

Yield, physical properties and nutrient availability in Chilli grown Vertisols as influenced by N application through FYM and Urea.

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Abstract

Application of FYM alone or in combination of urea increased the green and dry chilli yield and improved all physical properties of a Vertisol.

Introduction

Indian agriculture is required to lay greater emphasis in conserving organic matter and also in integrated nutrient management system. There are wide gaps between nutrient removal and addition of nutrients leading to high depletion and obviously imbalance poses serious threats to sustainability. Therefore, improvement lies in the combined use of all sources of plant nutrients and by improving nutrient use efficiency (Panda, 1996). Though, chilli responds to application of major nutrients, very meagre work was carried out to study the combined response of FYM and urea particularly on physical and chemical properties of chilli grown Vertisols. The present study was, therefore, undertaken to evaluate influence of applied nitrogen through FYM and Urea on yield and some physical and chemical properties of Vertisol.

Materials and Methods

A field experiment was conducted in 1995-96 with chilli (cv. Pusa Jwala) on a Typic Haplusterts at Horticultural Farm, Marathwada Agricultural University, Parbhani, during rabi season. The soil was clay in texture having bulk density 1.3 Mg/m, porosity 48.67 per cent, hydraulic conductivity 2.30×10^{-6} m/s and water holding capacity 42.28 per cent. The pH of the soil was 8.3, organic carbon 5.3 g/kg, CaCO_3 119.59 g/kg, available N 254.2 kg/ha, P_2O_5 17.0 kg/ha and K_2O 282.2 kg/ha. Initial and post harvest soil samples were analysed for their physical and chemical properties as per the standard procedures.

Results and discussion

The data (Table 1) indicated that application of nitrogen through FYM alone and in combination with urea increased the green and dry chilli yield and also improved all the physical properties under study. The highest yields and improvement in soil physical properties was observed in treatment receiving 75 kg N/ha through FYM + 75 kg N/ha through urea (T_{10}) which may be attributed to more nutrient availability, better aggregation of soil particles, formation of more pore spaces due to enhancement of microbial population, better aeration and friability of soil as reported by Gattani *et al* (1976).

The maximum N, P_2O_5 and K_2O availability was also recorded in the treatment receiving 75 kg N/ha through FYM + 75 kg N/ha through urea. Further, increase in N availability was observed in the treatment receiving 150 kg N either through FYM or through urea which is ascribed to more supply of N in its readily available form. The pronounced effect of FYM on N availability might be due to solubilization of different organic nitrogenous compounds into available form as reported by Puranik *et al* (1978). The available P_2O_5 was also increased with the supply of nitrogen through FYM + urea

Table 1. Effect of nitrogen through FYM and Urea on Chilli Yield, physical properties and nutrient availability in soil at harvest.

Treatment	Yield of Green chili* (kg/ha)	Yield of Red chilli** (kg/ha)	Bulk density Mg/m ³	Porosity (%)	Hydraulic conductivity (10 ⁻⁶ m/s)	Water holding capacity (%)	Nutrient availability at harvest (kg/ha)		
							N	P ₂ O ₅	K ₂ O
T1. Control	2318.00	1076.50	1.32	48.67	2.31	46.52	184.82	10.11	233.71
T2. 90 kg N ha ⁻¹ through FYM	4873.90	1335.80	1.30	48.07	2.69	47.02	209.06	11.74	245.66
T3. 120 kg N ha ⁻¹ through FYM	5412.90	1654.80	1.28	49.00	3.05	48.30	315.69	12.44	238.93
T4. 150 kg N ha ⁻¹ through FYM	6088.40	1782.70	1.27	49.25	3.44	48.03	341.82	13.85	235.95
T5. 90 kg N ha ⁻¹ through Urea	4548.10	1325.90	1.32	48.28	2.64	46.42	195.47	10.16	235.20
T6. 120 kg N ha ⁻¹ through Urea	5338.80	1535.80	1.33	47.99	2.92	46.88	295.83	10.56	239.68
T7. 150 kg N ha ⁻¹ through Urea	5639.30	1644.40	1.33	47.99	2.92	45.97	312.55	11.25	244.16
T8. 45 kg N ha ⁻¹ through FYM+ 45 kg N ha ⁻¹ through Urea	4775.30	1477.80	1.32	48.57	2.66	46.74	212.20	11.75	248.64
T9. 60 kg N ha ⁻¹ through FYM+ 60 kg N ha ⁻¹ through Urea	6232.10	1718.50	1.31	48.12	2.91	46.71	238.33	10.85	250.88
T10. 75 kg N ha ⁻¹ through FYM+ 75 kg N ha ⁻¹ through Urea	6802.60	1975.30	1.31	47.93	3.31	47.56	356.45	12.06	257.60
C.D. (P=0.05)	2076.30	268.80	0.021	1.18	0.061	0.74	24.84	2.09	N.S.

*Total yield of three pickings, ** yield of last picking.

as compared to its respective level alone showing synergistic relation and which might be due to acidifying action of microbes on FYM at the time of its decomposition making more phosphorus available as observed by Gattani et al (1976). The variations due to potassium availability are little and could not reach to the level of significance.

As regards to availability of nutrients it was observed that combined application of nitrogen i.e. 50 per cent through FYM and 50 per cent through urea improved its efficacy over either source alone. Increase in the N availability with the application of N either through FYM or urea may be ascribed as a result of more supply of N in its readily available form.

References

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