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Productivity of Three Maize Cultivars as Affected by Organomineral Fertiliser and Arbuscular Mycorrhizal Fungi under Greenhouse Conditions

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Abstract

Soil fertility is one of the major constraints to crop production in the tropics particularly for short-term arable crops such as maize. Varieties are being developed to increase yield to meet the nutritional requirement of the growing population. Can there be reasonable growth of these varieties in nutrient depleted soils? Can the symbiotic organism such as arbuscular mycorrhizae (AM) fungi and organomineral fertiliser (OMF) assist in enhancing the yield of these crops particularly under controlled conditions? Hence, a factorial experiment, completely randomised design replicated three times was conducted on nutrient depleted soil for 12 weeks using two levels of OMF (with and without) and AM fungi (*Glomus mossae*) on three cultivars of early maturing maize under greenhouse conditions, in 10 litre pots. The response of the vegetative parameters at the early growth stage at 2 weeks after sowing (WAS) showed that there was competition between AM fungi and the maize cultivars over the available nutrients. However, cultivar ACR9931-DMRSR increased significantly in height at 5, 7 and 10 WAS, but not significantly increased ($P < 0.05$) compared to cultivar ACR9922. Similar trend was followed by the same cultivars in terms of the maize stem girth; especially where OMF alone or combined with AM fungi were applied. Maize leaf length at 5, 7 and 10 WAS showed similar trend with cultivars ACR 9931 and ACR9928-DMRSR being significantly ($P < 0.05$) increased at 7 WAS compared to cultivar ACR9922-DMRSR which not significantly increased. At harvest, dry matter accumulation and grain yield followed a similar trend to those observed under height when OMF and AM fungi were applied and when OMF was applied without mycorrhizal. It is therefore possible to enhance the growth and yield of maize varieties through the combination of these technologies in nutrient depleted soils.

Keywords: Arbuscular mycorrhiza, maize cultivars, organomineral fertiliser, soil fertility

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