808/B

Effectiveness of vesicular arbuscular mycorrhizae (VAM) on growth of cocoa (*Theobroma cacao* L.) seedlings

S.Kumari[1*], B.C.Katudeniya[2] and H.A.Sumanasena[1]
1 Central research station, Department of Export Agriculture, Matale
2 Department of crop Science, Faculty of Agriculture, University of Peradeniya

Vesicular Arbuscular Mycorrhizae (VAM) is a mutualistic symbiont between soil-borne fungi with the roots of higher plants. Due to the perennial nature of cocoa, there is a significant potential for inoculation by mycorrhizae which can enhance the nutrient absorption efficiency and ultimately improve the productivity of cocoa. Therefore, this experiment was carried out to investigate the ability of inoculation and effectiveness of VAM inoculation on the growth of different varieties of cocoa seedlings. This pot experiment was conducted to identify the effectiveness of VAM on shoot and root development of cocoa seedlings (*Theobroma cacao*) at the nursery of the Export Agriculture Research Station, Department of Export Agriculture, Matale. Main treatments consisted of 150 g of inoculum (T1), 300 g of inoculum (T2) and a non inoculated control (T3). VAM spore density was 154 spores/50 g of inoculum. Two-months-old open pollinated seedlings of cultivars ICS1*NA32 (V1) SCA6*ICS6 (V2) and W6/457(V3) were planted in black polythene bags of 30x25 cm (gauge 150). The statistical design was randomized complete block design with factorial combination having seven replicates. Presence of darkly stained mycelium confirmed the infectivity of VAM for cocoa seedlings. The interaction effect between inoculum and cultivar was significant ($P<0.05$) for stem diameter at 3rd month after inoculation showing the maximum stem diameter of 0.87 cm for SCA6xICS6 at T1(150 g). Mean shoot height of 55 cm, 55 cm and 50 cm were observed for treatment T1 (150 g), T2 (300 g) and T3 (control) respectively and the shoot height for T3 was significantly smaller ($P<0.05$). Effect of inoculation has become significant for total leaf area at 3rd month after inoculation showing the smallest leaf area of 1451 cm^2 for T3 than T1 (150 g) & T2 (300 g). Independent effect of cultivar was significant having both smallest shoot height (46 cm) and the leaf area (1137 cm^2) for ICS1*NA32 (V1). Cocoa seedlings can be inoculated with VAM using soil inoculum of 150 g containing roots, fungal hyphae and spores and it is found to be a useful method to enhance growth of cocoa seedlings. Superior growth performances were observed in SCA6*ICS6 due to inoculation of VAM than in W6/457 and ICS1*NA32 cultivars.