

## SIX NEW GENERA OF DORYLAIMID NEMATODES

BY

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New genera proposed are *Apoleptonchus* and *Glochidorella* in Leptonchidae, *Paraqudsiella* in Swangeriidae, *Hulqus* in Hulqinae subfam. n., family Discolaimidae, *Saevadorella* in Nordiidae and *Kantbhala* in Xiphinemellinae, family Tylencholaimidae. *Mitoaxonchium* Yeates, 1973 is close to *Hulqus* and belongs to Hulqinae. *Actinolaimoides* Meyl, 1957 and *Thornedia* Husain & Khan, 1965 are rediagnosed and *Enchodelium* Andr ssy, 1963 is synonymized with *Actinolaimoides*.

\*New species described are: *Apoleptonchus ziauddini* (type-species) from Libya, *Glochidorella brevicula* (type-species) from Nigeria, *G. discoplana* from Malawi, *Paraqudsiella shamimi* (type-species) from Colombia, *Hulqus pengi* (type-species) from Papua New Guinea, *Saevadorella saeva* (type-species) from Western Australia and *S. longidorata* from Malawi.

New combinations proposed are: *Glochidorella bunocephala* for *Basirotyleptus bunocephalus* Siddiqi, 1970; *Saevadorella magna* for *Longidorella magna* Loof, 1971; *Kantbhala alii* (Suryawanshi, 1971) (type-species), *K. caudata* (Suryawanshi, 1971), *K. karamkalla* (Khan, 1972) and *K. minutissima* (Khan, 1972) for species previously in *Longidorella*; *Actinolaimoides angolensis* (Andr ssy, 1963), *A. asaccatus* (Dhanachand & Jairajpuri, 1980) and *A. thornei* (Baqri & Jairajpuri, 1976) for species previously in *Enchodelium*; and *Thornedia opisthodelphis* for *L. opisthodelphis* Jairajpuri, 1964 (= *T. opisthodelphis* Khan, 1972, new synonymy).

A large collection of dorylaimid nematodes assembled at the Commonwealth Institute of Helminthology (CIH), St. Albans, England, from countries that have made use of the CIH plant nematode identification service contained several new genera, six of which, viz., *Apoleptonchus*, *Glochidorella*, *Paraqudsiella*, *Hulqus*, *Saevadorella* and *Kantbhala* are described. Species of these genera occur in soil around plant roots and have a slender odontostyle, they may be plant feeders although nothing is known of their biology and food habits.

Nematodes were heat-killed, fixed, and mounted in dehydrated glycerin by processing through warm lactophenol; all measurements were from mounted specimens, spicules were measured along their median line.

Genus *Apoleptonchus* gen. n.*Diagnosis*

Leptonchinae, Leptonchidae. Cuticle with radial elements. Lip region offset by constriction, without a perioral disc. Odontostyle slender, straight, with aperture about half its length. Odontophore dorylaimoid, straight, its inner lining sclerotized only at base. Basal oesophageal bulb about twice as long as wide, slightly set off from anterior part. Didelphic amphidelphic. Vulva a large pore. Ovaries with several oocytes in multiple rows. Prerectum-intestinal junction post-vulval. Tail short, obtusely rounded.

*Type-species*

*Apoleptonchus ziauddini* gen. n., sp. n. No other species known. The generic name is derived from Greek *apo* = away, and *Leptonchus*, and is masculine in gender.

*Relationship*

*Apoleptonchus* gen. n. comes close to *Leptonchus* Cobb, 1920 and *Funaria* v. d. Linde, 1938, but differs from them in having a pore-like vulva and a straight odontophore which is sclerotized only at its base. From *Bertzuckermania* Khera, 1970 it differs in having an offset lip region, straight odontostyle and odon-

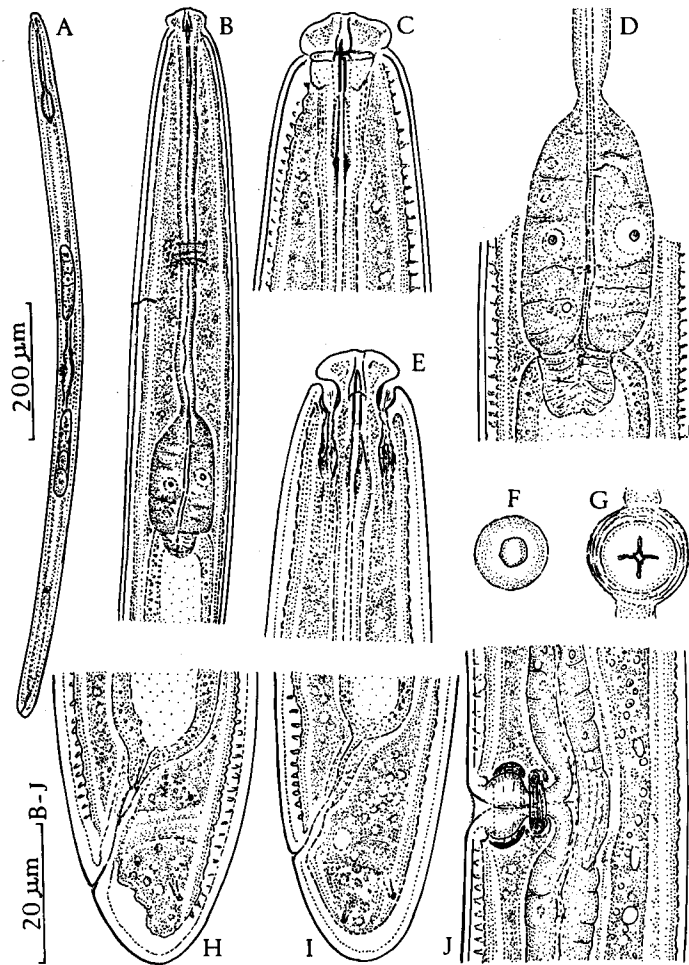


Fig. 1, A-J. *Apoleptonchus ziauddini* gen. n., sp. n. A-D&J. Holotype female. A. Entire female. B. Oesophageal region. C&E. Head end in lateral and ventral views, respectively. D. Basal oesophageal bulb. F&G. Vulva and vagina in ventral view, respectively. H&I. Female tail ends. J. Vulval region.

tophore and a pore-like vulva. It resembles *Xenonchium* Siddiqi, 1964 especially in lip region and odontophore but differs in having a shorter basal enlarged part of the oesophagus and didelphic gonad.

*Apoleptonchus ziauddini* gen. n., sp. n.  
(Fig. 1, A-J)

*Measurements*

- 8 ♀♀ (Paratypes): L = 0.92-1.12 (1.03) mm; a = 29-34 (31); b = 6-8 (6.7); c = 69-86 (75); c' (tail length/anal body width) = 0.7-0.8 (0.75); V = 48-51 (50); odontostyle = 7-8 (7.5)  $\mu\text{m}$ ; odontophore = 10.5-13.5 (12)  $\mu\text{m}$ .
- Holotype ♀: L = 1.07 mm; a = 33; b = 6.8; c = 82; c' = 0.7; V = 50.4; odontostyle = 7.5  $\mu\text{m}$ ; odontophore = 11  $\mu\text{m}$ .

*Description*

*Female:* Body cylindrical, straight to slightly arcuate. Cuticle finely striated; radial elements forming fixation folds. Lateral hypodermal chords about one third body-width; lateral pores 20-22 on one side, widely spaced; a single ventral body pore (= excretory pore?) a little behind nerve ring. Lip region knob-like, conoid-truncate anteriorly, offset by sharp constriction, without labial disc. Amphid apertures ellipsoidal, about 3/4 maximum lip region-width long; amphid pouch in lateral view stirrup-shaped with pushed in base. Odontostyle cylindrical, straight, with narrow lumen and aperture about half its length, not furcate at base. Odontophore dorylaimoid, its inner walls with sclerotization only at base (Fig. 1, C & E). Oesophagus very slender and non-muscular in its anterior 76-80 per cent; gradually enlarged muscular bulb, 31-38  $\mu\text{m}$  long by 15-19  $\mu\text{m}$  wide, nuclei of dorsal and two subventral glands at or slightly behind the middle of the bulb; orifice of dorsal gland a short distance from the distal end of the bulb, orifices of the subventral glands near their nuclei. Oesophago-intestinal valve large, rounded. Intestine oligocytous, with a wide lumen. Prerectum about four body-widths long. Rectum as long as anal body-width. Tail broadly rounded, slightly tapering, shorter than anal body-width.

Vulva a large pore; vagina +-shaped, with thick walls spherical in ventro-dorsal view (Fig. 1, F & G). Ovaries symmetrical, reflexed, with 20-30 oocytes, mostly in 2-3 rows. No sperm in uteri. Male not found.

*Type habitat and locality*

Soil around roots of soya bean (*Glycine hispida* Max.) at Tajora, Libya.

*Type specimens*

Collected in 1979 by Dr. Ziauddin Ahmad Siddiqi, Nematologist, Agricultural Research Centre, Tripoli, after whom the species is named.

Holotype ♀ and 4 ♀♀ paratypes at CIH, St. Albans, England. 1 ♀ paratype at each of these centres: Nematology Department, Rothamsted Experimental Station, Harpenden, England (RES); Landbouwhogeschool, Wageningen, Holland (WAG); USDA Nematology Laboratory, Beltsville, Maryland, USA (USDA); Indian Agricultural Research Institute, New Delhi, India (IARI).

Genus *Glochidorella* gen. n.

*Diagnosis*

Belonenchinae, Leptonchidae. Body moderately long (about 1 mm). Cuticle with radial elements. Lip region offset, with a perioral disc. Sclerotized stoma goblet-shaped, expanding within the lip region. Odontostyle straight, needle-like, without lumen for most of its length. Odontophore straight, with basal knobs which are laterally compressed and appear flange-like. Oesophagus slender, until it enlarges to form a cylindrical muscular basal bulb lacking abnormal inner cuticular thickening and a valvular chamber and measuring 1-1½ body-widths long. Didelphic amphidelphic; ovaries reflexed. Vulva transverse. Spicules dorylaimoid. Ventromedian supplements 2-4, spaced. Tails short (about one anal body-width long), rounded.

*Type-species*

*Glochidorella brevicula* sp. n.

*Other species*

*Glochidorella bunocephala* (Siddiqi, 1970) comb. n. Syn. *Basirotyleptus bunocephalus* Siddiqi, 1970. *G. discoplana* sp. n.

The generic name is derived from the Greek *glochis* = arrow point and *dorella* = small spear, and is feminine in gender.

*Relationship*

*Glochidorella* gen. n. differs from *Basirotyleptus* Jairajpuri, 1964 in having a goblet-shaped stoma that expands within the lip region (in contrast to an elongated cone-shaped stoma expanding posterior to the lip region in the latter), a knobbed odontophore and a cylindrical basal oesophageal bulb lacking inner valvular cuticular thickening (see Fig. 3, I).

The shape of the sclerotized part of the stoma and basal oesophageal bulb is somewhat similar to those of the genera *Proleptonchus* Lordello, 1955 and *Proleptonchoides* Ferris, Goseco & Kumar, 1979 which otherwise have a hollow odontostyle, monodelphic gonad and no perioral disc. Ferris *et al.* (1979) believed that the genera *Proleptonchus*, *Proleptonchoides* and *Loncharionema* Goseco, Ferris & Ferris, 1974 share a common ancestor. *Glochidorella* appears to occupy an intermediate position between *Basirotyleptus* (Belonenchinae) and *Proleptonchoides* (Leptonchinae).

*Glochidorella brevicula* gen. n., sp. n.  
(Fig. 2, A-I)

*Measurements*

15 ♀♀ (Paratypes): L = 0.71-0.88 (0.77) mm; a = 32-40 (36); b = 4.2-5.1 (4.7); c = 44-60 (48); c' = 0.8-1.2 (1); V = 51-58 (55); odontostyle = 6.5-8.5 (7.8)  $\mu$ m; odontophore = 9.5-12.5 (11)  $\mu$ m.

12 ♂♂ (Paratypes): L = 0.72-0.82 (0.75) mm; a = 38-42 (40); b = 4.4-5.0 (4.6); c = 42-49 (45); c' = 1-1.3 (1.1); T = 45-54 (50); odontostyle = 7.5-8.5 (8)  $\mu$ m; odontophore = 9.5-10.5 (10)  $\mu$ m; spicules = 21-23.5 (22)  $\mu$ m.

Holotype ♀: L = 0.76 mm; a = 35; b = 4.5; c = 43; c' = 1.13; V = <sup>15</sup>55<sup>14</sup>; odontostyle = 6.5  $\mu$ m; odontophore = 9.5  $\mu$ m.

*Description*

*Female*: Body open C-shaped. Cuticle striation indistinct, radial elements widely spaced, forming fixation folds. Lateral hypodermal chords 1/4-1/3

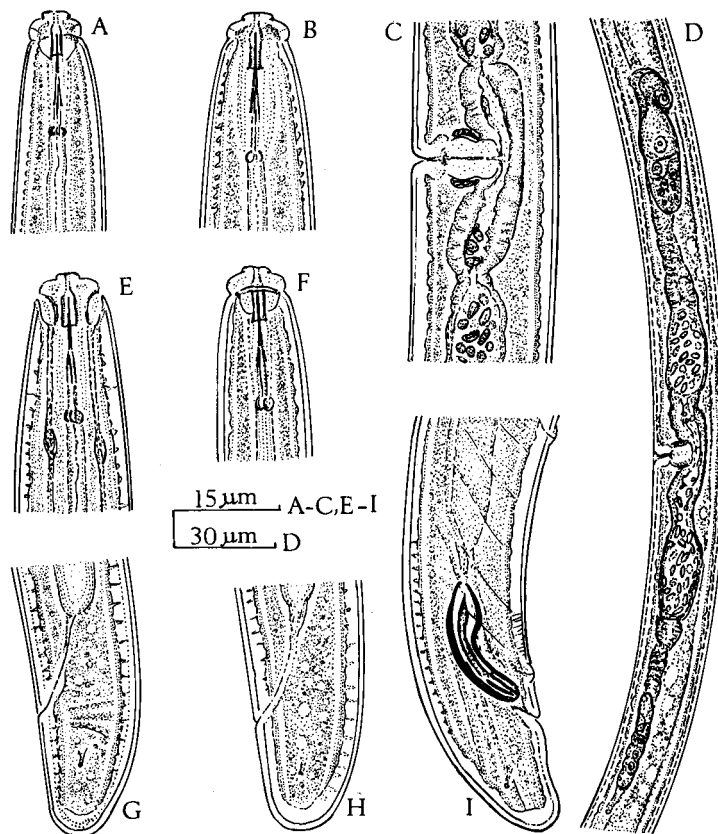


Fig. 2, A-I. *Glochidorella brevicula* gen. n., sp. n. A, C, D & G. Holotype female. F & I. Male. A, B, E & F. Head ends. C. Vulval region, lateral. D. Reproductive organs. G-I. Tail ends.

body-width. Lip region offset by slight constriction, surmounted by an elevated, offset, round-edged perioral disc; papillae not raised. Amphids stirrup-shaped, with wide apertures about  $3/4$  as long as width of lip region. Sclerotized part of stoma goblet-shaped,  $6.5-8.5 \mu\text{m}$  long, its posterior end forming a spear guiding ring. Odontostyle solid for most of its length, straight. Odontophore sclerotized only at base which bears three flange-like knobs which are poorly sclerotized (Fig. 2, A, B & E). Basal oesophageal bulb offset from anterior part by depression,  $23-28 \times 9-12 \mu\text{m}$ , without a valvular chamber. Cardia rounded. Vulva transverse. Vagina extends a little more than half body-width. Ovaries reflexed, posterior ovary always less developed (Fig. 2, D). Sperm in uteri about  $2.5 \mu\text{m}$  long. Prerectum indistinct. Rectum about one anal body-width long. Tail conoid-obtusely rounded,  $15-17.5 (16.5) \mu\text{m}$  long.

#### *Male*

Body arcuate with hooked posterior end. General morphology as for female. Spicules short and thick, ventrally bent near middle,  $21-23.5 (22) \mu\text{m}$  long. Lateral guiding pieces of spicules  $6-7 \mu\text{m}$  long. Tail  $15-18 \mu\text{m}$  long, conoid-rounded. Paired ventrosubmedian papillae  $7-9 \mu\text{m}$  anterior to cloacal aperture. Three ventromedian papillae at  $34-43$ ,  $44-46$  and  $57-89 \mu\text{m}$  from cloacal aperture; four ventromedian papillae in one specimen.

#### *Type habitat and locality*

Forest soil 25 miles east of Ore on the Ore-Benin City Road, Nigeria.

#### *Type specimens*

Collected by F. E. Caveness in 1978. Holotype♀ and 4♀♀ paratypes at CIH; 2♀♀ paratypes each at RES, WAG, USDA and IARI.

#### *Relationship*

*Glochidorella brevicula* sp. n. differs from *G. discoplana* sp. n. and *G. bunocephala* (Siddiqi, 1970) comb. n. in having a smaller body (hence the species name), reduced posterior ovary and shorter spicules.

*Glochidorella discoplana* gen. n., sp. n.  
(Fig. 3, A-I)

#### *Measurements*

6♀♀ (Paratypes): L =  $0.95-1.2 (1.06)$  mm; a =  $40-44 (42)$ ; b =  $5.3-6.2 (5.8)$ ; c =  $56-64 (59)$ ; c' =  $0.9-1.2 (1)$ ; V =  $51-56 (54)$ ; odontostyle =  $7-9 (8) \mu\text{m}$ ; odontophore =  $9-12 (10.5) \mu\text{m}$ .

3♂♂ (Paratypes): L =  $1.1-1.2 (1.06)$  mm; a =  $42-54 (48)$ ; b =  $5-7 (6)$ ; c =  $54-67 (61)$ ; c' =  $1-1.15 (1.08)$ ; T =  $51-63 (56)$ ; odontostyle =  $8 \mu\text{m}$ ; odontophore =  $10-11.5 (10.8) \mu\text{m}$ ; spicules =  $30-32.5 (31) \mu\text{m}$ .

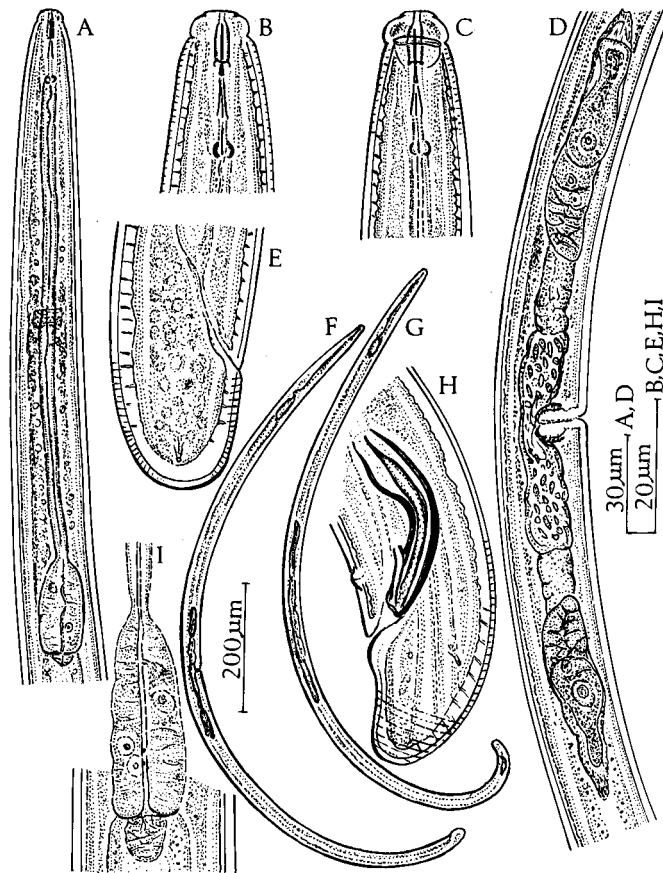


Fig. 3, A-I. *Glochidorella discoplana* gen. n., sp. n. A, B, D-F. Holotype female. C, G-I. Male. A. Oesophageal region. B & C. Head ends. D. Reproductive region. E & H. Tail ends. F & G. Entire female and male. I. Basal oesophageal bulb.

Holotype♀: L = 1.2 mm; a = 43; b = 6.1; c = 60; c' = 1; V =  $10.551^{10}$ ; odontostyle = 8  $\mu$ m; odontophore = 12  $\mu$ m.

#### Description

**Female:** Body open C-shaped. Cuticle distinctly but finely striated; radial elements present but not forming fixation folds. Lateral hypodermal chords 1/5-1/4 body-width. Lip region offset by constriction, rounded, narrower than adjacent body, with low flat disc (hence the species name), which is distinctly offset. Amphids stirrup-shaped with wide apertures 4/5 lip region-width long. Sclerotized part of stoma 8-9  $\mu$ m long. Odontostyle solid in anterior two-thirds, straight. Odontophore lightly sclerotized, straight, with three flange-like basal knobs (Fig. 3, B); total stylet length 17-20 (18.5)  $\mu$ m. Oesophagus a slender tube until it abruptly enlarges to form muscular basal bulb 25-30  $\times$  12-13  $\mu$ m. Cardia well developed, rounded.

Vulva transverse. Vagina  $3/5$  body-width long. Both ovaries equally developed; uteri with sperm (Fig. 3, D). Prerectum indistinct. Rectum about one anal body-width long. Tail broadly rounded with very little tapering, about one anal body-width long.

#### *Male*

General morphology similar to those of female. Testes two, one outstretched, the other reflexed. Spicules dorylaimoid, slender, bent near middle,  $30-32.5 \mu\text{m}$  long; lateral guiding piece  $8-9 \mu\text{m}$  long. Paired ventrosubmedian papillae  $8-9 \mu\text{m}$  anterior to cloacal aperture; 3-4 ventromedian papillae  $44-99 \mu\text{m}$  from cloacal aperture. Tail conoid-rounded, 1-1.15 times anal body-width long.

#### *Type habitat and locality*

Soil around roots of grasses at Nsambi Dambo, Kirk Range, Malawi.

#### *Type specimens*

Collected by D. C. M. Corbett on 13th June, 1964. Holotype♀, 2♀♀, 1♂ paratypes at CIH; 1♀, 1♂ paratypes each at USDA and IARI; 1♀ paratype each at RES and WAG.

#### *Relationship*

*Glochidorella discoplana* sp. n. differs from *G. bunocephala* (Siddiqi, 1970) comb. n. in having a longer and more slender body, a cuticle with distinct transverse striae, a low flat perioral disc and a shorter stylet with more conspicuous basal knobs.

#### Genus *Paraqudsiella* gen. n.

#### *Diagnosis*

Swangeriidae. Body small-sized (under 1 mm), slender. Lip region hemispherical, continuous; papillae not raised. Amphid stirrup-shaped. Odontostyle tiny ( $2.5-3.5 \mu\text{m}$  long in type-species), asymmetrical, with distinct lumen. Odontophore simple, rod-shaped, not sclerotized. Oesophagus slender, gradually expanding to form a basal bulb about  $1/4$  its entire length; no muscular sheath around basal bulb. Cardia elongated (one-third to two-fifths as long as basal bulb in type-species), with intestine attached to its posterior tip. Monodelphic opisthodelphic, a short anterior uterine sac present. Vulva transverse. Tail elongate, filiform.

#### *Type-species*

*Paraqudsiella shamimi* gen. n., sp. n. No other species.

*Relationship*

*Paraqudsiella* gen. n. comes close to *Qudsiella* Jairajpuri, 1967, from which it differs in having a tiny, asymmetrical odontostyle and monodelphic gonad and in lacking a muscular sheath around the basal oesophageal bulb.

The absence of a muscular sheath around the oesophageal bulb is a remarkable feature of this genus. In all other important diagnostic characters, especially an elongated isthmus-like cardia, *Paraqudsiella* is a typical swangeriid nematode.

This new genus is so named as to show its affinity to *Qudsiella* Jairajpuri, 1967, and the name is feminine in gender. Its type-species is named after Dr. Mohammad Shamim Jairajpuri in recognition of his work on Belondiroidea and other dorylaims.

*Paraqudsiella shamimi* gen. n., sp. n.

(Fig. 4, A-I)

*Measurements*

8 ♀♀ (Paratypes): L = 0.47-0.55 (0.52) mm; a = 36-42 (39); b = 4.0-4.7 (4.3); c = 4.8-6.0 (5.3); c' = 10-12 (11); V = 33.3-35.5 (34.5); odontostyle = 2.5-3.5 (3)  $\mu$ m; odontophore = 7-9 (8)  $\mu$ m.

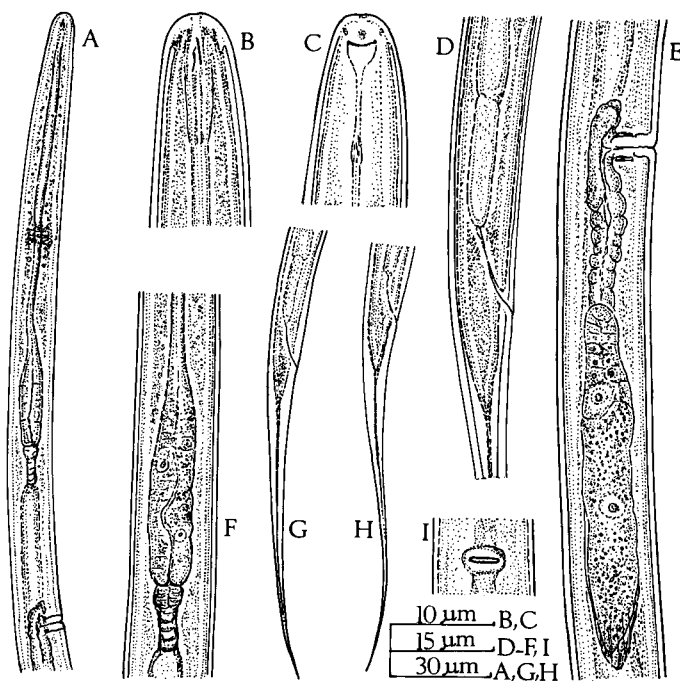


Fig. 4, A-I. *Paraqudsiella shamimi* gen. n., sp. n. A, D-G. Holotype female. A. Anterior part of body showing oesophagus and vulva. B & C. Head ends. D. Prerectum and rectum. E. Reproductive organs. F. Basal oesophageal bulb and cardia. G & H. Female tails. I. Vulva in ventral view.

Holotype♀: L = 0.53 mm; a = 39; b = 4; c = 5.6; c' = 10.4; V =  $1.335^{14.5}$ ; odontostyle = 2.5  $\mu$ m; odontophore = 8  $\mu$ m.

#### *Description*

*Female*: Body slender, arcuate. Cuticle with exceedingly fine transverse striae. Lateral hypodermal chords one third body-width; pores indistinct. Lip region continuous, hemispherical; papillae not raised. Amphids stirrup-shaped, aperture half as long as adjacent body-width. Odontostyle 2.5-3.5  $\mu$ m long, asymmetrical, poorly sclerotized, with distinct lumen (Fig. 4, B). Odontophore simple, rod-like, not sclerotized. Oesophagus a slender tube until it gradually enlarges to form a basal bulb about one fourth as long as total oesophageal length; no muscular sheath around the bulb. Cardia elongated 1/3 to 2/5 as long as basal oesophageal bulb, with intestine appearing to be attached to its tip (Fig. 4, F). Vulva a transverse slit, 1/3 body-width long and located at about two body-widths behind the cardia. Vagina half body-width long. Reproductive system monodelphic opisthodelphic. Anterior uterine sac 1/4 to 2/3 body-width long. Ovary reflexed, with about 15 oocytes mostly in two rows. Intestine thin-walled, with wide lumen. Prerectum about 1 1/2 anal body-widths long. Tail elongate-attenuated, regularly tapering to finely pointed tip; inner protoplasmic core of tail convex-conoid for about 1 1/2 anal body-widths behind anus, then abruptly narrows to become filamentous (Fig. 4, G & H). Male not found.

#### *Type habitat and locality*

Soil around roots of *Heliconia* sp., near hospital at Araracuara, Amazonas, Colombia.

#### *Type specimens*

Collected by Ms Kate Williamson during Colombian Amazonas Expedition in 1977. Holotype♀ and 4♀♀ paratypes at CIH; 1♀ paratype each at RES, WAG, USDA and IARI.

#### *Hulqinae* subfam. n.

#### *Diagnosis*

Discolaimidae. Lip region narrow, amalgamated, offset, papillae slightly raised. Lateral hypodermal glands indistinct. Amphid apertures oval. Oesophagus very long, enlarging anterior to its middle. Dorsal oesophageal gland orifice at two or more body-widths from beginning of oesophageal enlargement. Monodelphic opisthodelphic or didelphic amphidelphic. Vulva a transverse slit. Tail elongate-filiform.

#### *Type genus*

*Hulqus* gen. n.

*Other genus*

*Mitoaxonchium* Yeates, 1973.

Genus *Hulqus* gen. n.*Diagnosis*

*Hulquinae* n. subfam., *Discolaimidae*. Lip region narrow, amalgamated, slightly offset; papillae slightly raised. Amphid apertures wide, about half lip region-width or less long. Odontostyle with thin walls and wide lumen and aperture less than half its length. Oesophagus more than one-third of body-length, gradually enlarging anterior to its middle. Orifice of dorsal oesophageal gland at one-third length of enlarged part of oesophagus from anterior. Monodelphic opisthodelphic. Tail elongate filiform.

*Type-species*

*Hulqus pengi* gen. n., sp. n.

No other species known.

The generic name is derived from the Arabic and Urdu word *Hulq* meaning throat and refers to the characteristic long oesophagus. It is masculine in gender.

*Relationship*

*Hulqus* gen. n. differs from *Mitoaxonchium* Yeates, 1973 in having the enlarged part of the oesophagus not offset by a constriction from the anterior slender part, and a monodelphic gonad.

*Mitoaxonchium* was assigned to *Belondiridae* by Yeates (1973) who reported the presence of a faint sinistral (although in figure it is dextral) spiral sheath of muscles around the enlarged part of the oesophagus. An examination of two female paratypes at Rothamsted Experimental Station, Harpenden, England, and several specimens identified by me as *Mitoaxonchium basalticum* Yeates, 1973 from sugarcane soil, Pasuruan, Indonesia, revealed no such sheath (see Fig. 6, L). *Mitoaxonchium* is rediagnosed here and assigned to the subfamily *Hulquinae*.

*Hulqus pengi* gen. n., sp. n.

(Fig. 5, A-G)

*Measurements*

10♀♀ (Paratypes): L = 0.86-1.07 (0.97) mm; a = 43-52 (47); b = 2.5-2.7 (2.6); c = 5.2-7.4 (6.3); c' = 10-15 (13); V = 43-49 (45.5); odontostyle = 5.0-6.5 (5.5)  $\mu$ m; odontophore = 8-10 (9)  $\mu$ m.

Holotype♀: L = 1.0 mm; a = 45; b = 2.8; c = 6; c' = 12; V = 44<sup>10</sup>; odontostyle = 6  $\mu$ m; odontophore = 9  $\mu$ m.

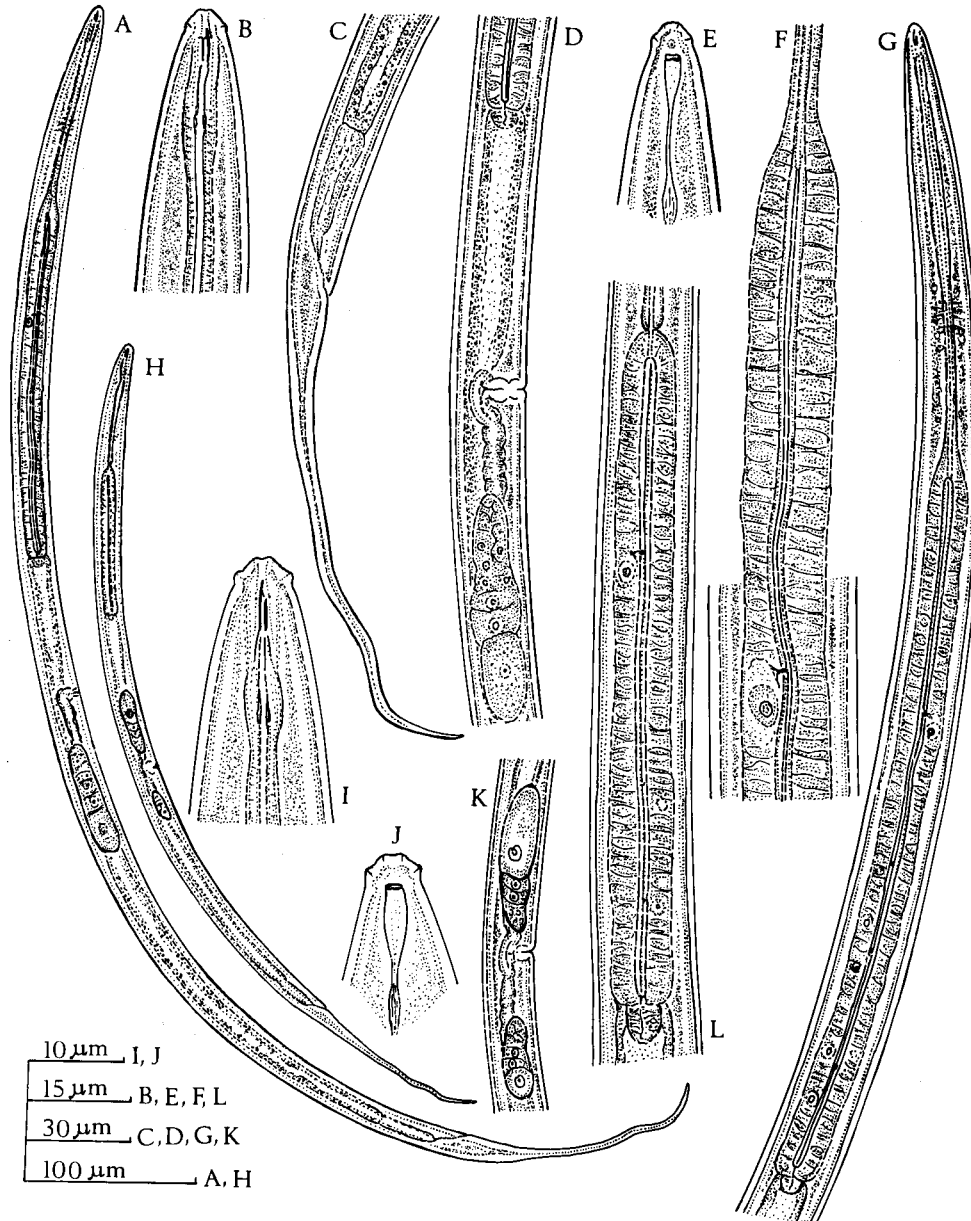


Fig. 5, A-G. *Hulqus pengi* gen. n., sp. n. A, C-F. Holotype female. H-L. *Mitoaxonchium basalticum* Yeates, 1973 from sugarcane soil; Pasuruan, Indonesia. A & H. Entire females. B, E, I & J. Head ends; E & J showing amphids. C. Tail end. D & K. Reproductive organs. F & L. Portions of oesophagus showing dorsal gland. G. Oesophageal region.

*Description*

*Female:* Body arcuate. Cuticle finely striated, lacking radial elements. Lateral hypodermal chords about one-third body width. Lip region offset by slight depression, elevated and tapering; not sclerotized; papillae slightly raised; labial disc absent (Fig. 5, B&E). Odontostyle thin-walled, tubular, with wide lumen and aperture one-third the length, 5.5-6.5  $\mu\text{m}$  or about one lip region-width long. Single faint spear guiding ring at less than an odontostyle length from anterior end. Odontophore enveloped by thick muscles, devoid of knobs or flanges at base.

Oesophagus 330-395 (360)  $\mu\text{m}$  long; its anterior part slender, with distinct lumen; posterior part very muscular, 58-67 (65)% of total oesophageal length. Orifice of dorsal oesophageal gland 65-80  $\mu\text{m}$  behind anterior end of enlarged part; nucleus of dorsal gland closely behind orifice (Fig. 5, F&G). Nuclei and orifice of posterior subventral glands 1 to 1 $\frac{1}{2}$  body-widths from base of oesophagus; those of anterior subventral glands indistinct, spaced (Fig. 5, G). Oesophago-intestinal junction small, heart-shaped to rounded. Vulva a transverse slit, slightly premedian, 40-125  $\mu\text{m}$  behind base of oesophagus. Vagina at right angles to body-axis, about half body width long. Reproductive system monodelphic opisthodelphic; anterior branch absent. Ovary reflexed, with 10-15 oocytes. Prerectum about 1.5-2.5 body-widths long. Rectum about 1.5 anal body-widths long. Vulva-anus distance 1.9-2.7 times tail length. Tail elongate-filiform, 130-190 (150)  $\mu\text{m}$  long, terminus pointed. Male not found.

*Type habitat and locality*

Soil around roots of *Coffea robusta* in Papua New Guinea (the species name is derived from the initials P.N.G.).

*Type specimens*

Holotype♀ and 2♀♀ paratypes at CIH; 2♀♀ paratypes each at: RES, WAG, USDA and IARI.

Genus *Mitoaxonchium* Yeates, 1973*Diagnosis* (emended)

Hulqinae n. subfam., Discolaimidae. Lip region narrow, amalgamated, offset; papillae slightly raised. Amphid apertures oval, less than half lip region width long. Odontostyle slender, with aperture less than half its length. Oesophagus about one third of body length, enlarging anterior to its middle by a sudden expansion; two parts being offset by a sharp constriction. Orifice of dorsal oesophageal gland at about one-third length of enlarged part of oesophagus from its anterior end. Didelphic amphidelphic. Tail elongate-filiform.

*Type-species*

*Mitoaxonchium basalticum* Yeates, 1973 (Fig. 5, H-L). No other species.

Genus *Saevadorella* gen. n.*Diagnosis*

Nordiinae, Nordiidae. Body robust, with pronounced tapering anteriorly. Cuticle thick, with fine transverse striations. Lip region offset by a constriction; lips partially separated, with raised papillae; framework not sclerotized. Amphids stirrup-shaped, not abnormally large. Odontostyle with distinct lumen, over 30  $\mu\text{m}$  long. Odontophore about as long as odontostyle; slightly bulboid basal region. Spear guiding ring single, about half odontostyle length from anterior end. Oesophagus muscular, gradually enlarging behind middle; orifice of dorsal gland near beginning of enlargement. Vulva transversely oval. Vagina thick walled, sclerotized. Ovaries paired, symmetrical. Tail in both sexes short, conoid. Male ventromedian supplements 2-3, widely spaced.

*Type-species*

*Saevadorella saeva* gen. n., sp. n.

*Other species*

*S. longidorata* sp. n.

*S. magna* (Loof, 1971) comb. n.

Syn. *Longidorella magna* Loof, 1971

*Eudorylaimus cuspidatus* Andr ssy, 1964 and *Longidorella arenicola* Vinciguerra & Zullini, 1980 may also belong to this genus.

The generic name is derived from the Greek *saeva* = ferocious and *dorella* = small spear, and is feminine in gender.

*Relationship and discussion*

The pronounced body tapering in the anterior end, thick cuticle and an offset lip region with partially separated lips differentiate *Saevadorella* gen. n. from *Enchodorella* Khan, 1964 and *Longidorella* Thorne, 1939. As pointed out by Loof (1971) for *S. magna*, the shape of the anterior tapering region of the body is reminiscent of the genus *Paraxonchium* Krall, 1958.

The subfamily Nordiinae was proposed by Jairajpuri & A. H. Siddiqi (1964) to contain their new genus *Nordia* and *Longidorella* Thorne, 1939. The first genus was later synonymized with *Enchodorella* Khan, 1964 for reasons of priority in publication (Siddiqi, 1964). Andr ssy (1966) reviewed the taxonomy of the genera *Longidorella* and *Enchodorella* giving reasons to distinguish between the two genera. Another related genus, *Thornedia*, was proposed by Husain & Khan (1965) who also commented upon Nordiinae. Siddiqi (1969) proposed Nordiidae with three subfamilies: Nordiinae, Pungentinae Siddiqi,

1969 and Cephalodorylaiminae Jairajpuri, 1967; Nordiinae containing *Enchodorella*, *Longidorella*, *Enchodelium* Andr ssy, 1963 and *Thornedia*.

Enchodorellinae proposed by Andr ssy (1966) is here considered a synonym of Nordiinae. Pungentinae, on the other hand, has been raised to the rank of a family by Monteiro (1970). In Pungentidae the base of the spear is furcate in contrast to the smooth base of the spear of Nordiidae. The subfamily Cephalodorylaiminae is considered a separate family, Cephalodorylaimidae (Monteiro, 1970).

Jairajpuri & Hooper (1969) reviewed the genus *Longidorella* and synonymized with it the genera *Enchodorella* and *Thornedia*. My study of the type material of the type-species of *Longidorella*, *L. parva* Thorne, 1939, supports Andr ssy's (1966) differentiation of *Longidorella* and *Enchodorella*. The lip region of *L. parva* is low so that the papillae come to lie near the oral plane (Fig. 7, G) and the ovaries lie close to the vulva since the uteri are far less pronounced than in *Enchodorella* and *Saevadorella*. *Thornedia* and *Actinolaimoides* Meyl, 1957 (syn. *Enchodelium* Andr ssy, 1963) are re-diagnosed below.

With the proposal of *Saevadorella* with its partially separated lips, the demarcation between the families Nordiidae and Qudsianematidae seems to be weakening. A similar lip region and elongate spear in *Oriverutus* (see Siddiqi, 1971) of the Qudsianematidae indicates a transition through *Saevadorella* to Nordiidae.

*Saevadorella saeva* gen. n., sp. n.  
(Fig. 6, A-N)

*Measurements*

7♀♀ (Paratypes): L = 0.7-0.9 (0.8) mm; a = 20-23 (21); b = 3.0-3.7 (3.2); c = 20-27 (22); c' = 1.2-2.0 (1.7); V = 53-58 (56); odontostyle = 39-42 (40) µm; odontophore = 42-48 (45) µm.

2♂♂ (Paratypes): L = 0.83-0.84 mm; a = 23-25; b = 3.1; c = 21-23; c' = 1.8-2.0; T = 58-60; odontostyle = 39 µm; odontophore = 42 µm; spicules = 38-40 µm.

Holotype♀: L = 0.77 mm; a = 23; b = 3.1; c = 21; c' = 1.8; V = <sup>13</sup>56<sup>13</sup>; odontostyle = 40 µm; odontophore = 42 µm.

*Description*

*Female*: Body robust, markedly tapering to lip region 2/7 to 1/4 as wide as body at oesophageal base. Cuticle thick, finely striated. Lateral body pores on one side 7-9 in oesophageal region, 4-6 between oesophagus and vulva and 9-11 (including two caudal) in postvulval part. Lip region hexagonal in face view, offset by a constriction; papillae raised; amphidial slit about half width of lip region long. Faint spear guiding ring 18-20 µm from anterior end. Odontostyle hollow needle-like with tip usually bent dorsally; odontophore base

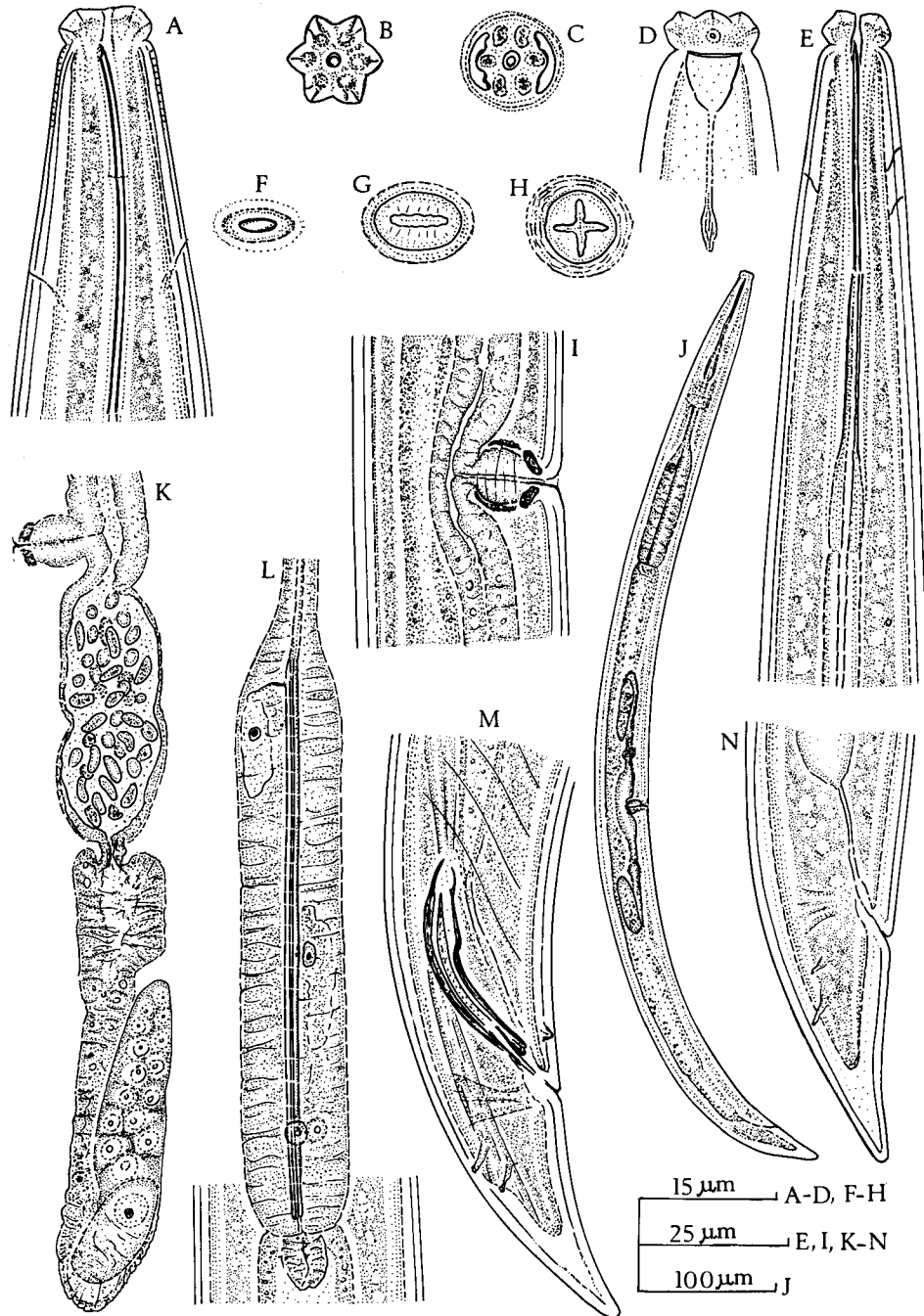


Fig. 6, A-N. *Saevadorella saeva* gen. n., sp. n. A, I, J & N. Holotype female. D & M. Male. A, D & E. Heads ends. B. *En face* view. C. Optical section through amphids. F, G & H. Vulva, vagina vera, vagina uterina, respectively, in ventral view. I. Vulval region lateral. J. Entire female. K. Posterior branch of female reproductive organs. L. Basal oesophageal bulb. M & N. Tail ends.

bulboid but not distinctly flanged or knobbed. Oesophagus muscular; enlarged part 88-100  $\mu\text{m}$  long or 35-40 per cent of entire length of oesophagus. Cardia large, rounded.

Vulva transverse, 4  $\mu\text{m}$  long; vagina extending halfway across body; vagina vera transverse, vagina uterina +-shaped; prominent sclerotization of its wall near vulva present (Fig. 6, I). Didelphic amphidelphic. Uteri usually packed with spindle-shaped sperm. Ovaries symmetrical, reflexed.

Prerectum about  $1\frac{1}{2}$  times length of rectum; latter about  $1\frac{1}{2}$  times anal body width long. Tail conoid to rounded tip, 34-44  $\mu\text{m}$  or 1.8-2 anal body widths long; its hyaline terminal portion 11-18  $\mu\text{m}$  long.

#### *Male*

Body more arcuate in posterior half than in female. Spicules dorylaimoid, rather slender, 38-40  $\mu\text{m}$  long; lateral guiding piece 11  $\mu\text{m}$  long. Supplements consist of pre-anal pair and two ventromedian papillae located at 83  $\mu\text{m}$  and 110  $\mu\text{m}$  anterior to cloacal aperture. Tail about twice anal body-width long.

#### *Type habitat and locality*

Soil around roots of apple tree (*Malus sylvestris* (L.)), Stoneville, Western Australia.

#### *Type specimens*

*Holotype* ♀ and 3 ♀♀, 2 ♂♂ paratypes at CIH; 1 ♀ paratype each at RES, WAG, USDA and IARI.

#### *Relationship*

*Saevadorella saeva* gen. n., sp. n. comes close to *S. magna* (Loof, 1971) comb. n. but differs in having a smaller body and longer odontostyle ( $L = 1.05-1.13$  mm; odontostyle = 30-35  $\mu\text{m}$  in *S. magna*).

#### *Saevadorella longidorata* sp. n.

(Fig. 7, A-E)

#### *Measurements*

Paratype ♀:  $L = 0.69$  mm;  $a = 17$ ;  $b = 2.6$ ;  $c = 13.3$ ;  $c' = 2.3$ ;  $V = 61$ ; odontostyle = 59  $\mu\text{m}$ ; odontophore = 55  $\mu\text{m}$ .

2 ♂♂ (Paratypes):  $L = 0.68-0.7$  mm;  $a = 19-20$ ;  $b = 2.5-2.9$ ;  $c = 13-20$ ;  $c' = 1.7-2.4$ ;  $T = 46-49$ ; odontostyle = 55-56  $\mu\text{m}$ ; odontophore = 54-55  $\mu\text{m}$ ; spicules = 30-31  $\mu\text{m}$ .

*Holotype* ♀:  $L = 0.67$  mm;  $a = 17$ ;  $b = 2.8$ ;  $c = 15.2$ ;  $c' = 2$ ;  $V = 1860^{11}$ ; odontostyle = 55  $\mu\text{m}$ ; odontophore = 56  $\mu\text{m}$ .

*Description*

*Female*: Body slightly arcuate, cuticle 2-2.5  $\mu\text{m}$  thick. Lip region offset by constriction, about 1/4 as wide as body; papillae raised. Length of amphidial aperture 2/5 lip region width. Lateral chords about 1/4 body-width. Three dorsal body pores in anterior end and 9 ventral pores in oesophageal region. Odontostyle 55-59  $\mu\text{m}$  long being longest among the nominal species (hence the species name), with distinct lumen and a slightly dorsally arcuate tip. Odontophore rod-like. Oesophagus muscular, enlarged part 95-100  $\times$  24  $\mu\text{m}$ . Cardia large, rounded. Vulva transversely oval. Vagina thick-walled, sclerotized. Uteri with sperm. Egg in uterus of holotype female 67  $\times$  30  $\mu\text{m}$ .

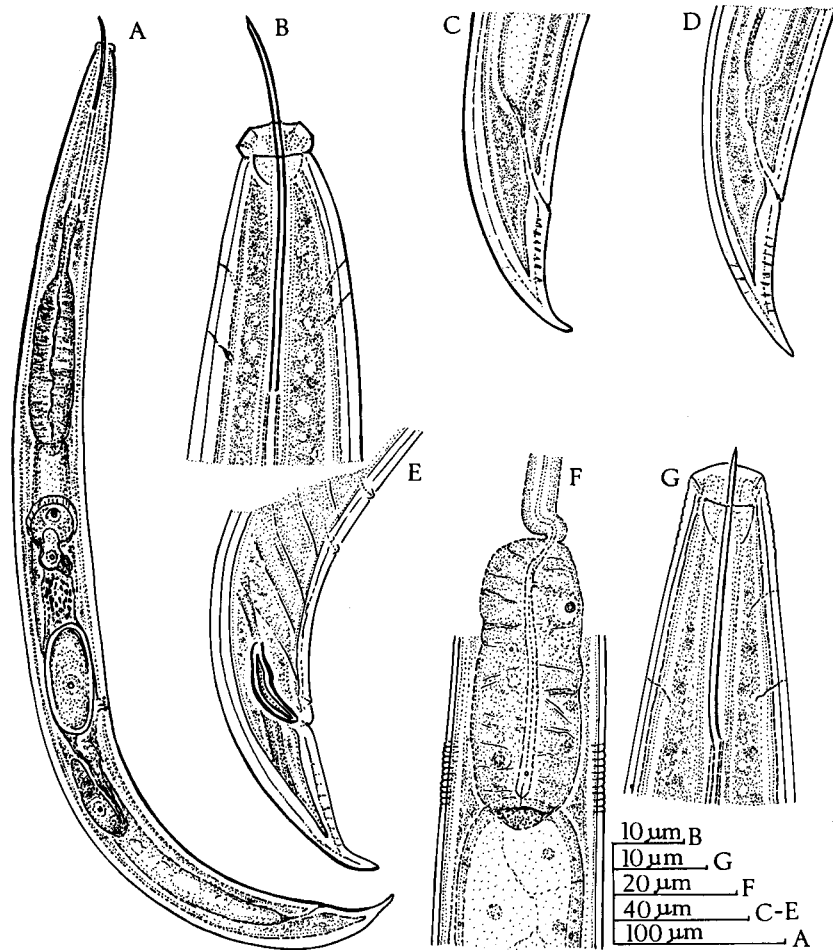


Fig. 7, A-E. *Saevadorella longidorata* gen. n., sp. n. A-C. Holotype female. E. Male, remainder female. A. Entire female. B. Head end. C, D & E. Tail ends. F-G. *Longidorella parva* Thorne, 1939, paratype female. F. Basal oesophageal bulb. G. Head end.

Prerectum indistinct. Rectum  $1\frac{1}{2}$  anal body-widths long. Tail conoid, ventrally arcuate; cuticle behind anus irregularly contracted; inner protoplasmic core conoid-pointed; hyaline terminal part 21-24  $\mu\text{m}$  long (Fig. 7, C&D).

#### Male

Essentially similar to female. Spicules slender, arcuate, with narrow ends, 30-31  $\mu\text{m}$ ; lateral guiding piece 6-7  $\mu\text{m}$  long. Paired ventrosubmedian papillae 8  $\mu\text{m}$  in front of cloacal aperture. Two ventromedian papillae located 53-54  $\mu\text{m}$  and 72-79  $\mu\text{m}$  anterior to cloacal aperture. Tail similar to that of female.

#### Type habitat and locality

Soil around roots of *Pinus taeda*, Chirinde Valley Road, Zomba Mountain, Malawi.

#### Type specimens

Collected by D. C. M. Corbett on 1st April, 1963. Holotype♀ and a paratype♂ at CIH. 1♀, 1♂ paratypes at IARI.

#### Relationship

*Saevadorella longidorata* sp. n. differs from other nominal species in having the longest odontostyle and odontophore. It is close to *S. saeva* but differs in having a more posterior vulva and a more pointed tail.

### Genus *Kantbhala* gen. n. (Fig. 8, A-G)

#### Diagnosis

Xiphinemellinae: Tylencholaimidae. Body small (under 0.5 mm). Cuticle with radial elements and fixation folds. Lip region offset, knoblike, without a perioral disc. Amphids large, with aperture almost encircling head. Odontostyle attenuated, over 3 lip region-widths long, with exceedingly fine lumen. Odontophore elongated, with bulboid base lacking knobs or distinct flanges. Enlarged part of oesophagus about one-third of oesophageal length, usually offset from anterior part by a depression. Intestine oligocytous. Vulval small, pore-like. Vagina inconspicuous, about 1/4 body width long. Didelphic amphidelphic; ovaries reflexed. Female tail short, conoid.

#### Type-species

*Kantbhala alii* (Suryawanshi, 1971) comb. n. Syn. *Longidorella alii* Suryawanshi, 1971.

#### Other species

*Kantbhala caudata* (Suryawanshi, 1971) comb. n. Syn. *Longidorella caudata* Suryawanshi, 1971. *K. karamkalla* (Khan, 1972) comb. n. Syn. *L. karamkalla*

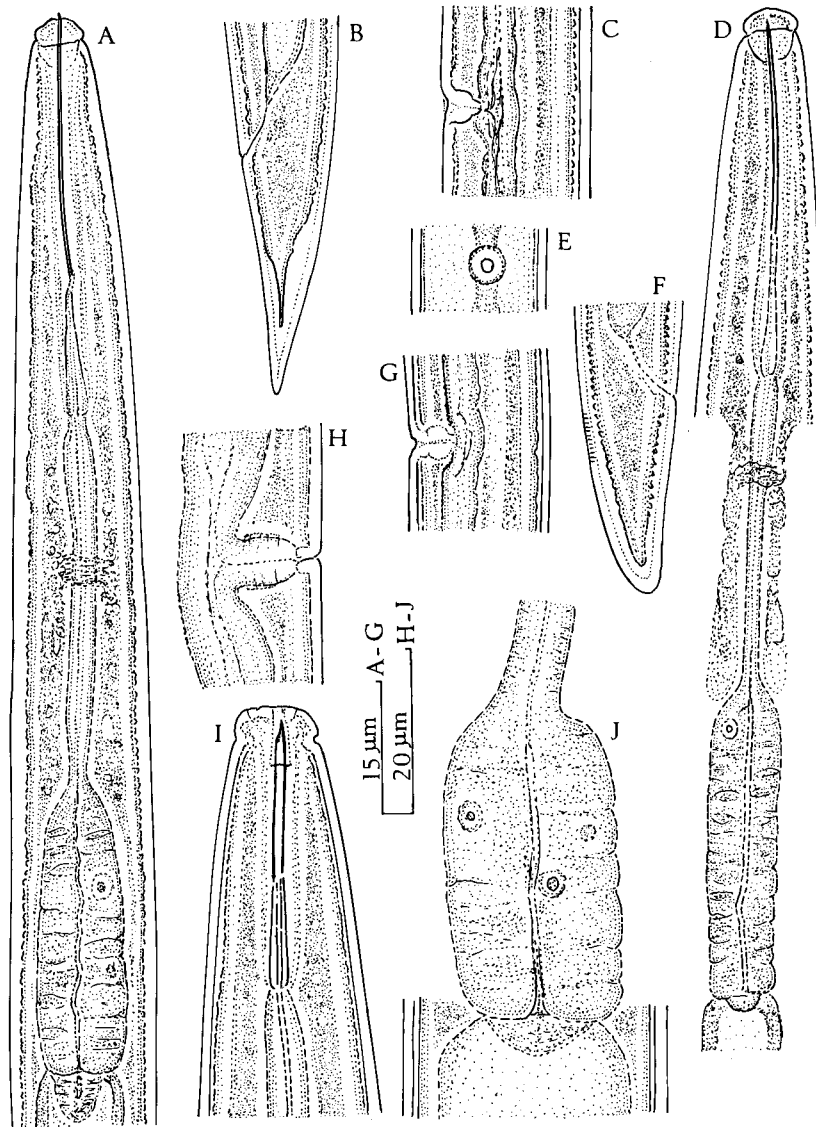


Fig. 8, A-C. *Kantbhala alii* (Suryawanshi, 1971) gen. n., comb. n., Paratype female No. T-892P at USDA Nematode Collection, Beltsville, Maryland, USA. D-G. *K. minutissima* (Khan, 1972) gen. n., comb. n., paratype female with M. R. Siddiqi. H-J. *Utahnema tenuidens* Thorne, 1939, slightly pressed paratype female at USDA Nematode Collection, Beltsville, Maryland, USA. A & D. Oesophageal regions. B & F. Tail ends. C, G & H. Vulval regions, lateral. E. Vulva in ventral view. I. Head end. J. Basal oesophageal bulb.

Khan, 1972. *K. minutissima* (Khan, 1972) comb. n. Syn. *L. minutissima* Khan, 1972.

*Longidorella perparvula* Monteiro, 1970 may also belong to this genus.

The name of the new genus is derived from Hindi *kanth* = throat and *bhala* = spear, and is feminine in gender.

#### *Relationship*

*Kantbhala* gen. n. differs from *Utahnema* Thorne, 1939 and *Siddiqius* Andrassy, 1976 in having a small body, a small pore-like vulva, inconspicuous and shorter vagina and a more attenuated and longer odontostyle (*cf.* odontostyle in Fig. 8, A & D with I). From *Xiphinemella* Loos, 1950 it differs in having a small body, a small pore-like vulva, inconspicuous vagina and no perioral disc.

The structure of the cuticle, meromyarian musculature and oligocytous intestine suggest that *Kantbhala* is a member of the family Tylencholaimidae and is not a relative of *Longidorella* and *Enchodorella* which belong to the family Nordiidae.

Genus *Actinolaimoides* Meyl, 1957  
(Fig. 9)

Syn. *Enchodelium* Andrassy, 1963

#### *Diagnosis*

Nordiinae, Nordiidae. Lip region narrowly rounded, not offset by a constriction; papillae not raised. Amphids narrow, with slit-like apertures about half lip region width long. Spear guiding tube bulboid posteriorly. Odontostyle attenuated, with fine lumen and smooth base, less than 2 lip region-widths long. Odontophore rod-like with slightly swollen base, devoid of distinct basal knobs and flanges. Oesophagus enlarging gradually behind its middle. Vulva a large pore. Monodelphic opisthodelphic. Tail conoid, arcuate, not filiform.

#### *Type-species*

*Actinolaimoides tobleri* (Micoletzky, 1925) Meyl, 1957 (Fig. 9, A-F). Syn. *Actinolaimoides tobleri* Micoletzky, 1925.

#### *Other species*

*Actinolaimoides angolensis* (Andrassy, 1963) comb. n. Syn. *Enchodelium angolense* Andrassy, 1963. *A. asaccatus* (Dhanachand & Jairajpuri, 1980) comb. n. Syn. *E. asaccatum* Dhanachand & Jairajpuri, 1980. *A. thornei* (Baqri & Jairajpuri, 1976) comb. n. Syn. *E. thornei* Baqri & Jairajpuri, 1976.

#### *Relationship and Discussion*

*Actinolaimoides* Meyl, 1957 differs from *Thornedia* Husain & Khan, 1965 in having a smaller spear, a bulboid spear guide and an elongate-conoid female tail in contrast to a subcylindrical tail of the latter.

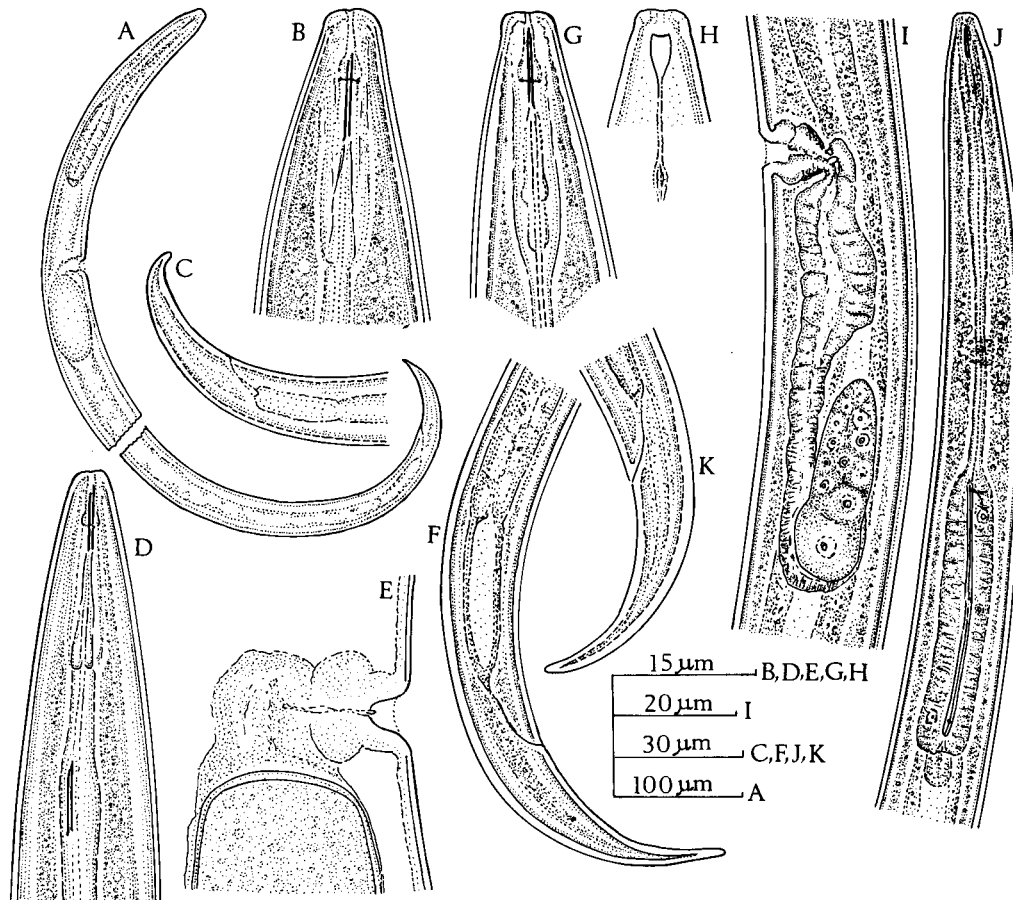


Fig. 9. Organisation of *Actinolaimoides* Meyl, 1957. A-F. *Actinolaimoides tobleri* (Micoletzky, 1925) Meyl, 1957. A, B, E & F. Slightly flattened holotype female. C & D. Slightly flattened paratype juvenile. G-K. *Actinolaimoides angolensis* (Andrássy, 1963) comb. n. Holotype female. A. Female in two parts. B, D, G & H. Head ends (note amphid in H and developing spear in D). E & I. Vulval regions. F & K. Tail ends. J. Oesophageal region.

The genus *Actinolaimoides* has heretofore been considered a member of the Actinolaimoidea because the stoma of its type-species, *A. tobleri* (= *Actinolaimus tobleri* Micoletzky, 1925) was wrongly thought to have cuticularized longitudinal ridges. Fortunately, both type specimens of *A. tobleri* (holotype ♀ in two parts and a paratype juvenile) are preserved on a slide in the Zoological Museum of the Humboldt University, East Berlin, where I studied them in August, 1975. The holotype female is morphologically indistinguishable from the holotype female of *Enchodelium angolense* Andrásy, 1963, the type-species of *Enchodelium* Andrásy, 1963 (see Fig. 9, G-K). *Enchodelium* is, therefore, synonymized with *Actinolaimoides* which is here considered to belong to the sub-family Nordiinae of the family Nordiidae.

Genus *Thornedia* Husain & Khan, 1965*Diagnosis* (emended)

Nordiinae, Nordiidae. Lip region narrow, continuous, elevated, smoothly rounded; framework moderately sclerotized with outer margins conspicuous. Amphids funnel-shaped, with apertures not occupying the body-width at that level. Odontostyle over twice head-width long, with exceedingly fine lumen and smooth base; odontophore elongated, lacking basal knobs or flanges. Oesophagus enlarging gradually behind middle. Didelphic-amphidelphic or monodelphic-opisthodelphic. Vulva pre-median. Female tail sub-cylindrical.

*Type-species*

*Thornedia solani* Husain & Khan, 1965. Syn. *Longidorella solani* (Husain & Khan, 1965) Jairajpuri & Hooper, 1969.

*Other species*

*T. opisthodelphis* (Jairajpuri, 1964) comb. n. Syn. *Longidorella opisthodelphis* Jairajpuri, 1964; *T. opisthodelphis* Khan, 1972 (new synonymy, also a secondary homonym).

*Utahnema nigerica* Jairajpuri, 1968 may also belong to this genus.

*Discussion*

*Thornedia* was proposed by Husain & Khan (1965) when they described *Thornedia solani* from around roots of potato at Aligarh, U.P., India. The genus was considered a junior synonym of *Longidorella* Thorne, 1939, by Jairajpuri & Hooper (1969) who renamed *T. solani* as *Longidorella solani*. A similar species was described by Jairajpuri (1964, 1968a) as *Longidorella opisthodelphis*, also from U.P., India. I have collected two females of *L. opisthodelphis* from mango soil in Aligarh (the type-locality of *T. solani*) and upon comparing them with the description and figures of *T. solani*, I feel that *T. solani* and *T. opisthodelphis* are congeneric (and may even be conspecific), the only 'major difference' between the two being the reported presence of two ovaries in *T. solani* as against one in *L. opisthodelphis*. As the vulva position, various body measurements and structure and size of the oesophagus, head and spear are the same in the two species and as in *L. opisthodelphis* the body contents are very granular in the region of the ovary and vulva, the reported presence of an anterior branch of the female reproductive system in *T. solani* could be a *lapsus* on the part of the authors. During my visit to Aligarh (India) my attempt to find type specimens of *T. solani* with A. M. Khan at Aligarh was not successful and I believe the type specimens are not extant. On the above diagnosis I consider *Thornedia* to be a valid genus (Andrássy, 1976; Ferris, 1971; Khan *et al.*, 1975; Monteiro, 1970; Siddiqi, 1969 have also considered it as valid) and to contain both monodelphic and didelphic species.

## ZUSAMMENFASSUNG

*Sechs neue Gattungen dorylaimider Nematoden*

Als neue Gattungen werden vorgeschlagen *Apoleptonchus* und *Glochidorella* bei den Leptonchidae, *Paraqudsiella* bei den Swangeriidae, *Hulqus* bei den Hulqinae subfam. n., Familie Discolaimidae, *Saevadorella* bei den Nordiidae und *Kantbhala* bei den Xiphinemellinae, Familie Tylencholaimidae. *Mitoaxonchium* Yeates, 1973 ist nahe verwandt mit *Hulqus* und gehört zu den Hulqinae. *Actinolaimoides* Meyl, 1957 und *Thornedia* Husain & Khan, 1965 werden neu definiert, *Enchodelium* Andrassy, 1963 wird mit *Actinolaimoides* synonymisiert.

Als neue Arten werden beschrieben *Apoleptonchus ziauddini* (Typenart) aus Libyen, *Glochidorella brevicula* (Typenart) aus Nigeria, *G. discoplana* aus Malawi, *Paraqudsiella shamimi* (Typenart) aus Colombien, *Hulqus pengi* (Typenart) aus Papua-Neuguinea, *Saevadorella saeva* (Typenart) aus Westaustralien und *S. longidorata* aus Malawi.

Als neue Kombinationen werden vorgeschlagen *Glochidorella bunoecephala* für *Basirotyleptus bunoecephalus* Siddiqi, 1970; *Saevadorella magna* für *Longidorella magna* Loof, 1971; *Kantbhala alii* (Suryawanshi, 1971) (Typenart), *K. caudata* (Suryawanshi, 1971), *K. karamkalla* (Khan, 1972) und *K. minutissima* (Khan, 1972) für Arten die bisher zu *Longidorella* gehörten; *Actinolaimoides angolensis* (Andrassy, 1963), *A. asaccatus* (Dhanachand & Jairajpuri, 1980) und *A. thornei* (Baqri & Jairajpuri, 1976) für Arten, die bisher zu *Enchodelium* gehörten und *Thornedia opisthodelphis* für *L. opisthodelphis* Jairajpuri, 1964 (= *T. opisthodelphis* Khan, 1972 neue Synonymie).

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