

Research Paper :

## Nitrogen uptake and available nitrogen content in soil as influenced by green manures and nitrogen levels

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### ABSTRACT

A Study on influence of green manure and nitrogen levels (0, 20, 40, 60 and 80 kg N ha<sup>-1</sup>) on nitrogen uptake and available nitrogen content in soil was undertaken at the Agricultural College Farm, Raichur on deep black clay soil during late *Kharif* season of 2002-03. The result showed that, incorporation of green leaf manure to castor recorded significantly higher nitrogen uptake (72.35 kg ha<sup>-1</sup>) over the sole castor without green manuring and castor with *in situ* green manuring. The available nitrogen content in the soil after harvest of castor was significantly higher in the *in situ* green manuring treatment (274.30 kg ha<sup>-1</sup>) over the sole castor (204.01 kg ha<sup>-1</sup>) and castor with green leaf manuring (237.94 kg ha<sup>-1</sup>). Among the nitrogen levels, application of 80 kg N ha<sup>-1</sup> recorded significantly higher nitrogen uptake (77.66 kg ha<sup>-1</sup>) and available nitrogen content in soil (262.28 kg ha<sup>-1</sup>) after harvest of the castor, while N uptake by castor with the application of 60 kg N ha<sup>-1</sup> (74.45 kg ha<sup>-1</sup>) was found at par with that of 80 kg N ha<sup>-1</sup>.

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The continuous decline in fertilizer use efficiency which resulted in low yields and steep increase in the cost of chemical fertilizers have begun to stare at the poor Indian farmers. Green manuring is becoming an increasingly important aspect of environment friendly agriculture. It is necessary for maintaining soil organic matter, which is important for favourable soil structure, soil water retention and soil microflora and fauna activity. Use of green manures in conjunction to chemical fertilizer is receiving attention in rainfed conditions. Green manuring enhance the yield along with improving physical and chemical properties of soil (Badanur and Bellakki, 2000). Advent of organic nutrition in sustainable land management practices paved the way for use of these green manures to associated crops like castor grown under rainfed conditions to achieve the vertical growth. Judicious combination of fertilizer nitrogen with green manures should be formulated so as to provide ideal nutrition for castor based cropping system within the ecological, social and economical feasibility. Integration of green manures not only reduces use of high cost fertilizers but also helps in supplying nutrients according to crop demand besides being eco-friendly. Keeping these facts in view present study was under taken to find out the effect of green manures and nitrogen levels on nitrogen uptake by castor and available nitrogen content in soil after the harvest of the castor.

### MATERIALS AND METHODS

A field experiment was conducted during the late

*Kharif* season of 2000-03 at the Agricultural College Farm, Raichur on deep black clay soil having 215.88 and 31.44 kg ha<sup>-1</sup> available N and P<sub>2</sub>O<sub>5</sub>, respectively with soil pH of 8.00 and organic carbon of 0.76 per cent. The treatments consisting of three green manures (M<sub>1</sub> : Sole castor without green manuring, M<sub>2</sub> : Castor with *in situ* green manuring, M<sub>3</sub> : Growing of green leaf manuring (Sunnhamp) in separate plot and incorporated in the experimental plot at 35 DAS of castor) to main plot and five nitrogen levels (S<sub>1</sub> : 0 kg N ha<sup>-1</sup>, S<sub>2</sub> : 20 kg N ha<sup>-1</sup>, S<sub>3</sub> : 40 kg N ha<sup>-1</sup>, S<sub>4</sub> : 60 kg N ha<sup>-1</sup>, S<sub>5</sub> : 80 kg N ha<sup>-1</sup>) were assigned to subplots. The experiment was laid out in split plot design and replicated thrice. One protective irrigation was given at 80 DAS.

### RESULTS AND DISCUSSION

The results obtained from the present investigation are summarized below :

#### Nitrogen uptake:

Significantly higher nitrogen uptake by castor was recorded with green leaf manuring (72.35 kg ha<sup>-1</sup>) over the sole castor (Table 2) without green manuring (53.26 kg ha<sup>-1</sup>) and castor with *in situ* green manuring (52.05 kg ha<sup>-1</sup>). This could be attributed to the reason that, additional availability of nitrogen and less competition for solar radiation, space, water and favorable microclimate made it possible for the plant to respond to high nitrogen requirement of increased sink. The results obtained are