

Research Paper

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## Integrated nitrogen management options on growth and yield of *Rabi* castor, *Ricinus communis* L.

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**ABSTRACT :** A field experiment was conducted during 2011-12 on loamy sand soil at Sardarkrushinagar to evaluate the effect of integrated nitrogen management on growth and yield of *Rabi* castor. maximum growth in terms of plant height and number of branches per plant was observed with application of 75 per cent nitrogen through inorganic + 25% N through castor cake + *Azospirillum*. it also resulted in longer length of main spike, length of primary spike, more number of secondary and tertiary and total spikes per plant and more number of capsules on main spike. Integrated use of inorganic fertilizer with organic manure and seed treated with *Azospirillum* recorded highest seed yield. Oil content and oil yield was also higher with application of 75% N through inorganic + 25% N through castor cake + *Azospirillum*.

**Key Words :** Integrated nitrogen management, Growth, Yield

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India is the leader in the world castor seed and its oil production. It contributes about 55 per cent and 70 per cent of world area and production, respectively. Among the castor growing states, Gujarat holds first position with regards to area (52%), production (80%) and productivity (1833 kg/ha DOR, 2009-10) followed by Rajasthan and Andhra Pradesh. The productivity of Gujarat state compared to other states is the highest due to more than 90 per cent castor area covered by hybrids under irrigated conditions with special crop management practices. Castor oil is considered as versatile industrial raw material because it contains about 85-90 per cent of ricinoleic acid and hydroxy fatty acid. The castor oil is different from other vegetable oils in the sense that it does not freeze even under adverse temperatures of -12°C to -18°C. Therefore, considered as the best lubricating agent particularly for both high speed engines and aeroplanes. castor is generally grown in rainy season. There is also a greater scope of growing castor in *Rabi* season (Anonymous, 2003). The crop matures within 180-200 days in *Rabi* season as compared to 240-260 days in *Kharif* season. Nitrogen plays a vital role in nutrition of plants. Incidentally, these are the nutrients which are lacking mostly in the soil. The major attraction of using biofertilizers in integrated nutrient management (INM) system is to convert the unavailable nutrients to available form which is readily available and easily accessible by the plants.

### RESEARCH PROCEDURE

A field experiment was conducted at Agronomy Instructional Farm, Chimanbhai Patel College of Agriculture, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, during the *Rabi* season of 2011-12. The soil of experimental field was loamy sand in texture, slightly alkaline (pH 7.75) with low organic carbon (0.16%), low available nitrogen (153 kg/ha) and medium in phosphorus (39.7 kg/ha) and potash (kg/ha) contents. Treatments were laid out in randomised block design with four replications having plot size 6.0 x 4.5 m. The treatment consisted of eight nitrogen management practices viz., (T<sub>1</sub>) RDN through inorganic (N-80 and P-25 kg/ha) (T<sub>2</sub>) 50% N through inorganic +50% N through FYM + *Azospirillum*, (T<sub>3</sub>) 50% N through inorganic + 50% N through vermicompost + *Azospirillum*, (T<sub>4</sub>) 50% N through inorganic + 50% N through castor cake + *Azospirillum*, (T<sub>5</sub>) 75% N through inorganic +25% N through FYM + *Azospirillum*, (T<sub>6</sub>) 75% N through inorganic +25% N through vermicompost + *Azospirillum*, (T<sub>7</sub>) 75% N through inorganic +25% N through castor cake + *Azospirillum*, (T<sub>8</sub>) 50% N through inorganic + green manuring (sunn-hemp) + *Azospirillum*. Castor seed were dibbled at a depth of 4-5 cm by adopting a spacing of 90 cm X 60 cm., GCH 7 cultivar was used in the study. The recommended dose of fertilizer @ 80 N 25 P<sub>2</sub>O<sub>5</sub> kg/ha was applied in 100 % RDN treatment.