

Research Paper :

Integrated nutrient management for sustainable groundnut cultivation in Theri soil

K.MANIKANDAN AND V. SUBRAMANIAN

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ABSTRACT

A field experiment was conducted in theri soils of Tamil Nadu to study the effect of various organics and inorganic fertilizers on the yield and quality of groundnut. Six different organics viz., raw coir pith (RCP), composted coir pith (CCP), goat manure (GM), farm yard manure (FYM), poultry manure (PM) and bio-digested press mud (BDP) were utilized using groundnut *var* VRI 2 as a test crop. The result indicated that application of recommended NPK+BDP @ 7.5 t ha⁻¹ produced the maximum pod yield. The highest oil yield was recorded in the treatment receiving recommended NPK+PM @ 5 t ha⁻¹. The BDP application in combination with recommended NPK significantly improved the quality of groundnut oil compared to other organics applied. The significant increase in soil available nitrogen, phosphorus and potassium was observed in all treatments that received organics and inorganic fertilizers. There was no significant improvement in organic carbon as well as physical properties of the soil whereas physico-chemical properties such as soil reaction and electrical conductivity were significantly influenced by various INM treatments.

See end of the article for authors' affiliations

Correspondence to :

K. MANIKANDAN

Directorate of Mushroom Research,
CHAMBAGHAT (H.P.)
INDIA

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Theri soil, a typical red sand dune soils occurs an area of 11,000 ha in Tamil Nadu, which is presently considered as wasteland. This sand dune ecosystem formed in isomegathemic and Ustic regime from geogenic sand deposits under a semi arid climate. As the soil texture is sandy, it is subjected to severe wind erosion and characterized with poor nutrient status. Water holding capacity of the soil is very low owing to the low clay content (Rakesh *et al.*, 1998), poor organic carbon content and single grain structure (Walia *et al.*, 1999). Because of these above unfavourable conditions, productivity of the soil is very low and conventional farming is become a difficult one. This necessitates intensive management to improve the physical, chemical and biological properties of this sandy soil.

Integrated nutrient management (INM) is one among the possible way to improve this soil for sustainable farming. The integrated use of organics and inorganics improves soil physical properties through organic carbon built up (Goyal *et al.*, 1992). The INM practices increase soil available nutrient, facilitates slow release of nutrients and thus reduces nutrient losses. As a whole, it augments physical, chemical and biological properties of soil. These positive effects enhance nutrient uptake of plants that results in higher productivity.

But till now, research on theri soil is scanty which are mostly of pot culture level. Hence, the present field investigation was conducted in theri soils of Tamil Nadu,

India to evaluate the effect of different organic sources along with inorganic fertilizers on the yield and quality of groundnut as well as soil properties.

MATERIALS AND METHODS

The field experiment was conducted in red sand dunes (theri soils) of Tamil Nadu, India during *Rabi* season. The climate of the study area was semiarid and the mean annual rainfall was 700 mm in which more than 60 per cent received during northeast monsoon season. The soils of the experimental site were deep, sandy in texture, neutral in soil reaction (pH 6.91), poor in organic carbon (0.09 per cent) and low in available NPK status. The experiment was laid out in a Randomized Block Design (4m x 4m) with following eight treatments;

T₁ - Control, T₂ - Rec. NPK, T₃ - Rec. NPK + CCP @ 12.5 t ha⁻¹, T₄ - Rec. NPK + RCP @ 12.5 t ha⁻¹, T₅ - Rec. NPK + GM @ 5 t ha⁻¹, T₆ - Rec. NPK + FYM @ 12.5 t ha⁻¹, T₇ - Rec. NPK + PM @ 5 t ha⁻¹ and T₈ - Rec. NPK + BDP @ 7.5 t ha⁻¹

The treatments were replicated thrice and calculated quantities of different organics were applied to respective plots after initial ploughing of soil. The recommended NPK (17:34:54) was applied to all plots except control through urea, single super phosphate and muriate of potash as basal. Groundnut seeds were treated with aldrin at the rate of 2g kg⁻¹ and sown in line at 30 cm spacing between