

un-aerolated lateral fields and shorter spicules ($43\ \mu$ long in *H. spinicaudata*). From the latter it can be differentiated in having larger body size, longer spear, and bursa not reaching phasmids (body size = 1.76–1.90 mm; spear = $24\ \mu$ long in *H. mucronata*).

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Nematode Parasites of the Coelomic Cavity of Earthworms.

V. *Plutellonema*, *Iponema*, and *Filiponema*, New Genera (Drilonematidae)R. W. TIMM AND A. R. MAGGENTI¹

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A large collection of earthworm nematode parasites sent to the United States Department of Agriculture, Beltsville, Maryland, between 1928 and 1933 by Dr. G. E. Gates has been made available for study through the courtesy of the Nematology Section, U.S.D.A. Two new genera and three new species from this collection are herein described. All specimens have been remounted in glycerin from the original glycerin slides; at least 10% shrinkage occurred in all specimens in the process of remounting. The slides will be redeposited in the U.S.D.A. collection under their original slide numbers. Dr. Gates has kindly informed us that some of the collection dates and collection areas given on the slides are obviously wrong; corrected information will be indicated. The third new genus described in this paper, containing a single species, was collected in the Philippines by the first author during the tenure of a South-East Asia Treaty Organization Research Fellowship.

Plutellonema new genus

DIAGNOSIS: Drilonematidae. Nonungellate. Amphids and symmetrical caudal suckers elliptical. Nerve ring posterior to esophagus.

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Clitellum-like bulge around vulva. Postvulvar uterine sac. Male possessing copulatory apparatus and delicate genital bursa.

TYPE SPECIES: *Plutellonema clitellatum* n. sp.

Plutellonema is most closely allied to *Filiponema* n. g., which lacks the bulge around the vulva of the female and differs in cephalic structure. Among the previously described genera of the Drilonematidae it is closest to *Perodira* Baylis, 1943, but the latter lacks a copulatory apparatus.

Plutellonema clitellatum new species
(Figs. 1, A–E)

FEMALE (10): Length = 1.63 mm (1.56–1.74); esophagus = 128 microns (118–138); esophagus to vulva = 0.81 mm (0.72–0.86); vulva to anus = 0.61 mm (0.57–0.67); tail = 108 microns (101–122); maximum body diameter (at bulge) = 81 microns (70–90).

MALE (4): Length = 1.42 mm (1.3–1.57); esophagus = 119 microns (112–125); esophagus to anus = 1.2 mm (1.08–1.34); tail = 102 microns (96–108); maximum body diameter = 35 microns (32–38).

HOLOTYPE FEMALE: Length = 1.56 mm; esophagus = 134 microns; esophagus to vulva = 0.77 mm; vulva to anus = 0.59 mm; tail = 108 microns; maximum body diameter = 80 microns.

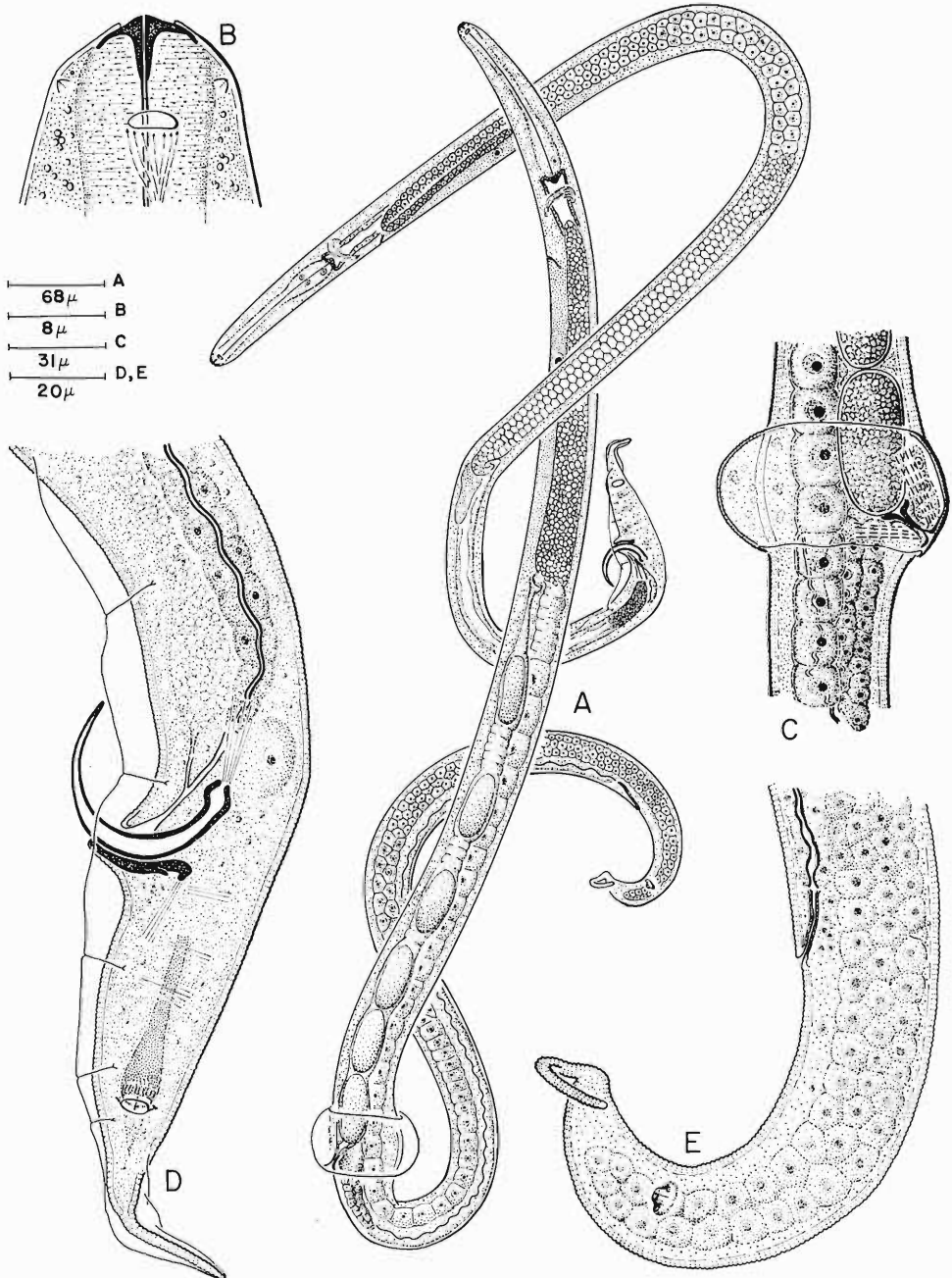


Fig. 1. *Plutellonema clitellatum* n. sp. A. Entire male and female; B. Head; C. Vulvar region; D. Male tail; E. Female tail.

ALLOTYPE MALE: Length = 1.57 mm; esophagus = 125 microns; esophagus to anus = 1.34 mm; tail = 102 microns; maximum body diameter = 38 microns.

DESCRIPTION: Cuticle thin, striated; striae about two microns wide, coarsely punctate, with punctations raised above surface of cuticle (Fig. 1, C). Head rounded, continuous with body contour; head diameter 20–25 microns in female, 16–20 microns in male; cephalic hooks lacking; stoma lacking but esophageal lining slightly thickened and protruding at anterior end. Faint elliptical amphids, about one-fourth head diameter wide, with broad pouch and prominent sensilla. Esophagus clavate, slightly narrower at isthmus; swollen posterior portion about 40 microns long; short conical cardia. Nerve ring at base of esophagus or slightly posterior. Excretory pore inconspicuous, about 1.5 body diameters posterior to esophagus, with short, lightly sclerotized duct; sublateral excretory gland cells with prominent nuclei and wavy canals. Intestine ventral to ovary behind vulva. Ovary begins in tail posterior to caudal suckers or between suckers and anus, extends forward to long elliptical spermatheca 3 body diameters posterior to esophagus; vulva surrounded by large clitellum-like bulge, more prominent on dorsal side; vulva opens at posterior of bulge. Ova elliptical, with unornamented shell, 56×24 microns, one to six in number. Short postvulvar uterine sac. Testis extending to within 2 body diameters of esophagus, reflexed ventrally 4–5 body diameters. Two equal spicules, 31 microns across arc, very arcuate, with large capitulum. Gubernaculum parallel to spicules, 15 microns long, with proximal posterior knob. Delicate, striated, irregular caudal alae; up to five fine genital rays supporting alae. Caudal suckers broadly elliptical to circular, situated near posterior of conical part of tail. Tail in both sexes conical, with long digitate tip; female tail ventrally curved.

TYPE HOST: *Plutellus* sp.

TYPE LOCALITY: Nepal.

TYPE HABITAT: Coelom.

HOLOTYPE: Female on Slide 1L_{1a}, collected by Dr. G. E. Gates on 14 March 1933.

ALLOTYPE: Male on Slide 1L_{1b}; same data as holotype.

PARATYPES: Males and females on Slides 1L₁–1L₅.

Iponema new genus

DIAGNOSIS: Nonungellate. Head slightly swollen. Amphids faint, broadly elliptical to circular. Nerve ring crossing isthmus. Copulatory apparatus present; genital bursa absent.

TYPE SPECIES: *Iponema major* n. sp.

This genus is most closely related to *Plutellonema* n. g. and *Filiponema* n. g., but differs chiefly in the absence of a male genital bursa.

Iponema major new species

(Fig. 2, A–D)

FEMALE (10): Length = 2.94 mm (2.44–3.65); esophagus = 172 microns (154–192); esophagus to vulva = 1.06 mm (0.96–1.34); vulva to anus = 1.45 mm (1.26–1.86); tail = 258 microns (243–282); maximum body diameter = 43 microns (35–58).

MALE (10): Length = 1.83 mm (1.64–2.15); esophagus = 164 microns (138–179); esophagus to anus = 1.56 mm (1.41–1.86); tail = 109 microns (90–124); maximum body diameter = 31 microns (26–33).

HOLOTYPE FEMALE: Length = 2.64 mm; esophagus = 176 microns; esophagus to vulva = 0.9 mm; vulva to anus = 1.31 mm; tail = 256 microns; maximum body diameter = 35 microns.

ALLOTYPE MALE: Length = 1.8 mm; esophagus = 176 microns; esophagus to anus = 1.54 mm; tail = 118 microns; maximum body diameter = 32 microns.

DESCRIPTION: Body finely striated. Head slightly swollen. Stoma lacking; lips often slightly protruding. Amphids faint, broadly elliptical to circular. Esophagus long, clavate; cardia broad and flat. Nerve ring surrounding isthmus. Excretory pore 1–2.5 body diameters posterior to esophagus. Ovary begins in tail at anterior sucker; spermatheca distinctly offset; ova 1–17 in number, $61\text{--}64 \times 32\text{--}35$ microns, without ornamentation; postvulvar uterine sac present. Testis reflexed ventrally at anterior. Spicules 40–54 microns long across arc, distinctly cephalated; gubernaculum 30 microns long, parallel to spicules. Female tail narrow and tapering to acute tip; 9–12.1 anal body diameters long. Male tail conical in an-

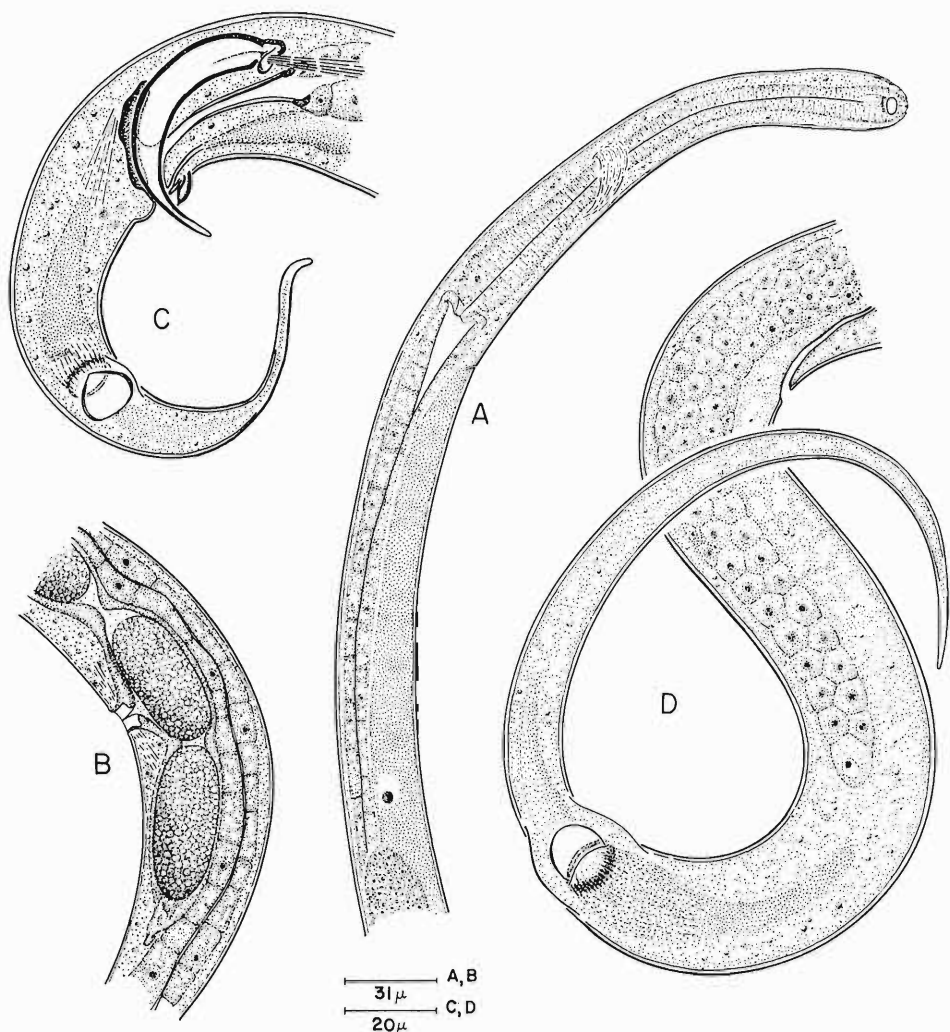


Fig. 2. *Iponema major* n. sp. A. Esophageal region; B. Vulvar region; C. Male tail; D. Female tail.

terior portion and spicate in posterior portion. Caudal suckers large, elliptical, asymmetrically disposed, with a large pocket beneath the surface anterior and posterior to each sucker.

TYPE HOST: *Eutyphoeus planatus* Gates, 1929.

TYPE LOCALITY: Prome, Burma.

TYPE HABITAT: Coelom.

HOLOTYPE: Female on Slide 12N_{1a}; collected by Dr. G. E. Gates on 9 October 1932.

ALLOTYPE: Male on Slide 12N₂; same data as holotype.

PARATYPES: Males and females on Slides 12N₁–12N₄.

DISCUSSION: This species differs from *Iponema minor* n. sp. by its larger size and by the different construction of the gubernaculum.

Iponema minor new species
(Fig. 3, A–C)

FEMALE (8): Length = 1.92 mm (1.6–2.14); esophagus = 148 microns (118–163); esophagus to vulva = 0.73 mm (0.62–0.83); vulva to anus = 0.8 mm (0.74–0.93); tail =

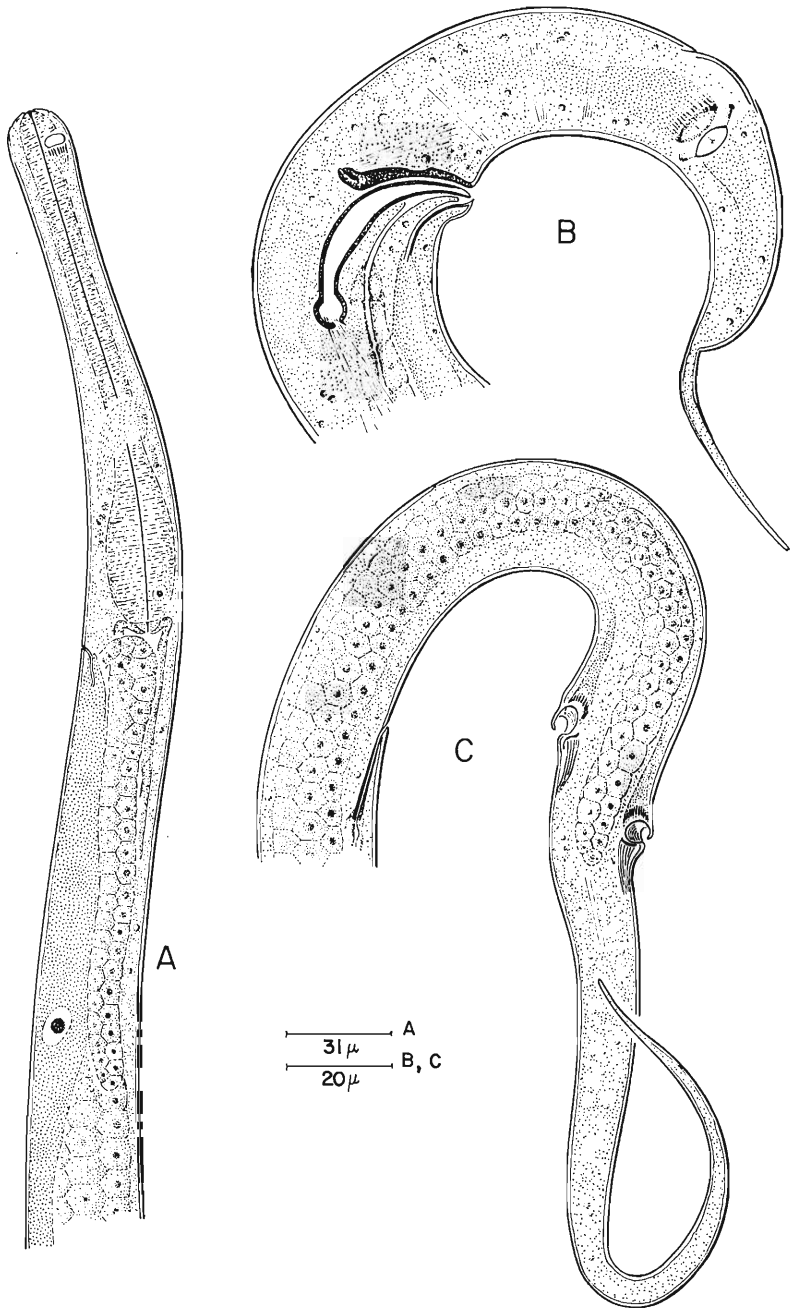


Fig. 3. *Iponema minor* n. sp. A. Esophageal region; B. Male tail; C. Female tail.

245 (211–272); maximum body diameter = 42 microns (36–51).

MALE (10): Length = 1.65 mm (1.33–1.92); esophagus = 147 microns (118–163); esophagus to anus = 1.41 mm (1.09–1.66); tail = 101 microns (90–115); maximum body diameter = 31 microns (26–38).

HOLOTYPE FEMALE: Length = 2.14 mm; esophagus = 145 microns; esophagus to vulva = 0.83 mm; vulva to anus = 0.93 mm; tail = 234 microns; maximum body diameter = 42 microns.

ALLOTYPE MALE: Length = 1.74 mm; esophagus = 146 microns; esophagus to anus = 1.47 mm; tail = 115 microns; maximum body diameter = 29 microns.

DESCRIPTION: Body finely striated, barely resolvable as composed of fine punctations. Head usually swollen slightly, with four clear sublateral areas bearing a central innervation. Stoma lacking, but lips often protruding. Amphids faint, broadly elliptical in female, more circular in male, with central innervation and broad sensilla. Esophagus long, clavate; isthmus not narrower than corpus; cardia short and flat. Nerve ring surrounding isthmus. Excretory pore at base of esophagus to one body diameter posterior; lightly sclerotized terminal excretory duct. Ovary single, anterior, beginning in tail; ova 6–11 in number, broadly elliptical, 65–75 × 25–32 microns, without ornamentation; postvulvar uterine sac present. Testis single, extending anteriorly from within one body diameter of esophageal base to one body diameter anterior to esophageal base, reflexed ventrally. Spicules long and thin, 39 microns long across arc, distinctly cephalated, with capitulum turned half-ventrally. Gubernaculum 25 microns long, thin and parallel to spicules, with proximal posterior knob. Bursa and genital papillae lacking. Female tail 9–9.7 anal body diameters long, uniformly tapering to acute tip. Male tail conical in anterior portion, 90–110 microns long; bluntly spicate in posterior portion, 22–42 microns long; tail region doubly coiled ventrally. Caudal suckers broadly elliptical, asymmetrical, 14 microns apart or less than one tail diameter, with prominent pouch beneath the surface.

TYPE HOST: *Eutyphoeus bullatus* Gates, 1933.

TYPE LOCALITY: Tiddim, Chin Hills, Burma (corrected locality).

TYPE HABITAT: Coelom.

HOLOTYPE: Female on Slide 3K₃; collected by Dr. G. E. Gates in September 1932 (corrected date).

ALLOTYPE: Male on Slide 3K₄; same data as holotype.

Filiponema new genus

The nematodes were found in both pre- and postclitellar segments of six out of ten specimens of *Pheretima benguetensis* examined. The largest number from one individual was eight females and four males. Mixed infections with a species of *Synoeconema* occurred.

DIAGNOSIS: Drilonematidae. Nonungellate. Ten short cephalic setae supporting a raised membrane. Amphids and symmetrical caudal suckers circular, conspicuous. Nerve ring posterior to esophagus. Copulatory apparatus present in male; delicate genital bursa supported by hairlike papillae.

TYPE SPECIES: *Filiponema philippinense* n. sp.

Filiponema philippinense n. sp.

(Fig. 4, A–D)

FEMALE (7): Length = 2.72 mm (1.65–2.96); esophagus = 161 microns (138–172); esophagus to vulva = 1.33 mm (0.88–1.52); vulva to anus = 0.92 mm (0.63–1.04); tail = 295 microns (210–340); maximum body diameter = 51 microns (35–68).

MALE (4): Length = 1.85 mm (1.36–2.21); esophagus = 149 microns (138–160); tail = 110 microns (79–127); maximum body diameter = 42 microns (35–48).

HOLOTYPE FEMALE: Length = 2.71 mm; esophagus = 163 microns; esophagus to vulva = 1.32 mm; vulva to anus = 0.96 mm; tail = 275 microns; maximum body diameter = 51 microns.

ALLOTYPE MALE: Length = 2.14 mm; esophagus = 160 microns; esophagus to testis = 512 microns; testis = 1.36 mm; tail = 112 microns; maximum body diameter = 35 microns.

DESCRIPTION: Cuticle finely striated. Lateral field prominent, consisting of two rows of cells. Head not set off; head diameter 24 microns; thin raised cuticular membrane around anterior, supported by six setose papil-

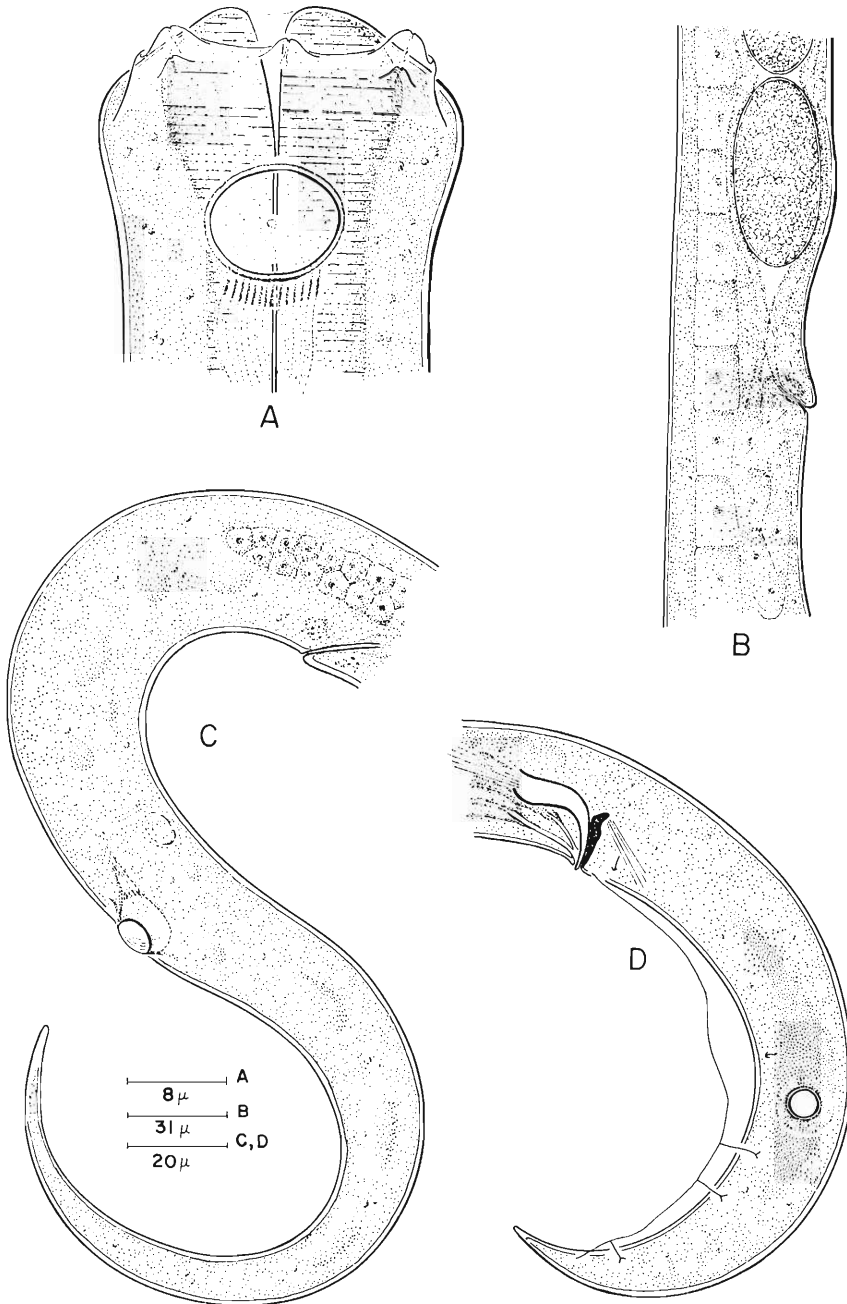


Fig. 4. *Filiponema philippinense* n. sp. A. Head; B. Vulvar region; C. Female tail; D. Male tail.

lae of inner circle; four smaller setose papillae in outer circle. Large prominent broadly elliptical to circular amphids, 9 microns in diameter or about 50% of head diameter in both sexes. Esophagus clavate. Nerve ring just behind esophageal base. Excretory pore inconspicuous, two body diameters anterior to spermatheca. Subventral excretory gland cells prominent. Ovary begins between anus and caudal suckers; elliptical spermatheca 2.5 body diameters long, five body diameters posterior to esophagus. Seven ova (6–11) in uterus, 60×30 microns, with clear shell; postvulvar uterine sac present. Testis dorsal to intestine at anterior, reflexed 190–290 microns ventrolaterally. Sperm spherical. Spicules 21 microns long across arc, cephalated, not internally divided. Gubernaculum 9–14 microns long, with dorsoposterior knob. Irregular delicate caudal alae, supported by wavy hairlike genital papillae; other short papillae present,

not extending to margin of alae. Female tail uniformly tapering to fine tip, 8.2–11 anal body diameters long. Male tail ventrally curved in a half-circle, 5 anal body diameters long. Opposite circular caudal suckers at about 40% of tail length, about 50% of corresponding tail diameter in diameter.

TYPE HOST: *Pheretima benguetensis* Bedard, 1912.

TYPE LOCALITY: Ateneo de Manila University, Quezon City, Philippines.

TYPE HABITAT: Coelom.

HOLOTYPE: Female, from collection of Biology Department, Ateneo de Manila University; dissected out by R. W. Timm on 9 January 1964; slide will be deposited with the Gates-U.S.D.A. collection.

ALLOTYPE: Male; same data as holotype.

PARATYPES: Males and females on Slide A65, Notre Dame College, Dacca; specimens also deposited in Department of Nematology, Davis, California.

On the Trematode genera *Lutztrema* Travassos, 1941 and *Anchitrema* Looss, 1899 from Malayan Bats, with a Discussion of Allometric Growth in Helminths

KLAUS ROHDE¹

Malaya has an extremely rich bat fauna which represents over one-third of the total mammalian fauna (nearly 200 species) of this area. Since the helminth fauna of bats had not yet been studied, a survey was conducted from July 1961 to October 1964. The first results of this survey have already been published and include records of the following species of trematodes: *Postorchigenes duboisi* Rohde, 1963, *Prosthodendrium longiforme* (Bhalerao, 1926), *Lecithodendrium linstowi* Dollfus, 1931,

Prosthodendrium parvouterus (Bhalerao, 1926), *Prosthodendrium swansoni* (?) Macy, 1936, *Odeningotrema bivesicularis* Rohde, 1962 (originally described from *Nycticebus coucang*, comp. Rohde 1962), small unidentified Lecithodendriidae, *Renschetrema malayi* Rohde, 1964, *Renschetrema sandoshami* Rohde, 1964, *Renschetrema* sp., and *Maxbraunium baeri* Rohde, 1964 (see Rohde 1963, 1964a and b). Altogether, 393 bats belonging to eight species of Megachiroptera (Pteropidae) and at least 28 species of Microchiroptera were dissected. Members of six of the seven families of Chiroptera which, according to Chasen (1940), occur in Malaya were examined. Only the Megadermidae are not represented. The localities at which the bats were caught are spread over a large part of Malaya (see map) and include a variety of different habitats. A brief character-

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