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INFLUENCE OF ORGANIC AND INORGANIC SOURCES ON YIELD, UPTAKE AND AVAILABILITY OF NUTRIENT IN SORGHUM

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ABSTRACT

An experiment was conducted at Central Research Station, Dr. P.D.K.V., Akola, during 1999-2000 on montmorillinite hyperthermic clay loam shallow soil with organic and inorganic fertilizer levels keeping sorghum as a test crop, and it was observed that with the application of organic manures in combination with chemical fertilizer found benificial in increasing the production of sorghum irrespective of treatment combinations. Maximum yield of sorghum grain (35.25 q ha^{-1}) was recorded with the application of 50% RDF N + 100% RDF P & K through chemical fertilizers + 50% N through vermicompost. The increase in N, P, K, S, Fe, Mn, Zn, Cu uptake at panicle initiation, earhead emergence and at harvest stage was recorded with the application of organics in combination with inorganics. Similarly, the availability of N, P, K, Fe, Mn, S, Zn, Cu increased with the application of 50% RDF (in respect of N) + 100% RDF (in respect of P & K) through chemical fertilizers + 50% N, through vermicompost.

Key words : Sorghum, Organic manures, Chemical fertilizers, N, P, K, Fe, Mn, Zn, Cu vermicompost, Panicle initiation, Earhead emergence, Harvest stages, RDF.

To sustain the crop yields and increase land productivity, combinations of organic manures with inorganic fertilizers are recognized as a prime factor. The combined use of organic and inorganic fertilizers not only increase the crop yield but also improves the physical and biological properties of soil (Shashidhar *et al.*, 1995). In view of this an experiment was conducted during 1999-2000 at Central Research Station, Dr. PDKV, Akola.

MATERIALS AND METHODS

The soil of study area was shallow montmorillonitic clay loam and had pH 7.48, EC, 0.3 dSm^{-1}, Organic carbon 0.40% and available N, P, K, S, Fe, Mn, Zn and Cu were 208 kg ha^{-1}, 18 kg ha^{-1}, 370 kg ha^{-1}, 22.56 kg ha^{-1}, 18.80 mg ha^{-1}, 9.74 mg ha^{-1} 0.40 mg ha^{-1} and 5.82 mg ha^{-1}, respectively. The experiment with seven treatments and four replications was conducted in randomized block design. The sorghum variety CSH-9 was sown @ 10 kg/ha. The soil and plant samples at panicle initiation, earhead emergence and harvest stage were collected and anlaysed for N, P, K, Fe, Mn, Zn and Cu.

Treatment detail :

T_1 : Control

T_2 : 50% Recommended dose of fertilizers (RDF) (40:20:20 kg NPK ha^{-1})
i.e. urea @ 87.98 kg ha^{-1}, Single super phosphate @ 122.85 kg ha^{-1} and Muriate of potash @ 43.10 kg ha^{-1}

T_3 : 100% RDF (80:40:40 kg NPK ha^{-1})
i. e. Urea @ 175.96 kg ha^{-1}, Single super phosphate @ 245.70 kg ha^{-1} and Muriate of potash @ 86.20 kg ha^{-1}

T_4 : 50% RDF of N + 100% RDF of P & K + 50% N through Farm Yard Manure
i.e. Urea @ 87.98 kg ha^{-1}, Single super phosphate @ 245.70 kg ha^{-1}, Muriate of potash @ 86.20 kg ha^{-1} and FYM @ 8163.26 kg ha^{-1}

T_5 : 50% RDF of N + 100% RDF of P & K + 50% N through Poultry Manure
i.e. Urea @ 87.98 kg ha^{-1}, Single super phosphate @ 245.70 kg ha^{-1} Muriate of potash @ 86.20 kg ha^{-1} and Poultry manure @ 1393.72 kg ha^{-1}

T_6 : 50% RDF of N + 100% RDF of P & K + 50% N through Vermicompost
i.e. @ Urea 87.98 kg ha^{-1}, Single super phosphate @ 245.70 kg ha^{-1}, Muriate of potash @ 86.20 kg ha^{-1} and vermicompost @ 2564.10 kg ha^{-1}

T_7 : 50% RDF of N + 100% RDF of P & K + 50% N through Sheep and Goat manure
i.e. Urea @ 87.98 kg ha^{-1}, Single super phosphate 245.70 kg ha^{-1}, Muriate of potash @ 86.20 kg ha^{-1} and sheep and goat manure @ 1498.12 kg ha^{-1}