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SEVEN SPECIES OF TYLENCHIDA FROM BRAZIL WITH DESCRIPTION OF A NEW SPECIES (NEMATODA: TYLENCHOIDEA)

by
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During the study of soil samples from Brazil we found seven tylenchoid species of which one is new. All species are described and illustrated. *Dolichodorus minor* and *Tylenchorhynchus queirozi* are reported for the first time since their original descriptions. Morphological variations are studied for *Coslenchus bisexualis, C. areolatus, T. queirozi* and *Pratylenchus brachyurus*.

Samples were collected by R.D. Sharma. Specimens studied were fixed in 5% hot formaldehyde and processed to anhydrous glycerine by a modified Seinhorst's method (De Grisse, 1969). The nematodes were mounted in dehydrated glycerine on aluminium slides with double coverslips.

Description

COSLENCHUS BISEXUALIS Siddiqi, 1981
(Table I, Fig. 1)

Females. Body straight to slightly curved; maximum width 14.5 (12.5-17.5) μm, annules 2-2.5 μm wide at mid-body. Longitudinal ridges 14 (7+7) or 16 (8+8) in number excluding lateral ridges. Lateral field marked

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Table I - *Morphometric data of* Coslenchus bisexualis. *Females and males.*

Locality	Ilhéus, Cepec		Ilhéus, Cepec, Quadra 'G'		Ilhéus, Cepec, Quadra 'G' Bloco I	Origin. descr. Siddiqi (1981)	
	♀♀, n=9	♂♂, n=8	♀♀, n=7	♂♂, n=2	n=1 ♂	♀♀, n=4	♂♂, n.=5
L (mm)	0.40 (0.37-0.44)	0.38 (0.36-0.40)	0.40 (0.37-0.45)	0.39-0.40	0.39	0.36 (0.36-0.37)	0.37 (0.36-0.38)
Pharynx (μm)	72.5 (68.5-76)	70.5 (66-74.5)	73.5 (67-77)	70-71	67	71 (69-73)	—
Excretory pore (μm)	56.5 (52-61)	56 (53-58)	56.5 (51-64.5)	56-57	58	62-64	—
Stylet (μm)	9-10	9.5 (9-10.5)	10.5 (10-11)	10	10	10-11	10-11
Tail length (μm)	77 (69-87.5)	79.5 (73-87.5)	79 (66-93)	76-80	77.5	—	—
Spicule length (μm)	—	11 (10-11.5)	—	10-12	10	—	—
Gubernaculum (μm)	—	4.5 (4-5)	—	4-5	4	—	—
Ratios: a	28.9 (24.6-31.7)	31.6 (27.2-38.6)	28.6 (22.0-33.0)	26.3-26.7	34.0	24.0 (22.0-26.0)	25.0 (22.0-27.0)
b	5.6 (5.2-5.9)	5.4 (5.1-6.1)	5.5 (5.3-5.9)	5.5-5.7	5.8	5.1 (5.0-5.3)	5.2 (4.9-5.5)
c	5.2 (4.9-6.0)	4.8 (4.6-5.4)	5.1 (4.4-6.2)	4.9-5.2	5.0	5.1 (4.7-6.0)	5.1 (4.8-5.5)
c'	9.4 (8.0-11.2)	10.5 (9.5-11.6)	9.7 (7.6-11)	8.4-10	12	7.4 (6.6-8.1)	8.0 (7.3-8.6)
V	63 (59-64)	—	64.4 (63-66)	—	—	65.6 (64.6-66.6)	—
T	—	29 (25-34)	—	24-31	22	—	36 (34-38)
Spear knobs in neck neck annule	7 (6-8)	8 (6-9)	8 (7-9)	8-9	8	—	—
Roes	37 (34-41)	38 (37-44)	38 (36-44)	38-40	37	34-35	34 (33-35)
Rex	29 (26-34)	31 (26-34)	31 (27-38)	32-33	33	30-31	31 (29-34)
RV	112 (108-123)	—	112 (108-120)	—	—	96-99	—
RVan	25 (24-28)	—	25 (22-27)	—	—	21-23	—
Total body annule without tail	137 (132-150)	139 (135-149)	137 (131-143)	138-144	141	119 (117-121)	127 (122-128)

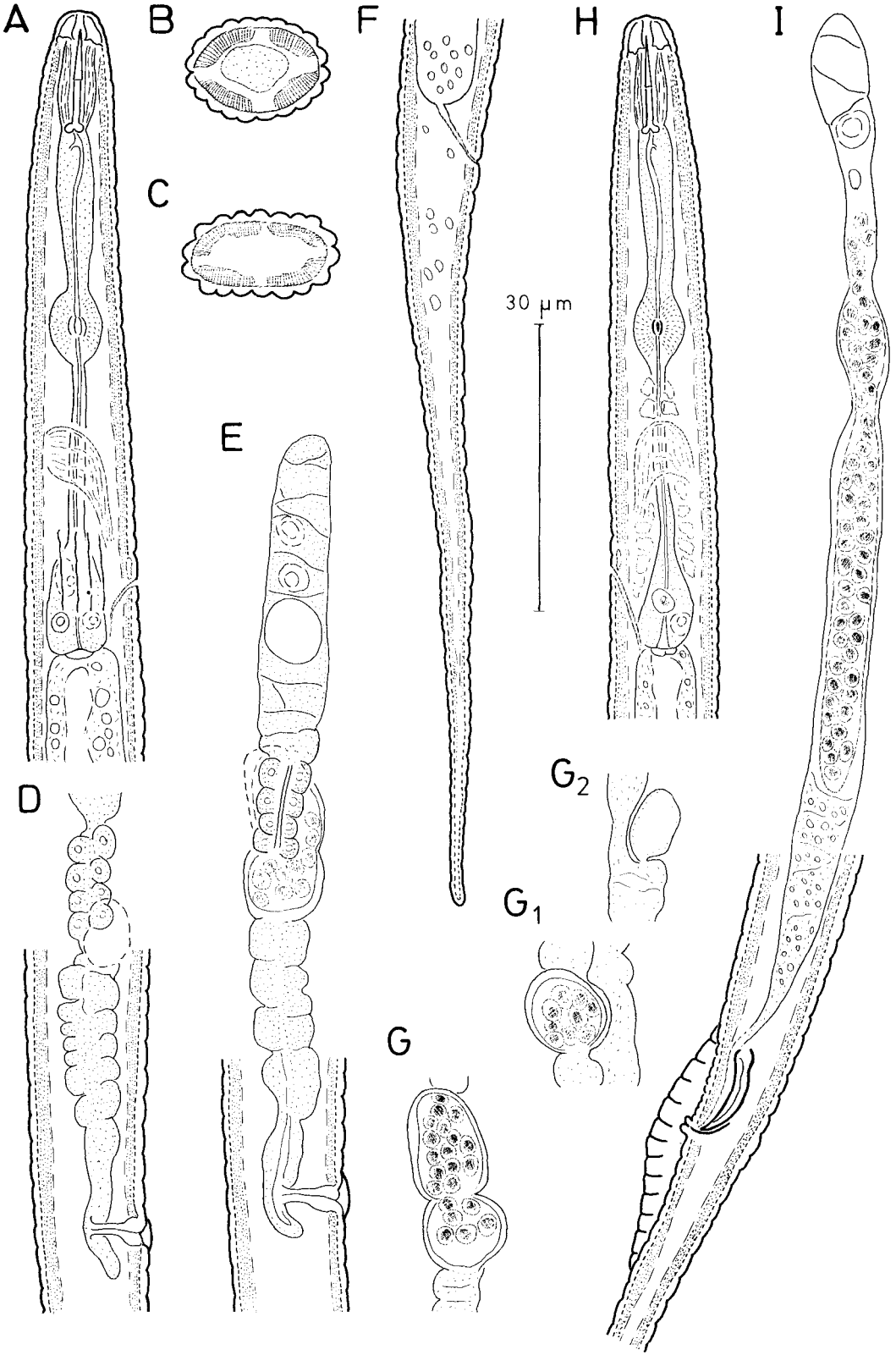

Fig. 1 - *Coslenchus bisexualis*. A: Anterior region female; B-C; Cross section through mid-body showing lateral field+longitudinal ridges; D-E: Female reproductive system; G-G_2: Variation in shape of spermatheca; H: Anterior region male; I: Male reproductive system.

with three incisures (Fig. 1 B and C). Lip region continuous with body with three more or less distinct annules, sclerotization light. Stylet with rounded knobs. Median bulb oval to rounded, muscular with distinct cuticular thickenings. Basal bulb pyriform to pear shaped, offset from intestine. Excretory pore just posterior to hemizonid, opposite anterior half of basal bulb. Hemizonid one annule wide. Nerve ring 45-51 μm from anterior end, around isthmus. Deirid at the level of excretory pore.

Ovary single, outstretched, with single row of oocytes. Spermatheca 8-19 μm long, usually bilobed, empty or filled with sperms (Fig. 1 G-G_2). Vagina at right angle to body axis. Vulva flanked by lateral membranes about two annules long. Post uterine sac very short. Phasmid not seen. Tail elongate conoid, tapering to a rounded terminus.

Males: Body ventrally arcuate. Similar to females in gross morphology. Testis single, outstretched with large sized spermatogonia. Spicules arcuate, cephalated in lateral view. Cloacal lips protruding with two papilla-like lobes, one on anterior and one on posterior lip, respectively. Bursa arising opposite the head of spicules and enveloping about 1/5 of tail, marked by 12-13 coarse striae. Tail with finely rounded terminus.

Habitat and locality: Heavy soil around the roots of *Theobroma cacao* L., Ilhéus, Cepec; Ilhéus, Cepec, Quadra 'G'; Ilhéus, Cepec, Quadra 'G' Bloco I, in Bahia, Brazil.

Discussion: Our populations have been identified as *C. bisexualis* Siddiqi, 1981, because they have a similar body length with few annules, males are present and the tail is finely rounded. Body annules fewer than 150 in number are found only in three species, the parthenogenetic *C. cancellatus* and *C. pycnocephalus* and the bisexual *C. bisexualis*. The differences in c' value, RV value and total number of body annules between the type population and our populations are considered to be due to intraspecific variation. *C. bisexualis* had been previously reported from Nicaragua, around the roots of banana (Siddiqi 1981) and recently also from Brazil (Huang and Raski, 1986).

COSLENCHUS AREOLATUS (Egunjobi, 1967) Siddiqi, 1978 (Fig. 2)

Measurements

Females (n=9): L=0.45 (0.41-0.49) mm; a=32.0 (26.5-37.4); pharynx=80.5 (76-83) μm; b=5.6 (5.4-5.9); tail=80.5 (70.5-90) μm; c=5.6 (5.2-6.5);

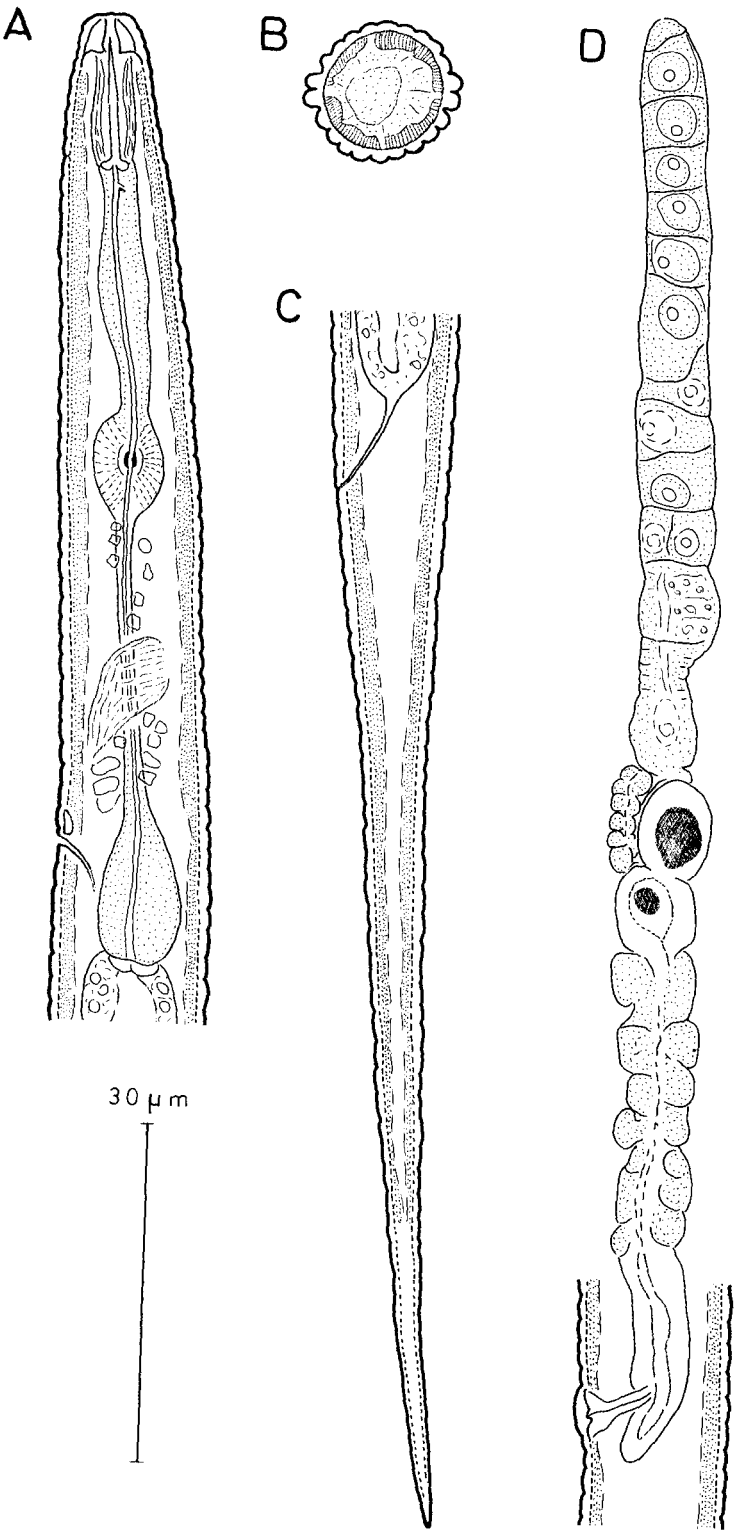

Fig. 2 - *Coslenchus areolatus*. ♀ A: Anterior region; B: Cross section through mid-body showing lateral field+longitudinal ridges; C: Tail region; D: Female reproductive system.

c'=9.3 (8.5-10); V=65.4 (63-68); stylet=10.5 (10-11.5) μm; spear knobs in neck annule =8-10; Roes=44-49; Rex=36-46; RV=136-145; RVan=28-34; total body annules excluding tail=158-180.

Females: Body slightly ventrally curved after fixation. Body annules distinct 2-2.5 μm wide. Cuticle marked by 18 (9 dorsal+9 ventral) longitudinal ridges. Lateral field marked by three incisures (Fig. 2B). Head truncate, continuous with body, with three indistinct annules, sclerotization weak. Stylet knobs rounded. Orifice of dorsal pharyngeal gland 1.5 μm behind stylet knobs. Median bulb oval, muscular with distinct cuticular thickening. Basal bulb pyriform; isthmus long. Excretory pore 65 (60-72) μm from head end. Hemizonid about 2 annules long, just anterior to excretory pore. Nerve ring located at 55 (52-58) μm from anterior end, around isthmus. Deirid not seen. Cardia small. Intestine filled with granules.

Ovary single, outstretched, with a single row of oocytes. Vulva not sunk in body contour. Vagina slightly oblique anteriorly. Lateral vulval flaps about two annules long. Spermatheca spherical, bilobed, partly offset, 8 (6-9) μm in diameter. Each part filled with a yellow globule. Post uterine sac very short, 1 μm long. Phasmid not seen. Tail with finely rounded terminus.

Male: Not found.

Habitat and locality: Heavy soil around the roots of *Theobroma cacao* L., Ilhéus, Cepec, Quadra 'G', Bahia, Brazil.

Discussion

Females correspond with the description by Andrássy (1982) except for the spermatheca which is partly offset in our females. The nature of the yellow globule in the spermatheca is not know but it is present in all females. *C. areolatus* is reported for the first time on *T. cacao*; previously it was described from specimens obtained around the roots of apple trees, New Zealand (Egunjobi, 1967), grass roots, Czechoslovakia; around lemon roots, Venezuela, and around cane roots and grass roots in Jamaica (Andrássy, 1982).

BOLEODORUS THYLACTUS Thorne, 1941 (Fig. 3)

Measurements

Female (n=1): L=0.39 mm; body width=16 μm; a=25; pharynx=88.5 μm; b=4.4; tail=53 μm; c=7.4; c'=6.4; V=65; stylet=10μm.

Female: Body spiral shaped after fixation. Cuticle with fine transverse striation. Lateral field marked by four incisures, outer one more distinct than inner one. Head continuous with body contour; lip region elevated, stylet weak, with small basal flanges. Pharynx almost cylindrical; corpus slightly widened; median bulb elongate fusiform without thickening of pharyngeal lumen, isthmus long, distinct. Basal pharyngeal bulb pyriform with three pharyngeal gland nuclei. Nerve ring encircling the isthmus at 58 μm from head end. Excretory duct passing through hemizonid, about 69.5 μm from anterior end. Hemizonid distinct, about two annules long. Intestine with granules. Cardia small, rounded. Ovary single, short, outstretched. Spermatheca offset, oval, with small sperms. Vulva a transverse slit. Vagina slightly anteriorly directed. Post-uterine sac very short. Tail ventrally curved, ending in a rounded tip. Phasmids not distinct.

Male: Not found.

Habitat and locality: Heavy soil around the roots of *Theobroma cacao* L. (Clone, SCA-6), Ilhéus, Cepec, Quadra 'G', Bahia, Brazil.

Discussion

The *Boleodorus* female has the involution of the head mentioned by Geraert (1971) but it is shorter than the usual *B. thylactus*. Because of the smaller length it also corresponds to *B. similis* Khan *et* Basir, 1963, but it differs slightly in the position of the excretory pore, in body shape and in having an offset spermatheca.

TYLENCHORHYNCHUS QUEIROZI Monteiro *et* Lordello, 1976 (Fig. 4)

Measurements

Females (n=9): L=0.49 (0.43-0.54) μm; body width=17.5 (15.5-19) μm; a=28.7 (26.2-33.6); pharynx=116 (105-126) μm; b=4.2 (3.8-4.6); tail=35

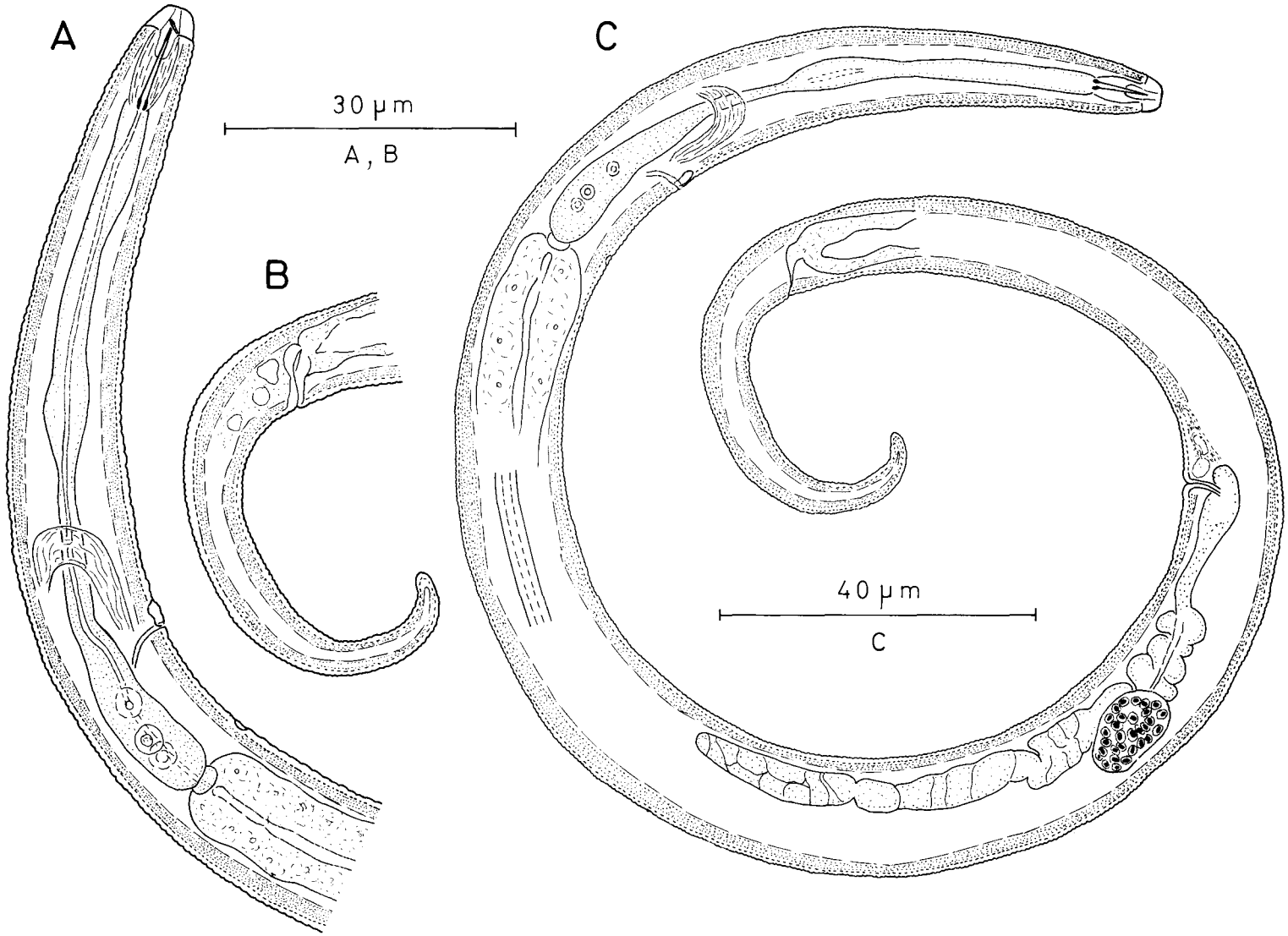

Fig. 3 - *Boleodorus thylactus*. ♀ A: Anterior region; B: Tail region; C: Female.

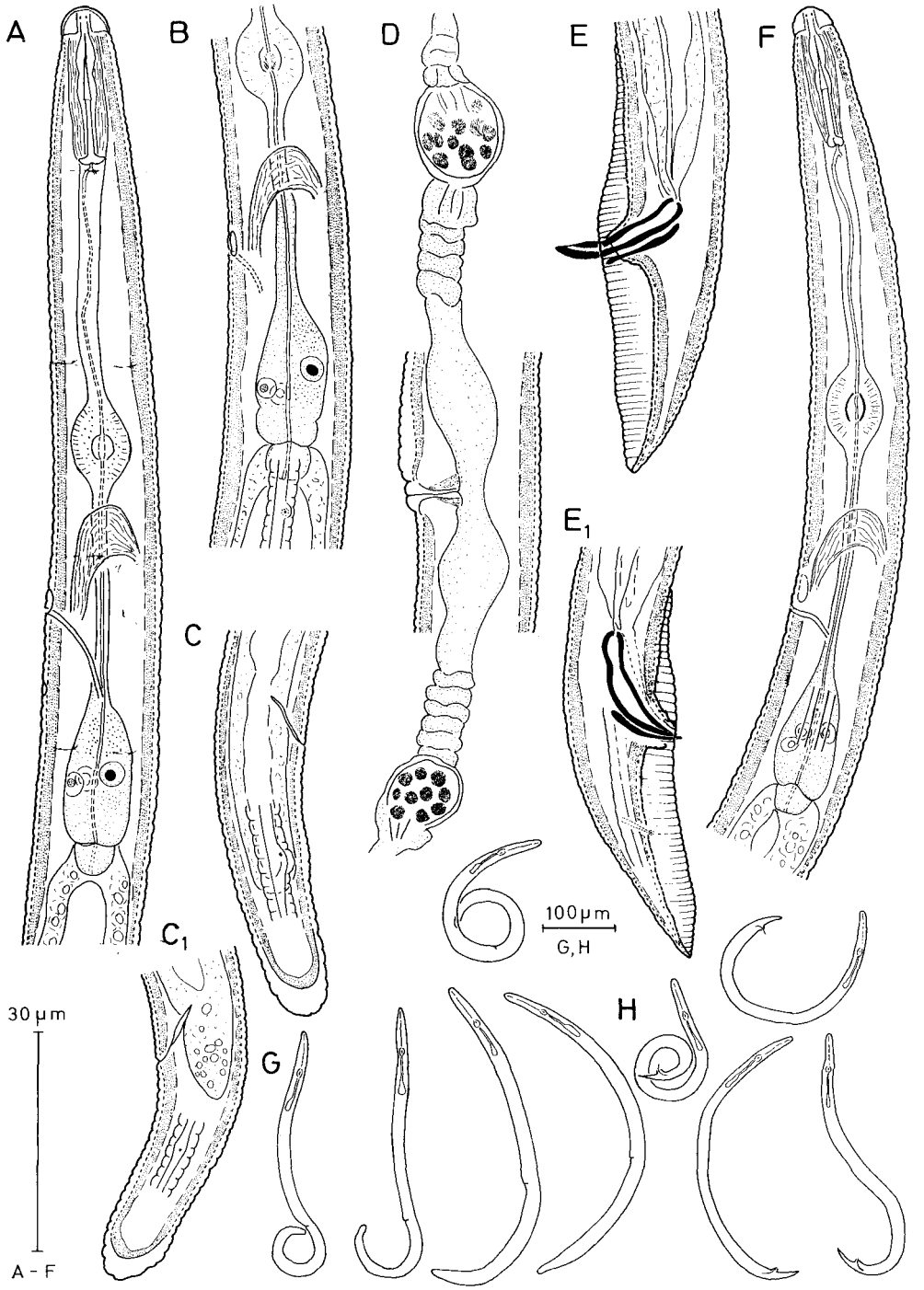

Fig. 4 - *Tylenchorhynchus queirozi*. A: Anterior region female; B: Pharyngeal region showing position of deirid; C-C_1: Female tails long and short intestinal sac; D: Vagina and vulva region with uteri and spermatheca; E-E_1: Male posterior region, E_1 showing position of phasmid; F: Anterior region male; Female body shapes; H: Male body shapes.

(28.5-39) μm; c = 14.3 (12.7-16.2); c' = 2.9 (2.5-3.5); V = 59 (58-61); stylet = 17 (15.5-18) μm.

Males (n = 4): L = 0.45 (0.44-0.48) mm; body width = 15.5 (13.5-16.5) μm; a = 29.8 (27.2-35.3); pharynx = 107.5 (104.5-110) μm; b = 4.2 (4.1-4.5); tail: 32 (30.5-34.5) μm; c = 14.3 (13.7-15.0); T = 57 (56-58); stylet = 17 (16.5-17.5) μm; spicules = 19.5 (18.5-20) μm; gubernaculum = 11.5 (11-12) μm.

Females: Body arcuate, in open 'C' shape or with a spiral in posterior half after fixation. Cuticle marked with distinct transverse striation, annules variable in width, varying from 1-2 μm on the body and 3 to 4 μm on tail. Longitudinal striation absent. Lateral field with four incisures, originating as three within one body width posterior to stylet, becoming four at mid-metacorporal level, outer incisures crenate. Head rounded, distinctly offset, annules indistinct, 4 or 5 in number. Stylet slender, with small, rounded to slightly pointed knobs; surrounded by a lyriform guiding apparatus. Dorsal gland orifice just posterior to stylet knobs. Procorpus cylindrical, followed by a muscular metacorpus; isthmus long, basal bulb pyriform. Three pharyngeal gland nuclei usually visible. Nerve ring 74 (71-77) μm from anterior end, around isthmus. Excretory pore, 85.5 (79-90) μm from anterior end, usually opening through hemizonid, sometimes one to two annules posterior to it. Hemizonid distinct. Deirid visible posterior to basal bulb. Cardia 4.5 (4-6) μm long. Intestine granulated.

Female didelphic; ovaries outstretched; oocytes arranged in a single row. Spermatheca spherical, with or without sperms. Vulval lips protruding; ventral cuticle anterior to vulva swollen (Fig. 4D). Vulva a transverse slit. Vagina extending about 1/2 vulval body width, with small epiptygma. Tail cylindrical, annulated with irregularly hemispherical terminus, terminal cuticle thickened; 21-26 annules occurring on ventral side of tail; annules larger on posterior half of tail. Phasmid 10-18 μm from anus, distinct. Posterior intestinal sac variable in length, 13-26 μm long.

Males: Similar to female in general appearance. Testis single, outstretched. Spicule structure typical for genus. Gubernaculum protrusible, linear, proximal end thickened in lateral view, distal end thinner. Cloaca protruding. Tail conical, with pointed to finely rounded terminus; annules on ventral side obscure. Phasmids opening on bursa at about midtail (Fig. 4 E_1).

Habitat and locality: Light soil around the roots of *Theobroma cacao* L. cv. Comum, Belmonte, Faz. Futurosa, Bahia, Brazil.

Discussion

Tylenchorhynchus queirozi was described by Monteiro and Lordello (1976) from Brazil. In comparison with type specimens, our specimens are smaller and wider (♀♀ L=492-605 μm, ♂♂ L=550-620 μm vs ♀♀ L=430-540 μm and ♂♂ L=440-480 μm). Five labial annules have been reported but were indistinct in our females. Vulva region was described as 'generally elevated' but no mention was made of the cuticle being swollen anterior to vulva. The cuticle on the tail tip was not drawn with the same thickness but the ending of the inner body cuticle suggests a similar thick cuticle.

NEODOLICHODORUS spec. sp. n. (Fig. 5 F-K_1)

Measurements:

Female (n=1): L=1.62 mm; body width=41 μm; a=39.5; pharynx=222 μm; b=7.2; tail=37 μm; c=45.3; c'=1.7; V=56; stylet=66 μm.

Female: Body ventrally arcuate after fixation. Cuticle 3 μm thick, with distinct annules about 4 μm wide. Lateral field begins at about seven annules from head end, marked with four longitudinal lines extending distinctly behind the anus, crenated, regularly interrupted by the transverse body striae and forming an areolated lateral field. Lip region distinctly offset from body contour, non-annulated with protruding labial disc. Labial framework strongly cuticularized. Stylet with slightly sloping knobs. Pharingeal gland orifice about 5 μm behind stylet knobs. Median bulb oval, 26×17 μm in diameter. Valve lying at 58% of pharyngeal length from anterior end. Terminal bulb truncate, three times as long as wide. Pharyngeal gland nuclei indistinct.

Excretory pore 5 annules anterior to hemizonid, at level of nerve ring, about 156 μm from anterior end. Nerve ring surrounding isthmus, 158 μm from head end. Hemizonid distinct. Cardia 3 μm long. Female didelphic; ovaries outstretched. Spermatheca rounded, not offset (without sperms?). Uterus convoluted. Vulva a transverse slit, slightly posterior to the middle of the body, with sclerotization. Vagina about 1/3 vulval body width, straight. No eggs. Tail spicate, with acute terminus. Phasmid distinct, at level of anus.

Male: Not found.

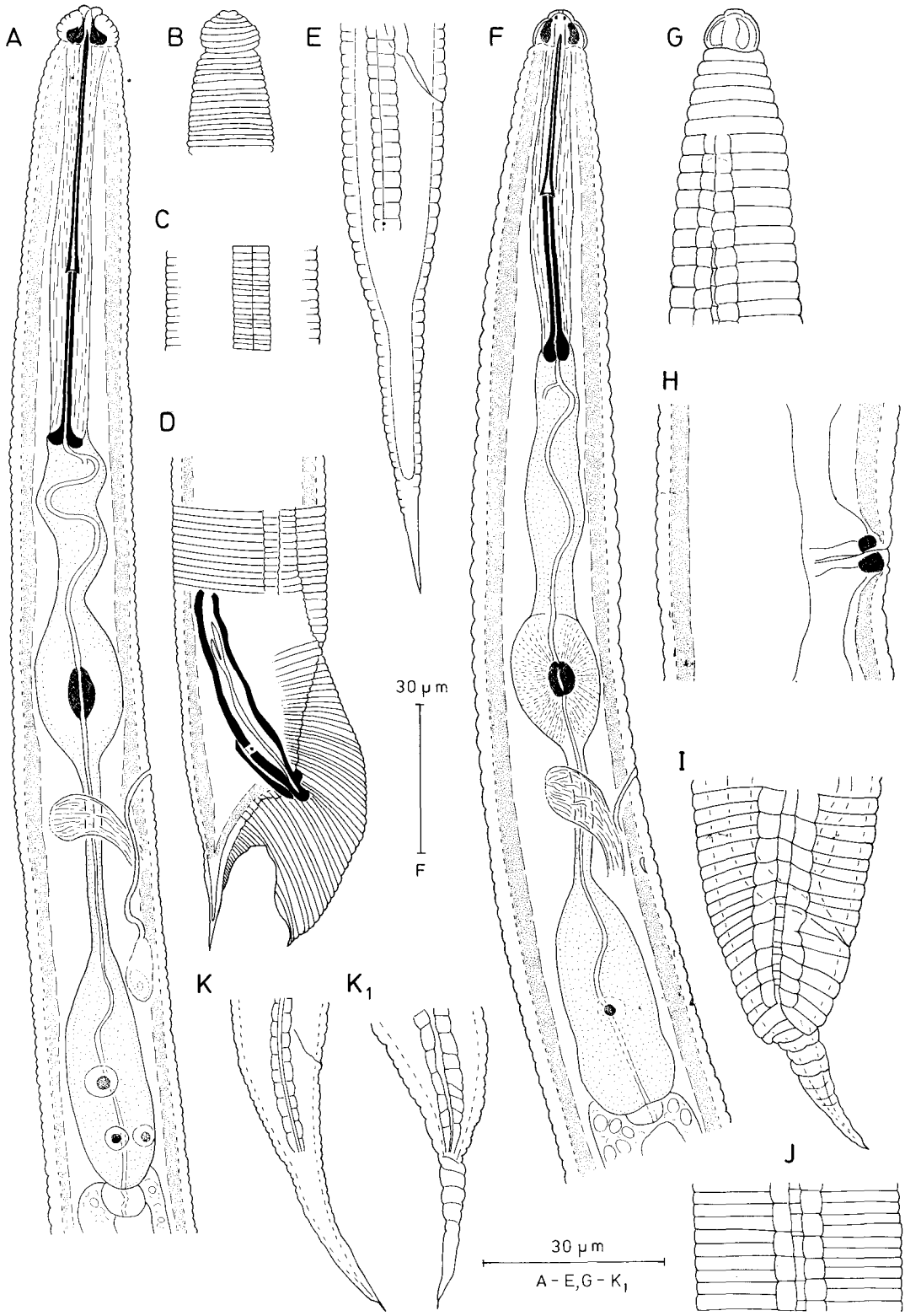

Fig. 5 - *Dolichodorus minor*. A: Anterior region male; B: Head region (surface view); C: Lateral field; D: Male posterior region showing position of phasmid; E: Tail female J_4.
Neodolichodorus spec. n. sp. F: anterior region female; G: Head region (surface view) showing beginning of lateral field; H: Vagina and vulva region; I: Female tail; J: Lateral field; K-K_1: Juvenile tails.

Type specimens: Single ♀ in slide 784 deposited in nematode collection of the Instituut voor Dierkunde, Rijksuniversiteit Gent, Belgium.

Type habitat and locality: Light sandy soil around the roots of *Theobroma cacao* L. cv. Comum, Itamaraju, Faz. Vigia, Bahia, Brazil.

Differential diagnosis: The single female from Brazil is related to *N. leiocephalus* Doucet, 1981, but it can be distinguished by head shape, smaller stylet (66 μm vs 80-99 μm), position of excretory pore, and by the shape of terminal bulb.

Siddiqi (1976) diagnosed *Plesiodorus* in the subfamily Dolichodorinae, by bluntly rounded or mammillate female tail and four incisures in lateral field. He diagnosed *Dolichodorus* by spicate female tail and lateral field with three incisures. Andrássy (1976) diagnosed *Neodolichodorus* with long stylet, lateral field marked with four incisures and female tail bluntly rounded. Later, Siddiqi (1977) synonymized his genus *Plesiodorus* with *Neodolichodorus*. *N. leiocephalus* has a spicate tail, which is the characteristic of *Dolichodorus*, but has a very long stylet and lateral field with four incisures. Our female also has characteristics of both genera. According to the number of incisures, we identified our female as a representative of the genus *Neodolichodorus*.

In both genera, stylet length is variable among species. In *Neodolichodorus*, the only species without labial annules is *N. leiocephalus*, but our females differs too much to consider it as this species.

DOLICHODORUS MINOR Loof *et* Sharma, 1975 (Fig. 5 A-F)

Measurements

Male (n=1): L=1.34 mm; body width=25 μm; a=54.5; pharynx=193 μm; b=6.9; tail=26 μm; c=51.5; c'=1.5; spicules=37 μm; gubernaculum=13 μm; stylet=68 μm.

Female 4th stage juvenile (n=1): L=1.27 mm; body width=21 μm; a=60.6; pharynx=207 μm; b=6.1; tail=80 μm; c=160; c'=4.8; V=51; stylet=73 μm.

Male: Body slender, slightly curved ventrally when relaxed. Cuticle about 2 μm thick, with distinct transverse striation. Lateral field marked by three incisures, the two outer ones crenate. Lip region annulated, offset

by a very deep constriction, with slightly protruding labial disc. Labial framework strongly sclerotized. Stylet long, straight, anterior conical part larger than the posterior part. Pharyngeal gland orifice 4 μm from base of stylet. Pharynx with swollen procorpus and oblong median bulb 25×14 μm in diameter. Valves lying at 55% of pharyngeal length from anterior end. Terminal bulb oblong, three times as long as wide. Three pharyngeal gland nuclei observed. Dorsal gland nucleus larger than ventro-sublateral gland nuclei. These nuclei lie near base of pharynx. Nerve ring surrounding isthmus at about 133 μm from head end. Excretory pore slightly anterior to nerve ring, 125 μm from anterior end, two annules posterior to median bulb. Hemizonid indistinct. Testis single, outstretched. Spicules almost straight, 37 μm long. Gubernaculum simple, rod-shaped, 13 μm long. Bursal alae denticulate. Tail short with acute terminus. Phasmid pre-anal.

Juvenile female (4th stage): Body slender, almost straight when relaxed. Tail spicate, much longer than in male. Phasmid post-anal, about 9 annules behind anus.

Habitat and locality: Heavy soil around the roots of *Theobroma cacao* L. Itamaraju, Faz. Pedra Grande, Bahia, Brazil.

Discussion

The single male and the fourth juvenile were identified as *Dolichodorus minor* Loof *et* Sharma, 1975, also described from Brazil. In our single male specimen, the phasmid is anterior to the cloacal opening, while in the original description the pashmid is reported as post-anal and very inconspicuous; other characteristics are similar (e.g. dentate bursa).

PRATYLENCHUS BRACHYURUS (Godfrey, 1929)
Filipjev *et* Sch. Stekhoven, 1941 (Fig. 6)

Measurements: Females, (n=10), L=0.51 (0.39-0.68) mm; pharynx=76.7 (50-97.5) μm; stylet=18.0 (17-19) μm; tail length=26.5 (20-30) μm; ratios: a=25.3 (19-29.7); b=7.0 (4.6-9.3); c=20.0 (11.8-26.4); c'=2.2 (1.6-2.8); V=81 (71-87); number of tail annules=15.5 (14-23).

Females: Body almost straight upon fixation. Cuticle coarsely annulated. Head shape angular sometimes elevated (Fig. 6A), with two

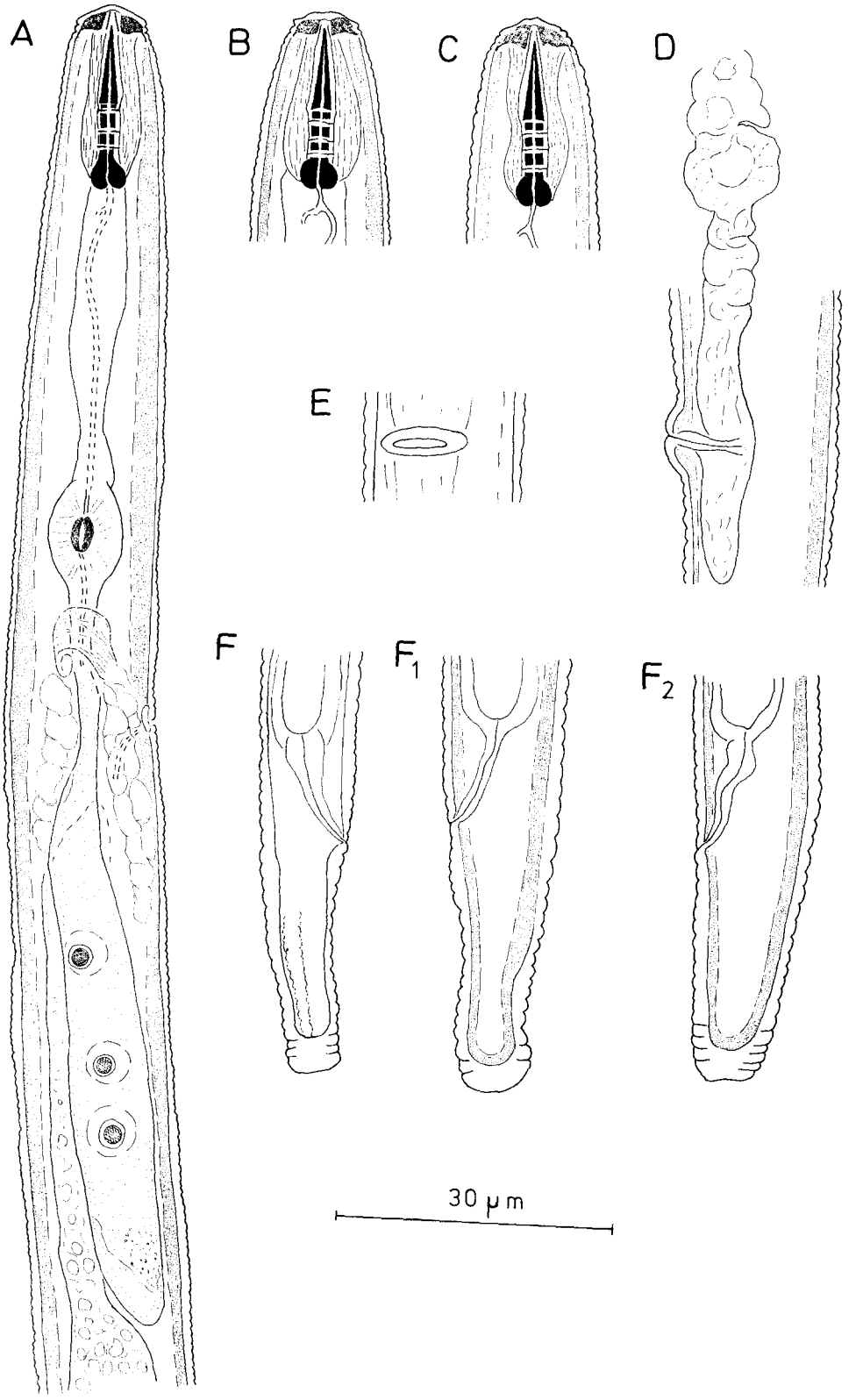

Fig. 6 - *Pratylenchus brachyurus*. ♀ A: Anterior region; B-C: Head region; D: Vulva region with post-vulval sac and spermatheca; E: Vulva, ventral view; F-F_2: Tail region.

annules, two specimens found with two annules on one side and three on other side (Fig. 6C). Spear with large, rounded knobs, 4-5 μm across. Dorsal pharyngeal gland orifice rather indistinct, about 2.5 μm behind the base of stylet knobs. Pharynx with more or less cylindrical procorpus, median bulb rounded to oval 12-14×9-10 μm. Pharyngeal gland ventrally overlapping intestine, with three usually distinct pharyngeal nuclei. Excretory pore 70 to 80 μm from anterior extremity. Hemizonid generally indistinct.

Female prodelphic, monodelphic; ovary outstretched. Spermatheca more or less rounded, empty, indistinct in some specimens. Vulva a transverse slit in ventral view (Fig. 6 E). Vulval lips protruding. Vagina almost straight. Posterior uterine sac 21 (16-24) μm long. Tail slender, with rounded to truncated terminus, tail tip smooth. Phasmids indistinct at about 50% of the tail length. Lateral field difficult to observe, with four lines.

Male: Not found.

Habitats and localities: Heavy and light soil around the roots of *Theobroma cacao* L., *Citrus paradisi, Nicotiana tabacum*, Sergipe and Bahia State, Brazil.

Discussion

The populations of *P. brachyurus* from Brazil, correpond well with the original description and also with descriptions by Sher and Allen (1953) and Loof (1960).

According to Tarjan and Frederick (1978), stylet length, post-vulval sac length and vulva-anus distance can be used to characterize the species. In our populations, most females have a relatively long post-vulval sac (16-24 μm), while vulva-anus distance is variable, 48-92 μm, stylet length is more constant and can be used as a reliable character to specific level.

SUMMARY

This paper deals with seven species belonging to the genera *Coslenchus, Boleodorus, Tylenchorhynchus, Pratylenchus, Dolichodorus* and *Neodolichodorus*. A new species *Neodolichodorus* spec. is described but as we have only one female this species is not named; *Neodolichodorus* spec. is closely related to *N. leiocephalus* Doucet, 1981 but it can be distinguished by head shape, smaller stylet (66 μm vs. 80-99 μm), position of excretory pore and by the shape of terminal bulb. Two species reported for the first time since their original descriptions are *Dolichodorus minor* Loof *et* Sharma, 1975 and *Tylenchorhynchus queirozi* Monteiro *et* Lordello, 1976.

LITERATURE CITED

ANDRASSY I., 1976 - *Evolution as a basis for the systematization of nematodes.* Pitman Publishing, London, S. Francisco, Melbourne, 288 pp.

ANDRASSY I., 1982 - The genera and species of the family Tylenchidae Örley, 1880 (Nematoda): The genus *Coslenchus* Siddiqi, 1978. *Acta Zool. Acad. Sci. Hung., 28*: 193-222.

DE GRISSE A., 1969 - 'Contribution to the morphology and the Systematics of the Criconematidae (Taylor, 1936) Thorne, 1949'. Dissertation, 24 pp.

DOUCET M.E., 1981 - Description of *Dolichodorus longicaudatus* n.sp. and *Neodolichodorus leiocephalus* n.sp. (Nematoda: Tylenchida). *Revue Nématol., 4*: 191-197.

EGUNJOBI O.A., 1967 - Four new species of the genus *Tylenchus* Bastian, 1865 (Nematoda: Tylenchida). *Nematologica, 13*: 417-424.

GERAERT E., 1971 - Observations on the genera *Boleodorus* and *Boleodoroides* (Nematoda: Tylenchida). *Nematologica, 17*: 263-276.

HUANG C.S. and D.J. RASKI, 1986. Some Tylenchidae from Brazil with description of *Cucullitylenchus amazonensis* gen. n., sp. n. (Tylenchoidea: Nemata). *Revue Nématol., 9*: 209-219.

KHAN E. and BASIR M.A., 1963 - *Boleodorus similis* n. sp. (Nematoda: Nothotylenchinae) from India. *Z. Parasitkde, 23*: 121-123.

LOOF P.A.A., 1960 - Taxonomic studies on the genus *Pratylenchus* (Nematoda). *Tijdschr. Plziekt., 66*: 29-90.

LOOF P.A.A. and SHARMA R.D., 1975 - *Dolichodorus minor* n.sp. (Nematoda: Dolichodoridae) with a key to the genus *Dolichodorus. Revista Theobroma, 5*: 35-41.

MONTEIRO A.R. and LORDELLO L.G.E., 1976 - *Tylenchorhynchus queirozi* n.sp. (Nematoda: Tylenchorhynchidae) from soil in Brazil. *Rev. Brasil. Biologica, 36*: 697-699.

SHER S.A. and ALLEN M.W., 1953 - Revision of the genus *Pratylenchus* (Nematoda: Tylenchidae). *Univ. Calif. Publs Zool., 57 (6)*: 441-469, Pls. 64-67.

SIDDIQI M.R., 1976 - New plant nematode genera *Plesiodorus* (Dolichodorinae), *Amplimerlinius* (Merliniinae) and *Gracilancea* (Tylodoridae grad. n.). *Nematologica, 22*: 390-416.

SIDDIQI M.R., 1977 - *Plesiodorus* Siddiqi, 1976 (Nematoda: Dolichodoridae) a junior objective synonym of *Neodolichodorus* Andrássy, 1976. *Nematologica. 23*: 265.

SIDDIQI M.R., 1981 - Six new species of *Coslenchus* Siddiqi, 1978 (Nematoda: Tylenchida). *Nematologica, 26*: 432-447.

TARJAN A.C. and FREDERICK J.J., 1978 - Intraspecific morphological variations among populations of *Pratylenchus brachyurus* and *P. coffeae. J. Nematol., 10*: 152-160.

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