

Research Paper :

Effect of integrated nutrient management on productivity of pearl millet and soil fertility of sandy loam soils under rain fed conditions

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Accepted : May, 2010

ABSTRACT

A field experiment was conducted on sandy loam soils at Dry Farming Research Station, Jamkhambhalia (Gujarat) during 2003-2008 to ascertain the effect of bio-fertilizer, various organic sources alone or along with inorganic fertilizers on productivity of pearl millet and post harvest soil fertility under rain fed conditions. There were six treatments involving inorganic, organic and bio fertilizers (*Azotobacter* and PSM). The results revealed that the grain and fodder yields of pearl millet were significantly affected due to different nutritional treatments. Maximum grain (1611 kg/ha) and fodder (4160 kg/ha), total income (Rs.23623/ha) and net realization (Rs.10376/ha) were obtained when pearl millet was fertilized with 50% RDF (40:20 kg NP /ha along with compost @ 2.5 t/ha and 500 kg castor cake/ha(T₄). The organic carbon content of soil as well as available status of nitrogen, phosphorus, potash and iron were remarkably improved when compost and castor cake involved in nutrient management of pearl millet

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Key words : Pearl millet, Nutrient management, Productivity, Soil fertility

Pearl millet is one of the important cereal crop cultivated in Gujarat state. Now a days, use of chemical fertilizer is increasing to boost up crop production. Simultaneously, cost of chemical fertilizer is increased constantly, besides these, only use of inorganic fertilizer is injurious to soil health and soil productivity. Integration of inorganic, organic and bio-fertilizers play vital role for enhancing crop productivity and sustaining soil fertility, this proves great promise for farmers. Nitrogen fixers and phosphate solubilizers contribute through biological fixation of nitrogen, solubilization of fixed nutrients and enhanced uptake of plant nutrients (Mane *et al.*, 2000). Keeping these views in mind, an experiment was conducted to find out the effect of bio-fertilizers, various organic sources alone or along with inorganic fertilizers on productivity of pearl millet and post harvest soil fertility under rain fed conditions.

MATERIALS AND METHODS

A field experiment was conducted on sandy loam soils at Dry Farming Research Station, Jamkhambhalia (Gujarat) during 2003-2008 to ascertain the effect of bio-fertilizer, various organic sources alone or along with inorganic fertilizers on productivity of pearl millet and post harvest soil fertility under rain fed conditions. The experiment comprising of total six treatments involving: T₁- Recommended dose of fertilizer (80-40 kg NP/ha), T₂- Compost @ 10 t/ha (0.5 % N), T₃- 50 % of T₁ + 50 % of T₂, T₄- 50 % of T₁ + 25 % of T₂ + Castor cake @

500 kg/ha, T₅- 25 % of T₁ + 25 % of T₂ + Castor cake @ 500 kg/ha + Bio fertilizer seed treatment (*Azotobacter* and PSM @ 625g/ha each), T₆- T₁ + 40 kg K₂O/ha in randomized block design with four replications. The crop was harvested at maturity, dried in the sun, threshing manually, grain and fodder yield were recorded net plot wise and converted on hectare basis. The soil samples were collected after completion of the experiment (2008), processed and analyzed for various soil chemical properties using standard procedure (Jackson, 1973; Lindsay and Norvell, 1978).

RESULTS AND DISCUSSION

The results obtained from the present investigation are summarized below :

Grain and fodder yields:

The results revealed that the grain and fodder yields of pearl millet were significantly affected due to different nutritional treatments (Table 1). Application of 50% RDF (40:20 kg NP /ha) along with 25% compost (2.5 t/ha) and 500 kg castor cake/ha (T₄) produced significantly highest grain (1611 kg/ha) and fodder (4160 kg/ha) yields in comparison of rest of all the treatments which was higher by 30.66 and 14.25 per cent as compared to T₁ (Recommended dose of fertilizer), respectively. The minimum grain (1036kg/ha) and fodder (3249 kg/ha) yields were recorded due to application of compost @ 10 t/ha (T₂). Similar beneficial effect of integration of inorganic