An Asian Journal of Soil Science, Vol. 3 No. 2 : 269-271 (December-2008)

Impact of integrated nutrient management practices on yield, nutrient concentration and nutrient uptake in sweet sorghum [*Sorghum biocolor* (L.) Moench]

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Accepted : *October, 2008*

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ABSTRACT

A Field experiments was conducted on sweet sorghum to evaluate the int1uence of inorganic (chemical) fertilizer, organics (Vermicompost), Biofertilizers (Azotobactor and phosphate solublising organisms (PSB) and micronutrient (Zn and Fe) on soil properties, green stalk yield, grain yield and various quality parameters of sweet sorghum (Var.HES-04) on Vertisol (Typic Haplustert) at Sorghum Research Station, Marathwada Agricultural university, Parbhani during *kharif* season of 2005-06. The seven treatments comprised of inorganic fertilizer, vermicompost, biofertilizer (Azotobacter + PSB) and micronutrient (Zn and Fe). The treatments used were T_1-100% RDF, T_2-50% RDF + vermicompost @ 2.5 mg ha^{-1}, T_3-50% RDF + micronutrients $ZnSO_4$ 20 kg ha^{-1} and $FeSO_4$ 25 kg ha^{-1}, T_4-50% RDF + biofertilizer (Azotobacter + PSB) $T_5 + T_2$ + micronutrient (Zn + Fe), $T_6 + T_2$ + biofertilizer, $T_7 + T_2$ + biofertilizer (Zn + Fe). The result indicated that the grain yield, green stalk yield and juice percentage was significantly highest in treatment T_7 (50% RDF + vermicompost @2.5 Mgha^{-1} + biofertilizer) and statistically at par with T_5 (50% RDF + vermicompost @2.5 mg ha^{-1} + micronutrients).

Key words : Nutrient concentration, N, P, K, Zn and Fe uptake, INM.

Sweet sorghum is a special type of sorghum that accumulates sugars (sucrose, glucose and fructose) in stalk. Green juicy cane contributes 70-80 per cent of total biomass. Green revolution with its higher production capabilities has gradually depicted the major secondary and micronutrients in early eighties. These deficiencies are to be met with proper amelioration techniques. Due to high prices of fertilizers there is need to substitute the part of it through organic manure like vermicompost, FYM and biofertilizers. The importance and usefulness of organic manures in soil sustainability has been emphasised by Katyal (2000) and judicious use of inorganic fertilizer along with organic sources has been suggested. The continuous use of chemical fertilizers over a long period may cause imbalance of microflora and thereby directly affect the biological properties (Manickam and Venkataraman, 1992). To sustain the crop yield and increase land productivity, combination of organic manures and fertilizers, not only increase the crop yield of sorghum but also improves physical and biological properties of soil (Bagade *et al.*, 2003). Yield and soil properties were significantly improved by combined application of organic, inorganic and biofertilizers than the inorganics alone Gawai and Pawan (2005). The poor fertility status of the soil is one of major constraints for higher productivity. The importance and usefulness of organic manures in soil sustainability has been emphasised by Katyal (2000) and judicious use of inorganic fertilizer along with organic sources have been suggested. To sustain the crop yield and increase land productivity, combination of organic manures fertilizers not only increase the crop yield of sorghum but also improves physical and biological properties of soil (Bagade *et al.*, 2003). Therefore, an attempt has been made to study the impact of inorganic fertilizer, vermicompost, biofertilizer and soil test based micronutrients (Fe and Zn) on yield and nutrient uptake of sweet sorghum.

MATERIALS AND METHODS

A field experiment was conducted on Vertisol (Typic-Haplustert) at Sorghum Research Station, Marathwada Agricultural University, Parbhani (M.S.) India in rainy season of 2005-06. The soil was slightly alkaline (pH 8.2) and low in available N (231 kg ha^{-1}) and moderate in availability of P_2O_5 (15 kg ha^{-1}) and high in K20 (472 kg ha^{-1}), having DTPA extractable Zn and Fe 0.79 and 4.29 mg kg^{-1}, respectively. The experiment was laid out in randomized block design with seven treatments replicated thrice. Sweet sorghum variety HES-04 was sown on 7th July, 2005. Inorganic fertilizers were applied as per recommended dose of fertilizer and micro nutrients as per treatment through chemical fertilizers. However, Azotobacter and phosphorus solubilizing bacteria (PSB) were used for seed treatment before sowing. Vermicompost was applied @ 2.5 Mg ha^{-1} as per treatment at the time of sowing. Other cultural operations