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Responses of Three Tomato Cultivars to Organomineral Fertiliser and Arbuscular Mycorrhizal Fungi under Field and Greenhouse Conditions

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Abstract

Tomato plants are classified as a heavy feeder having high requirement for nutrients. This is a strong limitation to both the quantity and quality of yield in infertile tropical soils. Application of chemical fertilisers is very limited due to logistic and lack of resources for its acquisition by the resource poor farmers. Deleterious effect of chemical fertilisers on the environment is also a critical factor that calls for a more environmentally friendly alternative. There are several tomato varieties that are commonly grown in different parts of West Africa. In this study, we evaluated three most commonly grown cultivars under field and greenhouse conditions to determine how their growth and yield can be improved through the combination of organomineral fertiliser (OMF) and arbuscular mycorrhizal fungi. A $2 \times 2 \times 3$ factorial experiment was used under greenhouse conditions with a completely randomised design while randomised complete block design was used under field conditions. Factors investigated include two levels of mycorrhizal application (with and without); two levels of organomineral fertiliser application (with and without, at the rate of 2.5 t h^{-1}) and three levels of tomato cultivars (Besue, Hausa and Ibadan local). All treatments were replicated thrice and data on yield and growth parameters analysed using ANOVA. Under greenhouse conditions, there was an increase in the number of fruit and fresh fruit weight of Hausa variety inoculated with mycorrhiza under OMF application by 300% and 85.9% respectively and were significantly ($P < 0.05$) higher compared to the values obtained for Besue but not significantly different from that of Ibadan local. Similar trends were observed under field conditions. The growth parameters like height and stem girth gave similar trends. It is therefore necessary to understand the mycorrhizal response status and organomineral fertiliser requirements of tomato cultivars before recommending these to farmers. It is possible that the level of fertiliser application in this investigation is not adequate to enhance the yield of Besue cultivar.

Keywords: Arbuscular mycorrhiza, organomineral fertiliser, soil fertility, tomato cultivars, yield