

Research Paper :

Sustaining castor productivity by relative use of green manures and nitrogen levels

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ABSTRACT

In an experiment conducted at the Agricultural College Farm, Raichur on deep black clay soil during late *Kharif* season of 2002-03 on sustaining castor productivity by relative use of green manure and nitrogen levels. The results showed that, green leaf manuring of sunnhemp recorded significantly higher seed yield (10.23 q ha^{-1}), seed weight per plant (62.78 g), number of spikes per plant (8.46), dry matter accumulation in reproductive parts ($40.70 \text{ g plant}^{-1}$), dry matter accumulation in stem ($87.19 \text{ g Plant}^{-1}$) and leaf area ($85.82 \text{ dm}^{-2} \text{ plant}^{-1}$) over the sole castor without green manuring and castor with *in situ* green manuring. Among the nitrogen levels, application of 80 kg N ha^{-1} produced significantly higher seed yield (10.09 q ha^{-1}), seed weight per plant (59.20 g), number of spikes per plant (7.93), dry matter accumulation in reproductive parts ($38.82 \text{ g plant}^{-1}$), dry matter accumulation in stem ($83.91 \text{ g plant}^{-1}$) and leaf area ($90.58 \text{ dm}^{-2} \text{ plant}^{-1}$) over the control, application of 20 kg N ha^{-1} and 40 kg N ha^{-1} . However, it remained at par with the application of 60 kg N ha^{-1} (10.07 q ha^{-1} , $58.57 \text{ g plant}^{-1}$, 7.73 , $38.51 \text{ g plant}^{-1}$, $83.57 \text{ g plant}^{-1}$ and $90.26 \text{ dm}^{-2} \text{ plant}^{-1}$ of seed yield, seed weight per plant, number of spikes per plant, dry matter accumulation in reproductive parts, dry matter accumulation in stem and leaf area, respectively).

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Castor is one of the important non edible oil seed cash crop grown widely in rainfed areas of India. The productivity of this crop in rainfed environment quite often fluctuates due to vagaries of monsoon. The average productivity of castor in India is 601 kg ha^{-1} . The low productivity of rainfed castor is attributed to its cultivation under marginal soils having low available nitrogen. It is also attributed to the erratic rainfall and its distribution, use of non descriptive cultivars and poor management practices (Anonymous, 1990). Castor is exhaustive crop and responds well to the added fertilizers. The fragile resources of arid region farmers and non availability of costly nitrogen fertilizers are yet some of the other constraints coming in the way to boost the crop yields in most of the tropical regions throughout the country (Venkateswaralu, 1986). In recent years it has been realized that, no single source of plant nutrients can meet the total nitrogen need for modern agriculture, which is expected to take care of increasing human needs. For efficient production of castor, it is necessary to develop alternate source of materials that supply the nutrients steadily based on the crop demand simultaneously sustaining the soil health. Green manures have been used as a means of maintaining and increasing soil fertility all along the history of farming. The green manure available from the most of the green manuring crops are eco-

friendly, freely available, have the immense potential in soil buildup and augment in timely release of nutrients and consequently boost the crop yield. Keeping these facts in view an experiment was conducted on sustaining castor productivity by relative use of green manures and nitrogen levels.

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^{-1} available N and P_2O_5 , respectively with soil pH of 8.00 and organic carbon of 0.76 per cent. The treatments consisting of three green manures (M_1 : Sole castor without green manuring, M_2 : Castor with *in situ* green manuring, M_3 : Growing of green leaf manuring (Sunnhemp) in separate plot and incorporated in the experimental plot at 35 DAS of castor) to main plot and five nitrogen levels (S_1 : 0 kg N ha^{-1} , S_2 : 20 kg N ha^{-1} , S_3 : 40 kg N ha^{-1} , S_4 : 60 kg N ha^{-1} , S_5 : 80 kg N ha^{-1}) were assigned to sub plots. The experiment was laid out in split plot design and replicated thrice. One protective irrigation was given at 80 DAS.

RESULTS AND DISCUSSION

Incorporation of green leaf manure of sunnhemp