Mermitbid nematodes as parasites of *Heliothis* spp. and other crop pests in Andhra Pradesh, India

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Abstract. Insect pests were collected from cultivated and wild plant species to study their parasites in Andhra Pradesh, India. Besides insects, nematodes emerged as parasites. While *Hexamermis* spp. were common in most lepidoptera, *Ovomermis albicans* (Siebold) was recovered from *Heliothis* spp. The nematodes were active, even more than insect parasites, during early monsoon. They were more active on light-soils than on heavy-soils. Against *Heliothis armigera* (Hubner) in particular, their incidence was more on "low-growing" crops like *Arachis hypogaea* (L.), and *Lycopersicon esculentum* (L.), and weeds. The nematode *Penraromimermis* sp. was recorded from the bug *Nezara viridula* L.

Keywords. Mermitids; *Ovomermis albicans*; *Hexamermis* spp; *Penratomimermis* sp.; *Heliothis* spp.

1. Introduction

The mermithid nematodes, in general, are known to infect a wide range of insects in 15 different orders (Nickle 1972). Ramakrishnan and Kumar (1976) reported the association of species of *Mermis*, *Agamermis*, *Hexamermis*, and *Geomermis* with 40 insect species in India. In this paper, observations on mermithids as parasites of some important insect pests on dry-land crops and their role in regulating the pests populations are described.

2. Material and methods

Insects were collected (1975–83) in their available stages from Medak, Rangareddy and Mahaboobnagar districts of Andhra Pradesh, India and reared in glass vials (9 x 2.5 cm) in the laboratory on the same natural hosts to study critically for nematode and insect parasites. The nematodes, when emerged, were preserved by the method suggested by IA Rubtsov (personal communication). The rates of nematode parasitism recorded over years in different months on different crops were calculated on the basis of total larvae in the samples which showed the nematodes.
3. Results and discussion

3.1 Nematode species and insect hosts

The mermithid nematode species identified from different insect hosts were as follows:

- *Ovomennis albicans* (Siebold)
  - *Heliothis armigera* (Hubner)
  - *H. assulta* Guenee
  - *H. peltigera* Schiff

- *Hexamermis spp.*
  - *Achaea janata* L.
  - *Chilo partellus* Swinhoe
  - *Cydia critica* Meyr.
  - *C. ptychora* Meyr.
  - *Lampides boeticus* L.
  - *Marasmius suspicilis* Walker
  - *Menochilus sexmaculatus* F.
  - *Mythimna separata* Walker
  - *Scirpophaga incertulas* Walker
  - *Spodoptera exigua* Hubner
  - *S. litura* F.

- *Pentatomimermis sp.*
  - *Nezara viridula* L.

*O. albicans* was recovered from the larvae of all the three *Heliothis* species found in India. *Hexamermis* spp. were recovered from many insects including a coleopteran *M. sexmaculatus* which predates on eggs and larvae of some insect pests. *Pentatomimermis* sp. emerged from *N. viridula*. The nematodes also emerged from the adults of *H. armigera*, *N. viridula* and *S. incertulas*.

The nematodes recorded on *Heliothis* and *N. viridula* are new records for these are not listed by Poinar (1975, 1979) in his reviews on entomophagus nematodes.

3.2 Nematode parasitism in relation to season and host crops

The rates of nematode parasitism recorded in different insects on cultivated and uncultivated host plants in different months are given in table 1. Although the collection of insects was from almost all months of year, the nematode parasitism was seen only between June to December with peak activity generally during July–September.

Nematodes, in general, were more active on light-soils (alfisols) than on heavy-soils (vertisols). This is, however, comparable in our data only for *S. bicolor* (L.) Moench, *Zea mays* L., and *C. cajan* (L.) Millsp which are grown on both types of soils. *A. hypogaea* (L.) and *Lycopersicon esculentum* (L.) are normally grown on light-soils, and weeds are also most common on these soils.

Amongst weeds, *Heliothis* was greatly parasitised on *Acanthospermum hispidum* DC., *Gomphrena celosioides* Mart., and *Cleome gynandra* (L.) Briq., and relatively less on *Datura metel* L. It should be noted here that *H. peltigera* is more predominant on *A. hispidum* and *H. assulta* on *D. metel* (Bhatnagar and Davies 1978).