

Performance of Binadhan-17 compare to BRRIdhan28, BRRIdhan29, BRRIdhan81 and BRRIdhan89

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ABSTRACT

The present experiment was undertaken to examine the suitability of Binadhan-17 (an Aman variety) cultivating in Boro season (Mid-November to Mid-April; approximately 180 days). The experiment was conducted at the experimental field of Bangladesh Institute of Nuclear Agriculture (BINA) substation, Cumilla. Four Boro varieties namely BRRIdhan28, BRRIdhan29, BRRIdhan81 and BRRIdhan89 were used to compare the performance of Aman variety "Binadhan-17". The experiment was laid out in randomized complete block design with two replications. Maximum yield (9.17 t/ha) was recorded in BRRIdhan89 which was statistically similar to BRRIdhan29 (8.94 t/ha) and Binadhan17 (8.25 t/ha). The lowest yield (6.24 t/ha) was found in BRRIdhan81 which was statistically similar to BRRIdhan28 (6.65 t/ha). Lowest duration was found in BRRIdhan28 (142.5 days) followed by BRRIdhan81 (144 days). Maximum duration was in BRRIdhan29 (164 days) followed by BRRIdhan89 (159 days). Binadhan-17 had medium duration which was 158 days. However, Binadhan-17 showed better performance compared to other varieties that may be suitable for Boro season.

INTRODUCTION

Agriculture is the main base for the development of Bangladesh. Agriculture sector contributes 13.31 percent in its GDP. Crops & horticulture sub sector contributes 7.10 percent and only rice contributes 53 percent of crop & Horticulture sub sector. In Bangladesh 66 percent of the labor force depend on agriculture for their employment.

Bangladesh has a population of about 159.9 million with a growth rate of 1.37 percent per annum, giving a population density of 1063 per square kilometer (BER, 2016). It is the fourth largest rice producing country in the world (FAOSTAT, 2012) and third largest (FAPRI, 2009) consumer of rice in the world. Rice is the staple food of Bangladesh, occupies nearly 90% of the total net cropped area of the country and more than 99% of the people eat rice as their main food @416 g/person/day (HIES, 2010). It is also most important crop in Bangladesh in respect of area, production and contribution to national economic development. Bangladesh has three rice producing season namely Aus, Aman and Boro. The Boro

rice is commonly known as winter rice. The term Boro is Bengali originated from Sanskrit word "Boro" which refers to cultivation from Nov.-May under irrigated condition (Lal et al., 2013). It is photo-insensitive, transplanted rice cultivated in waterlogged, low-lying or medium land with supplement water. Its production in Bangladesh increasing day by day, according to Department of Agriculture Extension during 2017-2018 total 48.59 lac hectare lands using for Boro rice production which was 8.55% more than 2016-2017 and production was 195.78 lac ton which also 8.66 percent higher than 2016-2017. Binadhan-17 is BINA released transplantation Aman variety. It is photo-insensitive, Green Super Rice (GSR) that means 20% less requirement of total nitrogen. It is drought tolerant, 30% less requirement of water. It gives 7.5 t/ha yields within 112-118 days (seed to seed) in Aman season. In Bangladesh farmers use 48.59 lakh hectare lands for Boro rice cultivation. If Binadhan-17 may cultivate in Boro season it would be more productive short duration Boro variety. Information is not available on cultivation of Binadhan-17 in Boro season. Keeping the above

facts in view the present experiment has been undertaken to determine the suitability of Binadhan-17 cultivating in Boro season, to know yield potentiality and life time.

MATERIALS AND METHODS

The Experiment

The experiment was conducted at the research field of BINA sub-station, Cumilla during the period of November 2018 to May 2019 to study the suitability of Binadhan-17 cultivating in Boro season with potential yield within short duration. The field experiment having one factor was laid out in Randomized Complete Block Design (RCBD) with two replications. The experiment consists of four BIRRI released Boro variety viz. BIRRIadhan28, BIRRIadhan29, BIRRIadhan81, BIRRIadhan89 and one Aman variety Binadhan-17. Distance between two replications was 1m and 0.5 m between two plots. The size of each unit plot was 5m×10 m (50m²). The total area of the experiment was 577.5m² and number of plot was 10.

Description of rice varieties

Binadhan-17 is BINA released short duration, very high yielding green super rice. The paddy of Binadhan-17 is long, thin and 1000 seeds weight 23.3 g. BIRRIadhan28 is a short duration medium high yielding variety. BIRRIadhan81 is also short duration medium high yielding variety having long and very thin paddy, 1000 seed weight 20.3 g. BIRRIadhan29 and BIRRIadhan89 are very high yielding long duration variety.

Cultivation

Seedling produced in ideal seed bed sowing after germination on 26th November, 2018. 35 days aged single seedling transplanted each hill maintain 25 cm distance between row and 20 cm distance between hills on 31st December, 2018. Nitrogen, Phosphorus, Potassium, Zinc and Sulphur were used as Urea, TSP, MoP, Zinc Sulphate and Gypsum. The doses were 267 kg/ha, 109 kg/ha, 134 kg /ha, 8 kg/ha and 59 kg/ha respectively. The total TPS, MoP, Zinc Sulphate, Gypsum were applied as basal dose. One third of

Urea was applied after 7 days of transplanting. The rest of the urea was applied at top dress at two equal slip at 30 days and 45 days after transplanting. To control soil pest Vitafuran 5g was applied @10 kg/ha. To control pre-emergence weed Rifit 500 EC was applied @1L/ha. Mipcin 75 WP was applied @1.3 kg/ha to control Green plant hopper infestation. Virtako 40 WG was applied to control yellow stem borer infestation @75g/ha. To control Blast and sheath blight infection Trooper 75 WP and Know in 50WP were applied @400g/ha and 1kg/ha respectively. Three hand weeding were done at 10, 25 and 40 days after transplanting to control weed infestation. Irrigation were done several time when necessary.

Data collection

Data were recorded on the plant height (cm), number (No.) of effective tillers/hill, No. of grains/panicle, No. filled grains/ panicle, No. of Unfilled grains/panicle, Panicle length (cm), Days to 50% flowering, Duration and Yield (t/ha). All the data were compiled and analyzed statistically by STAR program (A IRRI developed program).

RESULTS AND DISCUSSION

Plant height

The highest plant height was observed in BIRRIadhan89 (99.25 cm) which was statistically similar to BIRRIadhan29 (94.95 cm) and these were significantly different in height to other varieties. The medium plant height was recorded in BIRRIadhan28 (93.90 cm) followed by BIRRIadhan81 (91.25 cm). The lowest plant height was observed in Binadhan-17 (84.70 cm) which was statistically differed from others (Table 1). The difference in plant may occur due to varietal genetic character and in accordance with the observation of Sarkar (2014).

Number of tiller/hill

Maximum number of tillers/hill was recorded in BIRRIadhan29 (14.55) followed by BIRRIadhan28 (13.25), BIRRIadhan89 (12.00), Binadhan-17 (11.30) and minimum tillers/hill was found in BIRRIadhan81 (10.85). There were no statistical differences in number of tiller per hill among these varieties (Table 1). It agrees with Jisan et al.

(2014) where variation in number of tillers per hill might be due to varietal characters.

Number of effective tiller/hill

BRRIdhan29 had maximum tiller number (13.70) followed by BRRIdhan28 (12.90), BRRIdhan89 (11.85), BRRIdhan81 (10.60) and Binadhan-17 had lowest effective tillers. All varieties were statistically similar in production of effective tiller per hill (Table 1).

Number of grains/ panicle

The maximum grain number/panicle was found in Binadhan-17 (190.95) which was statistically identical to BRRIdhan29 (170.90), BRRIdhan89 (170.80) and BRRIdhan81 (145.40). BRRIdhan28 had lowest grain/panicle (99.05) which was statistically similar to BRRIdhan81 (145.40) but significantly dissimilar to others varieties (Table 1). The study is supported by Sarkar (2014) who reported that number of filled grains/panicle influenced significantly due to variety. Variation in grain filling may have occurred due to genetic,

environmental or cultural management practices adopted (Chowhan et Al., 2017).

Number of unfilled grains/panicle

There were significant differences among varieties in number of unfilled grain/panicle. BRRIdhan29 showed maximum result in number of unfilled grains/panicle (70.20) which was significantly similar to Binadhan-17 (50.35) but statistically difference to other varieties. Binadhan-17 (50.35) and BRRIdhan89 (44.35) had medium result in number of unfilled grains which were significantly dissimilar to BRRIdhan28 (13.80) and BRRIdhan81 (13.10) with lowest value.

Panicle length

No significant differences were found in panicle length among the varieties. However maximum panicle length was observed in BRRIdhan89 (24.65 cm) followed by BRRIdhan29 (24.30), Binadhan-17 (23.00), BRRIdhan81 (22.75). The minimum panicle length was recorded in BRRIdhan28 (22.20).

Table 1

Growth and yield contributing characters of four Boro varieties and one Aman variety in Boro Season.

Treatment	Plant height (cm)	No. of tiller /hill	No. of effective tiller /hill	No. of grain/panicle	No. of unfilled grain/panicle	Panicle length
Binadhan-17	84.70 c	11.30	10.35	190.95 a	50.35 ab	23.00
BRRIdhan28	93.90 ab	13.25	12.90	99.05 b	13.80 c	22.20
BRRIdhan29	94.95 ab	14.55	13.70	170.90 a	70.20 a	24.30
BRRIdhan81	91.25 b	10.85	10.60	145.40 ab	13.10 c	22.75
BRRIdhan89	99.25 a	12.00	11.85	170.80 a	44.35 b	24.65
LSD (5%)	6.35	-	-	48.21	23.55	-
CV (%)	2.46	17	18.89	11.17	22.12	4.13

In a column means having similar letter (s) are statistically similar and those having dissimilar letter(s) differ significantly by LSD at 0.05 level of probability

Days to maturity

It is revealed that BRRIdhan29 required maximum days to maturity (164) which was significantly differ from others varieties (Figure 1). The second highest days to maturity was found in BRRIdhan89 (159) which was significantly differed from others varieties. Binadhan-17 required medium days to maturity (158) whereas the minimum days to maturity was recorded in BRRIdhan28 (142) followed by BRRIdhan81

(144). The observation in this study is supported by Ghosh et al. (2015) who recorded variation of days to maturity due to different varieties. Haque et al. (2016) reported wide genotypic variation in phenological events among 14 aus cultivars. The duration also depends on cultural management, soil and climatic condition (edaphic factor) which is in accordance with the study of Ahmed et al. (2015).

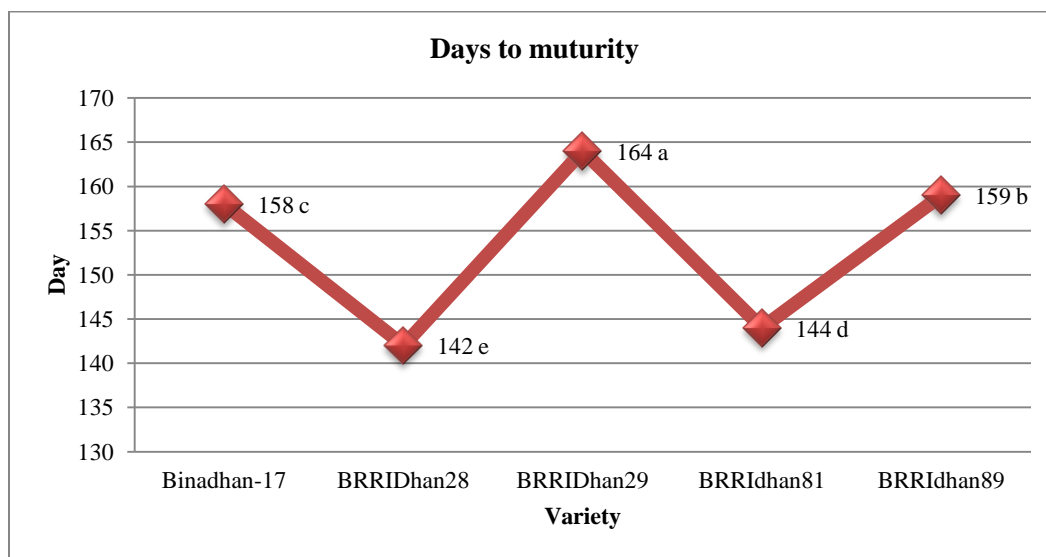


Figure 1. Days to maturity of different varieties

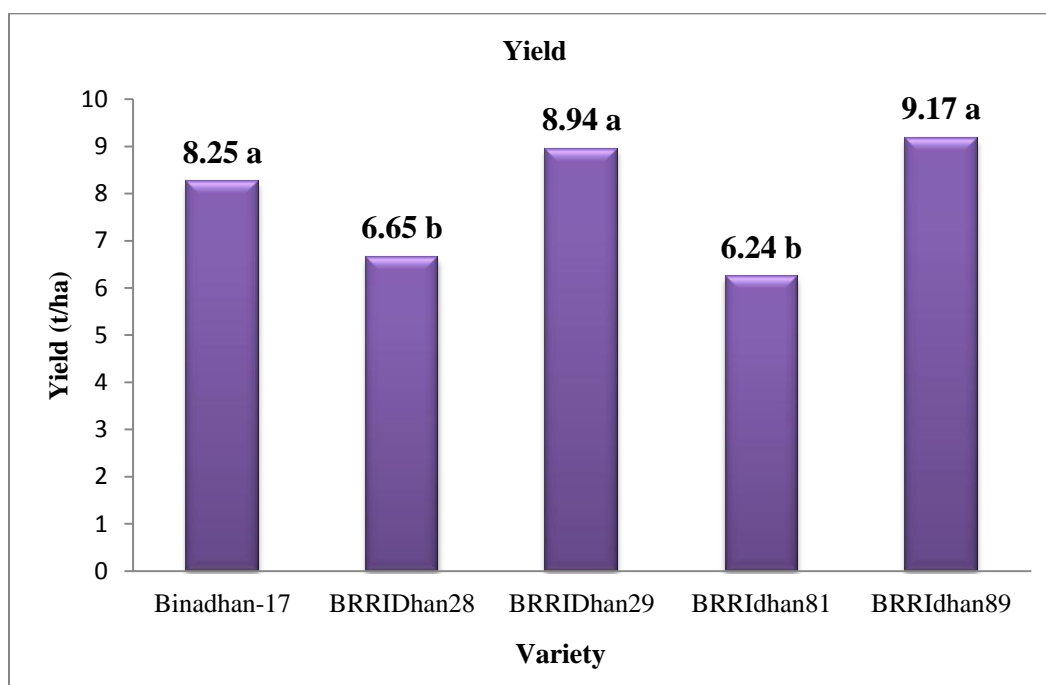


Figure 2. Yield of different varieties

Yield

BRRIdhan89 provided maximum yield (9.17 t/ha) followed by BRRIdhan29 (8.94 t/ha) and Binadhan-17 (8.25 t/ha). These three varieties were significantly identical but differ from

others two varieties (BRRIdhan28 and BRRIdhan81) (Figure 2). The lowest yield (6.24 t/ha) was recorded in BRRIdhan81 which was significantly similar to BRRIdhan28 (6.65 t/ha). This result is supported by Dutta et al. (2002) who observed that yield was affected by the

filled grains/panicle. Kiani and Nematzadeh (2012) observed that filled grains/panicle correlated significantly with grain yield. Varietal differences of grain yield were also reported by Biswas et al. (1998).

CONCLUSION

A wide variation was found in yield contributing characters, duration and yield among some varieties. The maximum plant height, panicle length and yield were observed in BRRIdhan89 with highest 1000 seed weight and second highest duration. BRRIdhan29 was a second highest yielding variety with highest duration. Farmers grow BRRIdhan28 for short duration with moderate yield. Farmers also prefer BRRIdhan81 for its fine grain. BINAdhan-17 had maximum grain /panicle with high yield which was significantly identical to maximum yielding variety BRRIdhan89 and the duration of BINAdhan-17 was fewer than BRIdhan-89. Binadhan-17 may be suitable for Boro season and it would give potential yield with short duration and deserves further experimental validation.

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