

Research Paper :

Effect of organics by substitutting inorganic N fertilizer on soil properties, nematode population and yield of banana

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ABSTRACT

A field experiment was conducted to quantify the amount of inorganic N fertilizer which can be substituted by using different organics and to find out its effect on soil properties, nutrient uptake, nematode population and yield of tissue cultured banana cv. GRAND NAINA. Application of 25 % N through FYM + 75 % N through inorganic fertilizers were found beneficial in terms of banana yield and monetary returns. Which was followed by application of 25 % N through FYM and green manuring crop + 75 % N through inorganic fertilizers. Further, substitution of inorganic N fertilizers by using FYM or Neem cake upto 50 or 75 % was not found beneficial and economical. Soil available NPK after harvest of crop and nutrient uptake (kg/ha) by crop was highest in all the treatment (T₂ to T₆) where different sources of organics were used with inorganic fertilizers as compared to the treatment T₁ i.e. 100 % N through inorganic fertilizers only. The nematode population was lower in the treatments in which part of inorganic N was provided through either Neem cake or other organic sources as compared to the inorganic treatment.

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Increase in cost of fertilizers and decrease in soil fertility due to injudicious and imbalanced use of inorganic fertilizers have evoked awareness among the farmers and research workers for use and utilization of organic resources as a source of plant nutrition. Although the fertilizers are quick acting and supplying adequate quantities of nutrients, there ill effects are observed when used in excess, affecting soil health and environment. There are many ways to reduce the use of inorganic fertilizers. Out of which, green manuring crops, FYM, Neem cake, castor cake, groundnut cake, crop residues, vermicompost, microbial cultures viz., N fixing bacterial, P solubilizing culture are some of the sources to reduce the use of inorganic fertilizers. It is well known fact that, use of different organics improve the physical, chemical and biological properties of soil. They also improve the efficiency of applied inorganic fertilizers and hence help to economize the inorganic fertilizers.

Nematode constitute one of the major limiting factors for banana production causing extensive root damage resulting in serious economic losses. The burrowing nematode (*Radopholus similis*) has a wide geographical distribution and is notorious for causing root of banana in banana growing region of the world. Its occurrence in Maharashtra in banana roots causing yellowing of leaves and rotting of roots has been reported by Darekar *et al.* (1981).

Grand Naine is a superior selection of Giant

Cavendish and is popular variety grown mostly in all export oriented countries of Asia, South America and Africa. Due to many desirable traits like excellent fruit quality, immunity to fusarium wilt etc it has proved better variety (Singh and Chundawat, 2002). Very little information is available on substitution of inorganic fertilizers by organic substances for banana cv. GRAND NAINA at Maharashtra condition. Hence, present investigation was undertaken to quantify the amount of inorganic N fertilizer by partial substitution with organic nitrogen sources and effect of such substitution on soil properties, nematode population, growth and yield of banana cv. GRAND NAINA.

MATERIALS AND METHODS

Field experiment was conducted during 1997-98, 1998-99 and 1999-2000 at Banana Research Station, Jalgaon. The soil of the experimental field was medium black having pH 8.01, electrical conductivity (EC) 0.36 dS/m, low in available nitrogen (221 kg/ha), moderate in available phosphorus (21.3 kg/ha) and very high in available potassium (642 kg/ha). The crop was planted in randomized block design comprised of six treatments and replicated four times. Each treatment plot in each replication comprised of 12 plants. Tissue cultured plantlets of banana cv. GRAND NAINA were planted in pair row system at 0.9 x 1.5 x 2.1 m spacing (4,444 plants/ha.). Inline drip irrigation system was used. Nitrogen was applied @ 200 g/plant through different sources of