Bangladesh Agron. J. 2023, 26(1): 1-8

STUDY ON GROWTH AND YIELD OF SOME AROMATIC RICE VARIETIES

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(Received: 17 April 2023, **Accepted:** 11 September 2023**)**

Keywords: Aromatic rice, varietal performance, growth, yield

Abstract

A field experiment was conducted at Agronomy field of Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka during the period from June to December 2017 with seventeen aromatic rice varieties *viz.*, V_1= Chiniatap 1, V_2= Chiniatap 2, V_3= Kataribhog 1, V_4= Kataribhog 2, V_5= BRRI dhan34, V_6= BRRI dhan37, V_7= BRRI dhan38, V_8= BR5/Dulabhog, V_9= Khoisanne, V_{10} = Sadasanne, V_{11}= Zirabhog, V_{12}= Begun bichi, V_{13}= Shakkhorkhora, V_{14}= Chinigura, V_{15}= Kalijira, V_{16}= Badshabhog, V_{17}= Modhumala to study on growth and yield of some aromatic rice varieties. The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications. Regarding growth and yield parameters, the highest number of total tillers hill^{-1} (23.33), leaf area index (5.38), flag leaf length (30.12 cm), number of effective tillers hill^{-1} (21.67), panicle length (32.00 cm), number of grains panicle^{-1} (230.3), number of filled grains panicle^{-1} (212.7), grain yield (3.42 t ha^{-1}), straw yield (6.19 t ha^{-1}) and number of biological yield (9.610 t ha^{-1}) were found in var. BRRI dhan37 but the highest 1000- grains weight (22.80 g) and harvest index (37.48%) were found Modhumala followed by BRRI dhan34, respectively. The lowest number of effective tillers hill^{-1} (13.33), panicle length (24.67 cm), grain yield (1.583 t ha^{-1}), straw yield (4.083 t ha^{-1}), biological yield (5.667 t ha^{-1}) and harvest index (27.89%) were found in the var. Modhumala.

Introduction

Rice (*Oryza sativa* L.) is the most important food crop in Bangladesh where 75.01% of total cropped area is used for rice production, with an annual production of 37.60 million tons from 11.70 million hectares of land (BBS, 2021). 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 and Das, 2000). In Northern districts of Bangladesh, 30% of the rice lands were covered by aromatic rice cultivars during Aman season (Islam *et al.*, 2012). 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 the international market.

The yield of rice depends on its different growth parameters i.e. leaf area index, dry matter production and its partitioning, tillering, etc (Idris and Matin, 1990). Again, the yield of rice also depends on leaf area duration (LAD), crop growth rate (Yusuf, 1997). 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). Though its yield is low, but it requires less input compared to coarse rice.

But research works on local aromatic rice genotypes is limited in Bangladesh in relation to their yield and grain quality characteristics. As such, research work has been undertaken in order to study the yield performance of aromatic rice varieties.

Materials and Methods

The experiment was conducted at the experimental field of Sher-e-Bangla Agricultural University, Dhaka under the Agro-ecological zone of Modhupur Tract, AEZ-28 during the period from July 2017 to December 2017. The experimental area is under the sub-tropical climate that is characterized by high temperature, high humidity, and heavy rainfall with occasional gusty winds in kharif season (April-September) and less rainfall associated with moderately low temperature during the Rabi season (October-March). The experiment was laid out in a randomized complete block design (RCBD) with three replications. The treatments (varieties) were as follows: 1) V_1 = Chiniatap 1, 2) V_2= Chiniatap 2, 3) V_3= Kataribhog 1, 4) V_4= Kataribhog 2, 5) V_5 = BRRI dhan34, 6) V_6 = BRRI dhan37, 7) V_7 = BRRI dhan38, 8) V_8 = BR5 (Dulabhog), 9) V_9 = Khoisanne, 10), V_{10}= Sadasanne, 11) V_{11}= Zirabhog, 12) V_{12} = Begun bichi, 13) V_{13} = Shakkhorkhora, 14) V_{14} =Chinigura, 15) V_{15} = Kalijira, 16) V_{16} = Badshabhog, 17) V_{17} =Modhumala.

The seeds of local varieties were collected from BRRI, Joydebpur, Gazipur, Bangladesh and personal collection. Seeds were sown in seedbed to transplant the seedlings in the main field. The plot selected for the experiment was opened in the last week of July 2017. Weeds and stubble were removed and finally obtained a desirable field for transplanting of the seedlings. Fertilizers and manure were applied for the cultivation of crops as recommended by BRRI, 2016. Uprooted seedlings were transplanted in the main field with a spacing 20 cm from row to row and 15 cm from hill to hill. All intercultural operations like gap filling, weeding, plant protection, irrigation and drainage were taken properly. The rice plant was harvested depending upon the maturity of the plant.The grains were cleaned and finally the weight was adjusted to a moisture content of 12%.

The height of the plant was recorded in centimeters (cm) at the time of 25, 50, 75 date after transplanting (DAT) and at harvest. Number of leaves hill^{-1}, leaf area index (LAI), number of effective tillers hill^{-1}, number of non-effective tillers hill^{-1}, number of total tiller^{-1}, number of filled, unfilled grains, number of total grains, panicle length (cm), sterile percentage, weight of 1000-grains (g) was counted.

Grain and straw obtained from each unit plot were sun-dried and weighed carefully. The biological yield was calculated with the following formula:

$$HI = \frac{\text{Economic yield (grain weight)}}{\text{Biological yield (total dry weight)}} \times 100$$

The data were analyzed, and the means were separated by LSD at 5% level of significance using the statistical computer package program MSTAT-C.

Results and Discussion

Plant height

Plant height of different aromatic rice varieties at different days after transplanting showed statistically significant difference (Table 1). Plant height was increased progressively with the advancement of time and growth stages. At vegetative stage, 25 DAT, among the varieties, the highest (54.47 cm) plant height was observed in the var. Modhumala. On the other hand, the lower (38.4 cm) plant height was observed in Shakkhorkhora which was statistically similar to the var. BRRI dhan34. At 50 DAT, among the varieties the highest (105.8 cm) plant height was

observed in Modhumala while lowest (76.20 cm) in var. BRRI dhan34. At the reproductive phase (75 DAT), the highest plant height was achieved from Modhumala (139.2 cm) and the lower t plant height was recorded in Chinigura (112.1 cm) followed by Kataribhog 1 (112.6 cm), Badshabhog (112.6 cm), BRRI dhan38 (113.2 cm) and Khoisanne (113.3 cm). r. At harvest, among the varieties the maximum (162.8 cm) plant height was observed in the var., Badshabhog which was statistically same with Modhumala. On the other hand, the lowest (137.3 cm) plant height was observed in the var. Khoisanne followed by h Chiniatap 2. Similar results were also reported by Sinha *et al.* (2009), Sarker *et al.* (2013) and Anwar and Begum (2010), also found that plant height varied significantly among the varieties after transplanting which increased up to maturity.

Number of leaves hill^{-1}

Significant difference on total number of leaves hill^{-1} in the rice varieties was observed from vegetative (25 DAT) to reproductive (75 DAT) stage (Table 1).

Table 1. Plant height and number of leaves hill^{-1} of 17 aromatic rice varieties

	Plant height (cm)				Number of leaves hill^{-1}			
	25 DAT	50 DAT	75 DAT	Harvest	25 DAT	50 DAT	75 DAT	Harvest
V_1	48.33 b	84.67 *e*	114.3 fg	154.5 de	22.90 *ef*	53.77 g	57.03 *e*	54.37 d
V_2	40.33 gh	87.33 cd	129.5 b	153.7 de	27.83 a	70.57 a	69.09 a	65.26 a
V_3	40.83 g	81.27 g	112.6 h	138.1 g	22.80 *efg*	67.38 b	62.57 bc	59.66 b
V_4	47.33 bc	88.23 c	127.5 c	149.5 f	22.74 *efg*	60.01 d	56.92 *e*	53.09 f
V_5	39.00 hi	76.20 i	114.3 fg	156.3 cd	22.64 *efg*	66.99 b	62.33 cd	59.30 b
V_6	48.73 b	88.50 c	114.8 f	152.3 *e*	26.75 b	63.69 c	57.95 *e*	54.04 de
V_7	48.50 b	84.77 *e*	113.2 gh	154.1 de	27.43 ab	60.67 d	61.57 cd	57.82 c
V_8	40.67 g	79.00 h	115.3 f	152.8 *e*	24.10 d	64.03 c	61.19 d	57.49 c
V_9	43.33 f	80.83 g	113.3 gh	137.3 g	21.50 h	60.01 d	62.21 cd	58.03 c
V_{10}	43.67 f	80.67 g	114.4 fg	155.7 cd	23.34 de	60.75 d	57.81 *e*	53.54 *ef*
V_{11}	46.43 cd	82.63 f	114.0 fg	157.8 bc	25.00 c	59.10 de	52.02 g	48.36 h
V_{12}	44.33 *ef*	81.83 fg	114.2 fg	157.8 bc	23.20 *ef*	56.90 f	53.99 f	51.09 g
V_{13}	38.40 i	91.67 b	126.1 d	159.9 b	20.33 i	57.34 *ef*	54.53 f	50.78 g
V_{14}	45.67 de	84.67 *e*	112.1 h	159.9 b	22.43 fg	53.78 g	63.81 b	59.35 b
V_{15}	48.47 b	90.50 b	123.6 *e*	157.5 bc	22.03 gh	52.47 g	62.10 cd	59.76 b
V_{16}	45.33 de	86.33 d	112.6 h	162.8 a	21.35 h	49.33 h	52.20 g	48.37 h
V_{17}	54.47 a	105.8 a	139.2 a	162.7 a	25.50 c	52.00 g	41.00 h	37.25 i
$LSD_{0.05}$	1.43	1.20	1.33	2.69	0.80	1.89	1.34	0.83
CV (%)	6.91	7.85	8.68	10.87	6.70	8.92	7.38	06.96

Values followed by same letter(s) did not differ significantly at 5% level of probability

V_1 = Chiniatap 1, V_2 = Chiniatap 2, V_3 = Kataribhog 1, V_4 = Kataribhog 2, V_5 = BRRI dhan34, V_6 = BRRI dhan37, V_7 = BRRI dhan38, V_8 = BR5 Dulabhog, V_9 = Khoisanne, V_{10} = Sadasanne, V_{11} = Zirabhog, V_{12} = Begun bichi, V_{13} = Shakkhorkhora, V_{14} = Chinigura, V_{15} = Kalijira, V_{16} = Badshabhog, V_{17} = Modhumala

The total number of leaves was continued to increase up to 75 DAT and thereafter declined. For 25 DAT, among the varieties tested, the maximum number of leaves hill^{-1} was recorded in Chiniatap 2 (27.83) followed by BRRI dhan38 (27.43) while the lowest number of leaves hill^{-1} was recorded in Shakkhorkhora (20.33). For 50 DAT, the highest number of leaves hill^{-1} was recorded in Chiniatap 2 (70.57) while lowest number of leaves hill^{-1} was recorded in Badshabhog (43.33). For 75 DAT, the highest number of leaves hill^{-1} was recorded in Chiniatap 2 (69.09) and the lowest number of leaves hill^{-1} in Modhumala (41.00).. At maturity, the highest

number of leaves hill^{-1} was recorded in Chiniatap 2 (65.26) and the lowest number of leaves hill^{-1} was recorded in Modhumala (37.25) Similar results also reported by Haque *et al.* (2013), Sarker *et al.* (2013) where the leaf number varied among rice cultivars.

Number of tillers hill^{-1}

The number of tillers plant^{-1} of different aromatic rice varieties on different days after transplanting showed a significant difference (Table 2). At 25 DAT, the highest number of tillers hill^{-1} was produced by BRRI dhan37 (9.94) while a lower number of tillers hill^{-1} was found in Modhumala (6.26) followed by Sadasanne (6.54) and Begun bichi (6.49). At 50 DAT, the maximum number of tillers hill^{-1} was produced by BRRI dhan37 (16.59) followed by Chiniatap 2 (16.03) and BRRI dhan38 (15.72). The lowest number of tillers hill^{-1} was found in Modhumala (9.81) which was significantly different from the rest of the varieties.

At 75 DAT, the maximum t number of tillers hill^{-1} was found in BR5/Dulabhog (23.00) which was at par BRRI dhan38 (22.75), BRRI dhan34 (22.51), and Chiniatap 2 (21.96). The lowest number of tillers hill^{-1} was found in Modhumala (14.87) which was significantly different from the rest of the variety. At maturity, the highest number of tillers hill^{-1} was produced by BRRI dhan37 (23.33) and the lowest number of tillers hill^{-1} was found in Modhumala (13.33). This result was also supported by Zahid *et al.* (2005). Chandra *et al.* (2021) Hossain *et al.* (2008), Obaidullah *et al.* (2009) and Chowdhury *et al.* (2005) also reported that the highest number of fertile tillers per hill was obtained in BRRI dhan37.

Table 2. Number of tillers hill^{-1} and leaf area index (LAI) of 17 aromatic rice varieties

Treatment	Number of tillers hill^{-1}				Leaf area index (LAI)		
	25 DAT	50 DAT	75 DAT	Harvest	25 DAT	50 DAT	75 DAT
V_1	6.81 fg	13.63d	17.63 f	17.67 de	0.76	4.56e	4.36 e
V_2	7.10 f	16.03 ab	21.96 abc	18.00 cd	0.73	4.20 f	4.10 f
V_3	7.90 cd	12.91 d	21.35 bcd	16.67 efg	0.60	3.55 h	3.43 h
V_4	7.08 f	13.79 d	20.17 de	17.33 def	0.53	3.47 h	3.34 h
V_5	7.50 e	15.01 bc	22.51 ab	19.00 bc	1.00	5.32 abc	5.11 bc
V_6	9.94 a	16.59 a	20.16 de	23.33 a	1.07	5.56 a	5.38 a
V_7	8.78 b	15.72 ab	22.75 ab	19.00 bc	0.95	5.44 ab	5.30 ab
V_8	7.66 de	15.33 b	23.00 a	19.67 b	0.99	5.23 bc	5.01 c
V_9	6.76 fg	13.53 d	20.30 de	17.67 de	0.63	3.55 h	3.38 h
V_{10}	6.54 gh	13.10 d	19.65 e	15.33 hi	0.73	4.15 f	4.01 f
V_{11}	8.67 b	13.88 cd	19.83 de	15.67 ghi	0.84	4.55 e	4.37 e
V_{12}	6.49 gh	13.00 d	19.50 e	16.33 fgh	0.61	3.70 gh	3.47 gh
V_{13}	7.93 cd	13.40 d	19.20 e	16.67 efg	0.64	3.85 g	3.66 g
V_{14}	6.64 g	13.32 d	19.73 e	16.67 efg	0.74	4.19 f	3.99 f
V_{15}	7.68 de	14.00 cd	17.46 f	17.33 def	0.91	5.13 cd	4.92 cd
V_{16}	8.13 c	13.18 d	20.75 cde	14.67 i	0.84	4.93 d	4.75 d
V_{17}	6.26 h	9.80 e	14.87 g	13.33 j	0.42	3.12 i	3.02 i
$LSD_{0.05}$	0.35	1.190	1.554	1.251	NS	0.26	0.19
CV (%)	7.74	8.97	9.05	8.35	3.65	9.55	8.49

Values followed by same letter(s) did not differ significantly at 5% level of probability.
V_1 = Chiniatap 1, V_2 = Chiniatap 2, V_3 = Kataribhog 1, V_4 = Kataribhog 2, V_5 = BRRI dhan34, V_6 = BRRI dhan37, V_7 = BRRI dhan38, V_8 = BR5 Dulabhog, V_9 = Khoisanne, V_{10} = Sadasanne, V_{11} = Zirabhog, V_{12} = Begun bichi, V_{13} = Shakkhorkhora, V_{14} = Chinigura, V_{15} = Kalijira, V_{16} = Badshabhog, V_{17} = Modhumala

Leaf area index

Leaf area index of different aromatic rice varieties at different days after transplanting showed significant difference from 55 DAT to 80 DAT but at 25 DAT, all the aromatic rice varieties showed non-significant difference. At 50 DAT, among the varieties the maximum (5.56) leaf area index was observed in the var. BRRI dhan37followed by the var. BRRI dhan34 and BRRI dhan38. On the other hand, the lowest (3.12) leaf area index was observed in the var. Modhumala. At 75 DAT, among the varieties the maximum (5.38) leaf area index was observed in the var. BRRI dhan37 which was followed by the var.

BRRI while the lowest (3.02) leaf area index was observed in the var. Modhumala. Shahidullah *et al.* (2009) who stated that different aromatic rice genotypes exhibited significant variations for leaf area index (LAI).

Number of non-effective tiller hill^{-1}

Number of ineffective tiller hill^{-1} of different aromatic rice varieties showed non- significant difference (Table 3).

Table 3. Number of non-effective tillers hill^{-1}, number of effective tillers hill^{-1}, Length of panicle (cm), number of total grains panicle^{-1}, filled grains panicle^{-1} and unfilled grains panicle^{-1} of aromatic rice varieties.

Treatment	Number of non-effective tillers hill^{-1}	Number of effective tillers hill^{-1}	Length of panicle (cm)	Number of filled grain's panicle^{-1}	Number of unfilled grain's panicle^{-1}
V_1	0.33	17.33cd	31.33 b	121.3h	18.33 f
V_2	0.67	17.33 cd	30.67 c	151.7 e	21.67 e
V_3	0.33	16.33 de	29.00 ef	98.33 j	32.33 c
V_4	1.00	16.33 de	29.00 ef	75.67 k	31.67 c
V_5	0.67	18.33 bc	26.33 h	144.3 f	35.67 b
V_6	1.66	21.67 a	32.00 a	212.7 a	17.67 fg
V_7	0.67	18.33 bc	31.00 bc	183.3 b	44.67 a
V_8	1.00	18.67 b	21.00 k	162.3 d	28.00 d
V_9	0.33	17.33 cd	25.33 i	121.0 h	19.33 ef
V_{10}	0.33	15.00 fg	25.67 i	128.0 g	17.33 fg
V_{11}	0.33	15.33 efg	27.67 g	169.7 c	28.00 d
V_{12}	0.33	16.00 ef	28.67 f	126.0 gh	17.33 fg
V_{13}	0.33	16.33 de	29.33 e	153.0 e	13.33 h
V_{14}	0.33	16.33 de	27.33 g	109.0 i	18.00 fg
V_{15}	1.00	16.33 de	30.00 d	131.3 g	9.00 i
V_{16}	0.33	14.33 g	26.67 h	143.3 f	27.67 d
V_{17}	0.67	12.67 h	24.67 j	93.33 j	15.67 gh
$LSD_{0.05}$	NS	1.20	0.60	5.47	2.50
CV (%)	111.08	10.33	8.34	10.8 6	8.77

Values followed by same letter(s) did not differ significantly at 5% level of probability

V_1 = Chiniatap 1, V_2 = Chiniatap 2, V_3 = Kataribhog 1, V_4 = Kataribhog 2, V_5 = BRRI dhan34, V_6 = BRRI dhan37, V_7 = BRRI dhan38, V_8 = BR5 Dulabhog, V_9 = Khoisanne, V_{10} = Sadasanne, V_{11} = Zirabhog, V_{12} = Begun bichi, V_{13} = Shakkhorkhora, V_{14} = Chinigura, V_{15} = Kalijira, V_{16} = Badshabhog, V_{17} = Modhumala

Number of effective tiller hill^{-1}

Number of effective tiller hill^{-1} of different aromatic rice varieties showed significant difference (Table 3). Among the varieties, the highest (21.67) number of effective tiller found in the var. BRRI while the lowest (12.67) var. Modhumala. Similar results were also reported by Jisan *et al.* (2014) and Yang *et al.* (2001).

Panicle length

Panicle length (cm) of different aromatic rice varieties showed statistically significant difference (Table 3). Among the varieties, the highest (32.00 cm) panicle length was found in the var. BRRI dhan37 and the lowest (24.67) number in the var. Modhumala. Similar results were also observed by Anwar and Begum (2010), Abou-Khalif (2009), Ashrafuzzaman *et al.* (2009), and Sarkar *et al.* (2014).

Number of filled grains panicle^{-1}

Different varieties of aman rice showed significant variation on number of filled grains panicle^{-1} (Table 3). The highest number of filled grains panicle^{-1} (212.7) was observed from in var. BRRI dhan37 and the lowest in var. Kataribhog 2. Similar result were also observed by Kusutani *et al.* (2000) and Chowdhury *et al.* (2005).

Number of unfilled grains panicle^{-1}

Number of unfilled grains panicle^{-1} was significantly varied (Table 3). The highest number of unfilled grains panicle^{-1} (44.67) was observed from the var. BRRI dhan38 and the lowest in the var. Kalijira. Similar result was also observed by Chowdhury *et al.* (2005).

Sterility percentage

Sterility percentage of different aromatic rice varieties showed significant difference (Table 4). Among the varieties, the highest sterility percentage (24.29%) was found in the var. Katari bhog1 and the lowest (6.38%) in the var. Kaligira which was at par to var. BRRI dhan37

Weight of 1000-grains

Weight of 1000-grains (g) of different aromatic rice varieties showed significant difference (Table 4). Among the varieties, the highest (22.80 g) 1000-grains weight (g) was found in the var. Modhumala and the lowest (9.11 g) in the var. Sadasanne. Similar results were also observed by Murshida *et al.* (2017) and Sarkar *et al.* (2014).

Grain yield

Different varieties of rice had significant influence on grain yield (Table 4). In was noted that the highest grain yield (3.42 t ha^{-1}) was observed from the var. BRRI dhan37 whilethe lowest grain yield (1.58 t ha^{-1}) from the var. Modhumala which was followe by Kataribhog2. Similar result was also observed by Haque *et al.* (2013), Murshida *et al.* (2017), and Sarker *et al.* (2013).

Straw yield

Straw yield of different aromatic rice varieties showed significant difference (Table 4). Among the varieties, the highest (6.19 t ha^{-1}) straw yielwas found in the var. BRRI dhan37 and the lowest (4.08 t ha^{-1}) in the var. Modhumala. Similar result was also observed by Chowdhury *et al.* (2005).

Biological yield

Biological yield of different aromatic rice varieties showed significant difference (Table 4). Among the varieties, the highest (9.61 t ha^{-1}) biological yield was found in the var. BRRI dhan37 and the lowest (5.67 t ha^{-1}) in Modhumala. Similar results were also observed by Chowdhury *et al.* (1995). They showed that grain yield was positively correlated with biological yield in rice.

Harvest index

Harvest index (%) of different aromatic rice varieties showed significant difference (Table 4). Among the varieties, the highest (37.48) harvest index was found in the var. BRRI dhan34 and the lowest (27.89) in the var. Modhumala which was at par with Kataribhog1 and Kataribhog2. Similar results were also observed by Ashrafuzzaman *et al.* (2009), and Bhowmick and Nayak (2000).

Table 4. Yield and Yield parameters of aromatic rice varieties

Treatment	Sterility percentage (%)	Weight of 1000-grains (g)	Grain yield (t ha^{-1})	Straw yield (t ha^{-1})	Biological yield (t ha^{-1})	Harvest index (%)
V_1	13.11 fgh	14.95de	2.43f	4.94ef	7.37 e	32.87d
V_2	12.49 gh	12.07 gh	2.22 g	4.91 ef	7.14 fg	31.17 e
V_3	24.98 a	13.57 f	1.90 h	4.77 fg	6.67 i	28.50 gh
V_4	23.48 b	13.72 f	1.69 i	4.29 i	5.99 j	28.23 gh
V_5	19.79 c	10.39 i	3.03 b	5.14 d	8.10 c	37.48 a
V_6	7.647 ij	15.64 d	3.42 a	6.19a	9.61 a	35.58 b
V_7	19.55 c	17.18 c	2.96 bc	5.573bc	8.54 b	34.72 bc
V_8	14.87 de	11.23 hi	2.33 fg	4.783fg	7.12 fg	32.77 d
V_9	13.74 efg	20.08 b	2.30 fg	4.523h	6.82 hi	33.76 cd
V_{10}	11.92 h	9.110 j	2.41 f	4.80 fg	7.21 ef	33.48 cd
V_{11}	14.12 ef	11.11 hi	2.66 e	5.04 de	7.68 d	34.54 bc
V_{12}	11.99 h	10.57 i	2.37 fg	4.57 h	6.94 gh	34.23 bcd
V_{13}	7.977 i	14.02 ef	2.02 h	4.65 gh	6.67 i	30.32 ef
V_{14}	14.05 ef	11.93 gh	2.04 h	4.87 ef	6.91 h	29.48 fg
V_{15}	6.38 j	12.91 fg	2.85 cd	5.62 b	8.47 b	33.66 cd
V_{16}	16.12 d	10.98 hi	2.70 de	5.40 c	7.95 c	33.97 cd
V_{17}	14.29 ef	22.80 a	1.58 i	4.08 j	5.67 k	27.89 h
$LSD_{(0.05)}$	1.34	1.23	0.17	0.17	0.19	1.57
CV (%)	7.88	9.10	6.90	6.37	8.35	9.91

Values followed by same letter(s) did not differ significantly at 5% level of probability

V_1 = Chiniatap 1, V_2 = Chiniatap 2, V_3 = Kataribhog 1, V_4 = Kataribhog 2, V_5 = BRRI dhan34, V_6 = BRRI dhan37, V_7 = BRRI dhan38, V_8 = BR5 Dulabhog, V_9 = Khoisanne, V_{10} = Sadasanne, V_{11} = Zirabhog, V_{12} = Begun bichi, V_{13} = Shakkhorkhora, V_{14} = Chinigura, V_{15} = Kalijira, V_{16} = Badshabhog, V_{17} = Modhumala

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