Performance of aromatic rice varieties under terai region of West Bengal

A.C. SINHA, P. KAIRI, P. S. PATRA AND B. DE

Department of Agronomy,
Uttar Banga Krishi Viswavidyalaya,
Pundibari- 736165, Cooch Behar, West Bengal

Rice is one of the most important and extensively grown food crop in the World. Basmati types are accepted as the best scented, longest and slenderest rice in the World. However, the aromatic rices are also highly regarded throughout Asia and are becoming popular in Europe (Berner and Hoff, 1986) as well as in U.S.A. including non traditional rice growing country like Australia (Blakeney 1992). Several rice growing countries are now working on scented rice and are using basmati as one of the base materials. An aromatic variety may perform well in a wider area; however, its fine grain traits are best expressed only in small pocket known as native area. Keeping these points in mind, the present investigation was undertaken.

A field experiment was carried out at the instructional farm of Uttar Banga Krishi Viswavidyalaya, Pundibari, Cooch Behar, West Bengal during *Kharif* season of 2007 on sandy loam soil with a pH of 5.5-6.8, low in available nitrogen, medium in available phosphorus and available potash. The experiment was laid out in a randomized block design with three replicates. There were seven treatments: V_1= CRM-2203-1, V_2= CRM-2203-2, V_3= CRM-2203-4, V_4= IET-17276 (CRM-2007-1), V_5= Taroari Basmati, V_6= Basmati-386 and V_7= Tulsibhog. Seedlings of 24 days old were transplanted (2-3 cm depth) at a spacing of 20 x 10 cm with 2-3 seedling hill^{-1}. Plot size was 5 x 3 m. Fertilizers were applied at 60, 30 and 30 kg ha^{-1} of N, P_2O_5, and K_2O respectively in the form of urea, single super phosphate and muriate of potash along with 10 t FYM ha^{-1}. The nitrogenous fertilizer was applied in three equal splits *i.e.* during transplantation, 19 days after transplantation (DAT) and at panicle initiation stage (40-45 DAT) but full P and K were applied at the time of transplantation. First and second weeding were done at 19 and 40 DAT. Data were recorded on plant height (cm), number of tillers m^{-2}, dry matter accumulation in roots and shoots**,** panicle length**,** 1000 grain weight (g), grain filling percentage and yield (t ha^{-1}). The data were analysed statistically for comparing the treatment means.

Plant height

Plant height varied significantly among the varieties upto 60 days after transplanting which increased upto maturity. The maximum plant height (121.33cm) was recorded in Taroari Bas, followed by Bas-386 and Tulsi Bhog, however, the minimum plant hight (107.11cm) was observed with CRM-2007-1 at 90 days after transplanting, although they were statistically at par.

Number of tillers m^{-2}

The number of tillers increased continuously and attained a maximum value at 60 days after transplanting. Among the varieties Taroari Bas produced the highest number of tiller at all stages of development (210.50, 347.34, 315.34, 274.20 and 245.25 at 30, 45, 60, 75 and 90 DAT respectively) followed by Bas-386 and CRM-2203-4 but Tulsi Bhog recorded lowest number of tiller m^{-2} .

Dry matter accumulation in roots

It was observed that dry matter accumulation in root increased with the increase in crop age. It was noticed that, Taroari Bas recorded the highest value of dry matter accumulation except at 45 DAT which was recorded with Bas – 386. The variety Tulsi Bhog recorded the lowest values at all the sampling dates (Table 2).

Dry matter accumulation in shoots

The progressive increase in dry matter accumulation was found in different varieties (Table 2) and there was significant difference among the varieties. At 45 DAT, the highest amount of dry matter accumulation (143.71 g m^{-2}) was recorded with Taroari Bas, followed by Bas-386 and CRM-2203-4. Whereas, Tulsi Bhog recorded the lowest value (133.93 g m^{-2}). Similar results were also obtained at the later stages of growth.

Panicle length

The longest panicle (30.00cm) was observed with Taraaribas which was statistically at par with Bas-386 (29.50cm) Tulsi Bhog (28.40cm) and CRM-2203-4 (28.00cm). The shortest panicle (25.66cm) was obtained from CRM-2203-2.

Grain filling percentage

The variety Taroari Bas produced the highest (87.68%) percentage of fertile grains, which was

E mail : pasi100@rediffmail.com
Short communication

Table 1: Effect of varieties on plant height and number of tiller m^{-2} at different growth stages of rice

Varieties	Plant height (cm)					Number of tiller m^{-2}				
	30DAT	45 DAT	60 DAT	75 DAT	90 DAT	30DAT	45 DAT	60 DAT	75 DAT	90 DAT
V_1(CRM-2203-1)	39.66	67.76	87.76	97.54	115.84	141.72	280.23	291.40	245.25	213.80
V_2 (CRM-2203-2)	36.23	63.44	85.45	103.36	110.10	137.61	265.80	277.80	228.50	196.75
V_3(CRM-2203-4)	35.11	62.22	84.12	102.25	109.20	167.36	294.33	308.57	262.40	212.50
V_4(CRM-2007-1)	37.00	65.12	86.14	103.12	107.11	152.68	275.25	296.70	249.75	218.40
V_5 (Taroari Bas)	42.83	69.83	90.18	105.72	121.33	210.50	347.34	315.34	274.20	245.25
V_6 (Bas-386)	33.49	60.12	82.10	100.20	118.20	192.18	327.80	309.80	263.50	236.00
V_7 (Tulsi Bhog)	41.73	68.84	89.81	105.18	116.12	206.27	334.20	311.20	265.50	185.60
LSD (P=0.05)	**6.10**	**5.67**	**6.38**	**NS**	**NS**	**16.30**	**6.79**	**8.51**	**17.56**	**4.375**

Table 2: Effect of varieties on dry matter accumulation in roots and shoots at different growth stages of rice

Varieties	Dry matter accumulation in roots (g m^{-2})					Dry matter accumulation in shoots (g m^{-2})				
	30DAT	45 DAT	60 DAT	75 DAT	90 DAT	30DAT	45 DAT	60 DAT	75 DAT	90 DAT
V_1(CRM-2203-1)	7.10	39.00	62.87	125.11	140.10	41.33	135.00	250.31	405.71	606.78
V_2 (CRM-2203-2)	6.80	36.20	60.33	125.00	140.00	40.34	135.00	248.40	380.67	600.25
V_3(CRM-2203-4)	7.33	40.14	66.83	128.79	143.80	47.67	138.13	255.00	419.77	611.35
V_4(CRM-2007-1)	8.00	39.50	66.75	124.78	143.10	43.67	136.75	252.70	408.15	608.79
V_5 (Taroari Bas)	10.30	45.00	72.50	132.45	150.30	52.34	143.71	256.98	424.60	616.20
V_6 (Bas-386)	9.10	45.84	71.19	130.71	146.70	47.99	142.67	255.25	419.87	634.87
V_7 (Tulsi Bhog)	6.10	31.14	59.48	119.97	136.10	38.33	133.93	246.00	406.00	582.45
LSD (P=0.05)	**2.19**	**7.18**	**7.98**	**3.71**	**5.95**	**6.47**	**9.33**	**9.01**	**10.20**	**8.63**

DAT : Days after transplanting

statistically *at par* with Bas-386 (86.90%) followed by CRM-2203-4, CRM-2203-2, CRM-2007-1 and CRM-2203-1. However, Tulsi Bhog produced the lowest (78.38) percentage of fertile grains (Table 3).

1000 grain weight

The thousand grains weight was highest (25.40 g) in Taroari Bas which was statistically at par with Bas-386 and CRM-2203-4. Tulsi Bhog recorded significantly the lowest value (19.67 g) of 1000 grain weight (Table 3).

Grain yield

The grain yield varied significantly from variety to variety. Among the varieties, the highest grain yield (3.56 t ha^{-1}) was recorded with Taroari Bas followed by Bas-386 (3.30) and CRM-2203-4 (3.13) whereas, Tulsi Bhog produced the lowest yield of (1.42) (Table 3).

Economics

It was revealed that, Taroari Bas recoded highest gross return (Rs. 33820/-) and return: cost ratio (2.58) followed by Bas-386 (Rs. 31350/- and 2.39), CRM-2203-4(Rs. 29735/- and 2.27), CRM-2007-1(Rs. 28500/- and 2.17), CRM-2203-1(Rs. 26030/- and 1.98) and CRM-2203-2 (Rs. 25175/- and 1.92) whereas, Tulsi Bhog recorded lowest gross return (Rs.14768/-) and return: cost ratio (1.13).

REFERENCES

Behera 1998. Response of scented rice (Oryza sativa) to nitrogen under transplanted condition. *Indian J.Agron.*.**43**: 64-67.

Ahuja, S.C. Pawar, D.V.S., Ahuja, U. and Gupta, K.R. 1995. Basmati rice- The scented pearl. Directorate of Publication, CCS Haryana Agril. Univ., Hissar. pp.63.

Ashraf, A., Khalid, A. and Ali, K., 1999. Effect of seedling age and density on growth and yield of rice in saline soil. *Pakisthan J. Biol. Sci*. **2**: 860-62.

Berner, D.K. and Hoff, B.J. 1986. Inheritance of scented in American long grain rice. *Crop Sci*. **26:**876-78.

Blakeney, A.B. 1992. Developing rice varieties with different texture and tastes. *Chem. Australia* **1:** 475-76.

Mahindru, S.N. 1995. *Mannual of Basmati Rice.* Metropolitan Book Co. Pvt.Ltd, New Delhi, India, pp. 307.

Raju VR, Jaggannatham A. and Rao R.S. 1990. Performance of scented rice (*Oryza sativa*) varieties under different levels of nitrogen in Andhra Pradesh. *Indian J.Agric.Sci*. **60**: 694-96.

Table 3: Effect of varieties on yield attributes, yield and economics of rice

Varieties	Panicle length(cm)	Grain filling percentage	1000 grain weight (g)	Grain yield (t ha^{-1})	Gross return (Rs. ha^{-1})	Return: Cost ratio
V_1(CRM-2203-1)	26.00	80.57	20.57	2.74	26030	1.98
V_2 (CRM-2203-2)	25.66	84.94	20.23	2.65	25175	1.92
V_3(CRM-2203-4)	28.00	84.95	24.10	3.13	29735	2.27
V_4(CRM-2007-1)	26.70	84.04	22.80	3.00	28500	2.17
V_5 (Taroari Bas)	30.00	87.68	25.40	3.56	33820	2.58
V_6 (Bas-386)	29.50	86.90	24.60	3.30	31350	2.39
V_7 (Tulsi Bhog)	28.40	78.38	19.67	1.42	14768	1.13
LSD (P=0.05)	**2.224**	**0.965**	**1.434**	**0.704**	-	-