

**NEW SPECIES OF MERMITHID *HEXAMERMIS*
DECEMLINEATAE SP.N. (NEMATODA, MERMITHIDAE) FROM
COLORADO BEETLE**

GORGADZE O., LORTKIPANIDZE M., KOKHIA M., MELASHVILI N., KUCHAVA M.

Institute of Zoology

(Received October 9, 2006)

Abstract

The paper deals with the description of the new species of mermithid *H. decemlineatae* sp.n. The measurements of adult female, male and post parasitic larvae are given. Host: Colorado beetle (*Leptinotarsa decemlineata* Say). Parasitic and postparasitic mermithid larvae are revealed in the body of beetle, but adult females and males were recorded in the soil. The minimal number of mermithid larvae in each beetle was 1 specimen, and maximal - 30 specimens. In the host the number of parasitic larvae amounts to 1-3 specimens. In natural environment 47.5% of the beetles and 64.5% of larvae were infected with mermithid larvae. Nematode is localized in adipose tissue of the beetle and larvae.

Key words: parasitic and postparasitic nematodes, anatomical and morphological studies, *Hexameris stepposis*, *Hexameris angusta*.

Introduction

Colorado beetle *Leptinotarsa decemlineata* Say (Coleoptera) belongs to the Chrysomelidae family. It is harmful pest of potato. This pest was introduced from North America and was spread in most territories of Europe and Asia [Briantsev, 1966].

According to the studies carried out in biocenosis of potato sowings it was found out that those organisms (nematodes, bugs, carabus, ladybirds), which significantly reduce number of Colorado beetle, were consequently adapted on them. In this way entomopathogenic nematodes of the Mermithidae family are especially significant. Those nematodes in humid conditions can infest beetle, as well as larvae of Colorado beetle, and stimulate their death with 80-95% rate [Mishachkov, 1980]. Due to this fact mermithids appear to be perspective control agents against pests [Ipatieva, Pimenova, 1985; Rubtsov, 1978].

The goal of our work was to study nematodes of Colorado beetles distributed in some regions of East Georgia.

Materials and Methods

To study parasitic nematodes of Colorado beetle and its larvae potato sowings of private farms of mountain regions of East Georgia were researched. Places of collection were: villages Thesami, Ghulelebi, Trani, (Mtskheta-Mtianeti region).

665 specimens of the beetle and 1225 specimens of its larvae were dissected using Pavlovski method [Pavlovski, 1957]. 511 specimens of parasitic and postparasitic nematodes of one species were revealed in beetles and larvae, but the adult forms of the same species - in the soil of potato sowings. For anatomical and morphological study of collected nematodes temporary and long-term preparations were prepared [Poinar, 1975]. For nematode identification international index formulae of nematology were used [De Man, 1884; Micoletzky, 1914]. It was established that recorded nematode belongs to the genus *Hexameris* and family Mermithidae.

Genus diagnosis - *Hexameris* Steiner, 1924 [Steiner, 1924].

Nematodes of this genus are of middle or big sizes (50-80 mm). Frontal part of the head of female, unlike male, is of mainly conic form. Tail end is rounded. Cuticle of the end parts of head and tail of parasitic and postparasitic larvae is thicker, than of the body middle part. Mouth opening in the frontal part of the head is placed symmetrically. Has 6 cephalic papillae; has no labial papillae; Amphids of small size. Vulva is straight and has significantly thickened stoma. Vagina is of pear-form; spicule - pair, straight and short. Has thick sexual papillae. Tail ends of parasitic and postparasitic larvae are rounded.

Typical species: *Hexameris angusta* Rubzov, 1971 [Rubtsov, 1971].

Results and Discussion

Host: Colorado beetle (*Leptinotarsa decemlineata* Say).

Localization: in adipose tissue of the beetle and larvae.

The apical part of head of female mermithid is speculated, but of male - rounded. (Fig. 1 A, C). Neck gland is seen under cuticle. There are not protrudent tubers on the head. Amphids are small (4-6 μm) and oval. Their ducts are opened a bit lower of cephalic papillae. Cuticle oesophagus is not spread up to the mouth opening. Width of mouths opening walls is of 3-5 μm .

Female: n=7; L=42.3 (32.0-62.5) mm; a = 172.1 (155.3-203.6); V (%) = 55 (54-57);

Body width: near cephalic papillae consists of 70 (53-115) μm , near nerve ring - 162 (92-222) μm , near vulva - 250 (157-380) μm and near the end of trophosome - 158 (120-277) μm . Distance from the frontal part of the head to nerve ring is 269 (179-335) μm ; up to vulva - 25.5 (17.3-30.8) mm; from the end of trophosome to the tail end - 168 (75-280) μm . Structure of vagina is not distinguished from that of species described by Rubtsov [Rubtsov, 1971]. Width of cuticle near mouth opening is 21 (19-32) μm , near vulva - 14 (9-18) μm , at the tail end - 25 (24-33) μm .

Male: n=23.5 (19.3-38.6) mm; a=135.1 (105-183.7); c=130.6 (83.8-159.4).

Body width: near cephalic papillae consists of 70 (56-93) μm ; near nerve ring 115 (80-193) μm ; at anus -155 (120-240) μm ; the widest part of body - 198(153-322) μm . Distance from the frontal part of head to nerve ring is 305 (240-396) μm . Male has weakly bent pair spicule (Fig. 1. D), which length is 161 (103-250) μm , diameter - 20 (15-36) μm , but its end is acute. Cuticle width at head opening in the front part of the body is 18 (14-23) μm , in the middle part - 13 (10-16) μm and near tail - 13 (6-30) μm . Tail length is 200 (150-304) μm .

Postparasitic larvae

Female: n=1; L=25.3 mm.

Body width: at cephalic papillae - 98 μm , at nerve ring - 170 μm , at vagina - 335 μm , at the end of trophosome - 225 μm . Distance from the apical part of the head to nerve ring consists of 350 μm , from the end of trophosome to the end of tail - 345 μm . Distance from front of the head to vagina equals to 20.2 mm. Cuticle width is: near head opening in the front of the head - 41 μm , at vagina in the middle part of the body - 13 μm , and at the tail - 102 μm .

Differential diagnosis

By anatomical and morphological characteristics species described above resembles species *Hexameris stepposis* Artyukhovskiy et Khartschenko, (1965) [Artyukhovskiy, Khartschenko, 1965], but is more similar to the species *Hexameris angusta* Rubtsov [Rubtsov, 1971], from which it is distinguished by the form of vulva lips, by form and size of amphids.

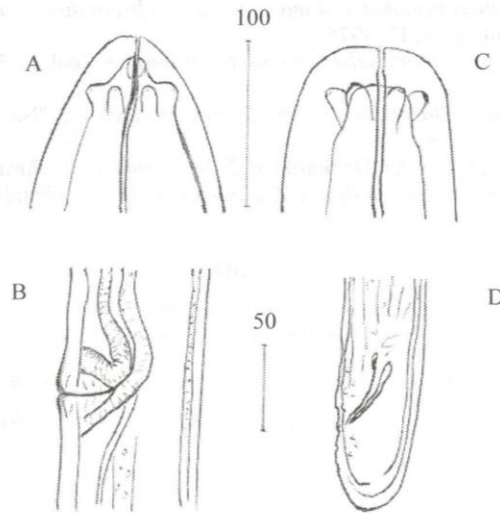


Fig. 1. *Hexameris decemlineatae* sp. n.
 Female: A – frontal end of the body; B – vulva segment
 Male: C – frontal end of the body; D – tail segment with spicule.

According to anatomical-morphological features *Hexameris decemlineatae* sp.n. is considered as a new species for Georgia.

References:

- Anderson R.S. *Methodes pour l'examen des nematodes en vue apicale*. Ann. Parasitol. Hum. Comp., **33**, 171-172, 1958.
- Artyukhovskiy A.K., Kharchenko N.A. *Study of mermithids of Streletskaia Steppe*. Proceedings of Central Black Sea Reservoir, M., p.9, 1965 (in Russian).
- Briantsev B.A. *Agricultural entomology*. L., "Kolos", pp.342, 1966 (in Russian).
- De Man J. G.. *Die frei in d. reinen Erde u. in sussen Wasser lebenden nematoden d. niederl. fauna Leiden*. p. 313-321, 1884.
- Ipatieva G.V., Pimenova I.N. *Mermithids of the Altai Mountains*. Publ. Saratov University, p.1-149, 1985 (in Russian).