light purple erect intermediate (<30-45°)	  2 5 9  3 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.42 mm white 2-cleft pale green pale green	  1 2 1 1	
04	<b>Days after 50% heading</b>	126 days, very late (>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	102.50 cm, long (81-110 cm) present 11 erect (<30°) 6.42 mm, large (6.1-7 mm) Purple lines strong	  7 9  1 5 3 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.60 cm, medium (21-25 cm) 10, medium (6-10) open heavy well exerted droopy low (1-5 %) intermediate (6-25%)	  5 5 9 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent purple white low (5-20%) purple spots on straw hairs on upper portion purple medium (1.6-2.5 mm) highly fertile (>90%) 16.37, low (16-19g) 6.81, short (6.1-7 mm) 2.73 5.63, medium (5.6-6.5 mm) 2.39, medium (L:W= 2.1-2.5) white glutinous (waxy) nonscented intermediate	1 6 1 3 6 3 4 3 1 3 3  3  5 1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	153 days, very late (>150 days)	9	
09	<b>Yield</b>	9.22 g/hill		

Accession no. 0545, Name: Jagli, Variety group: Boro

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	32.07 cm		
02	<b>Leaf (Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	33.33 cm 0.85 cm intermediate dark green absent  green erect intermediate (<30-45°)	 2 3 1  1 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.34 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	124 days, very late (>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	84.27 cm, long (81-110 cm) absent 13 open (≈60°) 4.18 mm, small (<5 mm) light gold strong	 7 1  5 1 2 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	21.87 cm, medium (21-25 cm) 12, many (>10) open heavy well exerted droopy low (1-5 %) intermediate (6-25%)	 5 7 9 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) whole length straw straw white no or a few (<5%) reddish to light purple short hairs gold medium (1.6-2.5 mm) highly fertile (>90%) 19.43, low (16-19g) 7.53, medium (7.1-8 mm)  2.65  5.08, short (<5.5 mm) 2.45, bold (L:W= 1.5-2) white  glutinous (waxy) nonscented intermediate	9 9 5 1 2 1 2 3 1 3 5  1 3  1  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	152 days, very late (>150 days)	9	
09	<b>Yield</b>	19.04 g/hill		

**Accession no. 0734, Name: Lahi boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Co de no.	Figure
01	Seedling height	30.20 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	41 cm 1.04 cm intermediate green absent  green erect intermediate (<30-45°)	 2 2 1  1 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.50 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	135 days, very late (>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	77.80 cm, medium (61-80 cm) absent 11 intermediate (≈30°) 4.07 mm, small (<5 mm) green strong	5 1  3 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	21 cm, medium (21-25 cm) 10, medium (6-10) open heavy moderately well exerted droopy moderate (6-25 %) easy (51-100%)	5 5 9 2 3 2 5 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent red apex white no or a few (<5%) straw short hairs straw medium (1.6-2.5 mm) partly sterile (50-74%) 22.04, medium (20-23g) 8.04, medium (7.1-8 mm) 3.11 5.98, medium (5.6-6.5 mm) 2.79, medium (L:W= 2.1-2.5) light brown indeterminate nonscented intermediate	1 5 1 1 0 4 1 3 5 5 5 3 5 2 3 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	162 days, very late (>150 days)	9	
09	<b>Yield</b>	3.57 g/hill		

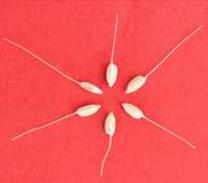
**Accession no. 0735, Name: Kali boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Cod e no.	Figure
01	Seedling height	40.33 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	40.53 cm 1.06 cm intermediate purple margins present  purple erect intermediate (<30-45°)	2 5 9  4 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	15.75 mm purple lines 2-cleft purple purple	2 2 3 2	
04	<b>Days after 50% heading</b>	124 days, very late (>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	91.33 cm, long (81-110 cm) present 13 open (≈60°) 4.66 mm, small (<5 mm) purple strong	7 9  5 1 4 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	18.90 cm, short (<20 cm) 11, many (>10) open heavy well exerted droopy Moderate (6-25%) easy (51-100%)	3 7 9 2 1 2 5 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length black purple purple low (5-20%) black short hairs purple medium (1.6-2.5 mm) highly fertile (>90%) 19.36, low (16-19 g) 7.59, medium (7.1-8 mm)  2.53 5.40, short (<5.5 mm) 2.19, medium (L:W= 2.1-2.5) brown  glutinous (waxy) nonscented intermediate	9 9 5 6 6 5 3 9 4 4 3 1 3 5  1 5 4  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	152 days, very late (>150 days)	9	
09	<b>Yield</b>	14.06 g/hill		

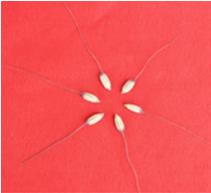
**Accession no. 0930, Name: Tepi boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	37.67 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	46.20 cm 1.04 cm intermediate dark green absent  green erect intermediate (<30-45°)	2 3 1  1 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.60 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	127 days, very late (>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	103.30 cm, long (81-110 cm) absent 14 intermediate (≈30°) 4.45 mm, small (<5 mm) green strong	7 1 3 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.33 cm, medium (21-25 cm) 12, many (>10) intermediate heavy well exerted droopy low (1-5 %) easy (51-100%)	5 7 5 2 1 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) whole length straw straw white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) highly fertile (>90%) 18.77, low (16-19g) 7.68, medium (7.1-8 mm) 2.75 5.36, short (<5.5 mm) 2.30, medium (L:W= 2.1-2.5) red glutinous (waxy) nonscented intermediate	9 9 5 1 2 1 3 0 4 1 3 1 3 5  1 5 5  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	156 days, very late (>150 days)	9	
09	<b>Yield</b>	13.11 g/hill		

**Accession no. 1280, Name: Chaite boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Cod e no.	Figure
01	Seedling height	41 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	45.83 cm 0.99 cm intermediate purple margins present  purple erect horizontal (<46-90°)	 2 5 9  4 1 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.63 mm purple lines 2-cleft purple purple	 2 2 3 2	
04	<b>Days after 50% heading</b>	122 days, very late (>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	93.87 cm, long (81-110 cm) present 11 open (≈60°) 4.64 mm, small (<5 mm) purple strong	 7 9  5 1 4 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	21.13 cm, medium (21-25 cm) 10, medium (6-10) open heavy well exerted droopy low(1-5%) intermediate (6-25%)	 5 5 9 2 1 2 3 5	

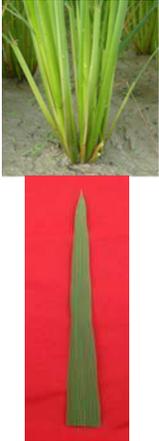
07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling):  p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length black purple purple low (5-20%) purple spots on straw short hairs purple medium (1.6-2.5 mm) highly fertile (>90%) 21.97, Medium (20-23g) 7.34, medium (7.1-8 mm)  2.75  5.41, short (<5.5 mm) 2.42, medium (L:W= 2.1-2.5) brown  glutinous (waxy) nonscented intermediate	9 9 5 6 6 5 3 6 4 4 3 1 5 5   1 5 4  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	151 days, very late (>150 days)	9	
09	<b>Yield</b>	13.95 g/hill		

**Accession no. 1281, Name: Kali boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Cod e no.	Figure
01	Seedling height	36.87 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	46.20 cm 0.86 cm intermediate purple margins present  purple horizontal horizontal (<46-90°)	2 5 9  4 5 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.33 mm purple lines 2-cleft purple purple	2 2 3 2	
04	<b>Days after 50% heading</b>	126 days, very late (>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	82.27 cm, long (81-110 cm) present 18 intermediate (≈30°) 3.66 mm, small (<5 mm) purple strong	7 9  3 1 4 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	21.27 cm, medium (21-25 cm) 15, many (>10) compact heavy well exerted droopy moderate (6-25%) easy (51-100%)	5 7 1 2 1 2 5 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling):  p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length purple purple purple low (5-20%) black short hairs purple medium (1.6-2.5 mm) partly sterile (50-74%) 21.53, Medium (20-23g) 7.68, medium (7.1-8 mm)  2.89  5.54, short (<5.5 mm) 2.42, medium (L:W= 2.1-2.5) speckled brown  glutinous (waxy) nonscented intermediate	9 9 5 5 6 5 3 9 4 4 3 5 5 5   1 5 3  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	154 days, very late (>150 days)	9	
09	<b>Yield</b>	9.31 g/hill		

**Accession no. 1282, Name: Manik muda, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	33 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	50.57 cm 1.09 cm intermediate green present  light purple horizontal horizontal (<46-90°)	2 2 9  3 5 5	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	28.23 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	122 days, very late (>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	97.40 cm, long (81-110 cm) absent 14 intermediate (≈30°) 4.77 mm, small (<5 mm) green moderately strong	7 1  3 1 1 3	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	22.80 cm, medium (21-25 cm) 12, many (>10) open heavy moderately well exerted droopy low (1-5%) easy (51-100%)	5 7 9 2 3 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling):  p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present medium (5-10 mm) Whole length red red apex white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 24.43, high (24-27g) 8.52, long (8.1-9 mm)  3.27  5.79, medium (5.6-6.5 mm) 2.91, bold (L:W= 1.5-2) red  glutinous (waxy) nonscented intermediate	9 5 5 4 5 1 3 0 4 1 3 3 7 7  3 3 3 5  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	151 days, very late (>150 days)	9	
09	<b>Yield</b>	10.12 g/hill		

**Accession no. 1469, Name: Lahi boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Cod e no.	Figure
01	Seedling height	33.80 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	49.23 cm 1.03 cm intermediate green absent  green horizontal horizontal (<46-90°)	  2 2 1  1 5 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.43 mm white 2-cleft pale green pale green	  1 2 1 1	
04	<b>Days after 50% heading</b>	128 days, very late (>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	93.33 cm, long, (81-110 cm) absent 15 intermediate (≈30°) 4.41 mm, small (<5 mm) green intermediate	7 1  3 1 1 5	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	20.17 cm, short (<20 cm) 13, many (>10) open heavy just exerted droopy low (1-5 %) intermediate (6-25%)	3 7 9 2 5 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 24.92, high (24-27g) 7.38, medium (7.1-8 mm) 3.54 5.06, short (<5.5 mm) 3.03, bold (L:W= 1.5-2) white glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 3 7 5   1 3 1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	156 days, very late (>150 days)	9	
09	<b>Yield</b>	8.67 g/hill		

**Accession no. 2257, Name: Tupa, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	33.80 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	49.23 cm 1.03 cm intermediate green present  light purple erect intermediate (<30-45°)	2 2 9  3 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.43 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	122 days, very late (>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	93.33 cm, long (81-110 cm) present 15 intermediate (≈30°) 4.41 mm, small (<5 mm) Purple lines intermediate	7 9  3 1 3 5	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25.33 cm, medium (21-25 cm) 13, many (>10) intermediate heavy well exerted droopy low (1-5%) intermediate (6-25%)	5 7 5 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling):  p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length purple purple white low (5-20%) gold and or gold furrows on straw short hairs straw medium (1.6-2.5 mm) highly fertile (>90%) 22.12, Medium (20-23g)  7.38, medium (7.1-8 mm)  2.86  5.19, short (<5.5 mm) 2.50, bold (L:W=1.5-2) red  glutinous (waxy) nonscented intermediate	9 9 5 5 6 1 3 1 4 1 3 1 5 5    1 3 5  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	149 days, late (136-150 days)	7	
09	<b>Yield</b>	13.20 g/hill		

**Accession no. 1476, Name: Jagoli, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	34.27 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	32.67 cm 0.84 cm intermediate green absent green horizontal horizontal (46-90°)	2 2 1 1 5 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.53 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	122 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	86.07 cm, long (81-110 cm) absent 15 spreading (>60°) 4.15 mm, small (<5 mm) green intermediate	7 1 7 1 1 5	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25.33 cm, medium (21-25 cm) 13, many (>10) intermediate heavy well exerted droopy low (1-5 %) easy (51-100%)	5 7 5 2 1 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length straw red apex white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 19.47, low (16-19g) 7.18, medium (7.1-8 mm) 2.57 4.98, short (<5.5 mm) 2.31, medium (L:W= 2.1-2.5) speckled brown glutinous (waxy) nonscented intermediate	9 9 5 1 5 1 3 0 4 1 3 3 3 5 1 5 3 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	150 days, late (136-150 days)	7	
09	<b>Yield</b>	9.47 g/hill		

**Accession no. 1648, Name: Elachi boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	35.07 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	62.47 cm 1.09 cm intermediate green absent  green erect horizontal (<46-90°)	  2 2 1  1 1 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	17.40 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	137 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	101.43 cm, long, (81-110 cm) absent 12 intermediate (≈30°) 4.95 mm, small (<5 mm) green strong	7 1  3 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25.93 cm, medium (21-25 cm) 10, medium (6-10) open heavy well exerted droopy low (1-5 %) easy (51-100%)	5 5 9 2 1 2 3 9	



**Accession no. 1649, Name: Kalo boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	36 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	44.37 cm 1.15 cm intermediate green absent  green erect intermediate (<30-45°)	 2 2 1  1 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	21.27 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	129 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	78 cm, medium (61-80 cm) absent 15 intermediate (≈30°) 4.80 mm, small (<5 mm) green strong	 5 1  3 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24.27 cm, medium (21-25 cm) 13, many (>10) open heavy well exerted droopy low (1-5 %) intermediate (6-25%)	 5 7 9 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent purple white low (5-20%) purple spots on straw short hairs purple short (<1.5 mm) fertile (75-90%) 17.42, low (16-19g) 6.1, short (6.1-7 mm) 3 3.89, short (<5.5 mm) 2.60, round (L:W= <1.5) white glutinous (waxy) nonscented intermediate	1 6 1 3 6 4 4 1 3 3 3  1 1 1 1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	157 days, very late (>150 days)	9	
09	<b>Yield</b>	11.81 g/hill		

**Accession no. 1652, Name: Local boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	41.33 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	43.47 cm 1.05 cm intermediate purple tips present  purple drooping horizontal (<46-90°)	 2 4 9  4 9 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	15 mm purple lines 2-cleft purple purple	 2 2 3 2	
04	<b>Days after 50% heading</b>	119 days, late(106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	85.13 cm, long (81-110 cm) absent 15 open ( $\approx 60^\circ$ ) 3.73 mm, small (<5 mm) green moderately strong	7 1  5 1 1 3	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25.23 cm, medium (21-25 cm) 14, many (>10) compact heavy well exerted droopy moderate (6-25%) easy (51-100%)	5 7 1 2 1 2 5 9	

07	<b>Grain (spikelet)</b>				
	a. Spikelet: awn	present	9		
	b. Length of the longest awn	very long (>20 mm)	9		
	c. Distribution of awn	Whole length	5		
	d. Awn colour	purple	5		
	e. Apiculus color	purple	6		
	f. Stigma color	light purple	4		
	g. Stigma exertion	low (5-20%)	3		
	h. Lemma & palae color	gold and or gold furrows on straw	1		
	i. Lemma & palae pubescence	short hairs	4		
	j. Sterile lemma color	straw	1		
	k. Sterile lemma length	medium (1.6-2.5 mm)	3		
	l. Spikelet sterility	partly sterile (50-74%)	5		
	m. 1000 grain weight	24.64, high (24-27g)	7		
	n. Length (mm) (without dehulling)	8.72, long (8.1-9 mm)	7		
	o. Width (mm) (without dehulling)	3.05			
	p. Decorticated grain length	6.13, medium (5.6-6.5 mm)	3		
q. Decorticated grain width	2.51,				
r. Decorticated grain shape	medium (L:W=2.1-2.5)	5			
s. Seed coat color (Decorticated grain)	red	5			
t. Endosperm type	glutinous (waxy)	2			
u. Decorticated grain, scent	nonscented	0			
v. Leaf senescence	intermediate	5			
08	<b>Maturity</b>				
	a. Days to maturity from seedling	147 days, late (136-150 days)	7		
09	<b>Yield</b>	10.16 g/hill			

**Accession no. 1653, Name: Sonali chikan, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	34.20 cm		
02	<b>Leaf (Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	47.13 cm 1.14 cm intermediate green absent  green drooping erect (<30°)	 2 2 1  1 9 1	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	16.03 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	125 days, very late (>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	95.90 cm, long, (81-110 cm) absent 15 open (≈60°) 4.33 mm, small (<5 mm) Light gold strong	7 1  5 1 2 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25.20 cm, medium (21-25 cm) 13, many (>10) open heavy well exerted droopy low (1-5 %) intermediate (6-25%)	5 7 9 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color f. Stigma color g. Stigma exertion h. Lemma & palae color i. Lemma & palae pubescence j. Sterile lemma color k. Sterile lemma length l. Spikelet sterility m. 1000 grain weight n. Length (mm) (without dehulling) o. Width (mm) (without dehulling) p. Decorticated grain length q. Decorticated grain width r. Decorticated grain shape s. Seed coat color (Decorticated grain): t. Endosperm type u. Decorticated grain, scent v. Leaf senescence	absent brown white low (5-20%) brown short hairs gold medium (1.6-2.5 mm) fertile (75-90%) 21.55, medium (20-23g) 8.64, long (8.1-9 mm) 2.86 6.08, medium (5.6-6.5 mm) 2.42, medium (L:W= 2.1-2.5) red glutinous (waxy) nonscented intermediate	1 3 1 3 4 4 2 3 3 5 7  3 5 5 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	153 days, very late (>150 days)	9	
09	<b>Yield</b>	14.26 g/hill		

**Accession no. 1703, Name: Jagli, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	42.80 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	34.23 cm 1.44 cm intermediate green absent  green erect erect (<30°)	 2 2 1  1 1 1	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.50 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	113 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	66.50 cm, medium (61-80 cm) absent 12 open (≈60°) 5.01 mm, small (<5 mm) green strong	5 1  5 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	20.33 cm, short (<20 cm) 10, medium (6-10) open heavy moderately well exerted droopy moderate (6-25 %) easy (51-100%)	3 5 9 2 3 2 5 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present short (2-5 mm) tip only gold red apex white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 23.27, medium (20-23g) 8.53, long (8.1-9 mm) 3.34 5.79, medium (5.6-6.5 mm) 2.84, bold (L:W= 1.5-2) red glutinous (waxy) nonscented intermediate	9 3 1 2 5 1 3 0 4 1 3 3 5 7 3 3 5 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	143 days, late (136-150 days)	7	
09	<b>Yield</b>	7.47 g/hill		

**Accession no. 1710, Name: Khoia, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	40.87 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	56.83 cm 0.93 cm intermediate green absent green erect erect (<30°)	2 2 1 1 1 1	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	15.17 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	128 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	81.67 cm, long (81-110 cm) absent 20 erect (>30°) 4.53 mm, small (<5 mm) Light gold strong	7 1 1 1 2 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24.07 cm, medium (21-25 cm) 17, many (>10) intermediate heavy moderately well exerted droopy low (1-5 %) intermediate (6-25%)	5 7 5 2 3 2 3 5	

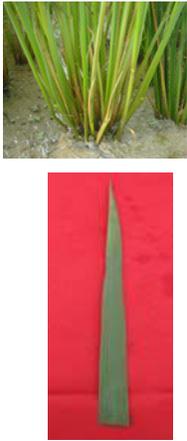
07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling):  p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present short (2-5 mm) tip only gold brown white low (5-20%) gold and or gold furrows on straw short hairs gold medium (1.6-2.5 mm) fertile (75-90%) 21.68, medium (20-23g) 7.87, medium (7.1-8 mm) 3.04  5.57, short (<5.5 mm) 2.81, bold (L:W= 1.5-2) white  glutinous (waxy) nonscented intermediate	9 3 1 2 3 1 3 1 4 2 3 3 5  5  1 3 1  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	158 days, very late (>150 days)	9	
09	<b>Yield</b>	14.84 g/hill		

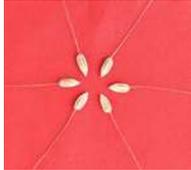
**Accession no. 1712, Name: Tepisail, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	42 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	58.03 cm 1.06 cm intermediate green present  light purple erect intermediate (<30-45°)	 2 2 9  3 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.03 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	129 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	91.37 cm, long, (81-110 cm) present 14 open (≈60°) 4.02 mm, small (<5 mm) purple lines strong	 7 9  5 1 3 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24.27 cm, medium (21-25 cm) 12, many (>10) open heavy well exerted droopy low (1-5 %) easy (51-100%)	5 7 9 2 1 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent purple white low (5-20%) straw hairs on upper portion straw medium (1.6-2.5 mm) highly fertile (>90%) 19.87, low (16-19g) 7.57, medium (7.1-8 mm) 2.70 5.50, short (<5.5 mm) 2.35, medium (L:W= 2.1-2.5) brown glutinous (waxy) nonscented intermediate	1 6 1 3 0 3 1 3 1 3 5  1  5 4  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	158 days, very late (>150 days)	9	
09	<b>Yield</b>	15.71 g/hill		

**Accession no. 1715, Name: Sada Boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	34.20 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	58.20 cm 1.32 cm intermediate green present  light purple horizontal intermediate (<30-45°)	2 2 9  3 5 3	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	12.80 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	117 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	96.93 cm, long (81-110 cm) present 14 open (≈60°) 4.35 mm, small (<5 mm) purple lines strong	7 9  5 1 3 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	21.53 cm, medium (21-25 cm) 13, many (>10) compact heavy well exerted droopy low (1-5%) intermediate (6-25%)	5 7 1 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling):  p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length purple purple white low (5-20%) gold and or gold furrows on straw short hairs straw medium (1.6-2.5 mm) partly sterile (50-74%) 21.30, medium (20-23g) 7.61, medium (7.1-8 mm) 2.70  4.95, short (<5.5 mm) 2.43, bold (L:W=1.5-2) red  glutinous (waxy) nonscented intermediate	9 9 5 5 6 1 3 1 4 1 3 5 5  1 3 5  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	147 days, late (136-150 days)	7	
09	<b>Yield</b>	8.30 g/hill		

**Accession no. 7362, Name: Jhora dhan, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	32.27 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	53.87 cm 1.31 cm intermediate dark green absent  green erect horizontal (46-90°)	 2 3 1  1 1 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.57 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	134 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	50.20 cm, short (41-60 cm) absent 12 erect (<30°) 5.83 mm, medium (5.1-6 mm) green strong	 3 1  1 3 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25.87 cm, medium (21-25 cm) 11, many (>10) intermediate heavy moderately well exerted droopy low (1-5 %) easy (51-100%)	5 7 5 2 3 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present medium (5-10 mm) Whole length straw straw white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) highly fertile (>90%) 22.93, medium (20-23g) 7.51, medium (7.1-8 mm) 2.69 5.39, short (<5.5 mm) 2.54, medium (L:W= 2.1-2.5) brown glutinous (waxy) nonscented intermediate	9 5 5 1 2 1 3 0 4 1 3 1 5 5 1 5 4 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	161 days, very late (>150 days)	9	
09	<b>Yield</b>	16.25 g/hill		

**Accession no. 1754, Name: Deshi boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	41 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	50.67 cm 1.27 cm intermediate green present  purple erect intermediate (<30-45°)	 2 2 9  4 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.47 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	124 days, very late (>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	83.57 cm, long (81-110 cm) present 21 open (≈60°) 4.21 mm, small (<5 mm) green strong	 7 9  5 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	17.70 cm, short (<20 cm) 18, many (>10) compact heavy well exerted droopy moderate (6-25%) easy (51-100%)	 3 7 1 2 1 2 5 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling):  p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length purple purple purple low (5-20%) black short hairs purple medium (1.6-2.5 mm) highly fertile (>90%) 21.77, medium (20-23g) 7.52, medium (7.1-8 mm) 3.06  5.39, short (<5.5 mm) 2.55, medium (L:W=2.1-2.5) brown  glutinous (waxy) nonscented intermediate	 9 9 5 5 6 5 3 9 4 4 3 1 5  5  1 5 4  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	155 days, very late (>150 days)	9	
09	<b>Yield</b>	15.38 g/hill		

Accession no. 1791, Name: Sada boro, Variety group: Boro

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	41.53 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	42.33 cm 0.63 cm intermediate purple margins present  purple erect erect (<30°)	 2 5 9  4 1 1	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	15.75 mm purple lines 2-cleft purple purple	 2 2 3 2	
04	<b>Days after 50% heading</b>	124 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	84.90 cm, long (81-110 cm) present 21 open ( $\approx 60^\circ$ ) 4.12 mm, small (<5 mm) purple strong	7 9  5 1 4 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	18.40 cm, short (<20 cm) 17, many (>10) Intermediate heavy well exerted droopy moderate (6-25%) easy (51-100%)	3 7 5 2 1 2 5 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length purple purple purple low (5-20%) purple furrows on straw short hairs purple medium (1.6-2.5 mm) partly sterile (50-74%) 22.29, medium (20-23g) 7.68, medium (7.1-8 mm) 3.06 5.43, short (<5.5 mm) 2.74, bold (L:W=1.5-2) red glutinous (waxy) nonscented intermediate	9 9 5 5 6 5 3 7 4 4 3 5 5 5 1 3 5 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	154 days, very late(>150 days)	9	
09	<b>Yield</b>	9.37 g/hill		

**Accession no. 1797, Name: Kharma dhan, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	41.33 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	39.63 cm 1.13 cm intermediate green absent  green horizontal horizontal (<46-90°)	 2 2 1  1 5 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	11.07 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	122 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	71.47 cm, medium (61-80 cm) absent 17 open ( $\approx 60^\circ$ ) 3.50 mm, small (<5 mm) green strong	5 1  5 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	18.20 cm, short (<20 cm) 16, many (>10) intermediate heavy well exerted droopy Moderate (6-25%) easy (51-100%)	3 7 5 2 1 2 5 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent red apex light purple low (5-20%) gold and or gold furrows on straw short hairs straw medium (1.6-2.5 mm) partly sterile (50-74%) 16.77, low (16-19g) 7.57, medium (7.1-8 mm)  2.68  5.21, short (<5.5 mm) 2.38, medium (L:W= 2.1-2.5) red  glutinous (waxy) nonscented intermediate	1 5 4 3 1 4 1 3 5 3 5    1 5 5  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	151 days, very late (>150 days)	9	
09	<b>Yield</b>	7.67 g/hill		

**Accession no. 1798, Name: Mugal sail, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	42.33 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	60 cm 1.30 cm intermediate green present  light purple horizontal horizontal (<46-90°)	 2 2 9  3 5 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.13 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	129 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	94.53 cm, long (81-110 cm) present 12 open (≈60°) 5.09 mm, small (<5 mm) Purple lines Moderately strong	 7 9  5 1 3 3	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25.23 cm, medium (21-25 cm) 10, medium (6-10) intermediate heavy just exerted droopy Moderate (6-25%) easy (51-100%)	 5 5 5 2 5 2 5 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white high (41-60%) straw short hairs straw short (<1.5 mm) highly fertile (>90%) 18.79, low (16-19g) 8.01, medium (7.1-8 mm) 2.85 6.30, medium (5.56-6.5 mm) 2.53, medium (L:W= 2.1-2.5) white glutinous (waxy) nonscented intermediate	1 2 1 7 0 4 1 1 1 3 5  3 5 1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	157 days, very late (>150 days)	9	
09	<b>Yield</b>	16.57 g/hill		

**Accession no. 1799, Name: Patri, Variety group: Boro**

App. des. no.	Characteristics	State of character	Cod e no.	Figure
01	Seedling height	36 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	48.10 cm 1.37 cm intermediate green absent  green drooping horizontal (<46-90°)	  2 2 1  1 9 5	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	16.93 mm white 2-cleft pale green pale green	  1 2 1 1	
04	<b>Days after 50% heading</b>	129 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	90.80 cm, long (81-110 cm) absent 9 erect (<30°) 4.83 mm, small (<5.0 mm) Green strong	 7 1  1 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24.87 cm, medium (21-25 cm) 8, medium (6-10) open heavy just exerted droopy high(>50 %) easy (51-100%)	 5 5 9 2 5 2 9 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling):  p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present Very short (<2 mm) tip only straw straw white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) partly sterile (50-74%) 18.45, low (16-19g) 7.71, medium (7.1-8 mm)  2.86  5.56, short (<5.5 mm) 2.52, medium (L:W= 2.1-2.5) white  glutinous (waxy) nonscented intermediate	9 1 1 1 2 1 3 0 4 1 3 5 3 5   1 5 1  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	158 days, very late(>150 days)	9	
09	<b>Yield</b>	7.14 g/hill		

**Accession no. 1803, Name: Bogra, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	41.87 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	58 cm 1.04 cm intermediate green present  light purple erect intermediate (<30-45°)	 2 2 9  3 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.70 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	123 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	96.60 cm, long (81-110 cm) present 15 open (≈60°) 4.54 mm, small (<5 mm) Purple lines strong	 7 9  5 1 3 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	19.07 cm, short (<20 cm) 14, many (>10) intermediate heavy well exerted droopy low (1-5%) easy (51-100%)	 3 7 5 2 1 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length straw straw white low (5-20%) gold and or gold furrows on straw short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 19.17, low (16-19g) 7, short (6.1-7 mm) 2.82 5.01, short (<5.5 mm) 2.53, bold (L:W=1.5-2) red glutinous (waxy) nonscented intermediate	9 9 5 1 2 1 3 1 4 1 3 3 3  3  1 3 5  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	151 days, very late(>150 days)	9	
09	<b>Yield</b>	12.81 g/hill		

**Accession no. 1807, Name: Jagli, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	42.27 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	49.27 cm 1.05 cm intermediate green present  light purple horizontal erect (<30°)	  2 2 9  3 5 1	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.93 mm white 2-cleft green pale green	 1 2 2 1	
04	<b>Days after 50% heading</b>	120 days, late(106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	91.33 cm, long (81-110 cm) absent 14 open (≈60°) 4.69 mm, small (<5 mm) green moderately strong	 7 1  5 1 1 3	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	20.94 cm, short (<20 cm) 12, many (>10) intermediate heavy well exerted droopy low (1-5%) easy (51-100%)	 3 7 5 2 1 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length straw straw white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 19.63, low (16-19g) 7.66, medium (7.1-8 mm) 2.79 5.53, short (<5.5 mm) 2.51, medium (L:W=2.1-2.5) red glutinous (waxy) nonscented intermediate	9 9 5 1 2 1 3 0 4 1 3 3 3 5 1 5 5 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	151 days, very late (>150 days)	9	
09	<b>Yield</b>	13.75 g/hill		

**Accession no. 1812, Name: Sada Tupa, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	34 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	46.30 cm 1.21 cm intermediate dark green absent  green erect erect (<30°)	 2 3 1  1 1 1	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.93 mm white 2-cleft green pale green	 1 2 2 1	
04	<b>Days after 50% heading</b>	134 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	92.67 cm, long (81-110 cm) absent 14 erect (<30°) 4.87 mm, small (<5 mm) green strong	 7 1  1 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25.90 cm, medium (21-25 cm) 12, many (>10) open heavy well exerted droopy Moderately high (265-50%) easy (51-100%)	5 7 9 2 1 2 7 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 20.45, medium (20-23g) 7.78, medium (7.1-8 mm) 2.67 5.32, short (<5.5 mm) 2.34, medium (L:W= 2.1-2.5) red glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 3 5 5  1 5 5  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	162 days, very late (>150 days)	9	
09	<b>Yield</b>	12.65 g/hill		

**Accession no. 1814, Name: Banajira, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	39.13 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	44 cm 1.04 cm intermediate purple margins present  purple lines erect intermediate (<30-45°)	2 5 9  2 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.07 mm white 2-cleft green pale green	1 2 2 1	
04	<b>Days after 50% heading</b>	134 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	105.67 cm, long (81-110 cm) present 13 intermediate (≈30°) 4.78 mm, small (<5 mm) Purple lines Moderately strong	7 9  3 1 3 3	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	24.13 cm, medium (21-25 cm) 11, many (>10) open heavy well exerted droopy low (1-5 %) intermediate (6-25%)	5 7 9 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent purple apex light purple low (5-20%) purple furrows on straw short hairs purple medium (1.6-2.5 mm) fertile (75-90%) 17.70, low (16-19g) 6.76, short (6.1-7 mm) 2.63 4.53, short (<5.5 mm) 2.45, bold (L:W= 1.5-2) white indeterminate nonscented intermediate	1 7 4 3 7 4 4 3 3 3 3 1 3 3 1 3 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	163 days, very late(>150 days)	9	
09	<b>Yield</b>	11.71 g/hill		

**Accession no. 1860, Name: Kunal boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	40.67 cm		
02	<b>Leaf (Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	46.07 cm 0.90 cm Intermediate green absent  green erect intermediate (<30-45°)	  2 2 1  1 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	12.07 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	125 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	95.40 cm, long (81-110 cm) absent 13 open (≈60°) 4.38 mm, small (<5 mm) green moderately strong	7 1  5 1 1 3	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	21.47 cm, medium (21-25 cm) 12, many (>10) open heavy just exerted droopy low (1-5 %) intermediate (6-25%)	5 7 9 2 5 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) highly fertile (>90%) 23.75, medium (20-23g) 7.80, medium (7.1-8 mm) 3.41 5.28, short (<5.5 mm) 3.03, bold (L:W= 1.5-2) white glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 1 5 5  1 3  1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	152 days, very late(>150 days)	9	
09	<b>Yield</b>	15 g/hill		

**Accession no. 1862, Name: Deshi boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	39.13 cm		
02	<b>LEAF</b> (Below the flag leaf) a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	57.63 cm 1.10 cm intermediate green absent  green drooping horizontal (<46-90°)	  2 2 1  1 9 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	11.47 mm white 2-cleft green pale green	  1 2 2 1	
04	<b>Days after 50% heading</b>	122 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	107.53 cm, long (81-110 cm) absent 16 open (≈60°) 4.52 mm, small (<5.0 mm) Green Moderately strong	7 1  5 1 1 3	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25.13 cm, medium (21-25 cm) 13, many (>10) intermediate heavy just exerted droopy low(1-5 %) easy (51-100%)	5 7 5 2 5 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present long (11-20 mm) tip only straw straw white low (5-20%) gold and or gold furrows on straw short hairs straw medium (1.6-2.5 mm) partly sterile (50-74%) 19.40, low (16-19g) 7.82, medium (7.1-8 mm)  2.76 5.46, short (<5.5 mm) 2.47, medium (L:W= 2.1-2.5) speckled brown glutinous (waxy) nonscented intermediate	9 7 1 1 2 1 3 1 4 1 3 5 3 5   1 5 3  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	152 days, very late(>150 days)	9	
09	<b>Yield</b>	13.60 g/hill		

**Accession no. 1863, Name: Sada boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	44.40 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	51.57 cm 1.06 cm intermediate green present  purple horizontal horizontal (<46-90°)	2 2 9  4 5 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.43 mm purple lines 2-cleft purple purple	2 2 3 2	
04	<b>Days after 50% heading</b>	120 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	96.07 cm, long (81-110 cm) present 11 spreading (>60°) 4.39 mm, small (<5 mm) Purple lines intermediate	7 9  7 1 3 5	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	25.53 cm, medium (21-25 cm) 10, medium (6-10) open heavy well exerted droopy moderate (6-25%) easy (51-100%)	5 5 9 2 1 2 5 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length purple purple purple low (5-20%) gold and or gold furrows on straw short hairs straw medium (1.6-2.5 mm) partly sterile (50-74%) 18.97, low (16-19g) 7.97, medium (7.1-8 mm) 3.01 5.49, short (<5.5 mm) 2.61, medium (L:W=2.1-2.5) red glutinous (waxy) nonscented intermediate	9 9 5 5 6 5 3 1 4 1 3 5 3 5  1 5 5  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	149 days, late(136-150 days)	7	
09	<b>Yield</b>	11.23 g/hill		

**Accession no. 1863, Name: Jagly, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	41.47 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	44.27cm 1.01 cm intermediate green present  light purple horizontal horizontal (<46-90°)	 2 2 9  3 5 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.17 mm white 2-cleft green pale green	 1 2 2 1	
04	<b>Days after 50% heading</b>	120 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	85.47 cm, long (81-110 cm) present 13 open (≈60°) 4.67 mm, small (<5 mm) Purple lines intermediate	 7 9  5 1 3 5	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	22 cm, medium (21-25 cm) 11, many (>10) open heavy well exerted droopy low (1-5%) easy (51-100%)	 5 7 9 2 1 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling):  p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length purple purple light purple low (5-20%) gold and or gold furrows on straw short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 20.12, medium (20-23g) 7.71, medium (7.1-8 mm) 2.88 5.52, short (<5.5 mm) 2.52, medium (L:W=2.1-2.5) red glutinous (waxy) nonscented intermediate	9 9 5 5 6 4 3 1 4 1 3 3 5 5  1 5 5  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	149 days, late (136-150 days)	7	
09	<b>Yield</b>	11.98 g/hill		

**Accession no. 1865, Name: Boraya, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	39 cm		
02	<b>Leaf (Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	43.60 cm 1.05 cm Intermediate dark green absent  green horizontal horizontal (<46-90°)	 2 3 1  1 5 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.03 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	126 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	92.27 cm, long (81-110 cm) absent 15 intermediate (≈30°) 3.75 mm, small (<5 mm) green moderately strong	 7 1  5 1 1 3	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	23.17 cm, medium (21-25 cm) 13, many (>10) open heavy well exerted droopy moderately high (26-50%) easy (51-100%)	 5 7 9 2 1 2 7 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) partly sterile (50-74%) 22.47, medium (20-23g) 6.93, short (6.1-7 mm) 3.20 4.60, short (<5.5 mm) 2.89, bold (L:W= 1.5-2) white glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 5 5 3  1 3  1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	155 days, very late(>150 days)	9	
09	<b>Yield</b>	10.94 g/hill		

**Accession no. 2256, Name: Topa, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	43 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	41.60 cm 1.06 cm intermediate green absent  green drooping descending (>90°)	 2 2 1  1 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	20.63 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	123 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	84.80 cm, long (81-110 cm) absent 11 open (≈60°) 4.43 mm, small (<5 mm) green strong	7 1  5 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	21.93 cm, medium (21-25 cm) 9, medium (6-10) open heavy well exerted droopy low (1-5%) easy (51-100%)	5 5 9 2 1 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling):  p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length straw straw white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 20.85, medium (20-23g) 7.72, medium (7.1-8 mm)  5.64, medium (5.6-6.5 mm) 2.50, medium (L:W=2.1-2.5) white glutinous (waxy) nonscented intermediate	9 9 5 1 2 1 3 0 4 1 3 3 5  5  3 5 1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	152 days, very late(>150 days)	9	
09	<b>Yield</b>	12.26 g/hill		

**Accession no. 2259, Name: Chhola boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	41.20 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	34.23 cm 0.77 cm intermediate green absent  green drooping descending (>90°)	2 2 1  1 9 7	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.47 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	121 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	93.13 cm, long (81-110 cm) absent 9 open (≈60°) 3.67 mm, small (<5 mm) green strong	7 1 9 5 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	20.40 cm, short (<20 cm) 8, medium (6-10) intermediate heavy well exerted droopy low (1-5%) easy (51-100%)	3 5 5 2 1 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length straw straw white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 21, medium (20-23g) 8.04, medium (7.1-8 mm) 2.80 5.66, medium (5.6-6.5 mm) 2.54, medium (L:W=2.1-2.5) red glutinous (waxy) nonscented intermediate	9 9 5 1 2 1 3 0 4 1 3 3 5 5 3 5 5 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	151 days, very late(>150 days)	9	
09	<b>Yield</b>	12.85 g/hill		

**Accession no. 2262, Name: Goa bish, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	39.27 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	44.03 cm 1.10 cm intermediate purple tips present  light purple erect intermediate (<30-45°)	2 4 9  3 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	16.07 mm white 2-cleft pale green pale green	1 2 1 1	
04	<b>Days after 50% heading</b>	120 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	95.63 cm, long (81-110 cm) present 12 open (≈60°) 4.17 mm, small (<5 mm) green strong	7 9  5 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	22.17 cm, medium (21-25 cm) 10, medium (6-10) open heavy well exerted droopy low (1-5%) easy (51-100%)	5 5 9 2 1 2 3 9	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling):  p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length purple purple light purple low (5-20%) gold and or gold furrows on straw hairs on upper portion straw medium (1.6-2.5 mm) partly sterile (50-74%) 18.89, low (16-19g)  7.77, medium (7.1-8 mm)  2.74  5.44, short (<5.5 mm) 2.50, medium (L:W=2.1-2.5) red  glutinous (waxy) nonscented intermediate	9 9 5 5 6 4 3 1 3 1 3 5 3  5   1 5 5  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	146 days, late (136-150 days)	7	
09	<b>Yield</b>	7.76 g/hill		

**Accession no. 2269, Name: Lafai, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	43.20 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	45.33 cm 1.06 cm intermediate green present  light purple erect intermediate (<30-45°)	 2 2 9  3 1 3	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.43 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	124 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	83.47 cm, long (81-110 cm) present 12 intermediate (≈30°) 4.09 mm, small (<5 mm) green moderately strong	 7 9  3 1 1 3	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	21.60 cm, medium (21-25 cm) 10, medium (6-10) intermediate heavy well exerted droopy low (1-5%) intermediate (6-25%)	 5 5 5 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length straw red apex white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 18.56, low (16-19g) 6.77, short (6.1-7 mm) 2.72 4.95, short (<5.5 mm) 2.33, medium (L:W=2.1-2.5) red glutinous (waxy) nonscented intermediate	9 9 5 1 5 1 3 0 4 1 3 3 3 3 1 5 5 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	155 days, very late(>150 days)	9	
09	<b>Yield</b>	12.07 g/hill		

**Accession no. 3447, Name: Gobirsail, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	42 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	52.37 cm 1.09 cm intermediate green present  light purple drooping descending (>90°)	 2 2 9  3 9 7	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.47 mm purple lines 2-cleft pale green pale green	 2 2 1 1	
04	<b>Days after 50% heading</b>	123 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	95.23 cm, long (81-110 cm) present 15 open (≈60°) 3.72 mm, small (<5 mm) purple lines moderately strong	 7 9  5 1 3 3	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	21 cm, medium (21-25 cm) 12, many (>10) compact heavy well exerted droopy low (1-5%) intermediate (6-25%)	 5 7 1 2 1 2 3 5	

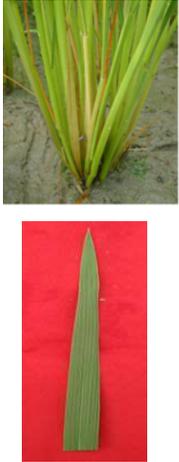
07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present very long (>20 mm) Whole length purple purple white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) partly sterile (50-74%) 22.60, medium (20-23g) 7.18, medium (7.1-8 mm) 3.17 4.83, short (<5.5 mm) 2.67, bold (L:W=1.5-2) white glutinous (waxy) nonscented intermediate	9 9 5 5 6 1 3 0 4 1 3 5 5    1 3 1  2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	150 days, late(136-150 days)	7	
09	<b>Yield</b>	6.31 g/hill		

**Accession no. 3954, Name: Bashful, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	42.27 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	45.60 cm 1.10 cm Intermediate green absent  green horizontal horizontal (<46-90°)	 2 2 1  1 5 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	11.60 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	129 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	87.20 cm, long (81-110 cm) absent 11 open (≈60°) 5.12 mm, medium (5.1-6 mm) green strong	 7 1  5 3 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	20.97 cm, short (<20 cm) 10, medium (6-10) open heavy well exerted droopy low (1-5%) intermediate (6-25%)	 3 5 9 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw short (<1.5 mm) fertile (75-90%) 12.60, very low (<15g) 5.25, very short (<6 mm) 2.67 3.42, short (<5.5 mm) 2.5, round (L:W= <1.5) white glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 1 3 1 1 1 1 1 1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	158 days, very late (>150 days)	9	
09	<b>Yield</b>	11.07 g/hill		

**Accession no. 3958, Name: Gul tepi, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	39.13 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	46.63 cm 1.06 cm intermediate green absent  green horizontal horizontal (<46-90°)	  2 2 1  1 5 5	
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	12.70 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	132 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	95.57 cm, long (81-110 cm) absent 10 intermediate (≈30°) 4.41 mm, small (<5 mm) green moderately strong	 7 1 3 1 1 3	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	19.73 cm, short (<20 cm) 9, medium (6-10) open heavy well exerted droopy low (1-5%) intermediate (6-25%)	 3 5 9 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	absent straw white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) highly fertile (>90%) 22.70, medium (20-23g) 7.35, medium (7.1-8 mm) 3.46 4.90, short (<5.5 mm) 3.13, bold (L:W= 1.5-2) white glutinous (waxy) nonscented intermediate	1 2 1 3 0 4 1 3 1 5 5   1 3  1 2 0 5	  
08	<b>Maturity</b> a. Days to maturity from seedling	161 days, very late (>150 days)	9	
09	<b>Yield</b>	13.72 g/hill		

**Accession no. 1470, Name: Banajira, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	40.93 cm		
02	<b>Leaf</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	48.60 cm 1.24 cm glabrous green present  light purple horizontal horizontal (<46-90°)	1 2 9  3 5 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	14.03 mm purple lines 2-cleft purple purple	2 2 3 2	
04	<b>Days after 50% heading</b>	120 days, late (106-120days)	7	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	101.67 cm, long (81-110 cm) present 12 open ( $\approx 60^\circ$ ) 4.76 mm, small (<5 mm) purple lines strong	7 9 5 1 3 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	20.63 cm, short (<20 cm) 10, medium (6-10) intermediate heavy well exerted droopy low (1-5%) easy (51-100%)	3 5 5 2 1 2 3 9	

07	<b>Grain (spikelet)</b>  a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling):  p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	Present very long (>20 mm) Whole length purple purple light purple low (5-20%) purple furrows on straw short hairs gold medium (1.6-2.5 mm) fertile (75-90%) 19.77, low (16-19g)  7.48, medium (7.1-8 mm)  2.97  5.07, short (<5.5 mm) 2.56, bold (L:W=1.5-2) red  glutinous (waxy) nonscented intermediate	9 9 5 5 6 4 3 7 4 1 3 3 3 5  1 3 5  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	148 days, late (136-150 days)	7	
09	<b>Yield</b>	11.65 g/hill		

**Accession no. 3987, Name: Rata, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	38 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	41.60 cm 1.14 cm intermediate green absent  green erect erect (<30°)	  2 2 1  1 1 1	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	10.37 mm white 2-cleft pale green pale green	  1 2 1 1	
04	<b>Days after 50% heading</b>	102 days, medium(86-105days)	5	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	85.67 cm, long (81-110 cm) absent 12 erect (<30°) 3.69 mm, small (<5 mm) green strong	 7 1  1 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	22.67 cm, medium (21-25 cm) 10, medium (6-10) open heavy well exerted droopy low (1-5%) intermediate (6-25%)	 5 5 9 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color f. Stigma color g. Stigma exertion h. Lemma & palae color i. Lemma & palae pubescence j. Sterile lemma color k. Sterile lemma length l. Spikelet sterility m. 1000 grain weight n. Length (mm) (without dehulling) o. Width (mm) (without dehulling)  p. Decorticated grain length q. Decorticated grain width r. Decorticated grain shape s. Seed coat color (Decorticated grain) t. Endosperm type u. Decorticated grain, scent v. Leaf senescence	present very long (>20 mm) Whole length gold straw white low (5-20%) straw short hairs gold medium (1.6-2.5 mm) fertile (75-90%) 19.57, low (16-19g)  7.31, medium (7.1-8 mm)  2.77  5.01, short (<5.5 mm) 2.57, bold (L:W=1.5-2) white  glutinous (waxy) nonscented intermediate	9 9 5 2 2 1 3 0 4 2 3 3 3  5   1 3 1  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	129 days, medium (116-135 days)	5	
09	<b>Yield</b>	11.99 g/hill		

**Accession no. 3988, Name: Bachi boro, Variety group: Boro**

App. des. no.	Characteristics	State of character	Code no.	Figure
01	Seedling height	39.13 cm		
02	<b>LEAF</b> <b>(Below the flag leaf)</b> a. Length b. Width c. Blade pubescence d. Blade color e. Leaf sheath color anthocyanin f. Basal leaf sheath color g. Leaf angle h. Flag leaf angle	52.30 cm 1.23 cm intermediate green absent  green horizontal horizontal (<46-90°)	  2 2 1  1 5 5	 
03	<b>Ligule</b> a. Length b. Color c. Shape d. Collar color e. Auricle color	13.47 mm white 2-cleft pale green pale green	 1 2 1 1	
04	<b>Days after 50% heading</b>	124 days, very late(>120days)	9	
05	<b>Culm</b> a. Length b. Anthocyanin color of nodes c. Total tiller no. d. Angle e. Culm diameter f. Internode color g. Strength	107.70 cm, long (81-110 cm) absent 19 intermediate (≈30°) 4.24 mm, small (<5 mm) green strong	7 1 3 1 1 1	
06	<b>Panicle length</b> a. Length b. No. of effective tiller/plant c. Type d. Secondary branching e. Exertion f. Axis g. Shattering h. Threshability	26.60 cm, long (26-30 cm) 16, many (>10) intermediate heavy well exerted droopy low (1-5%) intermediate (6-25%)	7 7 5 2 1 2 3 5	

07	<b>Grain (spikelet)</b> a. Spikelet: awn b. Length of the longest awn c. Distribution of awn d. Awn colour e. Apiculus color: f. Stigma color: g. Stigma exertion: h. Lemma & palae color: i. Lemma & palae pubescence j. Sterile lemma color: k. Sterile lemma length: l. Spikelet sterility: m. 1000 grain weight: n. Length (mm) (without dehulling): o. Width (mm) (without dehulling): p. Decorticated grain length: q. Decorticated grain width: r. Decorticated grain shape: s. Seed coat color (Decorticated grain): t. Endosperm type: u. Decorticated grain, scent: v. Leaf senescence:	present long (11-20 mm) upper half only straw straw white low (5-20%) straw short hairs straw medium (1.6-2.5 mm) fertile (75-90%) 16.97, low (16-19g) 7.46, medium (7.1-8 mm)  2.71  5.27, short (<5.5 mm) 2.48, medium (L:W= 2.1-2.5)  red glutinous (waxy) nonscented intermediate	9 7 3 1 2 4 1 3 3 3 5  1 5 5  2 0 5	    
08	<b>Maturity</b> a. Days to maturity from seedling	152 days, very late(>150 days)	9	
09	<b>Yield</b>	12.81 g/hill		

**Appendix-F. Morphological characters studied according to standard rice germplasm descriptors and evaluation form**



**Bangladesh Rice Research Institute  
Germplasm Descriptors & Evaluation Form**

Season.....

Date of sowing.....

Descriptor <sup>1</sup>	Code Guide	Growth stage
1. Accession number.....		
2. Name.....		
3. Former designation.....		
4. Seed source.....		
5. Country of origin.....		
6. Variety group.....	1 Indica (Boro/Aus/T.Aman/ DW rice/ Jhum) 2 sinica (japanica) 3 javanica 4 intermediate (hybrids) 2 .....	
7. Seedling height (cm) <b>LEAF</b> (below the flag leaf)		5-leaf stage
8. Length (cm)	2 .....	late vegetative stage
9. Width (cm)	2 .....	late vegetative stage
10. Blade pubescence <sup>3</sup>	1 glabrous 2 intermediate 3 pubescent	
11. Blade colour <sup>3</sup>	1 pale green 2 green 3 dark green 4 purple tips 5 purple margins 6 purple blotch 7 purple	late vegetative stage
12. Leaf sheath: anthocyanin color	1 Absent 9 Present	early to late vegetative stage
13. Basal leaf sheath colour <sup>3</sup>	1 green 2 purple lines 3 light purple 4 purple	early to late vegetative stage
14. Angle <sup>3</sup>	1 erect 5 horizontal 9 drooping	prior to heading
15. Flag leaf angel <sup>3</sup>	1 erect (<30) 3 intermediate or Semi erect (30-45) 5 horizontal (46-90) 7 descending (>90)	after heading
<b>LIGULE</b>		
16. Length (mm)	2 .....	late vegetative stage
17. Colour <sup>3</sup>	1 white 2 purple lines 3 purple	late vegetative stage
18. Shape <sup>3</sup>	1 acute to acuminate 2 2-claft 3 truncate	late vegetative stage
19. Collar colour <sup>3</sup>	1 pale green 2 green 3 purple	late vegetative stage
20. Auricle colour <sup>3</sup>	1 pale green 2 purple	late vegetative stage

**DAYS TO HEADING**

21. Number of days from effective seeding date to 50% heading

2 .....

at flowering

**Descriptor<sup>1</sup>**

- 1 Very early (>70 days)
- 3 Early (70-85 days)
- 5 Medium (86-105 days)
- Code Guide**
- 7 Late (106-120 days)
- 9 Very late (>120 days)

**Growth stage**

**CULM**

22. Length (cm)  
(Measure from the base of the plants to the neck of the panicle)

2 .....

after flowering

- 1 Very short (<40 cm)
- 3 Short (41-60 cm)
- 5 Medium (61-80 cm)
- 7 Long (81-110 cm)
- 9 Very long (>110 cm)

23. Culm: Anthocyanin colour

- 1 Absent
- 9 Present

24. Number (Total tiller)

2 .....

after flowering

25. Angel<sup>3</sup>

- 1 erect
- 3 intermediate
- 5 open
- 7 spreading
- 9 procumbent

26. Culm diameter (mm)  
(from 5 mother tillers in the lowest internode)

2 .....

after flowering

- 1 Small (<5.0 mm)
- 3 Medium (5.1-6.0 mm)
- 5 Large (6.1-7.0 mm)
- 7 Very Large (>7.0 mm)

27. Internode colour<sup>3</sup>

- 1 green
- 2 light gold
- 3 purple lines
- 4 purple

after flowering

28. Strength (lodging resistance)

- 1 strong (no lodging)
- 3 moderately strong (most plants leaning)
- 5 Intermediate (most plants moderately lodging)
- 7 weak (most plants nearly flat)
- 9 very weak (all plants flat)

after flowering up to maturity

**PANICLE**

29. Length (cm) (measured from the neck to the tip of the panicle of main tillers without awns).

2 .....

near maturity

- 3 Short (<20mm)
- 5 Medium (21-25 cm)
- 7 Long (26-30cm)
- 9 Very Long (>30 cm)

30. Number of the effective tillers per plant

2 .....

near maturity

- 3 Few (<6)
- 5 Medium (6-10)
- 7 Many (>10)

31. Type<sup>3</sup>

- 1 compact
- 5 intermediate
- 9 open

near maturity

32. Secondary branching<sup>3</sup>

- 0 absent
- 1 light
- 2 heavy
- 3 clustering

33. Exsertion<sup>3</sup>

- 1 well exserted
- 3 moderately well exserted
- 5 just exserted
- 7 partly exserted

near maturity

34. Axis<sup>3</sup>

- 9 enclosed
- 1 straight

at maturity

35. Shattering	2 droopy 1 very low (less than 1%) 3 low (1-5%) 5 Moderate (6-25%) 7 moderately high (26-50%) 9 high (more than 50%)	at maturity
36. Threshability	1 difficult 5 intermediate 9 easy	at maturity
<b>GRAIN</b> (spikelet)		
37. Spikelet: awns in the spikelet	1 Absent 9 Present	Flowering to maturity
<b>Descriptor<sup>1</sup></b>	<b>Code Guide</b>	<b>Growth stage</b>
38. Spikelet: length of the longest awn	1 Very short (<2 mm) 3 Short (2-5 mm) 5 Medium (5-10 mm) 7 Long (11-20 mm) 9 Very long (>20 mm)	Flowering to maturity
39. Distribution of awning <sup>3</sup>	1 Tip only 3 Upper part only 5 Whole length	flowering to maturity
40. Awn colour <sup>3</sup>	1 straw (1 DUST) 2 gold 3 brown (tawny) (3 DUST) 4 red (5 DUST) 5 purple (7 DUST) 6 black (9 DUST)	at maturity
41. Apiculus colour <sup>3</sup> (Colour of the tip of lemma)	1 white 2 straw 3 brown (tawny) 4 red 5 red apex 6 purple 7 purple apex	at maturity
42. Stigma colour <sup>3</sup>	1 white 2 light green 3 yellow 4 light purple 5 purple	at flowering
43. Stigma exertion	1 No or a few (<5.0%) 3 Low (5-20%) 5 Medium (21-40%) 7 High (41-60%) 9 Very high (>61%)	at flowering
44. Lemma and palea colour <sup>3</sup>	0 straw 1 gold and or gold furrows on straw background 2 brown spots on straw 3 brown furrows on straw 4 brown (tawny) 5 reddish to light purple 6 purple on straw 7 purple furrows on straw 8 purple 9 black W white	at maturity
45. Lemma and palea pubescence <sup>3</sup>	1 glabrous 2 hairs on lemma keel 3 hairs on upper protion 4 short hairs 5 long hairs (velvety)	flowering to maturity
46. Sterile lemma colour <sup>3</sup>	1 straw	at maturity

	2 gold	
	3 red	
	4 purple	
47. Sterile lemma length <sup>3</sup> (Measure at post harvest stage)	1 short (<1.5 mm)	at maturity
	3 medium (1.5-2.5 mm)	
	5 long (2.6-3.0 mm)	
	7 very long (>3.0 mm) (equal to or longer than lemma)	
48. Spikelet sterility <sup>3</sup>	9 asymmetrical	
	1 highly fertile (>90%)	at maturity
	3 fertile (75-90%)	
	5 partly sterile (50-74%)	
	7 highly sterile (>50% to trace)	
	9 completely sterile (0%)	
<b>Descriptor<sup>1</sup></b>	<b>Code Guide</b>	<b>Growth stage</b>
49. 1000 grain weight (g) (fully developed grains adjusted at 12% of moisture)	2 .....	at maturity
	1 Very low (<15g)	
	3 Low (16-19g)	
	5 Medium (20-23g)	
	7 High (24-27g)	
	9 Very high (>27g)	
50. Length (mm) (without dehulling)	2 .....	at maturity
	1 Very Short (<6.0 mm)	
	2 Short (<6.1-7.0 mm)	
	3 Medium (7.1-8.0 mm)	
	4 Long (8.1-9.0 mm)	
	5 Very long (>9.0 mm)	
51. Width (mm) (without dehulling)	2 .....	at maturity
52. Decorticated grain: Length (mm) (after dehulling, before milling)	2 .....	at maturity
	1 Short (<5.5 mm)	
	3 Medium (5.6-6.5 mm)	
	5 Long (6.6-7.5 mm)	
	7 Very long (>7.5 mm)	
53. . Decorticated grain: width (mm) (after dehulling, before milling)	2 .....	
	3 Narrow	
	5 Medium	
	7 Broad	
54. Decorticated grain: shape (Length-width (widest point) ratio of de-hulled grain)	1 Round (L: W <1.5)	at maturity
	3 Bold (L: W =1.5-2.0)	
	5 Medium (L: W = 2.1-2.5)	
	7 Medium slender (L: W =2.6-3.0)	
	9 Slender (L: W >3.0)	
55. Seed coat (bran) colour <sup>3</sup> (Decorticated grain)	1 white	at maturity
	2 light brown	
	3 speckled brown	
	4 brown	
	5 red	
	6 variable purple	
	7 purple	
56. Endosperm type <sup>3</sup>	1 nonglutinous (nonwaxy)	at maturity
	2 glutinous (waxy)	
	3 indeterminate	
57. Decorticated grain: Scent (aroma)	0 nonscented	At flowering or at maturity
	1 lightly scented	
	2 scented	
58. Leaf senescence <sup>3</sup> (Penultimate leaves are observed at the time of harvest.	1 late and slow (2 or more leaves retain green color at maturity)	at maturity
	5 intermediate	
	9 early and fast (leaves are dead at maturity)	

**MATURITY**

59. days from seeding  
(when 80% of grains on panicle are  
mature)

- <sup>2</sup> .....
- 1 Very early (<100 days)
  - 3 Early (1001-115 days)
  - 5 Medium (116-135 days)
  - 7 Late (136-150 days)
  - 9 Very late (>150 days)

at maturity

**Descriptor<sup>1</sup>**

60. Yield (g)

**Code Guide**  
<sup>2</sup> .....

**Growth stage**  
After harvesting

61. Other distinct special character (if any)