

TWO NEW MERMITHIDS (NEMATODA: MERMITHIDAE) PARASITES OF
SIMULIUM WOLFFHUEGELI ROUBAUD AND *S. JUJUYENSE* (PATERSON &
SHANNON) (DIPTERA: SIMULIIDAE) IN ARGENTINA

NORA B. CAMINO

Investigador CIC, Centro de Estudios Parasitológicos y de Vectores, CEPAVE, Calle 2 No 584, 1900 La Plata, Argentina

Two new species of mermithids (Nematoda: Mermithidae), Gastromermis doloresi n. sp. a parasite of Simulium wolffhuegeli Roubaud and Hydromermis doloresi n. sp. a parasite of S. jujuyense (Paterson & Shannon) from Córdoba, Argentina, are described and illustrated. G. doloresi n. sp. is characterized by having medium sized, pear-shaped and oval amphids, eight hypodermal chords all around the body, cylindrical S-shaped vagina, single long spicule 528 µm, with the sculpture tip, three rows of genital papillae in which the middle row contains 17 pre-anal and 9 post-anal papillae, and lateral rows contain 18 papillae.

Hydromermis doloresi n. sp. can be distinguished by the following: medium sized, pear-shaped amphids, eight hypodermal chords, a cylindrical, S-shaped vagina, one short curved spicule with sculpture and genital papillae arranged in three rows. The medium ventral row of papillae has 4 double and 9 single pre-anal papillae and 3 double and 6 single post-anal papillae, lateral rows have 18 single papillae each.

Key words: Nematoda – Mermithidae – Simuliidae – taxonomy

Five genera of mermithids (Nematoda: Mermithidae) have been reported parasitizing blackflies in Argentina: *Mesomermis* Daday, 1911 (Camino, 1985a), *Isomermis* Coman, 1953 (Camino, 1987), *Gastromermis* Micoletzky, 1923 (Camino, 1985b), *Octomyomermis* Johnson, 1963 (Camino, 1988) and *Ditremamermis* (Camino & Poinar, 1988).

In this contribution, *Gastromermis doloresi* n. sp. is described parasitizing larvae of *Simulium wolffhuegeli* Roubaud. In addition we report for the first time the genus *Hydromermis* Corti, 1902 as a parasite of simuliids, with the species *H. doloresi* n. sp. parasitizing larvae of *S. jujuyense* (Paterson and Shannon). Both of these species are from Córdoba, Argentina, and investigations are being continued to evaluate the effectiveness and potential of these parasites as a biological control agents.

MATERIALS AND METHODS

Simulium wolffhuegeli and *S. jujuyense* larvae were collected by the author in October of 1990, from the Del Medio stream, Villa

Dolores, Córdoba, Argentina. They were maintained in a bucket with dechlorinated tap water and an airpump, at 10 °C, until nematodes emerged. Post-parasitic juveniles were placed in distilled water in Petri dishes with a layer of sand at the bottom and kept at 10 °C ± 2. Adults and post-parasitic juvenile nematodes were observed alive and then killed in 60 °C distilled water for 3 seconds, fixed in TAF and processed to glycerol by Seinhorst's method for taxonomic studies. Histological sections to determine the longitudinal chord arrangement were made by fixing the nematodes in Bouin's fluid, passing them through an alcohol serie to paraplast, sectioning at 10 µm and staining with the hematoxilin-eosin technique. An apical view of the head was prepared in glycerine jelly. Drawings and measurements were made from live and fixed specimens with a camera lucida and micrometer on a Zeiss light microscope. Measurements are for the holotype male and allotype female and for paratypes the range is in parenthesis. All sizes are in micrometers (µm) except for the adult lengths which are in millimeters (mm).

DESCRIPTION

Gastromermis doloresi n. sp.

Received 1 March 1993.

Accepted 28 September 1993.

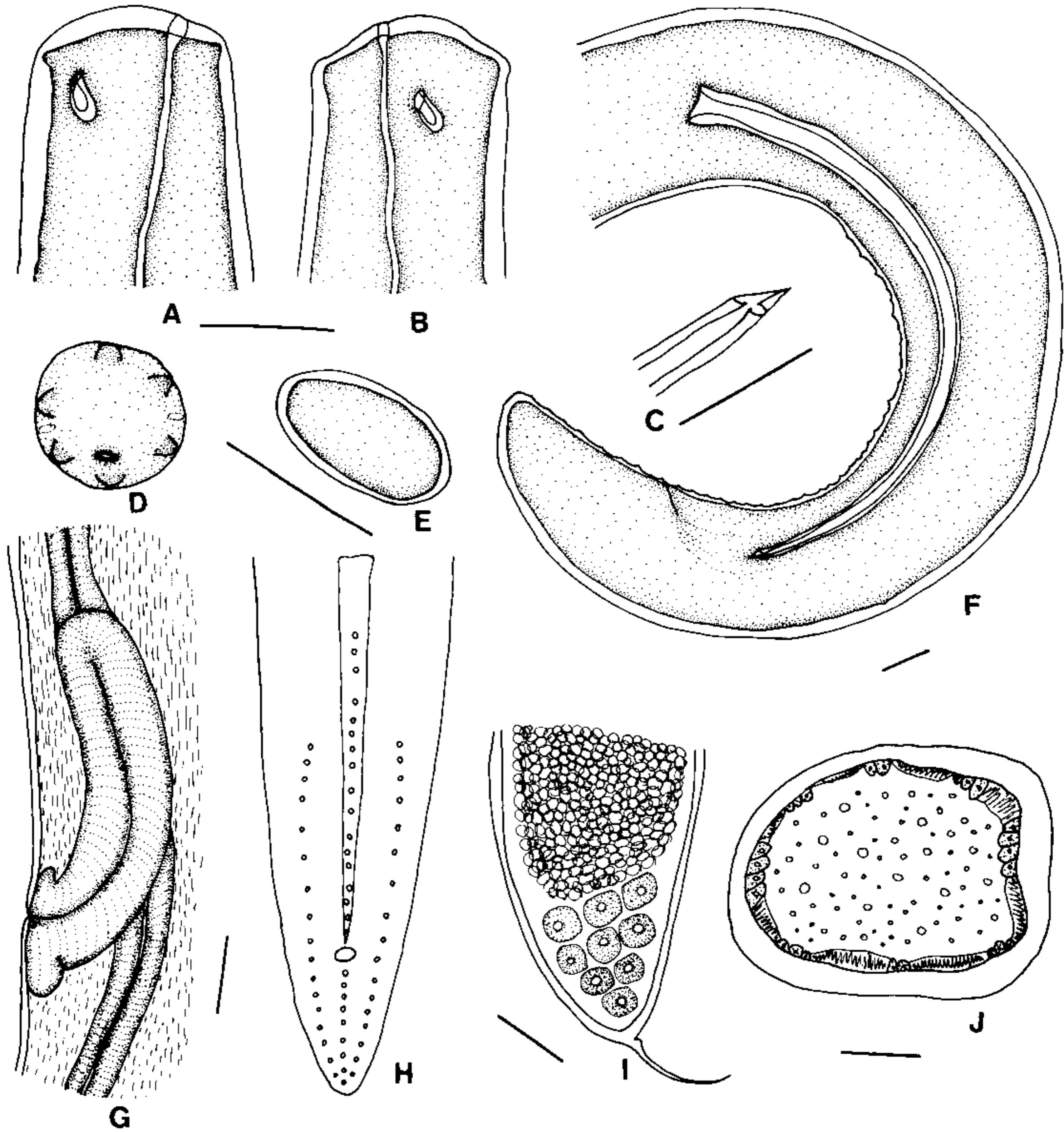


Fig. 1: *Gastromermis doloresi* n. sp. A: lateral view of female head. B: lateral view of male head. C: tip of the spicule. D: apical view of male head. E: egg. F: lateral view of male tail. G: vagina. H: ventral view of male tail. I: post-parasitic juvenile tail. J: cross section at midbody. (Bars = 50 μ m).

Cuticle thin without criss-cross fibres. Six cephalic papillae. Amphids medium sized, pear shaped and oval, amphidial pore rounded. Eight hypodermal chords present all around the body: lateral chords with four rows of cells; subdorsal and subventral chords with three rows of cells each; dorsal and ventral chords each with two rows of cells. Mouth ventrally shifted. Vulva not protruding. Vagina cylindrical, long and S-shaped. Single long spicule, with sculptured tip. Genital papillae arranged in three rows: middle row with 17 pre-anal and 9 post-anal papillae; two lateral rows each with 18 papil-

lae. Post-parasitic juveniles with thin and pointed tail appendage.

Male: (n = 10). Body length: 6 (5-9); width of head at level of cephalic papillae: 64 (60-86); width of body at level of nerve ring: 96 (96-120); greatest width of body: 160 (145-198); width of body at level of anus: 116 (104-132); distance from head to nerve ring: 220 (220-260); distance from anus to tail: 160 (144-180); length of the spicule: 528 (504-564); width of the spicule in the middle: 14 (12-16); length and width of amphids: 16 x 8.

Female: (n = 12). Body length: 8 (7-11); width of head at level of cephalic papillae: 68 (60-80); width of body at level of nerve ring: 116 (108-128); greatest width of body: 232 (220-248); width of body at level of posterior end of trophosome: 132 (120-136); width of body at level of vulva: 248 (240-252); distance from head to nerve ring: 260 (248-268); V: 49% (48-50); canal vaginal length: 284 (272-300); mean width vagina: 244 (236-248); length and width of amphids: 16 x 8.

Post-parasitic juvenile: n = 8. Tail appendage long, thin and pointed, mean length 64 (66-68).

Eggs: oval with smooth shell, unembryonated, without any additional covering. 32 x 52 (28-36 x 50-52).

Type host: larvae of *Simulium wolffhuegeli* Roubaud (Diptera: Simuliidae).

Type locality: Del Medio stream, Villa Dolores, Córdoba Province, Argentina. October, 1990.

Type material: collected by N. B. Camino in 1990. Types deposited in the CEPAVE, División Entomonemátodos, Argentina. Series numbered M0078-M0108.

REMARKS

G. doloresi n. sp. has a spicule typical of seven other species of the genus *Gastromermis* Micoletzky, 1923, namely: *G. boophthorae* Welch and Rubzov, 1965 from Russia; *G. cordobensis* Camino, 1991 from Argentina; *G. crassicauda* Rubzov, 1967; *G. longispicula* Rubzov, 1967; *G. rosalbus* Rubzov, 1967 all from Russia; *G. vaginiferous* Camino, 1985 from Argentina and *G. virescens* Rubzov, 1967 from Russia. All of these species are parasites of simuliids.

G. boophthorae differs from the new species in the arrangement of the genital papillae in three rows, with 32 to 40 papillae in the medial row (which divides near the anus into four rows) and 20 to 26 papillae in each lateral row.

G. cordobensis can be separated by its short spicule (464-520 µm long) and the arrangement of the genital papillae: the median row has 18 pre-anal and 10 post-anal papillae, the lateral rows each have 36 papillae.

G. crassicauda has a different arrangement

of the genital papillae with 16 to 18 papillae in median row, of which 12 to 13 are pre-anal, and 13 to 14 papillae are in lateral rows, of which 3 to 4 are post-anal and the remainder are pre-anal.

G. longispicula differs from *G. doloresi* n. sp. in the size of the spicule (900 µm long) and in the genital papillae arranged in three rows: 9 to 10 papillae in the medial row, of which 6 to 7 are pre-anal, and lateral rows each with 8 to 9 papillae.

G. rosalbus has a short spicule (280-300 µm long) and 17 to 18 papillae in the medial row, of which 5 to 6 are posterior to the genital aperture; lateral rows each with 11 to 12 papillae.

G. virescens differs from our new species in having a short spicule (410 µm long) and in the arrangement of the genital papillae in three rows: 16 papillae being in the medial row, of which 6 are anterior to genital aperture, and lateral rows that have 13 to 14 papillae each.

G. vaginiferous can be distinguished by its short spicule (300 µm) and in the arrangement of the genital papillae with more than 30 pre-anal and post-anal papillae.

G. doloresi n. sp. is characterized by having the amphids medium sized, pear-shaped and oval, eight hypodermal chords all around the body, a cylindrical, S-shaped vagina, a single long spicule (528 µm long), with the tip of the spicule sculptured and three rows of genital papillae: the median row with 17 pre-anal and 9 post-anal papillae, the lateral rows each with 18 papillae.

Hydromermis doloresi n. sp.

Description: Cuticle without criss-cross fibres. Six cephalic papillae around the mouth. Amphids medium sized, pear-shaped, amphidial pore rounded. Eight hypodermal chords: the lateral, subdorsal and subventral chords with two rows of cells, dorsal and ventral chords with one row of cells each. Mouth slightly shifted ventrally. Vagina cylindrical, S-shaped. One short spicule with sculptured tip. Genital papillae arranged in three rows: median ventral row with 4 double and 9 single pre-anal papillae and 3 double and 6 single post-anal papillae, the ventrolateral rows each with 18 single papillae. Post-parasitic juveniles with long and thin tail appendage.

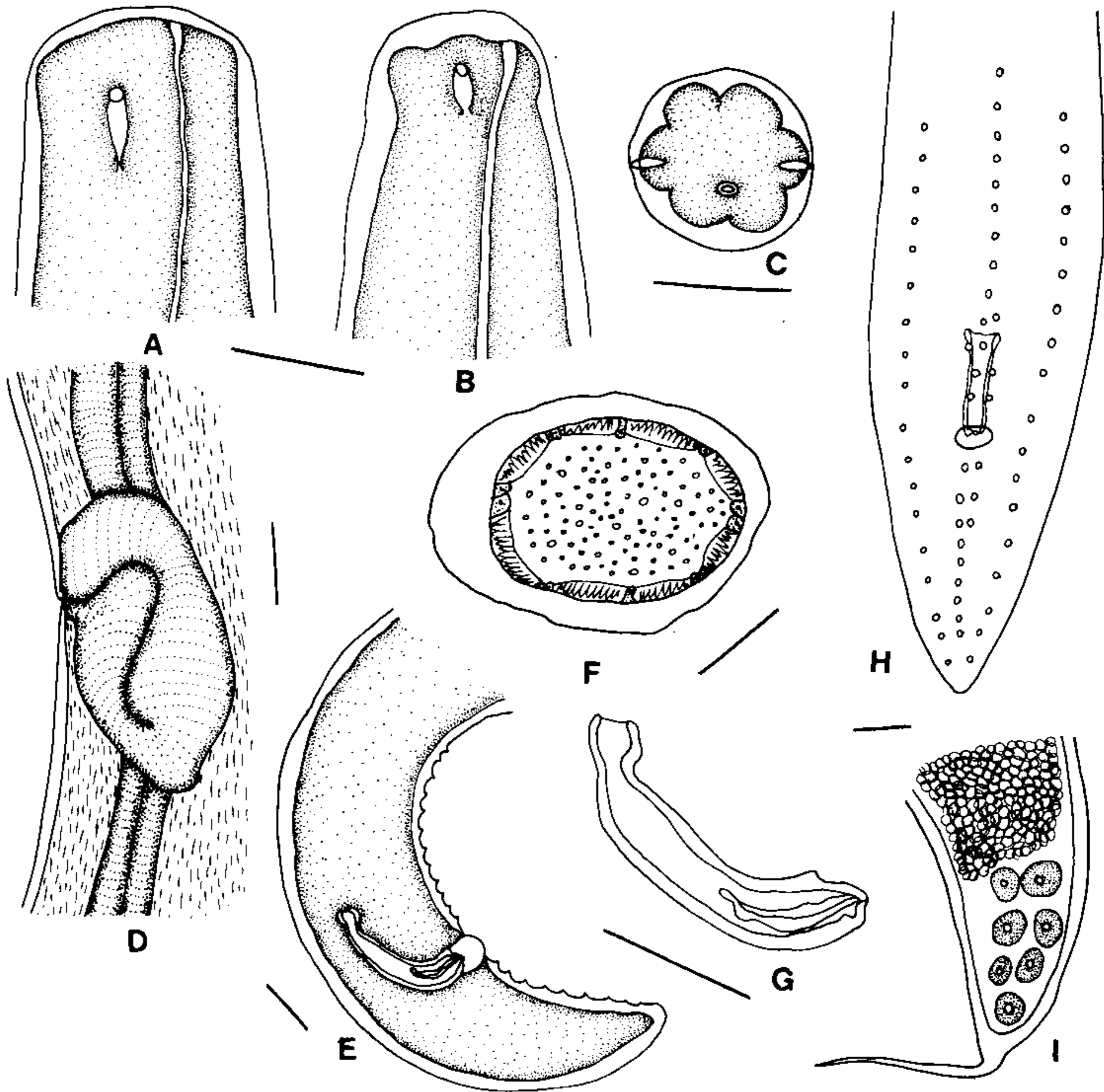


Fig. 2: *Hydromermis doloresi* n. sp. A: lateral view of female head. B: lateral view of male head. C: apical view of male head. D: vagina. E: lateral view of male tail. F: cross section at midbody. G: spicule. H: ventral view of male tail. I: post-parasitic juvenile tail. (Bars = 50 μ m).

Male: (n = 12). Body length: 6 (5-9); width of head at level of cephalic papillae: 64 (56-76); width of body at level of nerve ring: 88 (76-104); greatest width of body: 158 (144-172); width of body at level of anus: 128 (120-144); distance from head to nerve ring: 240 (200-280); distance from anus to tail: 164 (160-184); length of the spicule: 124 (116-132); width of the spicule in the middle: 18 (16-22); length and width of amphids: 16 x 8.

Female: (n = 10). Body length: 8 (8-11); width of head at level of cephalic papillae: 72 (64-80); width of body at level of nerve ring: 116 (104-128); greatest width of body: 244 (232-256); width of body at level of vulva:

260 (240-268); width of body at level of posterior end of trophosome: 140 (120-180); distance from head to nerve ring: 260 (240-320); V. 48% (47-50); canal vaginal length: 244 (240-260); mean width vagina: 144 (120-160); length and width of amphids: 20 x 12.

Post-parasitic juveniles: n = 10. Tail appendage long and thin, mean length: 150 (136-172).

Type host: larvae of *Simulium jujuyense* (Paterson and Shannon) (Diptera: Simuliidae).

Type locality: Del Medio stream, Villa Dolores, Córdoba Province, Argentina. October, 1990.

Type material: collected by N. B. Camino in 1990. Types deposited in CEPAVE, División Entomonemátodos, Argentina. Series numbered M0109-M0141.

REMARKS

Hydromermis doloresi n. sp. is morphologically similar to five species of the genus *Hydromermis* namely: *H. acutipenis* Rubzov, 1972 from Russia parasitizing midges (Diptera: Chironomidae), *H. churchillensis* Welch, 1960 from Canada parasitizing mosquitoes (Diptera: Culicidae), *H. contorta* (Linstow, 1889) from Russia, Austria, Italy, England and North America parasitizing midges, *H. itascensis* Johnson, 1965 from the USA parasitizing midges and *H. floridensis* Johnson, 1971 from the USA parasitizing midges.

H. acutipenis differs from our new species in the arrangement of the genital papillae: on the average 20 in one row, 10 in front and 10 behind the anus, and a total of about 12 in the two side rows.

H. churchillensis can be distinguished by its paired spicules fused from the apex through half their length; total length 220 μ m.

H. contorta can be separated from *H. doloresi* n. sp. by having the spicule sickle-shaped, curved, gradually narrowing towards apex, divided in basal half, fused from middle to apex, 270 μ m long. Genital papillae arranged in three rows: median row consisting of 33 papillae of which 13 are located posterior to anus.

H. itascensis differs from our new species in having the spicule 170 to 210 μ m long, the genital papillae arranged in one to two rows: in front of anus 41 (35 to 44), laterally 25 (22 to 40), behind anus, medially 17 (15 to 21), laterally 11 (5 to 15).

H. floridensis with long spicule, 212 μ m, genital papillae present, 18 pre-anal and 8 post-anal, lateral rows each with 24 papillae each.

H. doloresi n. sp. is characterized by having the amphids medium sized, pear-shaped, eight hypodermal chords, a cylindrical, S-shaped, vagina, single short sculptured spicule and the genital papillae arranged in three rows:

median ventral row with 4 double and 9 single pre-anal papillae, and 3 double and 6 single post-anal papillae, ventrolateral rows each with 18 single papillae.

REFERENCES

- CAMINO, N. B., 1985a. Estudio de cuatro especies del género *Mesomermis* Daday, 1911 (Nematoda: Mermithidae) parásitas de larvas de simúlidos (Diptera: Simuliidae). *Rev. Museo La Plata, sec. Zool.*, XIV: 1-19.
- CAMINO, N. B., 1985b. Contribución al estudio de la familia Mermithidae (Nematoda) parásita de larvas de dípteros acuáticos. I. *Gastromermis vaginiferous* sp. n. *Neotropica*, 31: 143-147.
- CAMINO, N. B., 1987. Dos especies nuevas del género *Isomermis* Coman, 1953 (Nematoda: Mermithidae), parásitas de larvas acuáticas de dípteros en Argentina. *Rev. iber. Parasitol.*, 47: 153-158.
- CAMINO, N. B., 1988. Descripción de *Octomyomermis bonaerensis* sp. n. (Mermithidae, Nematoda) parásita de larvas de *Simulium bonaerense* Coscarón y Wygodzinsky (Simuliidae, Diptera) en Argentina. *Neotropica*, 34: 93-97.
- CAMINO, N. B., 1991. *Gastromermis cordobensis* n. sp. (Nematoda: Mermithidae) parasitizing *Simulium lahillei* Paterson & Shannon (Diptera: Simuliidae) in Argentina. *Mem. Inst. Oswaldo Cruz*, 86: 223-227.
- CAMINO, N. B. & POINAR, G. O. Jr., 1988. *Ditrema-mermis simuliae* gén. nov. et sp. nov. (Nematoda: Mermithidae), parásito de *Simulium bonaerense* Coscarón y Wygodzinsky en Argentina. *Neotropica*, 34: 93-97.
- JOHNSON, A. A., 1965. *Hydromermis itascensis* sp. n. (Nematoda: Mermithidae), a parasite of *Glyptotendipes lobiferus* (Say) (Diptera: Chironomidae) and the taxonomic status of *Gastromermis*. *J. Parasitol.*, 51: 53-56.
- JOHNSON, A. A., 1971. *Hydromermis floridensis* sp. n. (Nematoda: Mermithidae), a larvicidal parasite of *Glyptotendipes paripes* (Edwards) (Diptera: Chironomidae). *J. Parasitol.*, 57: 1180-1184.
- LINSTOW, O. F. B. von, 1889. *Compendium der Helminthologie*. Nachtrag. Hannover, 151 p.
- RUBZOV, I. A., 1967. [Mermises (Nematoda, Mermithidae), parasitizing gnats (Diptera, Simuliidae), II: New species of the genus *Gastromermis* Micoletzky, 1923.]. (In Russian). *Tr. ZIN AN SSSR*, 43: 59-92.
- RUBZOV, I. A., 1972. *Aquatic Mermithidae of the fauna of the USSR*. Nauka, Leningrad, 280 p.
- WELCH, H. E., 1960. *Hydromermis churchillensis* n. sp. (Nematoda: Mermithidae) a parasite of *Aedes communis* (De G.) from Churchill, Manitoba, with observations on its incidence and bionomics. *Canad. J. Zool.*, 38: 465-474.
- WELCH, H. E. & RUBZOV, I. A., 1965. Mermithids (Nematoda: Mermithidae) parasitic in black flies (Insecta: Simuliidae), I: Taxonomy and bionomics of *Gastromermis boophthorae* sp. n. *Canad. Entomologist.*, 97: 581-596.