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SHORT COMMUNICATION

Estimation the Effect of Combined Use of Organic and Inorganic Nutrient and Different Plant Geometry on Red Rice Cultivars

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ABSTRACT

An experiment was carried out during *kharif* season of 2016 at Instructional cum Research Farm, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh. The experiment was laid out in split plot design with three replications keeping two red rice cultivars viz., Bantha luchai and Mokdo with two spacing 20 cm x 10 cm and 15 cm x 10 cm in main plots and four nutrient management i.e application of 100 % RDF, 75 % RDF, 50% RDF + 50 % RDN through FYM and 100 % RDN through FYM in sub plots. The recommended dose of fertilizers for red rice was 80: 60: 40 kg ha^{-1} N, P_2O_5 and K_2O, respectively. The calculated and net soil available nitrogen was affected with variety, plant geometry and nutrient management. The highest calculated and net soil available nitrogen were recorded under Mokdo + 20 cm x 10 cm, followed by calculated in Bantha luchai + 15 cm x 10 cm and net in Bantha luchai + 20 cm x 10 cm. The lowest calculated and net soil available nitrogen was recorded under Mokdo + 15 cm x 10 cm. In case application of 100 % RDN through FYM, the highest calculated and net soil available nitrogen was recorded with application of 100 % RDN through FYM followed by 50 % RDF + 50 % RDN through FYM. The lowest calculated and net soil available nitrogen was recorded with the 100 % RDF.

Key words *nitrogen, net, calculated, farm yard manure.*

Rice with a red bran layer is called red rice. Thought the color is confined to the bran layer, a tinge of red remains even after a high degree of milling. The color of the bran range from light to dark red. The bran layer contains polyphenols and anthocyanin and possesses antioxidant properties. The inner portion of red and white rice is alike and white. The zinc and iron content of red rice is 2-3 times higher than that of white rice (Ramaiah and Rao. 1953). The nutrient requirement of red rice is lesser than the white rice but the nutrietional quantity is much more in red rice than white rice. Area under rice crop in India is about 43.95 MT with production of 103 MT and productivity of 2424 kg ha^{-1} during 2013-14 (Anonymous, 2014). Chhattisgarh is known as "Rice bowl of India" and about 82 % population of the

Table 1. Effect of plant geometry and nutrient management on balance sheet of soil available nitrogen (kg ha^{-1}) of red rice cultivars

Treatment	Initial available soil N	Addition of N through fertilizer	Total available N	Removal of N by crop	Expected balance of available N	Actual balance of available N	Calculated gain of available N	Net available soil N
Variety + plant geometry								
Bantha luchai +20 cm x 10 cm	184.2	45	229.2	68.5	160.7	205.5	44.8	21.3
Bantha luchai + 15 cm x 10 cm	184.2	45	229.2	64.1	165.1	215.3	50.3	31.1
Mokdo + 20 cm x 10 cm	184.2	45	229.2	89.9	139.3	197.2	57.9	13.0
Mokdo + 15 cm x 10 cm	184.2	45	229.2	78.7	150.5	194.7	44.2	10.5
Nutrient management								
100 % RDF	184.2	80	264.2	75.8	188.4	196.8	8.3	12.6
75 % RDF	184.2	60	244.2	68.6	175.6	200.1	24.6	15.9
50 % RDF + 50 % RDN (FYM)	184.2	40	224.2	88.0	136.2	204.8	68.6	20.6
100 % RDN (FYM)	184.2	0	184.2	68.9	115.3	211.0	95.7	26.8
Grand Mean	184.2	45	229.2	95.7	153.9	203.2	49.3	19.0

state is dependent on agriculture for their livelihood. The total rice grown area in Chhattisgarh is 3.61 million hectares with production of 6.36 million tonnes and productivity of 2.0 tonnes ha^{-1} (Anonymous, 2013-14).

MATERIAS AND METHODS

The experiment was conducted at IGKV, Raipur during kharif 2016 and was laid out in split plot design with three replications keeping two red rice cultivars viz., Bantha Luchai and Mokdo with two spacing 20 x 10 cm and 15 x 10 cm in main plots and four nutrient management i.e soil application of 100 % RDF, 75 % RDF, 50 % RDF + 50 % RDN through FYM and 100 % RDN through FYM in sub plots. The soil of experimental field was '*Vertisols*', low in nitrogen (184.20 kg ha^{-1}), medium in phosphorus (10.12 kg ha^{-1}) and medium in potassium (252.6 kg ha^{-1}) contents with normal pH (6.8). The recommended dose of fertilizers for red rice was 80: 60: 40 kg ha^{-1} N, P_2O_5 and K_2O, respectively and applied through urea, single super phosphate and muriate of potash. Half dose of N, entire dose of P and K were applied after one week of transplanting and remaining half of the nitrogen through urea were top dressed at tillering and panicle initiation stage in equal amount. One seedling was transplanted in each hill at 20 cm x 10 cm and 15 cm x 10 cm spacing on 27 July 2016 and harvested on 7 November 2016.

RESULTS AND DISCUSSION

Balance sheet of soil available nitrogen (kg ha^{-1})

The data regarding balance sheet of soil available nitrogen as influenced by various treatments are presented in Table 1.The calculated and net soil available nitrogen was affected with variety, plant geometry and nutrient management. The highest calculated (57.9 kg ha^{-1}) and net (31.1 kg ha^{-1}) soil available nitrogen were recorded under Mokdo + 20 cm x 10 cm, followed by calculated in Bantha luchai + 15 cm x 10 cm and net in Bantha luchai + 20 cm x 10 cm (50.3 and 21.3 kg ha^{-1} respectively). The lowest calculated (44.2 kg ha^{-1}) and net (10.5 kg ha^{-1}) soil available nitrogen was recorded under Mokdo + 15 cm x 10 cm. The calculated and net soil available nitrogen was increased in the 100 % RDN through FYM, the highest calculated (95.7 kg ha^{-1}) and net (26.8 kg ha^{-1}) soil available nitrogen was recorded with application of 100 % RDN through FYM followed by 50 % RDF + 50 % RDN through FYM (68.6 kg ha^{-1}, respectively). The lowest calculated (8.3 kg ha^{-1}) and net (12.6 kg ha^{-1}) soil available nitrogen was recorded with the 100 % RDF.

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