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Research Paper :

Performance of banana cv. GRAND NAINA under nitrogen and potassium fertigation

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ABSTRACT

Field experiment was conducted at Banana Research Station, Jalgaon (M.S.) to find out the amount of N and K_2O which can be fed through drip irrigation for banana and the effect of fertigation on soil properties, nutrient uptake and yield of banana cv. GRAND NAINE. Application of 75 % recommended dose of N and K_2O through drip at weekly interval in 44 splits up to 300 days and recommended dose of P_2O_5 by soil placement at the time of planting, found beneficial in terms of banana yield and monetary returns, indicating 25 % saving in N and K fertilizers due to use of fertigation technique. Uptake of nutrients was increased in the fertigation treatments as compared to the conventional method of fertilizer application.

Key words : Banana, Fertigation, Nitrogen, Potassium

Efficient use of water and fertilizer is highly critical to sustained agricultural production. It will continue to occupy a dominant place in future to meet the projected growing demands of swelling population, in the context of declining per capita land, water availability, soil degradation, increasing fertilizer cost etc. The experimental results revealed that interaction between these two costly inputs governs sustainability of high crop productivity. Employment of drip irrigation has gained enormous popularity in recent years, especially in case of widely spaced high value crops. Under drip irrigation only a portion of the soil volume around each plant is wetted and thus traditional method of fertilizer application is ineffective. The limited root zone and the reduced amount of mineralization in the restricted wetted zone are the main reasons for the reduced nutrient availability to the plants with conventional method of fertilizer application under drip irrigation (Megen, 1995).

With drip irrigation both water and fertilizer can be applied more precisely in controlled quantity and at appropriate time directly to the root zone as per the crop needs at different growth stages (Yadav *et al.,* 1998).

Banana is heavy feeder both in respect of nutrients and water also. Irrigation through basin and fertilizer application through soil lead to heavy losses of water and nutrients on Vertisols. Under such condition, drip irrigation with fertigation will be useful for increasing the water and fertilizer use efficiency. Fertigation has been proved successful in commercial banana cultivars like Robusta (Mahalaxmi *et al*., 2001), Nendran (Pandey *et al.*, 2001) and Ney Poovan (Srinivas, 1997) with fertilizer and water economy. However, very little information is available on use of N and K_2O fertigation through conventional fertilizers for banana cv. GRAND NAINE. Hence, present investigation was undertaken to study the effect of fertigation and conventional method of fertilizer application on soil properties, nutrient uptake and yield of banana and to develope a stage wise fertigation schedule for banana cv. GRAND NAINE.

MATERIALS AND METHODS

Field experiment was conducted during 2003-04, 2005-06 and 2006-2007 at Banana Research Station, Jalgaon. The soil of the experimental field was medium black having pH 8.14, electrical conductivity (EC) 0.35 dS m^{-1}, medium in organic carbon (0.39 %), low in available nitrogen (238 kg ha^{-1}), moderately high in available phosphorus (21.6 kg ha^{-1}) and very high in available potassium (618 kg ha^{-1}). Experiment was laid out in randomized block design comprised of six treatments and replicated four times. Each treatment comprised of 12 plants. Tissue cultured plantlets of banana cv. GRAND NAINE were planted in pair row system at 0.9 x 1.5 x 2.1 m spacing (4,444 plants ha^{-1}). Inline drip irrigation system was used. Fertilizers were applied by two methods, *i.e.* fertigation and soil placement.

Treatment details was as below,

- 100 % recommended dose *i.e.* 200 g N and 200 g K_2O $plant^{-1}$ through drip
- 75 % recommended dose *i.e.* 150 g N and 150 g K_2O $plant^{-1}$ through drip
- 50 % recommended dose *i.e.* 100 g N and 100 g K_2O $plant^{-1}$ through drip
- 100 % recommended dose *i.e.* 200 g N and 200 g