



RESEARCH ARTICLE :

Influence of organic manures, micronutrients, Arbuscular Mycorrhiza and addition of crop residue enhance the soil organic carbon content and yield of maize-sunflower sequential cropping system

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SUMMARY : Field experiments were conducted to study the influence of organic manures, micronutrients and Arbuscular Mycorrhiza (AM) on the productivity of maize-sunflower cropping system at Tamil Nadu Agricultural University, Coimbatore during 2011-12 and 2012-13. The experiment was laid out in split plot design and replicated thrice for maize during winter 2011-12 and 2012-13 and the same experiment after dividing each plot into two was laid out in split-split plot design with three replications for sunflower during summer 2012 and 2013 to estimate the residual effects of organic manures. The popular maize hybrid NK 6240 was taken as test hybrid in maize and Co SFH2 as test hybrid in sunflower. Four sources of organic manures with RDF *viz.*, Farmyard manure 12.5 t ha⁻¹, sericulture waste 5 t ha⁻¹, poultry manure 5 t ha⁻¹ and goat manure 5 t ha⁻¹ were evaluated in main plot along with one control (RDF only). Arbuscular mycorrhiza 100 kg ha⁻¹, ZnSO₄ 37.5 kg ha⁻¹, TNAU Micronutrient mixture 30 kg ha⁻¹ and a control without micronutrients and AM were studied in the sub plot. Organic manures, micronutrients and AM were applied to first crop of maize only and their residual effect was studied in the succeeding crop of sunflower with and without recommended dose of fertilizer. Enhanced yield attributes and higher grain and stover yields were recorded due to addition of organic manures compared to application of NPK alone. The yield attributes *viz.* cob length, cob girth, number of grain rows cob⁻¹, number of grains row⁻¹, cob weight, test weight, grain and stover yield, crude protein and starch content were significantly higher under application of poultry manure @ 5 t ha⁻¹ with RDF followed by application of sericulture waste @ 5 t ha⁻¹ with RDF. Among the micronutrients and AM, better yield attributes and higher grain and stover yields, crude protein and starch content were recorded with application of ZnSO₄ @ 37.5 kg ha⁻¹ followed by TNAU MN mixture @ 30 kg ha⁻¹. The treatment combination of poultry manure @ 5t ha⁻¹ with RDF along with ZnSO₄ @ 37.5 kg ha⁻¹ recorded higher grain and stover yields followed by application of sericulture waste @ 5 t ha⁻¹ with RDF along with ZnSO₄ @ 37.5 kg ha⁻¹. Hence, considering the overall performance in terms of growth, physiological attributes, yield attributes, yield, economics and system profitability of maize- sunflower cropping system, it is concluded that application of poultry manure @ 5 t ha⁻¹ with RDF (150:75:75 kg N:P₂O₅:K₂O ha⁻¹) along with ZnSO₄ @ 37.5 kg ha⁻¹ to preceding maize and RDF to the succeeding sunflower can be recommended under irrigated condition to get higher yield, system profitability and also to maintain soil fertility.