

## On five plant parasitic tylenchs from Martinique (Nemata)

Esther VAN DEN BERG\* and Patrice CADET\*\*

\* National Collection of Nematodes, Biosystematics Division, Plant Protection Research Institute, Private Bag X134, Pretoria 0001, South Africa, and \*\* Laboratoire de Nématologie, Centre ORSTOM, B.P. 8006, 97259 Fort-de-France, Martinique.

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**Summary** — During collections in forest and natural vegetation areas in Martinique, several known plant-parasitic nematode species were found of which five are discussed. They are *Pratylenchus alleni* Ferris, 1961, *Hoplolaimus tylenchiformis* von Daday, 1905, *Discocriconemella limitanea* (Luc, 1959) De Grisse & Loof, 1965, *Hemicyclophora chilensis* Brzeski, 1974 — of which males are described for the first time — and *Gracilacus longilabiata* Huang & Raski, 1986. Additional descriptions, measurements and figures are given for all five species while three are also illustrated with SEM photographs.

**Résumé** — *Sur cinq espèces de Tylenchides (Nemata) provenant de la Martinique* — Au cours de récoltes dans des zones de forêt et de végétation naturelle de la Martinique, de nombreuses espèces de nématodes phytoparasites ont été rencontrées. Cinq d'entre elles sont rapportées ici : *Pratylenchus alleni* Ferris, 1961, *Hoplolaimus tylenchiformis* von Daday, 1905, *Discocriconemella limitanea* (Luc, 1959) De Grisse & Loof, 1965, *Hemicyclophora chilensis* Brzeski, 1974 — dont les mâles sont décrits pour la première fois — et *Gracilacus longilabiata* Huang & Raski, 1986. Des mensurations, descriptions complémentaires et illustrations sont données pour ces cinq espèces, ainsi que, pour trois d'entre elles, des photographies au MEB.

**Key-words** : Nematodes, Tylenchids, Martinique.

In a recent publication, Van den Berg and Cadet (1991) reported one new and thirteen known plant-parasitic nematode species from agricultural and natural vegetation areas in Martinique and French Guyana. Ongoing collections from this area have provided specimens of five more plant-parasitic nematode species from Martinique. *Pratylenchus alleni* Ferris, 1961 was collected from indigenous vegetation on a beach, while four species were found in forest areas viz. *Hoplolaimus tylenchiformis* von Daday, 1905, *Discocriconemella limitanea* (Luc, 1959) De Grisse & Loof, 1965, *Hemicyclophora chilensis* Brzeski, 1974, and *Gracilacus longilabiata* Huang & Raski, 1986. Extracting and handling procedures were similar to those given by Van den Berg and Cadet (1991). Additional descriptions, measurements and figures are given for all five species while three are also illustrated with SEM photographs. Males of *H. chilensis* are described for the first time.

### *Pratylenchus alleni* Ferris, 1961

(Fig. 1)

Apart from the original description from soybean from the USA by Ferris (1961) and one from chrysanthemum from India by Singh and Jain (1984), this species has apparently not been found elsewhere. This species is now reported from Martinique. Seven females and two males were collected on the Salines beach in the

south of Martinique from around the roots of mancenillier plants *Hippomane mancinella* (leg. P. Cadet, 23.xi.1990). Figures and a short description of these specimens are given below.

#### MEASUREMENTS

*Females* (n = 7) : L =  $0.390 \pm 32.9$  (0.340-0.430) mm; a =  $25.7 \pm 3.5$  (22-31.3); b =  $3.7 \pm 0.2$  (3.5-3.9); c =  $16.8 \pm 2.1$  (12.2-18.7); c' =  $2.1 \pm 0.4$  (1.9-2); o =  $25.6 \pm 2.4$  (22.2-28.6); V =  $78 \pm 1.6$  (76-80); OV<sub>1</sub> =  $37 \pm 6.8$  (29-42); stylet =  $13.3 \pm 0.6$  (12.5-14)  $\mu$ m.

*Males* (n = 2) : L = 0.332, 0.365 mm; a = 26.6, --; b = 3.3, 3.4; c = 18.1, 19.8; c' = 1.9, 2.1; o = --, 22.9; stylet = 12.9  $\mu$ m; spicules = 15.1, 14.3  $\mu$ m; gubernaculum = 2.9, 3.3  $\mu$ m.

#### DESCRIPTION

*Females* : Body almost straight, at most curved very slightly ventrally. Lip region with two annuli. Cephalids not seen. Stylet knobs flattened anteriorly,  $2.8 \pm 0.4$  (2.2-3.6)  $\mu$ m wide and  $1.6 \pm 0.1$  (1.5-1.8)  $\mu$ m high. Opening of dorsal oesophageal gland  $3.4 \pm 0.3$  (2.9-3.7)  $\mu$ m from base of stylet knobs. Nerve ring conspicuous, crossing isthmus just posterior to median bulb. Excretory pore situated from opposite posterior part of isthmus to opposite anterior part of oesophageal lobe,  $65.6 \pm 8.4$  (49.3-72)  $\mu$ m from anterior end of body. Hemizonid two or three annuli long, situated from

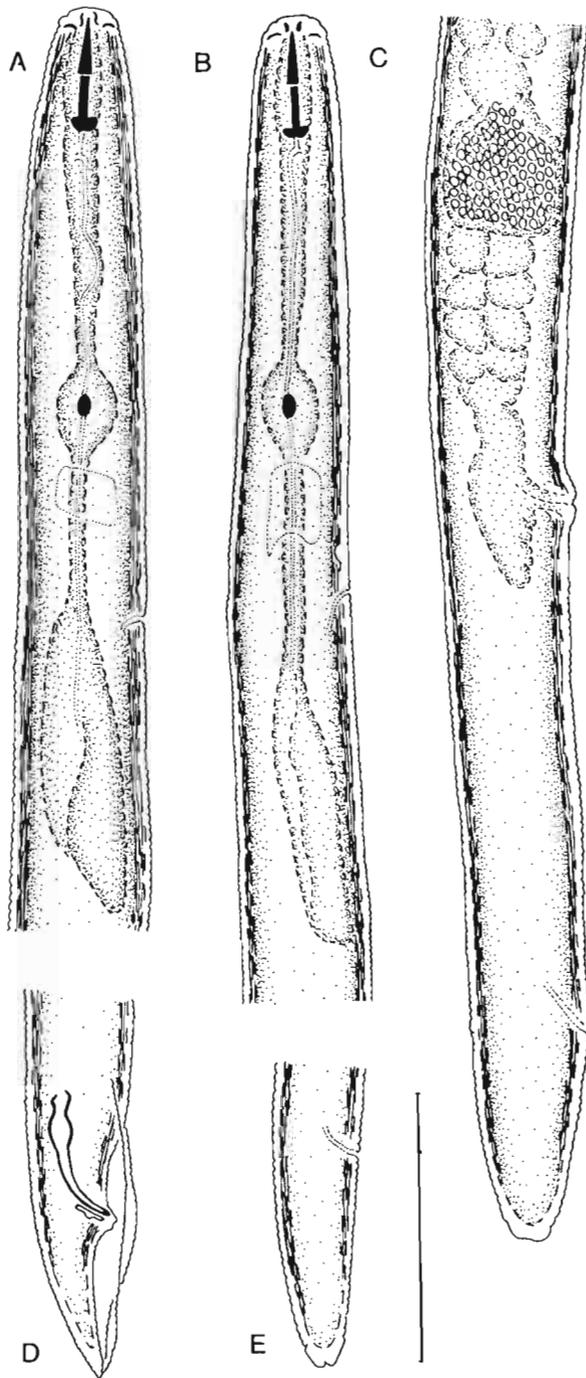


Fig. 1. *Pratylenchus alleni* Ferris, 1961 — Female. A : Oesophageal region; C : Posterior region; E : Tail — Male. B : Oesophageal region; D : Posterior region. (Bar = 30  $\mu$ m).

directly anterior to two annuli anterior to excretory pore. Hemizonion not seen. Width at midbody  $15.1 \pm 1.2$  (12.9-16.9)  $\mu$ m and at excretory pore  $13.3 \pm 1.2$

(12.5-15.1)  $\mu$ m. Spermatheca large, round or rectangular, filled with roundish sperm. Vulval lips protruding when viewed laterally. Length of post uterine branch  $17.2 \pm 1.8$  (14.7-19.5)  $\mu$ m. Tail with nineteen to 22 ventral annuli,  $23.3 \pm 3.5$  (19.5-29.8)  $\mu$ m long, terminus broadly rounded or indented, not annulated, rarely with one crenation. Phasmid eight to twelve annuli posterior to anus.

*Male* : Similar to female except for reproductive system. Tail 18.4  $\mu$ m long.

With their small size, broadly rounded tail and two lip annuli these specimens fit in very well with the diagnosis of the species by Ferris (1961).

### *Hoplolaimus tylenchiformis* von Daday, 1905

(Figs 2, 3)

Two females and four males were collected from a rain forest at Morne Platine south of Morne Jacob by P. Cadet during 1990. This species was originally described by von Daday (1905) from a mud hole on the Banco island in the Paraguay river at Asuncion in Paraguay and redescribed by Sher (1963) and Andrassy (1958). The only other reports of this species are from various localities in the USA (Sher, 1963; Riffle, 1969; MacGowan, 1988; Mead, 1989). Figures, measurements and a short description of the Martinique specimens are given below.

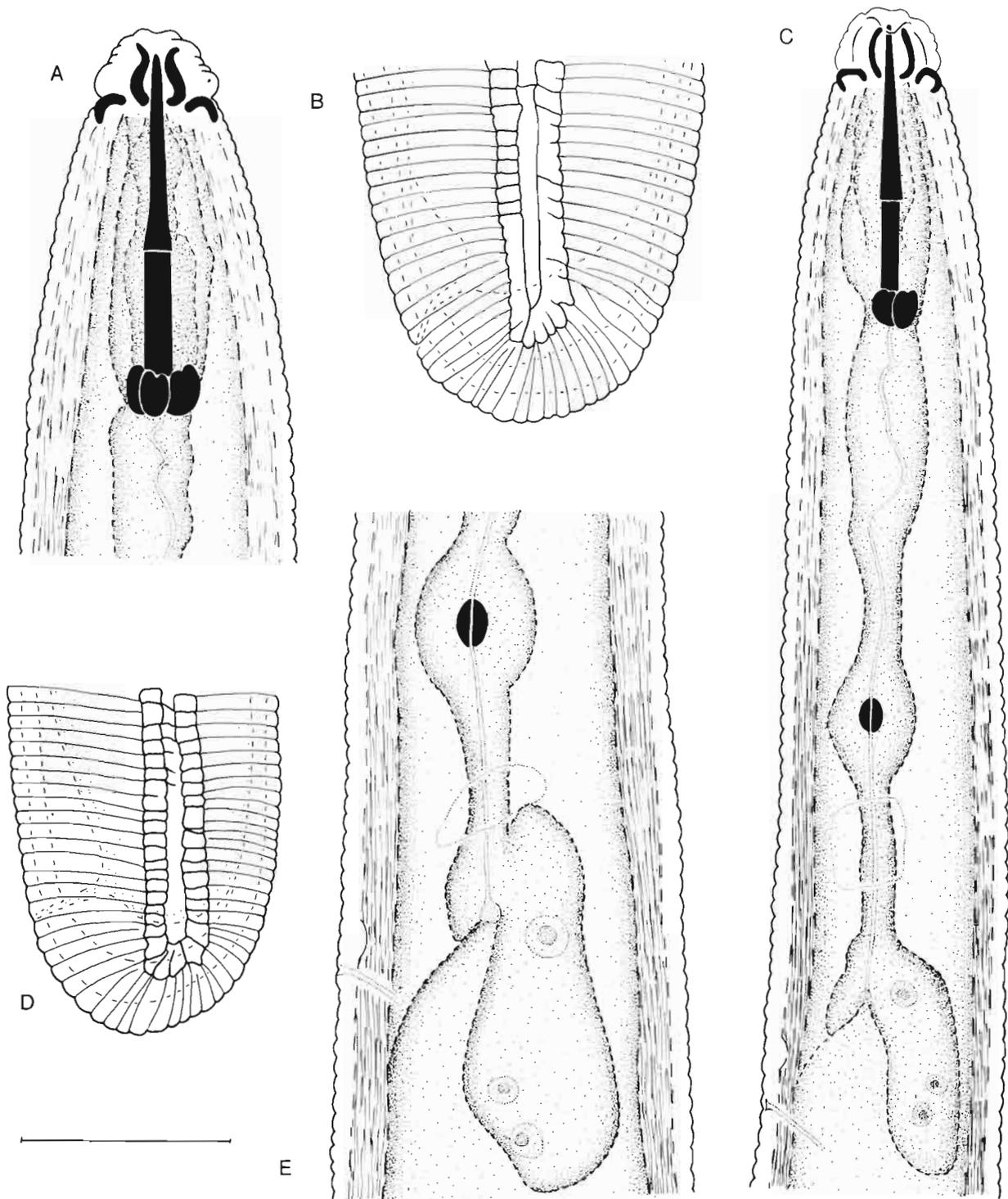
#### MEASUREMENTS

*Females* (n = 2) : L = 1.380, 1.640 mm; a = 27.4, 26.6; b' = 7.2, 8.2; b = 8.7, 10.6; c = 107, 139; c' = 0.4, 0.3; V = 58, 55; OV<sub>1</sub> = 19; OV<sub>2</sub> = 17, 15; stylet = 48.6, 50.4  $\mu$ m.

*Males* (n = 4) : L =  $1.280 \pm 95.8$  (1.150-1.360) mm; a =  $30.4 \pm 2.6$  (27.6-33.6); b' =  $7.4 \pm 0.5$  (6.7-7.9); b =  $8.8 \pm 0.5$  (8.0-9.2); c =  $45.7 \pm 1.6$  (43.7-47.4); c' =  $1.3 \pm 0.2$  (1.1-1.4); stylet =  $42.8 \pm 1.7$  (41.1-44.9)  $\mu$ m; anterior phasmid =  $39 \pm 6.4$  (33-48) %; posterior phasmid =  $80 \pm 3.6$  (78-85) %; spicules =  $41.7 \pm 3.0$  (37.5-44.5)  $\mu$ m; gubernaculum =  $18.1 \pm 1.0$  (16.9-19.1)  $\mu$ m; capitulum (n = 1) = 9.9  $\mu$ m.

#### DESCRIPTION

*Females* : Lip region with four annuli; first and basal annulus higher than two middle annuli; labial disc prominent; lip region 14, 14.7  $\mu$ m wide and 9.9, 10.3  $\mu$ m high, outline more conical than rounded, well set off from body by deep constriction; areolations of basal lip annulus could not be counted with certainty. Stylet knobs 9.6, 9.9  $\mu$ m wide and 6.6, 5.9  $\mu$ m high. Metenchium longer than telenchium (m = 52 %, 56 %). Excretory pore situated between oesophago-intestinal junction and base of oesophagus, 166, 168  $\mu$ m from anterior end. Lateral field 10.3, 11  $\mu$ m wide; outer band almost completely areolated over whole body with occa-



**Fig. 2.** *Hoplolaimus tylenchiformis* von Daday, 1905 — Female. A : Anterior part of oesophageal region; B, D : Tail; E : Posterior part of oesophageal region — Male. C : Oesophageal region. (Bar = 30  $\mu$ m).

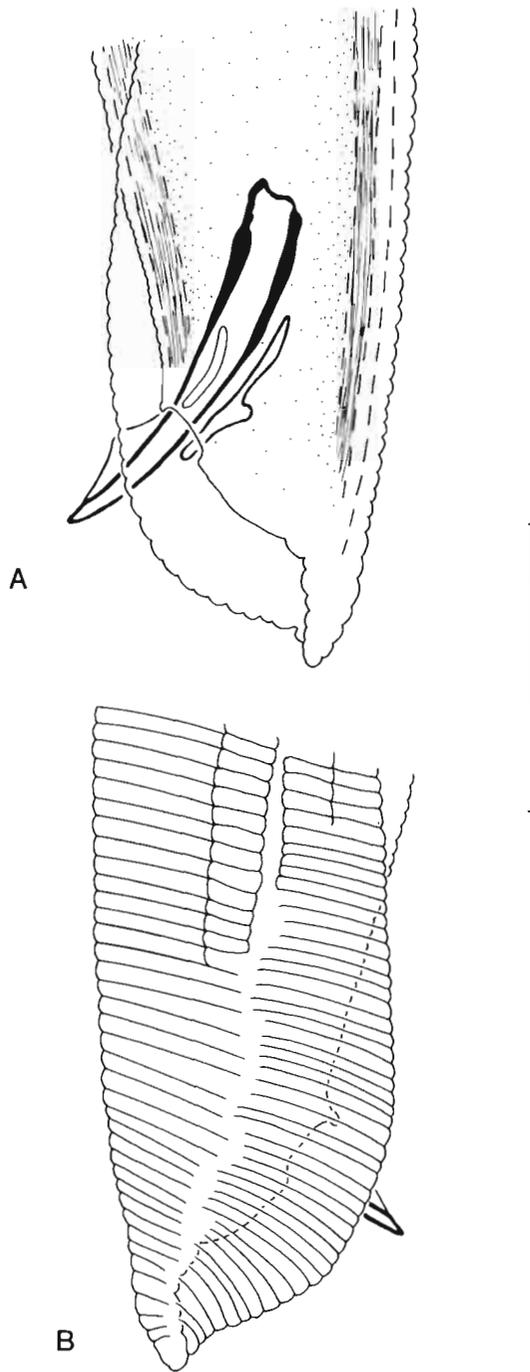


Fig. 3. *Hoplolaimus tylenchiformis* von Daday, 1905 — Male. A : Posterior region, internal view; B : Posterior region, external view. (Bar = 30  $\mu$ m).

sional areolations in middle band. Length of oesophageal overlap over intestine 33.1, 44.8  $\mu$ m and the coefficient of overlapping (de Guiran & Siddiqi, 1967) is 42.9, 54.2 %. Tail broadly rounded with eight to ten annuli.

*Males* : Similar to female except for reproductive system and lip region which appears more rounded in outline; lip region  $13.7 \pm 1.0$  (13.2-15.1)  $\mu$ m wide and  $9.8 \pm 0.8$  (8.8-10.7)  $\mu$ m high. Stylet knobs  $6.4 \pm 0.7$  (5.9-7.4)  $\mu$ m wide and  $5.3 \pm 0.5$  (4.8-5.9)  $\mu$ m high. Metenchium longer than telenchium ( $m = 50.8$ -57.2 %). Lateral field  $10.1 \pm 0.3$  (9.9-10.3)  $\mu$ m wide. Length of oesophageal overlap over intestine  $27.8 \pm 3.8$  (23.5-32.7)  $\mu$ m and the coefficient of overlapping is  $39.9 \pm 3.9$  (35.7-43.4) %. Tail  $28 \pm 2.2$  (25.4-30.5)  $\mu$ m long.

#### DISCUSSION

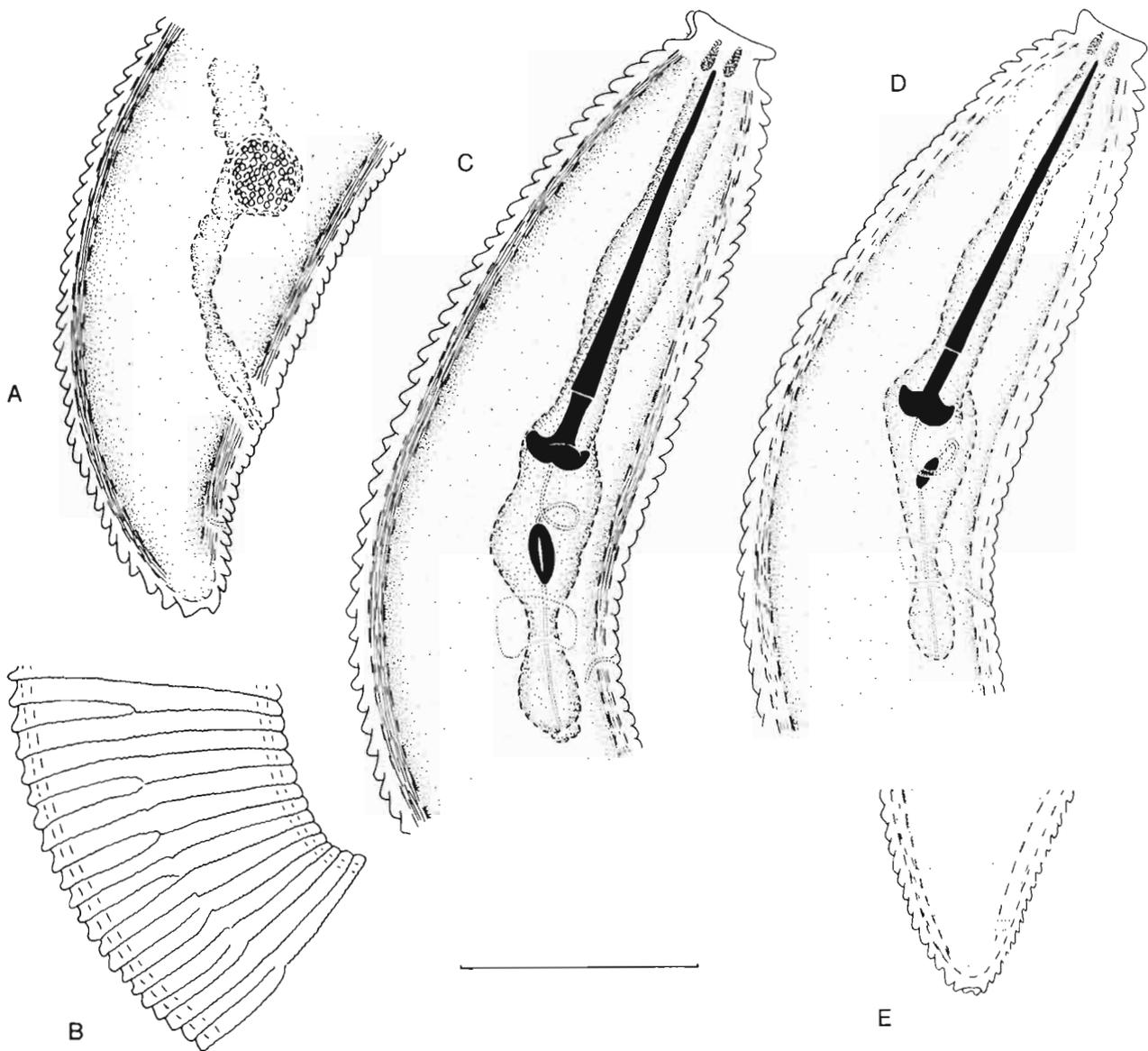
These specimens are in close agreement with the diagnosis of this species (Sher, 1963) except for a few minor differences such as a slightly less areolated lateral field and less blunt and more rounded female tail. Too few specimens were available for cross sections of the lip region or SEM photographs, thus the exact number of longitudinal striations on the basal lip annulus could not be established. The present specimens are also in close agreement with the redescription of the species by Andr assy (1958) which was based on one female from the type locality and five females obtained from the USA from S. A. Sher.

#### *Discocriconemella limitanea* (Luc, 1959) De Grisse & Loof, 1965 (Figs 4, 5)

Several specimens of this species were collected by P. Cadet during 1990 in a forest at Morne Caverne near Morne Bigot in the south of Martinique. These specimens compare well with the original description and various redescriptions of this species. Measurements, figures and SEM photographs are given for the Martinique specimens.

#### MEASUREMENTS

*Females* ( $n = 11$ ) : L =  $0.237 \pm 12.7$  (0.220-0.260) mm; a =  $6.8 \pm 0.5$  (5.9-7.4); b =  $2.4 \pm 0.06$  (2.4-2.6); c =  $19.6 \pm 1.6$  (17.8-22.3); o ( $n = 4$ ) =  $7.1 \pm 1$  (5.6-8.2); V =  $90 \pm 0.9$  (88-91);  $OV_1 = 41 \pm 6.2$  (31-49); stylet =  $56.2 \pm 2.1$  (52.5-59.2)  $\mu$ m; metenchium =  $46.1 \pm 1.9$  (42.6-48.9)  $\mu$ m; telenchium =  $10.1 \pm 0.7$  (8.5-11)  $\mu$ m; stylet knob width =  $8.2 \pm 0.5$  (7.7-8.8)  $\mu$ m; DGO =  $3.9 \pm 0.7$  (2.9-4.4)  $\mu$ m; ant. end to excret. pore =  $85 \pm 4$  (78-92)  $\mu$ m; diam. at midbody =  $35.4 \pm 3.6$  (30.5-42.3)  $\mu$ m; diam. at excret. pore =  $34.4 \pm 1.9$  (32.3-36.4)  $\mu$ m; annulus width =  $2.4 \pm 0.4$  (1.8-2.9)  $\mu$ m; tail length =  $12.2 \pm 1.1$  (10.3-14)  $\mu$ m; ant. end to centre of median bulb valve =  $71 \pm 2.8$  (68-75)  $\mu$ m; centre of median bulb valve to oesophagus base =  $24.9 \pm 2.2$  (22.8-28.7)  $\mu$ m; labial disc width =  $12 \pm 0.7$  (10.3-12.9)  $\mu$ m; width of first body annulus =  $14.5 \pm 0.6$  (13.6-15.8)  $\mu$ m; width of second body annulus =  $18.3 \pm 0.7$  (17.3-19.8)  $\mu$ m; R = 107-113 (dorsal side); RSt = 21-26; ROes =



**Fig. 4.** *Discocriconemella limitanea* (Luc, 1959) De Grisse & Loof, 1965 — Female. A : Posterior region; B : Lateral field area with anastomoses; C : Oesophageal region — Juvenile. D : Oesophageal region; E : Tail. (Bar = 30  $\mu$ m).

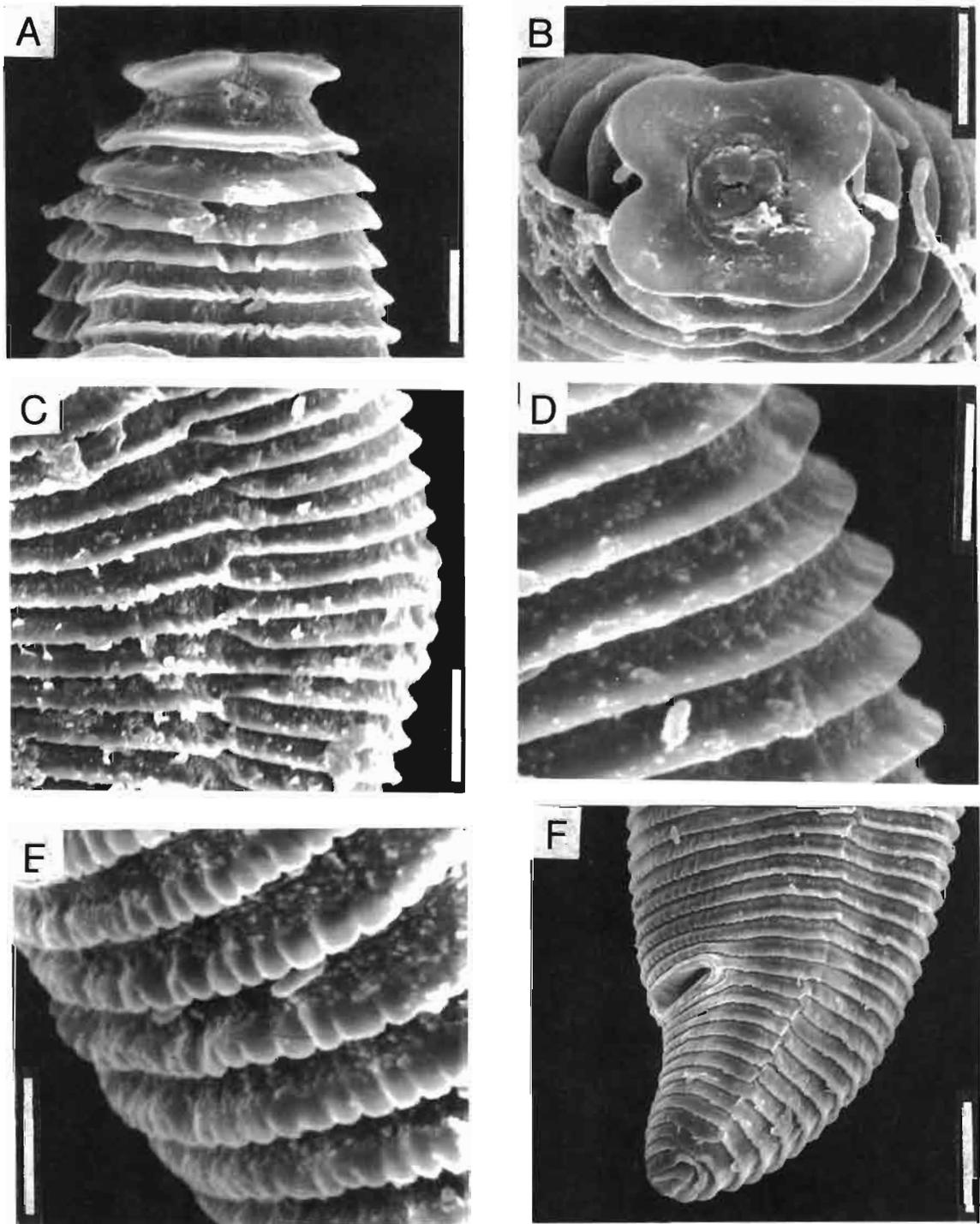
34-39; Rex = 28-33; RV = 12-15; Rvan = 5-7; Ran = 5-8; VL/VB =  $1 \pm 0.09$  (0.9-1.2); St % L =  $23.7 \pm 1$  (22.3-25.2).

*Juveniles* (n = 2) : L = 0.170, 0.220 mm; a = 6.7, 6.9; b = 2.1, 2.6; stylet = 46, 51.1  $\mu$ m; metenchium = 36.1, 40.8  $\mu$ m; telenchium = 9.9, 10.3  $\mu$ m; stylet knob width = 6.2, 7.4  $\mu$ m; stylet knob height = 2.6, 3.3  $\mu$ m; ant. end to excret. pore = 68.7, 72.8  $\mu$ m; diam. at midbody = 26.1, 31.6  $\mu$ m; annulus width = 1.8, 2.2  $\mu$ m; width of labial disc = 9.2, 9.6  $\mu$ m; width of first body annulus = 12.1, 12.9  $\mu$ m;

annulus = 14.7, 16.5  $\mu$ m; R = 114, 112 (dorsal side); RSt = 28, 24; Rex = 32; St % L = 26.4, 23.3.

#### DISCUSSION

These specimens correspond well with the original (Luc, 1959) and various redescrptions of the species (Luc, 1970; Loof & Sharma, 1980; Rashid *et al.*, 1987). Annulus margins on ventral half of body with distinct tooth-like projections (Fig. 5 E) while annulus margins on dorsal half of body appear almost smooth or at most rough (Fig. 5 D). This is in contrast to the other descrip-



**Fig. 5.** *Discocriconemella limitanea* (Luc, 1959) De Grisse & Loof, 1965 — Female. A : Lip region, lateral view; B : *En face* view of labial area; C : Lateral field with anastomoses; D : Annuli on dorsal half of body; E : Annuli on ventral half of body; F : Posterior region. (Bars = 5 µm).

tions in which the annuli are being described as crenate around the whole body. Annuli opposite oesophageal area directed anteriorly on ventral side of body (Fig. 4 C). This was regarded by De Grisse (1968) as a diagnostic character.

### *Hemicycliophora chilensis* Brzeski, 1974

(Figs 6, 7, 8)

A single female collected in Chile by Andrásy (1967) was regarded by him as belonging to *Hemicycliophora thienemanni* (Schneider, 1925) Loos, 1948. Brzeski (1974) restudied this female, found it to be different and proposed the name *H. chilensis* for this specimen. Additional studies by Mehta and Raski (1984) and Rashid *et al.* (1987) on specimens from Colombia and Brazil, respectively, added to the knowledge of this species. These authors did not report or describe males. Numerous female and male specimens were collected during 1990 however, by P. Cadet in rain forest at Morne Bois la Roche, Case Pilote. The identification was confirmed by Dr. E. Costa Manso from Brazil who is familiar with this species. A description, measurements, figures and SEM photographs of the Martinique specimens are given below.

#### MEASUREMENTS

*Females* (n = 14) : L =  $0.1020 \pm 90.2$  (0.870-0.1240) mm; a =  $27 \pm 2.8$  (23.7-32.4); b =  $6.2 \pm 0.4$  (5.6-6.7); c =  $7.3 \pm 0.5$  (6.5-8.2); o =  $9.1 \pm 1.2$  (7-10.6); V =  $79 \pm 0.7$  (78-80);  $OV_1$  =  $37 \pm 4.7$  (36-45); stylet =  $91.6 \pm 2.5$  (86.7-95.9)  $\mu$ m; R = 267-299; RSt = 26-30; ROes = 46-52; Rex = 50-55; RV = 63-85; RVan = 17-27; Ran = 42-62; PV/ABW =  $6.9 \pm 0.6$  (5.9-7.7); T/ABW =  $4.5 \pm 0.4$  (3.9-5.3); VA % T =  $53.2 \pm 11$  (37.1-76.2); VL/VB =  $6.2 \pm 0.5$  (5.5-7.7); St % L =  $9 \pm 0.6$  (7.7-10.1).

*Males* (n = 4) : L =  $0.850 \pm 94.3$  (0.740-0.970) mm; a =  $40 \pm 3.2$  (36.2-43.8); b =  $6.6 \pm 0.5$  (6.3-7.2); c =  $4.8 \pm 0.1$  (4.6-4.9); c' =  $10.9 \pm 1.1$  (9.4-11.8); spicules =  $42.1 \pm 2.1$  (39-43.4)  $\mu$ m (along median line) and  $26.6 \pm 1.9$  (23.9-27.9)  $\mu$ m; (chord); gubernaculum =  $8.1 \pm 0.3$  (7.7-8.5)  $\mu$ m; Rex = 97-109; Rhem = 89 (n = 1).

*Juveniles* 4th stage (n = 4) : L =  $0.700$  mm  $\pm 83.6$  (0.610-0.800) mm; a =  $23 \pm 2.6$  (19.8-25.9); b =  $4.9 \pm 0.4$  (4.4-5.3); c =  $6.5 \pm 1.3$  (4.9-7.9); o =  $10.1 \pm 1.4$  (8.8-11.6); stylet =  $74.8 \pm 8.2$  (63.9-82.4)  $\mu$ m; R = 283-304; RSt = 32-34; ROes = 56-61; Rex = 54-59; Ran = 52-84; T/ABW =  $5.7 \pm 0.8$  (4.9-6.4); St % L =  $10.7 \pm 0.4$  (10.3-11.2).

#### DESCRIPTION

*Females* : Body slightly arcuate ventrally. Sheath loosely fitting or closely fitting up to vulva, then loosely fitting. Lateral field starting as a break in the striae

opposite oesophageal area, becoming two indistinct lines which form blocks with the transverse striae; these lines continue as such to vulval area where they form a single line again until dwindling to a break in the striae on the tail; meeting of transverse lines within the blocks frequently irregular; faint longitudinal lines observed within these blocks. Cuticle outside lateral field with numerous faint longitudinal lines forming narrow blocks, less distinct opposite oesophageal area and post-vulvally where the blocks appear smaller; blocks not arranged in longitudinal rows. Lip region rounded with two annuli,  $16.7 \pm 0.9$  (15.4-18)  $\mu$ m wide and  $8.3 \pm 0.8$  (7-9.9)  $\mu$ m high. In an *en face* view (Fig. 8 A) the labial area appears in the form of a figure eight with oval labial disc not markedly raised above first lip annulus. Cephalic framework moderately sclerotized. Stylet very slender, slightly curved dorsally; stylet knobs sloping anteriorly, rounded posteriorly with a small cavity; knobs  $6.9 \pm 0.6$  (5.9-7.7)  $\mu$ m wide and  $3.6 \pm 0.4$  (2.9-4.4)  $\mu$ m high. Metenchium  $77.4 \pm 2.2$  (72.4-80.5)  $\mu$ m long and telenchium  $14.2 \pm 0.9$  (13.2-15.4)  $\mu$ m long. Opening of dorsal oesophageal gland  $8.4 \pm 1.1$  (6.6-9.6)  $\mu$ m from base of stylet knobs. Oesophagus  $116 \pm 5.2$  (108-127)  $\mu$ m from anterior end of body to centre of valve of median bulb and  $48.9 \pm 4$  (44.1-61.7)  $\mu$ m from centre of valve of median bulb to base of oesophagus. Hemizonid not seen. Excretory pore situated from one to six annuli posterior to oesophagus,  $177 \pm 8.2$  (158-191)  $\mu$ m from anterior end of body. Width at midbody  $37.9 \pm 2.9$  (32.7-43.4)  $\mu$ m and at excretory pore  $35.5 \pm 2.7$  (30.1-39.7)  $\mu$ m. Annuli on outer cuticle slightly rounded,  $4 \pm 0.4$  (3.3-4.8)  $\mu$ m wide at midbody. Distance between vulva and anus  $73.5 \pm 12$  (58.8-105.8)  $\mu$ m. Tail  $141 \pm 16.7$  (107-168)  $\mu$ m long, tapering gradually to about last third where it narrows more abruptly, then gradually again to a finely rounded or sharply pointed terminus; annulation indistinct near terminus in some specimens, distinct but smaller than on rest of body in others. Spermatheca round to oblong, filled with roundish sperm, five or six annuli long and situated 25 to 42 annuli anterior to vulva.

*Males* : Body slightly arcuate ventrally. Lip region rounded, not annulated,  $10.1 \pm 0.6$  (9.6-11)  $\mu$ m wide and  $6.5 \pm 0.5$  (6.2-7)  $\mu$ m high; basal part wider than adjoining body. Stylet absent. Oesophagus degenerate. Lateral field  $3.5 \pm 0.5$  (2.9-4)  $\mu$ m wide with two slightly crenate lines, each crenation corresponding to two body annuli; disappearing on bursa. Hemizonid distinct, four annuli long and situated two to six annuli anterior to excretory pore. Excretory pore situated  $139 \pm 11$  (123-148)  $\mu$ m from anterior end of body. Width at midbody  $21.3 \pm 0.8$  (20.2-22.1)  $\mu$ m and at excretory pore  $19.9 \pm 1.1$  (19.1-21.3)  $\mu$ m. Annuli  $1.3 \pm 0.2$  (1.1-1.5)  $\mu$ m wide at midbody. Tail  $180 \pm 22.8$  (149-203)  $\mu$ m long, gradually tapering to an acute terminus; last part of tail not distinctly annulated. Bursa

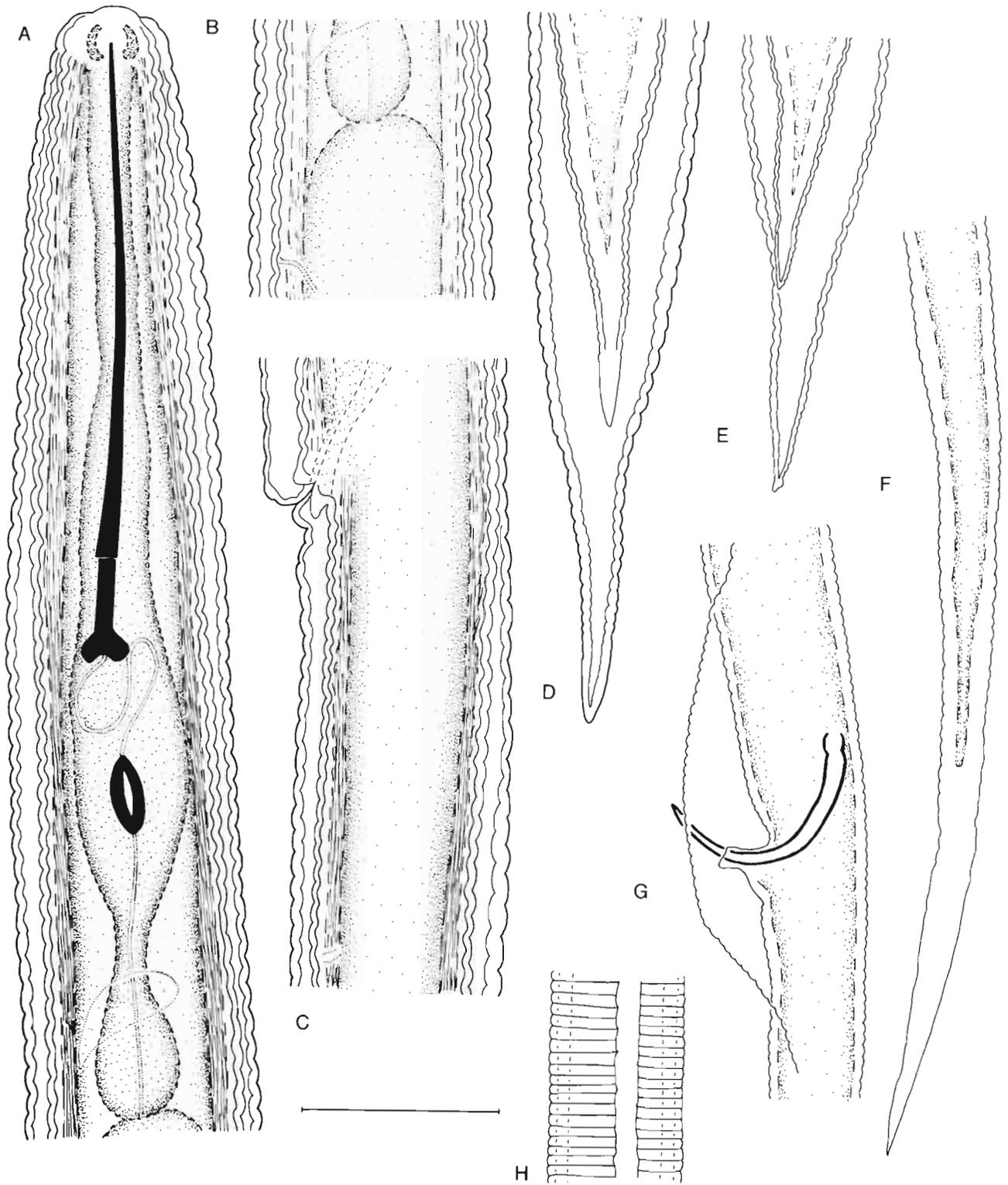
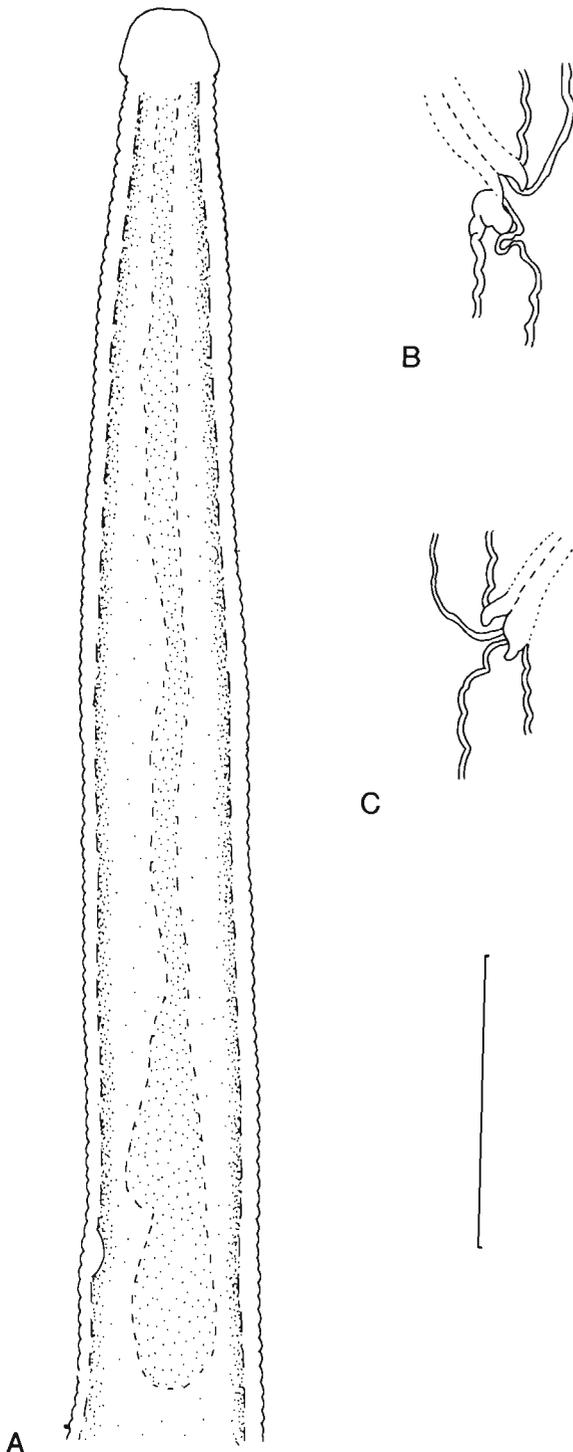


Fig. 6. *Hemicyclophora chilensis* Brzeski, 1974 — Female. A : Oesophageal region; B : Excretory pore region; C : Vulval region; D, E : Tail — Male. F : Tail; G : Cloacal region; H : Lateral field. (Bar = 30  $\mu$ m).



**Fig. 7.** *Hemicycliophora chilensis* Brzeski, 1974 — Male. A : Oesophageal region — Female. B, C : Vulval lips. (Bar = 30  $\mu$ m).

well developed, about five times cloacal body width long. Penial tube  $6.5 \pm 0.9$  (5.2-7.4)  $\mu$ m long.

*Juveniles* (4th stage) : Similar to female. Length of genital primordium  $71.4 \pm 10.4$  (62.5-82)  $\mu$ m with numerous cells.

#### DISCUSSION

These specimens from Martinique correspond well with the original description of the species from Chile as well as redescrptions from Brazil and Colombia except for the presence of males and filled spermathecae in the females. Females are slightly larger (0.870-1.240 *vs* 0.690-1.040 mm) with more body annules (267-299 *vs* 212-274) and a longer tail (107-168 *vs* 66-101  $\mu$ m); vulval lips slightly more elongated and vulval sheath slightly more prominent varying from not present to about one annulus long. Dr. E. Costa Manso (pers. comm.) confirmed that several Brazilian populations comprised males and females with filled spermathecae.

#### *Gracilacus longilabiata* Huang & Raski, 1986

(Figs 9, 10)

This species was originally described from banana and unidentified grass near Brazlandia and from grass near Cristalina Goias in Brazil by Huang and Raski (1986). Now several specimens, regarded as belonging to this species, have been collected in the forest along the Rivière Blanche on the Piton de l'Alma as well as from another forest at Morne Platine by P. Cadet during 1990 in Martinique. Measurements, figures, SEM photographs and a description is given for these specimens. This is the second report of this species.

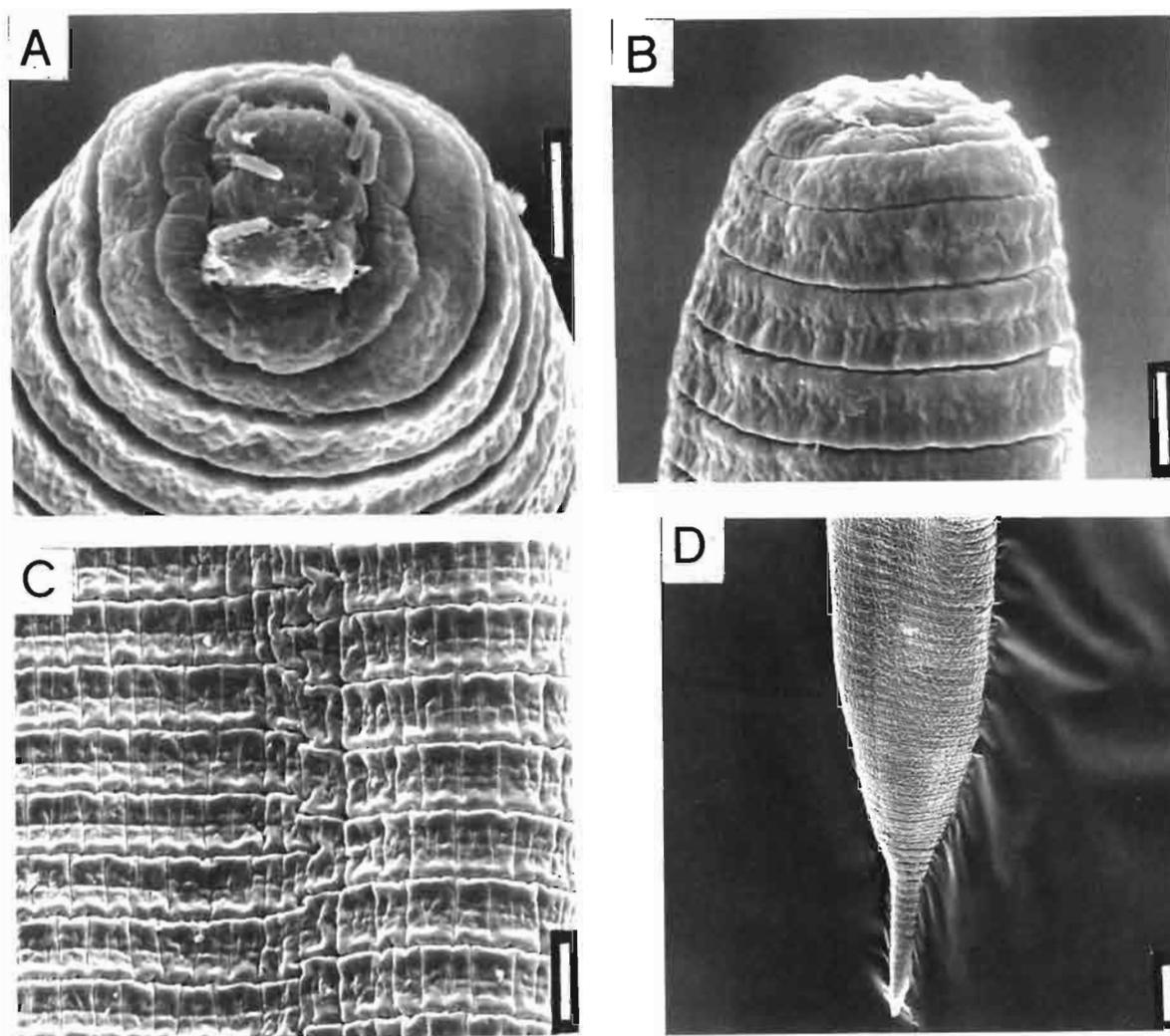
#### MEASUREMENTS

*Females* - Rivière Blanche (n = 14) : L =  $0.320 \pm 16.5$  (0.300-0.350) mm; a =  $24.3 \pm 1.8$  (20.1-26.2); b =  $3.9 \pm 0.2$  (3.7-4.2); c =  $15.8 \pm 0.5$  (15.1-18.2); c' =  $2.8 \pm 0.3$  (2.3-3.6); o = 9.2 (n = 1); V =  $80 \pm 1$  (78-82); stylet =  $46.6 \pm 1.6$  (44.1-50.4)  $\mu$ m.

*Females* - Morne Platine (n = 18) : L =  $0.350 \pm 14.2$  (0.330-0.360); a =  $24.4 \pm 2$  (21-27.2); b =  $4.1 \pm 0.4$  (3.2-4.3); c =  $16.3 \pm 2.5$  (13.6-21.2); c' =  $3 \pm 0.4$  (2.5-3.6); o = 11.5, 9.7 (n = 2); V =  $78 \pm 0.9$  (77-79); OV<sub>1</sub> =  $34 \pm 5.6$  (27-39); stylet =  $42.3 \pm 0.9$  (41.2-44.1)  $\mu$ m.

#### DESCRIPTION

*Females* : Body curved ventrally into the form of an open or closed C. Labial area transformed into a large disc,  $4.5 \pm 0.4$  (4-5.2)  $\mu$ m wide, clearly set off from rest of non-annulated lip region. Stoma walls cuticularized on both sides. Stylet very slender, sometimes slightly curved dorsally. Stylet knobs rounded posteriorly and sloping anteriorly,  $3.5 \pm 0.4$  (2.9-4)  $\mu$ m wide and  $2 \pm 0.3$  (1.5-2.6)  $\mu$ m high. Metenchium  $34.5 \pm 1.8$  (31.6-38.6)  $\mu$ m long and telenchium  $10.7 \pm 1.2$  (8.8-12.5)  $\mu$ m long. Opening of dorsal oesophageal



**Fig. 8.** *Hemicycliophora chilensis* Brzeski, 1974 — Female. A : En face view of labial area; B : Lip region, lateral view; C : Lateral field and annuli with longitudinal lines; D : Tail. (Bar = 5  $\mu\text{m}$  in A, B, C; 20  $\mu\text{m}$  in D).

gland seen in three specimens only, 4-4.8  $\mu\text{m}$  from base of stylet knobs. Nerve ring crossing over middle of isthmus. Length of oesophagus 55  $\pm$  3 (51.5-64.3)  $\mu\text{m}$  from anterior end of body to centre of median bulb valve and 29.4  $\pm$  2.8 (24.3-37.5)  $\mu\text{m}$  from centre of median bulb valve to base of oesophagus. Hemizonid three annuli long, situated one or two annuli anterior to excretory pore. Hemizonion not seen. Excretory pore situated from opposite posterior part of isthmus to opposite posterior part of oesophageal lobe, 74.8  $\pm$  3.5 (70.2-80.5)  $\mu\text{m}$  from anterior end of body. Vulval lips not prominent; body not constricted behind vulva. Lateral vulval flaps distinct and rounded. Spermatheca distinct, rounded and filled with roundish sperm. Post uterine branch absent. Lateral field 2  $\pm$  0.3 (1.5-2.6)  $\mu\text{m}$  wide with four equally distinct lines in most specimens.

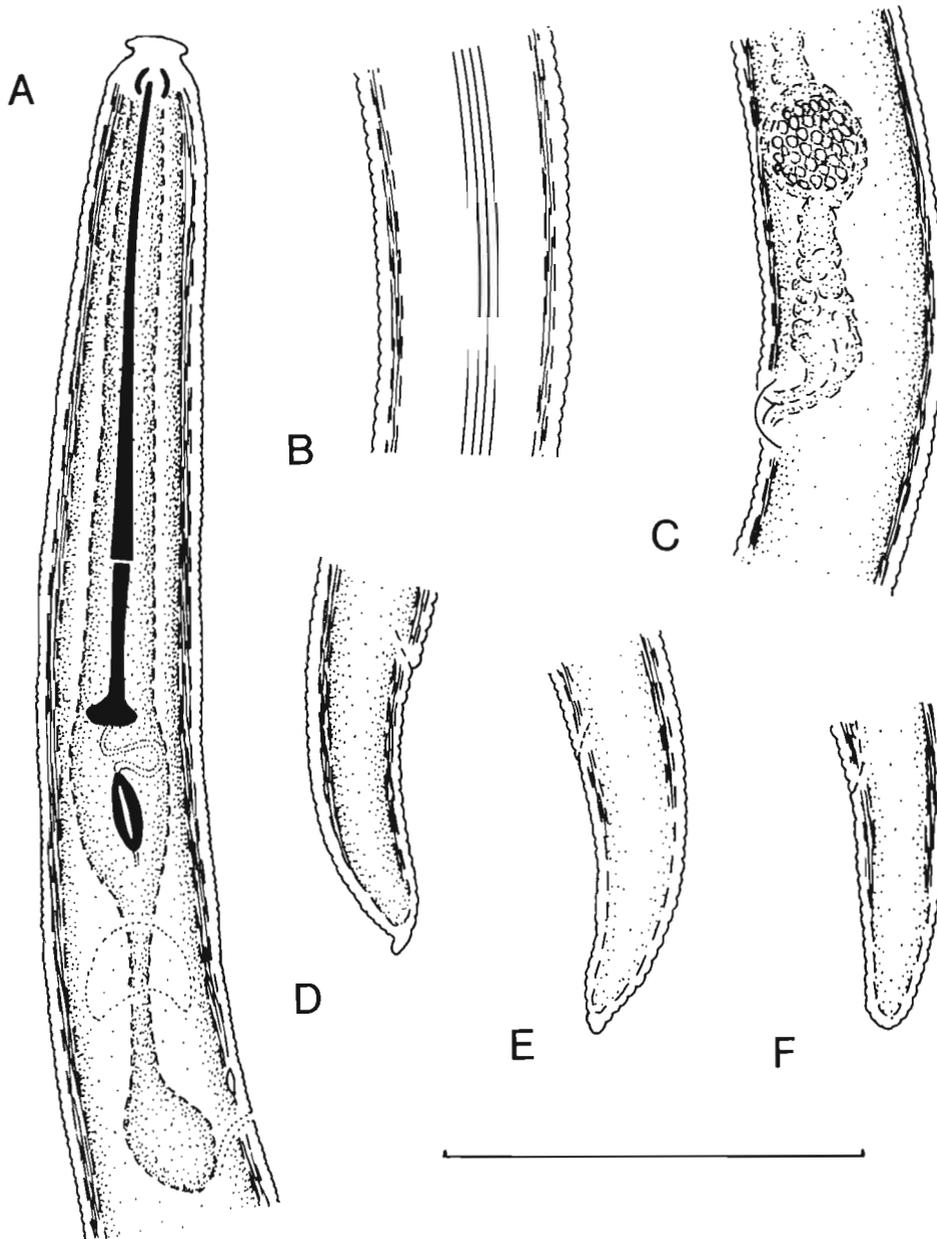
Phasmids not observed. Width of annuli near midbody 0.8  $\pm$  0.2 (0.7-1.1)  $\mu\text{m}$ . Width at midbody 13.8  $\pm$  1.9 (12.1-16.5)  $\mu\text{m}$  and at excretory pore 12.3  $\pm$  0.8 (10.7-13.2)  $\mu\text{m}$ . Tail 20.8  $\pm$  2.6 (15.4-25)  $\mu\text{m}$  long, tapering gradually to a slightly pointed tip with a small peg on the terminus, rarely rounded.

*Males* : Not found.

*Juveniles* : Not found.

#### DISCUSSION

The present specimens are very similar to the Brazilian specimens except for having a smaller stylet (41.2-50.4 *vs* 58-71  $\mu\text{m}$ ). Other slight differences noticed are anteriorly sloping stylet knobs *vs* anteriorly flattened knobs and an excretory pore which is mainly situated opposite oesophageal lobe *vs* in region of median bulb.



**Fig. 9.** *Gracilacus longilabiata* Huang & Raski, 1986 — Female. A : Oesophageal region; B : Lateral field; C : Vulval region; D, E, F : Tail variations. (Bar = 30  $\mu$ m).

The only other species in the genus with a disc-like lip region is *Gracilacus capitata* Adams & Eichenmuller, 1962. This species has anteriorly sloping stylet knobs, but the present specimens differ in being slightly smaller (0.300-0.360 vs 0.410-0.510 mm), in having a shorter stylet (41.2-50.4 vs 63-82  $\mu$ m), body not as constricted, and extremely ventrally curved behind vulva; lateral field not expanding opposite vulva vs expanded to an oval pattern; vulva not a deep slit and not circum-

scribed by a cuticular evagination; annulus width smaller (0.7-1.1 vs 1.4  $\mu$ m) and lateral field slightly narrower (15.5 vs 20%). Although *C. capitata* females have a stylet almost similar to *C. longilabiata* in length, the Martinique specimens differ in many respects from the former species whilst they are almost similar to *C. longilabiata* except for stylet length which could be as a result of geographic variation and is thus regarded as belonging to this species.

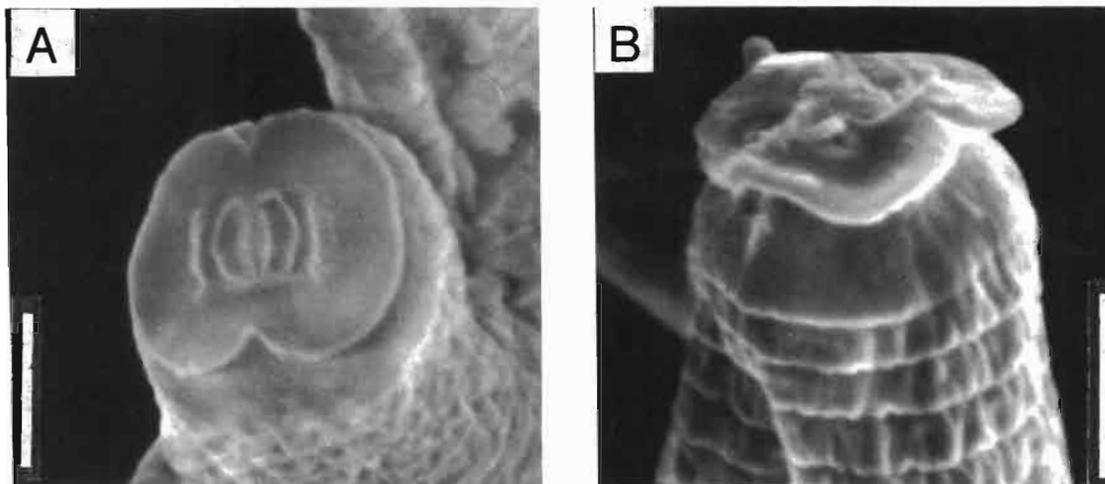


Fig. 10. *Gracilacus longilabiata* Huang & Raski, 1986 — Female. A : En face view of labial area; B : Lip region, lateral view. (Bars = 2.5  $\mu$ m).

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