GROWTH AND YIELD OF SHORT SLENDER AROMATIC RICE (*ORYZA SATIVA* L.) VARIETIES AS INFLUENCED BY INTEGRATED NUTRIENT MANAGEMENT

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Abstract: A experiment was conducted during the *kharif* season of 2009 at Instructional Cum Research Farm of India Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh. The result of the experiment revealed that between two varieties, Badshah Bhog was found to produce higher growth, yield attributing characters, yield and B:C ratio as compared to Gopal Bhog. For quality production of scented rice varieties, application of only organic nutrients *i.e.* 20 t FYM ha^{-1}(T_1) was found superior than other integrated nutrient management treatments. As regards to the effect of different integrated nutrient management, the results revealed that various growth parameters and yield attributing characters were recorded highest with the application of 50:50:60 kg NPK ha^{-1} with blending of N and P through FYM (T_6) which also gave the highest yield and economic return.

Keywords: FYM, Inorganic fertilizer, Poultry manures, Scented rice, Vermicompost

INTRODUCTION

Rice (*Oryza sativa* L.) is the most consumed cereal grain in the world, constituting the dietary staple food for more than half of the planet's human population. Asia produces and consumes 90 per cent of world's rice. Among the rice growing countries, India ranks first in area followed by China and Bangladesh. The slogan 'Rice is life' is most appropriate for India as this crop plays a vital role in our national food security. India is well known for its aromatic rice which are distributed in almost all the corners of the country. In India, Chhattisgarh is known as 'rice bowl' considered as one of the centers of origin and evolution of rice and is blessed with funds of rice variability. Aromatic rice occupies an important status in domestic as well as in International market due to its several outstanding qualities and earns premium prices. The success of production potential and its quality depends upon the genetic characteristics of varieties and nutrient management. Therefore information needs to be develop the suitable nutrient management practices for better high productive aromatic rice varieties by integration of inorganic and organic sources of nutrients and proper blending of nutrients to increase the nutrient use efficiency.

MATERIAL AND METHOD

A field experiment was conducted during *kharif* season of 2009 at Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh. The experimental soil was sandy loam with neutral pH (7.12), having low organic carbon (0.58%) and the initial status of N, P_2O_5 and K_2O was available N (170.0 Kg ha^{-1}), medium available P (17.0 Kg ha^{-1}) and available K (270.0 Kg ha^{-1}) respectively. The experiment was laid out in Factorial Randomized Block Design having nine levels of nutrients and two aromatic rice varieties replicated thrice to find out the effect of organic, inorganic and integrated nutrient management on scented rice varieties. The experiment was conducted with two varieties viz. Gopal Bhog (V_1) and Badshah Bhog (V_2) and nine treatments viz. T_1 = 20 t FYM ha^{-1}, T_2 = 5 t Poultry manure ha^{-1}, T_3 = 5 t vermicompost ha^{-1}, T_4 =50:50:60 Kg NPK ha^{-1}, T_5 = 50:50:40 Kg NPK ha^{-1} with blending of N and P through FYM, T_6 = 50:50:60 Kg NPK with blending of N and P through FYM, T_7 = 10 t FYM ha^{-1} + 25:25:20 Kg NPK ha^{-1}, T_8 = 2.5 t Poultry manure ha^{-1} + 25:25:20 Kg NPK ha^{-1}, T_9 = 2.5 t Vermicompost ha^{-1} + 25:25:20 Kg NPK ha^{-1} . N, P_2O_5 and K_2O were basically applied through Urea, Single super phosphate and Murate of potash, respectively. Nitrogen was applied in three equal splits as 30:40:30 % at basal, tillering and panicle initiation stages respectively. However in case of T_4 and T_6 Potassium was applied in two equal splits at basal and panicle initiation stage. In case of blending of N and P, with FYM as in T_4 and T_6, the required quantity of Urea and SSP plot^{-1} was thoroughly mixed with air dried fine powdered form of well decomposted FYM and incubated for 48 hours prior to its application. Rice seedlings *cv*. Gopal Bhog and Badshah Bhog was transplanted at 20 cm x 10 cm spacing.

RESULT AND DISCUSSION

Data in Table 1 and 2 revealed that the aromatic rice svariety Badshah Bhog recorded significantly increased higher plant height (143.5 cm), number of tillers m^{-2} (318.6) than Gopal Bhog. Higher number of effective tillers m^{-2} (295.4), number of spikelets panicle^{-1} (215.7) and grain yield (28.1 q ha^{-1}) were recorded with Badshah Bhog than Gopal Bhog. While variety Gopal Bhog gave significantly highest panicle length (29.9 cm), panicle weight (2.8 g), sterility percentage (19.1) and test weight (17.1 g) as compared to Badshah Bhog. Lower sterility percentage (14.5 %), higher number of effective tillers and spikelets panicles^{-1} may be the reason for recording higher yield of Badshah Bhog.

Among the different integrated nutrient management treatment, application of 50:50:60 Kg NPK ha^{-1} with blending of N and P through FYM (T_6) resulted significantly higher plant height and it was at par with treatments T_4 and T_8. The application of 50:50:60 Kg NPK ha^{-1} with blending of N and P through FYM (T_6) excellent in producing the heaviest plants which remained at par to treatments T_1, T_4, T_5, T_7, T_8 and T_9. The highest value of dry matter accumulation on these treatments might be due to higher direct availability and translocation of nutrient during development phase of growth stage which facilitate more photosynthesis process and resulted in higher dry matter accumulation (Roul *et al.* 2007 and Netam *et al.* 2008).

In case of integrated nutrient management treatments, application of 50:50:60 Kg NPK ha^{-1} with blending of N and P through FYM (T_6) recorded significantly largest panicles which was found to be at par with application of treatments T_4, T_5, T_7, T_8 and T_9.Whereas application of 50:50:60 Kg NPK ha^{-1} with blending of N and P through FYM (T_6) was observed significantly higher grain yield (30.17 q ha^{-1}) over others and it was at par with treatments T_4, T_5, T_7 and T_8. The increases in yield under these treatments have been attributed owing to increased growth and yield attributing characters as well (Sarawgi *et al.* 2006 and Ganajaxi and Math 2008). It is well known fact that vermicompost helps in improving the soil properties and other organic sources like poultry manure, FYM helps in continuous supply of the nutrients, various enzymes and hormones, reduced nutrient loss and enhanced the nutrient use efficiency and yield (Pandey *et al.* 1999 and Pal *et al.* 2001).

Table1: Growth and yield attributes of aromatic rice varieties as affected by integrated nutrient management

Treatments	Plant Height (cm)	Tillers m^{-2} (No)	Dry matte accumu -lation (g $hill^{-1}$)	Effective Tillers m^{-2} (No)	Panicle length (cm)	Panicle weight (g)	Spikelets $Panicle^{-1}$ (No)	Sterility (%)	Test Weight (g)
Varieties									
V1-Gopal Bhog	132.4	298.1	34.2	261.0	29.9	2.8	180.7	19.1	17.1
V2-Badshah Bhog	143.5	318.6	36.3	295.4	25.6	2.2	215.7	14.5	11.6
CD at 5%	1.56	7.7	NS	16.3	0.9	0.2	16.5	2.3	2.3
Integrated nutrient Management									
T1 - 20t FYM ha^{-1}	137.0	304.0	33.5	269.2	26.9	2.4	190.2	18.4	13.0
T2 - 5t PM ha^{-1}	131.9	297.3	31.1	248.0	26.3	2.2	169.9	20.0	11.8
T3 - 5t VC ha^{-1}	132.8	304.0	31.6	260.5	26.4	2.4	184.4	18.7	12.4
T4 – 50:50:60 Kg NPK ha^{-1}	143.7	313.6	38.6	294.8	28.8	2.6	210.5	14.0	15.9
T5 – 50:50:40 Kg NPK ha^{-1} with blending of N and P through FYM	139.2	308.3	34.6	284.5	28.1	2.5	201.8	17.3	13.2
T6 – 50:50:60 Kg NPK ha^{-1} with blending of N and P through FYM	145.5	315.3	40.1	297.7	29.1	2.6	226.3	12.3	22.4
T7 - 10t FYM ha^{-1}+ 25:25:20 Kg NPK ha^{-1}	142.2	310.0	36.9	284.8	28.3	2.5	200.6	16.2	13.5
T8 – 2.5t PM ha^{-1}+ 25:25:20 Kg NPK ha^{-1}	142.7	312.7	37.0	286.2	28.7	2.6	202.5	16.6	13.9
T9 – 2.5t VC ha^{-1}+ 25:25:20 Kg NPK ha^{-1}	137.3	306.6	33.8	278.2	27.2	2.5	197.1	17.6	13.1
CD at 5%	3.3	NS	7.1	NS	2.0	NS	NS	NS	NS

Note: FYM = Farm Yard Manure, PM = Poultry Manure, VC = Vermicompost.

Table 2: yield, harvest index and B:C ratio of aromatic rice varieties as affected by integrated nutrient management

Treatment	Grain yield(q ha^{-1})	Straw yield (q ha^{-1})	Harvest index(%)	B:C ratio
Varieties				
V1-Gopal Bhog	21.9	82.3	28.7	0.9
V2-Badshah Bhog	28.1	87.6	33.7	1.5
CD at 5%	2.82	NS	NS	-
Integrated nutrient management				
T1 - 20t FYM ha^{-1}	21.7	81.2	33.9	0.8
T2 - 5t PM ha^{-1}	20.4	77.4	25.8	0.9
T3 - 5t VC ha^{-1}	21.6	78.4	26.5	0.9
T4 – 50:50:60 Kg NPK ha^{-1}	29.9	92.0	37.9	1.6
T5 – 50:50:40 Kg NPK ha^{-1} with blending of N and P through FYM	24.3	81.8	31.6	1.2

T6 – 50:50:60 Kg NPK ha^{-1} with blending of N and P through FYM	30.2	105.7	28.4	1.7
T7 - 10t FYM ha^{-1}+ 25:25:20 Kg NPK ha^{-1}	25.0	83.6	31.7	1.1
T8 – 2.5t PM ha^{-1}+ 25:25:20 Kg NPK ha^{-1}	28.0	83.2	36.7	1.6
T9 – 2.5t VC ha^{-1}+ 25:25:20 Kg NPK ha^{-1}	24.0	81.2	28.1	1.1
CD at 5%	5.9	NS	NS	-

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