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Effect of *Paecilomyces lilacinus* Strain 251 on the Survival and Virulence of the Entomopathogenic Nematodes *Steinernema feltiae*, *Heterorhabditis bacteriophora*, and *H. megidis*

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Abstract

Modern agricultural practices often require the application of multiple types of control agents to reduce pest and disease damages. These methodologies must be compatible and integrated in overall production systems. In the present study, the compatibility of *Paecilomyces lilacinus* strain 251 with three entomopathogenic nematode species was investigated. *P. lilacinus* is a facultative egg pathogen of sedentary nematodes and commercially available in several countries for the control of a wide spectrum of plant parasitic nematodes. Entomopathogenic nematodes are important biocontrol agents against soil-inhabiting insect pests. The biocontrol efficacy of these entomopathogenic nematodes is due to obligate mutualism with insect-pathogenic bacteria that are carried within the nematodes' bodies. In a bio-assay the effect of the culture filtrate of *P. lilacinus* on the mobility of the entomopathogenic nematode (EPN) species *S. feltiae*, *H. bacteriophora* and *H. megidis* was investigated. Furthermore, the survival of these entomopathogenic species in soil treated with the fungus *P. lilacinus* was investigated after 1, 7 and 14 days. Additionally, the effect of the fungal biocontrol agent on the efficacy of the EPN tested against *Galleria mellonella* was determined using a sand column assay. It was demonstrated that there was no negative effect on the activity of the EPN tested after 24-hour exposure to the fungal culture filtrates. In addition, the survival and the virulence of the entomopathogenic species tested were not affected by the presence of *P. lilacinus*. In conclusion, the present study demonstrated that *P. lilacinus* strain 251 and the entomopathogenic nematodes tested are compatible elements of integrated pest management.

Keywords: Biological control, compatibility, entomopathogenic nematodes, *Paecilomyces lilacinus*