Suppression of root-knot nematode by mycosymbionts on pyrethrum 
(Chrysanthemum cinerariefolium Vis.)

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Abstract

Five arbuscular mycorrhiza fungi (AMF) obtained from pyrethrum fields were screened for efficacy in improving pyrethrum (Chrysanthemum cinerariefolium Vis.) growth and in suppressing a root-knot nematode, Meloidogyne hapla in the greenhouse. The fungi screened were Glomus macrocarpum Tul and Tul, G. constrictum Trappe, G. monosporum Gerd. & Trappe, Scutellospora calospora (Nicol. Gerd.) Walker & Sanders and Gigaspora gigantea (Nicol. Gerd.) Gerd. & Trappe. A mixed fungal inoculum was incorporated into sterilized sand-soil mixture before transplanting 6-week-old pyrethrum seedlings. The inoculum consisted of the growth medium, spores, external mycelia and infected root segments. The plants were inoculated with 6000 M. hapla second stage juvenile (J-2) 3 months after fungal inoculation. Dry shoot weights, fresh root weights, percent root colonization by the fungi, nematode gall indices, number of eggs and females in the root system and number of J-2 in the soil were determined at the end of the experiment, 2 months after nematode inoculation. Glomus macrocarpum and S. calospora significantly improved top biomasses of fungus-treated and fungusnematode-treated plants. Glomus macrocarpum was the most effective, causing a 35% top biomass increase. Glomus constrictum, G. monosporum and G. gigantea improved top biomasses of fungusnematode-treated plants. Scutellospora calospora and G. constrictum significantly increased fresh root weights of pyrethrum by 46% and 53%, respectively. Except G. constrictum and G. monosporum, all the other fungi suppressed M. hapla disease severity and egg production. Glomus macrocarpum was the most effective, causing 87% nematode suppression. Scutellospora calospora and Gigaspora gigantea suppressed disease severity and egg production by up to 33% and 37%, respectively. All the fungi significantly reduced the number of females and J-2 in pyrethrum roots. Nematodes did not affect root colonization by the fungi except in G. constrictum and G. monosporum-colonized plants.

Key Words: Gigaspora gigantea, Glomus macrocarpum, G. constrictum, G. monosporum, Meloidogyne hapla, pyrethrum, Scutellospora calospora, suppression