Morphological Characteristics of ICRISAT-bred Pearl Millet Hybrid Seed Parents

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International Crops Research Institute
for the Semi-Arid Tropics

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Morphological Characteristics of ICRISAT-bred Pearl Millet Hybrid Seed Parents

Edited by

KN Rai, SK Gupta, Ranjana Bhattacharjee, VN Kulkarni, AK Singh and AS Rao

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International Crops Research Institute for the Semi-Arid Tropics

Patancheru 502 324, Andhra Pradesh, India

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Foreword

Pearl millet (*Pennisetum glaucum L*.) is an important staple crop for millions of poor rural households in the semi-arid tropics of Asia and Africa. Owing to its importance for food, feed and fodder, considerable global efforts have gone into improving its productivity through genetic enhancement. ICRISAT has a global mandate for conserving the genetic resources of pearl millet and enhancing its productivity in Asia and Africa. This is done through collaborative research with multiple partners in the national agriculture research systems (NARS), advanced research institutes, private sector, and non-governmental organizations (NGOs).

Initially, ICRISAT's focus on pearl millet improvement was in developing open pollinated varieties (OPVs), based on an assumption that OPVs have wider adaptation, and that farmers can use their grain harvest as seed for the next crop, implying its cost effectiveness. Later research, however, showed that hybrids may have adaptations as wide as OPVs and that seed cost is not the most important investment criteria in pearl millet cultivation. The seed rate in pearl millet is just about 3-4 kg/ha, and farmers in India often prefer to purchase new seed every year on account of its cost effectiveness, and better quality than their own saved seeds. Most important of all, hybrids in general have a 20-30% grain yield advantage over OPVs. Further, private seed companies as significant and competent players in pearl millet hybrid development and delivery in India, had little interest in OPVs. Based on the above realities, public sector breeding programs in India have gradually and almost totally shifted to hybrid development. In alignment with the regional priority of the Asia region, pearl millet research at ICRISAT-Patancheru followed a strategy of developing improved breeding lines and potential hybrid parents, leaving the development, testing and release of hybrids to the public sector programs and the private sector. At ICRISAT, these materials are generated and disseminated as international public goods.

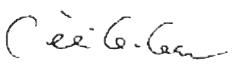
ICRISAT-bred male-sterile lines and restorer lines are developed mostly by breeding methods that leave cryptic variability within the lines from which within-line selections can be made with slight modification in plant traits. In view of the increasing awareness of Intellectual Property Rights (IPR) protection, it was considered necessary to characterize ICRISAT-bred parental lines and place them in the public domain to enhance ICRISAT's ability to protect these materials from any possible infringement, and to allow unhindered access by public organizations globally. A beginning was

made in this direction with the characterization of male-sterile lines using the descriptors developed for the Distinctiveness, Uniformity and Stability (DUS)–test.

During the 1981–2004 period, ICRISAT developed 99 male-sterile lines (A-lines) and their corresponding maintainers (B-lines) from a diverse genetic base and with diverse morphological traits. These lines were designated and disseminated as potential hybrid parents after evaluation for agronomic performance and resistance to diverse pathotypes of downy mildew, in the years they were designated. Although these lines have been developed from diverse genetic backgrounds and with diverse morphological traits, these had not been evaluated for a comprehensive set of morphological traits in common environments.

This document provides detailed characterization of 99 pairs of male-sterile lines (A-lines) and their counterpart maintainer lines (B-lines) for the traits stipulated in the DUS-test guidelines, based on their evaluation in two seasons at ICRISAT-Patancheru. The characterization data showed not only the differences among the A/B pairs, but also the extent to which they could be influenced by environmental factors, not to mention a small variability within some of the lines. Such variability among and within the lines provide opportunities for further selection and genetic enhancement; and it has implications in IPR protection as well.

It is my hope that this publication will be useful to all pearl millet researchers and seed producers worldwide.



William D. Dar
Director General, ICRISAT

Introduction

Pearl millet *(Pennisetum glaucum* (L) R. Br.) is a major warm-season cereal grown on 26 million ha in the arid and semi-arid tropical (SAT) regions of Asia (>10 million ha) and Africa (15-16 million ha), with India being the largest producer (> 9 million ha) of this crop in the world. It is a highly cross-pollinated crop with an outcrossing rate of more than 85%. The protogynous flowering and wind-borne pollination favor cross-pollination, making open-pollinated varieties (OPVs) as the natural cultivar state of this crop. OPVs, however, are not amenable to achieving as much heterozygosity and the consequent heterosis as it is possible in single-cross hybrids. Furthermore, OPVs are highly heterogeneous and hence morphologically more variable than single-cross hybrids. It has been observed that single-cross hybrids generally give 20-30% more grain yield than OPVs (Rai et al 2006). Based on these considerations, and with the availability of a commercially exploitable cytoplasmic-nuclear male sterility (CMS), the National Agricultural Research System (NARS) in India took the first significant step in the world to embark on grain hybrid development. With the rapid growth of a vibrant seed industry, pearl millet research in India, both in the private and the public sector, is now almost all directed towards hybrid breeding. In alignment with the regional priority in Asia region, ICRISAT's pearl millet improvement research at Patancheru followed a strategy of developing improved breeding lines and potential hybrid parents, leaving the development, testing and release of hybrids to the NARS and the private sector.

There has been extensive use of ICRISAT-bred hybrid parents, especially seed parents (male-sterile lines), by both NARS and the private sector. For instance, 60-70% of the hybrids often included in the All India Trials and released by both NARS and the private sector are based on ICRISAT-bred seed parents. In view of the increasing awareness of Intellectual Property Rights (IPR) protection, a need has been felt to characterize ICRISAT-bred parental lines and place them in public domain as international public goods. This would enhance ICRISAT's ability to protect these materials from any possible infringement, and allow unhindered access by public organizations globally. During the 1981-2004, ICRISAT developed 99 male-sterile lines (A-lines) and their counterpart maintainers (B-lines). These lines were designated and disseminated as potential hybrid parents after evaluation for agronomic performance and resistance to downy mildew (*Sclerospora graminicola* (Sacc.) Schroet.), the most dreaded disease of pearl millet in India. These evaluations, however, were done in the years the lines were developed and designated. Although these lines have been developed

from diverse genetic backgrounds and with diverse morphological traits, these had not been evaluated for a comprehensive set of morphological traits in common environments. The objective of the present study was to characterize all the 99 pairs of A- and B-lines using 26 morphological traits developed as DUS (Distinctness, Uniformity and Stability) descriptors as shown in Annexure I (AICPMIP, 2006).

Materials and Methods

Plant material and field trials

In pearl millet improvement program at ICRISAT, the first male sterile was developed in 1981 and was designated as 81A. Thereafter and till 1986, the lines were designated with a 3- digit number, the first two digits indicating the year. Since 1988, 5-digit system was followed, where the first two digits refer to the year in which they are designated and made available for use, followed by three digits (the same number in triplicate) for specific A/B pairs. For example, ICMA/B 97333 refers to the third A/B pair developed and designated in 1997 and ICMA/B 06555 refers to the fifth A/B pair developed and designated in 2006 (Annexure II). The 99 A-lines in three diverse cytoplasmic backgrounds (63 A_1, 35 A_4 and 1A_g), and their counterpart B-lines were planted in a split-plot design, with 99 genotypes as main plots and two cytoplasms (fertile vs sterile) as sub-plots, in two replications during the 2005 postrainy (dry) season (February - May) and rainy season (July - October) at ICRISAT, Patancheru (18º N lat; 78º E long.). During the postrainy season, there was a total rainfall of 121 mm with weekly mean maximum temperatures ranging between 27 and 37°C, weekly mean minimum temperatures ranging between 15 and 23°C and relative humidity above 60% (Figure 1). During the rainy season, there was a total of 830 mm rainfall with the weekly mean maximum temperatures ranging between 27 and 32°C, weekly mean minimum temperatures ranging between 20 and 23°C and relative humidity >92% (Figure 2).

Each line was machine-planted in single row of 4 m with 60 cm spacing between the rows in postrainy season and 75 cm in the rainy season, and 15 cm spacing between the plants in both seasons. The experiment was conducted in Alfisols with applied fertilizer levels of 80 kg ha^{-1} N (18% basal and rest as top dressing), and 46 kg ha^{-1} P (basal dose) with seven irrigations during the postrainy season and one irrigation during the rainy season. The standard cultural and agronomic practices were followed that included thinning and manual weeding at 15 days after sowing.

Data collection and analysis

The observations on nine quantitative traits were taken on 10 random plants in each plot for plant height (cm), panicle length (cm), panicle diameter (cm), number of productive tillers plant^{-1}, number of nodes plant^{-1}, leaf sheath length (cm), leaf blade length (cm), leaf blade width (cm) and 1000-grain weight (g). Time to 50% flower was recorded on plot basis when the main panicles of 50% of the plants in the plots had full stigma emergence. Data were also taken on 16 other traits. These included seedling color, panicle exsertion, panicle tip sterility, node pubescence, node pigmentation, internode pigmentation, leaf sheath pubescence, anther color, glume pigmentation, presence/absence of bristles in panicle, and bristle color for which data were recorded on the basis of visual assessment of individual

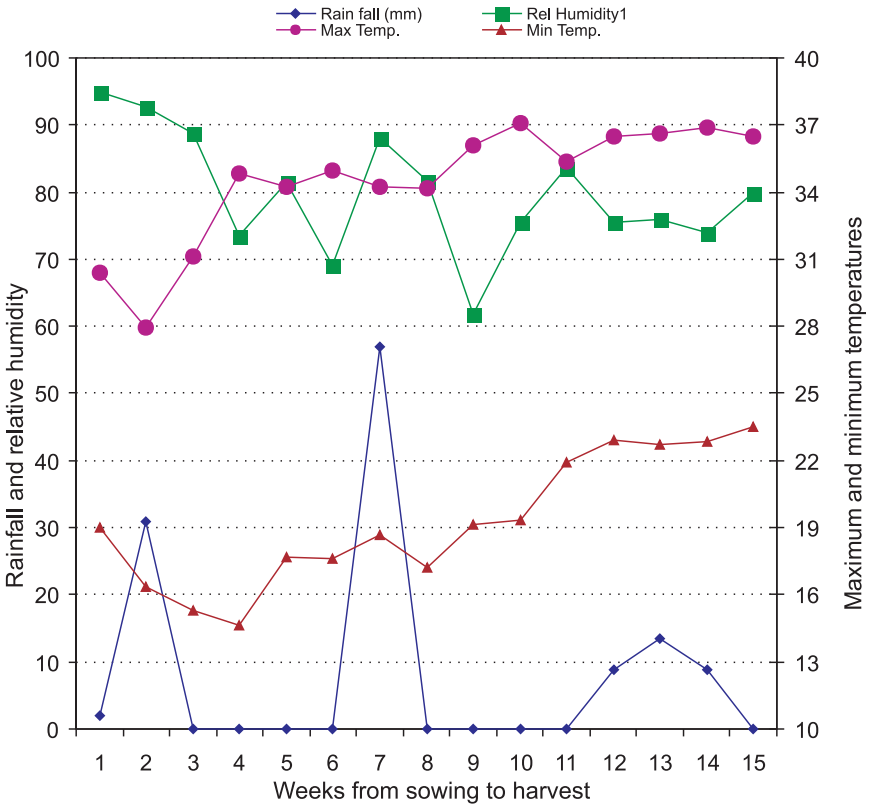


Fig. 1. Weekly distribution of rainfall (mm), maximum and minimum temperature (°C) and relative humidity (%) during 2005 post-rainy(dry) season, ICRISAT, Patancheru.

plants (or parts of plants) within a plot (VS); or it was based on visual assessment of group of plants (or parts of plants) in a plot (VG) for traits such as plant growth habit, panicle shape, panicle density, seed color and seed shape. The mean plot values of the quantitative traits measured were subjected to analysis of variance for each season as well across the two seasons following split-plot design and using Genstat 10.1 software.

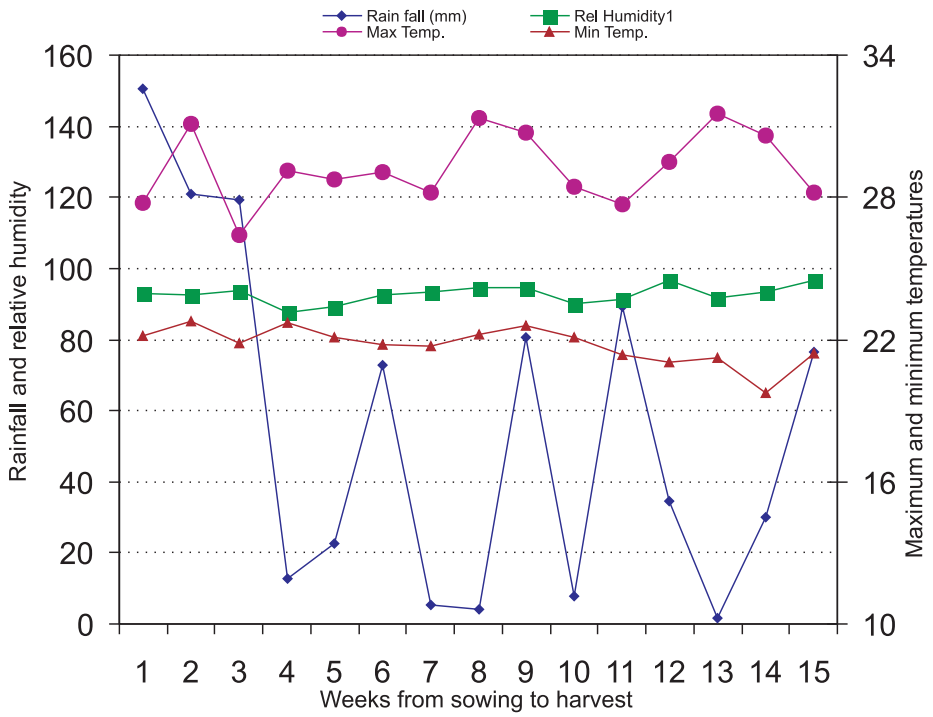


Fig. 2. Weekly distribution of rainfall (mm), maximum and minimum temperataure (°C) and relative humidity (%) during 2005 rainy season, ICRISAT, Patancheru.

Results and Discussion

Germplasm base

In pearl millet improvement program at ICRISAT, hybrid parental lines (A/B pairs) are developed with considerable morphological diversity and then designated based on agronomic performance and resistance to at least two downy mildew (DM) pathotypes. Designated B-lines are rigorously screened often against five diverse DM pathotypes under high disease pressure in the green house seedling inoculation test (80-90 % disease incidence in susceptible checks) and B-lines with <10% disease incidence are classified as resistant. The parentage of 99 designated seed parental lines is provided in annexure II, which shows the utilization of a wide range of germplasm and improved lines in developing these lines. For instance, three B-lines were directly selected from the germplasm accessions, and 9 were selected directly from composites (Table 1). In addition, 21B-lines were derived from crosses that involved germplasm in their parentage and 19 lines had composites in their parentage. Thus, there were 52 seed parental lines that had some components of germplasm and /or composite in their parentage, indicating apparently substantial usage of germplasm/ composites in the development of these seed parental lines. The remaining 47 seed parental lines were derived from crosses between elite inbred lines. Like any targeted breeding program, where some elite lines occur more frequently in the crosses, in this program also some lines were involved in

Table 1. Genetic base of designated seed parents (B-lines) of pearl millet bred at ICRISAT during 1981-2004.

Germplasm base	No. of B-lines	Remarks	Genetic base (Code)[1]
Germplasm	3	Inbreeding and selection directly from germplasm	1
Composite	9	Includes composites and open pollinated varieties	2
Germplasm* × Elite line	21	Includes early-generation breeding lines derived from germplasm	3
Composite* × Elite line	19	Includes early-generation breeding lines derived from composites	4
Elite line × Elite line	47	Includes crosses between advanced generation lines	5

*Includes a line directly derived from a germplasm and similarly for composites.
[1]Refer to Annexure II.

more crosses than others in the development of designated B-lines. For instance, 843B, known for its early maturity, large seed size, dwarf height, good tillering and good combining ability, was involved as the first cycle or second cycle parent in 47 B-lines, followed by 81B in 16 B-lines and ICMB 89111 in 15 B-lines. ICMB 89111 itself involves 843B as one of the parents in its parentage indicating that 843 B is directly or in directly involved in 63% of the designated B–lines developed at ICRISAT, Patancheru, India.

Quantitative traits

The overall mean for ten quantitative characters over both the seasons for all the 99 A/B pairs revealed that characters like plant height, leaf and panicle-related characters had increased expression in the rainy season than in the postrainy (dry) season. The reverse was true for characters like days to flowering, number of productive tillers plant^{-1} and 1000-grain weight. A- and B-lines are expected to be genetically similar as they differ only for cytoplasm. However, pooled analysis of variance for 10 quantitative traits revealed that A- and B-lines had significant differences between them for the expression of all the quantitative characters under study (Table 2). However, these differences were of small magnitude to have any practical significance. For instance, A- lines, on the average, flowered in 48 days, one day earlier than the average number of days taken by B-lines. Similarly, B-lines, on an average were only 0.7 cm taller in plant height and had 0.2 cm longer panicles than A-lines. Thus, the magnitude of the differences mentioned above can increase or decrease with the changes in the environment as the effect of the environment and its interaction with the cytoplasm was highly significant.

The individual A/B pairs were further studied season-wise for the above traits to examine the contribution of cytoplasm x environment interaction (Annexure III). It was found that three A-lines in the rainy season and ten A-lines in the postrainy season flowered significantly earlier (3-6 days) than their counterpart B-lines. Amongst these lines, only ICMA 02777 was earlier than its B-line in both the seasons, while other A-lines showed earliness in comparison to their counterpart B-lines in one season only. Similarly, for plant height, in 6 A/B pairs in the rainy season and 4 pairs in the postrainy season, there were significant differences between the A-and B-lines ranging from 9 to 12 cm. Three A-lines out of these 6 pairs in rainy season and two A-lines in postrainy season were shorter than their corresponding B-lines. Out of these, ICMA 02111 was found to be the only A- line which was shorter than its counterpart B- line in both the seasons. For panicle diameter, three

Table 2. Mean squares for 10 quantitative traits in pearl millet seed parental lines.

Source of variation	d.f.	Mean square									
		LSL	LBL	LBW	PL	PD	NNP	NPT	PHT	TGW	DF
Season	1	592.41*	5197.39	57.47**	2.15	667.09	74.25*	22.47*	1951.79	125.60	1776.05**
Replication/ Season	2	0.71	5210.9	0.84	8.63	24.59	.10	0.48	352.7	7.97	0.126
Genotype	98	17.23**	309.66**	1.86**	122.44**	111.38**	3.64**	5.43**	2545.26**	15.32**	98.52**
Season x Genotype	98	1.51**	32.8**	0.19**	4.01**	6.15**	0.83**	0.56**	293.38**	2.28**	20.49**
Error (a)	196	0.29	6.5	0.05	1.09	1.26	0.28	0.26	32.52	0.65	2.49
Cytoplasm	1	3.51**	169.2**	0.90**	10.10*	51.72**	7.90**	4.42**	84.50*	8.80**	188.13**
Season x Cytoplasm	1	1.34**	15.2*	0.00	3.27	10.64**	2.07**	0.83*	53.84*	5.37**	7.69**
Genotype x Cytoplasm	98	0.24**	5.02**	0.04	0.94	1.75**	0.16**	0.15	30.72**	0.56*	1.59**
Season x Genotype x Cytoplasm	98	0.19**	2.85	0.03	0.72	0.95	0.11	0.19	16.22*	0.63**	1.09*
Error (b)	198	0.11	2.3	0.03	1.11	0.76	0.09	0.19	11.58	0.35	0.69

d.f. = Degrees of freedom; LSL = Leaf sheath length; LBL = Leaf blade length; LBW = Leaf blade width; PL = Panicle length;
PD = Panicle diameter; NNP = Number of nodes per plant; NPT = Number of productive tillers; PHT = Plant height;
TGW = 1000-grain weight; DF = Days to 50% flower;
* = significant at 5%; ** = significant at 1%

pairs in the rainy season and 22 A/B pairs in the postrainy season showed significant differences in the range of 1.6 – 4.2 cm. No A/B pair was found to follow the same trend of response in both the seasons for panicle diameter. One A-line out of these 3 in rainy and only two A-lines out of these 22 pairs in postrainy season had thicker panicles than their corresponding B-lines. Similar trend of significant differences were observed for 5 (A/B) pairs in the rainy season (in the range of 1.6- 2.4 g) and for 8 pairs in the postrainy season (in the range of 1.1- 1.8g) for 1000- grain weight. No line was found to follow same trend of response in both the seasons for 1000- grain weight. Thus, although some A/B pairs showed significant differences between them for different characters in different seasons, this behavior was not found consistent across the seasons, indicating the effect of environment and its interactions with the cytoplasm. Such differences could also arise due to incomplete transfer of the entire genome of B-lines into A-lines as the A/B pairs were not developed by plant x plant crossing and pedigree breeding. Rather bulk pollen collected normally from 4-8 plants of the B-line was crossed onto 3-4 plants of the corresponding backcross progenies and both backcross progenies and B-lines were harvested as bulks for generation advance. If the latter is true, then prolonged backcrossing using plant x plant crossing approach might dissipate such differences. Assuming it to be so, we shall henceforth discuss the variability among B-lines in these 99 A/B pairs.

The effect of season on various traits in B-lines was also found to be significant (Annexure III). These include leaf blade length (45.3 cm in rainy; 40.2 cm in postrainy), panicle diameter (2.7cm in rainy; 2.5 cm in postrainy), plant height (97.4 cm in rainy; 94.2 cm in postrainy), 1000- grain weight (9.7 g in rainy; 10.5 g in postrainy), and days to 50% flower (47 days in rainy and; 50 days in postrainy). The extent of variation attributable to seasonal effect on these lines may vary depending on the environments.

The utilization of diverse breeding materials in the development of these designated B-lines has resulted into a wide range of variability (Table 3). For instance, plant height ranged from 61 to 136 cm, 50 % flowering from 41 to 60 days, panicle length from 12 to 35 cm and panicle diameter from 2 to 3.7 cm in these B-lines. There were only 5 genotypes, which had more than 4 tillers while most of the remaining had 2-3 productive tillers. Thus, immense variability shown among these designated B-lines provides ample opportunity to breed hybrids for specific requirements of different agro-climatic zones in pearl millet. Some of the lines used more widely in commercial seed production provide reference lines for specific

Table 3. Frequency distribution of designated pearl millet B-lines for grain yield and its component traits.

Trait		No. of B-lines in trait classes								Range		Reference B-line	
Plant height (cm)	Trait Class	60-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	Minimum	61	81B	76
	No. of lines	6	17	18	16	19	13	8	2	Maximum	136	841B	103
Days to 50% flower (d)	Trait Class	<42	42.1-45	45.1-48	48.1-51	51.1-54	54.1-57	57.1-60		Minimum	41	843B	42
	No. of lines	3	8	21	44	12	9	2		Maximum	60	81B	54
Number of productive tillers plant^{-1}	Trait Class	1	1.1-2	2.1-3	3.1-4	4.1-5	5.1-6			Minimum	1	89111B	4.2
	No. of lines	0	31	41	22	4	1			Maximum	6		
Panicle length (cm)	Trait Class	<15	15.1-20	20.1-25	25.1-30	30.1-35				Minimum	12	81B	21.6
	No. of lines	18	64	10	5	2				Maximum	35		
Panicle diameter (cm)	Trait Class	2.0-2.5	2.6-3.0	3.1-3.5	3.6-4.0					Minimum	2	863B	3.1
	No. of lines	39	43	15	2					Maximum	3.7		
1000-grain weight (g)	Trait Class	6-7	7.1-8	8.1-9	9.1-10	10.1-11	11.1-12	12.1-13		Minimum	6	843B	11.2
	No. of lines	1	8	15	25	22	21	7		Maximum	13		

traits. For instance, 8 B-lines flowered in 42-45 days and were in the same maturity group as the earliest-flowering commercial seed parent 843B (42 days). This B-line is also popular for its large seed size. There were 21 designated B-lines that had comparable or higher 1000-grain weight than 843B (11.2g). In fact, 7 B-lines had more than 12g of 1000-grain weight. Another commercial seed parent 81B line is popular for its dwarf height and long panicles. There were 17 B-lines that were in the same height group as 81B (76cm), and 10 B-lines were in the same panicle length group as 81B (22 cm). ICMB 89111 is the highest-tillering line among the commercial seed parents. There were 4 B-lines that had tillering ability comparable to ICMB 89111 (4 tillers plant-1). One B-line, ICMB 02222 recorded even higher tillering than of ICMB 89111. 863B had the thickest panicles among the commercial seed parents. There were 17 designated B-lines that had panicle diameter comparable to or greater than 863B (3.1 cm).

Qualitative and quasi- qualitative traits

Frequency distribution of the 99 A/B pairs for 16 qualitative and quasi-qualitative characters revealed considerable variation for most of the traits except for traits like plant growth habit, presence of bristles in the panicle, bristle color, anthocyanin pigmentation on glumes and node, and leaf sheath pubescence (Annexure III) . Majority of the lines (90%) were erect in their growth habit. Only 8 lines had pubescent node and leaf sheath. Green color was most dominant for node (74%) and internode (87%) pigmentation, purple color being the next major trait. Majority of the lines had grey colored seeds (68%) followed by deep grey (29%) and cream colored (3%) seeds. Globular seed shape (77%) was most dominant, followed by obovate (19%) and only 4% lines had hexagonal seed shape. About 68% of the lines had partial panicle exsertion and 12% of the lines had variable exsertion. Semi-compact panicles were most common (51%), followed by lines that showed variable expression within a line for compact to semi-compact panicles (26%). Only 6 lines had compact panicles.

Differences were observed between A- and B-lines in the expression of some traits such as seedling anthocyanin pigmentation and panicle density. Ten A/B pairs showed differences in expression for anthocyanin pigmentation of seedlings. For instance, ICMA 94444 had pigmented seedlings and ICMB 94444 had non-pigmented seedlings across both the seasons. Similarly, 4 A/B pairs had differences in the expression for panicle density. For instance, ICMA 03999 had loose panicles and ICMB 03999 had semi-compact panicles in postrainy season. These differences between A- and B-lines can

apparently be attributed to the effect of cytoplasm. The differences among the A/B pairs also varied across the two seasons for some of the traits. For pigmentation of seedlings, 9 A-lines and 7 B-lines had different predominant class in different seasons. Six of these A- and B-lines belonged to same A/B pairs. For instance, ICMA 91777 and ICMB 91777 had predominantly non-pigmented seedlings in the rainy season but pigmented seedlings in the postrainy season. Similarly, three A/B pairs showed differences in expression for node pubescence. For instance, both ICMA 96222 and ICMB 96222 had pubescent nodes during the rainy season and non-pubescent nodes during the postrainy season. A similar trend was observed for some of the quasi-qualitative traits like panicle exsertion and panicle density also. For panicle density, 40 A and 40 B-lines of the same A/B pairs showed difference in expression across seasons. For instance, 843A and 843B had loose panicles during the rainy season and semi-compact panicles during the postrainy season. Similarly, 19 A- and 19 B-lines of the same A/B pairs showed differential expression for panicle exsertion. For instance, 863A and 863B had partial exsertion during the rainy season and complete exsertion during the postrainy season. The differences in the expression of traits in different seasons suggest that there is substantial effect of environment on these traits in some genetic backgrounds. Therefore, if more number of environments (seasons or locations) were included in this study, there would be every possibility of detecting differences in the expression of other qualitative and quasi-qualitative traits which otherwise might not be possible with only two seasons and one location as used in this study.

Variability within the B-lines was observed even across the two replications for some traits like anthocyanin pigmentation of seedlings, panicle exsertion and panicle density. If alternate phenotype for a particular trait was present in a replication, it was indicated with a superscript “a” on its code (Annexure III). For anthocyanin pigmentation of seedlings, alternate phenotypes were present in 34 B-lines, either across both the seasons or in a single season. For instance, alternate phenotype for seedlings pigmentation color was present in 81B in both the seasons while ICMA 03111 had such alternate phenotypes in rainy season only. Similarly, for panicle exsertion, alternate phenotypes were present in 34 B-lines. For instance, ICMB 97555 had complete exsertion as predominant class, though some plants with partial exsertion were also present in both the seasons. Following the same trend, 10 B-lines had alternate phenotypes other than the predominant class for panicle density across both the seasons or in a single season .For instance, ICMB 92444 had loose panicles but alternate phenotypes

for panicle density were also present in both the seasons. This within-line variability seems to be due to method of pollination, where bulk pollen from plants of recurrent parent (there may be some out- crossed plant present in the recurrent parent) is taken during backcrossing program during the development of seed parental lines. It is possible that other B-lines which have not shown such within-line variability in this study, might show it if tested with larger sample size, and perhaps in different environments. In the present study, only 20-30 plants per replication per season were evaluated for these qualitative or quasi- qualitative characters, so it may (or may not) be possible to find/detect plants having low frequency of an alternate phenotype in comparison to the predominant class of a particular trait. For instance, if the frequency of a phenotype is 0.5%, then there is a need to study at least 200 plants per replication to detect at lease one plant that has particular alternate phenotype. Therefore, if characterization of these seed parental lines are carried out with large number of plants (200-300 plants per replication), it may be possible to detect a few plants that expresses the alternate phenotype of these qualitative (or quasi-qualitative) traits, which otherwise should not be construed as a new phenotype or plant type at any given time.

References

AICPMIP (All India Coordinated Pearl Millet Improvement Project). 2006. Distinctness, uniformity, stability (DUS) test guidelines and morphological descriptors for pearl millet [*Pennisetum glaucum* (L.) R. Br.]. Technical Bulletin No.1. All India Coordinated Pearl millet Improvement Project (Indian Council of Agricultural Research), Agricultural Research station, Mandor, Rajasthan, India.

Rai KN, Kulkarni VN, Thakur RP, Haussmann BIG and Mgonja MA. 2006. Pearl millet hybrid parent's research: approaches and achievements. In: CLL Gowda, KN Rai, Belum VS Reddy & KB Saxena (Eds.), Hybrid parents research at ICRISAT. Patancheru 502 324, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics. 11-74 pp.

Genstat release 10.1. Lawes Agricultural Trust (Rothamsted Experimental Station), UK.

Annexure I. Description of DUS[1] characters and their classification.					
S. No.	**Characters**	**Status**	**Node[2]**	**Stage of Observation[3]**	**Type of Assessment[4]**
1.	Seedling: anthocyanin coloration of first leaf sheath	Absent Present	1 9	Seedling emergence (3)	VS
2.	Plant: growth habit	Erect Intermediate Spreading	1 5 7	Panicle emergence (45)	VG
3.	Plant: number of productive tillers plant^{-1}	Monoculm Low (2-3 tillers) Medium (4-6 tillers) High (>6 tillers)	1 3 5 7	Dough (65)	MS
4.	Plant: height (excluding panicle)	Very short (<101 cm) Short (101-150 cm) Medium (151-200 cm) Tall (201-250 cm) Very tall (>250 cm)	1 3 5 7 9	Dough (65)	MS
5.	Plant: number of nodes	Low (<11) Medium (11-15) High (>15)	3 5 7	Dough (65)	MS
6.	Plant: node pubescence	Absent Present	1 9	Dough (65)	VS

7.	Plant: node pigmentation	Whitish Green Brown Red Purple	1 2 3 4 5	Dough (65)	VS
8.	Plant: internode pigmentation (between 3rd and 4th node from top)	Whitish Green Brown Red Purple	1 2 3 4 5	Dough (65)	VS
9.	Leaf: sheath length	Short (<11 cm) Medium (11-15 cm) Long (>15 cm)	3 5 7	Panicle emergence (45)	MS
10.	Leaf: sheath pubescence	Absent Present	1 9	Panicle emergence (45)	VS
11.	Leaf: blade length	Very short (<41 cm) Short (41-50 cm) Medium (51-60 cm) Long (61-70 cm) Very long (>70 cm)	1 3 5 7 9	Panicle emergence (45)	MS
12.	Leaf: blade width (at widest point)	Narrow (<3 cm) Medium (3-4 cm) Broad (>4 cm)	3 5 7	Panicle emergence (45)	MS

13.	Panicle: time of panicle emergence (50% plants with at least one panicle emerged fully)	Very early (<43 days) Early (43-46 days) Medium (47-50 days) Late (51-54 days) Very late (>54 days)	1 3 5 7 9	Panicle emergence (45)	VG
14.	Panicle: length	Very small (<11 cm) Small (11-20 cm) Medium (21-30 cm) Long (31-40 cm) Very long (>40 cm)	1 3 5 7 9	Dough (65)	MS
15.	Panicle: diameter at maximum point (excluding bristles)	Thin (<1.6 cm) Medium (1.6-3.0 cm) Thick (>3.0 cm)	3 5 7	Dough (65)	MS
16.	Panicle: exsertion	Partial Complete	1 2	Dough (65)	VS
17.	Panicle: density	Very loose Loose Semi-compact Compact Very compact	1 3 5 7 9	Harvest maturity (75)	VG
18.	Panicle: tip sterility	Absent Present	1 9	Harvest maturity (75)	VS

19.	Panicle: shape	Cylindrical Conical Spindle Candle Lanceolate Dumb-bell Club Oblanceolate Globose	1 2 3 4 5 6 7 8 9	Dough (65)	VG
20.	Panicle: anther color	Yellow Brown Purple	1 2 3	Anthesis (50)	VS
21.	Panicle: anthocyanin pigmentation of glume	Absent Present	1 9	Dough (65)	VS
22.	Panicle: bristle	Absent Present	1 9	Dough (65)	VS
23.	Panicle: bristle color	Green Brown Red Purple	1 2 3 4	Dough (65)	VS

24.	Seed: color	Whitish Cream Yellow Grey Deep grey Grey brown Yellow brown	1 2 3 4 5 6 7	Harvest/ maturity (75)	VG
25.	Seed: shape	Obovate Elliptical Hexagonal Globular	1 2 3 4	Harvest/ maturity (75)	VG
26.	Seed: weight of 1000 grains	Very small (<5.0 gm) Small (5.0-7.5 gm) Medium (7.6-10.0 gm) Bold (10.1-12.5 gm) Very bold (>12.5 gm)	1 3 5 7 9	Harvest/ maturity (75)	MS

[1]Source: Distinctness, Uniformity, Stability test guidelines and morphological descriptors for pearl millet (2006). Published by AICPMIP (ICAR), ARS, Mandor, Jodhpur – 342304.

[2]Nodes (1-9) are for the purpose of electronic data processing.

[3]Figures in parenthesis indicate the code for growth stages:

3: Seedling emergence stage
45: Panicle emergence stage
50: Anthesis stage
65: Dough stage
75: Harvest maturity stage

[4]Type of assessment of characteristics:

MS: Measurement of a number of individual plants or parts of plants.

VG: Visual assessment by single observation of a group of plants or parts of plants.

VS: Visual assessment by observation of individual plants or parts of plants.

Annexure II. Pedigree details of ICRISAT-bred designated pearl millet A/B-lines developed during 1981 to 2004 at ICRISAT, Patancheru, India

S. No	Designation	Pedigree	Cytoplasm	Genetic base (Code[1])
1	**81A**	81B backcrossed to Tift 23D2A cytoplasm source	A_1	
2	**81B**	Induced downy mildew resistant selection from Tift 23D2B		5
3	**841A**	841B backcrossed to 5141A cytoplasm source	A_1	
4	**841B**	Downy mildew resistant selection from seed lot #8015 of 5141B		5
5	**842A**	842B backcrossed to AKM 2221 cytoplasm source	A_1	
6	**842B**	Selection from KSU line BKM 2221		3
7	**843A**	843B backcrossed to AKM 2068 cytoplasm source	A_1	
8	**843B**	Selection from KSU line BKM 2068		3
9	**863A**	863B backcrossed to 81A cytoplasm source	A_1	
10	**863B**	Togo-13-4-1		1
11	**ICMA 88004**	ICMB 88004 backcrossed to 81A cytoplasm source	A_1	

12	**ICMB 88004**	Togo-11-5-2 selection		1
13	**ICMA 88006**	ICMB 88006 backcrossed to 81A cytoplasm source	A_1	
14	**ICMB 88006**	{(81B x SRL 53-1) x 843B}-30-2-B		3
15	**ICMA 89111**	ICMB 89111 backcrossed to 861A cytoplasm source	A_1	
16	**ICMB 89111**	{843B x (GNS x SS-48-40-4)-1-9-8}-30-B-B-1		3
17	**ICMA 91222**	ICMB 91222 backcrossed to 81A cytoplasm source	A_1	
18	**ICMB 91222**	(26B x 81B)-4-1-2		5
19	**ICMA 91444**	ICMB 91444 backcrossed to 81A cytoplasm source	A_1	
20	**ICMB 91444**	{843B x (Boudama-481 x Ankoutess-2)-4}-2-B		3
21	**ICMA 91666**	ICMB 91666 backcrossed to 81A cytoplasm source	A_1	
22	**ICMB 91666**	{843B x (J 1623 x 3/4 EB-96-1-10)}-92-2-1		5
23	**ICMA 91777**	ICMB 91777 backcrossed to 81A cytoplasm source	A_1	
24	**ICMB 91777**	{843B x (J 1623 x 3/4 EB-96-1-10)}-5-2		5
25	**ICMA 92111**	ICMB 92111 backcrossed to 81A cytoplasm source	A_1	

26	**ICMB 92111**	(81B x 843B)-11-1-1-B		5
27	**ICMA 92333**	ICMB 92333 backcrossed to 81A cytoplasm source	A_1	
28	**ICMB 92333**	(843B x 81B)-30-1-1		5
29	**ICMA 92444**	ICMB 92444 backcrossed to 81A cytoplasm source	A_1	
30	**ICMB 92444**	(843B x ICMPS 1500-7-4-1-6)-23-1-B-1-4		3
31	**ICMA 92666**	ICMB 92666 backcrossed to 81A cytoplasm source	A_1	
32	**ICMB 92666**	{ICMPES 34 x (843B x ICMPES 34)}-155-4-2		3
33	**ICMA 92777**	ICMB 92777 backcrossed to 88006A cytoplasm source	A_1	
34	**ICMB 92777**	{843B x (ICMPS 500-4-4-3 x ICMPS 1800-3-1-2-C3-4)}-7-1-3		3
35	**ICMA 92888**	ICMB 92888 backcrossed to 88006A cytoplasm source	A_1	
36	**ICMB 92888**	(843B x ICMPS 900-9-3-2-2)-41-2-6-2-2		3
37	**ICMA 93111**	ICMB 93111 backcrossed to 88006A cytoplasm source	A_1	
38	**ICMB 93111**	{(81B x SRL 53-1) x 843B}-30-1-1		3
39	**ICMA 93222**	ICMB 93222 backcrossed to 81A cytoplasm source	A_1	

40	**ICMB 93222**	(26B x 834B)-11-2-B-B		5
41	**ICMA 93333**	ICMB 93333 backcrossed to 88006A cytoplasm source	A_1	
42	**ICMB 93333**	(843B x ICMPS 900-9-3-8-2)-21-8-4		3
43	**ICMA 94111**	ICMB 94111 backcrossed to 81A cytoplasm source	A_1	
44	**ICMB 94111**	[(ICMB 89111 x ICMB 88002) x {(81B x SRL 53-1) x 843B}-3-5-2-1-16 x IP 9402-2-1-1-4]-31		3
45	**ICMA 94222**	ICMB 94222 backcrossed to 81A cytoplasm source	A_1	
46	**ICMB 94222**	[{{843B x (843B x 700651)}-11-1-2-B x 1163B} x (ICMB 89111 x ICMB 88004)]-3-3		5
47	**ICMA 94333**	ICMB 94333 backcrossed to 81A cytoplasm source	A_1	
48	**ICMB 94333**	(843B x Togo plot# 26-1)-27-B		3
49	**ICMA 94444**	ICMB 94444 backcrossed to 81A cytoplasm source	A_1	
50	**ICMB 94444**	(843B x 405B)-4-B		5
51	**ICMA 94555**	ICMB 94555 backcrossed to 81A cytoplasm source	A_1	
52	**ICMB 94555**	[{{843B x (843B x 700651)}-11-1-2-B x 1163B} x (ICMB 89111 x ICMB 88004)]-5-3		5

53	**ICMA 95111**	ICMB 95111 backcrossed to 81A cytoplasm source	A_1	
54	**ICMB 95111**	[{843B x (GNS x SS-48-40-4)-1-9-8}-30-B-B-1 x {843B x (843B x 700651)-11-1-2-B}]-39-B		5
55	**ICMA 95222**	ICMB 95222 backcrossed to 81A cytoplasm source	A_1	
56	**ICMB 95222**	[{843B x (GNS x SS-48-40-4)-29-7-4-B} x (843B x ICMPES 29)-23-2-3]-16-B		5
57	**ICMA 95333**	ICMB 95333 backcrossed to 81A cytoplasm source	A_4	
58	**ICMB 95333**	[{(B282 x S10B-38)-35 x Togo-29-2-2}-53 x {843B x {843B x (B 282 x 3/4 EB-100)-11-9-2}}]-60-29-1		5
59	**ICMA 95444**	ICMB 95444 backcrossed to 843A cytoplasm source	A_1	
60	**ICMB 95444**	(81-1164 DB/85-1856LR-16-B x 843DMR1)-14-6-3		5
61	**ICMA 95555**	ICMB 95555 backcrossed to 843A cytoplasm source	A_1	
62	**ICMB 95555**	DMR1 S2-96-2-3-4		3
63	**ICMA 96111**	ICMB 96111 backcrossed to 81A cytoplasm source	A_1	
64	**ICMB 96111**	(843B x 81B)-58-1-1-1		5
65	**ICMA 96222**	ICMB 96222 backcrossed to 81A cytoplasm source	A_1	
66	**ICMB 96222**	[{26B x (81B x SRL 50-1)}-1-1-2 x 852B]-69-1-1		5

67	**ICMA 96333**	ICMB 96333 backcrossed to 88004A cytoplasm source	A_1	
68	**ICMB 96333**	[{{843B x (843B x 700651)-11-1-2-B} x 1163B} x (ICMB 89111 x ICMB 88005)]-5-2-2		5
69	**ICMA 96444**	ICMB 96444 backcrossed to 89111A cytoplasm source	A_1	
70	**ICMB 96444**	(SPF3/S91-933 x SPF3/S91-3)-4-2-3-1		5
71	**ICMA 96555**	ICMB 96555 backcrossed to 81A cytoplasm source	A_1	
72	**ICMB 96555**	(SPF3/S91-5 x ARD early bulk)-2-3-3		5
73	**ICMA 96666**	ICMB 96666 backcrossed to 81A cytoplasm source	A_1	
74	**ICMB 96666**	(SPF3/S91-327 x SPF3/S91-5)-6-2-3		5
75	**ICMA 97111**	ICMB 97111 backcrossed to 863A cytoplasm source	A_1	
76	**ICMB 97111**	HTBC-48-B-1-1-1-1		2
77	**ICMA 97222**	ICMB 97222 backcrossed to 88004A cytoplasm source	A_1	
78	**ICMB 97222**	{(ICMB 88006 x ICMB 88005) x (ICMB 89111 x ICMB 88004)}-28-2-B		5
79	**ICMA 97333**	ICMB 97333 backcrossed to 89111A cytoplasm source	A_1	
80	**ICMB 97333**	(ICMB 89111 x ICMB 88004)-9-2-6-3-3-2-B		5

81	**ICMA 97444**	ICMB 97444 backcrossed to 843A cytoplasm source	A_1	
82	**ICMB 97444**	DMR1 S2-133-1-2-4-B		3
83	**ICMA 97555**	ICMB 97555 backcrossed to 81A cytoplasm source	A_4	
84	**ICMB 97555**	(SPF3/S91-5 x ARD early bulk)-2-3-2		3
85	**ICMA 98111**	ICMB 98111 backcrossed to 891111A cytoplasm source	A_1	
86	**ICMB 98111**	HTBC HS-27-1-1-1		2
87	**ICMA 98222**	ICMB 98222 backcrossed to 842A cytoplasm source	A_1	
88	**ICMB 98222**	ARD-288-1-10-1-2(RM)-5		1
89	**ICMA 98333**	ICMB 98333 backcrossed to 81A cytoplasm source	A_4	
90	**ICMB 98333**	(843B x ICTP 8202-161-5)-19-2-1-B-B-2		4
91	**ICMA 98444**	ICMB 98444 backcrossed to 81A cytoplasm source	A_1	
92	**ICMB 98444**	(BSECBPT/91-40 x SPF3/S91-529)-12-1-1-5		4
93	**ICMA 98555**	ICMB 98555 backcrossed to 88004A cytoplasm source	A_1	
94	**ICMB 98555**	[{(81B x SRL 53-1) x 843B}-3-5-2 x (843B x 834B)-25-B-B-1]-84-5-B-B		5

95	**ICMA 98666**	ICMB 98666 backcrossed to 81A cytoplasm source	A_4	
96	**ICMB 98666**	(ICMB 89111 x IPC 1466)-21-1-3-6-B-5		5
97	**ICMA 98777**	ICMB 98777 backcrossed to 81A cytoplasm source	A_g	
98	**ICMB 98777**	{(F4FC 1498-1-1-3 x J 104)-11-2-1-1}-7-3-1-B		5
99	**ICMA 99111**	ICMB 99111 backcrossed to 81A cytoplasm source	A_4	
100	**ICMB 99111**	(843B x ICTP 8202-161-5)-17-1-2-B-1		4
101	**ICMA 99222**	ICMB 99222 backcrossed to 863A cytoplasm source	A_1	
102	**ICMB 99222**	(BSECBPT/91-40 x SPF3/S91-94)-3-1-1-2		4
103	**ICMA 99333**	ICMB 99333 backcrossed to 81A cytoplasm source	A_1	
104	**ICMB 99333**	{(84-3869/85-4414)-8-B x 843DMR1}-1-3-2-B		5
105	**ICMA 99444**	ICMB 99444 backcrossed to 81A cytoplasm source	A_4	
106	**ICMB 99444**	(SPF3/S91-327 x SPF3/S91-5)-6-2-2		5
107	**ICMA 99555**	ICMB 99555 backcrossed to 81A cytoplasm source	A_4	
108	**ICMB 99555**	(BSECBPT/91-38 x SPF3/S91-529)-10-1-7		4

109	**ICMA 99666**	ICMB 99666 backcrossed to 81A cytoplasm source	A_4	
110	**ICMB 99666**	(BSECBPT/91-38 x SPF3/S91-529)-10-1-5-2		4
111	**ICMA 00111**	ICMB 00111 backcrossed to 863A cytoplasm source	A_1	
112	**ICMB 00111**	(BSECBPT/91-40 x SPF3/S91-3)-1-2-2-4		4
113	**ICMA 00222**	ICMB 00222 backcrossed to 88004A cytoplasm source	A_1	
114	**ICMB 00222**	[{(81B x SRL 53-1) x 843B}-3-5-2 x (843B x 834B)-25-B-B-1]-84-6-B-B		5
115	**ICMA 00333**	ICMB 00333 backcrossed to 81A cytoplasm source	A_1	
116	**ICMB 00333**	(BSECBPT/91-40 x SPF3/S91-529)-12-1-1-7-1		4
117	**ICMA 00444**	ICMB 00444 backcrossed to 843A cytoplasm source	A_1	
118	**ICMB 00444**	(SPF3/S91-544 x SPF3/S91-5)-5-1-2-1		5
119	**ICMA 00555**	ICMB 00555 backcrossed to 81A cytoplasm source	A_1	
120	**ICMB 00555**	HHVBC-S1-16-6-3-5-2-B		2
121	**ICMA 00666**	ICMB 00666 backcrossed to 81A cytoplasm source	A_1	
122	**ICMB 00666**	[(ICMB 89111 x ICMB 88002) x {(81B x SRL 53-1) x 843B}-3+]-31		5

123	**ICMA 00777**	ICMB 00777 backcrossed to 81A cytoplasm source	A_4	
124	**ICMB 00777**	{IPC 1598 x (843B x DSA 105B)}-51-3-B-B		5
125	**ICMA 00888**	ICMB 00888 backcrossed to 81A cytoplasm source	A_4	
126	**ICMB 00888**	(843B x ICTP 8202-161-5)-20-3-B-B-3		4
127	**ICMA 00999**	ICMB 00999 backcrossed to 88004A cytoplasm source	A_1	
128	**ICMB 00999**	(ICMB 89111 x 863B)-65-8-B-B		5
129	**ICMA 01111**	ICMB 01111 backcrossed to 89111A cytoplasm source	A_1	
130	**ICMB 01111**	(SPF3/S91-933 x SPF3/S91-3)-4-2-2-B		5
131	**ICMA 01222**	ICMB 01222 backcrossed to 81A cytoplasm source	A_4	
132	**ICMB 01222**	HHV-S1-24-3-B-3-2-1		2
133	**ICMA 01333**	ICMB 01333 backcrossed to 81A cytoplasm source	A_4	
134	**ICMB 01333**	HHV-S1-64-3-2-3-2-1		2
135	**ICMA 01444**	ICMB 01444 backcrossed to 81A cytoplasm source	A_4	
136	**ICMB 01444**	[{843B x (B 816 x 3/4 EB-105-6-1)-3-3}-15-B-4-1]-12-2-4-1		5

137	**ICMA 01555**	ICMB 01555 backcrossed to 81A cytoplasm source	A_4	
138	**ICMB 01555**	(BSECBPT/91-40 x SPF3/S91-529)-12-1-1-3		4
139	**ICMA 01666**	ICMB 01666 backcrossed to 81A cytoplasm source	A_4	
140	**ICMB 01666**	{(ICMB 89111 x ICMB 88004) x (ICMB 88006 x IP 9402)-2-1-1-4}-102-B-1		5
141	**ICMA 01777**	ICMB 01777 backcrossed to 81A cytoplasm source	A_5	
142	**ICMB 01777**	(BSECBPT/91-38 x SPF3/S91-529)-10-1-6		4
143	**ICMA 01888**	ICMB 01888 backcrossed to 81A cytoplasm source	A_1	
144	**ICMB 01888**	[{(81B x SRL-53-1) x 843B}-3-5-3 x [(843B x 111B)-10-1-2-2]}-226-B-2-B-B-B		5
145	**ICMA 02111**	ICMB 02111 backcrossed to 81A cytoplasm source	A_4	
146	**ICMB 02111**	{(ICMB 88006 x ICMB 88005)x (ICMB 89111x ICMB 88004)}-99-B		5
147	**ICMA 02222**	ICMB 02222 backcrossed to 81A cytoplasm source	A_4	
148	**ICMB 02222**	{(ICMB 89111 x ICMB 88004)x (ICMB 88006x ICMB 88005)-2-1-1-4}-101-B-3		5
149	**ICMA 02333**	ICMB 02333 backcrossed to 81A cytoplasm source	A_4	
150	**ICMB 02333**	(BSECBPT/91-39 x SPF3/S91-116)-15-2-1-2		4

151	**ICMA 02444**	ICMB 02444 backcrossed to 81A cytoplasm source	A_5	
152	**ICMB 02444**	(BSECBPT/91-38 x SPF3/S91-529)-2-1-B-2		4
153	**ICMA 02555**	ICMB 02555 backcrossed to 81A cytoplasm source	A_5	
154	**ICMB 02555**	ICMV87901-175-2-3-2-B-1		2
155	**ICMA 02666**	ICMB 02666 backcrossed to 81A cytoplasm source	A_4	
156	**ICMB 02666**	(ICMB89111 x IP9554-9)-4-2-2		3
157	**ICMA 02777**	ICMB 02777 backcrossed to 81A cytoplasm source	A_4	
158	**ICMB 02777**	HHVBC-II HS-9-1-1-2-7-1		2
159	**ICMA 02888**	ICMB 02888 backcrossed to 81A cytoplasm source	A_4	
160	**ICMB 02888**	HHVBC 2 HS-21-4		2
161	**ICMA 02999**	ICMB 02999 backcrossed to 81A cytoplasm source	A_4	
162	**ICMB 02999**	(PBLN-1/87-246 x SPF3/S91-5)-14-1		5
163	**ICMA 03111**	ICMB 03111 backcrossed to 81A cytoplasm source	A_4	
164	**ICMB 03111**	[{{843B x (843Bx700651)-11-1-2-B)} x 1163B}x (ICMB 89111 x ICMB 88005)]-5-3-B		5

165	**ICMA 03222**	ICMB 03222 backcrossed to 81A cytoplasm source	A_1	
166	**ICMB 03222**	690-93B		5
167	**ICMA 03333**	ICMB 03333 backcrossed to 81A cytoplasm source	A_5	
168	**ICMB 03333**	9035/S92-B-3		5
169	**ICMA 03444**	ICMB 03444 backcrossed to 81A cytoplasm source	A_4	
170	**ICMB 03444**	HHVBC-II D2 HS-456-1-2-5-1		2
171	**ICMA 03555**	ICMB 03555 backcrossed to 81A cytoplasm source	A_4	
172	**ICMB 03555**	(843B x ICTP8202-161-5)-17-1-3-B-2		4
173	**ICMA 03666**	ICMB 03666 backcrossed to 89111A cytoplasm source	A_1	
174	**ICMB 03666**	DMR1S252-4-1-1-B		3
175	**ICMA 03777**	ICMB 03777 backcrossed to 81A cytoplasm source	A_4	
176	**ICMB 03777**	(SPF3/S91-933 x SPF3/S91-3)-8-1-1-B		5
177	**ICMA 03888**	ICMB 03888 backcrossed to 81A cytoplasm source	A_4	
178	**ICMB 03888**	{(ICMB 88006 x ICMB 88005) x (ICMB 89111 x ICMB 88005)}-1-1-3-B-9		5

179	**ICMA 03999**	ICMB 03999 backcrossed to 81A cytoplasm source	A_4	
180	**ICMB 03999**	(ICMB 89111 x IP 9402-2-1-1-2)-31-1-B-B		3
181	**ICMA 04111**	ICMB 04111 backcrossed to 81A cytoplasm source	A_4	
182	**ICMB 04111**	(81B x 4017-5-4-B)-12-3-1-3		3
183	**ICMA 04222**	ICMB 04222 backcrossed to 81A cytoplasm source	A_4	
184	**ICMB 04222**	(843B x EEBC S1-407)-12-3-B		4
185	**ICMA 04333**	ICMB 04333 backcrossed to 81A cytoplasm source	A_1	
186	**ICMB 04333**	(ICMB 96111 x 4026-1-6-B)-4-2-1-1		3
187	**ICMA 04444**	ICMB 04444 backcrossed to 81A cytoplasm source	A_4	
188	**ICMB 04444**	(D2BLN95-103 x EEBC C1-3)-6-B-B		4
189	**ICMA 04555**	ICMB 04555 backcrossed to 81A cytoplasm source	A_1	
190	**ICMB 04555**	{D2BLN95-214 x (ICMB 96333 x HHVBC)}-11-B-2		5
191	**ICMA 04666**	ICMB 004666 backcrossed to ICMA 89111 cytoplasm source	A_1	
192	**ICMB 04666**	(SPF3/S91-933 x SPF3/S91-3)-4-2-3-B		5

193	**ICMA 04777**	ICMB 04777 backcrossed to 81A cytoplasm source	A_4	
194	**ICMB 04777**	(SRC II C3 S1-19-3-2 x HHVBC)-17-3-1-3		4
195	**ICMA 04888**	ICMB 04888 backcrossed to 81A cytoplasm source	A_4	
196	**ICMB 04888**	{(843B x ICTP 8202-161-5)-20-3-B-B-3 x B-lines bulk}-2-B-1-3		4
197	**ICMA 04999**	ICMB 04999 backcrossed to 81A cytoplasm source	A_1	
198	**ICMB 04999**	(EBC-Gen-S1-40-2-2-1 x B-line bulk)-25-B-B		4

1: Refer to Table 1

Decoding of abbreviations used in pedigree of some of the B-lines	
Designation	**Pedigree**
843DMR1	{(843B x (843B x 700651)}-11-1-2-B
DMR1	[{(843B x (843B x 700651)}-11-1-2-B]-96-2-3-4
SPF3/S91-933	[{{843B x (GNS x SS-48-40-4)-1-9-8}-30-B-B-B} x (842B x 3/4 EB-11-9-2-1)-44-5-1]-10
SPF3/S91-3	[{{{843B x (843B x 700651)}-11-1-2-B} x 81-1164B} x (ICMB 89111 x ICMB 88005)]-3-3

SPF3/S91-5	[{{{843B x (843B x 700651)}-11-1-2-B} x 81-1164B} x (ICMB 89111 x ICMB 88005)]-5-3
SPF3/S91-327	{(ICMB 88006 x ICMB 88005) x (ICMB 89111x ICMB 88004)}-7
SPF3/S91-529	[(ICMB 89111 x ICMB 88004) x {(81B x SRL 53-1) x 843B}-3-52-1-16-B-B x IP 9402-2-1-1-4]-16
SPF3/S-91-94	(843B x ICTP 8202-161-5)-13-5
SPF3/S-91-544	[(ICMB 89111 x ICMB 88002) x {(81B x SRL 53-1) x 843B}-1-10 x IP 9402-2-1-1-4)]-26
IPC 1598	{842B x (B 282 x 3/4 EB-100)-11-9-2-1}-44-B-5
IPC 1466	H 77/833-2
BSECBPT/91-38	BSEC8202-126-5-1
BSECBPT/91-40	BSEC8202-126-5-3
J 1623	An inbred line from Jamnagar
9035/S92	{(ICMB 89111 x ICMB 88004)x (ICMB 88006x ICMB 88005)-2-1-1-4}-101
9053/S92	{(ICMB 89111 x ICMB 88004)x (ICMB 88006x IP 9402)-2-1-1-4}-102
9057/S92	{(ICMB 88006 x ICMB 88005)x (ICMB 89111x ICMB 88004)}-99

Annexure III. Morphological characteristics of pearl millet A/B pairs during 2005 rainy season (E1) and post-rainy(dry) season (E2) at ICRISAT, Patancheru, India																				
A/B Pairs	Leaf sheath length (cm)				Leaf blade length (cm)				Leaf blade width (cm)				Panicle length (cm)				Panicle diameter (cm)			
	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*
81A	11.4	9.8	10.6	5	46.6	40.4	43.5	3	3.0	2.4	2.7	5	19.5	20.2	19.8	3	2.1	1.8	2.0	5
81B	11.2	10.3	10.8	5	46.4	41.4	43.9	3	3.1	2.5	2.8	5	21.7	21.5	21.6	5	2.2	1.9	2.1	5
841A	11.5	9.9	10.7	5	43.1	37.6	40.4	3	3.4	2.6	3.0	5	18.1	16.7	17.4	3	2.1	1.9	2.0	5
841B	11.7	9.8	10.7	5	41.1	36.1	38.6	1	3.5	2.4	3.0	5	17.6	16.1	16.8	3	2.1	1.9	2.0	5
842A	13.0	10.5	11.8	5	41	34.4	37.7	1	2.9	2.3	2.6	5	17.4	18.3	17.8	3	2.5	2.2	2.4	5
842B	13.1	10.9	12.0	5	41.9	37.0	39.5	1	3.1	2.4	2.7	5	17.5	18.6	18.1	3	2.5	2.2	2.4	5
843A	10.4	8.1	9.3	3	34.5	30.5	32.5	1	2.1	1.9	2.0	3	13.5	14.1	13.8	3	2.2	2.0	2.1	5
843B	11.4	8.4	9.9	3	38.1	32.3	35.2	1	2.3	2.0	2.2	3	14.6	14.6	14.6	3	2.2	2.1	2.2	5
863A	11.8	10.8	11.3	5	51.4	49.3	50.4	3	3.6	3.2	3.4	5	15.1	17.0	16.0	3	3.1	3.1	3.1	7
863B	12.1	10.7	11.4	5	54	49.8	51.9	5	4.0	3.2	3.6	5	15.4	16.0	15.7	3	3.3	3.0	3.1	7
ICMA 88004	10.0	8.4	9.2	3	36.4	28.3	32.4	1	2.5	1.8	2.1	3	14.8	13.6	14.2	3	2.8	2.1	2.5	5
ICMB 88004	10.1	8.7	9.4	3	39.5	30.0	34.7	1	2.6	1.9	2.3	3	14.5	13.9	14.2	3	2.9	2.5	2.7	5
ICMA 88006	11.7	9.6	10.6	5	44.4	36.7	40.6	1	2.7	2.2	2.4	3	15.8	15.4	15.6	3	2.5	2.2	2.4	5
ICMB 88006	12.2	10.3	11.2	5	44.5	39.3	41.9	3	2.7	2.3	2.5	5	15.2	15.4	15.3	3	2.6	2.5	2.6	5
ICMA 89111	11.5	9.3	10.4	3	37.3	32.8	35.1	1	2.6	2.1	2.4	3	17.3	16.6	16.9	3	2.3	2.1	2.2	5
ICMB 89111	11.5	9.9	10.7	5	39	34.7	36.9	1	2.7	2.2	2.4	3	17.4	17.1	17.3	3	2.4	2.1	2.2	5
ICMA 91222	10.2	9.1	9.7	3	41.2	35.4	38.3	1	2.8	2.5	2.6	5	15.6	13.7	14.6	3	2.3	2.0	2.1	5
ICMB 91222	10.4	9.9	10.2	3	42.4	36.2	39.3	1	2.8	2.8	2.8	5	15.7	13.9	14.8	3	2.3	2.1	2.2	5
ICMA 91444	12.1	12.0	12.1	5	47.6	45.4	46.5	3	2.6	2.4	2.5	5	21.6	18.9	20.3	3	2.3	2.2	2.2	5
ICMB 91444	12.3	12.5	12.4	5	49	47.2	48.1	3	2.7	2.5	2.6	5	20.6	20.0	20.3	3	2.2	2.2	2.2	5
ICMA 91666	12.5	9.0	10.7	5	45.7	39.7	42.7	3	3.0	2.3	2.6	5	19.3	16.8	18.0	3	3.1	2.7	2.9	5
ICMB 91666	12.1	9.6	10.8	5	49.1	41.4	45.3	3	3.1	2.2	2.7	5	19.6	17.0	18.3	3	2.9	2.7	2.8	5
ICMA 91777	13.8	10.5	12.1	5	49.2	42.3	45.7	3	3.6	2.8	3.2	5	20.5	17.7	19.1	3	3.1	2.6	2.9	5
ICMB 91777	13.5	10.7	12.1	5	47.9	41.7	44.8	3	3.7	2.9	3.3	5	20.0	19.0	19.5	3	3.0	2.6	2.8	5

A/B Pairs	Leaf sheath length (cm)				Leaf blade length (cm)				Leaf blade width (cm)				Panicle length (cm)				Panicle diameter (cm)			
	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*
ICMA 92111	11.3	9.8	10.5	5	43	40.3	41.6	3	2.9	2.2	2.5	5	18.8	18.0	18.4	3	2.3	2.0	2.1	5
ICMB 92111	11.5	10.2	10.8	5	42.3	38.7	40.5	1	2.7	2.4	2.5	5	18.4	19.3	18.8	3	2.2	1.9	2.1	5
ICMA 92333	12.0	9.6	10.8	5	41.6	33.8	37.7	1	2.8	2.2	2.5	5	16.4	13.9	15.2	3	2.4	2.1	2.3	5
ICMB 92333	11.9	9.6	10.8	5	42.9	35.7	39.3	1	2.9	2.3	2.6	5	16.4	14.9	15.7	3	2.5	2.3	2.4	5
ICMA 92444	11.6	10.1	10.8	5	45.6	40.8	43.2	3	2.7	2.4	2.5	5	15.8	16.8	16.3	3	2.4	2.4	2.4	5
ICMB 92444	11.6	10.2	10.9	5	46.4	41.6	44.0	3	2.7	2.2	2.5	5	15.3	15.9	15.6	3	2.5	2.4	2.4	5
ICMA 92666	10.3	9.4	9.8	3	42.4	37.8	40.1	1	2.5	2.3	2.4	3	17.1	16.8	16.9	3	2.3	2.1	2.2	5
ICMB 92666	10.4	9.1	9.7	3	41.9	37.0	39.4	1	2.7	2.1	2.4	3	17.0	16.8	16.9	3	2.3	2.2	2.3	5
ICMA 92777	10.3	9.3	9.8	3	47.1	43.1	45.1	3	2.7	2.3	2.5	5	16.6	15.9	16.2	3	2.7	2.7	2.7	5
ICMB 92777	9.9	9.5	9.7	3	45	42.6	43.8	3	2.7	2.1	2.4	3	17.1	16.0	16.5	3	2.9	2.8	2.8	5
ICMA 92888	13.0	9.9	11.4	5	47.6	36.7	42.1	3	3.0	2.1	2.6	5	20.1	16.5	18.3	3	2.9	2.5	2.7	5
ICMB 92888	11.4	8.5	9.9	3	45.2	33.7	39.5	1	3.2	2.2	2.7	5	19.8	17.4	18.6	3	2.9	2.6	2.7	5
ICMA 93111	11.4	9.8	10.6	5	46.5	40.7	43.6	3	3.4	2.5	3.0	5	18.2	16.7	17.5	3	3.0	2.7	2.8	5
ICMB 93111	11.3	9.8	10.6	5	48.5	42.6	45.5	3	3.4	2.6	3.0	5	17.9	17.2	17.6	3	3.0	2.7	2.8	5
ICMA 93222	13.6	11.8	12.7	5	52.6	45.6	49.1	3	3.1	2.5	2.8	5	17.4	17.2	17.3	3	2.7	2.6	2.7	5
ICMB 93222	13.8	12.1	13.0	5	52.9	48.1	50.5	3	3.2	2.4	2.8	5	17.6	17.3	17.5	3	2.8	2.6	2.7	5
ICMA 93333	11.4	11.0	11.2	5	54	49.3	51.6	5	3.6	2.9	3.2	5	18.9	20.4	19.7	3	3.0	2.8	2.9	5
ICMB 93333	11.1	11.0	11.0	5	53.1	49.7	51.4	5	3.5	2.8	3.2	5	18.0	19.4	18.7	3	2.9	2.6	2.7	5
ICMA 94111	11.3	9.3	10.3	3	47.5	41.9	44.7	3	2.9	2.5	2.7	5	17.1	16.1	16.6	3	3.1	2.9	3.0	5
ICMB 94111	11.0	9.1	10.0	3	48.6	41.8	45.2	3	2.8	2.4	2.6	5	17.1	17.4	17.3	3	3.0	2.9	2.9	5
ICMA 94222	9.8	7.7	8.8	3	34.2	27.6	30.9	1	2.2	1.8	2.0	3	14.5	15.0	14.7	3	2.1	2.1	2.1	5
ICMB 94222	9.6	8.2	8.9	3	33.1	29.2	31.1	1	2.0	1.8	1.9	3	14.3	15.4	14.9	3	2.1	2.3	2.2	5
ICMA 94333	10.3	9.2	9.7	3	37.9	33.2	35.6	1	1.7	1.6	1.7	3	12.2	14.0	13.1	3	2.2	2.2	2.2	5
ICMB 94333	10.4	10.3	10.4	3	41.5	39.2	40.4	1	2.1	1.9	2.0	3	12.1	13.5	12.8	3	2.2	2.3	2.2	5
ICMA 94444	9.3	8.3	8.8	3	45.7	39.0	42.4	3	2.6	2.1	2.3	3	15.1	13.6	14.4	3	2.6	2.3	2.5	5
ICMB 94444	9.4	8.1	8.8	3	44.9	38.9	41.9	3	2.4	2.0	2.2	3	14.6	13.2	13.9	3	2.5	2.3	2.4	5

A/B Pairs	Leaf sheath length (cm)				Leaf blade length (cm)				Leaf blade width (cm)				Panicle length (cm)				Panicle diameter (cm)			
	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*
ICMA 94555	11.8	9.3	10.6	5	42.5	33.1	37.8	3	3.1	2.2	2.6	5	16.9	16.2	16.5	3	2.7	2.5	2.6	5
ICMB 94555	12.4	9.2	10.8	5	45.3	37.8	41.5	3	3.1	2.5	2.8	5	16.9	17.3	17.1	3	2.8	2.7	2.8	5
ICMA 95111	11.1	8.2	9.6	3	37.4	32.4	34.9	1	2.4	2.2	2.3	3	13.7	14.3	14.0	3	2.2	2.3	2.3	5
ICMB 95111	11.1	8.6	9.8	3	37.3	33.1	35.2	1	2.7	2.2	2.4	3	14.4	14.9	14.6	3	2.4	2.4	2.4	5
ICMA 95222	10.4	9.5	9.9	3	48.2	43.2	45.7	3	3.4	2.5	2.9	5	17.5	17.4	17.5	3	2.4	2.2	2.3	5
ICMB 95222	10.4	9.5	9.9	3	47.9	42.3	45.1	3	3.4	2.4	2.9	5	17.6	17.4	17.5	3	2.5	2.3	2.4	5
ICMA 95333	13.2	12.6	12.9	5	57.3	56.0	56.7	5	4.6	4.1	4.4	5	23.7	23.9	23.8	5	2.8	3.0	2.9	5
ICMB 95333	13.1	12.3	12.7	5	59.1	58.0	58.6	5	4.4	4.0	4.2	5	25.5	25.8	25.6	5	2.8	3.0	2.9	5
ICMA 95444	10.5	8.2	9.3	3	38.8	36.8	37.8	1	2.2	2.1	2.2	3	14.5	16.9	15.7	3	2.0	2.3	2.2	5
ICMB 95444	9.8	9.5	9.6	3	40.8	40.7	40.8	1	2.0	2.1	2.1	3	14.9	16.6	15.8	3	2.1	2.4	2.2	5
ICMA 95555	11.4	7.8	9.6	3	38	26.7	32.3	1	2.9	1.7	2.3	3	14.4	13.1	13.8	3	2.4	1.9	2.2	5
ICMB 95555	11.2	7.1	9.1	3	38.8	27.7	33.2	1	2.9	1.7	2.3	3	15.6	13.8	14.7	3	2.4	2.1	2.3	5
ICMA 96111	11.5	10.5	11.0	5	45.4	41.2	43.3	3	2.9	2.7	2.8	5	18.2	18.2	18.2	3	2.2	2.4	2.3	5
ICMB 96111	11.3	10.8	11.1	5	45.9	41.9	43.9	3	2.7	2.6	2.7	5	18.5	18.5	18.5	3	2.3	2.4	2.3	5
ICMA 96222	11.7	10.1	10.9	5	48	43.1	45.5	3	3.6	2.6	3.1	5	22.2	19.5	20.8	5	2.9	2.6	2.7	5
ICMB 96222	11.8	10.1	11.0	5	46	43.2	44.6	3	3.5	2.6	3.0	5	22.3	20.3	21.3	5	2.8	2.5	2.7	5
ICMA 96333	11.0	8.2	9.6	3	38.9	33.4	36.2	1	2.7	2.2	2.4	3	16.0	15.7	15.9	3	2.7	2.5	2.6	5
ICMB 96333	11.1	8.4	9.7	3	39	32.5	35.7	1	2.6	2.1	2.3	3	16.8	16.0	16.4	3	2.6	2.5	2.5	5
ICMA 96444	11.0	8.8	9.9	3	40.3	36.7	38.5	1	2.5	2.2	2.3	3	17.6	18.8	18.2	3	2.4	2.4	2.4	5
ICMB 96444	11.3	9.4	10.3	3	43.1	41.4	42.2	3	2.7	2.5	2.6	5	17.9	19.5	18.7	3	2.6	2.5	2.5	5
ICMA 96555	13.4	11.6	12.5	5	52.4	48.9	50.6	3	3.0	2.9	3.0	5	20.6	21.5	21.0	5	3.3	3.2	3.3	7
ICMB 96555	13.8	12.4	13.1	5	51.8	46.9	49.3	3	3.3	3.0	3.2	5	20.2	21.5	20.8	5	3.5	3.2	3.3	7
ICMA 96666	12.1	9.6	10.8	5	40.8	35.5	38.1	3	2.8	2.3	2.5	5	16.4	17.6	17.0	3	2.5	2.2	2.3	5
ICMB 96666	12.1	10.5	11.3	5	49.2	46.2	47.7	3	3.0	2.6	2.8	5	17.6	18.1	17.8	3	2.6	2.5	2.6	5
ICMA 97111	10.5	9.1	9.8	3	47.9	42.7	45.3	3	2.7	2.1	2.4	3	17.7	17.2	17.4	3	3.1	2.7	2.9	5
ICMB 97111	10.9	8.7	9.8	3	47.1	42.6	44.8	3	2.8	2.0	2.4	3	17.4	16.8	17.1	3	3.1	2.8	2.9	5

A/B Pairs	Leaf sheath length (cm)				Leaf blade length (cm)				Leaf blade width (cm)				Panicle length (cm)				Panicle diameter (cm)			
	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*
ICMA 97222	10.9	9.0	10.0	3	42.2	39.0	40.6	1	3.0	2.5	2.7	5	14.8	13.9	14.3	3	2.9	2.6	2.8	5
ICMB 97222	10.4	9.8	10.1	3	42.8	39.3	41.1	3	2.8	2.5	2.7	5	14.4	14.5	14.5	3	2.9	3.0	3.0	5
ICMA 97333	12.8	10.5	11.6	5	45.6	40.6	43.1	3	3.1	2.5	2.8	5	17.8	17.0	17.4	3	2.6	2.2	2.4	5
ICMB 97333	12.9	10.5	11.7	5	46.5	42.1	44.3	3	3.0	2.6	2.8	5	18.1	17.2	17.7	3	2.7	2.3	2.5	5
ICMA 97444	10.0	8.1	9.1	3	35.6	28.6	32.1	1	2.3	1.9	2.1	3	14.8	14.0	14.4	3	2.5	2.2	2.3	5
ICMB 97444	10.4	7.9	9.2	3	33.3	28.3	30.8	1	2.4	1.9	2.2	3	15.4	15.0	15.2	3	2.5	2.3	2.4	5
ICMA 97555	12.5	9.8	11.2	5	43.9	39.1	41.5	3	3.0	2.5	2.8	5	18.0	18.7	18.4	3	3.1	2.8	2.9	5
ICMB 97555	12.8	10.5	11.7	5	48.7	41.4	45.0	3	2.9	2.8	2.9	5	17.8	19.7	18.7	3	3.2	3.1	3.2	7
ICMA 98111	9.7	9.4	9.5	3	41.4	38.5	40.0	1	2.1	2.0	2.1	3	13.1	12.3	12.7	3	2.3	2.3	2.3	5
ICMB 98111	9.8	10.0	9.9	3	41.7	38.4	40.1	1	2.2	2.1	2.2	3	12.7	12.5	12.6	3	2.4	2.3	2.3	5
ICMA 98222	12.3	10.1	11.2	5	44.6	39.0	41.8	3	3.7	2.7	3.2	5	17.1	18.9	18.0	3	3.3	3.2	3.2	7
ICMB 98222	11.9	9.2	10.5	5	42.9	36.4	39.7	1	3.5	2.6	3.0	5	15.8	16.7	16.3	3	3.3	3.0	3.1	7
ICMA 98333	11.4	10.1	10.8	5	39.2	32.6	35.9	1	1.9	1.6	1.7	3	16.3	17.3	16.8	3	2.6	2.1	2.4	5
ICMB 98333	11.4	9.5	10.5	5	40.5	32.8	36.7	1	2.0	1.6	1.8	3	16.1	16.5	16.3	3	2.4	2.3	2.3	5
ICMA 98444	12.2	9.2	10.7	5	40.3	31.9	36.1	1	3.2	2.3	2.8	5	17.6	15.9	16.8	3	3.1	2.7	2.9	5
ICMB 98444	12.2	9.4	10.8	5	42	33.9	37.9	1	3.1	2.6	2.9	5	17.5	16.7	17.1	3	3.1	2.9	3.0	5
ICMA 98555	9.8	9.0	9.4	3	40.8	37.6	39.2	1	2.5	2.3	2.4	3	11.1	13.3	12.2	3	2.6	2.5	2.6	5
ICMB 98555	10.1	8.8	9.5	3	44.7	40.1	42.4	3	2.7	2.4	2.6	5	12.1	12.6	12.3	3	2.7	2.7	2.7	5
ICMA 98666	10.7	10.2	10.4	3	41.8	39.0	40.4	1	3.0	2.8	2.9	5	15.2	15.8	15.5	3	2.1	1.9	2.0	5
ICMB 98666	11.3	10.6	11.0	5	46.1	46.1	46.1	3	3.1	3.0	3.0	5	16.8	16.8	16.8	3	2.1	2.2	2.1	5

A/B Pairs	Leaf sheath length (cm)				Leaf blade length (cm)				Leaf blade width (cm)				Panicle length (cm)				Panicle diameter (cm)			
	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*
ICMA 98777	8.6	7.9	8.3	3	40.7	35.3	38.0	1	2.8	2.2	2.5	5	14.6	15.6	15.1	3	2.2	2.0	2.1	5
ICMB 98777	9.0	7.7	8.3	3	40.5	36.8	38.7	1	3.1	2.4	2.7	5	15.0	14.8	14.9	3	2.2	2.0	2.1	5
ICMA 99111	11.3	10.0	10.6	5	50.5	46.1	48.3	3	3.5	3.0	3.2	5	18.0	18.5	18.3	3	3.2	3.1	3.1	7
ICMB 99111	12.1	11.3	11.7	5	54.8	49.4	52.1	5	3.8	2.9	3.4	5	18.2	19.1	18.7	3	3.2	3.1	3.1	7
ICMA 99222	11.2	10.7	10.9	5	53.9	49.2	51.6	5	3.7	3.2	3.4	5	17.0	18.2	17.6	3	3.2	3.2	3.2	7
ICMB 99222	11.9	10.7	11.3	5	54.3	50.7	52.5	5	3.8	3.3	3.5	5	18.2	18.6	18.4	3	3.4	3.1	3.2	7
ICMA 99333	11.2	10.7	10.9	5	46	42.6	44.3	3	2.6	2.4	2.5	5	16.2	17.4	16.8	3	2.7	2.8	2.7	5
ICMB 99333	10.9	10.6	10.7	5	46.3	40.8	43.5	3	2.9	2.3	2.6	5	17.1	17.5	17.3	3	2.8	2.8	2.8	5
ICMA 99444	11.6	11.2	11.4	5	47.8	47.0	47.4	3	2.5	2.5	2.5	5	16.3	17.9	17.1	3	2.6	2.7	2.7	5
ICMB 99444	11.9	11.4	11.7	5	53.2	50.4	51.8	5	3.2	2.6	2.9	5	17.4	18.5	17.9	3	2.8	2.7	2.7	5
ICMA 99555	13.4	11.2	12.3	5	45.2	39.9	42.5	3	4.0	3.1	3.6	5	17.7	17.8	17.7	3	3.4	3.1	3.2	7
ICMB 99555	13.8	11.4	12.6	5	46.1	40.0	43.0	3	3.9	3.2	3.5	5	17.2	18.5	17.9	3	3.5	3.2	3.4	7
ICMA 99666	13.1	11.1	12.1	5	40.5	35.7	38.1	1	3.2	2.9	3.1	5	16.1	15.9	16.0	3	3.1	3.0	3.0	5
ICMB 99666	13.1	11.3	12.2	5	42.7	37.7	40.2	1	3.6	3.0	3.3	5	16.2	16.4	16.3	3	3.4	3.1	3.2	7
ICMA 00111	9.8	8.6	9.2	3	37.5	31.8	34.7	1	2.6	2.6	2.6	5	15.3	15.7	15.5	3	3.0	2.8	2.9	5
ICMB 00111	10.1	8.8	9.5	3	40.2	35.2	37.7	1	3.4	2.9	3.1	5	15.4	14.9	15.2	3	3.0	2.9	3.0	5
ICMA 00222	10.4	9.1	9.8	3	44.1	40.5	42.3	3	2.4	2.4	2.4	3	11.6	12.0	11.8	3	2.5	2.6	2.6	5
ICMB 00222	10.0	9.1	9.5	3	44.5	40.5	42.5	3	2.5	2.5	2.5	5	11.8	12.2	12.0	3	2.7	2.7	2.7	5

A/B Pairs	Leaf sheath length (cm)				Leaf blade length (cm)				Leaf blade width (cm)				Panicle length (cm)				Panicle diameter (cm)			
	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node
ICMA 00333	11.0	7.5	9.2	3	35.8	26.6	31.2	1	3.6	2.1	2.9	5	16.5	15.1	15.8	3	3.0	2.4	2.7	5
ICMB 00333	11.4	7.7	9.6	3	36.3	26.9	31.6	1	3.1	2.4	2.7	5	16.6	15.6	16.1	3	3.0	2.1	2.6	5
ICMA 00444	10.1	8.7	9.4	3	43.4	37.3	40.4	1	3.1	2.4	2.8	5	15.6	14.3	14.9	3	3.2	2.7	3.0	5
ICMB 00444	10.1	8.8	9.5	3	41.9	38.8	40.3	1	3.0	2.6	2.8	5	15.8	14.7	15.2	3	3.2	2.9	3.0	5
ICMA 00555	14.4	10.9	12.6	5	47.8	43.5	45.6	3	4.3	3.3	3.8	5	22.5	21.5	22.0	5	3.4	3.2	3.3	7
ICMB 00555	14.0	11.2	12.6	5	46.9	44.5	45.7	3	4.2	3.3	3.8	5	22.1	23.7	22.9	5	3.5	3.2	3.4	7
ICMA 00666	11.6	9.3	10.4	3	44.5	39.6	42.1	3	2.6	2.4	2.5	5	16.6	18.8	17.7	3	3.1	2.8	2.9	5
ICMB 00666	11.1	9.3	10.2	3	45.3	40.6	43.0	3	2.7	2.3	2.5	5	16.3	18.4	17.4	3	3.0	2.7	2.8	5
ICMA 00777	10.7	9.7	10.2	3	38.8	33.3	36.1	1	2.6	2.1	2.4	3	15.2	15.0	15.1	3	2.8	2.5	2.7	5
ICMB 00777	10.4	9.5	10.0	3	40.7	37.1	38.9	1	2.8	2.3	2.6	5	15.7	16.0	15.8	3	2.9	2.8	2.9	5
ICMA 00888	12.2	10.3	11.3	5	50.1	45.7	47.9	3	2.8	2.6	2.7	5	17.6	17.9	17.8	3	2.9	2.7	2.8	5
ICMB 00888	12.3	10.7	11.5	5	49.1	46.2	47.6	3	2.9	2.8	2.9	5	17.2	17.2	17.2	3	3.1	2.8	3.0	5
ICMA 00999	13.5	12.9	13.2	5	51.9	47.3	49.6	3	3.0	2.6	2.8	5	18.7	20.0	19.4	3	2.7	2.3	2.5	5
ICMB 00999	14.6	12.1	13.4	5	51.1	47.8	49.5	3	3.1	2.4	2.8	5	19.4	19.0	19.2	3	2.6	2.4	2.5	5
ICMA 01111	11.8	8.9	10.3	3	41.3	37.2	39.2	1	2.8	2.3	2.5	5	18.2	19.1	18.6	3	2.6	2.4	2.5	5
ICMB 01111	11.2	9.8	10.5	5	40.9	37.6	39.2	1	2.6	2.3	2.5	5	18.6	19.9	19.2	3	2.6	2.6	2.6	5
ICMA 01222	13.4	11.2	12.3	5	45.4	41.2	43.3	3	3.0	2.7	2.9	5	22.7	22.0	22.4	5	3.0	3.1	3.1	7
ICMB 01222	13.4	12.7	13.0	5	46.6	41.3	44.0	3	3.3	3.0	3.1	5	23.0	22.5	22.7	5	3.2	3.2	3.2	7
ICMA 01333	14.2	12.4	13.3	5	53.9	49.7	51.8	5	3.6	2.9	3.2	5	25.7	28.2	26.9	5	3.5	3.5	3.5	7
ICMB 01333	13.9	13.8	13.8	5	55.1	51.0	53.1	5	3.7	3.2	3.4	5	24.7	28.8	26.8	5	3.6	3.7	3.6	7
ICMA 01444	15.9	12.9	14.4	5	55.1	47.1	51.1	5	4.1	3.0	3.5	5	26.0	25.1	25.6	5	3.3	3.1	3.2	7
ICMB 01444	16.0	11.8	13.9	5	52.4	43.7	48.1	3	4.0	2.7	3.4	5	25.2	27.4	26.3	5	3.0	2.9	3.0	5
ICMA 01555	12.5	8.6	10.6	5	39.6	32.0	35.8	1	3.3	2.3	2.8	5	16.0	15.6	15.8	3	2.9	2.4	2.7	5
ICMB 01555	12.6	9.5	11.1	5	41	34.6	37.8	1	3.4	2.6	3.0	5	16.1	15.4	15.8	3	3.0	2.7	2.8	5
ICMA 01666	12.9	11.2	12.0	5	51.7	47.0	49.3	3	3.0	2.6	2.8	5	15.8	16.4	16.1	3	2.7	2.6	2.6	5
ICMB 01666	12.8	11.7	12.2	5	52.7	47.0	49.9	3	2.9	2.6	2.8	5	16.7	17.5	17.1	3	2.7	2.6	2.6	5

A/B Pairs	Leaf sheath length (cm)				Leaf blade length (cm)				Leaf blade width (cm)				Panicle length (cm)				Panicle diameter (cm)			
	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node
ICMA 01777	13.2	11.2	12.2	5	47.9	42.1	45.0	3	4.9	3.2	4.0	5	18.9	19.5	19.2	3	4.0	3.5	3.7	7
ICMB 01777	13.3	11.2	12.2	5	46.7	41.5	44.1	3	4.8	3.0	3.9	5	18.7	19.8	19.3	3	3.9	3.5	3.7	7
ICMA 01888	15.3	13.3	14.3	5	62	54.7	58.4	5	3.2	2.5	2.9	5	24.2	22.2	23.2	5	2.9	2.4	2.6	5
ICMB 01888	15.5	15.0	15.3	7	63.2	58.7	60.9	5	3.5	2.9	3.2	5	24.8	24.6	24.7	5	3.0	2.8	2.9	5
ICMA 02111	10.9	9.3	10.1	3	43.7	39.1	41.4	3	3.2	2.6	2.9	5	15.4	14.6	15.0	3	3.0	2.9	2.9	5
ICMB 02111	10.6	9.5	10.0	3	45.5	39.5	42.5	3	3.2	2.7	3.0	5	15.1	14.9	15.0	3	3.2	3.1	3.2	7
ICMA 02222	7.7	7.1	7.4	3	30.2	25.4	27.8	1	2.2	1.9	2.0	3	11.7	11.4	11.5	3	2.2	1.8	2.0	5
ICMB 02222	7.8	7.2	7.5	3	30.9	26.3	28.6	1	2.3	2.0	2.2	3	12.3	12.1	12.2	3	2.2	1.9	2.1	5
ICMA 02333	12.5	9.7	11.1	5	47.5	37.9	42.7	3	3.3	2.1	2.7	5	16.1	18.3	17.2	3	3.2	2.7	3.0	5
ICMB 02333	12.5	10.1	11.3	5	49.4	38.7	44.0	3	3.5	2.1	2.8	5	16.5	18.5	17.5	3	3.3	2.8	3.0	5
ICMA 02444	11.0	9.1	10.0	3	45.4	38.9	42.1	3	3.3	2.7	3.0	5	18.4	18.2	18.3	3	3.3	2.9	3.1	7
ICMB 02444	11.3	9.6	10.5	5	45.7	40.4	43.1	3	3.5	2.7	3.1	5	18.5	18.6	18.5	3	3.3	2.9	3.1	7
ICMA 02555	16.3	13.5	14.9	5	56.3	49.0	52.6	5	4.1	3.3	3.7	5	25.4	24.9	25.1	5	2.7	2.6	2.7	5
ICMB 02555	16.1	13.6	14.9	5	58.2	49.1	53.7	5	4.2	3.3	3.7	5	28.0	25.6	26.8	5	2.8	2.6	2.7	5
ICMA 02666	11.3	10.3	10.8	5	47.2	42.6	44.9	3	2.9	2.5	2.7	5	17.1	18.8	18.0	3	2.1	2.0	2.0	5
ICMB 02666	10.9	10.7	10.8	5	47.1	42.8	44.9	3	3.0	2.5	2.7	5	17.8	18.3	18.0	3	2.1	2.0	2.0	5
ICMA 02777	13.7	12.0	12.9	5	49.2	47.6	48.4	3	3.5	3.0	3.2	5	23.2	25.1	24.1	5	2.9	2.9	2.9	5
ICMB 02777	13.0	12.6	12.8	5	51.4	49.3	50.4	3	3.7	3.2	3.4	5	24.2	25.5	24.8	5	3.1	3.1	3.1	7
ICMA 02888	14.7	12.9	13.8	5	49.4	44.6	47.0	3	3.6	3.0	3.3	5	25.4	24.4	24.9	5	3.3	3.0	3.1	7
ICMB 02888	14.9	13.4	14.1	5	50.2	43.8	47.0	3	3.6	3.3	3.5	5	26.2	26.1	26.1	5	3.2	3.2	3.2	7
ICMA 02999	12.0	8.7	10.3	3	42	32.3	37.2	1	3.2	2.3	2.8	5	19.5	17.5	18.5	3	2.6	2.5	2.6	5
ICMB 02999	12.1	9.2	10.6	5	45	35.1	40.0	1	3.2	2.4	2.8	5	19.5	18.2	18.8	3	2.7	2.6	2.6	5
ICMA 03111	10.9	7.6	9.3	3	35.8	27.2	31.5	1	2.7	1.9	2.3	3	17.0	15.0	16.0	3	2.4	2.2	2.3	5
ICMB 03111	11.0	8.3	9.6	3	37.7	29.5	33.6	1	3.0	2.0	2.5	5	17.5	15.9	16.7	3	2.5	2.3	2.4	5
ICMA 03222	11.2	10.3	10.7	5	50.2	47.1	48.7	3	2.3	1.6	2.0	3	14.0	14.3	14.2	3	2.3	2.6	2.4	5
ICMB 03222	11.1	10.4	10.7	5	51.2	49.2	50.2	3	2.4	1.7	2.1	3	13.8	14.1	13.9	3	2.2	2.5	2.4	5

A/B Pairs	Leaf sheath length (cm)				Leaf blade length (cm)				Leaf blade width (cm)				Panicle length (cm)				Panicle diameter (cm)			
	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node
ICMA 03333	8.5	7.6	8.1	3	34.3	30.3	32.3	1	2.8	2.4	2.6	5	17.8	12.0	14.9	3	2.7	2.7	2.7	5
ICMB 03333	8.9	7.5	8.2	3	35.5	31.0	33.3	1	2.9	2.3	2.6	5	18.7	12.4	15.6	3	2.9	2.7	2.8	5
ICMA 03444	12.9	9.9	11.4	5	40.2	32.6	36.4	1	3.1	1.8	2.5	5	23.5	21.3	22.4	5	2.9	2.5	2.7	5
ICMB 03444	13.0	10.4	11.7	5	47.3	38.7	43.0	3	2.9	2.2	2.6	5	23.8	22.0	22.9	5	3.1	2.5	2.8	5
ICMA 03555	11.9	9.8	10.8	5	50.1	47.7	48.9	3	3.7	3.3	3.5	5	19.1	19.5	19.3	3	2.9	2.8	2.8	5
ICMB 03555	12.7	10.5	11.6	5	50.8	47.1	49.0	3	3.6	3.4	3.5	5	18.9	18.4	18.6	3	2.8	2.7	2.8	5
ICMA 03666	12.1	9.4	10.7	5	41.6	38.6	40.1	1	3.1	2.6	2.9	5	15.1	12.5	13.8	3	2.6	2.1	2.4	5
ICMB 03666	12.1	9.6	10.8	5	41.2	36.7	38.9	1	2.9	2.6	2.7	5	15.0	12.7	13.9	3	2.6	2.3	2.4	5
ICMA 03777	10.1	8.3	9.2	3	40.1	37.0	38.6	1	2.3	2.2	2.3	3	15.1	16.0	15.5	3	2.5	2.4	2.5	5
ICMB 03777	10.3	8.8	9.6	3	40.8	40.3	40.6	1	2.6	2.6	2.6	5	14.5	17.2	15.8	3	2.5	2.6	2.6	5
ICMA 03888	9.7	9.0	9.4	3	44.8	39.6	42.2	3	2.6	2.3	2.5	5	15.2	14.8	15.0	3	2.6	2.4	2.5	5
ICMB 03888	9.9	8.9	9.4	3	46.3	42.9	44.6	3	3.0	2.5	2.8	5	15.5	15.9	15.7	3	2.7	2.5	2.6	5
ICMA 03999	10.9	9.3	10.1	3	42.8	36.4	39.6	1	2.6	2.2	2.4	3	17.2	16.8	17.0	3	2.5	2.4	2.4	5
ICMB 03999	10.7	8.7	9.7	3	44	37.6	40.8	1	2.5	2.4	2.5	5	16.4	17.3	16.8	3	2.5	2.5	2.5	5
ICMA 04111	15.4	13.7	14.6	5	51.2	45.5	48.4	3	3.6	3.0	3.3	5	32.8	34.6	33.7	7	2.2	2.0	2.1	5
ICMB 04111	16.0	13.4	14.7	5	53.5	47.2	50.4	5	3.5	3.1	3.3	5	30.7	36.7	33.7	7	2.1	2.1	2.1	5
ICMA 04222	11.3	9.3	10.3	3	39.1	34.0	36.6	1	2.3	1.6	1.9	3	14.7	13.5	14.1	3	2.6	2.1	2.4	5
ICMB 04222	10.8	9.2	10.0	3	37.5	34.5	36.0	1	2.2	1.7	1.9	3	14.0	13.8	13.9	3	2.4	2.5	2.5	5
ICMA 04333	13.1	11.9	12.5	5	56.1	52.4	54.2	5	3.1	2.6	2.9	5	22.7	21.4	22.1	5	2.4	2.3	2.4	5
ICMB 04333	13.0	12.0	12.5	5	55.7	53.7	54.7	5	2.8	2.8	2.8	5	22.3	21.5	21.9	5	2.3	2.3	2.3	5
ICMA 04444	11.9	10.2	11.0	5	51.9	46.7	49.3	3	2.8	2.4	2.6	5	15.3	14.5	14.9	3	2.8	2.7	2.8	5
ICMB 04444	12.5	10.1	11.3	5	52	47.0	49.5	3	3.0	2.2	2.6	5	16.1	14.2	15.1	3	3.0	2.6	2.8	5
ICMA 04555	12.9	10.9	11.9	5	52.3	47.7	50.0	3	2.8	2.8	2.8	5	19.0	19.0	19.0	3	2.7	2.6	2.7	5
ICMB 04555	12.8	10.9	11.9	5	51.3	46.3	48.8	3	3.1	2.6	2.9	5	20.3	19.8	20.0	3	2.9	2.7	2.8	5
ICMA 04666	11.0	9.4	10.2	3	38.8	36.1	37.5	1	2.2	2.3	2.3	3	17.1	18.7	17.9	3	2.5	2.5	2.5	5
ICMB 04666	11.8	10.0	10.9	5	43.2	40.9	42.0	3	2.6	2.5	2.6	5	17.6	21.3	19.4	3	2.6	2.7	2.6	5
ICMA 04777	14.9	14.5	14.7	5	60.9	57.9	59.4	5	4.5	3.7	4.1	7	34.1	34.2	34.2	7	2.7	2.4	2.6	5

A/B Pairs	Leaf sheath length (cm)				Leaf blade length (cm)				Leaf blade width (cm)				Panicle length (cm)				Panicle diameter (cm)			
	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node
ICMB 04777	14.7	14.2	14.4	5	61.9	55.3	58.6	5	4.3	3.8	4.0	5	37.3	33.2	35.2	7	2.6	2.3	2.4	5
ICMA 04888	11.9	10.5	11.2	5	45.4	39.6	42.5	3	3.9	3.4	3.6	5	17.4	18.8	18.1	3	3.4	3.2	3.3	7
ICMB 04888	11.9	10.6	11.2	5	44.9	41.2	43.1	3	3.8	3.4	3.6	5	16.8	17.7	17.2	3	3.3	3.3	3.3	7
ICMA 04999	12.4	9.3	10.8	5	42.6	35.7	39.2	1	3.4	2.7	3.1	5	20.3	21.2	20.8	5	2.6	2.4	2.5	5
ICMB 04999	12.5	9.1	10.8	5	43.1	36.6	39.8	1	3.2	2.6	2.9	5	19.4	19.7	19.6	3	2.5	2.4	2.4	5
Mean (A-lines)	11.8	9.9	10.8		44.8	39.6	42.2		3.0	3.1	2.7		17.9		17.7	17.8		2.7	2.5	2.6
Mean (B-lines)	11.8	10.2	11.0		45.7	40.8	43.2		2.5	2.5	2.8		18.0		18.0	18.0		2.8	2.6	2.7
Grand mean	11.8	10.0	10.9		45.3	40.2	42.8		3.0	2.5	2.8		17.9		17.8	17.9		2.7	2.5	2.6
S.E.(±)	0.7	0.4			2.9	1.8			0.4	0.1			0.8	0.6			0.9	0.6		

E1: Mean data of 2005 rainy season

E2: Mean data of 2005 postrainy (dry) season

*: Refer to Annexure I

A/B Pairs	Number of Nodes Per Plant				Number of Productive tillers				Plant Height (cm)				Time to Panicle Emergence				1000-Grain Weight			
	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*
81A	7.7	6.5	7.1	3	2.7	3.6	3.2	3	77.1	75.8	76.4	1	49.0	58.0	53.5	7	8.2	7.2	7.7	5
81B	7.3	6.9	7.1	3	2.6	3.0	2.8	3	73.0	79.8	76.4	1	50.0	58.5	54.3	7	8.0	6.9	7.5	3
841A	7.0	6.1	6.5	3	1.8	2.1	1.9	3	103.6	95.0	99.3	1	49.5	52.0	50.8	7	6.8	8.2	7.5	3
841B	7.2	5.8	6.5	3	1.8	1.9	1.9	3	113.4	92.5	102.9	3	49.0	52.0	50.5	7	7.7	8.7	8.2	5
842A	5.7	5.7	5.7	3	2.3	3.1	2.7	3	93.6	102.5	98.1	1	46.5	51.0	48.8	5	11.2	10.7	10.9	7
842B	6.0	5.4	5.7	3	2.3	2.8	2.6	3	99.8	94.8	97.3	1	46.5	50.5	48.5	5	11.5	10.8	11.1	7
843A	4.6	4.5	4.5	3	3.6	3.3	3.4	3	70.0	70.5	70.3	1	38.5	44.5	41.5	1	11.2	11.4	11.3	7
843B	4.9	4.5	4.7	3	3.8	3.5	3.6	5	72.8	75.3	74.0	1	39.0	45.0	42.0	1	10.9	11.5	11.2	7
863A	7.5	6.2	6.9	3	1.2	2.7	1.9	3	128.0	106.5	117.3	3	49.0	48.0	48.5	5	12.3	11.2	11.7	7
863B	7.9	6.3	7.1	3	1.6	2.6	2.1	3	126.0	105.0	115.5	3	50.0	50.0	50.0	5	11.4	10.7	11.0	7
ICMA 88004	6.5	5.3	5.9	3	2.1	4.0	3.0	3	112.8	90.0	101.4	3	49.0	45.0	47.0	5	12.2	11.3	11.7	7
ICMB 88004	6.6	5.7	6.1	3	2.6	3.3	2.9	3	117.3	91.8	104.5	3	49.0	47.5	48.3	5	10.9	11.9	11.4	7
ICMA 88006	5.7	5.7	5.7	3	2.6	4.1	3.3	3	92.0	87.5	89.8	1	46.5	51.5	49.0	5	12.7	11.0	11.8	7
ICMB 88006	5.8	5.7	5.7	3	2.4	3.1	2.8	3	87.5	87.5	87.5	1	47.0	52.0	49.5	5	12.3	11.4	11.8	7
ICMA 89111	4.9	4.5	4.7	3	4.2	4.8	4.5	5	82.8	88.8	85.8	1	45.5	42.0	43.8	3	8.6	8.9	8.7	5
ICMB 89111	5.4	5.3	5.4	3	4.2	4.1	4.2	5	82.3	87.5	84.9	1	46.0	45.0	45.5	3	8.0	7.6	7.8	5
ICMA 91222	6.4	6.6	6.5	3	3.3	3.3	3.3	3	89.8	92.8	91.3	1	47.0	50.0	48.5	5	8.6	10.7	9.6	5
ICMB 91222	6.2	6.7	6.4	3	3.2	3.1	3.1	3	88.5	93.8	91.1	1	47.5	51.5	49.5	5	9.0	9.8	9.4	5

A/B Pairs	Number of Nodes Per Plant				Number of Productive tillers				Plant Height (cm)				Time to Panicle Emergence				1000-Grain Weight			
	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*	E1	E2	Mean	Node*
ICMA 91444	5.8	7.3	6.5	3	2.4	2.8	2.6	3	84.5	101.5	93.0	1	45.0	51.5	48.3	5	10.1	11.1	10.6	7
ICMB 91444	6.3	7.4	6.8	3	2.7	2.4	2.6	3	86.3	100.0	93.1	1	45.5	53.5	49.5	5	10.8	11.2	11.0	7
ICMA 91666	6.5	5.4	5.9	3	3.6	2.1	2.9	3	79.6	85.5	82.6	1	49.5	51.5	50.5	7	10.2	10.3	10.2	7
ICMB 91666	6.4	5.8	6.1	3	2.6	2.2	2.4	3	77.2	76.0	76.6	1	51.5	53.5	52.5	7	9.3	10.0	9.6	5
ICMA 91777	7.3	5.4	6.3	3	2.9	2.8	2.8	3	95.3	103.3	99.3	1	51.5	51.0	51.3	7	10.6	11.0	10.8	7
ICMB 91777	7.1	5.4	6.2	3	2.6	2.9	2.8	3	84.0	101.3	92.6	1	53.0	50.0	51.5	7	8.9	10.1	9.5	5
ICMA 92111	6.5	5.9	6.2	3	4.7	4.1	4.4	5	90.3	97.0	93.6	1	48.0	53.0	50.5	7	8.5	9.1	8.8	5
ICMB 92111	6.5	5.7	6.1	3	3.8	5.4	4.6	5	86.5	91.8	89.1	1	49.0	55.0	52.0	7	8.2	8.3	8.3	5
ICMA 92333	6.0	5.3	5.6	3	3.3	5.0	4.1	5	89.3	80.8	85.0	1	47.5	51.0	49.3	5	9.4	9.6	9.5	5
ICMB 92333	6.3	5.4	5.8	3	4.2	4.2	4.2	5	90.3	80.8	85.5	1	47.5	51.0	49.3	5	9.8	10.8	10.3	7
ICMA 92444	6.0	6.6	6.3	3	3.5	3.6	3.6	3	111.0	106.5	108.8	3	45.0	51.5	48.3	5	7.7	9.3	8.5	5
ICMB 92444	6.3	6.4	6.4	3	2.6	2.6	2.6	3	112.8	103.8	108.3	3	46.0	53.5	49.8	5	8.0	8.5	8.2	5
ICMA 92666	5.5	5.0	5.3	3	3.1	4.6	3.9	5	117.5	105.8	111.6	3	44.5	50.0	47.3	5	11.1	11.1	11.1	7
ICMB 92666	5.5	5.1	5.3	3	2.9	3.2	3.0	3	110.8	105.8	108.3	3	45.5	49.0	47.3	5	11.6	10.9	11.2	7
ICMA 92777	7.1	6.8	6.9	3	3.4	4.3	3.8	5	129.5	116.8	123.1	3	45.0	50.5	47.8	5	11.6	12.4	12.0	7
ICMB 92777	7.0	6.8	6.9	3	3.0	3.4	3.2	3	126.3	113.3	119.8	3	46.0	52.0	49.0	5	11.3	11.1	11.2	7
ICMA 92888	5.8	4.4	5.1	3	1.3	2.8	2.0	3	91.3	82.8	87.0	1	49.0	45.5	47.3	5	11.2	13.3	12.3	7
ICMB 92888	5.6	4.8	5.2	3	1.5	2.4	1.9	3	85.3	85.8	85.5	1	49.5	47.5	48.5	5	10.8	11.9	11.3	7
ICMA 93111	5.9	5.7	5.8	3	1.5	2.7	2.1	3	77.8	84.5	81.1	1	50.5	53.5	52.0	7	12.4	12.4	12.4	7
ICMB 93111	6.4	5.4	5.9	3	1.5	2.3	1.9	3	73.8	81.5	77.6	1	51.0	54.0	52.5	7	10.8	11.7	11.3	7

A/B Pairs	Number of nodes per Plant				Number of productive tillers				Plant height (cm)				Days to 50% flower				1000-grain weight (g)			
	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node
ICMA 93222	7.3	6.8	7.1	3	2.7	2.7	2.7	3	114.8	108.8	111.8	3	50.5	53.5	52.0	7	11.7	12.2	12.0	7
ICMB 93222	7.6	6.6	7.1	3	2.6	2.5	2.5	3	112.0	106.5	109.3	3	51.5	54.0	52.8	7	11.2	11.9	11.5	7
ICMA 93333	7.7	7.2	7.4	3	2.1	2.7	2.4	3	145.3	135.8	140.5	3	49.5	56.0	52.8	7	8.5	8.6	8.5	5
ICMB 93333	7.7	7.2	7.4	3	1.6	1.9	1.8	3	139.8	132.0	135.9	3	50.5	57.5	54.0	7	8.3	8.5	8.4	5
ICMA 94111	7.6	5.8	6.7	3	2.8	3.6	3.2	3	132.5	107.0	119.8	3	49.0	50.0	49.5	5	8.0	11.2	9.6	5
ICMB 94111	7.3	5.7	6.5	3	3.1	3.1	3.1	3	126.5	104.3	115.4	3	49.5	48.5	49.0	5	9.6	10.0	9.8	5
ICMA 94222	5.0	4.3	4.6	3	3.6	3.1	3.3	3	75.3	77.3	76.3	1	41.5	41.5	41.5	1	7.6	10.3	8.9	5
ICMB 94222	5.2	4.3	4.7	3	3.0	2.9	2.9	3	76.8	78.8	77.8	1	41.5	40.0	40.8	1	7.6	9.6	8.6	5
ICMA 94333	5.4	4.8	5.1	3	4.1	4.7	4.4	5	104.5	86.2	95.4	1	40.5	42.0	41.3	1	7.9	10.8	9.4	5
ICMB 94333	6.5	5.8	6.1	3	4.0	3.8	3.9	5	112.8	102.5	107.6	3	41.5	46.5	44.0	3	10.2	10.0	10.1	7
ICMA 94444	6.4	5.9	6.1	3	3.3	3.0	3.1	3	117.5	103.5	110.5	3	49.5	50.0	49.8	5	10.2	10.1	10.1	7
ICMB 94444	6.3	5.9	6.1	3	2.9	2.7	2.8	3	117.8	101.3	109.5	3	48.0	51.5	49.8	5	8.2	10.8	9.5	5
ICMA 94555	5.8	4.3	5.0	3	2.1	3.3	2.7	3	72.0	71.3	71.6	1	46.5	45.0	45.8	3	10.0	11.1	10.5	7
ICMB 94555	6.6	5.2	5.9	3	1.7	3.1	2.4	3	74.5	70.5	72.5	1	46.5	46.5	46.5	5	11.1	10.4	10.8	7
ICMA 95111	4.9	4.3	4.6	3	3.1	4.3	3.7	5	68.5	69.5	69.0	1	43.5	45.5	44.5	3	9.1	10.9	10.0	5
ICMB 95111	5.0	4.1	4.6	3	2.9	3.6	3.2	3	71.3	70.8	71.0	1	44.0	45.5	44.8	3	9.7	10.2	10.0	5
ICMA 95222	6.8	5.8	6.3	3	2.8	4.0	3.4	3	126.0	112.0	119.0	3	50.5	50.0	50.3	5	7.1	10.4	8.7	5
ICMB 95222	6.6	5.9	6.2	3	3.3	3.1	3.2	3	131.5	112.5	122.0	3	50.0	51.0	50.5	7	7.8	9.1	8.5	5
ICMA 95333	6.1	5.8	6.0	3	1.2	1.9	1.5	3	84.0	92.3	88.1	1	49.5	59.5	54.5	9	9.0	11.1	10.0	5
ICMB 95333	6.1	6.2	6.1	3	1.7	1.9	1.8	3	84.8	94.5	89.6	1	49.5	58.0	53.8	7	9.6	10.4	10.0	5
ICMA 95444	4.5	4.3	4.4	3	3.3	2.4	2.8	3	79.5	80.0	79.8	1	43.0	46.0	44.5	3	8.6	12.8	10.7	7
ICMB 95444	4.4	5.2	4.8	3	2.8	2.8	2.8	3	77.2	82.5	79.9	1	43.0	46.0	44.5	3	8.4	11.0	9.7	5
ICMA 95555	5.2	3.5	4.3	3	2.5	3.1	2.8	3	67.0	61.8	64.4	1	45.0	41.0	43.0	3	9.2	10.0	9.6	5
ICMB 95555	5.4	3.7	4.5	3	2.5	2.5	2.5	3	66.5	63.3	64.9	1	45.5	39.5	42.5	3	8.3	9.2	8.8	5
ICMA 96111	5.5	6.2	5.8	3	4.0	5.6	4.8	5	88.8	87.8	88.3	1	45.5	54.0	49.8	5	10.6	11.2	10.9	7
ICMB 96111	5.6	6.4	6.0	3	3.6	3.4	3.5	5	89.3	90.5	89.9	1	46.5	54.5	50.5	7	9.6	9.9	9.8	5

A/B Pairs	Number of nodes per Plant				Number of productive tillers				Plant height (cm)				Days to 50% flower				1000-grain weight (g)			
	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node
ICMA 96222	6.7	6.4	6.5	3	2.3	2.1	2.2	3	90.0	86.0	88.0	1	51.0	54.0	52.5	7	10.1	11.2	10.6	7
ICMB 96222	6.5	6.5	6.5	3	1.7	1.9	1.8	3	95.0	88.5	91.8	1	52.0	55.5	53.8	7	10.8	11.6	11.2	7
ICMA 96333	5.3	4.9	5.1	3	3.1	3.8	3.5	5	73.0	73.0	73.0	1	44.5	49.0	46.8	5	10.7	11.6	11.1	7
ICMB 96333	5.1	4.5	4.8	3	3.4	3.3	3.4	3	73.5	74.8	74.1	1	44.5	48.5	46.5	5	9.9	10.8	10.4	7
ICMA 96444	5.3	4.7	5.0	3	3.5	2.8	3.1	3	74.3	82.3	78.3	1	44.0	48.0	46.0	3	7.0	9.5	8.2	5
ICMB 96444	5.0	4.8	4.9	3	2.9	3.1	3.0	3	73.3	85.8	79.5	1	45.0	50.5	47.8	5	7.6	9.1	8.4	5
ICMA 96555	5.4	5.6	5.5	3	1.5	1.9	1.7	3	64.8	84.8	74.8	1	50.5	51.0	50.8	7	10.0	14.5	12.2	7
ICMB 96555	5.8	6.0	5.9	3	1.6	1.6	1.6	3	72.8	75.8	74.3	1	50.0	53.0	51.5	7	10.2	14.4	12.3	7
ICMA 96666	5.5	5.0	5.2	3	3.4	4.2	3.8	3	91.0	86.5	88.8	1	43.5	46.5	45.0	3	12.7	12.6	12.6	9
ICMB 96666	5.8	5.8	5.8	3	2.8	3.2	3.0	3	86.5	93.8	90.1	1	45.0	49.0	47.0	5	12.8	12.7	12.7	9
ICMA 97111	7.0	5.9	6.4	3	2.0	3.1	2.5	3	135.8	115.0	125.4	3	47.5	49.0	48.3	5	11.1	11.8	11.5	7
ICMB 97111	6.6	6.4	6.5	3	1.8	2.2	2.0	3	134.5	120.5	127.5	3	48.5	50.5	49.5	5	11.3	11.5	11.4	7
ICMA 97222	6.1	6.3	6.2	3	2.9	4.1	3.5	5	116.8	104.3	110.5	3	41.5	50.5	46.0	3	10.8	12.3	11.5	7
ICMB 97222	6.6	6.8	6.7	3	2.8	3.3	3.0	3	116.3	108.8	112.5	3	46.0	51.5	48.8	5	11.0	11.9	11.4	7
ICMA 97333	6.5	5.3	5.9	3	3.0	3.5	3.2	3	109.0	102.8	105.9	3	47.0	46.5	46.8	5	7.9	11.0	9.4	5
ICMB 97333	6.6	6.1	6.3	3	3.0	4.0	3.5	5	109.3	105.3	107.3	3	47.0	46.5	46.8	5	8.6	10.7	9.6	5
ICMA 97444	4.9	4.3	4.6	3	1.7	3.3	2.5	3	75.0	70.3	72.6	1	44.5	44.0	44.3	3	10.5	11.5	11.0	7
ICMB 97444	5.0	4.6	4.8	3	1.8	3.2	2.5	3	72.5	73.3	72.9	1	45.0	44.5	44.8	3	11.2	11.1	11.1	7
ICMA 97555	5.1	4.6	4.8	3	1.2	2.4	1.8	3	58.0	69.8	63.9	1	47.5	46.0	46.8	5	10.0	11.7	10.8	7
ICMB 97555	5.4	5.7	5.5	3	1.3	2.7	2.0	3	62.8	74.8	68.8	1	48.5	49.0	48.8	5	10.4	11.4	10.9	7
ICMA 98111	5.1	6.2	5.6	3	2.9	3.8	3.3	3	104.5	114.8	109.6	3	44.0	51.0	47.5	5	10.1	11.4	10.7	7
ICMB 98111	5.5	6.8	6.2	3	2.2	3.0	2.6	3	112.0	123.0	117.5	3	45.5	52.5	49.0	5	10.0	11.3	10.7	7
ICMA 98222	6.2	5.1	5.7	3	1.5	1.9	1.7	3	137.3	108.0	122.6	3	43.5	44.0	43.8	3	11.1	12.0	11.5	7
ICMB 98222	6.6	5.3	5.9	3	1.5	1.7	1.6	3	135.3	103.0	119.1	3	46.5	46.5	46.5	5	11.1	10.8	11.0	7
ICMA 98333	5.6	4.8	5.2	3	2.2	3.4	2.8	3	113.0	95.3	104.1	3	41.5	43.0	42.3	1	12.7	11.1	11.9	7
ICMB 98333	5.7	4.9	5.3	3	2.1	3.1	2.6	3	112.3	89.5	100.9	3	42.0	44.0	43.0	3	11.6	11.0	11.3	7

A/B Pairs	Number of nodes per plant				Number of productive tillers				Plant height (cm)				Days to 50% flower				1000-grain weight (g)			
	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node
ICMA 98444	5.5	4.2	4.8	3	2.3	2.3	2.3	3	78.8	83.0	80.9	1	47.5	49.0	48.3	5	7.8	11.0	9.4	5
ICMB 98444	5.8	5.5	5.6	3	1.6	2.6	2.1	3	81.8	87.0	84.4	1	48.0	50.0	49.0	5	8.5	10.5	9.5	5
ICMA 98555	6.1	5.3	5.7	3	3.0	4.9	4.0	5	106.8	87.8	97.3	1	44.5	50.5	47.5	5	11.0	11.3	11.1	7
ICMB 98555	6.2	6.1	6.1	3	3.1	4.1	3.6	3	106.5	95.5	101.0	3	44.5	51.5	48.0	5	11.9	10.7	11.3	7
ICMA 98666	6.7	6.0	6.3	3	3.0	3.4	3.2	3	93.8	86.5	90.1	1	49.0	56.0	52.5	7	7.0	6.8	6.9	3
ICMB 98666	6.6	5.9	6.2	3	3.3	3.3	3.3	3	86.5	86.0	86.3	1	50.5	62.0	56.3	9	6.3	6.7	6.5	3
ICMA 98777	7.3	4.5	5.9	3	3.8	3.3	3.5	5	131.5	101.0	116.3	3	48.5	49.0	48.8	5	8.0	8.2	8.1	5
ICMB 98777	7.1	5.9	6.5	3	3.2	2.8	3.0	3	125.0	99.5	112.3	3	49.5	51.0	50.3	5	9.1	7.7	8.4	5
ICMA 99111	6.8	5.7	6.2	3	2.1	2.0	2.0	3	128.3	114.8	121.5	3	47.5	51.0	49.3	5	12.6	13.2	12.9	9
ICMB 99111	6.8	6.0	6.4	3	1.8	1.5	1.6	3	135.3	111.8	123.5	3	47.5	53.5	50.5	7	11.5	12.9	12.2	7
ICMA 99222	6.4	5.4	5.9	3	1.4	1.4	1.4	1	126.8	114.0	120.4	3	46.5	52.0	49.3	5	8.7	12.5	10.6	7
ICMB 99222	6.5	6.0	6.3	3	1.8	1.4	1.6	3	133.8	119.5	126.6	3	47.5	54.0	50.8	7	9.5	11.7	10.6	7
ICMA 99333	5.5	5.1	5.3	3	2.4	1.9	2.2	3	87.0	93.3	90.1	1	45.0	53.0	49.0	5	10.9	12.4	11.6	7
ICMB 99333	5.1	5.6	5.3	3	3.0	2.0	2.5	3	87.8	87.8	87.8	1	45.0	52.0	48.5	5	10.5	12.1	11.3	7
ICMA 99444	5.6	5.7	5.6	3	2.2	2.7	2.5	3	85.0	90.8	87.9	1	45.5	52.0	48.8	5	9.8	11.8	10.8	7
ICMB 99444	6.0	5.9	5.9	3	2.4	2.9	2.7	3	87.0	89.0	88.0	1	47.0	53.0	50.0	5	10.5	11.6	11.1	7
ICMA 99555	6.2	4.4	5.3	3	1.7	1.9	1.8	3	77.3	90.0	83.6	1	48.5	48.5	48.5	5	10.2	11.0	10.6	7
ICMB 99555	6.3	5.3	5.8	3	1.9	1.8	1.8	3	75.8	91.3	83.5	1	49.5	50.0	49.8	5	10.8	11.8	11.3	7
ICMA 99666	6.6	5.4	6.0	3	1.2	2.4	1.8	3	82.8	92.3	87.5	1	49.5	51.5	50.5	7	7.8	10.7	9.2	5
ICMB 99666	7.0	5.8	6.4	3	1.4	2.7	2.0	3	89.3	96.8	93.0	1	50.0	52.0	51.0	7	8.7	10.3	9.5	5
ICMA 00111	6.2	5.2	5.7	3	2.4	2.6	2.5	3	113.5	94.3	103.9	3	42.5	48.0	45.3	3	12.1	11.4	11.7	7
ICMB 00111	6.1	6.0	6.0	3	1.8	2.0	1.9	3	117.8	99.0	108.4	3	44.0	49.0	46.5	5	11.1	10.5	10.8	7
ICMA 00222	5.6	5.9	5.7	3	4.2	4.4	4.3	5	103.3	100.5	101.9	3	44.0	51.5	47.8	5	10.4	11.1	10.7	7
ICMB 00222	5.6	5.8	5.7	3	3.5	4.4	3.9	5	99.8	99.8	99.8	1	44.5	51.5	48.0	5	10.8	10.4	10.6	7

A/B Pairs	Number of nodes per plant				Number of productive tillers				Plant height (cm)				Days to 50% flower				1000-grain weight (g)			
	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node
ICMA 00333	5.2	4.0	4.6	3	2.1	2.9	2.5	3	65.3	70.3	67.8	1	47.5	44.0	45.8	3	8.4	12.1	10.3	7
ICMB 00333	5.5	4.1	4.8	3	2.4	2.8	2.6	3	72.0	71.3	71.6	1	47.5	45.5	46.5	5	9.7	11.3	10.5	7
ICMA 00444	6.4	5.2	5.8	3	3.3	3.3	3.3	3	114.0	95.8	104.9	3	45.5	48.0	46.8	5	12.5	12.1	12.3	7
ICMB 00444	6.3	6.0	6.1	3	2.3	2.9	2.6	3	113.5	95.3	104.4	3	46.0	49.5	47.8	5	12.1	13.3	12.7	9
ICMA 00555	6.9	5.5	6.2	3	1.8	1.4	1.6	3	91.5	94.0	92.8	1	52.0	53.5	52.8	7	9.6	11.2	10.4	7
ICMB 00555	7.1	5.9	6.5	3	1.6	1.6	1.6	3	87.8	97.5	92.6	1	53.0	56.0	54.5	9	9.7	10.3	10.0	5
ICMA 00666	6.6	5.8	6.2	3	3.1	3.2	3.1	3	123.3	102.5	112.9	3	48.5	48.5	48.5	5	7.4	8.5	7.9	5
ICMB 00666	6.7	5.2	5.9	3	3.2	2.9	3.0	3	121.8	104.0	112.9	3	48.5	48.5	48.5	5	7.1	8.5	7.8	5
ICMA 00777	5.7	4.6	5.1	3	2.9	3.1	3.0	3	119.8	96.5	108.1	3	42.5	43.0	42.8	3	9.3	9.3	9.3	5
ICMB 00777	5.9	5.7	5.8	3	2.8	3.2	3.0	3	122.3	105.0	113.6	3	43.5	47.5	45.5	3	9.6	9.2	9.4	5
ICMA 00888	5.7	5.7	5.7	3	2.1	2.7	2.4	3	131.5	118.0	124.8	3	42.5	47.0	44.8	3	12.2	12.5	12.4	7
ICMB 00888	6.0	6.5	6.3	3	1.7	1.9	1.8	3	133.0	122.3	127.6	3	44.5	49.0	46.8	5	13.3	11.7	12.5	7
ICMA 00999	5.9	4.7	5.3	3	3.6	3.8	3.7	5	129.3	120.3	124.8	3	48.5	50.0	49.3	5	9.8	9.5	9.6	5
ICMB 00999	5.8	5.3	5.5	3	3.5	2.9	3.2	3	120.8	118.3	119.5	3	49.5	51.0	50.3	5	8.6	8.8	8.7	5
ICMA 01111	5.3	4.4	4.8	3	3.3	2.7	3.0	3	84.5	93.0	88.8	1	46.0	50.0	48.0	5	7.4	8.5	8.0	5
ICMB 01111	5.7	4.5	5.1	3	3.4	3.2	3.3	3	86.3	95.5	90.9	1	45.5	51.0	48.3	5	6.9	8.4	7.7	5
ICMA 01222	6.0	5.1	5.6	3	1.5	1.5	1.5	1	88.8	102.0	95.4	1	49.0	51.5	50.3	5	8.9	10.1	9.5	5
ICMB 01222	6.0	5.7	5.8	3	1.3	1.9	1.6	3	91.3	102.3	96.8	1	48.0	55.0	51.5	7	8.7	9.5	9.1	5
ICMA 01333	7.7	5.2	6.4	3	1.1	1.4	1.2	1	90.3	95.3	92.8	1	54.0	56.0	55.0	9	10.1	9.3	9.7	5
ICMB 01333	8.0	5.7	6.8	3	1.2	1.4	1.3	1	90.3	94.3	92.3	1	55.0	59.0	57.0	9	8.7	9.5	9.1	5
ICMA 01444	5.7	4.9	5.3	3	2.3	1.5	1.9	3	67.0	80.8	73.9	1	49.0	51.5	50.3	5	10.8	10.1	10.4	7
ICMB 01444	5.4	4.6	5.0	3	1.8	1.7	1.7	3	58.3	71.0	64.6	1	50.5	53.0	51.8	7	10.1	10.2	10.2	7
ICMA 01555	5.9	4.5	5.2	3	2.8	2.9	2.8	3	78.0	82.0	80.0	1	49.5	49.5	49.5	5	9.4	11.1	10.3	7
ICMB 01555	5.5	4.7	5.1	3	3.0	2.9	2.9	3	74.8	83.8	79.3	1	49.0	49.5	49.3	5	9.7	10.1	9.9	5
ICMA 01666	5.9	5.7	5.8	3	2.4	2.5	2.5	3	115.0	108.0	111.5	3	47.0	53.0	50.0	5	10.3	12.3	11.3	7
ICMB 01666	5.7	5.8	5.7	3	2.8	2.3	2.5	3	112.8	104.5	108.6	3	48.5	56.0	52.3	7	9.7	11.3	10.5	7

A/B Pairs	Number of nodes per plant				Number of productive tillers				Plant height (cm)				Days to 50% flower				1000-grain weight (g)			
	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node
ICMA 01777	6.2	5.1	5.7	3	1.7	1.5	1.6	3	136.0	113.5	124.8	3	48.5	51.5	50.0	5	10.1	12.1	11.1	7
ICMB 01777	6.2	5.3	5.7	3	1.8	1.5	1.6	3	129.0	114.8	121.9	3	49.0	51.0	50.0	5	9.7	11.6	10.7	7
ICMA 01888	5.9	5.7	5.8	3	1.6	2.0	1.8	3	94.6	103.0	98.8	1	50.5	59.0	54.8	9	11.0	10.5	10.8	7
ICMB 01888	6.3	5.9	6.1	3	1.7	1.6	1.6	3	95.0	107.5	101.3	3	51.0	59.0	55.0	9	8.7	10.5	9.6	5
ICMA 02111	6.6	5.9	6.2	3	2.4	4.0	3.2	5	116.5	107.5	112.0	3	44.5	49.0	46.8	5	13.7	13.7	13.7	9
ICMB 02111	6.6	6.4	6.5	3	3.1	3.1	3.1	3	128.5	121.3	124.9	3	45.5	50.5	48.0	5	12.4	13.1	12.7	9
ICMA 02222	6.0	5.0	5.5	3	5.3	5.4	5.3	5	97.3	83.0	90.1	1	45.0	44.0	44.5	3	10.1	10.0	10.0	5
ICMB 02222	6.1	5.4	5.8	3	6.2	6.2	6.2	5	97.8	83.5	90.6	1	46.5	47.0	46.8	5	9.2	11.5	10.3	7
ICMA 02333	6.3	5.2	5.7	3	1.8	1.9	1.8	3	119.0	94.0	106.5	3	46.5	46.5	46.5	5	7.2	9.2	8.2	5
ICMB 02333	6.9	5.3	6.1	3	1.2	1.9	1.5	1	124.5	97.8	111.1	3	47.0	47.5	47.3	5	8.0	8.7	8.3	5
ICMA 02444	6.4	5.3	5.9	3	1.4	2.7	2.0	3	119.8	97.5	108.6	3	48.5	51.5	50.0	5	10.3	10.1	10.2	7
ICMB 02444	6.6	6.0	6.3	3	1.5	1.9	1.7	3	117.8	101.3	109.5	3	49.0	52.0	50.5	7	9.2	9.9	9.6	5
ICMA 02555	6.8	6.7	6.7	3	1.9	1.6	1.7	3	118.0	113.0	115.5	3	49.0	53.0	51.0	7	9.2	9.2	9.2	5
ICMB 02555	6.9	7.2	7.0	3	2.3	1.5	1.9	3	117.8	117.0	117.4	3	49.5	52.5	51.0	7	9.5	9.0	9.2	5
ICMA 02666	6.3	5.6	5.9	3	2.8	3.7	3.3	3	82.8	79.8	81.3	1	48.0	59.0	53.5	7	9.0	7.7	8.4	5
ICMB 02666	6.5	5.5	6.0	3	3.2	2.5	2.8	3	78.5	79.0	78.8	1	50.0	59.0	54.5	9	7.7	8.0	7.8	5
ICMA 02777	7.2	6.0	6.6	3	1.5	1.7	1.6	3	86.8	104.0	95.4	1	57.5	56.0	56.8	9	8.5	10.9	9.7	5
ICMB 02777	8.2	6.1	7.1	3	1.5	2.0	1.8	3	112.3	108.5	110.4	3	60.5	60.0	60.3	9	8.6	11.0	9.8	5
ICMA 02888	6.6	5.6	6.1	3	1.6	2.3	2.0	3	88.0	110.5	99.3	1	52.0	57.0	54.5	9	10.0	9.2	9.6	5
ICMB 02888	6.2	5.7	5.9	3	1.6	2.4	2.0	3	93.5	109.5	101.5	3	53.0	56.0	54.5	9	9.2	9.0	9.1	5
ICMA 02999	6.1	4.6	5.3	3	2.7	2.9	2.8	3	65.5	64.5	65.0	1	46.5	50.5	48.5	5	7.1	10.2	8.6	5
ICMB 02999	6.4	5.1	5.7	3	2.3	2.9	2.6	3	59.3	63.6	61.5	1	48.5	49.5	49.0	5	7.9	9.5	8.7	5
ICMA 03111	5.5	3.7	4.6	3	2.5	3.3	2.9	3	71.3	66.0	68.6	1	42.5	40.5	41.5	1	9.8	10.3	10.0	5
ICMB 03111	5.8	5.0	5.4	3	1.9	3.5	2.7	3	74.0	75.3	74.6	1	44.5	43.0	43.8	3	10.0	10.3	10.1	7
ICMA 03222	7.2	6.2	6.7	3	3.6	4.2	3.9	5	137.5	121.0	129.3	3	49.0	51.0	50.0	5	7.2	8.7	7.9	5
ICMB 03222	7.0	6.7	6.8	3	3.5	3.9	3.7	5	141.5	128.0	134.8	3	50.0	52.0	51.0	7	7.7	7.5	7.6	5

A/B Pairs	Number of nodes per plant				Number of productive tillers				Plant height (cm)				Days to 50% flower				1000-grain weight			
	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node
ICMA 03333	6.5	5.5	6.0	3	3.6	4.9	4.3	5	102.0	88.5	95.3	1	47.0	48.0	47.5	5	10.5	13.0	11.7	7
ICMB 03333	6.3	5.8	6.1	3	4.1	4.0	4.1	5	101.3	94.3	97.8	1	47.5	49.5	48.5	5	9.6	11.9	10.7	7
ICMA 03444	5.8	4.3	5.0	3	1.2	2.2	1.7	3	72.0	82.5	77.3	1	50.5	48.0	49.3	5	8.2	9.2	8.7	5
ICMB 03444	5.7	4.4	5.0	3	1.1	1.8	1.5	1	72.8	88.3	80.5	1	51.0	49.5	50.3	5	8.4	9.4	8.9	5
ICMA 03555	5.3	4.7	5.0	3	2.4	1.9	2.1	3	58.0	73.0	65.5	1	48.5	50.0	49.3	5	8.5	10.9	9.7	5
ICMB 03555	5.5	5.2	5.4	3	2.0	1.9	1.9	3	65.8	69.0	67.4	1	48.0	51.5	49.8	5	8.8	9.8	9.3	5
ICMA 03666	5.6	4.9	5.3	3	3.5	3.3	3.4	3	73.0	77.5	75.3	1	47.5	50.0	48.8	5	12.2	11.7	11.9	7
ICMB 03666	5.4	5.5	5.4	3	2.8	2.7	2.7	3	74.5	79.5	77.0	1	47.0	52.0	49.5	5	10.8	11.2	11.0	7
ICMA 03777	5.2	4.4	4.8	3	3.4	3.9	3.6	5	89.5	91.5	90.5	1	43.0	48.0	45.5	3	8.2	11.6	9.9	5
ICMB 03777	5.1	5.5	5.3	3	2.7	3.9	3.3	3	90.3	95.5	92.9	1	44.5	50.0	47.3	5	10.3	11.1	10.7	7
ICMA 03888	6.4	6.1	6.2	3	2.5	3.0	2.8	3	132.0	105.5	118.8	3	44.5	45.5	45.0	3	12.7	12.6	12.6	9
ICMB 03888	6.6	6.0	6.3	3	3.1	3.1	3.1	3	125.6	109.0	117.3	3	46.0	47.5	46.8	5	11.2	12.3	11.7	7
ICMA 03999	5.5	5.5	5.5	3	3.4	3.8	3.6	5	105.0	87.0	96.0	1	40.0	41.0	40.5	1	9.4	9.2	9.3	5
ICMB 03999	5.4	5.2	5.3	3	2.5	4.3	3.4	3	105.3	85.5	95.4	1	41.0	42.5	41.8	1	10.7	8.9	9.8	5
ICMA 04111	6.8	6.3	6.5	3	1.3	1.6	1.4	1	94.5	110.0	102.3	1	52.0	57.5	54.8	9	8.6	9.7	9.2	5
ICMB 04111	6.4	6.7	6.6	3	1.2	1.6	1.4	1	87.8	114.5	101.2	3	54.0	57.5	55.8	9	8.2	8.4	8.3	5
ICMA 04222	5.8	4.9	5.3	3	2.1	2.9	2.5	3	109.5	85.0	97.3	1	42.5	43.0	42.8	3	10.8	10.6	10.7	7
ICMB 04222	5.9	5.9	5.9	3	1.8	2.9	2.3	3	107.8	87.5	97.7	1	44.0	42.5	43.3	3	11.7	10.8	11.2	7
ICMA 04333	6.8	7.0	6.9	3	2.9	2.8	2.9	3	77.0	78.5	77.8	1	49.5	61.0	55.3	9	7.6	10.1	8.8	5
ICMB 04333	7.4	7.1	7.2	3	2.3	2.7	2.5	3	81.0	82.0	81.5	1	50.5	62.0	56.3	9	9.0	10.2	9.6	5
ICMA 04444	7.2	7.2	7.2	3	2.0	3.9	2.9	3	135.0	122.0	128.5	3	47.0	51.0	49.0	5	12.9	12.1	12.5	7
ICMB 04444	7.2	7.2	7.2	3	2.4	2.7	2.5	3	124.8	121.0	122.9	3	48.5	52.0	50.3	5	12.4	11.3	11.8	7
ICMA 04555	6.8	6.7	6.7	3	2.9	3.8	3.3	3	110.5	109.0	109.8	3	49.0	52.5	50.8	7	11.3	12.0	11.6	7
ICMB 04555	6.6	6.3	6.4	3	3.3	3.2	3.2	3	101.0	105.0	103.0	3	49.0	52.5	50.8	7	9.6	11.5	10.5	7

A/B Pairs	Number of nodes per plant				Number of productive tillers				Plant height (cm)				Days to 50% flower				1000-grain weight			
	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node	E1	E2	Mean	Node
ICMA 04666	4.9	4.9	4.9	3	2.6	3.5	3.0	3	77.3	86.0	81.6	1	45.0	50.0	47.5	5	7.4	8.4	7.9	5
ICMB 04666	5.1	5.3	5.2	3	3.1	3.5	3.3	3	79.0	91.0	85.0	1	45.5	51.0	48.3	5	9.5	8.4	8.9	5
ICMA 04777	7.4	6.4	6.9	3	1.5	1.2	1.3	1	72.5	93.0	82.8	1	54.0	58.0	56.0	9	8.2	8.7	8.4	5
ICMB 04777	7.2	6.8	7.0	3	1.1	1.2	1.1	1	74.8	96.0	85.4	1	56.5	59.0	57.8	9	7.5	7.9	7.7	5
ICMA 04888	6.4	5.9	6.1	3	1.7	2.5	2.1	3	63.0	69.8	66.4	1	46.5	45.5	46.0	3	11.2	12.3	11.8	7
ICMB 04888	6.5	6.3	6.4	3	1.8	2.4	2.1	3	64.5	74.3	69.4	1	47.0	48.0	47.5	5	11.9	12.7	12.3	7
ICMA 04999	6.8	5.1	5.9	3	2.0	3.1	2.5	3	83.5	87.5	85.5	1	50.0	49.5	49.8	5	8.2	9.0	8.6	5
ICMB 04999	6.4	5.0	5.7	3	1.7	2.5	2.1	3	82.5	84.3	83.4	1	50.0	50.5	50.3	5	7.8	8.2	8.0	5
Mean (A-lines)	6.1	5.4	5.7		2.5	2.9	2.7		97.3	93.6	95.5		47.0	49.8	48.4		9.8	10.7	10.2	
Mean (B-lines)	6.2	5.7	5.9		2.5	2.7	2.6		97.4	94.8	96.1		47.8	51.0	49.4		9.7	10.4	10.0	
Grand Mean	6.1	5.5	5.8		2.5	2.8	2.7		97.4	94.2	95.8		47.4	50.4	48.9		9.7	10.5	10.1	
S.E.(±)	0.7	0.4			0.4	0.3			3.8	4.2			1.0	1.2			1.3	0.5		

E1: Mean data of 2005 rainy season
E2: Mean data of 2005 post-rainy season

Annexure III Contd.

A/B Pairs	Seedling: anthocyanin coloration of first leaf			Panicle anther color			Panicle: anthocyanin pigmentation of glume			Panicle exsertion			Panicle density		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
81A	9[a]	9[a]	9[a]	1	1	1	1	1	1	2[a]	2[a]	2[a]	7	7	7
81B	9[a]	9[a]	9[a]	1	1	1	1	1	1	2[a]	2[a]	2[a]	7	7	7
841A	1	1	1	1	1	1	1	1	1	1	1	1	7	7	7
841B	1	1	1	1	1	1	1	1	1	1	1	1	7	7	7
842A	9	9	9	2	2	2	1	1	1	2	2	2	5	7	5-7
842B	9	9	9	2	2	2	1	1	1	2	2	2	5	7	5-7
843A	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	3	5	3-5
843B	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	3	5	3-5
863A	1	1	1	3	3	3	1	1	1	1	2	1-2	5	5	5
863B	1	1	1	3	3	3	1	1	1	1	2	1-2	5	5	5
ICMA 88004	1[a]	9[a]	1-9	1	1	1	1	1	1	2	2	2	5	5	5
ICMB 88004	1[a]	9[a]	1-9	1	1	1	1	1	1	2	2	2	5	5	5
ICMA 88006	9	9	9	2	2	2	1	1	1	2	2	2	7	5	5-7
ICMB 88006	9	9	9	2	2	2	1	1	1	2	2	2	7	5	5-7
ICMA 89111	9	9	9	1	1	1	1	1	1	2	2	2	5	5	5
ICMB 89111	9	9	9	1	1	1	1	1	1	2	2	2	5	5	5
ICMA 91222	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMB 91222	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMA 91444	9[a]	9[a]	9[a]	2	2	2	1	1	1	1[a]	2[a]	1-2	7	5	5-7
ICMB 91444	9[a]	9[a]	9[a]	2	2	2	1	1	1	1[a]	2[a]	1-2	7	5	5-7
ICMA 91666	9[a]	9[a]	9[a]	1	1	1	1	1	1	2	2	2	5	5	5
ICMB 91666	9[a]	9[a]	9[a]	1	1	1	1	1	1	2	2	2	5	5	5
ICMA 91777	1[a]	9[a]	1-9	1	1	1	1	1	1	2	2	2	5	5	5
ICMB 91777	1[a]	9[a]	1-9	1	1	1	1	1	1	2	2	2	5	5	5
ICMA 92111	1[a]	9[a]	1-9	2	2	2	1	1	1	2	2	2	5	5	5
ICMB 92111	1[a]	9[a]	1-9	2	2	2	1	1	1	2	2	2	5	5	5
ICMA 92333	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMB 92333	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMA 92444	1[a]	9[a]	1-9	1	1	1	1	1	1	2	2	2	3[a]	3[a]	3[a]
ICMB 92444	1[a]	9[a]	1-9	1	1	1	1	1	1	2	2	2	3[a]	3[a]	3[a]
ICMA 92666	1[a]	9[a]	1-9	1	1	1	1	1	1	2	2	2	5	5	5
ICMB 92666	1	1	1	1	1	1	1	1	1	2	2	2	5	5	5
ICMA 92777	9[a]	9[a]	9[a]	2	2	2	1	1	1	1	2	1-2	5[a]	5[a]	5[a]
ICMB 92777	9[a]	9[a]	9[a]	2	2	2	1	1	1	1	2	1-2	5[a]	5[a]	5[a]
ICMA 92888	1[a]	9[a]	1-9	2	2	2	1	1	1	1[a]	2[a]	1-2	7	5	5-7
ICMB 92888	9[a]	9[a]	9[a]	2	2	2	1	1	1	1[a]	2[a]	1-2	7	5	5-7
ICMA 93111	9	9	9	1	1	1	1	1	1	2	2	2	5	5	5
ICMB 93111	9	9	9	1	1	1	1	1	1	2	2	2	5	5	5

A/B Pairs	Seedling: anthocyanin coloration of first leaf			Panicle anther color			Panicle: anthocyanin pigmentation of glume			Panicle exsertion			Panicle density		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
ICMA 93222	9[a]	1[a]	1-9	1	1	1	1	1	1	2	2	2	5	7	5-7
ICMB 93222	9[a]	9[a]	9[a]	1	1	1	1	1	1	2	2	2	5	7	5-7
ICMA 93333	9	9	9	1	1	1	1	1	1	1[a]	2[a]	1-2	7	7	7
ICMB 93333	9	9	9	1	1	1	1	1	1	1[a]	2[a]	1-2	7	7	7
ICMA 94111	9	9	9	1	1	1	1	1	1	2	2	2	5	5	5
ICMB 94111	9	9	9	1	1	1	1	1	1	2	2	2	5	5	5
ICMA 94222	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	5	5	5
ICMB 94222	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	5	5	5
ICMA 94333	1[a]	1[a]	1[a]	2	2	2	1	1	1	2	2	2	7	5	5-7
ICMB 94333	1[a]	1[a]	1[a]	2	2	2	1	1	1	2	2	2	7	5	5-7
ICMA 94444	9[a]	9[a]	9[a]	1	1	1	1	1	1	2	2	2	7[a]	5[a]	5-7
ICMB 94444	1[a]	1[a]	1[a]	1	1	1	1	1	1	2	2	2	7[a]	5[a]	5-7
ICMA 94555	9	9	9	1	1	1	1	1	1	2	2	2	7	7	7
ICMB 94555	9	9	9	1	1	1	1	1	1	2	2	2	7	7	7
ICMA 95111	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMB 95111	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMA 95222	9[a]	9[a]	9[a]	2	2	2	1	1	1	2[a]	2[a]	2[a]	5[a]	5[a]	5[a]
ICMB 95222	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	5[a]	5[a]	5[a]
ICMA 95333	9[a]	9[a]	9[a]	1	1	1	1	1	1	2	2	2	5[a]	3[a]	3-5
ICMB 95333	9[a]	9[a]	9[a]	1	1	1	1	1	1	2	2	2	5[a]	3[a]	3-5
ICMA 95444	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	7	5	5-7
ICMB 95444	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	7	5	5-7
ICMA 95555	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	5	5	5
ICMB 95555	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	5	5	5
ICMA 96111	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMB 96111	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	5	5	5
ICMA 96222	9[a]	9[a]	9[a]	1	1	1	1	1	1	2	2	2	7	5	5-7
ICMB 96222	9[a]	9[a]	9[a]	1	1	1	1	1	1	2	2	2	7	5	5-7
ICMA 96333	9[a]	9[a]	9[a]	2	2	2	1	1	1	1[a]	2[a]	1-2	5	5	5
ICMB 96333	9[a]	9[a]	9[a]	2	2	2	1	1	1	1[a]	2[a]	1-2	5	5	5
ICMA 96444	9	9	9	2	2	2	1	1	1	2	2	2	7[a]	5[a]	5-7
ICMB 96444	9	9	9	2	2	2	1	1	1	2	2	2	7[a]	5[a]	5-7
ICMA 96555	9	9	9	2	2	2	1	1	1	1[a]	2[a]	1-2	5	5	5
ICMB 96555	9	9	9	2	2	2	1	1	1	1[a]	2[a]	1-2	5	5	5
ICMA 96666	9	9	9	1	1	1	1	1	1	2	2	2	5	5	5
ICMB 96666	9	9	9	1	1	1	1	1	1	2	2	2	5	5	5
ICMA 97111	9	9	9	2	2	2	1	1	1	2	2	2	5[a]	7[a]	5-7
ICMB 97111	9	9	9	2	2	2	1	1	1	2	2	2	5[a]	7[a]	5-7
ICMA 97222	9	9	9	2	2	2	1	1	1	1[a]	1[a]	1[a]	5	5	5

A/B Pairs	Seedling: anthocyanin coloration of first leaf			Panicle anther color			Panicle: anthocyanin pigmentation of glume			Panicle exsertion			Panicle density		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
ICMB 97222	9	9	9	2	2	2	1	1	1	1[a]	1[a]	1[a]	5	5	5
ICMA 97333	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMB 97333	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMA 97444	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMB 97444	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMA 97555	9	9	9	2	2	2	1	1	1	2[a]	2[a]	2[a]	5	5	5
ICMB 97555	9	9	9	2	2	2	1	1	1	2[a]	2[a]	2[a]	5	5	5
ICMA 98111	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	5[a]	5[a]	5[a]
ICMB 98111	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	5[a]	5[a]	5[a]
ICMA 98222	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	5[a]	5[a]	5[a]
ICMB 98222	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	5[a]	5[a]	5[a]
ICMA 98333	9	9	9	2	2	2	1	1	1	2	2	2	3[a]	5[a]	3-5
ICMB 98333	9	9	9	2	2	2	1	1	1	2	2	2	3	5	3-5
ICMA 98444	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMB 98444	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMA 98555	9	9	9	1	1	1	1	1	1	1[a]	1[a]	1[a]	5[a]	5[a]	5[a]
ICMB 98555	9	9	9	1	1	1	1	1	1	1[a]	1[a]	1[a]	5[a]	5[a]	5[a]
ICMA 98666	1	1	1	1	1	1	1	1	1	2	2	2	5[a]	5[a]	5[a]
ICMB 98666	1	1	1	1	1	1	1	1	1	2	2	2	5[a]	5[a]	5[a]
ICMA 98777	1[a]	1[a]	1[a]	2	2	2	1	1	1	2	2	2	7	7	7
ICMB 98777	1[a]	1[a]	1[a]	2	2	2	1	1	1	2	2	2	7	7	7
ICMA 99111	9	9	9	2	2	2	9	9	9	1[a]	1[a]	1[a]	5	5	5
ICMB 99111	9	9	9	2	2	2	9	9	9	1[a]	1[a]	1[a]	5	5	5
ICMA 99222	9[a]	9[a]	9[a]	2	2	2	9	9	9	2	2	2	5	5	5
ICMB 99222	9[a]	9[a]	9[a]	2	2	2	9	9	9	2	2	2	5	5	5
ICMA 99333	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMB 99333	9	1[a]	1-9	2	2	2	1	1	1	2	2	2	5	5	5
ICMA 99444	9[a]	9[a]	9[a]	2	2	2	1	1	1	1[a]	2[a]	1-2	7	7	7
ICMB 99444	9[a]	9[a]	9[a]	2	2	2	1	1	1	1[a]	2[a]	1-2	7	7	7
ICMA 99555	9	9	9	1	1	1	1	1	1	2	2	2	3	5	3-5
ICMB 99555	9	9	9	1	1	1	1	1	1	2	2	2	3	5	3-5
ICMA 99666	9	9	9	1	1	1	1	1	1	2	2	2	5	5	5
ICMB 99666	9	9	9	1	1	1	1	1	1	2	2	2	5	5	5
ICMA 00111	9[a]	9[a]	9[a]	2	2	2	9	9	9	2	2	2	5	5	5
ICMB 00111	9[a]	9[a]	9[a]	2	2	2	9	9	9	2	2	2	5	5	5
ICMA 00222	9	9	9	2	2	2	1	1	1	1[a]	2[a]	1-2	7	5	5-7
ICMB 00222	9	9	9	2	2	2	1	1	1	1[a]	2[a]	1-2	7	5	5-7
ICMA 00333	9	9	9	1	1	1	1	1	1	2	1	1-2	5	5	5

A/B Pairs	Seedling: anthocyanin coloration of first leaf			Panicle anther color			Panicle: anthocyanin pigmentation of glume			Panicle exsertion			Panicle density		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
ICMB 00333	9	9	9	1	1	1	1	1	1	2	1	1-2	5	5	5
ICMA 00444	9[a]	1[a]	1-9	2	2	2	1	1	1	1[a]	1[a]	1[a]	5	5	5
ICMB 00444	9[a]	1[a]	1-9	2	2	2	1	1	1	1[a]	1[a]	1[a]	5	5	5
ICMA 00555	1	1	1	1	1	1	9	9	9	1[a]	1[a]	1[a]	3	5	3-5
ICMB 00555	1	1	1	1	1	1	9	9	9	1[a]	1[a]	1[a]	3	5	3-5
ICMA 00666	9	9	9	1	1	1	1	1	1	1[a]	1[a]	1[a]	3	5	3-5
ICMB 00666	9	9	9	1	1	1	1	1	1	1[a]	1[a]	1[a]	3	5	3-5
ICMA 00777	9	9	9	2	2	2	1	1	1	2	2	2	5	3	3-5
ICMB 00777	9	9	9	2	2	2	1	1	1	2	2	2	5	3	3-5
ICMA 00888	9	9	9	2	2	2	1	9	1-9	2	2	2	5	5	5
ICMB 00888	9	9	9	2	2	2	9	9	9	2	2	2	5	5	5
ICMA 00999	9	9	9	2	2	2	1	1	1	2[a]	2[a]	2[a]	5	5	5
ICMB 00999	9	9	9	2	2	2	1	1	1	2[a]	2[a]	2[a]	5	5	5
ICMA 01111	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMB 01111	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMA 01222	9	9	9	2	2	2	9	9	9	1[a]	2[a]	1-2	5	5	5
ICMB 01222	9	9	9	2	2	2	9	9	9	1	2	1-2	5	5	5
ICMA 01333	9	9	9	2	2	2	9	9	9	2	2	2	3	5	3-5
ICMB 01333	9	9	9	2	2	2	9	9	9	2	2	2	3	5	3-5
ICMA 01444	9	9	9	3	3	3	1	1	1	1[a]	1[a]	1[a]	1	3	1-3
ICMB 01444	9	9	9	3	3	3	1	1	1	1[a]	1[a]	1[a]	3	1	1-3
ICMA 01555	9	9	9	2	2	2	1	1	1	1[a]	2[a]	1-2	5[a]	7	5-7
ICMB 01555	9	9	9	2	2	2	1	1	1	1[a]	2[a]	1-2	5[a]	7	5-7
ICMA 01666	9	9	9	2	2	2	1	1	1	1[a]	1[a]	1[a]	5	7	5-7
ICMB 01666	9	9	9	2	2	2	1	1	1	1[a]	1[a]	1[a]	5	7	5-7
ICMA 01777	9	9	9	3	3	3	1	1	1	2	2	2	3	5	3-5
ICMB 01777	9	9	9	3	3	3	1	1	1	2	2	2	3	5	3-5
ICMA 01888	9	9	9	1	1	1	1	1	1	2[a]	2[a]	2[a]	5	5	5
ICMB 01888	9	9	9	1	1	1	1	1	1	2[a]	2[a]	2[a]	5	5	5
ICMA 02111	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMB 02111	9	9	9	2	2	2	1	1	1	2	2	2	5	5	5
ICMA 02222	9	9	9	2	2	2	1	1	1	2	2	2	3	5	3-5
ICMB 02222	9	9	9	2	2	2	1	1	1	2	2	2	3	5	3-5
ICMA 02333	9	9	9	2	2	2	1	1	1	1	2	1-2	5[a]	5	5
ICMB 02333	9	9	9	2	2	2	1	1	1	1	2	1-2	5[a]	5	5
ICMA 02444	9	9	9	1	1	1	1	1	1	1[a]	2[a]	1-2	3	5	3-5
ICMB 02444	9	9	9	1	1	1	1	1	1	1[a]	2[a]	1-2	3	5	3-5
ICMA 02555	9	9	9	3	3	3	1	1	1	1	1	1	5	7	5-7

A/B Pairs	Seedling: anthocyanin coloration of first leaf			Panicle anther color			Panicle: anthocyanin pigmentation of glume			Panicle exsertion			Panicle density		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
ICMB 02555	9	9	9	3	3	3	1	1	1	1	1	1	5	7	5-7
ICMA 02666	9	9	9	1	1	1	1	1	1	2	2	2	5	7	5-7
ICMB 02666	9	9	9	1	1	1	1	1	1	2	2	2	5	7	5-7
ICMA 02777	9	9	9	3	3	3	9	9	9	2	2	2	5	7	5-7
ICMB 02777	9	9	9	3	3	3	9	9	9	2	2	2	5	7	5-7
ICMA 02888	9	9	9	2	2	2	9	9	9	2	2	2	5	5	5
ICMB 02888	9	9	9	2	2	2	9	9	9	2	2	2	5	5	5
ICMA 02999	9	9	9	1	1	1	1	1	1	2	2	2	5[a]	5	5
ICMB 02999	9	9	9	1	1	1	1	1	1	2	2	2	5[a]	5	5
ICMA 03111	1[a]	9	1-9	1	1	1	1	1	1	1	2	1-2	5[a]	5	5
ICMB 03111	9	9	9	1	1	1	1	1	1	1	2	1-2	5[a]	5	5
ICMA 03222	9	9	9	1	1	1	9	9	9	2	2	2	5	5	5
ICMB 03222	9	9	9	1	1	1	9	9	9	2	2	2	5	5	5
ICMA 03333	9	9	9	2	2	2	1	1	1	1	2	1-2	5	5	5
ICMB 03333	9	9	9	2	2	2	1	1	1	1	2	1-2	5	5	5
ICMA 03444	9	9	9	2	2	2	1	9	1-9	2	2	2	5	7	5-7
ICMB 03444	9	9	9	2	2	2	1	1	1	2	2	2	7	5	5-7
ICMA 03555	9	9	9	1	1	1	9	9	9	1	2	1-2	7	5	5-7
ICMB 03555	9	9	9	1	1	1	9	9	9	1	2	1-2	5	7	5-7
ICMA 03666	9	9	9	1	1	1	1	1	1	2	2	2	5	5	5
ICMB 03666	9	9	9	1	1	1	1	1	1	2	2	2	5	5	5
ICMA 03777	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	7	5	5-7
ICMB 03777	9[a]	9[a]	9[a]	2	2	2	1	1	1	2	2	2	7	5	5-7
ICMA 03888	9	9	9	1	1	1	1	1	1	1	2	1-2	7	9	7-9
ICMB 03888	9	9	9	1	1	1	1	1	1	1	2	1-2	7	9	7-9
ICMA 03999	9	9	9	1	1	1	1	1	1	1	2	1-2	5[a]	3[a]	3-5
ICMB 03999	9	9	9	1	1	1	1	1	1	1	2	1-2	3[a]	5[a]	3-5
ICMA 04111	9[a]	9[a]	9[a]	1	1	1	1	1	1	2[a]	2[a]	2[a]	9	9	9
ICMB 04111	9[a]	9[a]	9[a]	1	1	1	1	1	1	2	2	2	9	9	9
ICMA 04222	9	1	1-9	2	2	2	1	1	1	2	2	2	5	5	5
ICMB 04222	9	1	1-9	2	2	2	1	1	1	2	2	2	5	5	5
ICMA 04333	9	9	9	1	1	1	1	1	1	1[a]	1[a]	1[a]	5	5	5
ICMB 04333	9	9	9	1	1	1	1	1	1	1[a]	1[a]	1[a]	5	5	5
ICMA 04444	9[a]	9[a]	9[a]	1	1	1	1	1	1	2	2	2	5	7	5-7
ICMB 04444	9[a]	9[a]	9[a]	1	1	1	1	1	1	2	2	2	5	7	5-7
ICMA 04555	9	9	9	1	1	1	1	1	1	2	2	2	5	7	5-7
ICMB 04555	9	9	9	1	1	1	1	1	1	2	2	2	5	7	5-7
ICMA 04666	9	9	9	2	2	2	1	1	1	2	2	2	5[a]	7	5-7
ICMB 04666	9	9	9	2	2	2	1	1	1	2	2	2	5[a]	7	5-7

A/B Pairs	Seedling: anthocyanin coloration of first leaf			Panicle anther color			Panicle: anthocyanin pigmentation of glume			Panicle exsertion			Panicle density		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
ICMA 04777	9[a]	9[a]	9[a]	1	1	1	1	1	1	1[a]	1[a]	1[a]	5	7	5-7
ICMB 04777	9[a]	9[a]	9[a]	1	1	1	1	1	1	1[a]	1[a]	1[a]	5	7	5-7
ICMA 04888	9[a]	9[a]	9[a]	1	1	1	1	1	1	1	1	1	5	7	5-7
ICMB 04888	9[a]	9[a]	9[a]	1	1	1	1	1	1	1	1	1	5	7	5-7
ICMA 04999	9	9	9	1	1	1	1	1	1	2[a]	2[a]	2[a]	5	7	5-7
ICMB 04999	9	9	9	1	1	1	1	1	1	2[a]	2[a]	2[a]	5	7	5-7

[a]Predominant class but also indicates the presence of other classes.

A/B Pairs	Panicle shape			Panicle: bristle			Panicle: tip sterility			Seed color			Seed shape		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
81A	1	1	1	1	1	1	1	1	1	4	4	4	1	1	1
81B	1	1	1	1	1	1	1	1	1	4	4	4	1	1	1
841A	1	1	1	1	1	1	1	1	1	4	4	4	3	3	3
841B	1	1	1	1	1	1	1	1	1	4	4	4	3	3	3
842A	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
842B	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
843A	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4
843B	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4
863A	2	2	2	1	1	1	1	1	1	5	5	5	3	3	3
863B	2	2	2	1	1	1	1	1	1	5	5	5	3	3	3
ICMA 88004	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 88004	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 88006	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 88006	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 89111	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 89111	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 91222	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 91222	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 91444	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 91444	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 91666	4	4	4	1	1	1	1	1	1	4	4	4	1	1	1
ICMB 91666	4	4	4	1	1	1	1	1	1	4	4	4	1	1	1
ICMA 91777	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 91777	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 92111	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 92111	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 92333	4	4	4	1	1	1	9	9	9	4	4	4	4	4	4

A/B Pairs	Panicle shape			Panicle: bristle			Panicle: tip sterility			Seed color			Seed shape		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
ICMB 92333	4	4	4	1	1	1	9	9	9	4	4	4	4	4	4
ICMA 92444	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 92444	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 92666	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4
ICMB 92666	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4
ICMA 92777	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMB 92777	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMA 92888	4	4	4	1	1	1	1	1	1	2	2	2	4	4	4
ICMB 92888	4	4	4	1	1	1	1	1	1	2	2	2	4	4	4
ICMA 93111	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 93111	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 93222	1	1	1	1	1	1	1	1	1	5	5	5	4	4	4
ICMB 93222	1	1	1	1	1	1	1	1	1	5	5	5	4	4	4
ICMA 93333	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 93333	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 94111	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 94111	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 94222	2	2	2	1	1	1	1	1	1	2	2	2	4	4	4
ICMB 94222	2	2	2	1	1	1	1	1	1	2	2	2	4	4	4
ICMA 94333	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMB 94333	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMA 94444	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 94444	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 94555	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4
ICMB 94555	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4
ICMA 95111	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4
ICMB 95111	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4
ICMA 95222	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 95222	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 95333	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4
ICMB 95333	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4
ICMA 95444	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 95444	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 95555	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 95555	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 96111	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 96111	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 96222	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMB 96222	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMA 96333	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4

A/B Pairs	Panicle shape			Panicle: bristle			Panicle: tip sterility			Seed color			Seed shape		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
ICMB 96333	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4
ICMA 96444	2	2	2	1	1	1	9	9	9	4	4	4	1	1	1
ICMB 96444	2	2	2	1	1	1	9	9	9	4	4	4	1	1	1
ICMA 96555	2	2	2	1	1	1	1	1	1	2	2	2	4	4	4
ICMB 96555	2	2	2	1	1	1	1	1	1	2	2	2	4	4	4
ICMA 96666	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 96666	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 97111	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 97111	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 97222	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMB 97222	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMA 97333	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 97333	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 97444	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 97444	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 97555	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 97555	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 98111	4	4	4	1	1	1	1	1	1	5	5	5	1	1	1
ICMB 98111	4	4	4	1	1	1	1	1	1	5	5	5	1	1	1
ICMA 98222	2	2	2	1	1	1	1	1	1	5	5	5	3	3	3
ICMB 98222	2	2	2	1	1	1	1	1	1	5	5	5	3	3	3
ICMA 98333	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 98333	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 98444	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 98444	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 98555	4	4	4	1	1	1	1	1	1	5	5	5	4	4	4
ICMB 98555	4	4	4	1	1	1	1	1	1	5	5	5	4	4	4
ICMA 98666	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4
ICMB 98666	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4
ICMA 98777	4	4	4	1	1	1	1	1	1	4	4	4	1	1	1
ICMB 98777	4	4	4	1	1	1	1	1	1	4	4	4	1	1	1
ICMA 99111	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMB 99111	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMA 99222	2	2	2	1	1	1	9	9	9	5	5	5	4	4	4
ICMB 99222	2	2	2	1	1	1	9	9	9	5	5	5	4	4	4
ICMA 99333	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 99333	4	4	4	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 99444	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 99444	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 99555	5	5	5	1	1	1	1	1	1	4	4	4	1	1	1

A/B Pairs	Panicle shape			Panicle: bristle			Panicle: tip sterility			Seed color			Seed shape		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
ICMB 99555	5	5	5	1	1	1	1	1	1	4	4	4	1	1	1
ICMA 99666	2	2	2	1	1	1	1	1	1	5	5	5	1	1	1
ICMB 99666	2	2	2	1	1	1	1	1	1	5	5	5	1	1	1
ICMA 00111	5	5	5	1	1	1	9	9	9	5	5	5	1	1	1
ICMB 00111	5	5	5	1	1	1	9	9	9	5	5	5	1	1	1
ICMA 00222	2	4	4	1	1	1	1	1	1	5	5	5	4	4	4
ICMB 00222	2	4	4	1	1	1	1	1	1	5	5	5	4	4	4
ICMA 00333	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 00333	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 00444	2	2	2	1	1	1	1	1	1	4	4	4	1	1	1
ICMB 00444	2	2	2	1	1	1	1	1	1	4	4	4	1	1	1
ICMA 00555	2	2	2	1	1	1	1	1	1	4	4	4	1	1	1
ICMB 00555	2	2	2	1	1	1	1	1	1	4	4	4	1	1	1
ICMA 00666	2	2	2	1	1	1	1	1	1	4	4	4	1	1	1
ICMB 00666	2	2	2	1	1	1	1	1	1	4	4	4	1	1	1
ICMA 00777	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 00777	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 00888	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMB 00888	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMA 00999	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMB 00999	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMA 01111	2	2	2	1	1	1	1	1	1	4	4	4	1	1	1
ICMB 01111	2	2	2	1	1	1	1	1	1	4	4	4	1	1	1
ICMA 01222	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 01222	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 01333	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 01333	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 01444	1	1	1	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 01444	1	1	1	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 01555	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMB 01555	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMA 01666	4	4	4	1	1	1	9	9	9	5	5	5	4	4	4
ICMB 01666	4	4	4	1	1	1	9	9	9	5	5	5	4	4	4
ICMA 01777	5	5	5	1	1	1	1	1	1	4	4	4	1	1	1
ICMB 01777	5	5	5	1	1	1	1	1	1	4	4	4	1	1	1
ICMA 01888	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 01888	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 02111	2	2	2	1	1	1	9	9	9	5	5	5	4	4	4
ICMB 02111	2	2	2	1	1	1	9	9	9	5	5	5	4	4	4

A/B Pairs	Panicle shape			Panicle: bristle			Panicle: tip sterility			Seed color			Seed shape		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
ICMA 02222	2	2	2	1	1	1	9	9	9	5	5	5	4	4	4
ICMB 02222	2	2	2	1	1	1	9	9	9	5	5	5	4	4	4
ICMA 02333	2	2	2	1	1	1	1	1	1	4	4	4	1	1	1
ICMB 02333	2	2	2	1	1	1	1	1	1	4	4	4	1	1	1
ICMA 02444	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 02444	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 02555	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 02555	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 02666	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMB 02666	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMA 02777	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMB 02777	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMA 02888	2	2	2	1	1	1	9	9	9	5	5	5	4	4	4
ICMB 02888	2	2	2	1	1	1	9	9	9	5	5	5	4	4	4
ICMA 02999	1	1	1	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 02999	1	1	1	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 03111	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4
ICMB 03111	2	2	2	1	1	1	9	9	9	4	4	4	4	4	4
ICMA 03222	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 03222	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 03333	2	2	2	1	1	1	9	9	9	5	5	5	4	4	4
ICMB 03333	2	2	2	1	1	1	9	9	9	5	5	5	4	4	4
ICMA 03444	5	5	5	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 03444	5	5	5	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 03555	2	2	2	1	1	1	1	1	1	5	5	5	1	1	1
ICMB 03555	2	2	2	1	1	1	1	1	1	5	5	5	1	1	1
ICMA 03666	1	1	1	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 03666	1	1	1	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 03777	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 03777	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 03888	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 03888	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 03999	2	2	2	1	1	1	1	1	1	4	4	4	1	1	1
ICMB 03999	2	2	2	1	1	1	1	1	1	4	4	4	1	1	1
ICMA 04111	1	1	1	1	1	1	1	1	1	4	4	4	1	1	1
ICMB 04111	1	1	1	1	1	1	1	1	1	4	4	4	1	1	1
ICMA 04222	2	2	2	1	1	1	9	9	9	5	5	5	1	1	1
ICMB 04222	2	2	2	1	1	1	9	9	9	5	5	5	1	1	1
ICMA 04333	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 04333	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4

A/B Pairs	Panicle shape			Panicle: bristle			Panicle: tip sterility			Seed color			Seed shape		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
ICMA 04444	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMB 04444	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMA 04555	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 04555	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 04666	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMB 04666	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4
ICMA 04777	1	1	1	1	1	1	9	9	9	5	5	5	1	1	1
ICMB 04777	1	1	1	1	1	1	9	9	9	5	5	5	1	1	1
ICMA 04888	2	2	2	1	1	1	1	1	1	4	4	4	3	3	3
ICMB 04888	2	2	2	1	1	1	1	1	1	4	4	4	3	3	3
ICMA 04999	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4
ICMB 04999	2	2	2	1	1	1	1	1	1	5	5	5	4	4	4

A/B Pairs	Plant: growth habit			Leaf sheath pubescence			Plant node pubescence			Plant node pigmentation			Plant internode pigmentation		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
81A	1	1	1	9	9	9	1	1	1	2	2	2	5	5	5
81B	1	1	1	9	9	9	1	1	1	2	2	2	5	5	5
841A	1	1	1	1	9	1-9	9	9	9	2	2	2	2	2	2
841B	1	1	1	1	9	1-9	9	9	9	2	2	2	2	2	2
842A	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
842B	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
843A	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
843B	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
863A	1	1	1	1	1	1	1	1	1	5	5	5	5	5	5
863B	1	1	1	1	1	1	1	1	1	5	5	5	5	5	5
ICMA 88004	1	1	1	1	1	1	1	1	1	5	5	5	5	5	5
ICMB 88004	1	1	1	1	1	1	1	1	1	5	5	5	5	5	5
ICMA 88006	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 88006	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 89111	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 89111	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 91222	1	1	1	1	1	1	1	1	1	5	5	5	1	1	1
ICMB 91222	1	1	1	1	1	1	1	1	1	5	5	5	1	1	1
ICMA 91444	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 91444	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 91666	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2

A/B Pairs	Plant: growth habit			Leaf sheath pubescence			Plant node pubescence			Plant node pigmentation			Plant internode pigmentation		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
ICMB 91666	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 91777	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 91777	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 92111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 92111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 92333	5	5	5	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 92333	5	5	5	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 92444	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 92444	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 92666	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 92666	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 92777	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 92777	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 92888	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 92888	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 93111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 93111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 93222	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1
ICMB 93222	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1
ICMA 93333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 93333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 94111	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 94111	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 94222	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 94222	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 94333	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 94333	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 94444	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 94444	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 94555	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 94555	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 95111	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 95111	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 95222	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 95222	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 95333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 95333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 95444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 95444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 95555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2

A/B Pairs	Plant: growth habit			Leaf sheath pubescence			Plant node pubescence			Plant node pigmentation			Plant internode pigmentation		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
ICMB 95555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 96111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 96111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 96222	1	1	1	1	1	1	9	1	1-9	2	2	2	2	2	2
ICMB 96222	1	1	1	1	1	1	9	1	1-9	2	2	2	2	2	2
ICMA 96333	1	1	1	1	1	1	1	1	1	2	2	2	5	5	5
ICMB 96333	1	1	1	1	1	1	1	1	1	2	2	2	5	5	5
ICMA 96444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 96444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 96555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 96555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 96666	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 96666	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 97111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 97111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 97222	1	1	1	1	1	1	1	1	1	5	5	5	5	5	5
ICMB 97222	1	1	1	1	1	1	1	1	1	5	5	5	5	5	5
ICMA 97333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 97333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 97444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 97444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 97555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 97555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 98111	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1
ICMB 98111	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1
ICMA 98222	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 98222	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 98333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 98333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 98444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 98444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 98555	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 98555	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 98666	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 98666	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 98777	1	1	1	1	1	1	1	9	1-9	2	2	2	2	2	2
ICMB 98777	1	1	1	1	1	1	1	9	1-9	2	2	2	2	2	2
ICMA 99111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 99111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 99222	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2

A/B Pairs	Plant: growth habit			Leaf sheath pubescence			Plant node pubescence			Plant node pigmentation			Plant internode pigmentation		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
ICMB 99222	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 99333	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 99333	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 99444	1	1	1	9	9	9	1	1	1	5	5	5	2	2	2
ICMB 99444	1	1	1	9	9	9	1	1	1	5	5	5	2	2	2
ICMA 99555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 99555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 99666	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 99666	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 00111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 00111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 00222	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 00222	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 00333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 00333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 00444	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 00444	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 00555	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1
ICMB 00555	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1
ICMA 00666	1	1	1	1	1	1	1	1	1	2	2	2	5	5	5
ICMB 00666	1	1	1	1	1	1	1	1	1	2	2	2	5	5	5
ICMA 00777	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 00777	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 00888	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 00888	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 00999	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 00999	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 01111	1	1	1	1	1	1	1	1	1	5	5	5	5	5	5
ICMB 01111	1	1	1	1	1	1	1	1	1	5	5	5	5	5	5
ICMA 01222	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 01222	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 01333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 01333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 01444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 01444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 01555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 01555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 01666	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 01666	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2

A/B Pairs	Plant: growth habit			Leaf sheath pubescence			Plant node pubescence			Plant node pigmentation			Plant internode pigmentation		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
ICMA 01777	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 01777	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 01888	1	1	1	9	9	9	1	1	1	2	2	2	1	1	1
ICMB 01888	1	1	1	9	9	9	1	1	1	2	2	2	1	1	1
ICMA 02111	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 02111	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 02222	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 02222	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 02333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 02333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 02444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 02444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 02555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 02555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 02666	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 02666	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 02777	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 02777	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 02888	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 02888	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 02999	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 02999	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 03111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 03111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 03222	1	1	1	1	1	1	1	9	1-9	5	5	5	2	2	2
ICMB 03222	1	1	1	1	1	1	1	9	1-9	5	5	5	2	2	2
ICMA 03333	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 03333	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 03444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 03444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 03555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 03555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 03666	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 03666	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 03777	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 03777	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 03888	1	1	1	1	1	1	1	1	1	5	5	5	5	5	5
ICMB 03888	1	1	1	1	1	1	1	1	1	5	5	5	5	5	5
ICMA 03999	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 03999	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2

A/B Pairs	Plant: growth habit			Leaf sheath pubescence			Plant node pubescence			Plant node pigmentation			Plant internode pigmentation		
	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean	E1	E2	Mean
ICMA 04111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 04111	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 04222	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 04222	5	5	5	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 04333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 04333	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 04444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 04444	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 04555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 04555	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 04666	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMB 04666	1	1	1	1	1	1	1	1	1	5	5	5	2	2	2
ICMA 04777	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 04777	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 04888	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 04888	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMA 04999	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
ICMB 04999	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2

Key Characteristics of Seed Parents

SEED PARENTS

81A: 81B backcrossed to Tift 23D2A (A_1) cytoplasm source

81B: Induced downy mildew resistant selection from Tift23D2B

Key Characteristics

	81A	81B
Growth habit	Erect	Erect
Days to 50% flowering	Late (54 d)	Late (54 d)
Anther color	Yellow	Yellow
Leaf sheath pubescence	Present	Present
Internode pigmentation	Purple	Purple
Plant height	D_2 Dwarf (76 cm)	D_2 Dwarf (76 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (20 cm)	Medium (22 cm)
Panicle diameter	Medium (2.0 cm)	Medium (2.1 cm)
Panicle shape	Cylindrical	Cylindrical
Panicle density	Compact	Compact
Seed color	Grey	Grey
Seed shape	Obovate	Obovate
1000-grain weight	Medium (8 g)	Medium (8 g)

SEED PARENTS

841A: 841B backcrossed to 5141A (A_1) cytoplasm source

841B: DM resistant selection from seed lot number 8015 of 5141B

Key Characteristics

	841A	841B
Growth habit	Erect	Erect
Days to 50% flowering	Late (51 d)	Late (51 d)
Anther color	Yellow	Yellow
Leaf sheath pubescence	Present/ Absent	Present/ Absent
Plant height	Very short (99 cm)	Short (103 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Partial	Partial
Panicle length	Small (17 cm)	Small (17 cm)
Panicle diameter	Medium (2.0 cm)	Medium (2.0 cm)
Panicle shape	Cylindrical	Cylindrical
Panicle density	Compact	Compact
Seed color	Grey	Grey
Seed shape	Hexagonal	Hexagonal
1000-grain weight	Medium (8 g)	Medium (8 g)

SEED PARENTS

842A: 842B backcrossed to AKM 2221 (A_1) cytoplasm source

842B: Selection from KSU line BKM 2221

Key Characteristics

	842A	842B
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Medium (49 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Plant height	Tall D_2 (98 cm)	Tall D_2 (97 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (18 cm)	Small (18 cm)
Panicle diameter	Medium (2.4 cm)	Medium (2.4 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact/ compact	Semi-compact/ compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

843A: 843B backcrossed to AKM 2068 (A_1) cytoplasm source

843B: Selection from KSU line BKM 2068

Key Characteristics

	843A	843B
Growth habit	Intermediate	Intermediate
Days to 50% flowering	Early (42 d)	Early (42 d)
Anther color	Brown	Brown
Plant height	D_2 Dwarf (70 cm)	D_2 Dwarf (74 cm)
Number of productive tillers plant^{-1}	Low (3)	Medium (4)
Panicle exsertion	Complete	Complete
Panicle length	Small (14 cm)	Small (15 cm)
Panicle diameter	Medium (2.1 cm)	Medium (2.1 cm)
Panicle shape	Conical	Conical
Panicle density	Loose/ semi-compact	Loose/ semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

863A: 863B backcrossed into 81A (A_1) cytoplasm source

863B: Togo-13-4-1

Key Characteristics

	863A	863B
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Medium (50 d)
Anther color	Purple	Purple
Node pigmentation	Purple	Purple
Internode pigmentation	Purple	Purple
Plant height	Short (117 cm)	Short (116 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Partial complete	Partial complete
Panicle length	Small (16 cm)	Small (16 cm)
Panicle diameter	Thick (3.1 cm)	Thick (3.1 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Hexagonal	Hexagonal
1000-grain weight	Bold (12 g)	Bold (11 g)

SEED PARENTS

ICMA 88004: ICMB 88004 backcrossed to 81A (A_1) cytoplasm source

ICMB 88004: Togo-11-5-2 selection

Key Characteristics

	ICMA 88004	ICMB 88004
Growth habit	Erect	Erect
Days to 50% flowering	Medium (47 d)	Medium (48 d)
Anther color	Yellow	Yellow
Node pigmentation	Purple	Purple
Internode pigmentation	Purple	Purple
Plant height	Short (101 cm)	Short (105 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (14 cm)	Small (15 cm)
Panicle diameter	Medium (2.5 cm)	Medium (2.7 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (12 g)	Bold (11 g)

SEED PARENTS

ICMA 88006: ICMB 88006 backcrossed to 81A (A_1) cytoplasm source

ICMB 88006: {(81B x SRL 53-1)} x 843B]-30-2-B

Key Characteristics

	ICMA 88006	ICMB 88006
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Medium (50 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Plant height	Medium D_2 (90 cm)	Medium D_2 (88 cm)
Number of productive tillers $plant^{-1}$	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (16 cm)	Small (15 cm)
Panicle diameter	Medium (2.4 cm)	Medium (2.6 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact/ compact	Semi-compact/ compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (12 g)	Bold (12 g)

SEED PARENTS

ICMA 89111: ICMB 89111 backcrossed to 861A (A_1) cytoplasm source

ICMB 89111: [843B x (GNS x SS-48-40-4)-1-9-8]-30-B-B-1

Key Characteristics

	ICMA 89111	ICMB 89111
Growth habit	Intermediate	Intermediate
Days to 50% flowering	Medium (44 d)	Medium (46 d)
Anther color	Yellow	Yellow
Node pigmentation	Purple	Purple
Plant height	Medium D_2 (86 cm)	Medium D_2 (85 cm)
Number of productive tillers plant^{-1}	Medium (5)	Medium (4)
Panicle exsertion	Complete	Complete
Panicle length	Small (17 cm)	Small (17 cm)
Panicle diameter	Medium (2.2 cm)	Medium (2.2 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (9 g)	Bold (8 g)

SEED PARENTS

ICMA 91222: ICMB 91222 backcrossed to 81A (A_1) cytoplasm source

ICMB 91222: (26B x 81B)-4-1-2

Key Characteristics

	ICMA 91222	ICMB 91222
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Medium (50 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Internode pigmentation	Whitish	Whitish
Plant height	Medium D_2 (91 cm)	Medium D_2 (91 cm)
Number of productive tillers $plant^{-1}$	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (15 cm)	Small (15 cm)
Panicle diameter	Medium (2.1 cm)	Medium (2.2 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (10 g)	Medium (9 g)

SEED PARENTS

ICMA 91444: ICMB 91444 backcrossed to 81A (A_1) cytoplasm source

ICMB 91444: [843B x (Boudama-481 x Ankautess-2)-4]-2

Key Characteristics

	ICMA 91444	ICMB 91444
Growth habit	Erect	Erect
Days to 50% flowering	Medium (48 d)	Medium (50 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Plant height	Tall D_2 (93 cm)	Tall D_2 (93 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Partial/ complete	Partial/ complete
Panicle length	Small (20 cm)	Small (20 cm)
Panicle diameter	Medium (2.2 cm)	Medium (2.2 cm)
Panicle shape	Candle	Candle
Panicle density	Compact/ Semi-compact	Compact/ Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

ICMA 91666: ICMB 91666 backcrossed to 81A (A_1) cytoplasm source

ICMB 91666: [843B x (J 1623 x 3/4 EB-96-1-10)]-92-2-1

Key Characteristics

	ICMA 91666	ICMB 91666
Growth habit	Erect	Erect
Days to 50% flowering	Late (51 d)	Late (53 d)
Anther color	Yellow	Yellow
Plant height	D_2 Dwarf (83 cm)	D_2 Dwarf (77 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (18 cm)	Small (18 cm)
Panicle diameter	Medium (2.9 cm)	Medium (2.8 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Obovate	Obovate
1000-grain weight	Medium (10 g)	Medium (10 g)

SEED PARENTS

ICMA 91777: ICMB 91777 backcrossed to 81A (A_1) cytoplasm source

ICMB 91777: [843B x (J 1623 x 3/4 EB-96-1-10)]-5-2

Key Characteristics

	ICMA 91777	ICMB 91777
Growth habit	Erect	Erect
Days to 50% flowering	Late (51 d)	Late (52 d)
Anther color	Yellow	Yellow
Node pigmentation	Purple	Purple
Plant height	Tall D_2 (99 cm)	Tall D_2 (93 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (19 cm)	Small (20 cm)
Panicle diameter	Medium (2.9 cm)	Medium (2.8 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Medium (10 g)

SEED PARENTS

ICMA 92111: ICMB 92111 backcrossed to 81A (A_1) cytoplasm source

ICMB 92111: (81B x 843B)-11-1-1-B

Key Characteristics

	ICMA 92111	ICMB 92111
Growth habit	Erect	Erect
Days to 50% flowering	Late (51 d)	Late (52 d)
Anther color	Brown	Brown
Plant height	Tall D_2 (94 cm)	Tall D_2 (89 cm)
Number of productive tillers plant^{-1}	Medium (4)	Medium (5)
Panicle exsertion	Complete	Complete
Panicle length	Small (19 cm)	Small (20 cm)
Panicle diameter	Medium (2.1 cm)	Medium (2.1 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (9 g)	Medium (8 g)

SEED PARENTS

ICMA 92333: ICMB 92333 backcrossed to 81A (A_1) cytoplasm source

ICMB 92333: (843B x 81B)-30-1-1

Key Characteristics

	ICMA 92333	ICMB 92333
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Medium (49 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Plant height	Medium D_2 (85 cm)	Medium D_2 (86 cm)
Number of productive tillers plant^{-1}	Medium (4)	Medium (4)
Panicle exsertion	Complete	Complete
Panicle length	Small (15 cm)	Small (16 cm)
Panicle diameter	Medium (2.3 cm)	Medium (2.4 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (10 g)	Medium (10 g)

SEED PARENTS

ICMA 92444: ICMB 92444 backcrossed to 81A (A_1) cytoplasm source

ICMB 92444: (843B x ICMPS-1500-7-4-1-6)-23-1-B-1-4

Key Characteristics

	ICMA 92444	ICMB 92444
Growth habit	Erect	Erect
Days to 50% flowering	Medium (48 d)	Medium (50 d)
Anther color	Yellow	Yellow
Node pigmentation	Purple	Purple
Plant height	Short (109 cm)	Short (108 cm)
Number of productive tillers plant^{-1}	Medium (4)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (16 cm)	Small (16 cm)
Panicle diameter	Medium (2.4 cm)	Medium (2.4 cm)
Panicle shape	Candle	Candle
Panicle density	Loose	Loose
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (9 g)	Medium (8 g)

SEED PARENTS

ICMA 92666: ICMB 92666 backcrossed to 81A (A_1) cytoplasm source

ICMB 92666: [ICMPES-34 x (843B x ICMPES-34)-155-4-2

Key Characteristics

	ICMA 92666	ICMB 92666
Growth habit	Erect	Erect
Days to 50% flowering	Medium (47 d)	Medium (47 d)
Anther color	Yellow	Yellow
Plant height	Short (112 cm)	Short (108 cm)
Number of productive tillers plant^{-1}	Medium (4)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (17 cm)	Small (17 cm)
Panicle diameter	Medium (2.2 cm)	Medium (2.3 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

ICMA 92777: ICMB 92777 backcrossed to ICMA 88006 (A_1) cytoplasm source

ICMB 92777: [843B x (ICMPS 500-4-4-3 x ICMPS 1800-3-1-2-C3-4)]-7-1-3

Key Characteristics

	ICMA 92777	ICMB 92777
Growth habit	Erect	Erect
Days to 50% flowering	Medium (48 d)	Medium (49 d)
Anther color	Purple	Purple
Node pigmentation	Brown	Brown
Plant height	Short (123 cm)	Short (120 cm)
Number of productive tillers plant^{-1}	Medium (4)	Low (3)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Small (16 cm)	Small (17 cm)
Panicle diameter	Medium (2.7 cm)	Medium (2.8 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Bold (12 g)	Bold (11 g)

SEED PARENTS

ICMA 92888: ICMB 92888 backcrossed to ICMA 88006 (A_1) cytoplasm source

ICMB 92888: (843B x ICMPS 900-9-3-2-2)-41-2-6-2-2

Key Characteristics

	ICMA 92888	ICMB 92888
Growth habit	Erect	Erect
Days to 50% flowering	Medium (47 d)	Medium (49 d)
Anther color	Brown	Brown
Plant height	Medium D_2 (87 cm)	Medium D_2 (86 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Small (18 cm)	Small (19 cm)
Panicle diameter	Medium (2.7 cm)	Medium (2.7 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact/ Compact	Semi-compact/ Compact
Seed color	Cream	Cream
Seed shape	Globular	Globular
1000-grain weight	Bold (12 g)	Bold (11 g)

SEED PARENTS

ICMA 93111: ICMB 93111 backcrossed to ICMA 88006 (A_1) cytoplasm source

ICMB 93111: (81B x SRL 53-1) x 843B)-30-1-1

Key Characteristics

	ICMA 93111	ICMB 93111
Growth habit	Erect	Erect
Days to 50% flowering	Late (52 d)	Late (53 d)
Anther color	Yellow	Yellow
Plant height	D_2 dwarf (81 cm)	D_2 dwarf (78 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Small (18 cm)	Small (18 cm)
Panicle diameter	Medium (2.8 cm)	Medium (2.8 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (12 g)	Bold (11 g)

SEED PARENTS

ICMA 93222: ICMB 93222 backcrossed to 81A (A_1) cytoplasm source

ICMB 93222: (26B x 834B)-11-2-B-B

Key Characteristics

	ICMA 93222	ICMB 93222
Growth habit	Erect	Erect
Days to 50% flowering	Late (52 d)	Late (53 d)
Anther color	Yellow	Yellow
Node pigmentation	Brown	Brown
Plant height	Short (112 cm)	Short (109 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (17 cm)	Small (18 cm)
Panicle diameter	Medium (2.7 cm)	Medium (2.7 cm)
Panicle shape	Cylindrical	Cylindrical
Panicle density	Semi-compact/ Compact	Semi-compact/ Compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Bold (12 g)	Bold (12 g)

SEED PARENTS

ICMA 93333: ICMB 93333 backcrossed to ICMA 88006 (A_1) cytoplasm source

ICMB 93333: (843B x ICMPS 900-9-3-8-2)-21-8-4

Key Characteristics

	ICMA 93333	ICMB 93333
Growth habit	Erect	Erect
Days to 50% flowering	Late (53 d)	Late (54 d)
Anther color	Yellow	Yellow
Plant height	Short (141 cm)	Short (136 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Small (20 cm)	Small (19 cm)
Panicle diameter	Medium (2.9 cm)	Medium (2.7 cm)
Panicle shape	Candle	Candle
Panicle density	Compact	Compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (9 g)	Medium (8 g)

SEED PARENTS

ICMA 94111: ICMB 94111 backcrossed to 81A (A_1) cytoplasm source

ICMB 94111: {(ICMB 89111 x ICMB 88002) x [(81BxSRL53-1) x 843B]-3+ x IP9402-2+}-31

Key Characteristics

	ICMA 94111	ICMB 94111
Growth habit	Erect	Erect
Days to 50% flowering	Late (50 d)	Late (49 d)
Anther color	Yellow	Yellow
Node pigmentation	Purple	Purple
Plant height	Short (120 cm)	Short (115 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (17 cm)	Small (17 cm)
Panicle diameter	Medium (3.0 cm)	Medium (2.9 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (10 g)	Medium (10 g)

SEED PARENTS

ICMA 94222: ICMB 94222 backcrossed to 81A (A_1) cytoplasm source

ICMB 94222: {{[843B x (843B x 700651)] +x 1163B} x (ICMB 89111 x ICMB 88004)}-3-3

Key Characteristics

	ICMA 94222	ICMB 94222
Growth habit	Erect	Erect
Days to 50% flowering	Very early (42 d)	Very early (41 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Plant height	D_2 dwarf (76 cm)	D_2 dwarf (78 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (15 cm)	Small (15 cm)
Panicle diameter	Medium (2.1 cm)	Medium (2.2 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Cream	Cream
Seed shape	Globular	Globular
1000-grain weight	Medium (9 g)	Medium (9 g)

SEED PARENTS

ICMA 94333: ICMB 94333 backcrossed to 81A (A_1) cytoplasm source

ICMB 94333: (843B x Togo plot# 26-1)-27-B

Key Characteristics

	ICMA 94333	ICMB 94333
Growth habit	Erect	Erect
Days to 50% flowering	Very early (41 d)	Very early (44 d)
Anther color	Brown	Brown
Plant height	Medium D_2 (95 cm)	Medium D_2 (108 cm)
Number of productive tillers plant^{-1}	Medium (4)	Medium (4)
Panicle exsertion	Complete	Complete
Panicle length	Small (13 cm)	Small (13 cm)
Panicle diameter	Medium (2.2 cm)	Medium (2.3 cm)
Panicle shape	Conical	Conical
Panicle density	Compact/ Semi-compact	Compact/ Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Medium (9 g)	Bold (10 g)

SEED PARENTS

ICMA 94444: ICMB 94444 backcrossed to 81A (A_1) cytoplasm source

ICMB 94444: (843B x 405B)-4

Key Characteristics

	ICMA 94444	ICMB 94444
Growth habit	Erect	Erect
Days to 50% flowering	Medium (50 d)	Medium (50 d)
Anther color	Yellow	Yellow
Node pigmentation	Purple	Purple
Plant height	Short (111 cm)	Short (110 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (14 cm)	Small (14 cm)
Panicle diameter	Medium (2.5 cm)	Medium (2.4 cm)
Panicle shape	Conical	Conical
Panicle density	Compact/ Semi-compact	Compact/ Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (10 g)	Bold (10 g)

SEED PARENTS

ICMA 94555: ICMB 94555 backcrossed to 81A (A_1) cytoplasm source

ICMB 94555: {{[843B x (843B x 700651)]+x 1163B} x (ICMB 89111 x ICMB 88004)}-5-3

Key Characteristics

	ICMA 94555	ICMB 94555
Growth habit	Intermediate	Intermediate
Days to 50% flowering	Early (46 d)	Early (47 d)
Anther color	Yellow	Yellow
Plant height	D_2 dwarf (72 cm)	D_2 dwarf (73 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (17 cm)	Small (17 cm)
Panicle diameter	Medium (2.6 cm)	Medium (2.8 cm)
Panicle shape	Conical	Conical
Panicle density	Compact	Compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

ICMA 95111: ICMB 95111 backcrossed to 81A (A_1) cytoplasm source

ICMB 95111: {[843B x (GNS x SS-48-40-4)-1+]-30+ x [843B x (843B x 700651)-11-1-2-B]}-39

Key Characteristics

	ICMA 95111	ICMB 95111
Growth habit	Intermediate	Intermediate
Days to 50% flowering	Early (45 d)	Early (45 d)
Anther color	Brown	Brown
Plant height	D_2 dwarf (69 cm)	D_2 dwarf (71 cm)
Number of productive tillers plant^{-1}	Medium (4)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (14 cm)	Small (15 cm)
Panicle diameter	Medium (2.3 cm)	Medium (2.4 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (10 g)	Medium (10 g)

SEED PARENTS

ICMA 95222: ICMB 95222 backcrossed to 81A (A_1) cytoplasm source

ICMB 95222: {[843B x (GNS x SS-48-40-4)-29-7-4-B] x (843B x ICMPES-29)-23-2-3}-16

Key Characteristics

	ICMA 95222	ICMB 95222
Growth habit	Intermediate	Intermediate
Days to 50% flowering	Medium (50 d)	Late (51 d)
Anther color	Brown	Brown
Plant height	Short (119 cm)	Short (122 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (18 cm)	Small (18 cm)
Panicle diameter	Medium (2.3 cm)	Medium (2.4 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (9 g)	Medium (9 g)

SEED PARENTS

ICMA 95333: ICMB 95333 backcrossed to 81A (A_1) cytoplasm source

ICMB 95333: {[(B282 x S10B-38)-35 x Togo-29+]-53 x {843A x [843B x (B282 x 3/4EB)-11+]}}-6

Key Characteristics

	ICMA 95333	ICMB 95333
Growth habit	Erect	Erect
Days to 50% flowering	Very late (55 d)	Late (54 d)
Anther color	Yellow	Yellow
Plant height	Medium D_2 (88 cm)	Medium D_2 (90 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Medium (24 cm)	Medium (26 cm)
Panicle diameter	Medium (2.9 cm)	Medium (2.9 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact/ Loose	Semi-compact/ Loose
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (10 g)	Medium (10 g)

SEED PARENTS

ICMA 95444: ICMB 95444 backcrossed to 843A (A_1) cytoplasm source

ICMB 95444: [81-1164 DB/85-1856LR-16-B x 843DMR1]-14-6-3

Key Characteristics

	ICMA 95444	ICMB 95444
Growth habit	Erect	Erect
Days to 50% flowering	Early (45 d)	Early (45 d)
Anther color	Brown	Brown
Plant height	D_2 dwarf (80 cm)	D_2 dwarf (80 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (16 cm)	Small (16 cm)
Panicle diameter	Medium (2.2 cm)	Medium (2.2 cm)
Panicle shape	Candle	Candle
Panicle density	Compact/ Semi-compact	Compact/ Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Medium (10 g)

SEED PARENTS

ICMA 95555: ICMB 95555 backcrossed to 843A (A_1) cytoplasm source

ICMB 95555: DMR1 S2-96-2-3-4

Key Characteristics

	ICMA 95555	ICMB 95555
Growth habit	Erect	Erect
Days to 50% flowering	Early (43 d)	Early (43 d)
Anther color	Brown	Brown
Plant height	D_2 dwarf (64 cm)	D_2 dwarf (65 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (14 cm)	Small (15 cm)
Panicle diameter	Medium (2.2 cm)	Medium (2.3 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (10 g)	Medium (9 g)

SEED PARENTS

ICMA 96111: ICMB 96111 backcrossed to 81A (A_1) cytoplasm source

ICMB 96111: (843B x 81B)-58-1-1

Key Characteristics

	ICMA 96111	ICMB 96111
Growth habit	Erect	Erect
Days to 50% flowering	Medium (50 d)	Late (51 d)
Anther color	Brown	Brown
Plant height	Medium D_2 (88 cm)	Medium D_2 (90 cm)
Number of productive tillers $plant^{-1}$	Medium (5)	Medium (4)
Panicle exsertion	Complete	Complete
Panicle length	Small (18 cm)	Small (19 cm)
Panicle diameter	Medium (2.3 cm)	Medium (2.4 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Medium (10 g)

SEED PARENTS

ICMA 96222: ICMB 96222 backcrossed to 81A (A_1) cytoplasm source

ICMB 96222: [26B x (81B x SRL 50-1)]-1-1-2 x 852B}-69-1-1

Key Characteristics

	ICMA 96222	ICMB 96222
Growth habit	Erect	Erect
Days to 50% flowering	Late (53 d)	Late (54 d)
Anther color	Yellow	Yellow
Node pubescence	Present/ Absent	Present/ Absent
Plant height	Medium D_2 (88 cm)	Medium D_2 (92 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Medium (21 cm)	Medium (21 cm)
Panicle diameter	Medium (2.7 cm)	Medium (2.7 cm)
Panicle shape	Conical	Conical
Panicle density	Compact/ Semi-compact	Compact/ Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

ICMA 96333: ICMB 96333 backcrossed to ICMA 88004 (A_1) cytoplasm source

ICMB 96333: {{[843B x (843B x 700651)-11-+] x 1163B} x (ICMB 89111 x ICMB 88005)}-5-2-2

Key Characteristics

	ICMA 96333	ICMB 96333
Growth habit	Erect	Erect
Days to 50% flowering	Medium (47 d)	Medium (47 d)
Anther color	Brown	Brown
Internode pigmentation	Purple	Purple
Plant height	D_2 dwarf (73 cm)	D_2 dwarf (74 cm)
Number of productive tillers plant^{-1}	Medium (4)	Low (3)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Small (16 cm)	Small (16 cm)
Panicle diameter	Medium (2.6 cm)	Medium (2.5 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Bold (10 g)

SEED PARENTS

ICMA 96444: ICMB 96444 backcrossed to ICMA 89111 (A_1) cytoplasm source

ICMB 96444: (SPF3/S91-933 x SPF3/S91-3)-4-2-3-1

Key Characteristics

	ICMA 96444	ICMB 96444
Growth habit	Erect	Erect
Days to 50% flowering	Early (46 d)	Medium (48 d)
Anther color	Brown	Brown
Plant height	Medium D_2 (78 cm)	Medium D_2 (80 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (18 cm)	Small (19 cm)
Panicle diameter	Medium (2.4 cm)	Medium (2.5 cm)
Panicle shape	Conical	Conical
Panicle density	Compact/ Semi-compact	Compact/ Semi-compact
Seed color	Grey	Grey
Seed shape	Obovate	Obovate
1000-grain weight	Medium (8 g)	Medium (8 g)

SEED PARENTS

ICMA 96555: ICMB 96555 backcrossed to 81A (A_1) cytoplasm source

ICMB 96555: (SPF3/S91-5 x ARD Early bulk)-2-3-3

Key Characteristics

	ICMA 96555	ICMB 96555
Growth habit	Erect	Erect
Days to 50% flowering	Late (51 d)	Late (52 d)
Anther color	Brown	Brown
Plant height	D_2 dwarf (75 cm)	D_2 dwarf (74 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Medium (21 cm)	Medium (21 cm)
Panicle diameter	Thick (3.3 cm)	Thick (3.3 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Cream	Cream
Seed shape	Globular	Globular
1000-grain weight	Bold (12 g)	Bold (12 g)

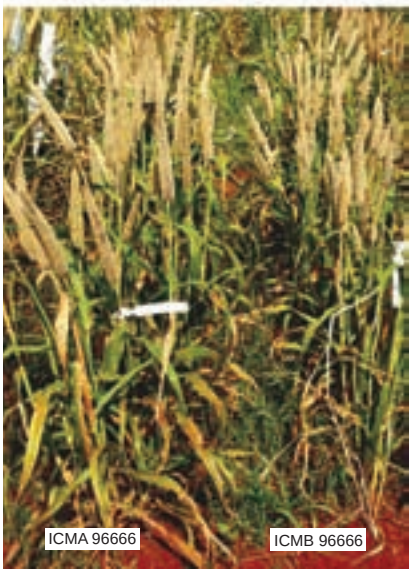
SEED PARENTS

ICMA 96666: ICMB 96666 backcrossed to 81A (A_1) cytoplasm source

ICMB 96666: (SPF3/S91-327 x SPF3/S91-5)-6-2-3

Key Characteristics

	ICMA 96666	ICMB 96666
Growth habit	Intermediate	Intermediate
Days to 50% flowering	Early (45 d)	Medium (47 d)
Anther color	Yellow	Yellow
Plant height	Medium D_2 (89 cm)	Medium D_2 (90 cm)
Number of productive tillers plant^{-1}	Medium (4)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (17 cm)	Small (17 cm)
Panicle diameter	Medium (2.3 cm)	Medium (2.6 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Very bold (13 g)	Very bold (13 g)



SEED PARENTS

ICMA 97111: ICMB 97111 backcrossed to 863A (A_1) cytoplasm source

ICMB 97111: HTBC-48-B-1-1-1-1

Key Characteristics

	ICMA 97111	ICMB 97111
Growth habit	Erect	Erect
Days to 50% flowering	Medium (48 d)	Medium (50 d)
Anther color	Brown	Brown
Plant height	Short (125 cm)	Short (128 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Small (17 cm)	Small (17 cm)
Panicle diameter	Medium (2.9 cm)	Medium (2.9 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact/ Compact	Semi-compact/ Compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (12 g)	Bold (11 g)

SEED PARENTS

ICMA 97222: ICMB 97222 backcrossed to ICMA 88004 (A_1) cytoplasm source

ICMB 97222: [(ICMB 88006 x ICMB 88005) x (ICMB 89111 x ICMB 88004)]-28-2-B

Key Characteristics

	ICMA 97222	ICMB 97222
Growth habit	Erect	Erect
Days to 50% flowering	Early (46 d)	Medium (49 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Internode pigmentation	Purple	Purple
Plant height	Short (111 cm)	Short (113 cm)
Number of productive tillers plant^{-1}	Medium (4)	Low (3)
Panicle exsertion	Partial	Partial
Panicle length	Small (14 cm)	Small (15 cm)
Panicle diameter	Medium (2.8 cm)	Medium (3.0 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Bold (12 g)	Bold (11 g)

SEED PARENTS

ICMA 97333: ICMB 97333 backcrossed to ICMA 89111 (A_1) cytoplasm source

ICMB 97333: (ICMB 89111 x ICMB 88004)-9-2-6-3-3-2-B

Key Characteristics

	ICMA 97333	ICMB 97333
Growth habit	Erect	Erect
Days to 50% flowering	Medium (47 d)	Medium (47 d)
Anther color	Brown	Brown
Plant height	Tall D_2 (106 cm)	Tall D_2 (107 cm)
Number of productive tillers plant^{-1}	Low (3)	Medium (4)
Panicle exsertion	Complete	Complete
Panicle length	Small (17 cm)	Small (18 cm)
Panicle diameter	Medium (2.4 cm)	Medium (2.5 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (9 g)	Medium (10 g)

SEED PARENTS

ICMA 97444: ICMB 97444 backcrossed to 843A (A_1) cytoplasm source

ICMB 97444: DMR1 S2-133-1-2-4-B

Key Characteristics

	ICMA 97444	ICMB 97444
Growth habit	Erect	Erect
Days to 50% flowering	Early (44 d)	Early (45 d)
Anther color	Brown	Brown
Plant height	D_2 dwarf (73 cm)	D_2 dwarf (73 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (14 cm)	Small (15 cm)
Panicle diameter	Medium (2.3 cm)	Medium (2.4 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

ICMA 97555: ICMB 97555 backcrossed to 81A (A_4) cytoplasm source

ICMB 97555: (SPF3/S91-5 x ARD early bulk)-2-3-2

Key Characteristics

	ICMA 97555	ICMB 97555
Growth habit	Erect	Erect
Days to 50% flowering	Medium (47 d)	Medium (49 d)
Anther color	Brown	Brown
Plant height	D_2 dwarf (64 cm)	D_2 dwarf (69 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Small (18 cm)	Small (19 cm)
Panicle diameter	Medium (2.9 cm)	Thick (3.2 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

ICMA 98111: ICMB 98111 backcrossed to ICMA 89111 (A_1) cytoplasm source

ICMB 98111: HTBC-HS-27-1-1-1

Key Characteristics

	ICMA 98111	ICMB 98111
Growth habit	Erect	Erect
Days to 50% flowering	Early (48 d)	Early (49 d)
Anther color	Brown	Brown
Internode pigmentation	Whitish	Whitish
Plant height	Short (110 cm)	Short (118 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (13 cm)	Small (13 cm)
Panicle diameter	Small (2.3 cm)	Small (2.4 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Obovate	Obovate
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

ICMA 98222: ICMB 98222 backcrossed to 842A (A_1) cytoplasm source

ICMB 98222: ARD-288-1-10-1-2 (RM)-5

Key Characteristics

	ICMA 98222	ICMB 98222
Growth habit	Erect	Erect
Days to 50% flowering	Early (47 d)	Medium (47 d)
Anther color	Brown	Brown
Plant height	Short (123 cm)	Short (119 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Small (18 cm)	Small (16 cm)
Panicle diameter	Thick (3.2 cm)	Thick (3.1 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Hexagonal	Hexagonal
1000-grain weight	Bold (12 g)	Bold (11 g)

SEED PARENTS

ICMA 98333: ICMB 98333 backcrossed to 81A (A_4) cytoplasm source

ICMB 98333: (843B x ICTP 8202-161-5)-19-2-1-B-B-2

Key Characteristics

	ICMA 98333	ICMB 98333
Growth habit	Erect	Erect
Days to 50% flowering	Early (42 d)	Early (43 d)
Anther color	Brown	Brown
Plant height	Tall D_2 (104 cm)	Tall D_2 (101 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (17 cm)	Small (16 cm)
Panicle diameter	Medium (2.4 cm)	Medium (2.3 cm)
Panicle shape	Conical	Conical
Panicle density	Loose/ Semi-compact	Loose/ Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (12 g)	Bold (11 g)

SEED PARENTS

ICMA 98444: ICMB 98444 source backcrossed to 81A (A_1) cytoplasm source

ICMB 98444: (BSECBPT/91-40 x SPF3/S91-529)-12-1-1-5

Key Characteristics

	ICMA 98444	ICMB 98444
Growth habit	Erect	Erect
Days to 50% flowering	Early (48 d)	Medium (49 d)
Anther color	Brown	Brown
Plant height	Medium D_2 (81 cm)	Medium D_2 (84 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Small (17 cm)	Small (17 cm)
Panicle diameter	Small (2.9 cm)	Small (3.0 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Obovate	Obovate
1000-grain weight	Bold (9 g)	Bold (10 g)

SEED PARENTS

ICMA 98555: ICMB 98555 backcrossed to ICMA 88004 (A_1) cytoplasm source

ICMB 98555: {[(81B x SRL 53-1) x 843B]-3-5-2 x (843B x 834B)-25-B-B-1}-84-5-B-B

Key Characteristics

	ICMA 98555	ICMB 98555
Growth habit	Intermediate	Intermediate
Days to 50% flowering	Medium (48 d)	Medium (48 d)
Anther color	Yellow	Yellow
Plant height	Tall D_2 (97 cm)	Tall D_2 (101 cm)
Number of productive tillers $plant^{-1}$	Medium (4)	Medium (4)
Panicle exsertion	Partial	Partial
Panicle length	Small (12 cm)	Small (12 cm)
Panicle diameter	Medium (2.6 cm)	Medium (2.7 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

ICMA 98666: ICMB 98666 backcrossed to 81A (A_4) cytoplasm source

ICMB 98666: (ICMB 89111 x IPC 1466)-21-1-3-6-B-5

Key Characteristics

	ICMA 98666	ICMB 98666
Growth habit	Erect	Erect
Days to 50% flowering	Late (53 d)	Very late (56 d)
Anther color	Yellow	Yellow
Plant height	Medium D_2 (90 cm)	Medium D_2 (86 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (16 cm)	Small (17 cm)
Panicle diameter	Medium (2.0 cm)	Medium (2.1 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Small (7 g)	Small (7 g)

SEED PARENTS

ICMA 98777: ICMB 98777 backcrossed to 81A (A_g) cytoplasm source

ICMB 98777: [(F4FC 1498-1-1-3 x J 104)-11-2-1-1]-7-3-1-B

Key Characteristics

	ICMA 98777	ICMB 98777
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Medium (50 d)
Anther color	Brown	Brown
Node pubescence	Present/ Absent	Present/ Absent
Plant height	Short (116 cm)	Short (112 cm)
Number of productive tillers plant^{-1}	Medium (4)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (15 cm)	Small (15 cm)
Panicle diameter	Medium (2.1 cm)	Medium (2.1 cm)
Panicle shape	Candle	Candle
Panicle density	Compact	Compact
Seed color	Grey	Grey
Seed shape	Obovate	Obovate
1000-grain weight	Medium (8 g)	Medium (8 g)

SEED PARENTS

ICMA 99111: ICMB 99111 backcrossed to 81A (A_4) cytoplasm source

ICMB 99111: (843B x ICTP 8202-161-5)-19-2-1-B-B-2

Key Characteristics

	ICMA 99111	ICMB 99111
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Late (51 d)
Anther color	Brown	Brown
Plant height	Short (122 cm)	Short (124 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Partial	Partial
Panicle length	Small (18 cm)	Small (19 cm)
Panicle diameter	Thick (3.1 cm)	Thick (3.1 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Very bold (13 g)	Bold (12 g)

SEED PARENTS

ICMA 99222: ICMB 99222 backcrossed to 863A (A_1) cytoplasm source

ICMB 99222: (BSECBPT/91-40 x SPF3/S91-94)-3-1-1-2

Key Characteristics

	ICMA 99222	ICMB 99222
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Late (51 d)
Anther color	Brown	Brown
Plant height	Short (120 cm)	Short (127 cm)
Number of productive tillers plant^{-1}	Monoculm (1)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Small (18 cm)	Small (18 cm)
Panicle diameter	Thick (3.2 cm)	Thick (3.2 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

ICMA 99333: ICMB 99333 backcrossed to 81A (A_1) cytoplasm source

ICMB 99333: {(84-3869/85-4414)-8-B x 843DMR1}-1-3-2-B

Key Characteristics

	ICMA 99333	ICMB 99333
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Late (49 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Plant height	Medium D_2 (90 cm)	Medium D_2 (88 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (17 cm)	Small (17 cm)
Panicle diameter	Thick (2.7 cm)	Thick (2.8 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (12 g)	Bold (11 g)

SEED PARENTS

ICMA 99444: ICMB 99444 backcrossed to 81A (A_1) cytoplasm source

ICMB 99444: (SPF3/S91-327 x SPF3/S91-5)-6-2-2

Key Characteristics

	ICMA 99444	ICMB 99444
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Late (50 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Leaf sheath pubescence	Present	Present
Plant height	Medium D_2 (88 cm)	Medium D_2 (88 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Small (17 cm)	Small (18 cm)
Panicle diameter	Thick (2.7 cm)	Thick (2.7 cm)
Panicle shape	Candle	Candle
Panicle density	Compact	Compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

ICMA 99555: ICMB 99555 backcrossed to 81A (A_4) cytoplasm source

ICMB 99555: (BSECBPT/91-38 x SPF3/S91-529)-10-1-7

Key Characteristics

	ICMA 99555	ICMB 99555
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Late (50 d)
Anther color	Yellow	Yellow
Plant height	Medium D_2 (84 cm)	Medium D_2 (84 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Small (18 cm)	Small (18 cm)
Panicle diameter	Thick (3.2 cm)	Thick (3.4 cm)
Panicle shape	Lanceolate	Lanceolate
Panicle density	Loose/ Semi-compact	Loose/ Semi-compact
Seed color	Grey	Grey
Seed shape	Obovate	Obovate
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

ICMA 99666: ICMB 99666 backcrossed to 81A (A_4) cytoplasm source

ICMB 99666: (BSECBPT/91-38 x SPF3/S91-529)-10-1-5-2

Key Characteristics

	ICMA 99666	ICMB 99666
Growth habit	Erect	Erect
Days to 50% flowering	Late (51 d)	Late (51 d)
Anther color	Yellow	Yellow
Plant height	Medium D_2 (88 cm)	Medium D_2 (93 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Small (16 cm)	Small (16 cm)
Panicle diameter	Medium (3.0 cm)	Thick (3.3 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Obovate	Obovate
1000-grain weight	Medium (9 g)	Medium (10 g)

SEED PARENTS

ICMA 00111: ICMB 00111 backcrossed to 863A (A_1) cytoplasm source

ICMB 00111: (BSECBPT/91-40 x SPF3/S91-3)-1-2-2-4

Key Characteristics

	ICMA 00111	ICMB 00111
Growth habit	Erect	Erect
Days to 50% flowering	Early (45 d)	Medium (47 d)
Anther color	Brown	Brown
Plant height	Tall D_2 (104 cm)	Tall D_2 (108 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Small (16 cm)	Small (15 cm)
Panicle diameter	Medium (2.9 cm)	Medium (3.0 cm)
Panicle shape	Lanceolate	Lanceolate
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Obovate	Obovate
1000-grain weight	Bold (12 g)	Bold (11 g)

SEED PARENTS

ICMA 00222: ICMB 00222 backcrossed to ICMA 88004 (A_1) cytoplasm source

ICMB 00222: {[(81B x SRL53-1) x 843B]-3-5-2 x (843B x 834B)-25-B-B-1}-84-6-B-B

Key Characteristics

	ICMA 00222	ICMB 00222
Growth habit	Intermediate	Intermediate
Days to 50% flowering	Medium (48 d)	Medium (48 d)
Anther color	Brown	Brown
Plant height	Medium tall (102 cm)	Medium tall (100 cm)
Number of productive tillers plant^{-1}	Medium (4)	Medium (4)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Small (12 cm)	Small (12 cm)
Panicle diameter	Medium (2.6 cm)	Medium (2.7 cm)
Panicle shape	Conical	Conical
Panicle density	Compact/ Semi-compact	Compact/ Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

ICMA 00333: ICMB 00333 backcrossed to 81A (A_1) cytoplasm source

ICMB 00333: (BSECBPT/91-40 x SPF3/S91-529)-12-1-1-7-1

Key Characteristics

	ICMA 00333	ICMB 00333
Growth habit	Erect	Erect
Days to 50% flowering	Early (46 d)	Medium (47 d)
Anther color	Yellow	Yellow
Plant height	D_2 Dwarf (68 cm)	D_2 Dwarf (72 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Partial to Complete	Partial to Complete
Panicle length	Small (16 cm)	Small (16 cm)
Panicle diameter	Medium (2.7 cm)	Medium (2.6 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (10 g)	Bold (11 g)

SEED PARENTS

ICMA 00444: ICMB 00444 backcrossed to 843A (A_1) cytoplasm source

ICMB 00444: (SPF3/S91-544 x SPF3/S91-5)-5-1-2-1

Key Characteristics

	ICMA 00444	ICMB 00444
Growth habit	Erect	Erect
Days to 50% flowering	Medium (47 d)	Medium (48 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Plant height	Tall D_2 (105 cm)	Tall D_2 (104 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Partial	Partial
Panicle length	Small (15 cm)	Small (15 cm)
Panicle diameter	Medium (3.0 cm)	Medium (3.0 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Obovate	Obovate
1000-grain weight	Bold (12 g)	Very bold (13 g)

SEED PARENTS

ICMA 00555: ICMB 00555 backcrossed to 81A (A_1) cytoplasm source

ICMB 00555: HHVBC-S1-16-6-3-5-2-B

Key Characteristics

	ICMA 00555	ICMB 00555
Growth habit	Erect	Erect
Days to 50% flowering	Late (53 d)	Very late (55 d)
Anther color	Yellow	Yellow
Internode pigmentation	Whitish	Whitish
Plant height	Medium D_2 (93 cm)	Medium D_2 (93 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Medium (22 cm)	Medium (23 cm)
Panicle diameter	Thick (3.3 cm)	Thick (3.4 cm)
Panicle shape	Conical	Conical
Panicle density	Loose/ Semi-compact	Loose/ Semi-compact
Seed color	Grey	Grey
Seed shape	Obovate	Obovate
1000-grain weight	Bold (10 g)	Bold (10 g)

SEED PARENTS

ICMA 00666: ICMB 00666 backcrossed to 81A (A_1) cytoplasm source

ICMB 00666: {(ICMB89111 x ICMB88002) x [(81B x SRL53-1) x 843B]-3+}-31

Key Characteristics

	ICMA 00666	ICMB 00666
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Medium (49 d)
Anther color	Yellow	Yellow
Internode pigmentation	Purple	Purple
Plant height	Short (113 cm)	Short (113 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Partial	Partial
Panicle length	Small (18 cm)	Small (17 cm)
Panicle diameter	Medium (3.0 cm)	Medium (2.8 cm)
Panicle shape	Candle	Candle
Panicle density	Loose/ Semi-compact	Loose/ Semi-compact
Seed color	Grey	Grey
Seed shape	Obovate	Obovate
1000-grain weight	Medium (8 g)	Medium (8 g)

SEED PARENTS

ICMA 00777 ICMB 00777 backcrossed to 81A (A_4) cytoplasm source

ICMB 00777: [IPC 1598 x (843B x DSA105B)]-51-3-B-B

Key Characteristics

	ICMA 00777	ICMB 00777
Growth habit	Erect	Erect
Days to 50% flowering	Early (43 d)	Early (46 d)
Anther color	Brown	Brown
Plant height	Short (108 cm)	Short (114 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (15 cm)	Small (16 cm)
Panicle diameter	Medium (2.7 cm)	Medium (2.9 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact/ Loose	Semi-compact/ Loose
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (9 g)	Medium (9 g)

SEED PARENTS

ICMA 00888: ICMB 00888 backcrossed to 81A (A_4) cytoplasm source

ICMB 00888: (843B x ICTP8202-161-5)-20-3-B-B-3

Key Characteristics

	ICMA 00888	ICMB 00888
Growth habit	Erect	Erect
Days to 50% flowering	Early (45 d)	Early (47 d)
Anther color	Brown	Brown
Plant height	Short (125 cm)	Short (128 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Small (18 cm)	Small (17 cm)
Panicle diameter	Medium (2.8 cm)	Medium (3.0 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Bold (12 g)	Bold (13 g)

SEED PARENTS

ICMA 00999: ICMB 00999 backcrossed to ICMA 88004 (A_1) cytoplasm source

ICMB 00999: (ICMB 89111 x 863B)-65-8-B-B

Key Characteristics

	ICMA 00999	ICMB 00999
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Medium (50 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Plant height	Short (125 cm)	Short (120 cm)
Number of productive tillers plant^{-1}	Medium (4)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (19 cm)	Small (19 cm)
Panicle diameter	Medium (2.5 cm)	Medium (2.5 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Medium (10 g)	Medium (9 g)

SEED PARENTS

ICMA 01111: ICMB 01111 backcrossed to ICMA 89111 (A_1) cytoplasm source

ICMB 01111: (SPF3/S91-933 x SPF3/S91-3)-4-2-2-B

Key Characteristics

	ICMA 01111	ICMB 01111
Growth habit	Erect	Erect
Days to 50% flowering	Medium (48 d)	Medium (48 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Internode pigmentation	Purple	Purple
Plant height	Medium D_2 (89 cm)	Medium D_2 (91 cm)
Number of productive tillers $plant^{-1}$	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (19 cm)	Small (19 cm)
Panicle diameter	Medium (2.5 cm)	Medium (2.6 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Obovate	Obovate
1000-grain weight	Medium (8 g)	Medium (8 g)

SEED PARENTS

ICMA 01222: ICMB 01222 backcrossed to 81A (A_4) cytoplasm source

ICMB 01222: HHV-S1-24-3-B-3-2-1

Key Characteristics

	ICMA 01222	ICMB 01222
Growth habit	Erect	Erect
Days to 50% flowering	Medium (50 d)	Late (52 d)
Anther color	Brown	Brown
Plant height	Medium D_2 (95 cm)	Medium D_2 (97 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Small (22 cm)	Small (23 cm)
Panicle diameter	Thick (3.1 cm)	Thick (3.2 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (10 g)	Medium (9 g)

SEED PARENTS

ICMA 01333: ICMB 01333 backcrossed to 81A (A_4) cytoplasm source

ICMB 01333: HHV-S1-64-3-2-3-2-1

Key Characteristics

	ICMA 01333	ICMB 01333
Growth habit	Erect	Erect
Days to 50% flowering	Very late (55 d)	Very late (57 d)
Anther color	Brown	Brown
Plant height	Medium D_2 (93 cm)	Medium D_2 (92 cm)
Number of productive tillers plant^{-1}	Monoculm (1)	Monoculm (1)
Panicle exsertion	Complete	Complete
Panicle length	Medium (27 cm)	Medium (27 cm)
Panicle diameter	Thick (3.5 cm)	Thick (3.6 cm)
Panicle shape	Conical	Conical
Panicle density	Loose/ Semi-compact	Loose/ Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (10 g)	Medium (9 g)

SEED PARENTS

ICMA 01444: ICMB 01444 backcrossed to 81A (A_4) cytoplasm source

ICMB 01444: {[843B x (B816 x 3/4EB-105-6-1)-3-3]-15-B-4-1}-12-2-4-1

Key Characteristics

	ICMA 01444	ICMB 01444
Growth habit	Erect	Erect
Days to 50% flowering	Medium (50 d)	Late (52 d)
Anther color	Purple	Purple
Plant height	D_2 dwarf (74 cm)	D_2 dwarf (66 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Partial	Partial
Panicle length	Medium (26 cm)	Medium (26 cm)
Panicle diameter	Thick (3.2 cm)	Thick (3.0 cm)
Panicle shape	Cylindrical	Cylindrical
Panicle density	Loose/ Very loose	Loose/ Very loose
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (10 g)	Bold (10 g)

SEED PARENTS

ICMA 01555 ICMB 01555 backcrossed to 81A (A_4) cytoplasm source

ICMB 01555: (BSECBPT/91-40 x SPF3/S91-529)-12-1-1-3

Key Characteristics

	ICMA 01555	ICMB 01555
Growth habit	Erect	Erect
Days to 50% flowering	Medium (50 d)	Medium (49 d)
Anther color	Brown	Brown
Plant height	Medium D_2 (80 cm)	Medium D_2 (79 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion:	Partial/ Complete	Partial/ Complete
Panicle length	Small (16 cm)	Small (16 cm)
Panicle diameter	Medium (2.7 cm)	Medium (2.9 cm)
Panicle shape	Conical	Conical
Panicle density	Compact/ Semi-compact	Compact/ Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Bold (10 g)	Medium (10 g)

SEED PARENTS

ICMA 01666: ICMB 01666 backcrossed to 81A (A_4) cytoplasm source

ICMB 01666: [(ICMB 89111 x ICMB 88004) x (ICMB 88006 x IP 9402)-2-1-1-4]-102-B-1

Key Characteristics

	ICMA 01666	ICMB 01666
Growth habit	Erect	Erect
Days to 50% flowering	Medium (50 d)	Late (52 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Plant height	Short (112 cm)	Short (109 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Partial	Partial
Panicle length	Small (16 cm)	Small (17 cm)
Panicle diameter	Medium (2.6 cm)	Medium (2.6 cm)
Panicle shape	Candle	Candle
Panicle density	Compact/ Semi-compact	Compact/ Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Medium (11 g)

SEED PARENTS

ICMA 01777: ICMB 01777 backcrossed to 81A (A_5) cytoplasm source

ICMB 01777: (BSECBPT/91-38 x SPF3/S91-529)-10-1-6 x 834B

Key Characteristics

	ICMA 01777	ICMB 01777
Growth habit	Erect	Erect
Days to 50% flowering	Medium (50 d)	Medium (50 d)
Anther color	Brown	Brown
Plant height:	Short (125 cm)	Short (122 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Small (19 cm)	Small (19 cm)
Panicle diameter	Thick (3.7 cm)	Thick (3.7 cm)
Panicle shape	Candle	Candle
Panicle density	Loose/ Semi-compact	Loose/ Semi-compact
Seed color	Grey	Grey
Seed shape	Obovate	Obovate
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

ICMA 01888: ICMB 01888 backcrossed to 81A (A_1) cytoplasm source

ICMB 01888: {[(81B x SRL-53-1) x 843B]-3-5-3 x [(843B x 111B)-10-1-2-2]}-226-B-2-B-B-B

Key Characteristics

	ICMA 01888	ICMB 01888
Growth habit	Erect	Erect
Days to 50% flowering	Very late (55 d)	Very late (55 d)
Anther color	Yellow	Yellow
Leaf sheath pubescence	Present	Present
Internode pigmentation	Whitish	Whitish
Plant height	Tall D_2 (99 cm)	Tall D_2 (101 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Small (19 cm)	Small (19 cm)
Panicle diameter	Medium (2.6 cm)	Medium (2.9 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (11 g)	Medium (10 g)

SEED PARENTS

ICMA 02111: ICMB 02111 backcrossed to 81A (A_4) cytoplasm source

ICMB 02111: [(ICMB 88006 x ICMB 88005) x (ICMB 89111x ICMB 88004)]-99-B

Key Characteristics

	ICMA 02111	ICMB 02111
Growth habit	Erect	Erect
Days to 50% flowering	Medium (47 d)	Medium (48 d)
Anther color	Brown	Brown
Node pigmentation:	Purple	Purple
Plant height	Short (112 cm)	Short (125 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (15 cm)	Small (15 cm)
Panicle diameter	Medium (2.9 cm)	Thick (3.2 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Very bold (14 g)	Very bold (13 g)

SEED PARENTS

ICMA 02222: ICMB 02222 backcrossed to 81A (A_4) cytoplasm source

ICMB 02222: [(ICMB 89111 x ICMB 88004) x (ICMB 88006 x ICMB 88005)-2-1-1-4]-101-B-3

Key Characteristics

	ICMA 02222	ICMB 02222
Growth habit	Erect	Erect
Days to 50% flowering	Early (45 d)	Medium (47 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Plant height	Very short (90 cm)	Very short (91 cm)
Number of productive tillers plant^{-1}	Medium (5)	Medium (6)
Panicle exsertion	Complete	Complete
Panicle length	Small (12 cm)	Small (12 cm)
Panicle diameter	Medium (2.0 cm)	Thick (2.1 cm)
Panicle shape	Conical	Conical
Panicle density	Loose/ Semi-compact	Loose/ Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Bold (10 g)	Bold (10 g)

SEED PARENTS

ICMA 02333: ICMB 02333 backcrossed to 81A (A_4) cytoplasm source

ICMB 02333: (BSECBPT/91-39 x SPF3/S91-116)-15-2-1-2

Key Characteristics

	ICMA 02333	ICMB 02333
Growth habit	Erect	Erect
Days to 50% flowering	Medium (47 d)	Medium (47 d)
Anther color	Brown	Brown
Plant height	Short (107 cm)	Short (111 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Small (17 cm)	Small (18 cm)
Panicle diameter	Medium (3.0 cm)	Medium (3.0 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Obovate	Obovate
1000-grain weight	Medium (8 g)	Medium (8 g)

SEED PARENTS

ICMA 02444: ICMB 02444 backcrossed to 81A (A_5) cytoplasm source

ICMB 02444: (BSECBPT/91-38 x SPF3/S91-529)-2-1-B-2

Key Characteristics

	ICMA 02444	ICMB 02444
Growth habit	Erect	Erect
Days to 50% flowering	Medium (50 d)	Late (51 d)
Anther color	Yellow	Yellow
Plant height	Short (109 cm)	Short (110 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Small (18 cm)	Small (19 cm)
Panicle diameter	Thick (3.1 cm)	Thick (3.1 cm)
Panicle shape	Candle	Candle
Panicle density	Loose/ Semi-compact	Loose/ Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (10 g)	Medium (10 g)

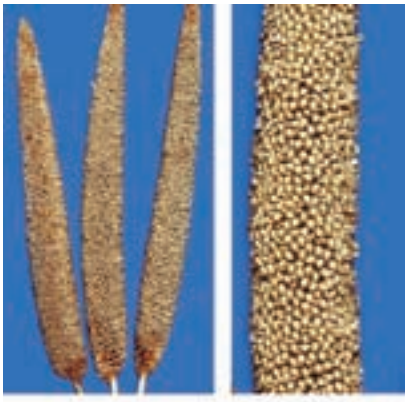
SEED PARENTS

ICMA 02555: ICMB 02555 backcrossed to 81A (A_5) cytoplasm source

ICMB 02555: ICMV87901-175-2-3-2-B-1

Key Characteristics

	ICMA 02555	ICMB 02555
Growth habit	Erect	Erect
Days to 50% flowering	Late (51 d)	Late (51 d)
Anther color	Purple	Purple
Plant height	Short (116 cm)	Short (117 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Partial	Partial
Panicle length	Medium (25 cm)	Medium (27 cm)
Panicle diameter	Medium (2.7 cm)	Medium (2.7 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact/ Compact	Semi-compact/ Compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (9 g)	Medium (9 g)



SEED PARENTS

ICMA 02666 ICMB 02666 backcrossed to 81A (A_4) cytoplasm source

ICMB 02666: (ICMB89111 x IP9554-9)-4-2-2

Key Characteristics

	ICMA 02666	ICMB 02666
Growth habit	Erect	Erect
Days to 50% flowering	Late (54 d)	Very Late (55 d)
Anther color	Yellow	Yellow
Plant height	Medium D_2 (81 cm)	Medium D_2 (79 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (18 cm)	Small (18 cm)
Panicle diameter	Medium (2.1 cm)	Medium (2.0 cm)
Panicle shape	Candle	Candle
Panicle density	Compact/ Semi-compact	Compact/ Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Medium (8 g)	Medium (8 g)

SEED PARENTS

ICMA 02777 ICMB 02777 backcrossed to 81A (A_4) cytoplasm source

ICMB 02777: HHVBC-II HS-9-1-1-2-7-1

Key Characteristics

	ICMA 02777	ICMB 02777
Growth habit	Erect	Erect
Days to 50% flowering	Very late (57 d)	Very late (60 d)
Anther color:	Purple	Purple
Plant height	Tall D_2 (95 cm)	Tall D_2 (110 cm)
Number of productive tillers $plant^{-1}$	Low (2)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Medium (24 cm)	Medium (25 cm)
Panicle diameter:	Medium (2.9 cm)	Thick (3.1 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact/ Compact	Semi-compact/ Compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Medium (10 g)	Medium (10 g)

SEED PARENTS

ICMA 02888 ICMB 02888 backcrossed to 81A (A_4) cytoplasm source

ICMB 02888: HHVBC 2 HS-21-4

Key Characteristics

	ICMA 02888	ICMB 02888
Growth habit	Erect	Erect
Days to 50% flowering	Very Late (55 d)	Very Late (55 d)
Anther color	Brown	Brown
Plant height	Tall D_2 (99 cm)	Tall D_2 (102 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Medium (25 cm)	Medium (26 cm)
Panicle diameter	Thick (3.1 cm)	Thick (3.2 cm)
Panicle shape	Conical	Conical
Panicle density:	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Medium (10 g)	Medium (9 g)

SEED PARENTS

ICMA 02999: ICMB 02999 backcrossed to 81A (A_4) cytoplasm source

ICMB 02999: (PBLN-1/87-246 x SPF3/S91-5)-14-1

Key Characteristics

	ICMA 02999	ICMB 02999
Growth habit	Intermediate	Intermediate
Days to 50% flowering	Medium (55 d)	Medium (55 d)
Anther color:	Yellow	Yellow
Plant height	D_2 dwarf (65 cm)	D_2 dwarf (62 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (19 cm)	Small (19 cm)
Panicle diameter	Medium (2.6 cm)	Medium (2.6 cm)
Panicle shape	Cylindrical	Cylindrical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (9 g)	Medium (9 g)

SEED PARENTS

ICMA 03111: ICMB 03111 backcrossed to 81A (A_4) cytoplasm source

ICMB 03111: {{843B x (843B x 700651)-11-1-2-B) x 1163B} x (ICMB89111 x ICMB88005)}-5-3-B

Key Characteristics

	ICMA 03111	ICMB 03111
Growth habit	Erect	Erect
Days to 50% flowering	Very early (42 d)	Early (44 d)
Anther color	Yellow	Yellow
Plant height	Medium D_2 (69 cm)	Medium D_2 (75 cm)
Number of productive tillers $plant^{-1}$	Low (3)	Low (3)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Small (16 cm)	Small (17 cm)
Panicle diameter	Medium (2.3 cm)	Medium (2.4 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (10 g)	Bold (10 g)

SEED PARENTS

ICMA 03222: ICMB 03222 backcrossed to 81A (A_1) cytoplasm source

ICMB 03222: 690-93B

Key Characteristics

	ICMA 03222	ICMB 03222
Growth habit	Erect	Erect
Days to 50% flowering	Medium (50 d)	Late (51 d)
Anther color	Yellow	Yellow
Node pubescence	Present/ Absent	Present/ Absent
Node pigmentation	Purple	Purple
Plant height	Short (129 cm)	Short (135 cm)
Number of productive tillers plant^{-1}	Medium (4)	Medium (4)
Panicle exsertion	Complete	Complete
Panicle length	Small (14 cm)	Small (14 cm)
Panicle diameter	Medium (2.4 cm)	Medium (2.4 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (8 g)	Medium (8 g)

SEED PARENTS

ICMA 03333: ICMB 03333 backcrossed to 81A (A_5) cytoplasm source

ICMB 03333: 9035/S92-B-3

Key Characteristics

	ICMA 03333	ICMB 03333
Growth habit	Erect	Erect
Days to 50% flowering	Medium (48 d)	Medium (49 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Plant height	Medium tall (95 cm)	Medium tall (98 cm)
Number of productive tillers plant^{-1}	Medium (4)	Medium (4)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Small (15 cm)	Small (16 cm)
Panicle diameter	Medium (2.7 cm)	Medium (2.8 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Bold (12 g)	Bold (11 g)

SEED PARENTS

ICMA 03444: ICMB 03444 backcrossed to 81A (A_4) cytoplasm source

ICMB 03444: HHVBC-II D2 HS-456-1-2-5-1

Key Characteristics

	ICMA 03444	ICMB 03444
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Medium (50 d)
Anther color:	Brown	Brown
Plant height	D_2 dwarf (77 cm)	D_2 dwarf (81 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Medium (22 cm)	Medium (23 cm)
Panicle diameter	Medium (2.7 cm)	Medium (2.8 cm)
Panicle shape	Candle	Candle
Panicle density	Semi-compact/ Compact	Semi-compact/ Compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (9 g)	Medium (9 g)

SEED PARENTS

ICMA 03555: ICMB 03555 backcrossed to 81A (A_4) cytoplasm source

ICMB 03555: (843B x ICTP 8202-161-5)-17-1-3-B-2

Key Characteristics

	ICMA 03555	ICMB 03555
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Medium (50 d)
Anther color	Yellow	Yellow
Plant height	D_2 dwarf (66 cm)	D_2 dwarf (67 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Small (19 cm)	Small (19 cm)
Panicle diameter	Medium (2.9 cm)	Medium (2.8 cm)
Panicle shape	Conical	Conical
Panicle density	Compact/ Semi-compact	Compact/ Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Obovate	Obovate
1000-grain weight	Medium (10 g)	Medium (9 g)

SEED PARENTS

ICMA 03666: ICMB 03666 backcrossed to ICMA 89111 (A_1) cytoplasm source

ICMB 03666: DMR1 S2 52-4-1-1-B

Key Characteristics

	ICMA 03666	ICMB 03666
Growth habit	Intermediate	Intermediate
Days to 50% flowering	Medium (49 d)	Medium (50 d)
Anther color	Yellow	Yellow
Plant height	Medium D_2 (75 cm)	Medium D_2 (77 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (14 cm)	Small (14 cm)
Panicle diameter	Medium (2.4 cm)	Medium (2.4 cm)
Panicle shape	Cylindrical	Cylindrical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (12 g)	Bold (11 g)

SEED PARENTS

ICMA 03777: ICMB 03777 backcrossed to 81A (A_4) cytoplasm source

ICMB 03777: (SPF3/S91-933 x SPF3/S91-3)-8-1-1-B

Key Characteristics

	ICMA 03777	ICMB 03777
Growth habit	Erect	Erect
Days to 50% flowering	Early (46 d)	Medium (47 d)
Anther color	Brown	Brown
Plant height	Tall D_2 (91 cm)	Tall D_2 (93 cm)
Number of productive tillers plant^{-1}	Medium (4)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (16 cm)	Small (16 cm)
Panicle diameter	Medium (2.5 cm)	Medium (2.6 cm)
Panicle shape	Conical	Conical
Panicle density	Compact/ Semi-compact	Compact/ Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (10 g)	Bold (11 g)

SEED PARENTS

ICMA 03888: ICMB 03888 backcrossed to 81A (A_4) cytoplasm source

ICMB 03888: [(ICMB88006 x ICMB88005) x (ICMB89111 x ICMB88005)]-1-1-3-B-9

Key Characteristics

	ICMA 03888	ICMB 03888
Growth habit	Erect	Erect
Days to 50% flowering	Early (45 d)	Medium (47 d)
Anther color	Yellow	Yellow
Node pigmentation	Purple	Purple
Internode pigmentation	Purple	Purple
Plant height	Short (119 cm)	Short (117 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Small (15 cm)	Small (16 cm)
Panicle diameter	Medium (2.5 cm)	Medium (2.6 cm)
Panicle shape	Conical	Conical
Panicle density	Compact/ Very Compact	Compact/ Very Compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Very bold (13 g)	Bold (12 g)

SEED PARENTS

ICMA 03999 ICMB 03999 backcrossed to 81A (A_4) cytoplasm source

ICMB 03999: (ICMB89111 x IP9402-2-1-1-2)-31-1-B-B

Key Characteristics

	ICMA 03999	ICMB 03999
Growth habit	Erect	Erect
Days to 50% flowering	Very early (41 d)	Very early (42 d)
Anther color	Yellow	Yellow
Plant height	Very short (97 cm)	Very short (95 cm)
Number of productive tillers plant^{-1}	Medium (4)	Low (3)
Panicle exsertion	Partial/ Complete	Partial/ Complete
Panicle length	Small (17 cm)	Small (17 cm)
Panicle diameter	Medium (2.5 cm)	Medium (2.6 cm)
Panicle shape	Conical	Conical
Panicle density	Loose/ Semi-compact	Loose/ Semi-compact
Seed color	Grey	Grey
Seed shape	Obovate	Obovate
1000-grain weight	Medium (9 g)	Medium (10 g)

SEED PARENTS

ICMA 04111: ICMB 04111 backcrossed to 81A (A_4) cytoplasm source

ICMB 04111: (81B x 4017-5-4-B)-12-3-1-3

Key Characteristics

	ICMA 04111	ICMB 04111
Growth habit	Erect	Erect
Days to 50% flowering	Very late (55 d)	Very late (56 d)
Anther color	Yellow	Yellow
Plant height	Tall D_2 (102 cm)	Tall D_2 (101 cm)
Number of productive tillers $plant^{-1}$	Monoculm (1)	Monoculm (1)
Panicle exsertion	Complete	Complete
Panicle length	Long (34 cm)	Long (34 cm)
Panicle diameter	Medium (2.1 cm)	Medium (2.1 cm)
Panicle shape	Cylindrical	Cylindrical
Panicle density	Very compact	Very compact
Seed color	Grey	Grey
Seed shape	Obovate	Obovate
1000-grain weight	Medium (9 g)	Medium (8 g)

SEED PARENTS

ICMA 04222 ICMB 04222 backcrossed to 81A (A_4) cytoplasm source

ICMB 04222: (843B x EEBC S1-407)-12-3-B

Key Characteristics

	ICMA 04222	ICMB 04222
Growth habit	Intermediate	Intermediate
Days to 50% flowering	Early (43 d)	Early (43 d)
Anther color	Brown	Brown
Plant height	Very short (97 cm)	Very short (98 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Small (14 cm)	Small (14 cm)
Panicle diameter	Medium (2.4 cm)	Medium (2.5 cm)
Panicle shape	Cylindrical	Cylindrical
Panicle density	Semi-compact	Semi-compact
Seed color	Deep grey	Deep grey
Seed shape	Obovate	Obovate
1000-grain weight	Bold (11 g)	Bold (11 g)

SEED PARENTS

ICMA 04333 ICMB 04333 backcrossed to 81A (A_1) cytoplasm source

ICMB 04333: (ICMB 96111 x 4026-1-6-B)-4-2-1-1

Key Characteristics

	ICMA 04333	ICMB 04333
Growth habit	Erect	Erect
Days to 50% flowering	Very late (55 d)	Very late (56 d)
Anther color	Yellow	Yellow
Plant height	Medium D_2 (78 cm)	Medium D_2 (82 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Partial	Partial
Panicle length	Small (22 cm)	Small (22 cm)
Panicle diameter	Medium (2.4 cm)	Medium (2.3 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact	Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (9 g)	Medium (10 g)

SEED PARENTS

ICMA 04444: ICMB 04444 backcrossed to 81A (A_4) cytoplasm source

ICMB 04444: (D2BLN95-103 x EEBC C1-3)-6-B-B

Key Characteristics

	ICMA 04444	ICMB 04444
Growth habit	Erect	Erect
Days to 50% flowering	Medium (49 d)	Medium (50 d)
Anther color	Yellow	Yellow
Plant height	Short (129 cm)	Short (123 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (15 cm)	Small (15 cm)
Panicle diameter	Medium (2.8 cm)	Medium (2.8 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact/ Compact	Semi-compact/ Compact
Seed color	Deep grey	Deep grey
Seed shape	Globular	Globular
1000-grain weight	Bold (13 g)	Bold (12 g)

SEED PARENTS

ICMA 04555: ICMB 04555 backcrossed to 81A (A_1) cytoplasm source

ICMB 04555: {D2BLN95-214 x (ICMB 96333 x HHVBC)}-11-B-2

Key Characteristics

	ICMA 04555	ICMB 04555
Growth habit	Erect	Erect
Days to 50% flowering	Late (51 d)	Late (51 d)
Anther color	Yellow	Yellow
Plant height	D_2 dwarf (110 cm)	D_2 dwarf (103 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (19 cm)	Small (20 cm)
Panicle diameter	Medium (2.7 cm)	Medium (2.8 cm)
Panicle shape	Cylindrical	Cylindrical
Panicle density	Compact/ Semi-compact	Compact/ Semi-compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Bold (12 g)	Bold (11 g)

SEED PARENTS

ICMA 04666: ICMB 04666 backcrossed to ICMA 89111 (A_1) cytoplasm source

ICMB 04666: (SPF3/S91-933 x SPF3/S91-3)-4-2-3-B

Key Characteristics

	ICMA 04666	ICMB 04666
Growth habit	Erect	Erect
Days to 50% flowering	Medium (48 d)	Medium (48 d)
Anther color	Brown	Brown
Node pigmentation	Purple	Purple
Plant height	Medium D_2 (82 cm)	Medium D_2 (85 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (3)
Panicle exsertion	Complete	Complete
Panicle length	Small (18 cm)	Small (19 cm)
Panicle diameter	Medium (2.5 cm)	Medium (2.6 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact/ Compact	Semi-compact/ Compact
Seed color	Grey	Grey
Seed shape	Globular	Globular
1000-grain weight	Medium (8 g)	Medium (9 g)

SEED PARENTS

ICMA 04777: ICMB 04777 backcrossed to 81A (A_4) cytoplasm source

ICMB 04777: (SRC II C3 S1-19-3-2 x HHVBC)-17-3-1-3-B+

Key Characteristics

	ICMA 04777	ICMB 04777
Growth habit	Erect	Erect
Days to 50% flowering	Very late (56 d)	Very late (58 d)
Anther color	Yellow	Yellow
Plant height	Medium D_2 (83 cm)	Medium D_2 (85 cm)
Number of productive tillers plant^{-1}	Monoculm (1)	Monoculm (1)
Panicle exsertion	Partial	Partial
Panicle length	Small (34 cm)	Small (35 cm)
Panicle diameter	Medium (2.6 cm)	Medium (2.4 cm)
Panicle shape	Cylindrical	Cylindrical
Panicle density	Semi-compact/ Compact	Semi-compact/ Compact
Seed color	Deep grey	Deep grey
Seed shape	Obovate	Obovate
1000-grain weight	Medium (8 g)	Medium (8 g)

SEED PARENTS

ICMA 04888: ICMB 04888 backcrossed to 81A (A_4) cytoplasm source

ICMB 04888: {(843B x ICTP 8202-161-5)-20-3-B-B-3 x B-lines bulk}-2-B-1-3

Key Characteristics

	ICMA 04888	ICMB 04888
Growth habit	Intermediate	Intermediate
Days to 50% flowering	Early (46 d)	Medium (48 d)
Anther color	Yellow	Yellow
Plant height	D_2 dwarf (66 cm)	D_2 dwarf (69 cm)
Number of productive tillers plant^{-1}	Low (2)	Low (2)
Panicle exsertion	Partial	Partial
Panicle length	Small (18 cm)	Small (17 cm)
Panicle diameter	Thick (3.3 cm)	Thick (3.3 cm)
Panicle shape	Conical	Conical
Panicle density	Semi-compact/ Compact	Semi-compact/ Compact
Seed color	Grey	Grey
Seed shape	Hexagonal	Hexagonal
1000-grain weight	Bold (12 g)	Bold (12 g)

SEED PARENTS

ICMA 04999: ICMB 04999 backcrossed to 81A (A_1) cytoplasm source

ICMB 04999: (EBC-Gen-S1-40-2-2-1 x B-line bulk)-25-B-B

Key Characteristics

	ICMA 04999	ICMB 04999
Growth habit	Erect	Erect
Days to 50% flowering	Medium (50 d)	Medium (50 d)
Anther color	Yellow	Yellow
Plant height	Medium D_2 (86 cm)	Medium D_2 (83 cm)
Number of productive tillers plant^{-1}	Low (3)	Low (2)
Panicle exsertion	Complete	Complete
Panicle length	Medium (21 cm)	Small (20 cm)
Panicle diameter	Medium (2.5 cm)	Medium (2.5 cm)
Panicle shape	Conical	Conical
Panicle density	Compact/ Semi-compact	Compact/ Semi-compact
Seed color	Deep grey	Deep grey
Seed shape:	Globular	Globular
1000-grain weight	Medium (9 g)	Medium (8 g)

About ICRISAT

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is a non-profit, non-political organization that does innovative agricultural research and capacity building for sustainable development with a wide array of partners across the globe. ICRISAT's mission is to help empower 644 million poor people to overcome hunger, poverty and a degraded environment in the dry tropics through better agriculture. ICRISAT is supported by the Consultative Group on International Agricultural Research (CGIAR).

Contact Information

ICRISAT-Patancheru (Headquarters)
Patancheru 502 324
Andhra Pradesh, India
Tel +91 40 30713071
Fax +91 40 30713074
icrisat@cgiar.org

ICRISAT-Liaison Office
CG Centers Block
NASC Complex
Dev Prakash Shastri Marg
New Delhi 110 012, India
Tel +91 11 32472306 to 08
Fax +91 11 25841294

ICRISAT-Nairobi (Regional hub ESA)
PO Box 39063, Nairobi, Kenya
Tel +254 20 7224550
Fax +254 20 7224001
icrisat-nairobi@cgiar.org

ICRISAT-Niamey (Regional hub WCA)
BP 12404, Niamey, Niger (Via Paris)
Tel +227 20722529, 20722725
Fax +227 20734329
icrisatsc@cgiar.org

ICRISAT-Bamako
BP 320
Bamako, Mali
Tel +223 20 223375
Fax +223 20 228683
icrisat-w-mali@cgiar.org

ICRISAT-Bulawayo
Matopos Research Station
PO Box 776
Bulawayo, Zimbabwe
Tel +263 383 311 to 15
Fax +263 383 307
icrisatzw@cgiar.org

ICRISAT-Lilongwe
Chitedze Agricultural Research Station
PO Box 1096
Lilongwe, Malawi
Tel +265 1 707297, 071, 067, 057
Fax +265 1 707298
icrisat-malawi@cgiar.org

ICRISAT-Maputo
c/o IIAM, Av. das FPLM No 2698
Caixa Postal 1906
Maputo, Mozambique
Tel +258 21 461657
Fax +258 21 461581
icrisatmoz@panintra.com

www.icrisat.org

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