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Hexamermis ovistriata n. sp. (Nematoda : Mermithidae) a parasite of the grasshopper *Staurorhectus longicornis* Giglio-Tos (Orthoptera : Acridiidae) in Argentina

S. Patricia STOCK and Nora B. CAMINO

Centro de Estudios Parasitológicos y de Vectores (CEPAVE), Calle 2, Nº 584, 1900 La Plata, Argentina.

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Summary — *Hexamermis ovistriata* n. sp. (Nematoda : Mermithidae) a parasite of the grasshopper *Staurorhectus longicornis* Giglio-Tos (Orthoptera : Acridiidae) is described and illustrated. It is characterized by the presence of large, flask-shaped amphids, vagina J-shaped, two medium sized spicules and six rows of genital papillae : fourteen pre-anal and eighteen post-anal papillae. Eggs with three longitudinal lines.

Résumé — Hexamermis ovistriata *n. sp. (Nematoda : Mermithidae) parasite de la sauterelle* Staurorhectus longicornis *Giglio-Tos (Orthoptera : Acridiidae) en Argentine — *Hexamermis ovistriata* n. sp. *(Nematoda : Mermithidae),* parasite de la sauterelle *Staurorhectus longicornis* Giglio-Tos (Orthoptera : Acridiidae) est décrit et illustré. Il est caractérisé par la présence de grandes amphides en forme de bouteille, un vagin en forme de J, la présence de deux spicules de taille moyenne et de six rangées de papilles génitales : quatorze préanales et dix-huit postanales. Les œufs sont ornés de trois lignes longitudinales.

Key-words : Hexamermis, grasshopper.

During the summer of 1989, we discovered a mermithid parasitizing nymphs of the grasshopper *Staurorhectus longicornis* Giglio-Tos, 1876, at Brandsen, Buenos Aires, Argentina. Twenty different genera of acridids parasitized by *Hexamermis* species have been reported from USA, Europe and South America.

Further investigations showed that this mermithid is new to science. It is described and figured below, as *Hexamermis ovistriata* n. sp.

Material and methods

Nymphs of *Staurorhectus longicornis*, were collected with a sweepnet from the field at Brandsen. They were placed in cages which had plastic containers with moist soil. The nematodes that emerged were collected from the moist soil and kept in moist soil until they matured.

Adults and post-parasitic juvenile nematodes were observed alive and then killed in distilled water at 60 °C for 3 s, fixed in TAF and processed to glycerol by Seinhorst's method for taxonomic studies (Curran & Hominick, 1980). Histological sections to determine the arrangment of the longitudinal chords were made by fixing the nematodes in Bouin's fluid, passing through alcohol series to paraplast, sectioning at 10 µm and staining with hematoxilin-eosin. An apical view of the head was prepared in glycerine jelly (Hooper, 1970). Drawing and measurements were made from live and fixed specimens with a camera lucida microscope and micrometer.

Hexamermis ovistriata n. sp.

(Fig. 1)

MEASUREMENTS

Female (paratypes; n = 23). L = 40-355 (126 ± 116.36) mm; head diam. at cephalic papillae level = 52-95 µm; (71 ± 11.61) µm; maximum body diam. = 144-560 µm (282.8 ± 137.27) µm; diam. at posterior end of trophosome level = 100-381 (208.19 ± 86.97) µm; dist. ant. end to nerve ring = 220-470 (349.19 ± 67.25) µm; V = 43.48-65.1 (52.12 ± 7.31); length ant. portion of vagina = 44-100 (63 ± 23.42) µm; vagina length = 80-500 (260 ± 141.91) µm; vagina width = 52 + 125 (98 ± 37.20) µm.

Male (paratypes; n = 15). L = 13-68.15 (34 ± 18.52) mm; head diam. at cephalic papillae level = 49.5-64 (57.2 ± 4.87) µm; body diam. at nerve ring level = 90-140 (115.5 ± 14.98) µm; body diam. = 139-200 (168.5 ± 23.93) µm; dist. ant. end to nerve ring = 246.5 (276 ± 19.83) µm; tail length = 142-309.5 (200 ± 59.84) µm; spicules length = 127.5-240 (167.5 ± 30.52) µm; width of spicules in the middle = 9-24 (14.5 ± 4.03) µm.

HOLOTYPE (male). L = 48 mm; head diam. at cephalic papillae level = 58 µm; body diam. at nerve ring level = 100 µm; maximum body diam. = 9 µm; body diam. at anus level = 151 µm; dist. ant. end to nerve ring = 278 µm; tail length = 203 µm; spicules length = 162.5 µm; width of spicules in the middle =

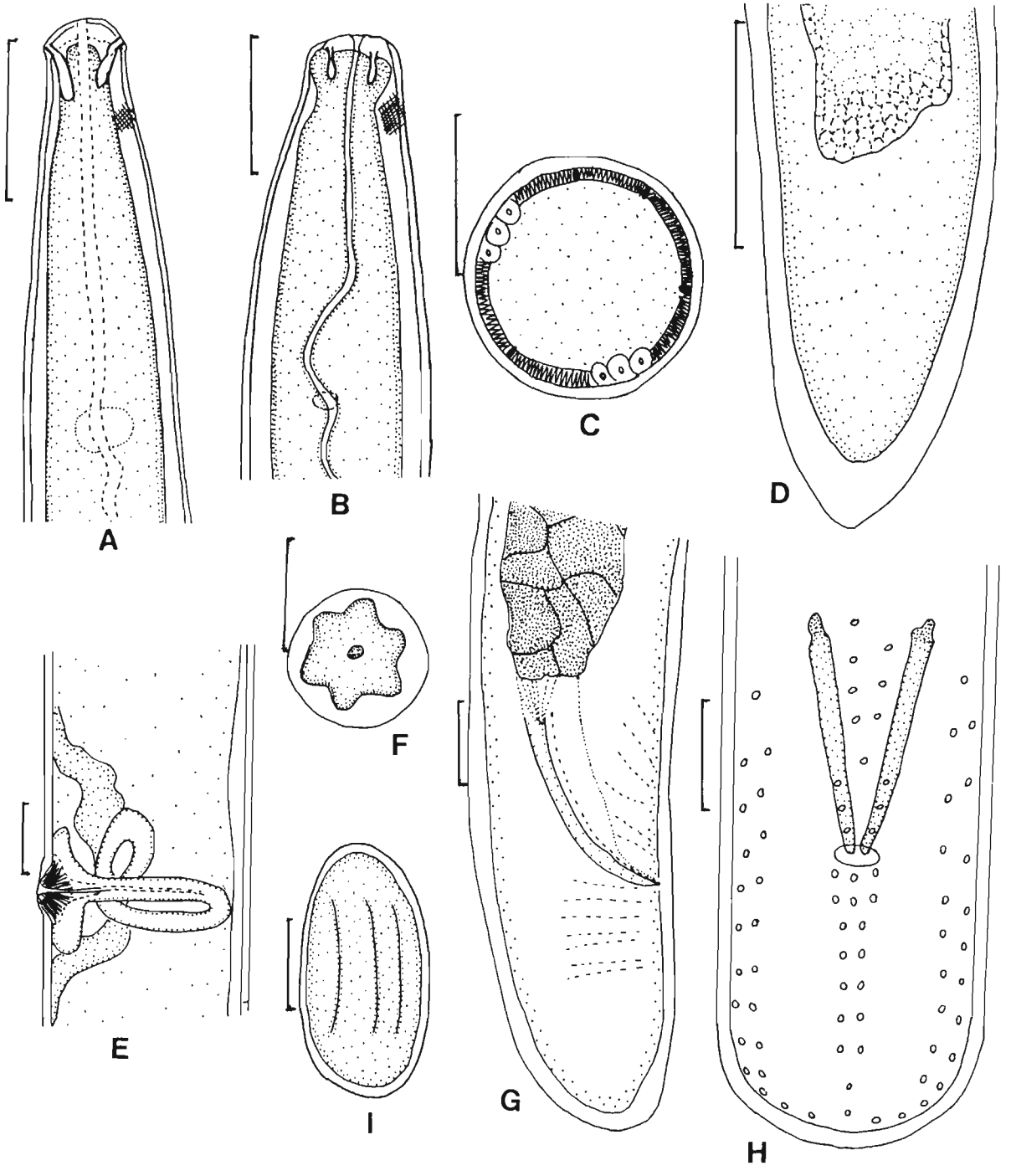

Fig. 1. *Hexamermis ovistriata* n. sp. A : Dorsal view of male head; B : Dorsal view of female head; C : Cross section at midbody, D : Lateral view of post-parasitic juvenile tail; E : Vagina; F : En face view of male head; G : Lateral view of male tail; H : Ventral view of male tail. *(Bars : A-E = 100 µm; F-I = 50 µm.)*

11.5 µm; length and width of amphids = 40.5 × 14.5 µm.

ALLOTYPE (female). L = 135 mm; head diam. at cephalic papillae level = 72.5 µm; body diam. at nerve ring level = 166.5 µm; maximum body diam. = 260 µm; body diam. at posterior end of trophosome level = 210 µm; dist. ant. end to nerve ring = 357.5 µm; V = 54; length ant. portion of vagina = 54 µm; vagina length = 325.5 µm; vagina width = 110 µm; length and width of amphids = 23.5 × 6 µm.

DESCRIPTION

Adults : Long white nematodes. Cuticle with criss-cross fibres, visible with light microscope. Head homocephalic. Six cephalic papillae surrounding the mouth. Amphids large sized, flask-shaped. Amphidial opening small. Six hypodermal chords : lateral chords containing three rows of cells all along the body; the dorsal, subventral and ventral chords containing one row of cells. Mouth terminal and central.

Females : Vulva a longitudinal slit. Cuticle thin at the vulval canal. Vagina J-shaped, perpendicular to the longitudinal body axis. Anterior portion of the vagina well muscularized, with a descending branch and another ascending whose terminal portion makes a loop before joining the uterus. Anterior uterus ventrally situated, connecting vagina directly anterior to vulval region. Head rounded, with a slight neck constriction. With or without tail appendage (juvenile females with tail appendage were found in a 6 % of the population).

Males : Spicules paired, medium sized, exceeding the width of body at anal level, never twisted. Spicule tip rounded, simple, lacking ornamentation. Six rows of genital papillae, double row of lateral papillae : the external row with thirteen papillae and the internal one with twelve papillae irregularly arranged; ventral row with fourteen pre-anal papillae : a single papilla at the beginning of the spicules, three pairs of papillae, a single papilla, and three pairs of papillae; eighteen post-anal papillae : two triplets of papillae, five pairs of papillae ending with two single ones. Head structure similar to that of the female. Amphid size greater in males than in females. With or without tail appendage (juvenile males with tail appendage were found in a 4 % of the population.)

Eggs : Not embryonated in uterus. Chorion composed of two layers, outer layer with three longitudinal lines and thin inner, smooth and clear; no byssi. Eggs = 120-165 (148 ± 23.1) × 73-105 (92 ± 16.27) µm.

Post-parasitic juveniles : Dimensions similar to that of adults. With or without caudal appendage.

TYPE HOST AND LOCALITY

Nymphs of *Staurorhectus longicornis* Giglio-Tos, 1976 (Orthoptera : Acridiidae). Brandsen, Buenos Aires, Argentina.

TYPE SPECIMENS

Holotype : deposited in the helminthological collection in the CEPAVE. *Allotype* and *paratypes :* deposited in the Invertebrata Division, Faculty of Natural Sciences and Museum, La Plata, Buenos Aires, Argentina.

DIAGNOSIS

Mermithidae Braun, 1883; *Hexamermis* Steiner, 1924. *Hexamermis ovistriata* n. sp. is characterized by : *i)* the presence of large, flask-shaped amphids which in profile do not pass inside the head almost to the oesophageal canal; *ii)* a J-shaped vagina, situated transversally near the middle of the body; *iii)* spicules medium sized and slightly curved; *iv)* six rows of genital papillae (fourteen pre-anal; eighteen post-anal); *v)* eggs with three longitudinal lines of striations.

RELATIONSHIPS

The new species is placed in the genus *Hexamermis* because, although its amphids are large, they are actually much smaller than those of *Amphidomermis* Filipjev, 1934.

Also, the preparasitic stage of *H. ovistriata* n. sp. lacks the post nodal region of the body, an oustanding character of the members of the genus *Agamermis* Cobb, Steiner & Christie, 1923 and the parasitic and post-parasitic stages of *H. ovistriata* n. sp. lack the nodal scar that is present in *Agamermis* species.

Hexamermis ovistriata n. sp. shares the morphology of its vagina (J-shaped) with nine species of the genus *Hexamermis* Steiner, 1924 : *H. albicans* (Siebold, 1848) Poloshentsev & Artyuskhovsky, 1959 from Europe, Asia and America; *H. arvalis* Poinar & Gyrisco, 1962 from USA; *H. brevis* (Hagmeier, 1912) Polozhentsev & Artyukhovsky, 1959 from Europe; *H. cathetospiculae* Poinar & Chang, 1985 from Malaysia; *H. cavicola* Welch, 1963 from Australia; *H. elongata* Kaiser, 1977 from Europe; *H. microamphidis* Steiner, 1925 from Java Islands; *H. hortensis* Camino & Stock, 1989 from Argentina.

H. albicans differs from the new species in the arrangement of the genital papillae in the males : four to eight pre-anal and five to nine post-anal papillae.

H. arvalis can be separated by having a vagina situated parallel to the longitudinal body axis and in the arrangement of the genital papillae : three to six irregular and discontinuous rows.

H. brevis has very short spicules (50-130 µm) and the post-anal papillae are placed in several rows to triplets.

H. cathetospiculae differs from *H. ovistriata* n. sp. in the size of the spicules (289-334 µm) and the genital papillae having three broken (double) rows; lateral double rows containing 20-32 papillae each, extending anteriorly past the cloacal opening, but only half the length the spicules; median double row of 20-25 papillae extending anteriorly almost the lateral papillae.

H. cavicola differs in the presence of several irregular rows of genital papillae (eight anal and ten post-anal).

H. elongata differs from *H. ovistriata* n. sp. by having large spicules (130-230 µm) and amphids situated laterally.

H. incisura differs in the size of the spicules, which are very short (110 µm) and thin at their beginning.

H. lineata can be separated from the new species by having spicules that are thin at their beginning (185-250 µm) and by the small amphids situated behind the cephalic papillae.

H. microamphidis differs from *H. ovistriata* n. sp. by having shorter spicules, with a length smaller than body diameter at anus level, and the very small amphids.

H. hortensis differs in the amphids, smaller than those of *H. ovistriata* n. sp., and in the distribution of the genital papillae.

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