Root alterations and nutrient uptake of mangosteen (Garcinia mangostana L.) seedlings in response to arbuscular mycorrhizal inoculation

ABSTRACT

Alterations to root system characteristics and nutrient uptake of mangosteen (Garcinia mangostana L.) seedlings in response to arbuscular mycorrhizal (AM) inoculation were studied. Weight-related parameters were unsuccessful in detecting small changes in infected roots. Tap-root penetration, root dry weight and root-to-shoot ratio were not influenced by AM inoculation. However, AM inoculation induced significant changes to length-related characteristics. In comparison with the uninoculated controls, AM inoculation increased root length density by 58–87%, root branching density by 20–30%, number of root tips by 22–25% and number of laterals by 15–26%. Positive alterations to root system were accompanied by tremendous increase in nutrient uptake. Uptakes of P, Zn and Cu were 67–88, 50–93 and 34–37% higher in inoculated seedlings. These results indicate that improved growth and nutrient uptake of the AM-inoculated seedlings were due to positive alterations of root system characteristics by the symbiosis.

Keyword: Arbuscular mycorrhiza; Root alteration; Nutrient uptake; Mangosteen