Summary

SUMMARY

Entomopathogenic nematodes in the families Heterorhabditidae and Steinernematidae are used world wide in the biological control of insects e.g. Scarabaeid and noctuid pests. Recently, novel isolates of entomopathogenic nematodes have been obtained from different regions in Egypt. Some of these isolates are tolerant to both temperatures and desiccation extremes. Susceptibility of peach beetle Pachnoda fasciata, the hairy beetle Tropinota squalida and/or the sugar-cane beetle Pentoden bispinosus to four Egyptian isolates of Heterorhabditis spp. with the code names: EBNU3, EGB1, EIS7 and ESS1 as well as three imported nematodes Steinernema carpocapsae, Steinernema glaseri and Heterorhabditis bacteriophora was carefully studied.

Survival and vertical movement of the most virulent nematodes against the scarabaeid pests were also studied. The results could be summarized as follows:

Susceptibility of grubs to nematode infections:

First instar larvae of P. fasciata were more susceptible to the infection induced either by the Egyptian or the imported nematodes than T. squalida larvae. Steinernema glaseri was the most effective nematode against the 1st instar larvae. Values of the medium lethal doses (LD_{50}) due to S. glaseri were 37 and 518 infective juveniles (IJ's) per 100 cc pot against P. fasciata and T. squalida larvae respectively. The least effective nematode on this particular instar was the isolate EBNU3. The LD_{50} values were 300 and 1512 IJ's per 100 cc pot for P. fasciata and T. squalida respectively.

Third instar larvae were resistant to all tested nematodes except S. glaseri which greatly affected the 3rd instar of the three tested scarabaeids. The LD_{50} values of S. glaseri were 77, 291 and 334 IJ's per 100 cc pot for the larvae of P. bispinosus, T. squalida and P. fasciata, respectively.

Susceptibility of adult beetles to the nematode infections:

Since adult scarabaeid beetles visit the soil frequently and for long periods during the night and unfavorable conditions, the susceptibility of these beetles to nematode infections was tested in the soil. T. squalida beetles showed susceptibility to nematode infections than P.fasciata. The most effective nematodes against P. fasciata beetles were S. carpocapsae, S. glaseri and H. bacteriophora giving the LD_{50} values of 2238, 2888 and 3949 IJ's respectively. H. bacteriophora however greatly affected T. squalida followed by S. glaseri and S. carpocapsae. The LD_{50} values were 342, 406 and 2421 IJ's respectively. Egyptian isolates gave over 20,000 IJ's as LD_{50} values against adult beetles.

Vertical migration of entomopathogenic nematodes in natural soils:

The vertical migration of entomopathogenic nematode, S. glaseri and the Egyptian

Heterorhabditis sp. EBNU3 were determined in clay and sandy soil. It was detected that, S. glaseri is able to disperse into 8 and 12 cm in clay and sandy soil respectively. However, the Egyptian Heterorhabditis sp. EBNU3 had the ability to migrate for a distance of 16 and 20 cm in both clay and sand respectively. The pupae of the greater wax moth Galleria mellonella were infected when placed at these distances.

Survival of entomopathogenic nematodes in natural soils:

Survival of the infective juveniles of entomopathogenic nematodes were also determined in clay and sandy soil. The results had indicated that, juveniles of both tested nematodes S. glaseri and Heterorhabditis bacteriophora did not survive over 5 days post application in clay soil out of manure piles. Meanwhile, they could persist in sandy soil of Nubaria for 30 days.