FRESHWATER NEMATODES FROM SURINAME COLLECTED BY J. VAN DER LAND

by

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with 2 maps, 15 text-figures, and 7 diagrams

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INTRODUCTION

In 1967 Dr. J. van der Land of the Rijksmuseum van Natuurlijke Historie, Leiden, collected small animals from freshwater habitats in Suriname (Van

der Land, 1970) [1]). His collections were made in the short dry period (February and March) and were restricted to the central part of the coastal region; 39 samples were taken from several types of habitat, such as ditches, creeks, ponds, and swamps, but not from the rivers, which are brackish in the area.

The nematodes were kindly put at my disposal and the present paper deals with all species found. The holotypes of the new species are deposited in the collecteion of the Leiden museum; paratype slides marked WT are in the collection of the Laboratorium voor Nematologie, Wageningen. A few specimens are in the collections of the U.S.D.A. Agricultural Research Service, Beltsville (Dr. Morgan Golden) and the Rolando Eötvös University, Budapest (Dr. I. Andrássy).

The scale lines in the illustrations correspond to 50 μ.

List of samples with species found

The numbers of the samples correspond to those given by Van der Land; the ecological data can be found in his paper. (See maps, p. 46).

Sample 288. *Actinolaimus tripapillatus* 8; *Mesodorylaimus flavomaculatus* 3; *Prodorylaimus hamatus* 1.

Sample 290. *Oncholaimus vanderlandi* 4; *Mesodorylaimus flavomaculatus* 1.

Sample 291. *Mesodorylaimus flavomaculatus* 6; *Chronogaster serrulata* 4; *Prodorylaimus* spec. 1.

Sample 292. *Actinolaimus tripapillatus* 91; *Mesodorylaimus flavomaculatus* 2; *Chronogaster serrulata* 1; *Tobrilus* spec. 1.

Sample 293. *Prodorylaimus depressus* 3; *Prodorylaimus hamatus* 1; *Chronogaster serrulata* 1; *Panagrolaimus thienemanni* 1; *Cryptonchus abnormis* 1; *Axonchium* spec. 1.

Sample 294. *Prodorylaimus depressus* 2; *Chronogaster serrulata* 1.

Sample 299. *Prodorylaimus depressus* 8.

Sample 301. *Panagrolaimus hygrophilus* 2; *Prodorylaimus depressus* 2.

Sample 302. *Tobrilus vicinus* 16; *Idiodorylaimus annulatiformis* 5; *Mesodorylaimus flavomaculatus* 1; *Mesodorylaimus* spec. 1; *Ironus paludicola* 1; *Oxydirus tropicus* 1; *Nygolaimus* spec. 1.

Sample 303. *Tobrilus longiformis* 25; *Actinolaimus tripapillatus* 1; *Chronogaster andrassyi* 1; *Monhystera paludicola* 1.

Sample 304. *Ironus ignavus* 93; *Ironus paludicola* 13; *Ironus longicaudatus* 1; *Chronogaster andrassyi* 3; *Chrysonemoides limigenus* 1; *Prismatolaimus eurylaimus* 1.

Sample 305. *Prodorylaimus depressus* 3; *Mononchulus nodicaudatus* 2; *Mesodorylaimus flavomaculatus* 1.

Sample 307. *Ironus longicaudatus* 11; *Ironus ignavus* 5; *Nothactinolaimus lacustris* 5; *Cryptonchus abnormis* 1; *Mesodorylaimus* spec. 1.

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1) Aided by a grant from the Stichting voor Wetenschappelijk Onderzoek van de Tropen WOTRO (No. W 954-53).

Sample 308. *Ironus longicaudatus* 3; *Ironus ignavus* 3.
Sample 309. *Ironus paludicola* 1.
Sample 310. *Mononchus tunbridgensis* 12; *Prodorylaimus hamatus* 6; *Chronogaster andrassyi* 1; *Chronogaster lissa* 2.
Sample 311 *Mesodorylaimus flavomaculatus* 4.
Sample 313. *Actinolaimus tripapillatus* 6; *Tobrilus vicinus* 6; *Alaimus simplex* 1; *Prodorylaimus depressus* 1.
Sample 314. *Actinolaimus tripapillatus* 19; *Tobrilus vicinus* 9; *Prodorylaimus depressus* 3; *Aporcelaimellus obtusicaudatus* 2; *Paraphanolaimus* cf. *behningi* 1; *Chronogaster* cf. *longicollis* 1.
Sample 315. *Prodorylaimus depressus* 4; *Actinolaimus tripapillatus* 4; *Aporcelaimellus obtusicaudatus* 1.
Sample 316. *Mesodorylaimus flavomaculatus* 3.
Sample 317. *Prodorylaimus depressus* 12; *Tobrilus vicinus* 7; *Mesodorylaimus flavomaculatus* 1.
Sample 318. *Actinolaimus tripapillatus* 3; *Tobrilus vicinus* 1.
Sample 319. *Mesodorylaimus flavomaculatus* 1.
Sample 322. *Prodorylaimus depressus* 6; *Prodorylaimus hamatus* 1; *Prismatolaimus eurylaimus* 1.
Sample 323. *Mononchulus nodicaudatus* 3; *Chronogaster andrassyi* 1; *Ironus ignavus* 1.
Sample 324. *Mesodorylaimus flavomaculatus* 21; *Prodorylaimus depressus* 2; *Paraphanolaimus microstomus* 1; *Chronogaster serrulata* 1.
Sample 325. *Tobrilus longiformis* 54; *Prodorylaimus depressus* 42; *Ironus paludicola* 11; *Mesodorylaimus flavomaculatus* 10; *Idiodorylaimus kreisi* 9; *Chronogaster serrulata* 4; *Actinolaimus tripapillatus* 4; *Mononchulus nodicaudatus* 2; *Prismatolaimus eurylaimus* 2; *Chrysonemoides limigenus* 1; *Monhystera paludicola* 1.
Sample 326. *Mesodorylaimus flavomaculatus* 9; *Nothactinolaimus lacustris* 9; *Ironus ignavus* 8; *Mononchulus nodicaudatus* 3; *Prodorylaimus depressus* 2; *Chronogaster serrulata* 1.

Some ecological remarks

The collector was unable to make analyses of the water samples; only the pH could be determined on the majority of the localities. In general the pH is high (up to 8.5) in the waters closest to the coast and decreases farther inland (down to 4.8) (see map). This roughly corresponds with a change from eusaprobous to oligosaprobous waters. A few indications suggest themselves.

Mesodorylaimus flavomaculatus occurs in alkaline waters as well as in acid ones; even in the most acid sample 319 it was found as the sole nematode species. Other eurysaprobionts are *Actinolaimus tripapillatus* and *Prodorylaimus depressus.*

Members of the genus *Ironus* were found only in acid localities (pH 5.0-6.7). The same holds for *Monhystera, Tobrilus, Nothactinolaimus* and *Idiodorylaimus.* Species of *Panagrolaimus,* on the other hand, seem to prefer eusaprobous waters, but only a few specimens were found. The other genera were found in too small numbers to say anything definite.

Remarkable facts are the occurrence of four nematode species in sample 310 with its very impure water covered by oil patches; and the occurrence in freshwater (though undoubtedly somewhat brackish) of a representative of the marine genus *Oncholaimus*.

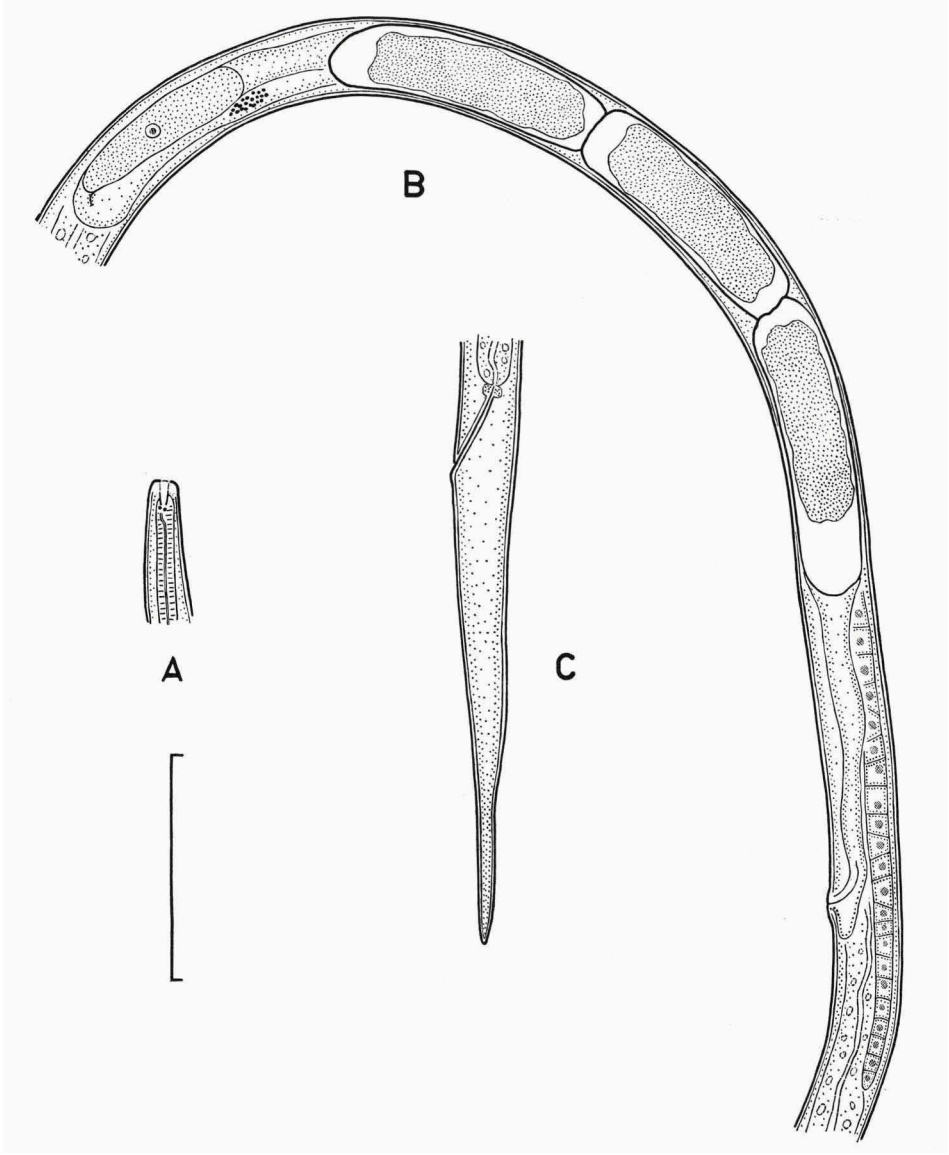


Fig. 1. *Panagrolaimus thienemanni* Hirschmann, female. A: head end; B: gonad; C: tail.

SYSTEMATIC PART

SUBCLASS SECERNENTES

PANAGROLAIMIDAE

Panagrolaimus thienemanni Hirschmann, 1952 (Fig. 1)

One female. Dimensions: L = 1.07 mm; a = 59; b = 5.7; c = 10; V = $^{32}78^{4}$. Lips low, round. Prorhabdions sclerotized more heavily than cheilorhabdions and twice as long. Metarhabdions knob-like. Vulva lips hardly protruding. Vagina bent anteriad. The postvulval part of the gonad is exceptionally short. Just past the anterior flexure of the gonad there is a group of minute spermatozoa. The second, rudimentary gonad is also very short. Dimensions of three intra-uterine eggs: 63-69 × 16 μ. The tail measures eight anal body widths.

The specimen agrees very well to Hirschmann's description. The species was known from Europe only so far. Meyl (1961) considered it identical with *P. hygrophilus* Bassen, 1940, but I do not agree to this: the peculiar vulva position and short postvulval gonad part, as well as the hardly protruding vulva lips clearly separate *P. thienemanni* from *P. hygrophilus*.

Sample 293.

Panagrolaimus hygrophilus Bassen, 1940 (Fig. 2)

One female. Dimensions: L = 1.11 mm; a = 35; b = 6.8; c = 7.9; V $^{26}53^{29}$. Lips low, rounded; prorhabdions much longer than cheilorhabdions. Corpus of oesophagus distinctly wider than isthmus. Vulva lips large, protruding distinctly. Gonad of normal shape for this genus, with very long postvulval part. Rudimentary second gonad about one body width long. Tail length equal to 6.8 anal body widths; terminus acute. Because of the rather poor condition of the specimen the number of lateral lines could not be determined. Deirid and excretory pore opposite posterior part of isthmus.

Bassen's original description did not mention protruding vulva lips; however, comparison was made with *P. rigidus* (Schneider, 1866) without any difference in vulva lips being mentioned; in *P. rigidus*, as in most species of this genus, the vulva lips protrude strongly. The terminus in this species is usually obtuse. The Suriname specimen differs from the original description by its slightly higher lips.

Sample 301.

Subclass Adenophori

Plectidae

Chronogaster andrassyi Loof & Jairajpuri, 1965

Dimensions of five females: L = 0.98-1.47 mm; a = 38-76; b = 3.9-6.1; c = 5.8-8.7; V = $^{8\cdot16}$48-52. The great variation in dimensions is due to one small specimen: L = 0.98 mm, a = 38; the other four have L = 1.30-1.47 mm and a = 57-76. Excretory pore located at 48-54% of neck length from head end. Crystalloids apparently absent. Tail curved strongly to ventral side; its length equal to 12-14 anal body diameters. Rudiment of posterior gonad hardly developed.

Samples 303, 304, 310, and 323.

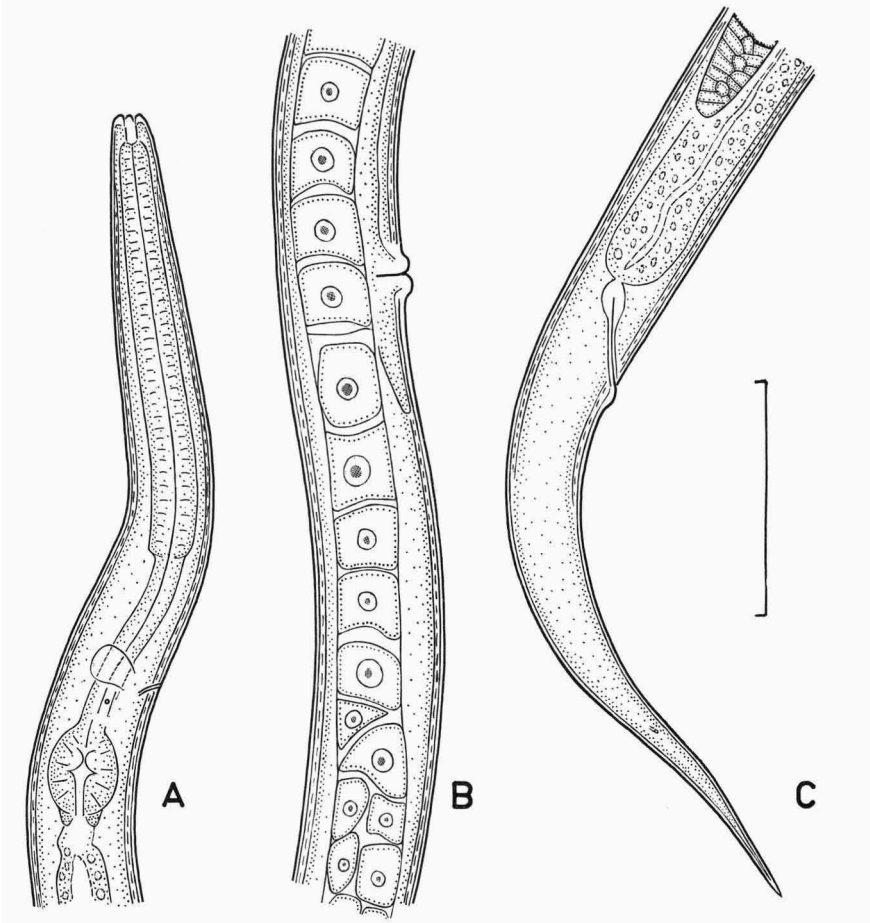


Fig. 2. *Panagrolaimus hygrophilus* Bassen, female. A: oesophageal region; B: vulvar region; C: tail.

Chronogaster serrulata n.sp. (Fig. 3)

Dimensions of seven females: L = 1.08-1.27 mm; a = 44-50; b = 4.1-5.0; c = 9.1-10.6; V = $^{7-22}52-57^{1}$.

Female, holotype: L = 1.10 mm; a = 48; b = 4.5; c = 9.1; V = $^{17}54^{1}$.

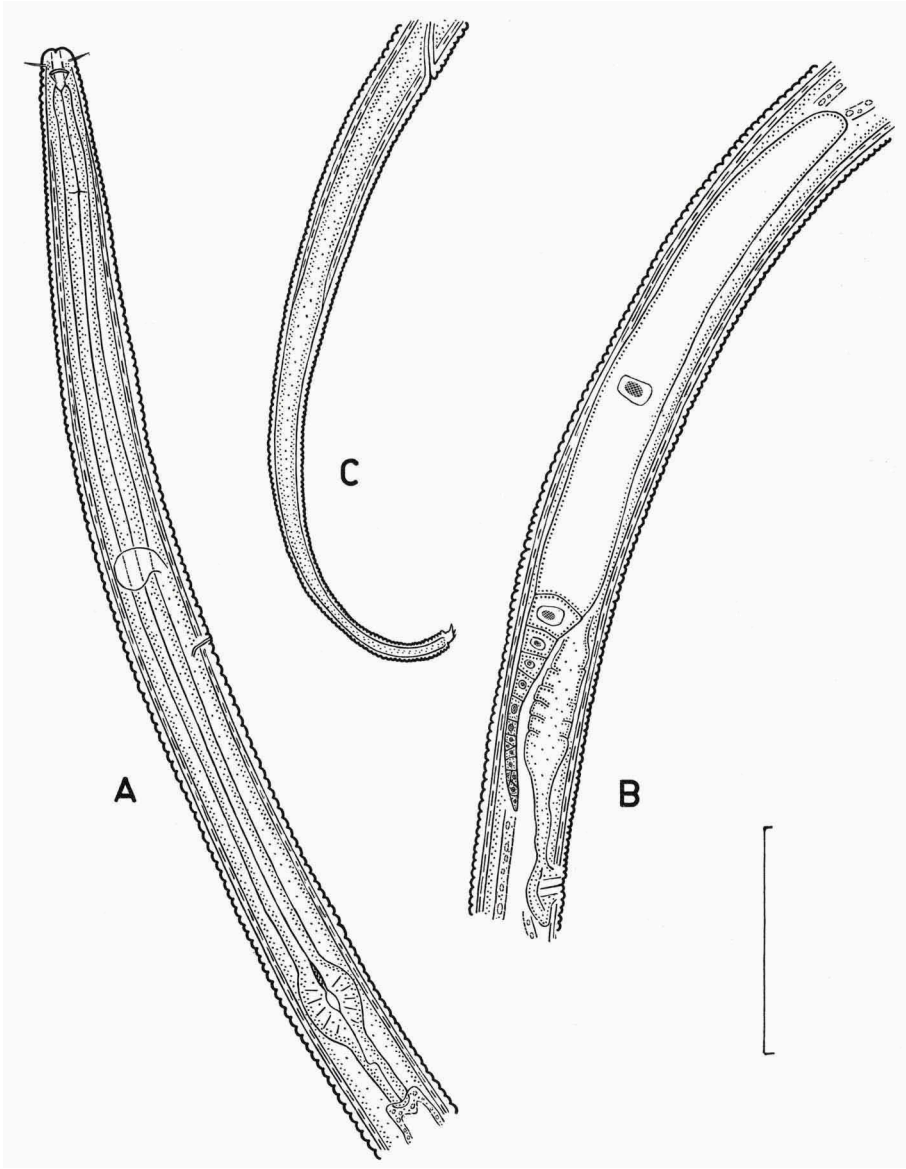


Fig. 3. *Chronogaster serrulata* n.sp., female. A: oesophageal region; B: gonad; C: tail.

Two females with abnormally long tails: L = 1.14-1.18 mm; = 46-56; b = 4.6-4.8; c = 6.7-7.0; V = $^{11\text{-}18}52^{1}$.

One female still within L-4 cuticle: L = 0.96 mm; a = 50; b = 4.4; c = 9.4; V = $^{9}54^{1}$.

This species strongly resembles *C. andrassyi*. Possibly it is one of the species reported as *Chronogaster* sp. by Riemann (1970) from Columbia. The annulation is of the same character as in *C. andrassyi* and becomes more pronounced towards the lip region. Amphids on second annule behind lip region. Length of cephalic setae 6 μ. Depth of stoma about 9.5 μ. Excretory pore distinct, located at 52-55% of neck length from head end. Body cavity in some specimens with small, inconspicuous crystalloids. Gonad single, anterior, reflexed; a distinct rudiment of the posterior gonad is present, measuring 8-12μ. Tail almost straight over the greater part of its length, only the distal quarter being bent ventrad. Terminus emarginate, bearing one large mucro bent ventrad and showing some small thorns on its dorsal surface. Tail length equals 7-9 anal body widths (12-13 in two specimens).

Holotype: Female on slide 7231. Paratypes: seven females on slides WT 1350-1354; one female with Dr. Andrássy, Budapest; one female with Dr. Morgan Golden, Beltsville.

Type habitat and locality: Ditch with *Eichhornia* near Uitkijk (sample 293). Paratypes from samples 291, 292, 325, and 326. One juvenile was found in sample 294.

This species differs from *C. andrassyi* by the more posterior vulva, presence of distinct posterior uterine branch, generally shorter and straighter tail, and by the emarginate terminus bearing a hook-like mucro with serrate dorsal margin (terminus not emarginate in *C. andrassyi*, with one large straight mucro surrounded by small ones at the base).

Chronogaster cf. **longicollis** (von Daday, 1899)

One female in poor condition. Dimensions: L = 1.25 mm; a = 74; b = 5.9; c = 7.5; V = 49; T/ABW = 12.5. Terminus with some mucros of equal length. Body strongly twisted, so that it could not be found out whether an excretory pore is present. Sample 314.

Chronogaster lissa n.sp. (Fig. 4)

One female, holotype: L = 0.97 mm; a = 62; b = 5.1; c = 7.0; V = $^{19}50$.

One fourth-stage juvenile beginning to moult: L = 0.77 mm; a = 58; b = 4.7; c = 8.0; V = 52.

Body curved ventrad strongly in death. Width of cuticular annules 1.4 μ, they are much shallower and less conspicuous than in *C. andrassyi* and *C. serrulata*. No longitudinal striae. Cephalic setae 3 μ long or one-half the corresponding body width. Amphids located 4.5 μ behind end, half as wide as body. Cheilorhabdions somewhat convex, prostom tapering. Oesophagus typical for genus. A distinct excretory pore at 57% of neck length from head end. The nerve ring surrounds the oesophagus just anterior to the

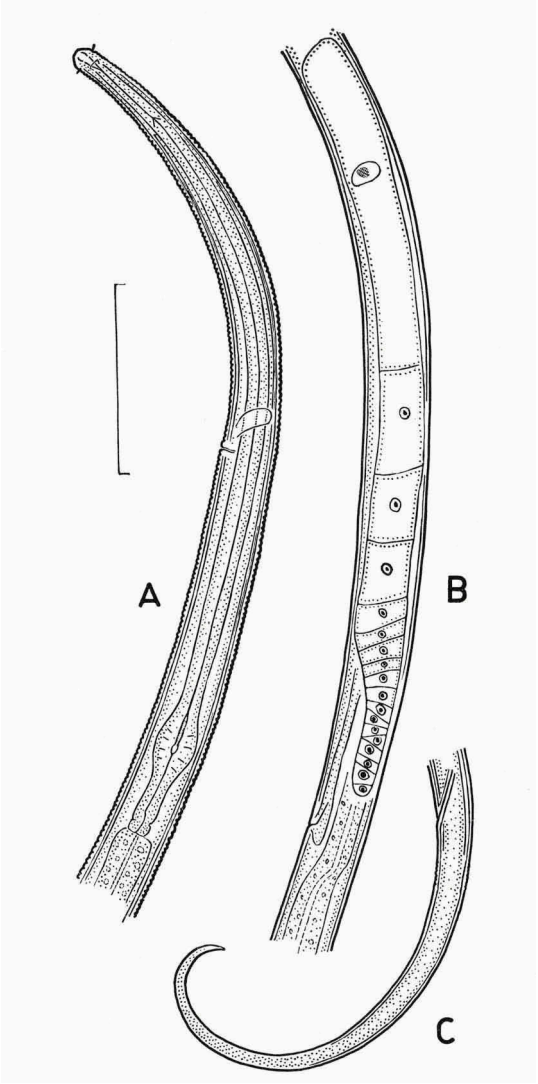


Fig. 4. *Chronogaster lissa* n.sp., female. A: oesophageal region; B: gonad; C: tail.

excretory pore. Vulva inconspicuous, gonad single, anterior, containing many oocytes; a very short posterior uterine branch is present. Tail curved ventrad strongly, 14 anal body widths long (11 in the juvenile); terminus narrowly rounded, without mucro.

Holotype: Female on slide 7232.

Type habitat and locality: Trench with strongly polluted water along road near Lelydorp (sample 310).

This species differs from *C. alata* Gerlach, 1954, the only other species with unarmed terminus, by the absence of longitudinal cuticular striae and by much smaller body size.

Leptolaimidae

Paraphanolaimus microstomus (von Daday, 1905)

One female. Dimensions: L = 1.34 mm; a = 38; b = 6.6; c = 7.4; V = $^{15}43^{14}$. The specimen corresponds well with the redescription given by Andrássy (1968); especially noteworthy is that the vagina agrees in every detail with Andrássy's illustration 23 C. About 38 lateral pores on each body side; the exact number is not determinable because the specimen is convoluted strongly. Lateral field extremely narrow, 1/30 of body width. Length of cephalic setae 6 μ. Rectum two anal body widths long. In a few minor details this specimen differs from Andrássy's description: width of annules 1.5 μ against 2 μ; tail length 12 anal body widths against 8; vulva more anterior and terminal part of tail not so distinctly swollen.

Sample 324.

Paraphanolaimus cf. **behningi** Micoletzky, 1923

One female. Dimensions: L = 0.88 mm; a = 37; b = about 4; c = 5.3; V = $^{11}46^{13}$. Fifteen lateral pores on each body side. Lateral field very narrow, 1/20 of body diameter. Width of annules 1.5 μ. Length of cephalic setae 4.5 μ. Terminus hardly swollen, with spinneret tube.

Sample 314.

Monhysteridae

Monhystera paludicola de Man, 1881

Two females. Dimensions: L = 0.97-1.33 mm; a = 34-38; b = 6.0-7.2; c = 5.3-6.3; V = $^{31\text{-}37}61\text{-}63$. In general morphology these specimens agree best with *M. paludicola,* but one can hardly be sure without males. Pigment spots distinct in one specimen, located 37 μ behind head end. Six cephalic

setae. Amphids 3.5-4.0 μ or 25-30% of corresponding body width, located 0.6-0.8 head widths from anterior end. Vulva-anus distance equal to 1.1-1.4 tail lengths; tail length 9-11 anal body diameters.

Samples 303 and 325.

Alaimidae

Alaimus simplex Cobb, 1914

One female. Dimensions: L = 1.82 mm; a = 75; b = 6.7; c = 9.4; V = 29^{27}. Lip region conoid-rounded, not so wholly continuous as described by Thorne (1939). Tail curved ventrad distally, its length equal to 13 anal body widths. Two eggs: 119 × 21 μ and 122 × 21 μ.

Sample 313.

Oncholaimidae

Oncholaimus vanderlandi n.sp. (Fig. 5)

Female, holotype: L = 2.83 mm; a = 60; b = 7.7; c = 32; V = $^{25}65$.

Female, paratype: L = 2.83 mm; a = 53; b = 8.9; c = 38; V = $^{25}60$.

A third female has the tail end damaged, so that no measurements can be given.

Body slender, the diameter of the lip region 50%; body width at base of oesophagus 85% and anal diameter 60% of maximum body width. Cuticle smooth, 3 μ thick. Lips and papillae rudimentary. Ten cephalic setae, the longer ones measuring 7 μ or one-third of corresponding body width. Amphids 6 μ wide or just over 25% of body width. Stoma 27 μ long, 12 μ wide. One large subventral tooth, the tip lying at 71-73% of stoma from the base. The second subventral tooth and the dorsal one are much smaller, reaching to 50-60%. Oesophagus cylindrical; the nerve ring lies just anterior to its middle. Excretory pore 50-56 μ from head end or about 2.3 head widths. Gonad single, anterior, reflexed. Intra-uterine eggs measure 67-69 × 34-36 μ. Vulva lips slightly protruding. Demanian system present: the ductus uterinus measures about 390 μ and is filled near its middle with small bodies (sperm?) over about 90 μ. Diameter of uvette 12-14 μ. The principal efferent is 90-120 μ long and ends in a pore on each body side. This pore is surrounded by a group of large cells lying at 80-82% of body length from head end, 400-500 μ anterior to the anus. Osmosium not distinct. (Terminology of demanian system after Rachor, 1969). Tail tapering first, then cylindrical; plump, bent ventrad distally; outlet of glands terminal. Tail length equal to three anal body widths.

Male not found.

One juvenile, probably L-3: L = 1.37 mm; a = 49; b = 5.9; c = 25; gonad primordium extends from 59% to 63% of body length from head end. The group of large cells surrounding the pore of the principal efferent in adults is already being formed and lies at 79%.

Holotype: Female on slide 7233. Paratypes: Two females and one juvenile on slides WT 1248-1250.

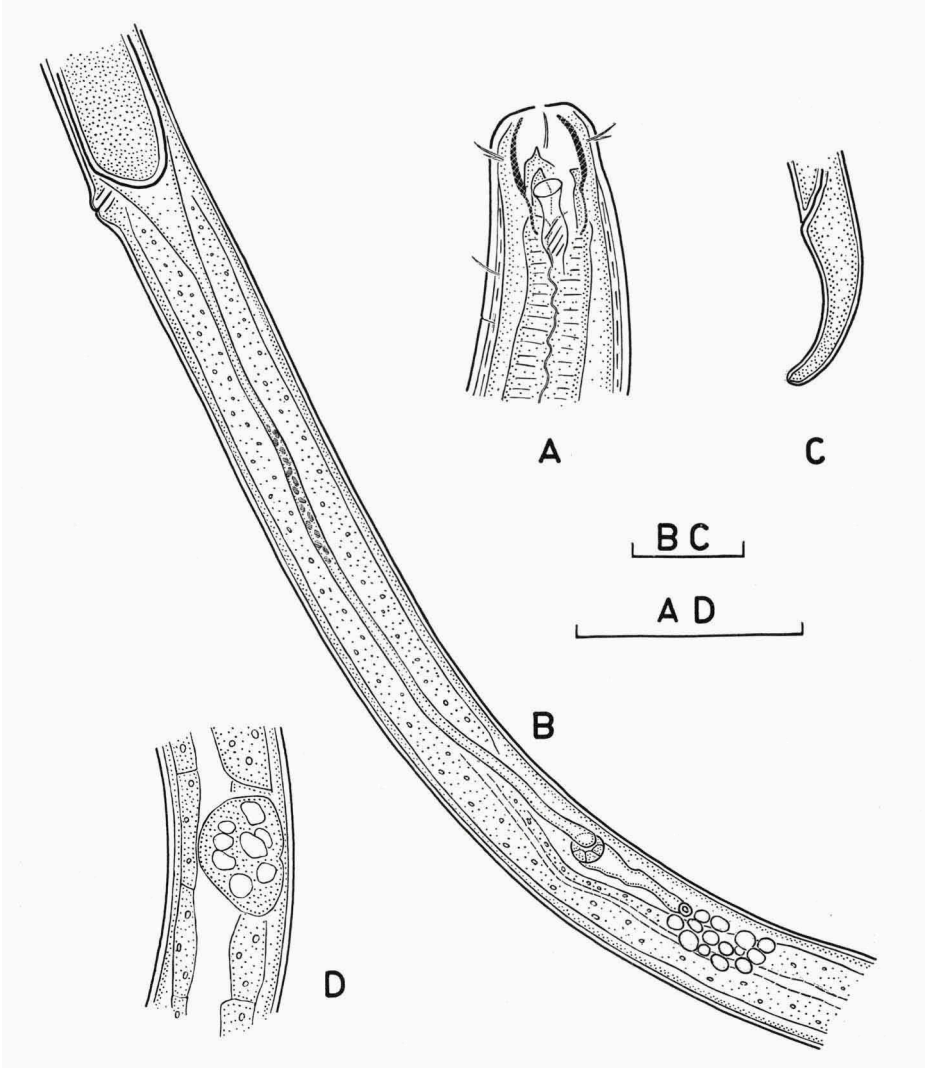


Fig. 5. *Oncholaimus vanderlandi* n.sp., A-C female. A: head end; B: demanian system; C: tail. D: juvenile showing primordium of cell group around demanian pore.

Type habitat and locality: Pond near coast, with undoubtedly somewhat brackish water; Weg naar Zee near Paramaribo (sample 290).

Diagnosis: This species belongs to the *O. paralangrunensis*-group and keys out, after the key by Wieser (1953) to the group *O. dujardinii, O. groenlandicus, O. viridis* and *O. armatus*. It is distinguished from all these species by the anterior vulva and the anterior location of the pore of the demanian system.

Tripylidae

Tobrilus longiformis n.sp. (Fig. 6 and 7 A)

Dimensions:

Females (n = 31): L = 1.50-2.10 mm; a = 24-32; b = 4.9-6.1; c = 6.7-9.3; V $^{12\text{-}25}42\text{-}49^{13\text{-}24}$.

Males (n = 6): L = 1.71-1.83 mm; a = 28-31; b = 5.1-5.6; c = 9.9-10.9; VD = $^{11\text{-}14}49\text{-}53^{12\text{-}15}$.

Male, holotype: L = 1.74 mm; a = 30; b = 5.1; c = 10.6; VD = $^{13}49^{14}$; spicules = 96 μ.

Body tapering anteriorly until the diameter of the lip region is one-half of body width at base of oesophagus. Anal body width is about half the maximum body diameter. Cuticle smooth, 3-3.5 μ thick. Lateral chord one-fifth of body width. Scattered setae 10-12 μ occur all over the body. Cephalic setae ten, the longer ones 10 μ long or 35-40% of corresponding body width. Walls of stoma and of first pocket thickened. Distance between the teeth 10-12 μ. The amphids open at level of anterior tooth. Oesophagus cylindrical, surrounded by the nerve ring at about one-third of its length from head end. No distinct crystalloids in body cavity.

Female. — Vagina one-third of body width, with peculiar sclerotization appearing in optical section as two triangles, somewhat reminiscent of certain species of *Trichodorus*. A curious dark mass fills the junction of vagina and uteri. Vagina surrounded by powerful muscles not forming a globose body and without distinct myocommata. Gonads two, opposed, outstretched. In the vulvar region there occur a few subdorsal setae 23-25 μ long. Dimensions of ten intra-uterine eggs: 33-43 × 33-40 μ.

Rectum slightly shorter than anal body width. Tail 6-10 anal body diameters long, the tip not clavate; with four subventral pairs of setae, and one subdorsal one near the terminus.

Male. — Two testes; ductus ejaculatorius surrounded by distinct oblique muscles reaching anteriorly to the anterior supplement. Number of supplements six; the three anterior ones very large with dentate outer surface,

the canal bent anteriad inward. The fourth supplement is smaller, but has the same structure. Nos. 5 and 6 are very small, the sixth lying close to the anus, the distance 4-5 is about equal to the distance 5-6. Between the supplements there are longer subventral setae (about 20 μ). Spicules curved, 84-96 μ long. Length of tail four to five anal body widths. The distal

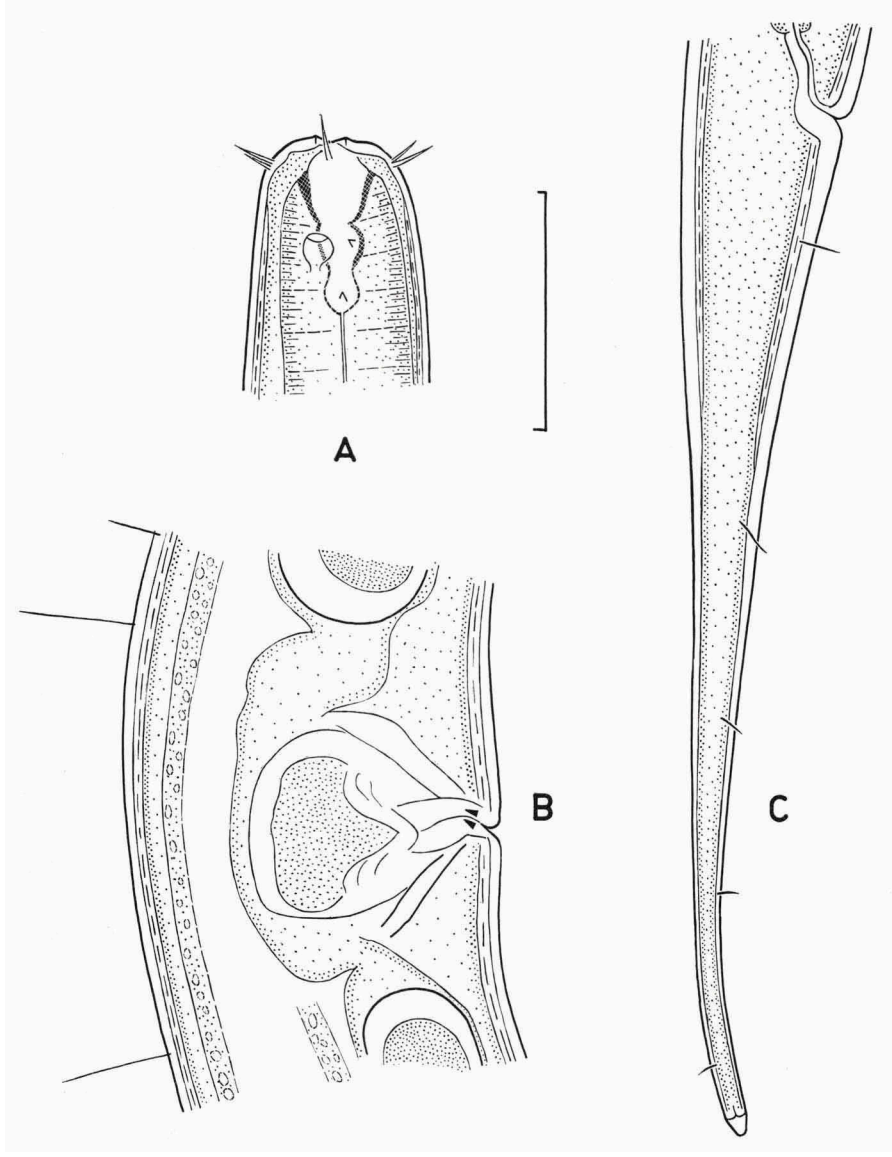


Fig. 6. *Tobrilus longiformis* n.sp., female. A: head end; B: vulvar region; C: tail.

cylindrical part of the tail is offset sharply from the anterior conical part. Sperm flagellate.

Holotype: Male on slide 7234. Paratypes: 3 males and 29 females on slides WT 1341-1349; one male and four females with Dr. Andrássy, Budapest; one male with Dr. Morgan Golden, Beltsville.

Type habitat and locality: Swamp-creek near Onverwacht (sample 325). Paratypes also from sample 303.

Discussion. — *Tobrilus longiformis* n.sp. is close to *T. longus* (Leidy, 1851). Perusal of taxonomic literature indicated that several species have been described under the name of *T. longus* by various authors. In a separate paper I intend to review this species. Cobb's detailed description (1914) may be taken as basis for *T. longus,* being based on topotypes. Cobb's specimens were kindly put at my disposal by Dr. Morgan Golden, Beltsville. Females of *T. longiformis* can be distinguished from *T. longus* by the peculiar triangular vaginal sclerotization. The vaginal muscles form a conspicuous globose body in *T. longus,* not so in *T. longiformis.* Males of *T. longiformis* can be recognized by the junction of ductus ejacutorius and

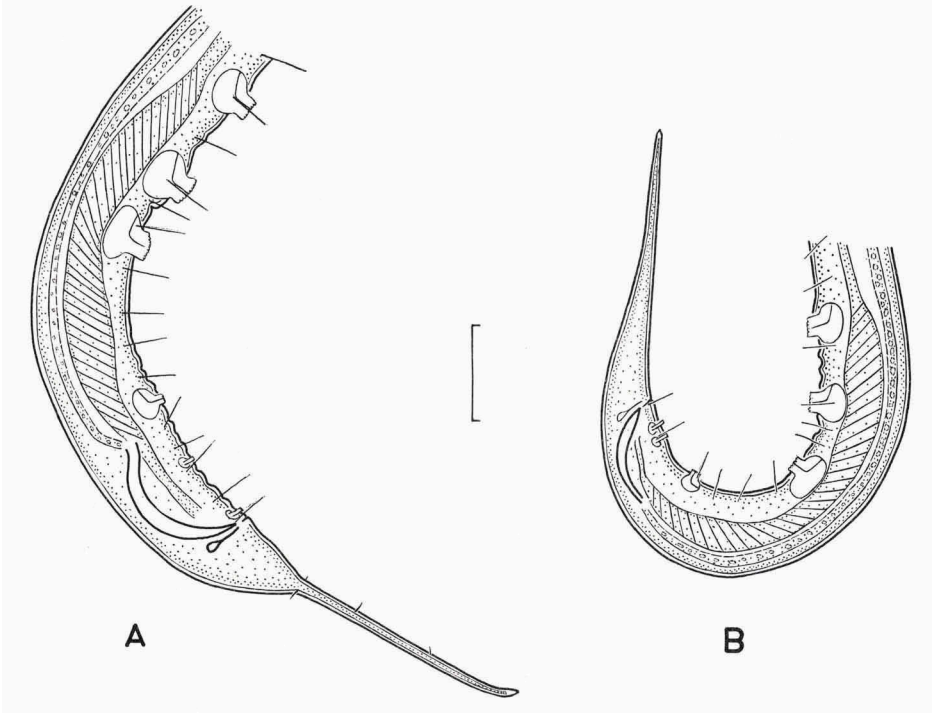


Fig. 7. A: *Tobrilus longiformis* n.sp., male, posterior part of body. B: *T. vicinus* n.sp., same.

vas deferens lying at level of anterior supplement, whereas in *T. longus* this junction lies definitely farther anteriad.

Dr. Andrássy, Budapest, kindly sent a type slide of *T. diversipapillatus* (von Daday, 1905), generally considered identical with *T. longus*. Actually it is different from both *longus* and *longiformis*, chiefly by the much shorter spicules (40-60 μ).

Tobrilus vicinus n.sp. (Fig. 7 B and 8)

Dimensions:

Females (n = 15): L = 1.49-2.06 mm; a = 26-40; b = 5.3-6.2; c = 7.8-9.3; V = $^{13-20}38-47^{13-27}$.

Males (n = 9): L = 1.45-1.76 mm; a = 29-41; b = 5.2-6.0; c = 10.4-16.3; VD = $^{10-13}52-57^{9-14}$.

Male, holotype: L = 1.61 mm; a = 39; b = 5.5; c = 11.8; VD = $^{11}52^{14}$; spicules = 54 μ.

In its general morphology this species is close to *T. longiformis*. Diameter of lip region about 60% of body width at base of oesophagus. Cuticle 2-3 μ thick, smooth. Lateral chord one-fifth of body width. The six longer cephalic setae measure 5-6 μ or 25% of corresponding body width; the four others are 1 μ shorter. Scattered setae about 5 μ long occur all over the body. Stoma as in *T. longiformis;* distance between teeth 9-11 μ. Amphids opening at level of anterior tooth. No crystalloids in body cavity.

Female. — Vagina half body width or more; vagina with sclerotization that appears more rectangular than triangular; sclerotization not visible in young females. Vagina surrounded by muscles not forming a conspicuous globular body. Gonads two, opposed, outstretched. Near the vulva there are a few subdorsal setae about 20 μ long. Rectum slightly longer than anal body diameter. Length of tail six to ten anal body widths. Caudal setae variable in number: two to four subdorsal (one of which subterminal), two to four subventral. Dimensions of ten intra-uterine eggs: 29-34 × 27-34 μ.

Male. — General structure and number of supplements as in *T. longiformis*. Supplements 5 and 6 lie close together, 6 lies rather far from the anus. Junction of vas deferens and ductus ejaculatorius at level of first supplement. Ductus ejaculatorius with oblique musculature. Testes two. Sperm flagellate. Spicules curved, 50-58 μ long. Tail length four to five anal body widths; the distal cylindrical part passing gradually into the anterior conical part. Subventral setae in supplement region about 17 μ long.

Holotype: Male on slide 7235. Paratypes: 6 males and 12 females on

slides WT 1336-1340; one male and two females with Dr. Andrássy, Budapest; one male and one female with Dr. Morgan Golden, Beltsville.

Type habitat and locality: Ditch along road, south of Paramaribo (sample 318). Paratypes from samples 302, 313, 314, and 317.

Discussion. — This species, too, belongs to the *T. longus*-group. Females differ from those of *T. longiformis* by the relatively longer vagina and the shape of the sclerotization; by the slenderer body and more anterior vulva (average 42% against 46%). From females of *T. longus* they can be dis-

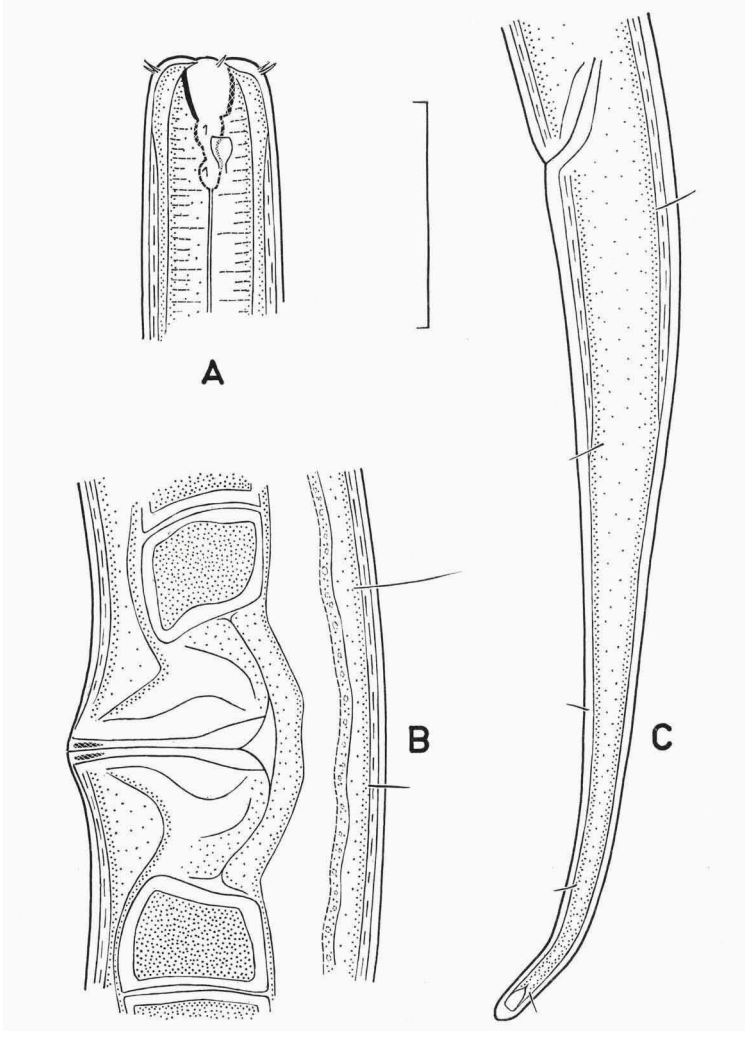


Fig. 8. *Tobrilus vicinus* n.sp., female. A: head end; B: vulvar region; C: tail.

tinguished by the shape of the vaginal muscles. Males can be distinguished from both *T. longus* and *T. longiformis* by the much shorter spicules: 50-58 μ against 82-96 μ; and by supplements 5 and 6 lying close together. From *T. longus* they differ further by the much shorter ductus ejaculatorius, from *T. longiformis* by the less sharply offset distal part of the tail. From *T. diversipapillatus,* which also has short spicules, *T. vicinus* differs by the close proximity of supplements 5 and 6, and the shorter ductus ejaculatorius.

Onchulidae

Prismatolaimus eurylaimus n. sp. (Fig. 9)

Dimensions of four females: L = 1.03-1.22 mm; a = 44-50; b = 4.7-5.3; c = 2.7-3.2; V = ^{9}37-40^{9} (gonads distinct in one specimen only).

Female, holotype: L = 1.03 mm; a = 47; b = 5.0; c = 2.7; V = ^{9}37^{9}.

Male not found.

Body slender, outstretched in death except the terminus which may be bent ventrad. Cuticular annulation 1.5 μ wide, not very conspicuous; widening to 2 μ on tail. Scattered setae 4 μ long occur all over the body. Head with six low lips each bearing a papilla. Ten cephalic setae, the longer ones measuring 7 μ or one-half the corresponding diameter, the shorter ones 4-5 μ. Stoma almost as wide as long (8.5-11 $\mu \times$ 7.3-10 μ), the walls conspicuously sclerotized, straight in lateral view, slightly convex in medial. The base of the stoma is formed by two ventrosublateral warts similar to those found in *P. verrucosus* Hirschmann, 1952; the dorsal sector of the stoma base bears a distinct tooth. Amphid apertures located 25-32 μ or two head diameters behind the anterior end. Oesophagus of uniform width throughout, with large cardia. The nerve ring surrounds the oesophagus just anterior to its middle. Gonads paired, opposed, reflexed, each containing only a small number of oocytes. Vulva inconspicuous, vagina somewhat sclerotized. Inner layer of cuticle irregularly striated near the vulva. Tail length equal to 22-25 anal body widths; tip with spinneret.

Holotype: Female on slide 7236. Paratypes: three females on slides WT 1246-1247.

Type habitat and locality: Small pool in clearing near Zanderij (sample 322). Paratypes from samples 304 and 325.

This species stands very close to *P. verrucosus,* especially through the structure of the base of the stoma. *P. verrucosus* is larger (1.73-1.85 mm) and has a deeper stoma (13-14 μ) with sides convex also in lateral view; the amphids lie three head widths from the anterior end (50 μ). *P. eury-*

laimus also resembles *P. waipukea* (Yeates, 1967): this species is smaller (0.78-0.92 mm) and has a relatively shorter tail (c = 3.6-4.5; tail length 11-16 anal body widths) and posterior vulva (54-59%). From *P. dolichurus* de Man, 1880 the new species differs by the very wide stoma and more anterior amphids.

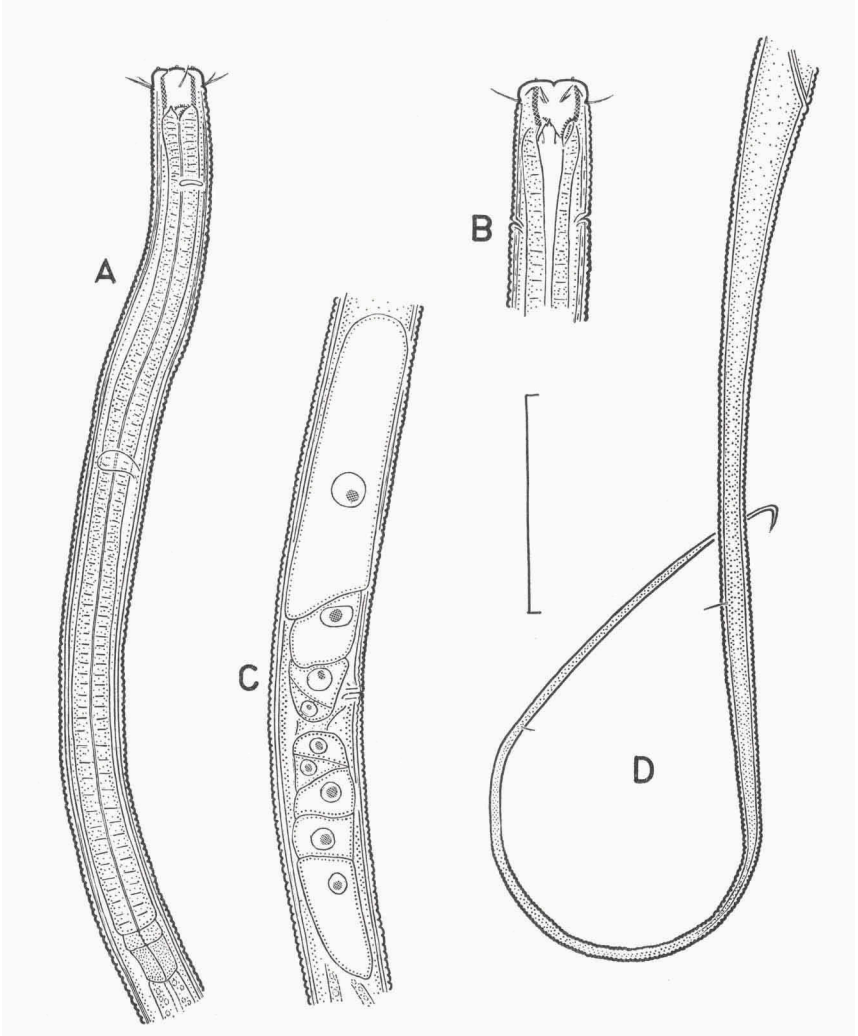


Fig. 9. *Prismatolaimus eurylaimus* n.sp., female. A: oesophageal region, lateral view; B: head end, medial view; C: gonads; D: tail.

IRONIDAE

Ironus ignavus Bastian, 1865 (Fig. 10 A)

Dimensions of 25 females: L = 1.43-1.80 mm; a = 41-52; b = 3.6-4.4; c = 6.0-7.7; V = $^{6\text{-}15}48\text{-}53^{9\text{-}12}$. Tail length equal to 11-13 anal body widths. Dimensions of six intra-uterine eggs: 170-189 × 23-29 μ. This is the most frequent species of the genus, especially numerous in sample 304, but occurring also in 307, 308, 323 and 326.

Ironus longicaudatus de Man, 1884 (Fig. 10 B)

Dimensions of 7 females: L = 1.43-1.66 mm; a = 39-44; b = 4.6-4.8; c = 3.8-4.9; V = $^{9\text{-}12}42\text{-}45^{9\text{-}12}$. Tail length equal to 14-18 anal body widths. Found in samples 304, 307, and 308, in all three together with *I. ignavus*.

Ironus paludicola (W. Schneider, 1937) Andrássy ,1968 (Fig. 10 C)

Dimensions of 19 females: L = 1.65-2.10 mm; a = 61-73; b = 4.2-5.4; c = 7.7-9.3; V = $^{9\text{-}18}45\text{-}54^{9\text{-}19}$. Tail length equal to 14-21 anal body widths. Dimensions of five intra-uterine eggs: 155-188 × 22-25 μ.

Samples 302, 304, 309 and 325.

These species can be separated easily, apart from vulva position, tail length and body width, by the shape of the tail. In *I. paludicola* the tail tapers over about half its length; only the distal half is filiform, the extreme terminal part curved narrowly over 180° to ventral side. In *I. ignavus* and *I. longicaudatus* by far the greater part of the tail is filiform; in *I. longicaudatus* the tail is more or less straight, whereas in *I. ignavus* the terminal quarter is curved widely to ventral side over about 180°.

Absolute oesophagus length also is a good character: in *I. longicaudatus* it is less than 360 μ, in *I. ignavus* and *I. paludicola* over 370 μ. Absolute body diameter is fairly constant: 35-37 μ in *I. longicaudatus* and *I. ignavus*, 27-29 μ in *I. paludicola*.

MONONCHIDAE

Mononchus tunbridgensis Bastian, 1865

Dimensions of 9 females: L = 0.80-1.24 mm; a = 26-34; b = 4.0-4.8; c = 8.7-10.2; V = $^{6\text{-}12}50\text{-}54^{7\text{-}12}$. Cephalic papillae projecting only slightly. Anteriorly the body tapers to a point opposite the base of the dorsal tooth, then it is cylindrical to head end. Mouth cavity 18-24 μ long and 7.0-8.5 μ

wide. Amphid apertures at level of apex of dorsal tooth. Vulva a transverse slit 4 μ long. Tail length equal to 4.0-5.3 anal body widths.

Sample 310. This species has not been reported from South America so far.

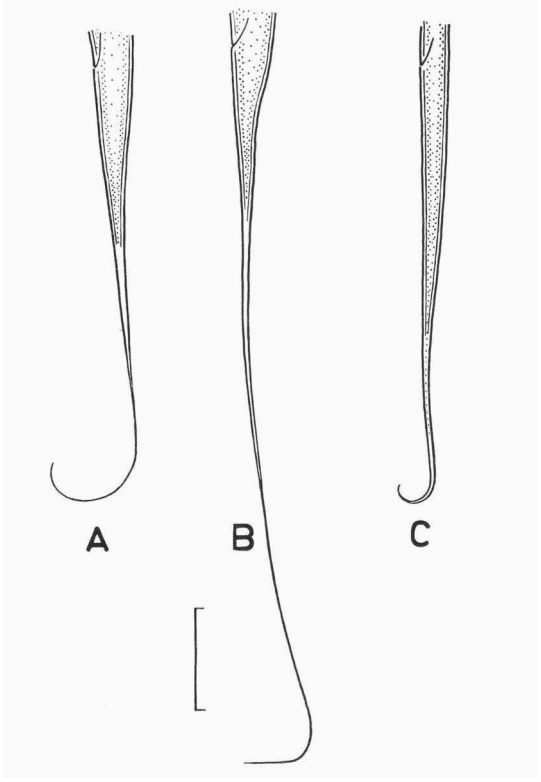


Fig. 10. Female tails of three *Ironus* species: A. *I. ignavus* Bastian; B: *I. longicaudatus* de Man; C: *I. paludicola* (Schneider).

MONONCHULIDAE

Mononchulus nodicaudatus (von Daday, 1901) W. Schneider, 1937

Dimensions of 9 females: L = 0.80-1.21 mm; a = 24-31; b = 3.4-4.2; c = 8.5-9.5; V = $^{9\text{-}21}$59-63; tail length 3.8-5.0 anal body widths.

Samples 305, 323, 325 and 326. This species may have a pantropical distribution; it has been reported from Indonesia, East Pakistan, and Suriname.

BATHYODONTIDAE

Cryptonchus abnormis (Allgén, 1933) Schuurmans Stekhoven, 1951

Two females. Dimensions: L = 0.97-1.22 mm; a = 36-42; b = 4.7; c = 3.4-5.0; V = $^{12\text{-}17}$41-48. Tail length equal to 11-20 anal body widths, but apparently in both specimens the tail is incomplete. Lip region not offset. Samples 293 and 307.

DORYLAIMIDAE (sensu lato)

Revision of the genus *Idiodorylaimus* Andrássy, 1969

In 1905 von Daday described a new species *Dorylaimus annulatus* on the basis of one male from Paraguay; characterized by strongly developed transverse striation of peculiar appearance in the cuticle, a unique feature in this genus.

In 1932 Kreis described one female from the same country. In 1964 Loof reported a female from Venezuela; this specimen had distinct longitudinal striae on the cuticle, a feature not reported by either von Daday or Kreis. As older authors — prior to about 1907 and occasionally afterwards — frequently overlooked longitudinal striae in dorylaims, Loof assumed that this was the case here too. However, in 1969 Andrássy reexamined the holotype of *D. annulatus* and found longitudinal striae definitely absent. At the same time he transferred the species to a new genus *Idiodorylaimus*.

Dorylaims with transverse striae were present in some samples from Suriname; this material allowed clarification of the situation. Two species are represented, neither of which is identical with *D. annulatus*, though both have already been reported under that name (Kreis, 1932; Loof, 1964; Loof & Coomans, 1970).

Key to the species of *Idiodorylaimus*

1. Cuticle with longitudinal striation; males with Kopulationshöcker and 32-34 supplements; DO-DN = 2 μ . . . . . *I. annulatiformis*
   Cuticle without longitudinal striae 2
2. Odontostyle length 70 μ; body length over 4 mm; spicule length 150 μ; supplements 37; Kopulationshöcker not reported; female unknown . . . . *I. annulatus*
   Odontostyle length 40 μ or less; body length under 4 mm; spicule length 70 μ or less; Kopulationshöcker present 3
3. Body length 2.6-3.3 mm; spicule length 65-70 μ; odontostyle length 34-40 μ; supplements 19-21; DO-DN = 7-12 μ . . . . . *I. kreisi*
   Body length 1.9-2.7 mm; spicule length 47-55 μ; odontostyle length 23-31 μ; supplement number and DO-DN unknown . . . . . *I. homalopapillatus*

Idiodorylaimus annulatus (von Daday, 1905) Andrássy, 1969

Syn. *Dorylaimus annulatus* von Daday, 1905; nec *D. annulatus* apud Kreis, 1932; apud Loof, 1964; apud Loof & Coomans, 1970.

Only one male known. Dimensions after Andrássy (1969): L = 4.55

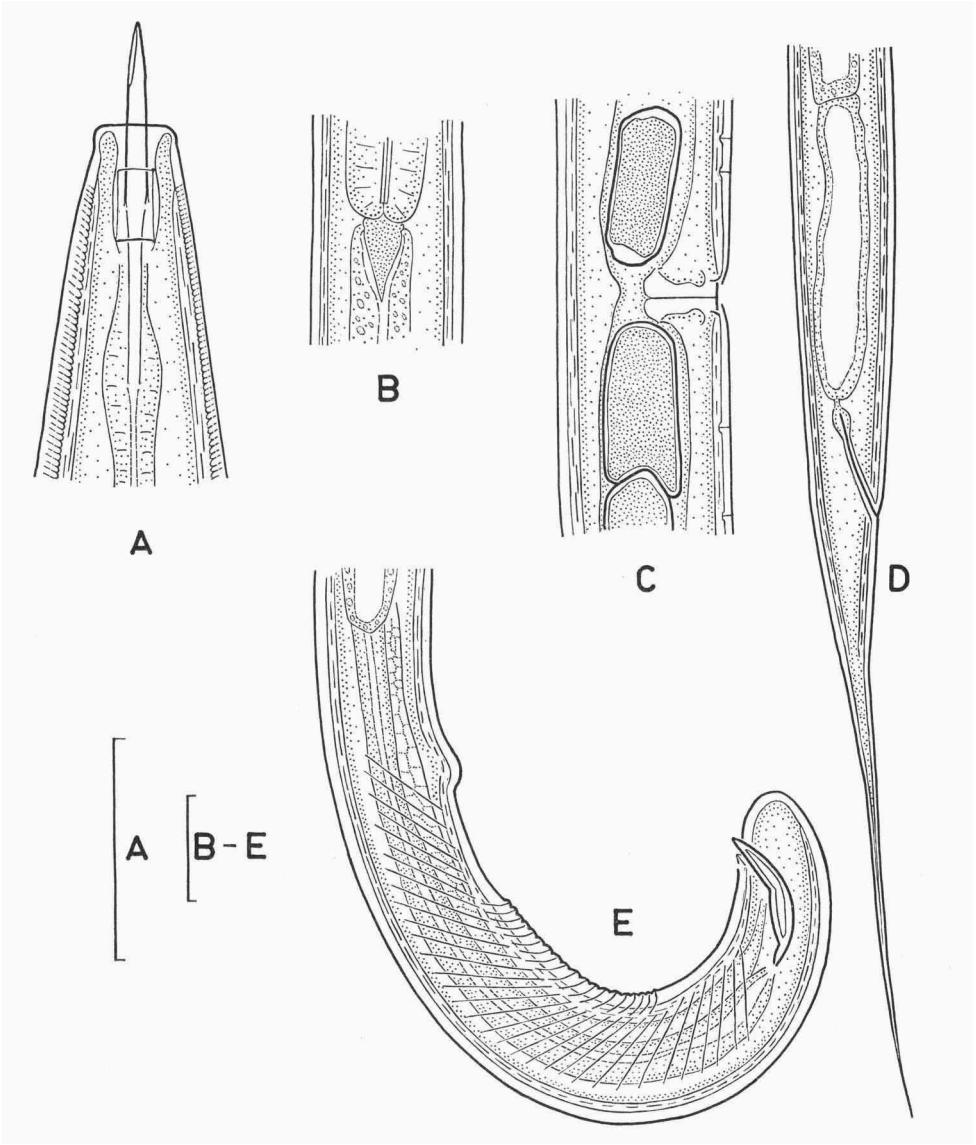


Fig. 11. *Idiodorylaimus kreisi* n.sp. A: head end; B: cardia; C: vulvar region; D: female, posterior part of body; E: male, posterior part of body

mm; a = 30; b = 3; c = 45. The "c" value is incorrect: Andrássy's drawings give a tail length of 48-49 μ and "c" would thus rather be 96. Length of odontostyle = 70 μ, of basal portion slightly less. Spicules 150 μ long. Supplements number 37. A Kopulationshöcker was neither figured nor mentioned.

Idiodorylaimus kreisi n.sp. (Fig. 11; Diagram 1)

Syn. *Dorylaimus annulatus* apud Kreis, 1932.

Females (n = 6): L = 2.81-3.33 mm; a = 35-41; b = 4.6-5.2; c = 9.6-11.5; V = $^{16\text{-}19}41\text{-}45^{15\text{-}19}$.

Males (n = 3): L = 2.63-2.91 mm; a = 34-37; b = 4.6-4.7; c = 98-105; VD = $^{21\text{-}23}52\text{-}57^{20\text{-}21}$.

Male, holotype: L = 2.91 mm; a = 37; b = 4.7; c = 105; VD = $^{21}56^{20}$; odontostyle = 35 μ; basal portion = 42 μ; spear = 77 μ; spicules = 70 μ; supplements = 21; prerectum length = 428 μ; prerectum extends 182 μ anterior to first supplement.

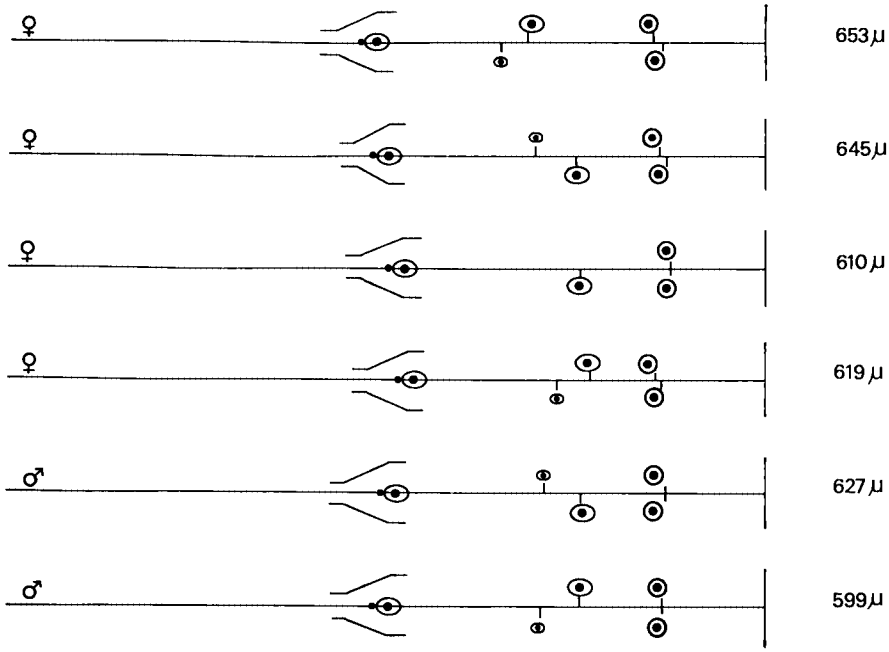
Cuticle 4 μ thick, increasing to 5 μ on base of female tail; with distinct transverse striae that appear concave externally; no longitudinal striae. Lateral chord about one-quarter of body diameter. Lip region offset by a shallow depression; lips partly amalgamated, round, the papillae hardly protruding. Distance from (real) guiding ring to head end about 25 μ or 1.5 × width of lip region. Amphids slightly more than half the corresponding body diameter. Length of odontostyle 38-40 μ in females, 34-37 μ in males; the aperture occupying about one-third of its length. Basal portion 38-43 μ long; total spear length 76-82 μ in females, 73-77 μ in males. The nerve ring surrounds the oesophagus at about one-third of its length from head end. Cardia conoid, triangular, its width at base about 22 μ, its length 36-38 μ.

The oesophagus begins to widen at 43-48% and attains its full width at 49-53% of its length from head end. DO lies distinctly anterior to the latter level, the distance DO-DN is 7-12 μ. The S_1N are both well developed, though the anterior one is slightly smaller; they lie some distance apart (18-28 μ), distinctly behind the middle of the distance DN-S_2N. The S_2N are rather small. Locations (2 males, 4 females):

DO 47-52%;	S_1N_1 65-74%;	S_2N 85-88%;	K = 79-87;
DN 48-53%;	S_1N_2 69-77%;	S_2O 85-87%;	K′ = 81-87.
DO-DN 1.1-2.0%;	dist. 2.9-5.3%;		

Female. — Vulva longitudinal, vagina about 40% of corresponding body width deep, somewhat sclerotized. A ventral papilla about one body width

anterior to the vulva, another at the same distance posterior to it. Both anteriorly and posteriorly a second papilla may be present. Gonads paired, opposed, reflexed over long distances, often covering the sperm as in *Mesodorylaimus cryptosperma* (cf. Loof, 1969); a not very pronounced sphincter between oviduct and uterus is present. Dimensions of five intrauterine eggs: 84-94 × 34 μ. Rectum 1.5-2.0 × as long as anal body width



1 Idiodorylaimus kreisi

or 50-67 μ; prerectum 139-201 μ long or 2.3-3.7 × as long as rectum. Tail length equal to 8.4-10.0 anal body widths. Tail attenuated, tapering to filiform terminus.

Male. — Testes two, dorylaimid. Spicules dorylaimid, 65-70 μ long (along axis) with lateral guiding pieces 17 μ long. Apart from the adanal pair there is a series of 19-21 contiguous supplements; anterior to these is a distinct Kopulationshöcker. Length of prerectum 333-428 μ, the prerectum extends 150-182 μ anterior to the supplement series.

Holotype: Male on slide 7237. Paratypes: One female on holotype slide; two males and five females on slides WT 1355-1357.

Type habitat and locality: Swamp-creek near Onverwacht (sample 325).

Geographical distribution: Paraguay (Kreis) and Suriname.

Differs from *I. annulatus* by much shorter body and odontostyle and much lower supplement number; from *I. annulatiformis* by absence of longitudinal cuticular striae, much longer cardia, much longer distance DO-DN and higher K and K′ values. The differences from *I. homalopapillatus* are not so clear (see under *I. homalopapillatus*).

Idiodorylaimus annulatiformis n.sp. (Fig. 12; Diagram 2)

Syn. *Dorylaimus annulatus* apud Loof, 1964; apud Loof & Coomans, 1970.

Males (n = 5): L = 3.30-3.83 mm; a = 41-51; b = 4.8-5.4; c = 109-132; VD = $^{17\text{-}24}54\text{-}59^{15\text{-}23}$.

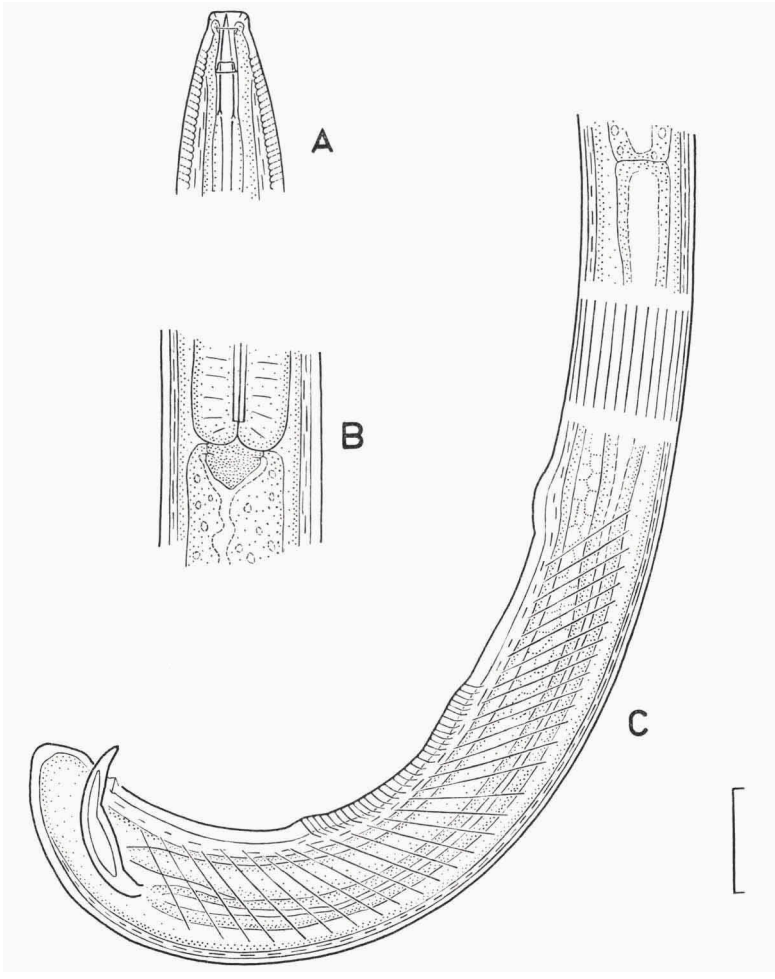


Fig. 12. *Idiodorylaimus annulatiformis* n.sp. A: Head end; B: cardia; C: male, posterior part of body.

Male, holotype: L = 3.51 mm; a = 41; b = 5.1; c = 121; VD = $^{18}59^{15}$; odontostyle = 47 μ; basal portion = 61 μ; spear = 108 μ; spicules = 75 μ; supplement number = 33; prerectum length = 484 μ; prerectum extends 308 μ anterior to supplement series.

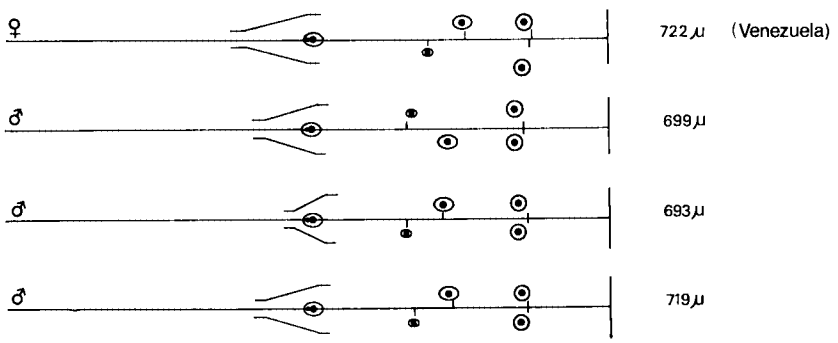
Females were not found, but one is known from Venezuela (Loof, 1964). Dimensions: L = 3.67 mm; a = 44; b = 4.8; c = 13; V = $^{7}42^{9}$ (gonads rather indistinct); odontostyle = 45 μ; basal portion = 50 μ; spear = 95 μ; rectum = 1.5 × anal body width; prerectum 320 μ or about seven times as long as rectum.

Cuticle 4 μ thick; transverse striae as in *I. kreisi*; in addition distinct longitudinal striae are present, numbering probably about 35-40. Lateral chord one-fifth of body width. Amphids about three-fifths of corresponding body diameter. Length of odontostyle 41-47 μ, the aperture occupying just over one-third of its length. Basal portion 50-61 μ long. Total spear length = 93-108 μ. Distance of (real) guiding ring to head end about 29 μ or 1.5 × width of lip region. Shape of lips as in the preceding species. The nerve ring surrounds the oesophagus at about one-third of its length from head end. Cardia conoid, usually wider than long: width 24 μ, length 14-24 μ.

The oesophagus begins to widen at 43-48% and attains its full width at 50-53% of its length from head end. DO lies at, or slightly anterior to, the latter level, the distance DO-DN is unusually short, 2.5 μ. Both S_1N are distinct, the anterior one somewhat smaller; located about 40 μ apart, the posterior one distinctly behind the middle of the distance DN-S_2N. Locations (three males, one female; cf. also Loof & Coomans, 1970):

DO 50-51%;	S_1N_1 66-70%;	S_2N 85-86%;	K = 73-78;
DN 51%;	S_1N_2 72-76%;	S_2O 86-87%;	K′ = 71-77.

DO-DN = 0.3-0.8%; dist. 4.0-6.1%;



2 Idiodorylaimus annulatiformis

Testes two, dorylaimid. Spicules dorylaimid, 71-79 μ; long (along axis) with lateral guiding pieces 16 μ long. Apart from the adanal pair there is a series of 32-34 contiguous supplements. Anterior to these is a distinct Kopulationshöcker; in addition a small cuticular elevation is present at the beginning of the supplement series, and one at the end. Length of prerectum 398-521 μ; the prerectum extends 236-342 μ anterior to the supplement series.

For description of the female see Loof (1964).

Holotype: Male on slide 7238. Paratypes: Two males and one female on slides WT 1358-1360; one male with Dr. Andrássy, Budapest; one male with Dr. Morgan Golden, Beltsville.

Type habitat and locality: Small marsh near Lelydorp (sample 302); the female paratype from fallow soil after cucumber, Cagua, Venezuela.

Geographical distribution: Venezuela and Suriname.

Differs from the three other *Idiodorylaimus* species chiefly by the presence of longitudinal striae.

Idiodorylaimus homalopapillatus (Kreis, 1932) Andrássy, 1969

Dimensions (from Kreis, 1932):

Females (n = 5); L = 2.1-2.7 mm; a = 24-33; b = 4.3-5.1; c = 10-13; V = 43-49; odontostyle = 29-31 μ.

Males (n = 3): L = 1.9-2.3 mm; a = 26-27; b = 4.3-4.6; c = 74-86; odontostyle = 23-29 μ; spicules = 47-55 μ.

Kreis' illustration 10 A gives an odontostyle of 34 mm and thus the magnification cannot be 1800 as stated. The chief distinguishing character of this species are the three large, low supplements in the male. Evidently, however, Kreis overlooked the true supplements (this can happen easily if the nematode body is slightly twisted); his anterior supplement is the Kopulationshöcker, the two others may well be cuticular elevations at the two ends of the supplement series such as are present in *I. annulatiformis*. The species needs re-examination. For the moment it can be differentiated from the other three by smaller body and shorter odontostyle and spicules. It appears to resemble *I. kreisi* most, but in that species no ventral cuticular elevations have been observed apart from the Kopulationshöcker.

Andrássy also included *Dorylaimus novaezealandiae* Cobb, 1904 in the genus *Idiodorylaimus*. However, Cobb's original description says: "The smooth yellowish skin is destitute of transverse markings so far as can be seen with moderately high powers." In the same paper he described another species, *D. profundis*, of which he remarked: "The structure of the skin was entirely typical, and so closely resembled that of *Novae Zealandiae*

that the same description would apply to both." As *Idiodorylaimus* has a very atypical skin structure which is evident at low magnification already, it may be safely concluded that *D. novaezealandiae* does not belong here. It must provisionally be left in *Dorylaimus sensu stricto* until it will be definitely known whether longitudinal striae are present or not. Andrássy apparently based his action on the description by Thorne & Swanger, 1936. However, their specimen came from the United States and it may be doubted if it is really conspecific with Cobb's specimens from New Zealand. The difference in wording between Thorne & Swanger's descriptions of *D. novaezealandiae* and *D. annulatus* suggests that in the former species the radial (transverse) striae are much less pronounced than in the latter, so that it appears quite possible that *D. novaezealandiae* apud Thorne & Swanger is not an *Idiodorylaimus*; more or less distinct radial (transverse) striae are not uncommon among dorylaims.

In current dorylaim taxonomy the presence or absence of longitudinal cuticular striae is generally considered a generic differentiating character (Andrássy, 1959; Goodey, 1963). The fact, however, that all four dorylaim species with coarse transverse striae of peculiar appearance occur, as far as known, only in South America, suggests that they are closely related and that this morphological character has developed in the Neogaean region. For this reason I prefer to include all four species in the single genus *Idiodorylaimus*.

Mesodorylaimus flavomaculatus (von Linstow, 1876) Goodey, 1963
(Diagram 3)

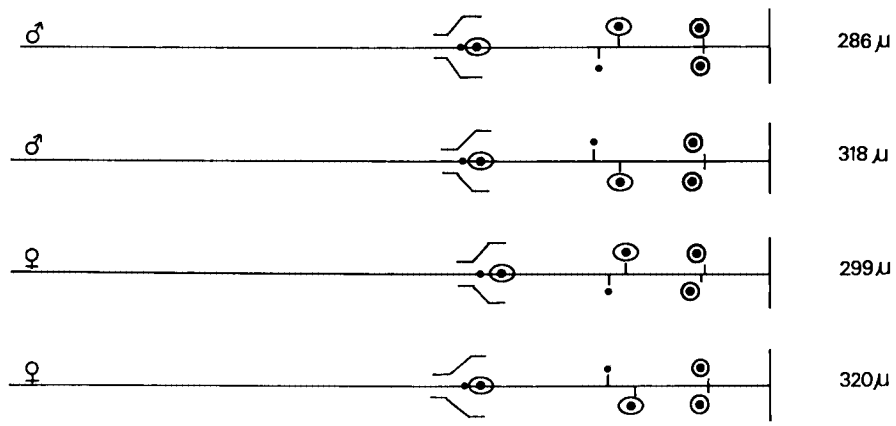
Dimensions:

Females (n = 13): L = 1.28-1.82 mm; a = 38-56; b = 4.4-5.6; c = 8-13; V = $^{11\text{-}22}42\text{-}47^{13\text{-}29}$.

Males (n = 23): L = 1.12-1.80 mm; a = 39-55; b = 4.1-5.2; c = 42-75; VD = $\{^{13\text{-}29}43\text{-}50^{12\text{-}28}$.

Cuticle thin, smooth; thickness 1.2 μ, increasing to 1.8 μ on base of female tail. Lateral chord one-quarter of body width. Lip region continuous, lips amalgamated, the papillae not protruding. Length of odontostyle 13-17 μ or about 1.5 × width of lip region, the aperture occupying about 40% of its length. Basal portion not very well marked, slightly shorter than odontostyle. Amphids one-half of corresponding body width. Guiding ring probably double, but odontostyle in all specimens more or less protruded; distance from guiding ring to head end slightly more than width of lip region. Cardia triangular, 13-18 μ long.

Oesophageal characters (2 males, 2 females): The oesophagus begins to



3 Mesodorylaimus flavomaculatus

widen at 57-61% and attains its full width at 59-63% of its length from head end. DO lies about the latter level, the distance DO-DN is 5-8 µ. The S_1N lie a small distance apart far behind the middle of the distance DN-S_2N; the anterior one is small and indistinct. Locations:

DO 59-62%;	S_1N_1 77-79%;	S_2N 90-91%;	K = 81-88;
DN 61-64%;	S_1N_2 80-82%;	S_2O 91-92%;	K′ = 83-89.
DO-DN 1.5-2.5%;	dist. 2.6-3.4%;		

Female. — Vulva longitudinal, vagina with distinct sclerotization. Uteri packed with sperm. Gonads two, opposed, reflexed. Tail tapering first, then subcylindroid to narrowly rounded terminus; its length equal to 6-13 anal body diameters. Rectum 1.6-1.7 anal body widths long, prerectum twice to thrice as long as rectum.

Male. — Testes two, dorylaimid. Spicules dorylaimid, rather variable in length (34-56 µ along axis). Lateral guiding pieces tapering, about 8 µ long. Apart from the adanal pair there is a series of 13-17 almost contiguous ventral supplements, at the anterior end of which there is a small Kopulationshöcker. Ventral contour of tail concave; a large subterminal ventral papilla.

Samples 288, 291, 302, 316, 319, 324, 325 and 326.

Though in these specimens no flavate bodies were distinctly visible, the continuous lip region and peculiar shape of the male tail place them in the *flavomaculatus*-group. The status of *M. flavomaculatus* is uncertain; redescription from topotypes is desirable. All species showing the above characters were synonymized with *M. flavomaculatus* by Andrássy (1959), but the various literature data then indicate such a large variability that I doubt

whether this is correct. Males of *M. flavomaculatus* were reported for the first time by Micoletzky (1914) and Hofmänner & Menzel (1915); they found supplement number 13-18, a Kopulationshöcker was not mentioned. Thorne & Swanger (1936) redescribed the species from the U.S.A. but their data are aberrant: body length about 3 mm, supplement number = 21-32; a Kopulationshöcker is present. *M. incae* (Steiner, 1920) and *M. dadayi* (Thorne & Swanger, 1936) may be identical with *M. flavomaculatus* (cf. Andrássy, 1954); *M. fecundus* (Cobb, 1914) is less certain: body length 3.4 mm, supplements 18-25.

Mesodorylaimus spec.

One female. Dimensions: L = 1.42 mm; a = 53; b = 4.6 (oesophagus coiled); c = 5.5; V = $^{7}43^{8}$; odontostyle = 18 μ or 1.6 × width of lip region; tail filiform, its length 17 anal body diameters; rectum 1.5 anal body widths, prerectum 2.2 × rectum. Lip region almost continuous, shape of odontostyle as in *Prodorylaimus depressus*. Vulva transverse, no sperm seen. Specimen in not too good a condition. Through the very long tail it resembles *M. hofmänneri* (Menzel, 1914), *M. renwicki* (v. d. Linde, 1938) and *M. lourdesae* (Lordello, 1955) but it is slenderer than these three species. Vulva position distinguishes it from *M. fastigatus* (Thorne & Swanger, 1936). Sample 307.

Mesodorylaimus spec.

One male. Dimensions: L = 1.40 mm; a = 40; b = 4.4; c = 77; VD = $^{11}44^{11}$; odontostyle = 19 μ or twice the width of lip region; aperture one-third; spicules = 37 μ; supplements nine, slightly spaced; prerectum extends 24 μ anteriad to first supplement. Lip region continuous, lips amalgated; body width at base of oesophagus thrice the width of the lip region. Oesophagus widened in its middle. Differs from *flavomaculatus* males by lower supplement number and absence of large ventrosubterminal caudal papilla. Sample 302.

Chrysonemoides limigenus Siddiqi, 1969

Two females. Dimensions: L = 2.34-2.41 mm; a = 70-74; b = 6.9-7.4 (oesophagus coiled in both specimens); c = 11-14; V = $^{13\text{-}23}43\text{-}44^{12\text{-}16}$; odontostyle = 12-13 μ; basal portion = 21 μ.

Lip region offset by depression, the papillae slightly modifying its contours. Odontostyle ten times as long as wide, the aperture occupying one-fifth of its length. Oesophagus widened near middle. Both uteri packed with sperm. Tail length equal to 9-13 anal body diameters, terminus round. These specimens differ from Dutch specimens of *C. holsaticus* (W. Schnei-

der, 1925) by more anterior vulva (against 46-49%) and by the presence of sperm in the uteri.

Samples 304 and 325.

Prodorylaimus hamatus n.sp. (Fig. 13; Diagram 4)

Dimensions:

Females (n = 6): L = 1.49-1.71 mm; a = 35-42; b = 3.7-4.8; c = 7.2-8.8; V = $^{8\text{-}13}44\text{-}49^{8\text{-}15}$.

Female, holotype: L = 1.51 mm; a = 38; b = 3.7; c = 7.4; V = $^{13}49^{11}$.

Male not found.

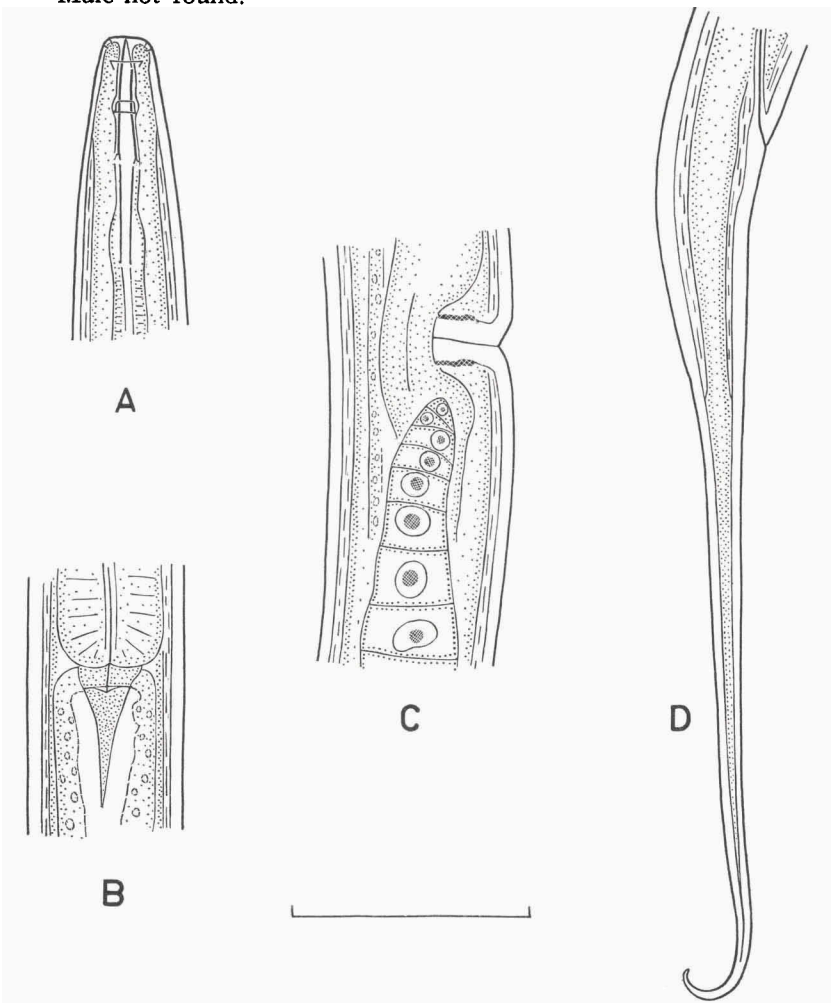
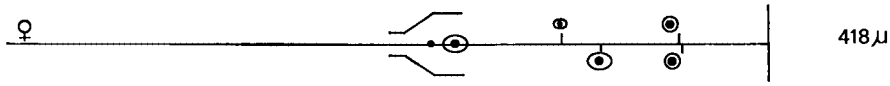


Fig. 13. *Prodorylaimus hamatus* n.sp., female. A: Head end; B: cardia; C: vulvar region; D: tail.

Body moderately slender, tapering towards head end, the diameter at base of oesophagus being thrice the width of the lip region. Cuticle 3 μ thick in mid-body, smooth. Lateral chord one-third of body width. Amphids two-thirds of corresponding body diameter. Lip region truncate, continuous; lips wholly amalgamated, the papillae not interfering with their contours. Length of odontostyle 20-25 μ or 2.1-2.3 $\times$ width of lip region; the odontostyle is slightly sinuate, the aperture occupies one-half of its length. Basal portion linear, as long as odontostyle. The structure of the guiding ring could not be determined with certainty, because in all specimens the odontostyle is more or less protruded. The nerve ring surrounds the oesophagus at about 30% of its length from head end. Cardia acute-triangular, 12-13 μ wide, 27-30 μ long.

In the holotype the oesophagus begins to widen at 52% at attains its full width at 56% of its length from head end. DO lies at the latter level, the distance DO-DN is 13 μ. The S_1N lie some distance apart, the anterior one is smaller. Locations:

DO 56%;	S_1N_1 73%;	S_2N 87-88%;	K = 72;
DN 59%;	S_1N_2 78%;	S_2O 88-89%;	K′ = 77.
DO-DN 3.3%;	dist. 5.2%;		



4 Prodorylaimus hamatus

Vulva depressed, appearing transversal in lateral view. Vagina one-half body width deep. Gonads two, opposed, reflexed, ovaries very long. No sperm. Tail tapering, then filiform, the terminus hooked; its length equal to eight to ten anal body widths. Ventral body contour not depressed at the anus. Length of rectum 1.7-2.1 anal body widths; prerectum 0.9-1.4 $\times$ as long as rectum.

Holotype: Female on slide 7239. Paratypes: Four females on slide WT 1361; one female with Dr. Morgan Golden, Beltsville.

Type habitat and locality: Small pool in clearing near Zanderij (sample 322). Paratypes from samples 288 and 310.

The inclusion of this species in *Prodorylaimus* is, of course, provisional, because males are unknown and probably do not exist. However, *P. hamatus* and *P. depressus* (see below) share the typical shape of head end and odontostyle with *P. paralongicaudatus* (Micoletzky, 1925). *P. hamatus* resembles *Dorylaimus flexus* Thorne & Swanger, 1936, but differs by the much shorter prerectum (twice as long as rectum in *D. flexus*) and shorter odonto-

style (against 29-30 μ). For distinction between *P. hamatus* and *P. depressus*, which species were found together in sample 322, see under the next species.

Prodorylaimus depressus n.sp. (Fig. 14; Diagram 5)

Dimensions:

Females (n = 33): L = 1.74 mm (1.22-2.17); a = 48 (40-57); b = 4.7 (4.1-5.4); c = 13.5 (10.3-16.2); V = 46 (43-48); G_1 = 13 (10-19); G_2 = 16 (10-25); odontostyle = 18 μ (17-18).

Female, holotype: L = 1.92 mm; a = 55; b = 4.5; c = 15.9; V = $^{10}47^{13}$; odontostyle = 18 μ.

Male not found.

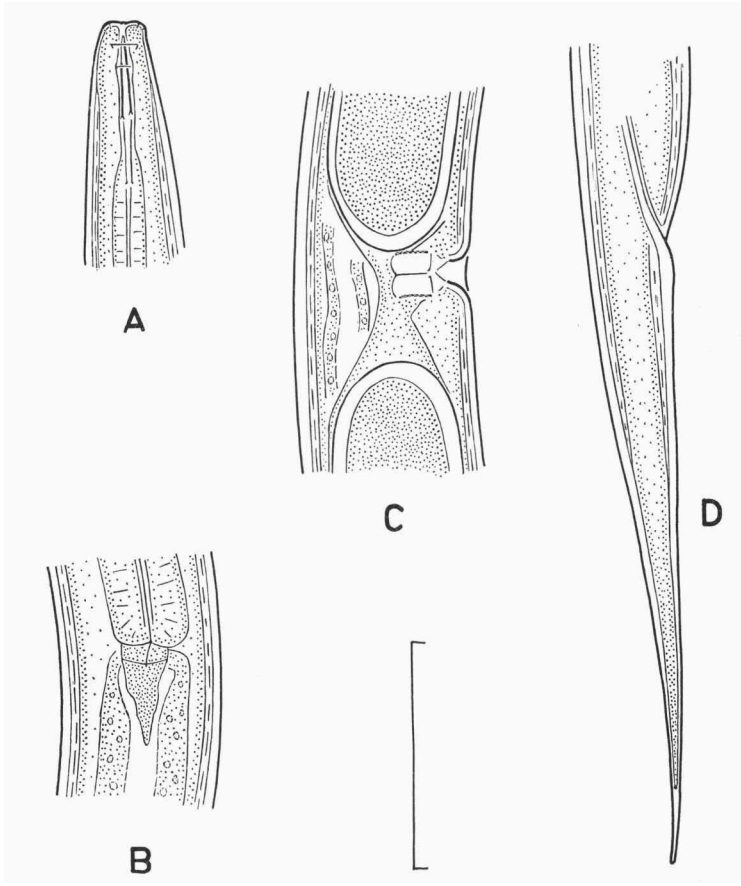
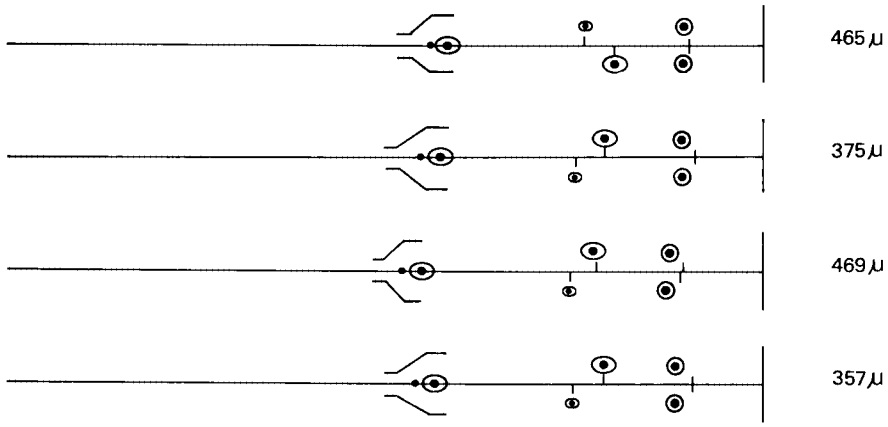


Fig. 14. *Prodorylaimus depressus* n.sp., female. A: Head end; B: cardia; C: vulvar region; D: tail.

Body slender, tapering anteriorly, the diameter at base of oesophagus about 3.5 × width of lip region. Cuticle with very fine transverse striae, appearing smooth; its thickness 2.4 μ in mid-body, 1.3 μ on neck and 1.7 μ on base of tail. Lateral chord one-fourth of body width. One dorsal cervical pore. Lip region continuous, truncate, stoma slightly depressed; lips amalgamated, the papillae not interfering with their contours. Amphids three-quarter of corresponding diameter. Odontostyle slightly sinuate, its length equal to twice width of lip region; the aperture occupies almost one-half of its length. Basal portion linear, as long as odontostyle. The nerve ring surrounds the oesophagus at about 32% of its length from head end. Cardia triangular, 12-14 μ wide at base, 27-30 μ long.

Oesophageal characters of four females: The oesophagus begins to widen at 47-53% and attains its full width at 52-56% of its length from head end. DO lies about the latter level, the distance DO-DN is 10-11 μ. The S_1N lie a small distance apart, behind the middle of the distance DN-S_2N; the anterior one is smaller. Locations:

DO 53-56%;	S_1N_1 74-77%;	S_2N 87-90%;	K = 82-86;
DN 55-58%;	S_1N_2 77-80%	S_2O 88-91%;	K′ = 83-86.
DO-DN 2.1-2.8%;	dist. 3.1-4.1%;		



5 Prodorylaimus depressus ♀

Vulva longitudinal, vagina without distinct sclerotization, more than half body width deep. Gonads two, opposed, ovaries very long, often reaching back almost to vulva. Dimensions of seven intra-uterine eggs: 99-111 × 26-32 μ. No sperm. Tail tapering, then attenuate, tip subacute, outstretched, ventral body outline distinctly depressed at anus. Length of tail six to eight

anal body widths. Rectum 1.1-2.1 anal body widths long, prerectum two to three times as long as rectum.

Holotype: Female on slide 7240. Paratypes: 31 females on slides WT 1362-1376; one female with Dr. Morgan Golden, Beltsville.

Type habitat and locality: Swamp-creek near Onverwacht (sample 325). Found also in samples 293, 294, 299, 301, 305, 313, 314, 315, 317, 322, 324, and 326.

This species resembles *P. hamatus,* from which it can be distinguished by the shorter odontostyle, greater prerectum/rectum ratio, and shorter, attenuate tail with depressed anus and without hooked terminus.

Nygolaimidae

Nygolaimus spec.

One female in not too good a condition. Dimensions: L = 1.41 mm; a = 31; b = 4.7; c = 58; V = $^{8}42^{12}$; odontostyle = 12 μ. Tail hemispheroid, one anal body width long, cuticle on terminus not thickened. Resembles *N. altherri* Heyns, 1968, but differs from that species by much stouter body (a = 31 against 58-62) and longer odontostyle (12 μ against 9 μ). Sample 302.

Aporcelaimidae

Aporcelaimellus obtusicaudatus (Bastian, 1865) Altherr, 1968

Two females. Dimensions: L = 1.52-1.71 mm; a = 25-27; b = 3.5-3.6; c = 59-63; V = $^{4\text{-}7}54\text{-}58^{3\text{-}7}$; odontostyle = 23 μ; basal portion = 42 μ; tail length equal to 0.7-0.8 anal body widths; lateral chord one-fifth to one-seventh of body width.

Samples 314 and 315.

Belondiridae sensu lato

Axonchium spec.

One indeterminable juvenile in sample 293.

Oxydirus tropicus Thorne, 1964

One female. Dimensions: L = 2.32 mm; a = 50; b = 6.6; c = 6.0; V = $^{16}35^{18}$; odontostyle = 8.5; tail length equal to 17 anal body widths.

Sample 302.

ACTINOLAIMIDAE

Actinolaimus tripapillatus (von Daday, 1905) Steiner, 1916 (Diagram 6)

Syn. *A. radiatus* Cobb, 1913;

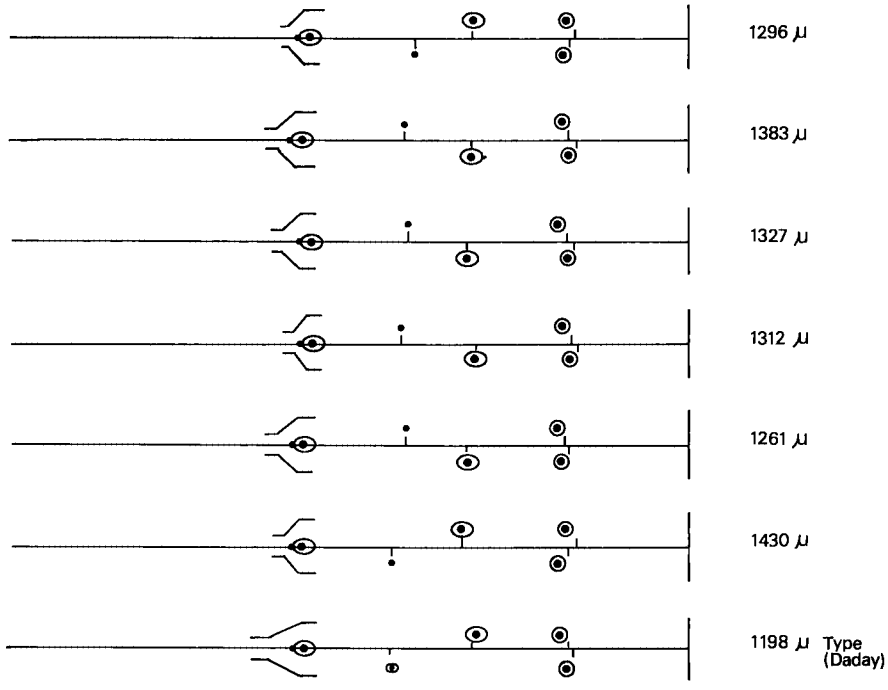
Neoactinolaimus tripapillatus (von Daday, 1905) Thorne, 1967.

Dimensions:

Females (n = 12): L = 5.84-8.27 mm; a = 73-84; b = 5.2-6.2; c = 19-29; V = $^{6\text{-}15}26\text{-}33^{34\text{-}53}$.

Males (n = 15): L = 4.49-7.38 mm; a = 67-81; b = 4.3-5.7; c = 140-205; VD = $^{13\text{-}18}58\text{-}62^{14\text{-}23}$.

Body outstretched in death except the male tail which is strongly curved ventrad and twisted. Cuticle thick: 7 μ in mid-body, 7-8.5 μ in anterior part of neck and on base of female tail. Cuticle with about 35-40 longitudinal striae; transverse striation imperceptible. Outer layer of cuticle very thin. Lateral chord one-fifth to one-sixth of body width; lateral organs and pores inconspicuous. Diameter of lip region one-third of body width at base of oesophagus. Lips round, offset by depression; amalgamated, the papillae not modifying their contours. Amphids one-half of corresponding



6 Actinolaimus tripapillatus ♀

body width. Pharynx with four large onchia. Guiding ring double, located 36 μ or 1.2 $\times$ width of head end from anterior end. Odontostyle robust, 43-51 μ long, the aperture occupying about 40% of its length. Basal portion about as long as odontostyle. About five head widths from anterior end there is a distinct constriction in the oesophagus. The nerve ring surrounds the oesophagus at about 24% of its length from head end. Cardia conoid, 33-35 μ wide at base, 28-41 μ long.

Oesophageal characters (five males and five females): The oesophagus begins to widen at 39-42% and attains its full width at 42-44% of its length from head end; the walls of the lumen are heavily sclerotized in the enlarged part. DO lies about the latter level, the distance DO-DN is 14-19 μ. The S_1N lie some distance from one another, the posterior one is distinct, the anterior one small. The S_2N lie far from the base of the oesophagus. The dorsal nucleus measures 18 $\times$ 8 μ, nucleolus 5.5 μ; S_1N_2 8 μ, nucleolus 4 μ. Locations:

DO 41-44%;	S_1N_1 55-61%;	S_2N 79-83%;	K = 54-68;
DN 42-45%;	S_1N_2 66-69%;	S_2O 80-84%;	K′ = 56-69.
DO-DN 1.0-1.5%;	dist. 7.6-10.8%;		

Female. — Vulva longitudinal, depth of vagina about one-half body width; no vaginal sclerotization. Gonads strongly asymmetrical, but both reflexed and functional, as eggs were found in both. Sperms rod-shaped, present in very large quantities. No distinct constriction seen between uterus and oviduct. Dimensions of 36 intra-uterine eggs: 101-117 μ $\times$ 40-48 μ. Tail attenuated, its length five to seven anal body widths. Rectum 1.2-1.7 anal body widths long, prerectum 6-11 times as long as rectum or 533-858 μ.

Male. — Testes two, dorylaimid. Spicules dorylaimid, 92-105 μ long (along axis) with lateral guiding pieces 23 μ long. Apart from the adanal pair there are two clusters of about 8-9 small supplements. Anterior to these is a distinct Kopulationshöcker containing some pore canals; von Daday and Thorne evidently mistook this for a third cluster of supplements. Submedian papillae present, but number not determinable owing to curving and twisting of the body in this region. Prerectum extending far anterior to the Kopulationshöcker, its length 1.0-1.2 mm.

A few females were found with vulva present, but the gonads still undeveloped. These had V-= 42-44%.

Very numerous in sample 292; found furthermore in samples 288, 303, 313, 314, 315, 318 and 325.

Discussion. — Andrássy (1954) synonymized *A. radiatus* Cobb, 1913, the type species of *Actinolaimus*, with *A. tripapillatus*, but Thorne (1967)

rejected this synonymy and placed *A. tripapillatus* in the genus *Neoactinolaimus,* chiefly because none of the descriptions of *A. tripapillatus* (von Daday, 1905; Kreis, 1932; Andrássy, 1954) mentioned longitudinal cuticular striae. Through the kindness of Dr. Andrássy I could study the original type material from von Daday's collection. Longitudinal striae are definitely present. The anterior female gonad, though much smaller than the posterior, is fully developed and reflexed. Of the three supplement groups in the male the anterior one is the Kopulationshöcker. Thorne (1939), in his redescription of *A. radiatus,* states that the anterior female gonad is reduced to a spermatheca, but Cobb's original description indicates (formula) that both gonads are reflexed. So I regard *A. tripapillatus* and *A. radiatus* as conspecific, *tripapillatus* being the valid name. It should be remarked that the Suriname specimens are much slenderer than either Cobb's (a = 50) or von Daday's according to the description (a = 51), but come close to those of Kreis (1932) and Thorne (1939); actually the type specimens have a = 60-75. Dimensions of the type specimens:

Two females: L = 6.64-6.81 mm; a = 67-75; b = 5.5-5.9; c = 19-21; V = $^{8-9}28\text{-}31^{34-37}$; odontostyle = 42-46 μ; T/ABW = 6-7.

Two males: L = 6.02-6.61 mm; a = 60-61; b = 5.1-5.6; c = 138-176; VD = $^{14-18}62^{11-18}$; odontostyle = 43 μ (n = 1); spicules = 98-99 μ.

One female very beautifully showed all five oesophageal gland nuclei. S_1N_1 is smaller than S_1N_2 but distinct. Locations:

The oesophagus begins to widen at 38% and attains its full width at 43%. Do-DN = 17 μ.

DO 42%;	S_1N_1 57%	S_2N = 82%	K = 52;
DN 44%;	S_1N_2 68%	S_2O = 82-83%	K′ = 55.
DO-DN 1.4%;	dist. 11.7%;		

Nothactinolaimus n.gen.

Diagnosis: Similar to *Paractinolaimus.* Vestibular ring dentate. Pharynx with four large onchia; walls without denticles. Oesophagus with constriction behind spear base. Cuticle without longitudinal striae. Female tail elongate, male tail short, rounded. Supplements an adanal pair and a ventromedian series. Female didelphic.

Type species: *Nothactinolaimus lacustris* n.sp.

The systematic position of this genus is uncertain. Except for the absence of pharyngeal denticles it agrees in every respect with *Paractinolaimus* Meyl, 1957. However, in Thorne's classification (1967) this character would place it in the family Neoactinolaimidae. It thus appears questionable whether these two families should be separated on this base.

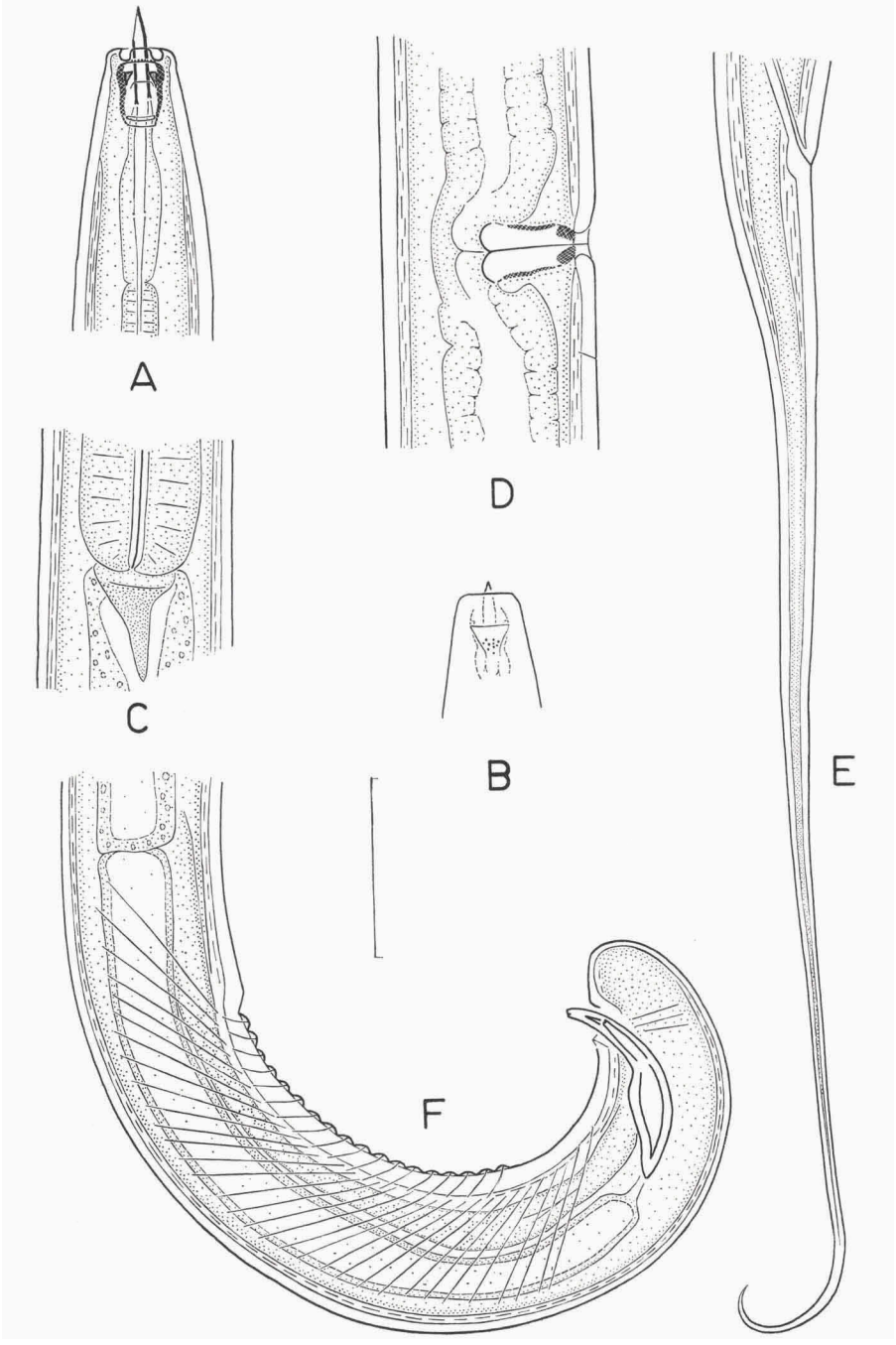


Fig. 15. *Nothactinolaimus lacustris* n.g., n.sp. A: Head end; B: amphid; C: cardia; D: vulvar region; E: female tail; F: male, posterior part of body.

Nothactinolaimus lacustris n.sp. (Fig. 15; Diagram 7)

Dimensions:

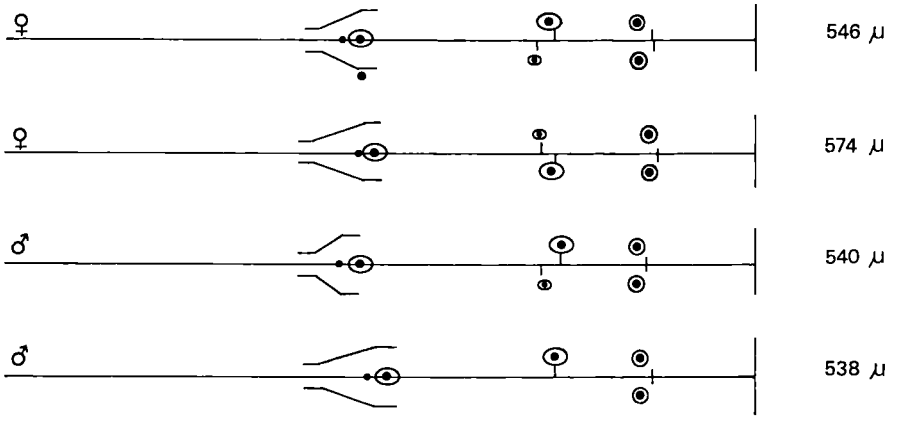
Females (n = 3): L = 2.56-2.58 mm; a = 44-47; b = 4.5-4.8; c = 7.3-8.7; V = $^{10\text{-}15}44\text{-}46^{13\text{-}16}$.

Males (n = 5): L = 2.29-2.42 mm; a = 42-49; b = 4.0-4.3; c = 101-118; VD = $^{13\text{-}21}46\text{-}52^{12\text{-}18}$.

Male, holotype: L = 2.30 mm; a = 46; b = 4.2; c = 112; VD = $^{17}52^{18}$.

Body slender, tapering anteriorly until the diameter of the lip region is one-third of body width at base of oesophagus. Cuticle smooth, 4 μ thick in mid-body, 3 μ on neck and 5 μ on base of female tail. Lateral chords one-quarter of body width. Lip region round, offset by a shallow depression, lips amalgamated, the papillae not modifying their contours. Width of amphid about one-half corresponding body diameter; amphids filled with a granular mass which might be mistaken for pharyngeal denticles. Guiding ring strong; in all specimens the odontostyle is partly protruded. Length of odontostyle 27-29 μ or about 1.3 × width of lip region, the aperture occupying about one-third of its length. Basal portion about as long as odontostyle, linear. Distance from guiding ring to head end 20 μ or 1.1 × width of lip region. The nerve ring surrounds the oesophagus at about one-third of its length from head end. Oesophagus without basal shield. Cardia triangular, 18 × 18 μ.

The oesophagus begins to widen at 40-42% and attains its full width at 44-47% of its length from head end. DO lies about the latter level, the distance DO-DN is 12-14 μ. The S_1N lie a small distance apart, far behind the middle of the distance DN-S_2N. The S_2N lie rather anterior. Locations:



7 Nothactinolaimus lacustris

DO 45-48%;	S_1N_1 71-72%;	S_2N 84-86%;	K = 90-93;
DN 48-49%;	S_1N_2 73-74%;	S_2O 86-87%;	K' = 92-93.
DO-DN 1.8-2.7%;	dist. 1.8-2.7%;		

Female. — Vulva longitudinal, vagina less than half body width deep, somewhat sclerotized. One postvulval papilla two-third body width from vulva. Gonads two, opposed, reflexed, with sphincter between uterus and oviduct; containing sperm. Tail elongate, 11-13 anal body diameters long, the tip curved. Length of rectum 1.8-1.9 anal body widths; prerectum 2.2-2.4 × as long as rectum.

Male. — Testes two, dorylaimid. Spicules dorylaimid, 57-62 μ long (along axis), with rectangular lateral guiding pieces 16 μ long. Apart from the adanal pair there is a series of 16-19 almost contiguous supplements; anterior to this series is a distinct Kopulationshöcker. About eight pairs of subventral papillae. Length of prerectum about 220 μ; the prerectum extends to about 50 μ anterior to the supplement series.

Holotype: Male on slide 7241. Paratypes: One female on holotype slide; two females and two males on slides WT 1399-1400; one male with Dr. Andrássy, Budapest; one male with Dr. Morgan Golden, Beltsville.

Type habitat and locality: Pond in forest between Onverwacht and Zanderij (sample 326); paratypes also from sample 307.

Acknowledgements

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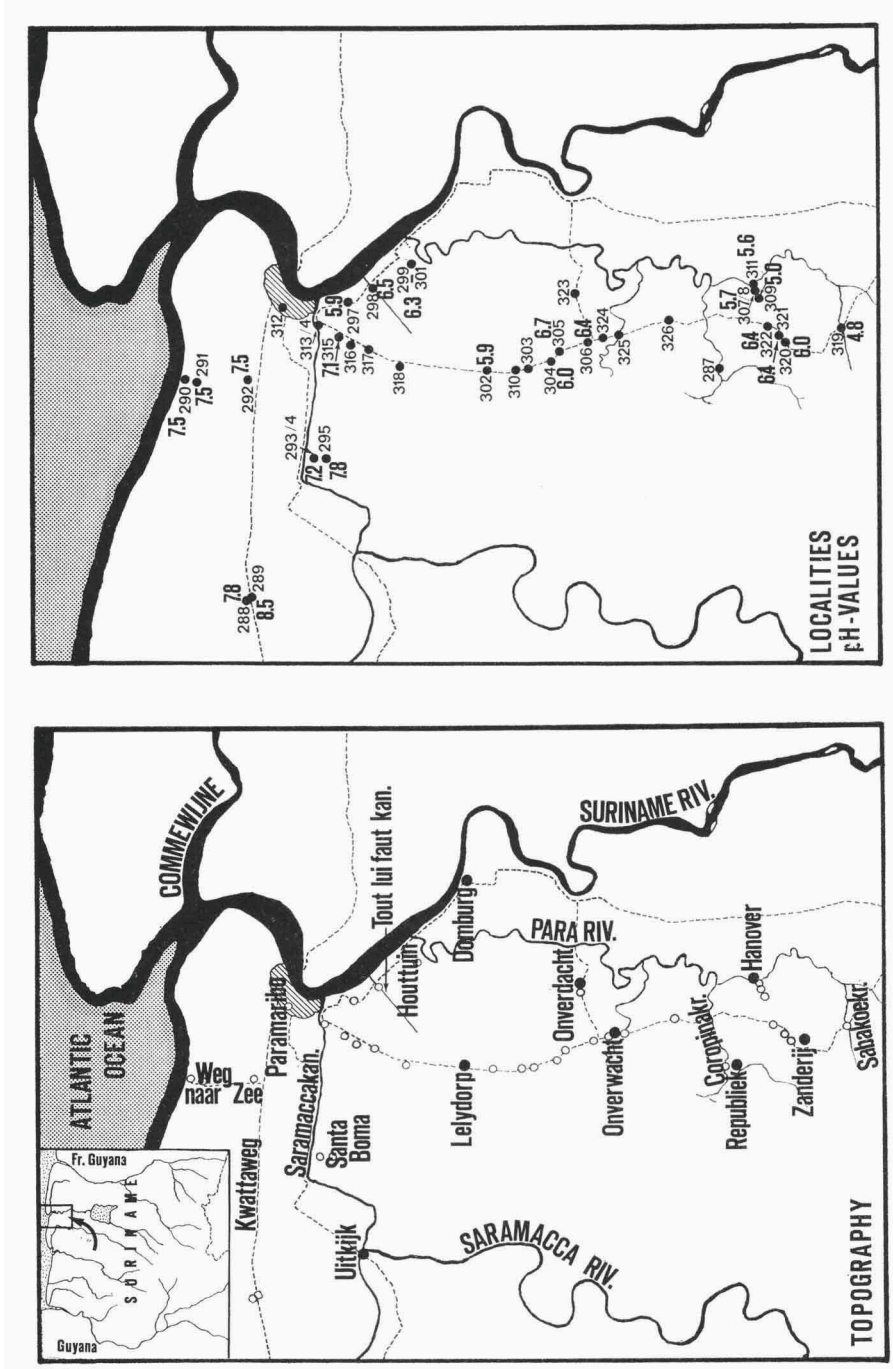
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