

Lindseyus costatus gen. n., sp. n., and Notes on the Roqueidae and Swangeriidae (Nematoda: Dorylaimida)¹

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ABSTRACT: *Lindseyus costatus* gen. n., sp. n., is described from Indiana as the second genus in the family Roqueidae (superfamily Belondiroidea). The diagnosis of Roqueidae is emended to accommodate the new genus. Similarities between the Roqueidae and the Swangeriidae are discussed.

A single large male belondiroid nematode resembling *Roqueus gracilis* Thorne, 1964, was recovered from soil obtained from southwestern Indiana in July 1967. The collecting site was an area of southern flora and fauna unusual for Indiana, at the edge of Hovey Lake in Posey County (Lindsey et al., 1969). Many large bald cypress trees (*Taxodium distichum*), swamp privet (*Forestiera acuminata*), and buttonbush (*Cephalanthus occidentalis*) border the lake. Broad-leaved arrowhead (*Sagittaria latifolia*) was the predominant plant in the immediate collecting site. Inasmuch as this lake is scheduled to be enlarged following completion of a dam on the adjacent Ohio River, and many features of the biological community despoiled, an attempt was made during October 1968 to secure more material. No specimens of this unusual nematode were found in soil processed in the laboratory on the Purdue University campus about 48 hr after collection. In June 1970, during another visit, soil processing and examination of residues from a No. 25 mesh sieve were carried out at the site. A total of six female specimens were found at this time, but no males.

Comparison with specimens of *R. gracilis* from Puerto Rico indicated that our specimens represent a new genus, which we name *Lindseyus* for Professor A. A. Lindsey, ecologist at Purdue University and diligent worker for the preservation of small natural areas in Indiana. *Lindseyus* is placed with *Roqueus* in the family Roqueidae, which is hereby emended to accommodate the new genus.

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Family Roqueidae, Thorne, 1964, Emended

Belondiroidea: Body exceedingly slender, $a = 67 - 117$ in known representatives. Female tail long and filiform; male tail short, rounded. Cardia very elongated, with basal portion projecting into intestine. Supplements low, rounded, number 7-14 in addition to adanal pair. Ventro-submedian papillae present.

TYPE GENUS: *Roqueus* Thorne, 1964.

Genus *Lindseyus* gen. n.

DIAGNOSIS: Roqueidae. Body long and slender ($a = 67 - 86$). Spear short and thin, with small aperture. Faint basketlike structure in lip region, guiding ring absent. Vulva transverse, simple. Ventromedian supplements seven, in addition to adanal pair. Lateral guiding pieces tapered and prominent.

TYPE SPECIES: *Lindseyus costatus* sp. n.

Lindseyus costatus is close to *Roqueus* from which it is distinguished by being less slender; by having a basketlike structure in the lip region and no guiding ring; by the sinistrally spiral twist of the musculature of the esophagus; by the simple transverse vulva; in the number and arrangement of supplements; and in the shape of the lateral guiding pieces. It has similarities also to members of the Swangeriidae in the basketlike structure in the lip region, elongate cardia, the sinistrally spiral musculature, and the long slender shape.

*Lindseyus costatus** sp. n.

(Fig. 1)

Females† (6): $L = 5.20 \text{ mm} \pm 0.53$ (4.3 - 5.67); $a = 78.1 \pm 6.8$ (67.2 - 86.3); $b = 14.7$

* The species name, *costatus*, is a Latin adjective meaning ribbed, and refers to the structure in the lip region.

† Figures given are for means, standard deviations, and ranges.

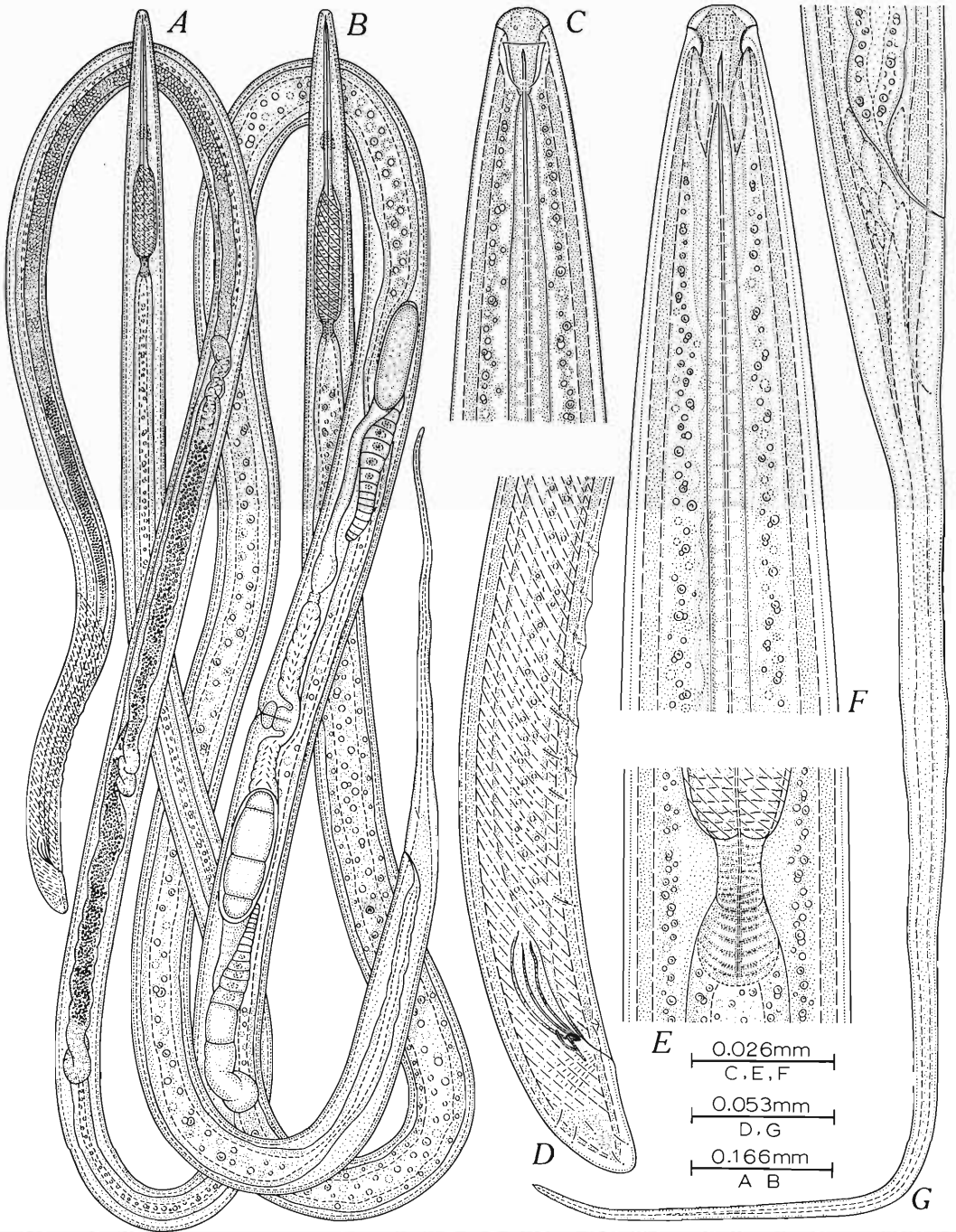


Figure 1. *Lindseyus costatus* sp. n. A, male; B, female; C, male head, lateral view showing amphid; D, male tail; E, cardia; F, female head, dorsoventral view showing basketlike structure in lip region; G, female tail.

Table 1. Known habitats of species of Swangeriidae and Roqueidae.

Species	Locality	Habitat	Authority
<i>Swangeria fragilis</i>	Sumatra	Soil around roots of rubber tree	Thorne, 1939
<i>Swangeria bisexualis</i>	Florida USA	Swampy soil	Hopper, 1961
<i>Qudsiella gracilis</i>	Middle Andamans, India	Soil around roots of papaya	Jairajpuri, 1967
<i>Roqueus gracilis</i>	Puerto Rico	Rain forest	Thorne, 1964
<i>Roqueus africanus</i>	Ivory Coast and Un. of S. Africa	Rice field and along Vaal River	Andrássy, 1970a, b
<i>Lindseyus costatus</i>	Hovey Lake, Indiana, USA	Wet soil around <i>Sagittaria</i> roots	Ferris and Ferris, this publ.

± 1.4 (12.6–16.5); $c = 11.2 \pm 1.4$ (9.9–13.7); $V = 37.9\% \pm 2.4$ (33.9–41.2); $g_1 = 10.7\% \pm 3.1$ (8.7–16.9); $g_2 = 10.4\% \pm 1.2$ (9.1–11.7); body width = 0.07 mm \pm 0.01 (0.06–0.08); esophagus length = 0.36 mm \pm 0.04 (0.29–0.39); tail length = 0.47 mm \pm 0.07 (0.35–0.57); prerectum length = 0.29 mm \pm 0.06 (0.19–0.37).

FEMALE (holotype): L = 5.3 mm; a = 73.3; b = 13.7; c = 11; V = 37%; $g_1 = 16.9\%$; $g_2 = 9.5\%$; body width = 0.07 mm; esophagus length = 0.39 mm; tail length = 0.49 mm; prerectum length = 0.37 mm.

MALE: (paratype): L = 4.1 mm; a = 77.5; b = 13.9; c = 87; T = 59.5%; body width = 0.05 mm; esophagus length = 0.29 mm; tail length = 0.047 mm; prerectum length = 0.32 mm.

Body slender, cuticle marked by fine transverse striae. Neck tapering to narrow, rounded lip region. Amphid chambers about $\frac{2}{3}$ width of adjacent body, the lower half filled with fine nerve fibrils as described by Thorne (1964) for *R. gracilis*. Sensillae pouches just posterior to base of spear extensions. Spear slender, 5–7 μ long, with small aperture. Spear extensions about 22 μ , exact length often difficult to determine. Lip region with suggestion of a basketlike structure of faintly sclerotized ribs as reported for *Swangeria* species (Thorne, 1939; Hopper, 1961). Enlargement of esophagus beginning at 58–70% of the esophageal length measured from anterior end, and surrounded by very prominent sinistrally spiral muscles. Prominent glands around anterior part of esophagus. Cardia long, basal portion attached to intestine as illustrated. "Stäbchensaum" present in intestinal lumen as reported by Thorne (1964) for *R. gracilis*. Prerectum four to six times as long as body

width. Vulva transverse, appearing as simple open ellipse in ventral view. Vagina in lateral view composed of two sections. Cellular oviducts lead to what appear to be elongate-oval spermathecae, although these structures contained few, if any, sperms in our specimens. The two structures are separated by prominent sphincter. Ovaries reflexed $\frac{1}{3}$ to $\frac{2}{3}$ distance back to vulva.

Female tail filiform, attenuated portion shorter than in *R. gracilis*. Terminus a sharp sclerotized point. Male tail short, rounded, ventrally arcuate with adanal pair and seven ventromedian supplements. Ventro-submedian papillae present. Spicules slightly arcuate. Lateral guiding pieces tapered and quite prominent.

HOLOTYPE: Female in Purdue Nematode Collection (PNC) on slide designated 7/31/70B1.

PARATYPES: Male in PNC on slide designated 7/15/67A7. Five females in PNC on slides with the following designations: 7/31/70A1; 7/31/70A2; 7/31/70B2; 7/31/70B3; 7/31/70C1.

TYPE HABITAT: Swampy soil at edge of lake around roots of broad-leaved arrowhead (*Sagittaria latifolia*).

TYPE LOCALITY: Hovey Lake, Posey Co., Indiana, USA.

Discussion

The family Swangeriidae is comprised of two genera, *Swangeria* and *Qudsiella*, containing only three species, *S. fragilis* Thorne, 1939, *S. bisexualis* Hopper, 1961, and *Q. gracilis* Jairajpuri, 1967. Roqueidae now with two genera, *Roqueus* and *Lindseyus* also has three species, *R. gracilis*, *R. africanus* Andrásy, 1970, and *L. costatus* sp. n. The presence of the

faint basketlike structure in the lip region of *L. costatus*, the elongate cardia, the sinistrally spiral musculature of the esophagus, and the long slender shape suggest a relationship between the Roqueidae and the Swangeriidae. *R. gracilis* has a guiding ring and no basketlike structure, but this structure is not a constant feature even of the Swangeriidae, as it is absent in *Qudsiella* (Jairajpuri, 1967). There are apparent similarities in the ecology of the six known species of the two families as well, as all have been found in southern areas and in moist to wet habitats (Table 1). The type habitat of *L. costatus*, although at 37°51' N latitude, is in an area of southern flora and fauna considered unusual for Indiana.

Although genera in both families have the cardia greatly elongated, differences exist between the families in the nature of the posterior attachment. In *Swangeria* and *Qudsiella* the cardia is extremely elongate and attached to the intestine only at the posterior end. Relatively more of the cardia in both *Roqueus* and *Lindseyus* projects into the intestine. Detailed observations of the cardia in living specimens of *L. costatus* indicated no major structural differences between living and fixed specimens. The sexual dimorphism in tail shape serves also to separate the families Roqueidae and Swangeriidae, but we consider the two families to be closely related.

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