

## Response of castor (*Ricinus communis*) to nitrogen and phosphorus

R. K. MATHUKIA AND M. M. MODHWADIA

Department of Agronomy, Gujarat Agricultural University, Junagadh 362 001

Received: January 1992

A field experiment was conducted with castor (*Ricinus communis* L.) to study the effect of nitrogen and phosphorus on its yield at Junagadh, during the rainy season (*kharif*) of 1986. The clayey soil had 74.9% clay, pH 7.8, electrical conductivity 0.51 mmhos/cm, and was moderate in total nitrogen (0.067%) and available phosphorus (36.96 kg P<sub>2</sub>O<sub>5</sub>/ha) and fairly rich in available potash (307.02 kg K<sub>2</sub>O/ha). Twenty treatment combinations consisting of 5 levels of N (0, 25, 50, 75 and 100 kg/ha) and 4 levels of P (0, 25, 50 and 75 kg P<sub>2</sub>O<sub>5</sub>/ha) were tried in randomized block design with 4 replications. The castor variety 'GCH 4' was sown on 30 July 1986, keeping 90 cm × 60 cm spacing with seed rate of 6 kg/ha manually, and harvested according to maturity of different spike orders. As per treatments, the entire dose of P in the form of single superphosphate and half the quantity of nitrogen in the form of urea were applied before sowing and the remaining N was top-dressed in the form of urea after 45 days after sowing.

The seed yield was significantly affected by various levels of nitrogen and increased with each increment in N level (Table 1). Application of 100 kg N/ha gave the highest seed yield of 14.90 q/ha but was on a par with 75 and 50 kg N/ha which produced 14.96 and 14.81 q/ha seed yields respectively. The appreciable increase in

seed yield in favour of 50 kg N/ha and above was probably due to improvement and development of growth and yield attributes, viz. plant height, length of main spike, number of capsules/main spike, number of spikes/plant and seed weight/plant. Similarly, stalk yield of castor did not differ under 50, 75 and 100 kg N/ha, but was higher over the lower levels of 0 and 25 kg N/ha. The additive effect of plant height under 50, 75 and 100 kg N/ha might have resulted in higher stalk yields under these levels. These findings are in agreement with those of AICRPDA, Dantiwada (1984), Narkhede *et al.* (1984) and Patel (1985).

The seed yield was not significantly affected by various levels of phosphorus. Failure to increase the seed yield may be due to the fact that different levels of P did not remarkably improve the yield attributes, viz. length of main spike, capsules/main spike, spikes/plant and seed weight/plant. Application of P @ 50 and 75 kg/ha gave higher stalk yields than 0 and 25 kg P/ha. Higher stalk yields under 50 and 75 kg P/ha might have evidently resulted from higher plant height under these levels. The profound effect of P on stalk yield may be at the expense of seed yield. The non-response of P by castor may be due to fluctuation in soil moisture, resulting from scanty, erratic and unevenly distributed rains and high calcareous and clay content of soil with

Table 1. Effect of nitrogen and phosphorus on yield and yield attributes of castor

Treatment	Plant height (cm)	Length of main spike (cm)	Capsules/main spike	Spikes/plant	Seed weight/plant (g)	100-seed weight (g)	Seed yield (q/ha)	Stalk yield (q/ha)
<i>N</i> (kg/ha)								
0	62.1	32.5	59.7	6.7	79.80	26.48	13.32	15.34
25	62.9	32.8	60.0	7.0	80.15	26.88	13.73	15.52
50	66.5	35.3	63.9	7.4	84.53	27.71	14.81	16.34
75	67.1	35.9	64.3	7.4	84.70	27.96	14.96	16.59
100	67.6	36.3	65.7	7.5	85.55	28.19	14.99	16.77
CD (P=0.05)	3.2	2.4	3.8	0.3	4.36	0.80	0.87	0.28
<i>P<sub>2</sub>O<sub>5</sub></i> (kg/ha)								
0	63.2	33.5	60.9	7.1	82.03	27.27	14.06	15.59
25	64.8	34.8	62.3	7.3	82.67	27.46	14.23	15.72
50	67.3	34.8	63.7	7.2	83.29	27.50	14.39	16.56
75	65.7	35.6	64.0	7.2	83.79	27.57	14.77	16.58
CD (P=0.05)	2.9	NS	NS	NS	NS	NS	NS	0.70

medium status of available P. The results confirm the findings of AICRPDA, Dantiwada (1984).

#### REFERENCES

- AICRPDA, Dantiwada, 1984. Fertilizer use in castor variety GAUCH 1. (In) *Annual Progress Report, 1983-84*. All-India Co-ordinated Research Project on Dryland Agriculture, Subcentre, Dantiwada.
- Narkhede, B. N., Patil, A. B. and Deokar, A. B. 1984. Varietal response to plant densities and nitrogen application in castor. *Journal of Oilseeds Research* 1 (2): 109-114.
- Paida, V. J. 1976. 'Effect of nitrogen and phosphorus fertilization on growth, yield and oil content of castor (*Ricinus communis* L.)'. M. Sc. (Agriculture) thesis (unpublished), Gujarat Agricultural University, Sardar Krushinagar.
- Patel, M. K. 1985. 'Effect of nitrogen and phosphorus in yield and chemical composition of castor variety GAUCH 1 under rainfed and irrigated condition.' M. Sc. (Agriculture) thesis, Gujarat Agricultural University, Sardar Krushinagar (unpublished).