

## Seed yield and net returns of drip irrigated late *Kharif* castor (*Ricinus communis* L.) as influenced by plant geometry and nitrogen levels

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### ABSTRACT

An experiment was conducted during the late *Kharif* season of the year 2006-07 and 2007-08 at Agricultural Research Station for Irrigated crops, A.A.U. Thasra, Gujarat, to evaluate productivity and economics of castor under varying levels of planting geometry (Pair row planting (180-60-180 cm) × 60 cm and 120 × 60 cm), drip irrigation (0.4, 0.6 and 0.8 ADFPE) and nitrogen (100 % RDN through spot application, 50 % RDN through fertigation and 100 % RDN through fertigation). Pair row planting (180-60-180) × 60 cm recorded maximum seed yield net return than 120 × 60 cm. The seed yield was significantly the highest (2841 kg/ha) under drip irrigation treatment I<sub>3</sub> (0.8 ADFPE). Application of 100 % RDN through fertigation (N<sub>3</sub>) recorded significantly the highest seed yield (3037 kg/ha) and net returns (Rs. 47126) as well as CBR (1:4.46) and Net CBR (1:3.46) as compared to treatments N<sub>2</sub> (50% RDN through fertigation) and N<sub>1</sub> (100% RDN through spot application).

**Key words :** Castor, Planting geometry, Drip irrigation, Nitrogen, Fertigation

### INTRODUCTION

The major castor growing states in the India are Gujarat, A.P., Rajasthan, Tamil Nadu, Karnataka, and Orissa. With the availability of short stature early hybrids, its cultivation in the middle Gujarat is increasing year by year. Castor (*Ricinus communis* L.) is an important non-edible oilseed crop of middle Gujarat grown as rainfed as well as irrigated under assured irrigation condition. Potential crop production and net return can be obtained, if its nitrogen and water requirements are provided through proper method during growth period. Planting geometry also becomes an important factor in the crop production under adequate supply of moisture and nutrients.

### MATERIALS AND METHODS

An experiment was conducted at the Agricultural Research Station for Irrigated Crops, Anand Agricultural University, Thasra, Dist. Kheda (Gujarat) during two consecutive late *Kharif* seasons of the year 2006-07 and 2007-08. The experiment was laid out in the split plot design, replicated quadruplicate. The soil of the experimental field was sandy clayloam in the texture, having good drainage capacity and neutral pH. It was low in organic carbon and nitrogen, medium in available phosphorus and high in available potash. The treatment comprised of two levels of spacing (Pair row planting (180-60-180 cm) × 60 cm and 120 × 60 cm), three levels of irrigation (drip irrigation at 0.4, 0.6 and 0.8 ADFPE) and three levels of nitrogen (100 % RDN through spot

application, 50 % RDN through fertigation and 100 % RDN through fertigation). Combinations of levels of spacing and irrigation were relegated in to the main plot as main plot treatments and levels of nitrogen were assigned to the sub plot as sub plot treatments.

Full dose of phosphorus (50 kg/ha) was applied as basal in the form of single super phosphate and in fertigation 30 % nitrogen as a basal dose and remaining nitrogen was applied in a four equal splits, each at a one month interval, while in spot application treatment 50 % as a basal dose and remaining nitrogen in two split at two months interval. (RD: - Recommended dose of fertilizer 75 kg N + 50 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup>). Nitrogen applied as per treatment and 50 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> as a common application as basal dose

Drip system was laid out in such a way that the main pipe was connected with head unit. The line was divided into three sub main having separate controlling valves for I<sub>1</sub>, I<sub>2</sub> and I<sub>3</sub> drip irrigation levels. Lateral lines connected with sub main were laid out at a distance of 120 cm in normal planting and 240 cm in pair row planting. The drippers were placed on lateral lines at a distance of 120 cm in normal planting and 60 cm in pair row planting. The crop was sown in second fort night of September. The drip irrigation schedule was started after one month of monsoon cessation. The drip irrigation treatments were given at an alternate days based on fraction of pan evaporation of two days. Daily pan evaporation measured with the help of USDA Class-A pan evaporimeter.

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