

Effect of long-term fertilization in vertisols on soil properties and yield of sorghum wheat sequence

SUJATA POTHARE, P .K. RATHOD, H. N. RAVANKAR, Y. G. PATIL, A. C. YEWALE AND DHAMMADINA POTHARE

.....

See end of article for authors' affiliations

.....

Correspondence to :
P.K. Rathod
Department of Agril. Chemistry
and Soil Science, Dr. P.D.K.V.,
AKOLA (M.S.) INDIA

Accepted : March, 2007

.....

ABSTRACT

The present investigation (2000-2001) were superimposed on the old long term fertilizer experiment started since 1988 at Dr.P.D.K.V., Akola, There were 14 treatments replicated four times indicated that all the soil properties such as pH, EC, organic matter, total and available NPK and S etc. were favorably influenced with the conjunctive use of organics and inorganics. Highest values were observed in the treatment of 100% NPK + 10 t FYM ha⁻¹. The influence on soil properties ultimately reflected in higher yield of sorghum and wheat and in the same treatment it is also observed that all the soil properties except pH, EC were highly significantly correlated with yield. Hence, in inereative for sustainable productivity and maintenance of soil fertility.

Key words : Sorghum, Wheat, Yield, Soil properties and Fertilization.

The escalating cost of fertilizer which is not within the reach of marginal farmers gave birth to many alternative complementary sources of nutrient input system in agriculture, like organic manuring, low energy input for sustainable agriculture, IPNS system, agricultural and industrial waste management, farm waste recycling and crop residue management.

The system of cropping crop sequence and combination affects the organic matter content of soil through their effect on the amount of crop residue, root to shoot ratio, canopy cover, residue with different C:N ratios etc. Malewar and Hasnabade (1995) conducted that application of 50% recommended dose of NPK plus 50% through FYM/wheat straw/ green leaf manure or glyricidia helped to improve organic carbon vis-à-vis yields in sorghum wheat sequence. Such studies are sporadic in literature and more emphasis on in-depth studies particularly under long term manuring need to be extended. Hence the present investigation was proposed.

N, P and S are present in soil organic matter inorganically bound forms. Thus, inter-relationship between N and C, N and P, N and S, S and P ratios plays a significant role in soil fertility and humus complex formation. During mineralization on with optimum environment condition, C:N ratio tends to decrease with time because carbon is lost in gaseous form while nitrogen remains in organic combination as long as the C:N ratio is wide.

MATERIALS AND METHODS

The present investigation was undertaken during the year 2000-2001 on the old long-term fertilization experiment started since 1988 to study the effect of long-term fertilization of Vertisols on soil properties and yield of sorghum wheat sequence. There were fourteen treatments replicated four times in a Randomised Block Design comprised of NPK levels with and without FYM, sulphur and Zinc (Table 1).

The soil of the experimental site was Vertisols, particularly montorillonitic type, Hyperthermic family of Type Haplustert. The soil was slightly alkaline in reaction, medium in organic carbon, low in available potassium. The soil was analyzed for different physico-chemical properties as described by (Piper, 1966 and Jackson, 1967).

RESULTS AND DISCUSSION

Physico-chemical properties:

Physico-chemical properties of soil as influenced by fertilization under sorghum wheat sequence (Table 2) indicated that no significant changes were observed in pH and electrical conductivity of soil due to various treatment combinations. Organic matter content varied significantly with various treatments, the highest being recorded under treatment 100% NPK +10 t FYM ha⁻¹ followed by 150% NPK. Organic matter content was lowest in control plot. FYM application and increased biomass are the main contribution factors to increased organic matter content. Significant increases in available NPK and S was observed as compared to control. Highest value of available NPK were observed with application