

## Role of Earthworm *Allolobophora caliginosa* in Enhancing Biological Control of Egyptian Cotton Leafworm *Spodoptera littoralis* by *Steinernema carpocapsae* and *Heterorhabditis bacteriophora*

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Received: 02 July 2018

Revised: 25 July 2018

Accepted: 31 July 2018

### ABSTRACT

Entomopathogenic nematodes, *Steinernema carpocapsae* (All strain) and *Heterorhabditis bacteriophora* (HP 88) dispersal were enhanced by the presence of earthworms that may serve as phoretic hosts based on increased IJs dispersal through the soil columns. IJs dispersal capability either in sandy or clayey soil is limited in the absence of earthworm *Allolobophora caliginosa* as compared with PVC column pipes that contained the earthworms. After two weeks, dispersal was estimated by using the greater wax moth, *Galleria mellonella* as bioassay organism. Results showed vertical dispersal of nematodes was increased significantly in the presence of earthworm as compared with soil columns in absence of earthworms. With two species of nematodes, when IJs were placed on the surface of soil columns, significantly more nematodes dispersed to the lower half of the columns when *A. caliginosa* was present and vice versa in the absence of earthworm. Thus, earthworm could be used as vectors to introduce/disperse beneficial organism. The current results showed that the ability of *S. carpocapsae* (All strain) and *H. bacteriophora* (HP 88) to control Egyptian cotton leafworm *Spodoptera littoralis* was enhanced in the presence of earthworm and caused significant *S. littoralis* suppression with mortality percentages 70 and 94 % relative to the control in the absence of earthworm.

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**Key words:** Earthworm, Nematode dispersal, *Steinernema carpocapsae*, *Heterorhabditis bacteriophora*, *Spodoptera littoralis*.