

Two New Species of Actinolaimidae Thorne, 1939 (Nemata: Dorylaimida) from China

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Abstract: Two new species of Actinolaimidae are described from China. *Trachactinolaimus brevicaudatus* n. sp. is 3.4–4.4 mm long; a = 40–60, b = 3.5–5.2, c = 20–21 in female and 34–39 in male; odontostyle length is 29–33 µm; spicules are 67–77 µm long; and the stoma has four onchia with numerous mural denticles. The female has a longitudinal vulva, and the male has 20 to 23 contiguous ventromedian supplements. *Egtitus sinensis* n. sp. is 1.7–2.2 mm long; a = 24–33, b = 3.1–3.9, c = 16–19 in female and 0.7–0.9 in male; odontostyle length is 25–29 µm; spicules are 55–56 µm long; and the prerectum 53–77 µm long. The cardia is short and blunt conoid, 13–19 µm long. The male has 12 to 13 ventromedian supplements at intervals of 2–3 µm.

Key words: Actinolaimidae, China, Dorylaimida, *Egtitus sinensis*, nematode, new species, taxonomy, *Trachactinolaimus brevicaudatus*.

Actinolaimid nematodes in China have scarcely been studied; only *Egtitus nudus* (Wu & Hoeppli, 1929) Thorne, 1967 and *Paractinolaimus microdentatus* (Thorne, 1939) Meyl; 1957 have been reported previously (Wu and Hoeppli, 1929; Wu and Sun, 1992). For a better understanding of nematofauna in the country, a survey has been carried out in the Yangtze River (Changjiang) Basin since 1995. Among the actinolaims collected, four known species (*Actinolaimus radiatus* Cobb, 1913, *Afractinolaimus noblei* Andrassy, 1970, *Metactinolaimus kreisi* Meyl, 1957, and *Mactinolaimus chitwoodi* (Moorthy, 1937) Andrassy, 1970) were identified (Wu and Liang, 1997). In addition to these four species, two species were found to be new to science. The new species are described and illustrated in this paper.

MATERIALS AND METHODS

Nematodes were isolated from soil by the Ludox flotation technique (Sommerfeld and

Warwick, 1996). Specimens were fixed in 4% formaldehyde and processed to anhydrous glycerin with a slow method (Seinhorst, 1962). Measurements were taken and drawings were made on specimens mounted in glycerin. Measurements are generally presented as mean and range.

SYSTEMATICS

Trachactinolaimus brevicaudatus n. sp.
(Fig. 1)

Measurements: See Table 1.

Adults: Body slightly curved. Cuticle with minute transverse striae. Dorsal body pores 4 or 5, anterior to nerve ring; ventral and lateral pores present throughout body, more conspicuous in caudal region. Lips amalgamated, lip region as wide as adjacent body and offset by a weak depression, 2.7 (2.4–2.9) times as wide as high (Fig. 1A). Odontostyle with aperture about half of its length. Odontophore simple, rod-like, 83% (77–88) of odontostyle length. Guiding ring double, fixed ring 22 µm (20–24) from anterior end. Amphids stirrup-shaped, with apertures 12 µm (11–15) wide, or 48% (43–50%) of corresponding body width (Fig. 1C). Vestibular ring corrugated with 50–60 prongs around oral opening (Fig. 1B). Cheilostom with four onchia. Numerous mural denticles (>100) on cheilostom walls, irregularly arranged. Esophagus gradually widening posteriorly, attaining greatest width at 60% (52–70) of its length from anterior end. Nerve ring at 22% (19–25) of esopha-

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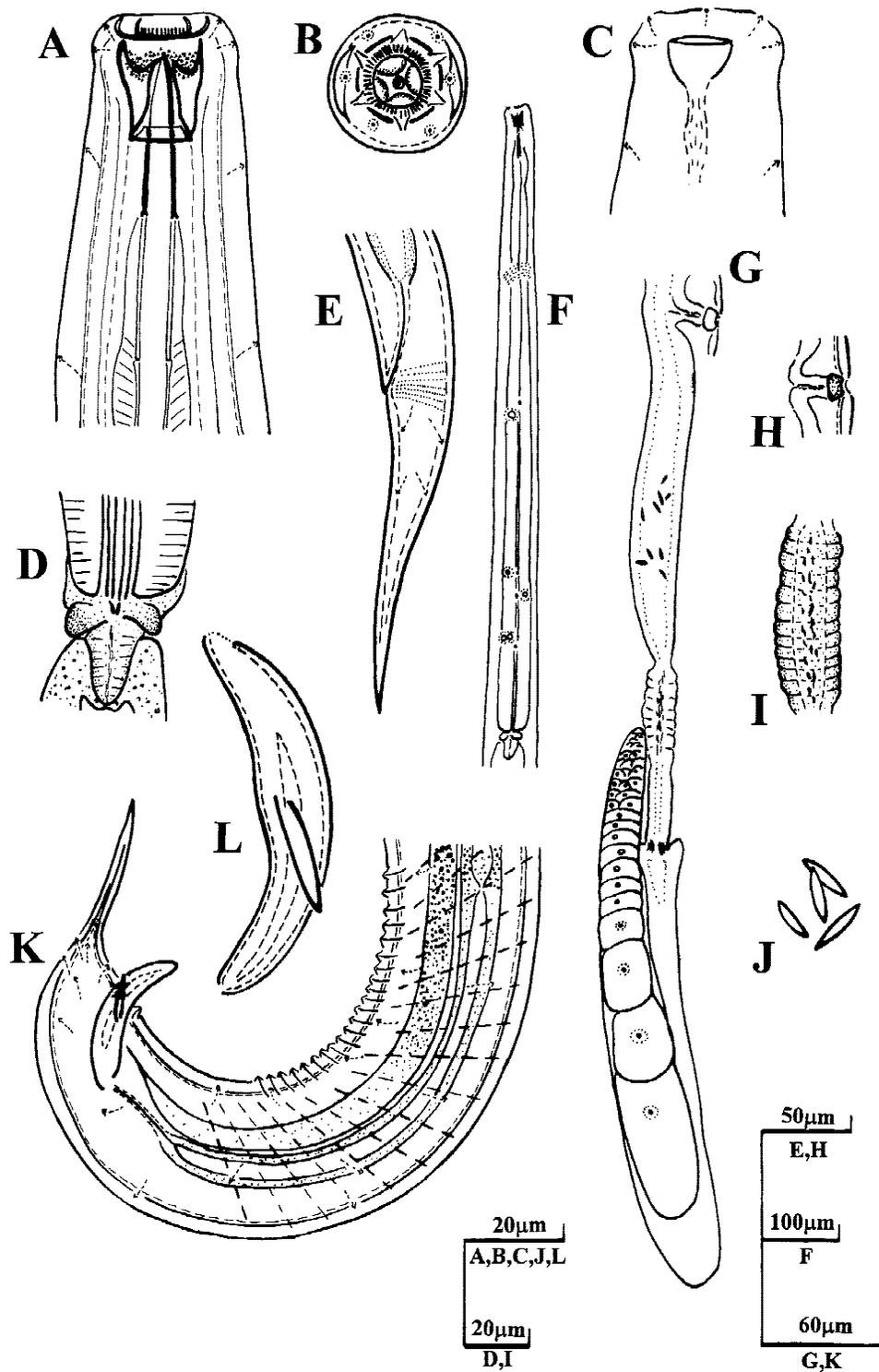


FIG. 1. *Trachtinolaimus brevicaudatus* n. sp. A) Anterior end. B) En face view. C) Anterior end in surface view. D) Base of esophagus. E) Female, posterior body region. F) Esophageal region. G) Posterior branch of female reproductive system. H) Vulva region. I) Part of uterus with Z-differentiation. J) Sperms. K) Male, posterior body region. L) Spicule.

TABLE 1. Measurements of *Trachactinolaimus brevicaudatus* n. sp.

	Holotype female	Paratype female (n = 1)	Paratype males (n = 5) Mean range
Linear (µm)			
Body length	4,016	4,410	3,406 (3,358–3,495)
Body width at mid-body	80	95	70 (59–86)
Body width at anus	41	45	44 (40–49)
Cuticle thickness at mid-body	3	4	4 (4–4)
Cuticle thickness on tail	5	4	4 (4–5)
Odontostyle length	29	29	31 (30–33)
Odontophore length	26	27	26 (24–28)
Esophageal length	822	848	843 (783–960)
Cardia length	32	30	28 (25–30)
Prerectum length	241	257	215 (186–244)
Rectum length	63	67	64 (58–74)
Tail length	190	222	98 (90–110)
Spicule length	—	—	72 (67–76)
Lateral guiding piece length	—	—	23 (23–24)
Sperm length	—	—	11 (9–12)
Ratios			
a	50	46	50 (40–60)
b	4.9	5.2	4.2 (3.5–4.4)
c	21	20	37 (34–39)
c'	4.6	4.9	2.2 (1.9–2.5)
V (%)	52.1	55.8	—

gus length (Fig. 1F). Esophageal bulb with basal shield. Cardia elongate-conoid. Cardiac glands present (Fig. 1D). Esophageal gland nuclei and their orifices located as follows: DO = 47 (46–48); DN = 49 (48–50); DO-DN = 15.8 (12.9–19.7); S₁N₁ = 72 (70–75); S₁N₂ = 76 (74–81); S₂N = 85 (85–85); S₂O = 85 (84–86).

Female (n = 2): Reproductive system amphidelphic, reflexed. Sphincter present at oviduct-uterus junction. Uterus with a muscular chamber containing Z-differentiation (Fig. 1G,I). Vulva a longitudinal slit, 7 µm long. Vagina 24 µm long, about one-third of corresponding body width. *Pars distalis vaginae* short. *Pars refringens vaginae* with a ring of weak sclerotization, in lateral view 7 µm long and 14 µm wide. *Pars proximalis vaginae* 16 µm long, slightly longer than wide (Fig. 1H). Prerectum 6 anal-body-widths long. Rectum 1.5 anal-body-widths long. Tail conical-elongate with acute tip, ventrally almost straight, dorsally first convex and then somewhat concave (Fig. 1E). Caudal pores four pairs in the anterior half of the tail, two subdorsal and two subventral.

Male (n = 5): Testes paired, outstretched. Sperms spindle-shaped with pointed ends (Fig. 1J). Spicules slender, ventrally arcuate, 1.6 (1.5–1.8) anal-body-widths long. Lateral guiding pieces, about one-third of spicule length (Fig. 1L). One pair of adanal supplements and 21 (20–23) contiguous ventromedian supplements. Hindmost supplement 68 µm (61–74) from cloacal opening. Prerectum about 5 times anal-body-width, extending just opposite or only slightly posterior to foremost supplement. Tail at first convex-conoid dorsally, then suddenly tapering to a straight, elongate portion with a pointed tip, the posterior tapering portion 64% (63–69%) of the tail length. Tail with five or six pairs of caudal pores (Fig. 1K).

Type habitat and locality

Moss from cliff of Small Three Gorges (31°1'N, 109°9'E), Sichuan Province, China.

Type specimens

Collected in July 1995. Holotype female (slide *Trachactinolaimus brevicaudatus* n. sp.

/1) with 1 paratype female and 5 paratype males (slides *Trachactinolaimus brevicaudatus* n. sp. /2–3) deposited in Specimen Room of Invertebrates, Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan, Hubei Province, China.

Etymology: This species is named for its relatively short tail. The specific epithet *brevi*-is derived from “brevis” and *caudatus* is derived from “cauda,” respectively, meaning “short” and “tail” in Latin.

Diagnosis: *Trachactinolaimus brevicaudatus* n. sp. is characterized by a long body (L = 3.4–4.4 mm), four onchia with numerous mural denticles (>100), longitudinal vulva, 20–23 contiguous ventromedian supplements, long spicules (67–77 μ m), and relatively short tail (c' = 4.6–4.9 in females and 1.9–2.5 in males).

Relationships: Up to now *Trachactinolaimus* has consisted of two species. Andr assy (1963) erected the genus *Trachactinolaimus* with *T. radulatus* Andr assy, 1963 as its type species. Vinciguerra (1988) transferred *Paractinolaimus dominicus* Hunt, 1978 (Hunt, 1978) to this genus.

The structure of the stoma, the presence of Z-differentiation, and the longitudinal vulva place *T. brevicaudatus* n. sp. close to *T. radulatus*, but the new species differs in having a longer body, shorter tail, and longer spicules, and in the number and arrangement of ventromedian supplements (in *T. radulatus*, L = 2.37–2.47 mm; c' = 8–9 in females and 4.5–6.2 in males; spicules 56–61 μ m long; males with 14–17 separate supplements). In the shape of the lip region and the elongate tail in both male and female, the new species resembles *T. dominicus* but differs in the larger body size, arrangement of mural denticles, presence of Z-differentiation, longitudinal vulva, shorter tail, longer spicules; and number and arrangement of ventromedian supplements (in *T. dominicus*, L = 2.31–2.64 mm; mural denticles arranged in three or four parallel transverse rows; no Z-differentiation; vulva pore-like; c' = 9.6–12.7 in females and 6.2–7.7 in males; spicule length 53–62 μ m; males with 9 supplements).

Egtitus sinensis n. sp.
(Fig. 2)

Measurements: See Table 2.

Adults: Body curved ventrad (Fig. 2G,I). Cuticle finely striated. Lateral chords about one-third of body width at midbody. Four dorsal body pores in esophageal region, ventral and lateral pores throughout body. Lips amalgamated, lip region narrower than the adjacent body and offset by a clear depression, and about three times as wide as high (Fig. 2A). Odontostyle slightly shorter than, and one-tenth as wide as, corresponding body diameter, with aperture about half of odontostyle length. Odontophore simple, rod-like, 1.3 (1.1–1.5) times odontostyle length. Guiding ring double, fixed ring 24 μ m (21–25) from anterior end. Amphids stirrup-shaped, 6 (6–8) μ m from anterior end, apertures 12 μ m (10–17) wide, one-third to one-half of corresponding lip region width (Fig. 2B). Vestibular ring heavily cuticularized, corrugated with 30–40 prongs around oral opening (Fig. 2C). Cheilostom with four onchia, without mural denticles. Esophagus enlarged at 46% (43–52) of its length from anterior end. Esophageal wall heavily cuticularized throughout. Nerve ring at 27% (25–28) of esophagus length. Basal shield present. Cardia blunt-conoid (Fig. 2E). Esophageal gland nuclei and their orifices located as follows: DO = 45 (42–47); DN = 47 (44–48); DO-DN = 14.2 (12.6–17.3); S₁N₁ = 70 (68–71); S₁N₂ = 76 (75–77); S₂N = 87 (87–87); S₂O = 89 (88–89).

Female ($n = 6$): Reproductive system didelphic, amphidelphic. Both sexual branches equally developed. Ovaries well-developed. Sphincter present at oviduct-uterus junction. Z-differentiation absent (Fig. 2D). Numerous sperms in uterus. Vulva transverse. Vagina extending about one-third of corresponding body width. *Pars distalis vaginae* short. *Pars refringens vaginae* sclerotizations rounded-triangular, with a combined width of 11 μ m (11–12). *Pars proximalis vaginae* 17 μ m (16–18) long (Fig. 2F). Prerectum length 1.9 (1.6–2.2) times the anal-body-widths. Rectum length 1.4 (1.2–1.5) times the anal-body-width. Tail conical elongate

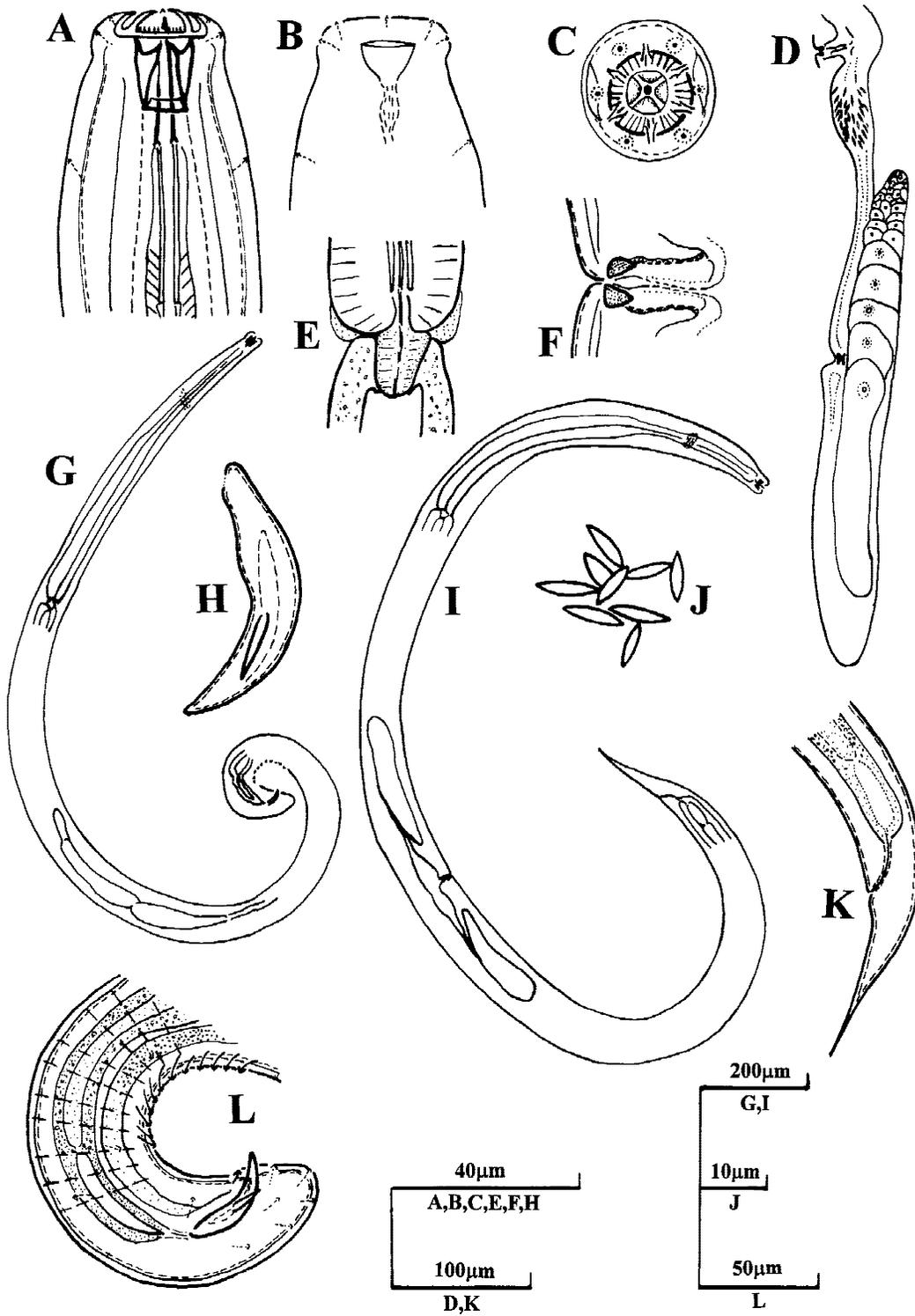


FIG. 2. *Egitus sinensis* n. sp. A) Anterior end. B) Anterior end in surface view. C) En face view. D) Posterior branch of female reproductive system. E) Base of esophagus. F) Vulva region. G) Entire male. H) Spicule. I) Entire female. J) Sperms. K) Female, posterior body region. L) Male, posterior body region.

TABLE 2. Measurements of *Eglitus sinensis* n. sp.

	Holotype female	Paratype females (n = 5)	Paratype males (n = 2)
Linear (μm)			
Body length	2,213	1,997 (1,867–2,064)	1,717–1,865
Body width at mid-body	75	73 (61–82)	30–30
Body width at anus	35	32 (29–37)	33–36
Cuticle thickness at mid-body	3	2 (2–3)	2–3
Cuticle thickness on tail	5	4 (4–5)	3–4
Odontostyle length	27	27 (25–29)	27–28
Odontophore length	35	38 (35–41)	32–33
Esophageal length	567	583 (544–607)	559–567
Cardia length	15	16 (16–18)	13–19
Prerectum length	61	60 (53–65)	54–77
Rectum length	44	44 (43–46)	51–69
Tail length	118	116 (110–126)	25–30
Spicule length	—	—	55–56
Lateral guiding piece length	—	—	12–14
Sperm length	—	—	8 (6–10)
Ratios			
a	30	28 (24–31)	30–33
b	3.9	3.4 (3.3–3.5)	3.1–3.3
c	19	17 (16–19)	63–73
c'	3.4	3.7 (3.0–4.3)	0.7–0.9
V (%)	54	55 (50–57)	—

with slender terminal portion and very fine tip, dorsally convex, ventrally first somewhat curved and then straight, with three pairs of caudal pores (Fig. 2K).

Male (n = 2): Testes paired, opposed, outstretched. Sperms spindle-shaped (Fig. 2J). Spicules dorylaimoid, 1.5–1.7 times anal-body-width (Fig. 2H). Lateral guiding pieces slightly less than one-fourth of spicule length. One adanal pair of supplements and 12–13 ventromedian supplements closely arranged with intervals of 2–3 μm . Hindmost supplement 45–55 μm from cloacal opening. Prerectum short, 1.5–2.3 times the anal body width. Tail convex-conoid with bluntly rounded terminus, slightly less than 1 anal-body-width, five or six caudal pores on each side (Fig. 2L).

Type habitat and locality

Forest litter from Xianning (29°8'N, 114°3'E), Hubei Province, China.

Type specimens

Collected in April 1997. Holotype female (slide *Eglitus sinensis* n. sp. /1) with 5 paratype females and 2 paratype males (slides *Eglitus sinensis* n. sp. /2–4) deposited in

Specimen Room of Invertebrates, Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan, Hubei Province, China.

Etymology: The specific epithet *sinensis* is derived from “Sina,” the Latin name for “China.”

Diagnosis: *Eglitus sinensis* n. sp. is 1.7–2.2 mm long, a = 24–33, b = 3.1–3.9, c = 16–19 in female and 0.7–0.9 in male, and is characterized by having a relatively long odontostyle (25–29 μm), short cardia (13–19 μm), short prerectum (53–77 μm), 12–13 ventromedian supplements at intervals of 2–3 μm .

Relationships: *Eglitus sinensis* n. sp. resembles *E. itanagrus* Khan, Ahmad & Jairajpuri, 1994 (Khan et al., 1994) and *E. sidharthi* Khan & Jairajpuri, 1996 (Khan and Jairajpuri, 1996) in the length of the odontostyle. It differs from *E. itanagrus* in having a shorter cardia, shorter prerectum, transverse vulva, absence of Z-differentiation, and in the number and arrangement of ventromedian supplements (in *E. itanagrus*, cardia elongate-conoid, 22–23 μm long; prerectum length 89–143 μm in female and 90–195 μm in male; vulva star-shaped; Z-differentiation present; ventromedian supplements 8–10 at intervals of 10–15 μm). The new species dif-

fers from *E. siddharthi* in having a shorter prerectum, shorter spicules, and more supplements with smaller intervals (in *E. siddharthi*, prerectum length 115–130 μm in female and 3.4–4.6 anal-widths-long in male, spicules 63–65 μm long, and ventromedian supplements 9–10 with intervals of 8–15 μm). The new species also resembles *E. naunii* Khan & Jairajpuri, 1994 (Khan and Jairajpuri, 1994) in the length of the prerectum but differs in having a longer odontostyle, longer cardia, and transverse vulva (in *E. naunii*, odontostyle length 22–24 μm ; cardia elongate-conoid, 25–33 μm long; vulva pore-like). The new species is similar to *E. shillongensis* Khan & Jairajpuri, 1994 (Khan and Jairajpuri, 1994) in odontostyle length and the shape of vulva but differs in having a longer odontostyle aperture, shorter cardia, shorter prerectum, and a different number and arrangement of ventromedian supplements (in *E. shillongensis*, odontostyle aperture about one-third of its length; cardia elongate-conoid, 25–30 μm long; prerectum 93–113 μm in female and 215 μm in male; ventromedian supplements 11, at intervals of 11–16 μm).

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