

Effect of nitrogen levels on growth and yield of turmeric

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Abstract

An experiment was conducted during 2000-2001 to study the response of two turmeric varieties (Krishna and Selam), five levels of nitrogen (0, 40, 80, 120, 150 kg ha⁻¹) on growth and yield. The results indicated that variety Krishna responded favourably for all the characters to the application of 120 kg N ha⁻¹. The maximum rhizome yield of 277.87 and 225.43 q ha⁻¹, respectively was harvested by the application of 120 kg N ha⁻¹ with turmeric variety 'Krishna'. The interaction of nitrogen x variety was significant only for fresh weight of fingers per plant.

Keywords : crop yield, *Curcuma longa*, nitrogen, turmeric

Turmeric (*Curcuma longa* L.) plays a vital role in earning foreign exchange for the country. It is grown in rainfed and irrigated regions of Maharashtra. Planting of turmeric in these areas commences from April and continues upto the end of July. Similarly, different varieties grown in the state and nitrogen is used at different levels by the cultivators for turmeric. No systematic research has been done on these aspects of turmeric cultivation. Therefore, these studies were initiated at Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola to determine suitable variety and nitrogen level to achieve higher production of turmeric.

The experiment was conducted during kharif season of the year 2000-2001. The treatments comprised of two turmeric varieties (Krishna and Selam) and five levels of nitrogen (0, 40, 80, 120, 150 kg ha⁻¹) and their combinations in a factorial Randomised Block Design with four replications. The mother rhizomes

of these varieties were planted in the first week of June in ridges and furrows at 8 to 10 cm deep with a spacing of 30.0 cm x 22.5 cm. The net plot size was 3.0 m x 2.25 m. Half dose of nitrogen as per the treatment in the form of urea and full dose of P₂O₅ and K₂O in the form of single super phosphate and muriate of potash, respectively, were applied at the time of planting. Remaining half dose of nitrogen was applied, 45 days after planting.

Data were recorded from five plants selected at random in each plot. The observations on plant height, leaf area prior to harvest of rhizomes and fresh weight of mother rhizomes, number of fingers per plant, length of fingers per plant, girth of fingers per plant, fresh weight of fingers per plant and fresh yield per hectare after harvesting the crop were recorded. Leaf area was computed by multiplying the product of length and breadth of the leaf with conversion factor (0.72).

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Effect of nitrogen

The nitrogen levels significantly influenced both vegetative and rhizome yield of turmeric (Table 1). Maximum leaf area (569.72 cm²), plant height (83.11 cm), fresh weight of mother rhizomes per plant (66.42 g), number of fingers per plant (22.17), length (8.69 cm) and girth of fingers (8.41 cm), fresh weight of fingers per plant (237.12 g) and rhizome yield (277.87 q) were recorded with the application of 120 kg N ha⁻¹ and this nitrogen level was found superior to 150 kg N ha⁻¹. The results of present findings are in agreement with the results of Muthuswamy & Shah (1981), Balashanugam & Chezhiyan (1986), Pandey (1992) and Singh & Singh (1988).

Effect of variety

The data on plant growth and yield attributes of the two varieties are presented in Table 1. Variety Krishna recorded maximum plant height (88.47 cm), leaf area (503.54 cm²),

weight of mother rhizomes (68.58 g), the number of fingers per plant (20.08) and length (8.47 cm) and girth (7.94 cm) of fingers as compared to the variety Selam. The highest fresh weight of fingers per plant (194.77 g) and yield per hectare (225.43 q) were also recorded in the variety Krishna as compared to variety Selam. Similar results were reported in the variety Krishna by Umate *et al.* (1984) and Pujari *et al.* (1986; 1987).

Effect of nitrogen x variety

The interaction effects between nitrogen level and variety were found to be significant only for the fresh weight of rhizome per plant (Table 1). The fresh weight of fingers per plant was significantly high (255.55 g) in the combinations of 120 kg N ha⁻¹ with Krishna variety of turmeric. These results are in close agreement with the earlier reports (Balashanmugam & Chezhiyan 1986; Singh & Singh 1988; Umate *et al.* 1989).

In conclusion the variety Krishna can be

Table 1. Effect of Nitrogen levels on growth and yield of turmeric var. Krishna and Selam

Treatment	Plant height (cm)	Leaf area (cm ²)	Weight of mother rhizomes (g)	Number of fingers plant ⁻¹	Length of fingers plant ⁻¹ (cm)	Girth of fingers plant ⁻¹ (cm)	Fresh weight plant ⁻¹ (g)	Yield ha ⁻¹ (q)
Variety								
Krishna	88.47	503.54	68.68	20.08	8.47	7.94	194.77	225.43
Selam	72.34	481.66	51.66	15.69	7.18	6.81	177.45	201.45
SE (m) ±	0.32	6.48	0.65	0.49	0.11	0.09	1.03	4.42
CD at 5 %	0.93	18.80	1.91	1.43	0.32	0.27	2.99	12.85
Nitrogen level (kg ha⁻¹)								
0	76.71	369.30	52.81	13.45	7.10	6.58	135.30	154.83
40	78.84	454.77	57.82	16.45	7.38	6.97	154.61	185.97
80	81.40	525.72	61.14	18.67	7.88	7.29	192.52	207.89
120	83.11	569.72	66.42	22.17	8.69	8.41	237.12	277.87
150	81.96	543.48	62.66	18.70	8.09	7.62	211.00	240.66
SE (m) ±	0.50	10.24	1.04	0.78	0.17	0.15	1.63	7.00
CD at 5 %	1.47	29.74	3.02	2.26	0.50	0.44	4.73	20.32
Interaction (V x N)	NS	NS	NS	NS	NS	NS	6.69	NS
CD at 5 %								

cultivated with the application of nitrogen @ 120 kg ha⁻¹ for obtaining better growth and higher yield under Akola conditions.

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