

A NEW AND A KNOWN SPECIES OF THE GENUS *CHRYSONEMA* THORNE, 1929 (NEMATODA: DORYLAIMIDA) FROM COSTA RICA

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Summary. A new and a known species of the genus *Chrysonema* Thorne, 1929 are described and illustrated from Costa Rica. *Chrysonema inbionis* sp. n. is characterized by having a 1.43-1.58 mm long, slender body, continuous lip region with amalgamated lips, slender odontostyle, comparatively anterior vulva, amphidelphic female reproductive system, and elongate ventrally arcuate tail. *Chrysonema attenuatum* (De Man, 1880) Loof, 1994, a rare species, is re-described based on a single female and a male specimen collected from Costa Rica.

Little is known about the dorylaimid nematode fauna of Costa Rica. Loof and Zullini (2000), in their very first paper on dorylaims from Costa Rica, described two new genera and six new and nine known species. During the summer of 2001, the first author of the current paper was invited by Instituto Nacional de Biodiversidad (IN-Bio) to study the dorylaim nematodes available in their collection. Some fresh material was also collected with the help of Dr. Alejandro Esquivel and Hans Arias. We have identified and described a large number of new and known species of Dorylaimida from this material (Ahmad and Shaheen, 2003, 2004; Ahmad, 2004; Shaheen and Ahmad, 2004). The present paper is the fifth in the series from that collection and provides descriptions of a new and a known species of the rare genus *Chrysonema* Thorne, 1929.

MATERIALS AND METHODS

Nematodes were extracted from soil samples by Cobb's sieving and decantation and the Baermann's funnel technique. Nematodes obtained in water were killed and fixed in hot TAF, dehydrated by the Seinhorst (1962) rapid glycerine method and mounted on slides in anhydrous glycerine. Measurements were made using an eyepiece micrometer and drawings were made using a drawing tube attached to the microscope.

DESCRIPTION

CHRYSONEMA ATTENUATUM

(de Man, 1880) Loof, 1994

Syn. *Dorylaimus attenuatus* de Man, 1880

Mesodorylaimus attenuatus (de Man, 1880)

Andrássy, 1959

Dorylaimus holsaticus Schneider, 1925

Chrysonemoides holsaticus (Schneider, 1925)

Siddiqi, 1969

Chrysonema holsaticum (Schneider, 1925)

Andrássy, 1990

Dorylaimus tenuissimus Stefansky, 1925

(Table I; Fig. 1)

Female. Body ventrally curved, C-shaped upon fixation. Cuticle finely striated, 1.0-1.5 μ m thick at mid-body, 1.5-2.0 μ m on tail. Lateral chords about one-fifth of body width at mid-body. Lateral, dorsal and ventral body pores indistinct.

Lip region continuous with the body, slightly expanded, about two and a half times as wide as high and about two-fifths as wide as body width at neck base. Lips amalgamated; labial papillae not protruding above lip contour. Amphids cup-shaped, their aperture about half of the corresponding body width, fusus 18 μ m behind aperture. Odontostyle slender, attenuated, about as long as lip region width, its aperture about 1/6th of its length. Stoma thickened, forming bulbous spear guide. Guiding ring at about half lip region width from anterior end. Odontophore simple, rod-like, about 1.3 times the odontostyle length. Nerve ring at 28% of neck length from anterior end. Expanded part of pharynx occupying about 50% of total neck length; expansion gradual. Cardia short, bluntly conoid. Pharyngeal gland nuclei and their orifices located as follows: DO = 52; DN = 56; DO-DN = 4.0; S₁N₁ = 79; S₁N₂ = 84; S₂N = 92; S₂O = 94.

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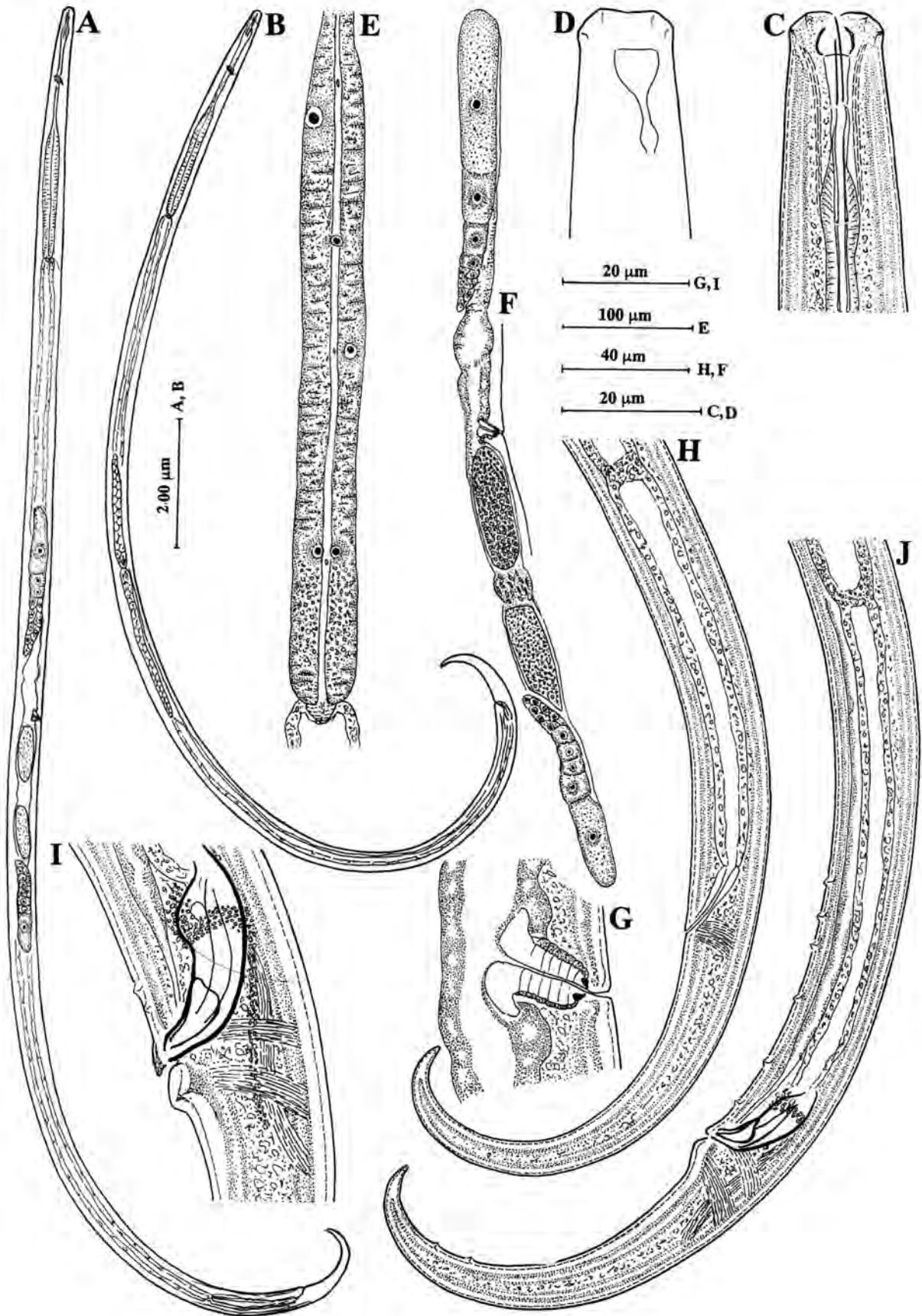


Fig. 1. *Chrysonema attenuatum* (de Man, 1880) Loof, 1994. A, entire female; B, entire male; C, anterior region of female; D, anterior end showing amphid of female; E, expanded part of pharynx of female; F, female gonad; G, vulval region; H, female posterior region; I, Male cloacal region; J, male posterior region.

Table I. *Chrysonema attenuatum* (De Man, 1880) Loof, 1994. (All measurements in μm except where indicated otherwise).

Character	Female	Male
L (mm)	2.45	2.06
a	70	61
b	6.15	5.7
c	15.9	14.8
c'	7.7	5.4
V	46	-
G1	13	-
G2	15	-
Lip region width	14	14
Lip region height	5.5	5.5
Amphid aperture	7	7
Odontostyle length	13.5	13.5
Odontophore length	18	20
Guiding ring from ant. end	6.5	7
Nerve ring from ant. end	112	104
Neck length	398	357
Expanded part of pharynx	199	177
Cardia length	6.5	8
Body width at neck base	35	33.5
Body width at anus	20	25.5
Anterior genital branch	346	-
Posterior genital branch	361	-
Vaginal depth	19	-
Vulva from ant. end	1128	-
Pre-rectum length	133	174
Rectum length	23.5	28.5
Tail length	154	139
Spicules length	-	38.5
Lateral guiding pieces	-	12.5
Ventro-median supplements	-	6

Reproductive system amphidelphic; the two sexual branches almost equally developed. Ovaries reflexed, measuring 259 μm (anterior) and 174 μm (posterior), with oocytes arranged in a single row, except near tip. Oviduct joining ovary subterminally, measuring 157 μm . Uterus a wide tube, measuring 54 μm (anterior) and 102 μm (posterior). Uterine eggs measuring 101 \times 30 μm . Sperm present in the uteri. Sphincter present at oviduct-uterus junction. Vulva transverse; vagina extending inwards about half of the corresponding body width. *Pars proximalis vaginae* measuring 13 \times 9 μm with straight walls encircled by circular musculature. *Pars refringens vaginae* with small triangular cuticularized pieces, each measuring 3 \times 1.5 μm and with a combined width of 6 μm . *Pars distalis vaginae* measuring 2.0 μm . Pre-rectum 6.7 times anal body widths long. Rectum 1.2 times anal body width long. Tail elongate conoid, ventrally arcuate with acute terminus, 7.7 times anal body width long.

Male. Supplements, an adanal pair and six irregularly spaced ventromedians. Spicules dorylaimoid with swollen, bulboid head, 1.5 times anal body width long.

Lateral guiding pieces about one-third spicules length. Pre-rectum 6.8 times anal body widths long. Rectum 1.2 times anal body width long. Tail elongated conoid, ventrally arcuate with acute terminus, 5.4 anal body widths long with two pairs of sub-ventral papillae.

Remarks. De Man (1880) described *Dorylaimus attenuatus* from Holland, based on a single female, which is no longer in his collection (Loof, 1994). Loof (1994), based on several collections made at the type locality, recorded several females of this species, and re-described and also designated the neotype. No males were recorded in this collection. Based on his observations, Loof (l.c.) concluded that this species belongs to the genus *Chrysonema* and transferred it to the latter genus as *C. attenuatum* (De Man, 1880). He also synonymized *Dorylaimus tenuissimus* Stefanski, 1925 and *D. bolsaticus* Schneider, 1925 with *C. attenuatum*. Males were not found at the type locality of *C. attenuatum*, but one was found on the Island of Terschelling (Loof, 1994). Our present specimens from Costa Rica completely fits the measurements of topotype provided by Loof. However, the uterine egg in the present female was comparatively large (*vs* 58-76 \times 19-21 μm in the topotype female), and the male had comparatively longer spicules and only six ventromedian supplements (*vs* spicules 35 μm and ventromedian supplements 7).

Chrysonema limiganum (Siddiqi, 1969) Andrassy, 1990, a species originally described from India, agrees fairly well with *C. attenuatum* in body measurements but differs in the number and arrangement of ventromedian supplements and the shape of the spicules. Loof (1973) described two female specimens of *C. limiganum* from Suriname. These specimens may belong to *C. attenuatum*; however, their exact identity can only be ascertained when males are recorded.

Habitat and locality. Primary tropical rainforest, Hitoxo Cevere Biological station; rotten leaves gathered in a small stream with stagnant water; La Amistad Caribe Conservation Area, Costa Rica.

CHRYSONEMA INBIONIS sp. n.

(Table II ; Fig. 2)

Female. Body slightly curved ventrally upon fixation, tapering gradually towards both extremities. Cuticle finely striated, 1.0-1.5 μm thick at mid-body and 2.5-3.0 μm on tail. Lateral chords about one-fourth to one-third of body width at mid-body. Lateral, dorsal and ventral body pores indistinct.

Lip region continuous, about two and a half times as wide as high and about two-fifths as wide as body width at neck base; lips amalgamated; labial papillae slightly interfering with the labial contour. Amphids stirrup-shaped, their aperture about half of the corresponding body width; fusus 15 μm behind aperture. Odontostyle slender, 1.1-1.2 times lip region width long; its aperture about one-fourth of its length. Guiding ring single, at about 0.4 times lip region width from anterior end.

Table II. *Chrysonema inbionis* sp. n. (All measurements in μm except where indicated otherwise).

Character	Holotype female	Paratype females (n = 4)
L (mm)	1.51	1.54 \pm 0.058 (1.43-1.58)
a	54	45.8 \pm 4.6 (40.4-50.6)
b	4.9	4.5 \pm 0.18 (4.4-4.7)
c	11.3	9.9 \pm 0.43 (9.5-10.4)
c'	7.6	7.6 \pm 0.61(7.1-8.4)
V	37.5	38.7 \pm 0.91 (37.5-39.5)
G1	6	9.03 \pm 2.67 (7-12)
G2	10	10.0 \pm 1.20 (9 – 11)
Lip region width	12.5	12.8 \pm 0.46 (12.5-13.5)
Lip region height	5	4.5 \pm 0.46 (4.0-4.8)
Amphid aperture	5	5.6 \pm 1.13 (4.8-6.4)
Odontostyle length	14.5	15.6 \pm 0.46 (15.2-16.0)
Odontophore length	22.5	21.8 \pm 0.92 (20.8-22.4)
Guiding ring from ant. end	5.5	5.3 \pm 0.21 (5.0-5.5)
Nerve ring from ant. end	154	112.9 \pm 3.9 (109-118)
Neck length	320	330.8 \pm 9.5 (320-340)
Expanded part of pharynx	149	146.5 \pm 1.91 (144-148)
Cardia length	8	8.6 \pm 0.76 (8.0-9.6)
Body width at neck base	29.5	33.2 \pm 3.54 (29.6-37.6)
Body width at anus	18.5	19.7 \pm 0.82 (19.0-20.8)
Anterior genital branch	88	139.4 \pm 48.9 (98.4-193.6)
Posterior genital branch	165	150.9 \pm 22.9 (125-168)
Vaginal depth	18	18.6 \pm 0.41 (18-19)
Vulva from ant. end	594	585.9 \pm 28.4 (558-616)
Pre-rectum length	51	45 \pm 6.2 (36.8-51.2)
Rectum length	30	29.4 \pm 1.28 (28.0-30.4)
Tail length	142	151.7 \pm 7.61 (144-162)

Stoma bulboid. Odontophore simple, rod-like, 1.4-1.6 times the odontostyle length. Nerve ring at 32-38% of neck length from anterior end. Expanded part of pharynx occupying about 43-46% of total neck length. Cardia short, hemispheroid, about one-fourth to one-third of the corresponding body width long. Pharyngeal gland nuclei and their orifices located as follows: DO = 63-64; DN = 65-66; DO-DN = 2-3; S₁N₁ = 77-78; S₁N₂ = 81-82; S₂N = 88-89; S₂O = 91-92.

Reproductive system amphidelphic; anterior genital branch slightly smaller than the posterior branch. Both the ovaries functional, reflexed; anterior ovary 44-109 μm and posterior ovary 67-106 μm long with oocytes arranged in a single row except near tip. Oviduct joining ovary sub-terminally, 48-86 μm long, *pars dilatata* with clear lumen. Uterus a wide tube, measuring 21-96 μm with no trace of sperm. Sphincter present at oviduct-uterus junction. Vagina extending inwards about 60% of the corresponding body width. Uterine egg measuring 81-95 \times 26-28 μm . *Pars proximalis vaginae* 11-13 μm with curved walls encircled by circular musculature. *Pars refringens vaginae* with triangular sclerotized pieces, each measuring 2.5-3.0 \times 3.0 μm and a combined width of 8-9 μm . *Pars distalis vaginae* measuring 2 μm in length. Vulva pore-like. Pre-rectum 2.0-2.8 times anal body width long. Tail elongate, ventrally

arcuate, with acute terminus, 7.1-8.4 anal body widths long. Caudal pores two on each side.

Male. Not found.

Type habitat and locality. Morrenas valley, habitat composed of mixed plants such as Graminaceae, Ericaceae, and Asteraceae, Chirripo National Park, La Amistad Pacifico Conservation Area, Costa Rica.

Type material. Holotype female on the slide *Chrysonema inbionis* sp. n./1; paratype females on the slides *Chrysonema inbionis* sp. n./2-3; deposited in the nematode collection of the Nematology Laboratory, Universidad Nacional, Costa Rica. A paratype female deposited in the nematode collection of the Department of Zoology, Aligarh Muslim University, India.

Diagnosis. *Chrysonema inbionis* sp. n. is characterized by having a 1.43-1.58 mm long, slender body, continuous lip region, 15-16 μm long, slender odontostyle, comparatively anterior vulva, amphidelphic female reproductive system, and elongated ventrally arcuate tail.

Relationships. The new species is closely related to *C. maksymovi* (Altherr, 1963) Andr ssy, 1990 but differs in having shorter odontostyle (*vs* 19-20 μm), anterior vulva (*vs* V = 44-46), and longer tail (*vs* c = 17-19; c' = 4-6). In the shape of the lip region, in having a strongly cuticularized vagina and in the position of the vulva, the new species also resembles *C. aurum*, but differs from it in

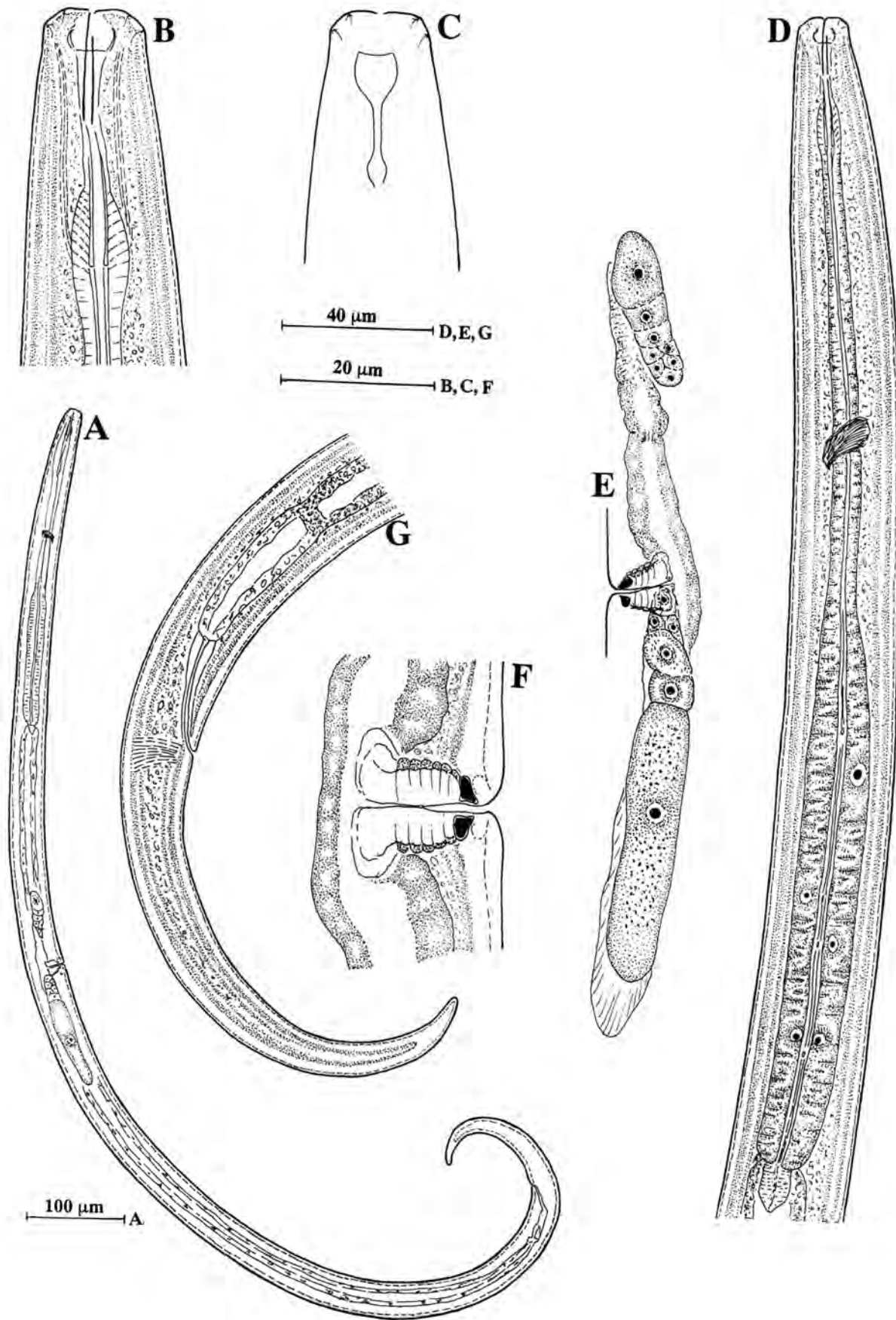


Fig. 2. *Chrysonema inbionis* sp. n. A, entire female; B, anterior region of female; C, anterior end of female showing amphid; D, pharyngeal region of female; E, female gonad; F, vulval region; G, Female posterior region.

having a smaller and comparatively robust body (vs L = 1.9 mm; a = 67), a single guiding ring (vs 'double'), a posterior vulva (vs V = 34), and a longer and differently shaped tail (vs c = 25; c' = 5; tail terminus hooked).

Etymology. The name of the new species, *inbionis* is derived from Instituto Nacional de Biodiversidad (INBio), Costa Rica, in recognition of its contributions to the Nematode Biodiversity Programme.

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