

# Indigenous Populations of a Biological Control Agent in Agricultural Field Soils Predicted Suppression of a Plant Pathogen

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## Abstract

The nematophagous fungus *Hyalorbilia oviparasitica* and relatives (*Hyalorbilia* spp.) are known to parasitize several endoparasitic nematodes. In this project, we hypothesized that indigenous populations of this fungus could be used to predict nematode suppression in agricultural field soils. We quantified *Hyalorbilia* spp. in soil samples from 44 different sugarbeet fields in the Imperial Valley of California. Seven soils harboring *Hyalorbilia* spp. and two that tested negative for the fungi were examined for nematode suppressive activity. Untreated and autoclaved portions of each soil were planted with cabbage and infested with sugar beet cyst nematode (*Heterodera schachtii*) juveniles. Females and cysts of *H. schachtii* were enumerated after 12 weeks. In the seven soils harboring *Hyalorbilia* spp., females and cysts in the untreated soils were reduced by 61 to 82% compared with the autoclaved controls. Soils with no detectable *Hyalorbilia* spp. exhibited no nematode suppression. Two novel *Hyalorbilia* strains, HsImV25 and HsImV27, were isolated from *H. schachtii* females reared in field soil using an enrichment and double-baiting cultivation technique. Both strains suppressed *H. schachtii* populations by more than 80% in soil-based assays, confirming that *Hyalorbilia* spp. are the likely causal agents of the nematode suppression in these soils.

This study demonstrated that indigenous populations of a hyperparasite (*Hyalorbilia* spp.) in agricultural field soils predicted suppressive activity against a soilborne plant pathogen (*H. schachtii*). To our knowledge, this is the first report to demonstrate this capability. We anticipate that this research will provide a blueprint for other similar studies, thereby advancing the field of soilborne biological control

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