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Integrated nitrogen management studies in tropical sugarbeet

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ABSTRACT

Field experiments were carried out at Agricultural College and Research Institute, Killikulam, Southern Tamil Nadu (TNAU) during September 2005 to March 2006 and September 2006 to March 2007 to evaluate the suitable integrated nitrogen management practice of tropical hybrids. The experiments were laid out in split plot design with three replications. The treatments consisted of four nitrogen management practice *viz.*,100 per cent recommended dose of N (RDN) (N_1) , 75 per cent RDN + 25 per cent N as FYM (N_2) , 50 per cent RDN + 25 per cent N as FYM + 25 per cent as vermicompost (N_3) and 100 per cent RDN +bio fertilizer + FYM (N_4) in main plots and three sugarbeet hybrids (Cauvery, Indus, Shubra) in subplots. The results revealed that higher growth attributes *viz.*, germination percentage, plant height and leaf area index and Brix reading were observed under 100 per cent RDN + bio fertilizer + FYM and this was at par with that of N_2 and N_3. Integrating inorganic (100 per cent RDN as urea) and organic (bio fertilizer + FYM) sources of nitrogen registered higher tuber weight and was significantly higher than N_1 and at par with both N_2 and N_3 in both the years of study. Higher growth and yield attributes were associated with the hybrid Indus followed by Cauvery. Integrated application of 100 per cent recommended dose of fertilizer nitrogen, bio-fertilizer and FYM (N_4) registered higher tuber yields of 44.3 and 26.8 t ha^{-1} in 2005-06 and 2006-07, respectively which was at par with N_3 and significantly higher than that of N_2 and N_1 in both the years of study. Among the hybrids, Indus recorded higher tuber yield which was at par with that of Cauvery.

Key words : Tropical sugarbeet, Hybrids, Nitrogen, Yield, Integrated nitrogen management.

INTRODUCTION

Tropical sugarbeet (*Beta vulgaris* spp *Vulgaris* var *altissimo* Doll) is a biennial sugar producing tuber crop grown in temperate countries. It provides more than 45 per cent of world sugar requirement. It is one of the most efficient converter of solar energy into stored energy and has great potentiality of augmenting sugar production at lower cost (Ahlawat *et al.*, 2002). Recently tropical sugarbeet hybrids are gaining momentum in tropical and sub tropical countries as a promising energy crop and alternative raw materials for the production of ethanol. With the recent development of tropicalised hybrids of sugarbeet it has been possible to grow crop in tropical and subtropical areas as supplementary crop for alternate sources of sugar production (Kala *et al.*, 2008). Tropical sugarbeet is now emerged as commercial field crop because of the favourable characters like shorter duration, moderate water requirement, higher sugar content of 12-15 per cent etc. As the harvesting period of sugarbeet coincides with the off season of sugar factories, it helps in continuous function of sugar mills. Being the introduced crop in Tamil Nadu, there is an urgent need to standardize the agronomic practices of sugarbeet for wide scale adoption of this crop. Hence, fields experiments were conducted to evaluate the integrated nitrogen management practice and to select the suitable hybrids for Tamil Nadu conditions.

MATERIALS AND METHODS

Field experiments were carried out at Agricultural College and Research Institute, Killikulam, Southern Tamil Nadu during September 2005 to March 2006 and September 2006 to March 2007 to evaluate the suitable integrated nitrogen management practice of tropical hybrids. The experiments were laid out in split plot design (S.P.D.) with three replications. The treatments consisted of four nitrogen management practice *viz.*,100 per cent recommended dose of N (RDN) (N_1) , 75 per cent RDN + 25 per cent N as FYM (N_2), 50 per cent RDN + 25 per cent N as FYM + 25 per cent as vermicompost (N_3) and 100 per cent RDN +bio fertilizer + FYM (N_4) in main plots and three sugarbeet hybrids (Cauvery, Indus, Shubra) in subplots. The soil of the experimental field was sandy loam with the available NPK status of medium, medium and low, respectively. The sugarbeet seeds were sown at a spacing of 45 x 15 cm under ridges and furrow method. The fertilizer application was done as per the treatments with a blanket recommendation of 150:75:75 kg NPK ha^{-1}. Half the dose of N and full dose of P and K were applied as basal and remaining half dose of nitrogen was applied in to two equal splits during 25 and 45 days after sowing. Biometric observation on growth, yield attributes and tuber yield were recorded.

RESULTS AND DISCUSSION

Growth parameters:

The influence of nitrogen management practice on the germination of sugarbeet was though not significant, hybrids showed significant response in both the years

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