Journal of Nematology 18(2):247–251. 1986.

Divisispiculimermis mirus n. gen., n. sp. (Mermithidae: Nematoda) Parasitizing Midges in Córdoba, Argentina[1]

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Abstract: *Divisispiculimermis mirus* n. gen., n. sp., a mermithid parasitizing larvae of *Chironomus* sp. in the Cajón o Grande Stream, Córdoba, Argentina, is described. The new genus differs from all other mermithid genera in having paired spicules which are separated and divided into proximal and distal sectors. The other diagnostic characters of the genus are medium size, nematodes with the cuticle appearing smooth (lacking cross fibers under the light microscope); head separated from the rest of the body by a slight constriction at the level of the amphids, six cephalic papillae, mouth papillae absent, mouth opening posterior to level of cephalic papillae; six hypodermal chords at midbody; weakly S-shaped vagina; postparasitic juvenile with a tail appendage.

Key words: Argentina, *Chironomus* sp., *Divisispiculimermis mirus,* mermithid, morphology, taxonomy, midge.

This paper is the third in a series recording and describing aquatic mermithids from rivers in Córdoba, Argentina. The first (3) and second (4) dealt with two species of *Gastromermis* Mycoletzky, 1923. They were *G. fidelis* Doucet, 1982, and *G. kolleonis* Doucet & Poinar, 1984, parasites of simuliids and chironomids, respectively.

The insect parasitic nematode fauna of Argentina is poorly known, and most mermithids collected are new to science (3,4; Miralles, pers. comm.).

The present report describes a new genus of mermithids parasitic in chironomids.

Materials and Methods

Adult worms, postparasitic juveniles, and larvae of *Chironomus* sp. (Diptera: Chironomidae) parasitized by mermithids were collected from the Grande o Cajón Stream, a tributary of the Río Tercero system, Province of Córdoba. The specimens and chironomid larvae were obtained from bottom sand using a 250-μm-pore sieve. Nematodes were then separated from the sand using a modified flotation–centrifugation method (6). Extracted nematodes were killed and fixed in 7% formalin at 80 C, then processed to glycerin by a simple evaporation method (8). En face views were obtained from gelatin-glycerine mounts (1).

Results

Divisispiculimermis n. gen. (Mermithidae Braun, 1883)

Diagnosis: Medium-sized nematodes. Adult cuticle without manifested cross fibers (under the light microscope). Head separated from the body by a slight constriction at the level of the amphids; six cephalic papillae, no mouth papillae; mouth opening terminal; buccal capsule poorly developed; amphids opening posterior to level of cephalic papillae; six hypodermal chords at midbody; vagina weakly S-shaped; spicules paired, separated; divided into proximal and distal sectors; postparasitic juvenile with a tail appendage.

Type species: Divisispiculimermis mirus n. sp.

Description: Medium-sized nematodes. Adult cuticle appearing smooth, without noticeable cross fibers; six cephalic papillae separated from the rest of the body by a slight neck constriction. Amphids cup-shaped, stretched (elongated); opening round to oval, shifted slightly dorsal in position. Vagina relatively short, weakly S-shaped. Vulval flap present. Spicules medium to long, less than two times the tail diameter; divided into two sectors (proximal and distal). Spicule walls of uniform thickness; spicule tips with small protuberances and a terminal pore; shaft with a distinct lumen and ring section. Genital pa-

Received for publication 4 February 1985.

[1] This research was financed by a grant from the Consejo de Investigaciones Científicas y Tecnológicas de la Provincia de Córdoba.

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The author thanks Dr. George O. Poinar, Jr., University of California, Berkeley, for guidance and manuscript review.

pillae arranged in three rows; the middle row bifurcates around the cloacal opening and continues anteriorly past the base of the spicules.

Postparasitic juvenile with well-developed tail appendage.

In the following quantitative description, all measurements are in micrometers unless otherwise specified. The first number represents the average value for that character, numbers in parentheses give the range of the character.

Females (N = 8) (Fig. 1F–I): Length = 9.5 (7.8–11.5) mm; greatest width = 89 (77–100); diameter of cephalic region to papillae level = 33.5 (30–37); distance from mouth opening to cephalic papillae = 10 (9–12); distance from head to nerve ring = 156 (143–175); body width at nerve ring = 56 (50–63); distance from head to amphidial opening = 16 (15–20); diameter of cephalic region at amphidial level = 31 (27–35); length of amphidial pouch = 18 (15–20), width = 9 (8–10); length of amphidial opening = 10 (9–12), width = 7 (6–8); length of pharyngeal tube = 3.7 (3.5–4) mm; length of S-shaped vagina = 112 (110–114); V = 56 (53–58); egg diameter = 54 (50–57).

Males (N = 12) (Fig. 1A–E, 2K–P): Length = 6.5 (4.1–9.7) mm; greatest width = 57 (47–75); diameter of cephalic region to papillae level = 32 (28–35); distance from mouth opening to cephalic papillae = 9 (7–10); distance from head to nerve ring = 153 (132–167); body width at nerve ring = 47 (37–57); distance from head to amphidial opening = 24 (19–28); diameter of cephalic region at amphidial level = 28 (24–33); length of amphidial pouch = 24 (22–26), width = 10 (10–10); length of amphidial opening = 15 (14–18), width = 9 (8–11); length of tail = 97 (80–110); body width at genital opening = 52 (42–62); length of spicules = 137 (127–145); length of proximal sector = 64 (55–70), width = 7 (6–9); length of distal sector = 74 (65–80), width = 8 (8–8); number of genital papillae in the middle row = 19 (16–22) (precloacals = 12 (10–15), postcloacals = 7 (6–7)); left row = 9 (7–13); right row = 10 (8–14).

Postparasitic juvenile (Fig. 1J): Head separated from the rest of the body by a slight neck constriction; amphids and cephalic papillae poorly developed; length of tail projection = 50; two cuticles are shed simultaneously in the environment before reaching adult stage.

Type host: Chironomus sp. (Chironomidae: Diptera).

Type locality: "La Chaqueña," Grande o Cajón Stream, Departament Calamuchita, Córdoba, Argentina.

Type species and specimen: Holotype (female) and allotype (male) deposited in the collection of the Department of Nematology, University of California, Davis. Paratypes deposited in the collection of the Laboratorio de Nematología of the Centro de Zoología Aplicada, Universidad Nacional de Córdoba.

Diagnosis: Previously described mermithid genera characterized by six cephalic papillae, smooth cuticle, paired and separated spicules, S-shaped vagina, and six hypodermal chords are *Strelkovimermis* Rubtsov, 1969 and *Isthmusimermis* Gafurov, 1980. Members of these genera, however, have conventional spicules without articulation (5,10). *Divisispiculimermis* is limited to forms with characteristically articulated spicules, divided into proximal and distal sectors, and a weakly S-shaped vagina.

Poinar and Petersen (9) described the genus *Drilomermis* from *Cybister fimbriolatus* (Say) (Coleoptera) in Louisiana. This genus contains six cephalic papillae, six hypodermal chords, an S-shaped vagina, and two long spicules (longer than 10 times body width at anus); these characters clearly separate it from the present form.

The mermithid described looks more like an *Isomermis* Coman, 1953, but it differs in the number of hypodermal chords; *Isomermis* is characterized by having eight hypodermal chords (2), whereas *Divisispiculi-*

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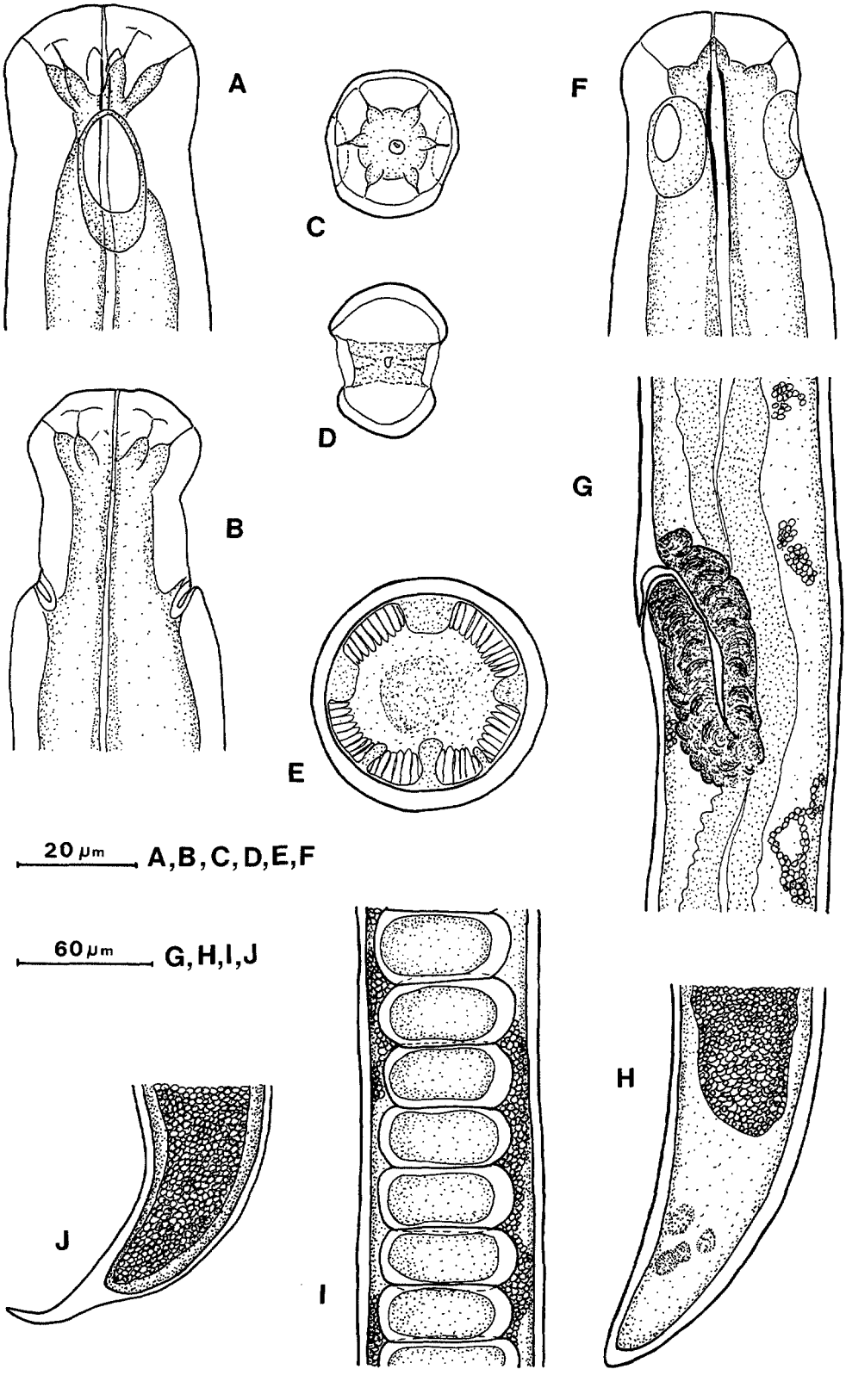
FIG. 1. *Divisispiculimermis mirus* n. gen., n. sp., A–E, male; F–I, female. A) Lateral view of head. B) Dorsal view. C) En face view. D) Cross section at amphid level. E) Cross section at midbody. F) Dorso-lateral view of head. G) Lateral view of vulval region. H) Lateral view of tail. I) Egg arrangement in uterus. J) Postparasitic juvenile, lateral view of tail.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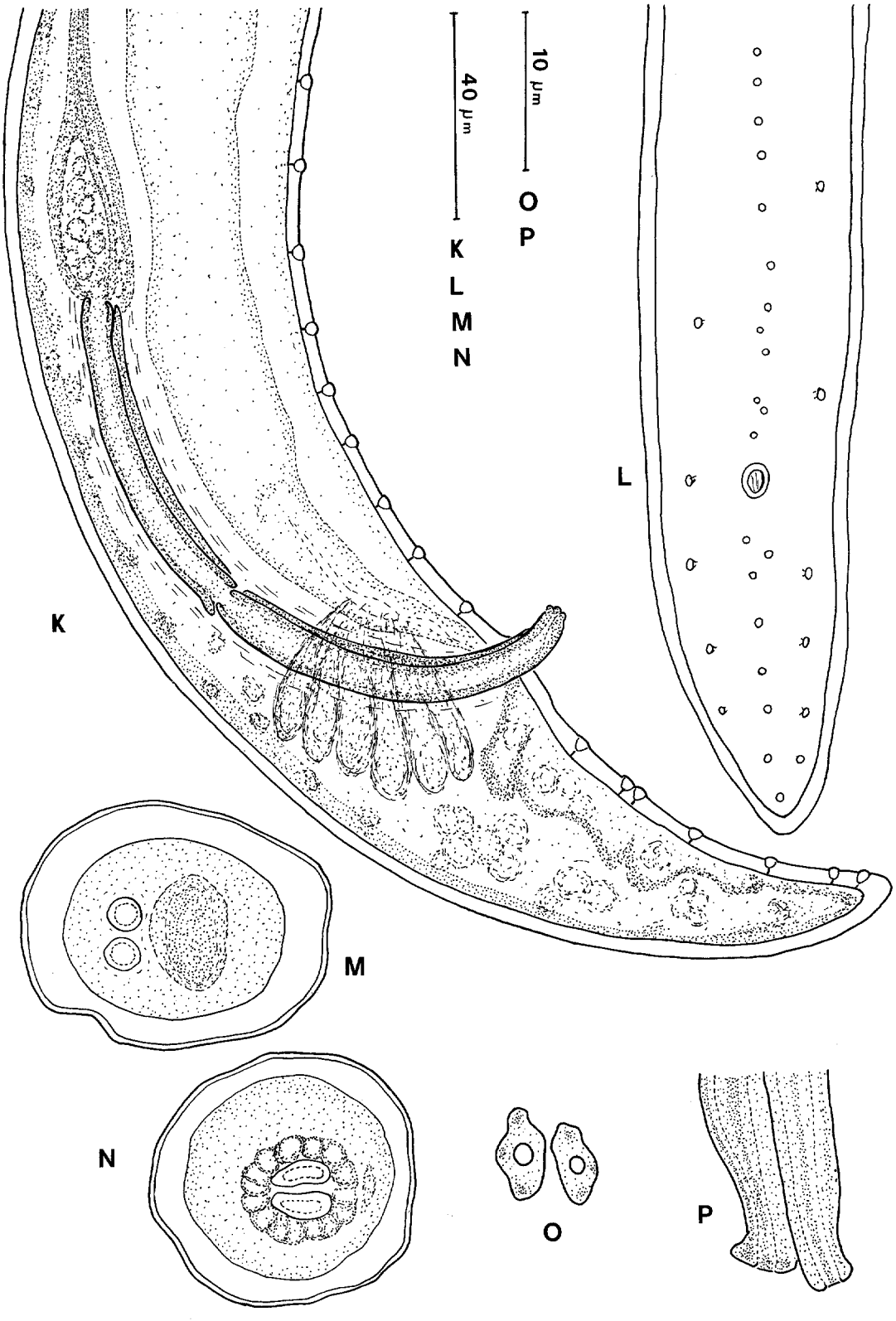
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mermis has six. However, both genera are similar in general morphology of the anterior region, shape of vagina, and posterior end of male and female. The large mass of nerve tissue at the base of the spicules is similar to that found in *I. herculanensis* (2) and *I. wisconsinensis* (7).

The relationship of *Divisispiculimermis* to other genera of Mermithidae is close, but spicule morphology is unique.

Biological observations: The collections were made in the dry season (winter and spring of 1982 and 1983) when the water level of the stream was low, allowing easy access to its bottom.

Seven separate collections were made at that time. Only larvae of *Chironomus* sp. were found having *D. mirus* in the location sampled. The parasitized insects were found only in spring. The incidence of parasitism was never more than 5%. The larvae of *Chironomus* sp. had no more than one or two mermithid juveniles free in the hemocele. These juveniles were generally small (length less than 4 mm), except in one insect where the mermithids were as long as the postparasitic juveniles found free in the sandy bottom of the stream. The morphology of the parasitic stages of the nematode is similar to the free stages.

Postparasitic juveniles and adults were collected free in the sand. The first ones were found in winter, and adults, especially females, were numerous in spring.

Although my observations were limited, it is probable that parasitic development of *D. mirus* occurs principally during summer and autumn, because so few adults were found in spring and none in winter.

The size of the parasites found in the hemocele suggests that parasitic development is generally completed in adult insects. Contrary to expectations, parasitized pupae were not found (80 individuals dissected).

Development of the free stages is assumed to occur during the dry season, in which water flow is smooth and does not suffer wide fluctuations in volume thereby facilitating the meeting of nematodes of both sexes.

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Fig. 2. *Divisispiculimermis mirus* n. gen., n. sp., male. K) Lateral view of tail. L) Ventral view. M) Cross section in the proximal region of spicules. N) Cross section in the distal region. O) En face view of spicule terminus. P) Ventral view of spicule terminus.