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Short Communication

A Note on Effect of Different Levels of Nitrogen and Phosphorus on Yield and Yield Attributes of Castor 'GAUCH-1' (*Ricinus Communis Linn*) @*

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Castor is one of the important oil seed crops in Gujarat State where it is grown in an area of about 88,000 hectares. Pioneering research has been done in Gujarat State for this crop to evolve hybrids to be grown successfully under commercial cultivation. Among the various agronomic factors augmenting crop yield, nutrient supply is con idered as one of the basic factors for achieving higher yields. Practically no work was carried out on the fertilizer requirements of castor hybrid 'GAUCH-1' evolved at the Main Oil seeds Research Station, Junagadh, and released in 1973 for general cultivation. Keeping this fact in mind, a field investigation was conducted at the College Farm of Gujarat Agricultural University, Junagadh Campus, Junagadh, during the *kharif* season of the year 1975-76 to study response of castor hybrid 'GAUCH-1' to different levels of nitrogen and phosphorus under rainfed conditions. There were sixteen treatment combinations involving four levels of nitrogen (0, 30, 60 and 90 kg N/ha) and four levels of phosphorus (0,30, 60 and 90 kg P_2O_5/ha) tested in randomized block design replicated four times. The gross and net plot sizes were 15 m x 4.5 m and 12.6 m x 2.7 m, respectively. Full dose of phosphorus in the form of single superphosphate and half dose of nitrogen in the form of urea were applied by country seed drill before sowing. Remaining half of the nitrogen in the form of urea was top-dressed by hand after one and a half months of sowing.

The total rainfall during the year 1976-77 was 807 mm which was 131 mm more than the average. The soil of the experimental plot was clayey in texture with medium status of total nitrogen, available phosphorus and available potash in the surface soil of 0-15 cm. The status of the above nutrients was low in the soil at a depth of 15-30 cm. The pH of the soil ranged from 7.8 to 8.0

The average yields, growth characters and oil content obtained from produce of different treatments are presented in Table 1. The data indicated

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TABLE 1

Effect of N and P_2O_5 on the yield, growth attributes and oil content of Castor GAUCH 1.

Treatment	*Seed yield kg/ha*	*Dry matter kg/ha*	*Oil content %*	*Plan ht. cm*	*Length of main spike, cm*	*No. of capsules on main spike*	*No. of spikes/ plant*	*Wt. of seeds/ plant 9*	*100-seed wt. g.*
N levels, kg/ha									
0	1136	1953	45.60	130.6	35.3	46.3	6.5	65.2	25.75
30	1213	2349	45.61	153.0	42.5	49.8	6.7	70.6	25.85
60	1305	2517	45.63	158.1	45.5	54.6	7.0	75.2	26.10
90	1464	3247	45.65	173.0	49.2	58.3	7.3	81.5	26.07
S.Em.±	13.82	50.56	0.084	2.67	0.823	0.909	0.191	0.681	0.057
C.D. 5%	39.40	144.05	N.S.	7.61	2.35	2.59	0.545	1.941	0.163
P_2O_5 levles, kg/ha									
0	1272	2378	45.63	148.6	41.3	50.7	6.5	72.1	25.68
30	1274	2492	45.65	148.1	42.8	52.4	6.8	73.8	25.00
60	1287	2583	45.60	159.2	43.1	52.8	7.0	73.6	26.02
90	1288	2612	45.63	158.5	45.2	52.7	7.2	73.0	26.05
S.Em.±	13.82	50.56	0.084	2.67	0.823	0.909	0.191	0.681	0.057
C.D. 5%	N.S.	144.03	N.S.	7.61	2.35	N.S.	N.S.	N.S.	0.163
C.V. %	4.4	8.0	0.74	6.9	7.6	6.9	11.0	3.7	1.00

TABLE 2

Effect of N and P_2O_5 on total income, cost of cultivation and net realization.

Treatment	*Yield kg/ha*		*Total income Rs/ha*	*Total cultivation cost Rs/ha*	*Net realization Rs/ha*
	Seed	*Dry matter*			
N levels, kg/ha					
0	1136	1953	1458	1046	412
30	1213	2349	1563	1163	400
60	1305	2517	1677	1280	397
90	1464	3247	1895	1397	498
P_2O_5 levels, kg/ha					
0	1272	2378	1637	1050	587
30	1274	2792	1642	1164	478
60	1287	2583	1657	1279	378
90	1288	2612	1660	1393	267

Note :

(1) Cost of urea @ Rs. 180/q.
(2) Cost of single superphosphate @ Rs. 62/q.
(3) Cost of endrin @ Rs. 40/- lit.
(4) Cost of metasystox @ Rs. 40/lit.
(5) Selling price of castor seed @ Rs. 125/q.
(6) Selling price of dry matter @ Rs. 2/q
(7) Labour charges : bullock — Rs. 15/pair
Male — Rs. 4/day
Female Rs. 4/day

that the application of nitrogen at 90 kg/ haproduced significantly maximum height of plant, length of main spike, number of capsules per main spike and weight of seeds per plant. The yield attributing characters ultimately increased the seed and dry matter yields which were significant at each level of nitrogen. Application of nitrogen at 90 kg/ha produced 1464 kg seed per hectare. This was 12, 21 and 29 per cent higher than that due to the application of 60, 30 and 0 kg N/ha, respectively. Similar results are reported by Jain (1971) and Padalia (1960). Application of nitrogen had no significant influence on the oil content of seeds.

Application of phosphorus significantly influenced dry matter, height of plant, length of main spike and test weight. The phosphorus application, however, did not have significant effect in terms of yield of castor seed and oil content.

Nitrogen x phosphorus interaction effects in respect of main and by-pro-

duct yields and oil content were not significant.

The data concerning effects of diffcrent treatments on economics are given in Table 2. The maximum net realization was obtained with the application of 90 kg N/ha (Rs 498/ha), while the net realization due to the application of 60 kg N/ha was the lowest (Rs. 397/ha). Net realization progressively decreased with the increase in the levels of P_2O_5.

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REFERENCES

Jain, T.C. 1971. *Effect of N, P and K on yield, evaportranspiration and water use efficiency of castor (Ricinus communis L.) in arid tract of western Rajasthan. Indian J. Agron.* **15**(1) : 13-20.

Padalia, C.R. 1960. Effect of NPK and certain trace elements on the yield and quality of castor bean. A thesis submitted to the Sardar Patel University, in partial fulfilment of the requirements for the degree of M.Sc. (Agri.) in Agronomy.