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INFECTIVITY OF *PASTEURIA PENETRANS* TO ENTOMOPATHOGENIC NEMATODES

by

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Summary. The infectivity of an Indian isolate of *Pasteuria penetrans* (PMI-1) to isolates of the entomopathogenic nematodes *Steinernema* sp. and *Heterorhabditis* sp. was tested in aqueous suspensions. Spores of *P. penetrans* did not attach to any of the entomopathogenic nematodes even after 72 hours of exposure at 25 °C, while in the case of *Meloidogyne incognita*, from which the bacterium was originally isolated, spore attachment was observed after 24 hours of exposure. These results indicate that *P. penetrans*, a parasite of phytonematodes, does not adversely affect entomopathogenic nematodes.

Pasteuria penetrans is a mycelial and endospore-forming obligate bacterial parasite of plant parasitic nematodes (Stirling, 1988). This bacterium has been reported as a potential agent for the biological control of plant parasitic nematodes throughout the world (Stirling, 1988; Sayre and Starr, 1988).

Considerable variations have been reported in the host range of different geographical isolates of *P. penetrans*. However, any adverse effect of this bacterium on beneficial nematodes like the entomopathogens needs to be established before its development as a biological control agent can progress, as these nematodes often co-exist with plant parasitic nematodes in agro-ecosystems.

In the present study, infectivity of an Indian isolate of *P. penetrans* to the entomopathogenic nematodes *Steinernema* sp. and *Heterorhabditis* sp. was studied.

Materials and methods

Pasteuria penetrans (Thorne) Sayre *et* Starr, isolate PMI-1 was originally isolated from *Meloidogyne incognita* at the Indian Agricultural Research Institute (IARI) farm, New Delhi. Multiplication of the bacterium in culture and preparation of a spore-laden dry root powder formulation (containing 1×10^5 spores/mg root powder) was done as described by Stirling and Wachtel (1980).

The *Meloidogyne incognita* (Kofoid *et* White) Chitw. population used in the study was obtained from glasshouse cultures maintained at the Nematology Section, Sugarcane Breeding Institute, Coimbatore, on tomato plants raised in sterile soil: sand (2:1) mixture. Infective juveniles of entomopathgenic nematodes *viz. Steinernema glaseri* Steiner, *Heterorahbditis indica*, Karunakar *et* David, *Heterorahbditis zealandica* Poinar *Heterorahbditis bacteriophora* Poinar were used in this study. In addition to this infective juveniles of seven new isolates each of *Steinernema* sp. and *Heterorhabditis* sp. were also included in the study. All the new isolates tested were recovered from soil samples collected from sugarcane fields. The isolates were maintained in the laboratory at 25 °C on larvae of the greater wax moth, *Galleria mellonella* L.

Infective juveniles had the dauer cuticle intact and were less than one week old when tested.

Three ml of bacterial spore suspension ($1x10^5$ spores/ml sterile water) was pipetted into a 17x50 mm diam Petri dish and 100 infective juveniles of each isolate of *Steinernema* sp. and *Heterorhabditis* sp. in 0.5 ml water were added and three replicates for each nematode isolate were incubated at 25 °C. Three replicates with second-stage juveniles (J2) of *M. incognita* served as control. Infectivity of *P. penetrans* to entomopathogenic nematodes as indicated by the number of spores attached to each nematode body was determined for 20 nematodes in each of the three replicates after 24, 48 and 72 hours of incubation.

Results and discussion

Observations on the infectivity of *P. penetrans* to the entomopathogenic nematodes *Steinernema* sp. and *Heterorhabditis* sp. revealed that spores of *P. penetrans* did not attach to any of the entomopathogenic nematodes even after 72 hours of exposure at 25 °C, the optimum temperature for the attachment of spores of this isolate of *P. penetrans* (Somasekhar and Gill, 1990). However, in the control treatment with J2 of *M. incognita*, spore attachment (35 spores/J2) was noticed 24 hours after exposure to the bacterial spore suspension. These observations support the earlier report that *P. penetrans* spores generally show greater attachment to the nematode species on which they are originally cultured (Oostendorp *et al.*, 1990). Therefore, this bacterium can safely be used as a biocontrol agent against phytonematodes.

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