

Growth Characteristics of Tropical and Temperate Arbuscular Mycorrhizal Fungi in Onion (*Allium cepa* L.) Roots

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Abstract

Onion (*Allium cepa* L.) plants were inoculated with isolates of three tropical and one temperate arbuscular mycorrhizal fungi isolated from field soils, with the objective of selecting infective and rapidly spreading mycobionts for the production of fungal inoculum for field applications. Onion plants grown in quartz sand and calcined atapulgitic (clay mineral) medium in a 5:1 ratio were inoculated with propagules of arbuscular mycorrhizal fungi under greenhouse conditions. Sequential harvests of the plants were done at 10-day intervals. Roots were cleared of cytoplasmic contents and stained with trypan blue in acidic glycerol to assess root colonisation. Fungal entry points into root epidermal cells and colonisation or spread of fungal hyphae, vesicles and arbuscules were estimated microscopically. The number of entry points per cm root length varied considerably among the different isolates over time. Mean entry points per cm of root length ranged from 0.29 to 2.69, with the *Scutelospora* sp. isolate having the highest value 31 days after inoculation. Percent root colonised, an indication of hyphal spread within the root cortex, ranged from 9.9% to 60%. At the final harvest, 71 days after inoculation, the highest colonisation was associated with the temperate *Glomus mosseae* isolate followed by the *Gigaspora gigantea*, the tropical *Glomus mosseae* and the *Scutelospora* sp. isolate in that order. The aggressiveness of the fungal isolates during the early colonisation phase was not correlated with the internal spread of the fungi in the root cortex. The tropical isolates *Gigaspora gigantea*, *Glomus mosseae* and the temperate isolate, *Glomus mosseae*, were, therefore, desirable for selection compared to *Scutelospora* sp. although the latter fungus was more aggressive in the initial soil phase of the colonisation process.