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Research Article

Effect of organic and inorganic sources of nutrients on growth and yield of groundnut in two different textured soils

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Field experiments were carried out in a farmer's field at Chinnathanakuppam and Ayeekuppam villages, Cuddalore District during December, 2008 and March, 2009 to study the effect of combined use of organic and inorganic sources of nutrients on growth and yields of groundnut in two different textured soils. The experimental soil at Chinnathanakuppam belonged to vadalapakkam series (Typic Haplustalf) with loam texture having pH-7.8 and EC - 0.36 dSm⁻¹, organic carbon status 3.4 g kg⁻¹, 285 kg ha⁻¹ of alkaline KMnO₄ -N, 11 kg ha-1 of Olsen-P and 190 kg ha-1 of NH₄OAC- K.The experimental soil at Ayeekuppam belonged to vadalapakkam series (Typic haplustalf) with sandy in texture, having pH- 8.1 and EC $- 0.41 \text{ dSm}^{-1}$. The soil was low in OC (2.8 g kg⁻¹), low in available N (230 kg ha⁻¹) and P (9.0 kg ha⁻¹) and medium in available K (160 kg ha⁻¹). The experiment was conducted with 16 treatment combinations. The treatments consisted of different levels of NPK viz., 100%, 75% and 50% RDF and different sources of nutrients viz., farm yard manure @ 12.5 t ha⁻¹, fly ash @ 10 t ha⁻¹ and humic acid @ 20 kg ha⁻¹ along with micronutrients boron @ 10 kg ha⁻¹ and zinc sulphate @ 25 kg ha⁻¹. The experiment was laid out in randomized block design (RBD) with three replications and tested with groundnut crop var.JL-11.The results of the experiment clearly indicated the usefulness of various sources of nutrients and NPK application in promoting the growth and yield of groundnut. Among the levels of NPK, application of 100% RDF+ ZnSO4 @ 25 kg ha-1 + boron @ 10 kg ha-¹ and farm yard manure @ 12.5 t ha⁻¹ (T_s) recorded the highest plant height in loam (24.50 cm at flowering, 35.0 cm at peg formation and 52.07 cm at harvest) and sandy (20.55 cm at flowering, 25.04 cm at peg formation and 43.25 cm at harvest) soils. Similarly, the dry matter production of groundnut was the highest in the above said treatments. The loam soil registered a DMP of 1152 kg ha⁻¹ at flowering and 2041 kg ha⁻ ¹ at peg formation stage. The sandy soil recorded a DMP of 520 kg ha⁻¹ at flowering and 1220 kg ha⁻¹ at peg formation stage. The treatment T_s recorded the highest yield characters in the soils viz., number of pods plant⁻¹(22.81, 22.53), 100 kernel weight (43.37,38.05), shelling percentage (77.87, 77.45), pod yield (3310, 2509 kg ha⁻¹) and haulm yield (3991, 3102 kg ha⁻¹) in loam and sandy soils, respectively. In the treatment T_{12} -75% RDF + ZnSO₄+ boron+ humic acid the values of yield and growth, were at par with T_{g} values in both loam and sandy soils. With regard to 50% RDF along with different sources of nutrients registered lowest plant height DMP, No. of pods plant¹, shelling percentage, 100 kernel weight, pod and haulm yields in both loam and soils. Among added organic sources FYM gave better result (T_s) which was at par with 75% RDF plus humic acid @ 20 kg ha⁻¹. This trend followed on T_4 , T_6 , T_7 , T_{10} and T_{11} . 100% RDF+ ZnSO₄ @ 25 kg ha⁻¹ + boron @ 10 kg ha⁻¹ and farm yard manure @ 12.5 t ha⁻¹ (T_s). Among the sources tried, FYM was superior in the performance of growth and yield parameters. The humic acid was the next best source. The micronutrient sources zinc sulphate and borax was relatively better in their performance but fly ash showed poor performance. Thus the result revealed that 75% RDF + ZnSO₄ @ 25 kg ha⁻¹ + boron @ 10 kg ha⁻¹ and humic acid @ 20 kg ha⁻¹ which resulted in better growth and yield performance in both the soils could be the best treatment.

Key words : Sandy soil, Loam soil, Zinc, Boron, Organics, Growth, Yield, Groundnut

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