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YIELD PERFORMANCE OF SEVEN AROMATIC RICE VARIETIES OF BANGLADESH

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ABSTRACT

An experiment was conducted at RDRS Bangladesh farm, Monthana, Rangpur, Bangladesh during July to December 2016 to evaluate the yield performance of seven aromatic rice varieties of Bangladesh viz. Jirakatari, Chiniatab, Chinigura, Kataribhog, Kalizara, Badshabhog and BRRI dhan34. The experiment was laid out in a randomized complete block design with three replications. The entire yield contributing attributes and quality parameters varied significantly among the aromatic rice varieties. The highest plant height (167.0 cm) was found in the variety Chinigura and the lowest (120.1 cm) in the variety Chiniatab. In the variety Kataribhog number of filled grains panicle^{-1} was found highest (255.6) and the lowest (130.7) was recorded in the variety Badshabhog. Badshabhog produced the highest 1000-grain weight (18.3 g) and the lowest (11.4 g) was recorded from the variety Kataribhog. The highest grain yield (2.54 t ha^{-1}) was obtained from Kataribhog and the lowest grain yield (1.83 t ha^{-1}) was obtained from Kalizara. Among the seven aromatic rice varieties under North-west condition Kataribhog and BRRI dhan34 are suitable in respect of yield.

Keywords: Yield, yield contributing characters, Aromatic rice, Variety

1. INTRODUCTION

Rice (*Oryza sativa* L.) is the most important food crop in Bangladesh. Among the leading rice growing countries of the world, Bangladesh ranks fourth in both rice area and production (WRP,

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2016 and BRRI, 2007). About 75.01% of total cropped area of Bangladesh is used for rice production, with annual production of 34.71 million tons from 11.28 million hectares of land (BBS, 2015). Most of the aromatic rice varieties in Bangladesh are of traditional type, photoperiod sensitive and are grown during Aman season in the rain fed low land ecosystem (Baqui *et al.,* 2000). In Northern districts of Bangladesh, 30% of the rice lands were covered by aromatic rice cultivars during Aman season (Islam *et al*., 2012). Among the aromatic rice cultivars, Chinigura was the predominant one that covered more than 70% farms in the northern districts of Naogaon and Dinajpur (Baqui *et. al.,* 1997). The average area devoted to aromatic rice production in the T. Aman season was 12.5%, with an average yield of 2.0 t ha^{-1} and the resultant total production of 1.42 million metric tons (Islam *et al.* 1996). A comprehensive survey conducted by the Department of the Agriculture Extension (DAE) in all the districts revealed that total area devoted to aromatic rice production in Aman and Boro seasons of 2003-04 was 118 thousand hectares, with a total production of 173 thousand metric tons of rice only (DAE, 2004). In respect of production of aromatic rice, Dinajpur, Naogaon, Chittagong and Sherpur had 1st, 2nd, 3rd and 4th position respectively in 2002-03 (Talukder *et. al.,* 2004). Aromatic rice varieties are rated best in quality and fetch much higher price in international market. Aromatic rice plays a vital role in international rice trading. Bangladesh has a bright prospect for export of fine rice thereby earning foreign exchange (Islam *et al.,* 2012). The demand of aromatic rice in this country is increasing due to its special appeal for aroma and acceptability although grain yield is low. Aromatic rice is the most highly valued rice commodity in Bangladesh agricultural trade markets having small grain and pleasant aroma with soft texture upon cooking (Dutta *et al*., 1998). However, the price of fine rice, especially the aromatic rice is 2-3 times higher than that of coarse rice (Biswas *et al.,* 1992). In spite of low yielding of aromatic rice, it requires less input compared to coarse rice. The study was done to find out the yield performance and promotion of aromatic rice in the North-west region of Bangladesh.

2. MATERIALS AND METHODS

The experiment was conducted at the RDRS Bangladesh Farm Monthona, Rangpur during *Aman* season (July-December) of 2016 to find out the yield performance in response to variety. The experimental site was a medium high land with loamy soil. The experiment was conducted with locally popular seven aromatic rice varieties namely Jirakatari, Chiniatab, Chinigura, Kataribhog, Kalizara, Badshabhog and BRRI dhan34. The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications. The plot size was 8.0m x 5.0m (1 Decimal). Thirty days old seedlings were transplanted at 25cm x 20cm spacing using 3 seedlings per hill. During land preparation for seedling transplanting TSP, MoP, Gypsum and Zinc sulfate were applied at the rate of 100, 70, 60 and 12 Kg ha^{-1} as basal dose. Urea was applied in two equal installments at 20 and 45 days after transplanting. Intercultural operations like weeding,

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gap filling, drainage and pest management were done as and when necessary. From three hills (excluding border hills) randomly selected in each plot to record yield contributing attributes. Then all plots were harvested to obtain grain and straw yield. Data were collected on different growth parameters such as plant height, tiller number and dry matter accumulation as well as yield contributing characters viz. number of effective tillers per hill, length of panicle, number of grains panicle^{-1}, 1000–grain weight, grain yield, straw yield, biological yield, harvest index and grain weight. The collected data were analyzed statistically using the "analysis of variance" and treatment means were compared using Duncan's Multiple Range Test (DMRT).

3. RESULTS AND DISCUSSION

Crop characters, yield contributing characters and yield of aromatic rice varieties varied significantly (Table 1). Plant heights at maturity of the tested varieties showed significant variation. Highest plant height (167.0cm) was observed in Chinigura and the lowest (120.1cm) in Chiniatab. These may be due to genetic characteristics of the varieties (Tyeb *et al.,* 2013; Sarkar *et al.,* 2014; Islam *et al.*, 2014, Jisan *et al*., 2014; Bony *et al*., 2015). Lodging of local aromatic rice varieties at maturity stage was observed due to higher plant height. The highest number of total tiller hill^{-1} (16.1) was obtained from Chinigura and lowest number of total tiller hill^{-1} (11.4) was obtained from Kalizara. Maximum effective tiller hill^{-1} (12.1) was obtained from Chinigura which is statistically similar to Kataribhog and minimum effective tiller hill^{-1} (8.9) was obtained from Jirakatari. Maximum panicle length (26.9cm) was obtained from Kataribhog and minimum panicle length (23.8cm) was obtained from BRRI dhan34. This variation might be due to heredity that was directly related genetic characteristics of varieties. Similar result was recorded by Sarkar *et al.* (2014), Ray *et al.* (2015) and ldris *et al.* (1990).The maximum number of filled grain panicle^{-1} (255.7) was observed in Kataribhog and the minimum (130.8) was obtained from Badshabhog. The minimum number of unfilled grain panicle^{-1} (18.7) was observed in Chinigura and the maximum (31.4) was obtained from Badshabhog. The maximum number of total grains panicle^{-1} (278.2) was observed in Kataribhog and the minimum number of grains panicle^{-1} (162.2) was counted from Badshabhog. The maximum 1000 grains weight (18.3g) was found in Badshabhog and the minimum (11.5g) in Kataribhog. Among, the seven aromatic rice varieties the highest grain yield (2.54 t ha-1) was obtained from Kataribhog that was statistically similar to BRRI dhan34 gave higher yield due to higher numbers filled grain per panicle and higher individual seed weight whereas Badshabhog due to higher number fertile tillers and grains per panicle. The lowest grain yield (1.83 t ha-1) was obtained from Kalizara. The highest straw yield (8.54 t ha- 1) was obtained from Chinigura due to higher plant height and total tillers hill^{-1}. The highest harvest index (37.5%) was calculated from the variety Kataribhog and the lowest (21.1%) was calculated from the variety Chinigura that means the variety Chinigura is less efficient to translocation assimilate towards the grain.

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Table 1: Effect variety on yield and yield contributing attributes of seven aromatic rice cultivars

Treatment (Variety)	Yield and yield contributing attributes										
	Plant height (cm)	Number of total tiller hill^{-1}	Number of effective tiller hill^{-1}	Panicle length (cm)	Number of filled grains panicle-1	Number of unfilled grains panicle^{-1}	Total grains panicle^{-1}	1000-grain weight (g)	Grain yield (t ha^{-1})	Straw yield (t ha^{-1})	Harvest index (%)
Jirakatari	128.67c	11.78a	8.89a	26.28d	172.11d	29.89c	202.0b	12.47b	2.25bc	4.78d	31.96cd
Chiniatab	120.11a	16.11b	9.89ab	24.43ab	143.22b	25.33b	168.56a	11.53a	2.08ab	3.72a	35.87ef
Chinigura	167.0e	12.33a	12.11b	25.20c	162.11d	18.67	180.78a	12.49bc	2.29bcd	8.54f	21.15a
Kataribhog	129.78c	15.33b	11.44ab	26.98d	255.67e	22.56ab	278.22c	11.47a	2.54d	4.23b	37.52f
Kalizara	153.11d	11.44a	9.22a	25.02bc	160.67cd	18.67	179.33a	12.87c	1.83a	5.24e	25.78b
Badshabhog	123.67b	12.11a	9.56ab	26.59d	130.78a	31.44c	162.22a	18.30e	2.05ab	4.52c	30.93c
BRRI dhan34	124.0b	12.33a	9.56ab	23.77a	150.11ab	25.67bc	164.67a	13.53d	2.5cd	4.78d	34.28de
Level of significance	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
CV (%)	12.34	18.98	21.84	4.84	23.36	26.04	21.34	16.93	13.77	28.89	18.41

Figures in a column followed by different letter (s) differ significantly but common letter (s) do not differ significantly at 1% level of probability as adjusted by DMRT.

4. CONCLUSION

From the results it can be concluded that among tested seven aromatic rice variation exists in different growth parameters and yield as well as yield contributing characters. Under North-west condition Kataribhog and BRRI dhan34 are suitable in respect of yield.

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