

Research Paper :

## Influence of nitrogen and phosphorus on yield of castor (*Ricinus communis* L.) on sandy clay loam soils under rainfed conditions

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### ABSTRACT

An experiment was carried out during the *Kharif* season of 1986 to 1995 on light textured soils of North Saurashtra Agro-climatic Zone at Jamkhabhalia to study the nitrogen and phosphorus requirement of castor (*Ricinus communis* L.) under rainfed conditions. The results revealed that significantly higher grain yield (617 kg/ha), highest net ICBR (1:3.59) and FUE (2.8) were obtained when castor was fertilized with 30 kg N/ha. Application of phosphorus @ 30 kg P<sub>2</sub>O<sub>5</sub>/ha significantly increased yield of castor with net ICBR 1:1.10 and 1.83 FUE as compared to control.

**Key words :** Castor, Nitrogen and phosphorus fertilization, Yield, Economic and FUE

Castor is one of the important crop grown under rainfed area since last few years. Yield potentiality of castor, predominant and economically important which did not sustained owing to inadequate, erratic and uneven distribution of rainfall during crop growth periods and hence, ultimately, area under castor cultivation is increased due to its drought tolerant habit, wide adaptability to varying soil type and climate. However, average yield of castor is very low because of inferior fertility status of soil and fertilizer management. There is no systematic information is available on nitrogen and phosphorus requirements of hybrid castor (GAUCH-1) grown under rainfed condition. Therefore, a study was incorporated to find out optimum dose of nitrogen and phosphorus for castor grown on light textured soils under dry farming conditions.

### MATERIALS AND METHODS

The field experiment was conducted during the *Kharif* season of 1986 to 1995 for 10 years at Dry Farming Research Station, Jamkhabhalia (Dist. Jamnagar) on sandy clay loam soil having pH 8.3, organic carbon 0.36 %, available P<sub>2</sub>O<sub>5</sub> 16.7 kg ha<sup>-1</sup> and K<sub>2</sub>O 296.8 kg ha<sup>-1</sup>. The experiment was laid out in Factorial Randomized Block Design with 12 treatment Combinations comprising four levels of nitrogen *i.e.* 0, 30, 60 and 90 kg N/ha and three levels of phosphorus *i.e.* 0, 30 and 60 kg P<sub>2</sub>O<sub>5</sub>/ha with four replications. The crop was fertilized as per treatment with half quantity of nitrogen and entire quantity of phosphorus as basal before sowing through urea and single super phosphate, respectively. Remaining half quantity of nitrogen was top

dressed at 45-50 days after sowing when sufficient moisture was prevailing in root zone.

Castor (GAUCH -1) crop was sown with onset of monsoon every year at spacing of 90 cm x 60 cm with seed rate of 6.0 kg/ha. All cultural management practices (thinning, inter culturing and weeding) were followed whenever needed. Various pests like jassids, semilooper, capsule borer and whitefly were observed at different growth stages. The plant protection measures were taken whenever the pest attack found beyond the threshold level. The crop was harvested periodically as per maturity of spike. After complete harvesting, threshing was done and yield was recorded net plot wise and converted on hectare basis.

Rainfall pattern of the zone is erratic in nature and uneven in distribution. The crop was failed during 1987 and 1993 due to drought and hence results were not incorporated.

### RESULTS AND DISCUSSION

The results obtained from the present investigation are summarized below :

#### Effect of nitrogen:

The perusal of data (Table 1) indicated that grain yield of castor was significantly influenced due to nitrogen application during years of 1986, 88, 89, 92, 94, and 95 as well as in pooled results. On the basis of pooled results, application of nitrogen @ 30, 60, and 90 kg/ha, being at par, increased grain yield of castor to the tune of 15.7, 19.2, 18.4 per cent, respectively over control (533 kg/