*Instituto «López-Neyra» de Parasitología, C.S.I.C. - 18001 Granada, España*
*and*
*Landbouwuniversiteit, Wageningen, Netherlands**

# ON TWO SPECIES OF *HEMICYCLIOPHORA* DE MAN, 1921 (NEMATODA: CRICONEMATOIDEA) FOUND IN SPAIN

by
P. CASTILLO, A. GOMEZ-BARCINA and P.A.A. LOOF*

**Summary.** During a survey of the nematode fauna of wet soils in the Sierra de Cazorla in the southeastern part of Spain we found two species of the genus *Hemicycliophora* de Man, 1921. One was identified as *H. conida* Thorne, 1955; the other is described here as *H. iberica* sp.n.

Soil samples collected from wet habitats in a mountainous area in southeastern Spain yielded two nematode species belonging to the genus *Hemicycliophora* de Man, 1921.

Specimens were killed by gentle heat, fixed in 4% formaldehyde and mounted in dehydrated glycerine (Seinhorst, 1962). SEM photos for Fig. 2 were taken with a Zeiss DSM 950 scanning electron microscope at 10 kV, using specimens already processed to glycerine, and then coated with a thin layer of gold. SEM photos for Fig. 4 were made as follows: A, B and D on a Jeol JSM 35 and C on a Jeol JSM U 3, both located at TFDL, Wageningen, Netherlands.

## *HEMICYCLIOPHORA IBERICA* sp. n. (Figs. 1-3, Table I)

Female, holotype: L = 0.86 mm; a = 31; b = 5.6; c = 11.1; c' = 3.7; V = 85; $G_1$ = 44; stylet = 83 µm; St%L = 9.7; Rex = 52; RV = 57; RVan = 17; Ran = 40; R = 264; oesophagus = 152 µm; tail = 77 µm; T%PV = 59; PV/ABW = 6.3.

*Female*: body slightly curved ventrad in death. Outer cuticle fitting closely around body. Lateral field 5.5 ± 0.6 µm (5-6) wide, marked by two longitudinal lines (Fig. 2, D); between them breaks in the transverse striae suggest a possible third line. Annulation distinct on both cuticle and sheath; only on the inner cuticle it becomes obscure at the extreme tail tip. Lip region truncate, composed of three annuli, 11.7 ± 0.7 µm (10-13) wide. Labial disc clearly separated; amphidial apertures wide open (Fig. 2,A). Labial disc rather small, oval, with thickened edges. Cephalic framework moderately developed 4.5-5 µm long. Stylet typical, knobs directed backward, 7 ± 0.8 µm (6-9) across, with distinct cavity 17 ± 0.3 µm (1.3-2). Orifice of dorsal oesophageal gland 7.4 ± 1.9 µm (6-8.7) from base of stylet knobs. Oesophagus typical. Hemizonid two annuli long, situated 1-2 annuli anterior to excretory pore. Excretory pore 4-6 annuli behind base of oesophagus. Vulval lips elongate, modified. Vulval discontinuity marked. Vulval sleeve very short, almost non-existent. Gonad typical; spermatheca empty. Distance between vulva and anus 45.» ± 8.8 µm (33-56). Tail with distal part offset, elongate-triangular.

*Male*: not found.

*Juvenile*: similar to female except for the tail which is more conically rounded.

*Type habitat and locality*: specimens collected from wet soil around the roots of *Populus nigra* L. from Arroyo Frio, in Sierra de Cazorla (Jaén) at southeastern Spain.

*Type specimens*: holotype female on slide WT 2722 and nine female paratypes on slides WT 2723-2728 at Department of Nematology, Landbouwuniversiteit, Wageningen, Netherlands; 15 female paratypes on slides H111-H115 at the Nematology collection of Instituto «López-Neyra» de Parasitología, C.S.I.C., Granada, Spain; two female paratypes deposited at each of the following addresses: Istituto di Nematologia Agraria, C.N.R., Bari, Italy; C.I.P. St. Albans, Herts., England; Institut für Nematologie, Biologische Bundesanstalt für Land-und-Forstwirtschaft, Münster, Germany; Department fo Systematic Zoology and Ecology, Eötvös Loránd University, Budapest, Hungary; University of California, Department of Nematology, Riverside, USA; Division of Nematology, University of California, Davis, USA; Department of Nematology, Rothamsted Expt. Station, Harpenden, England; Department of

Zoology, Rand Afrikaans University, Johannesburg, South Africa; Mycology and Nematology Laboratory, Biosystematics and Beneficial Insects Institute, Beltsville, Maryland, USA; Muséum National d'Histoire Naturelle, Laboratoire des Vers, Paris, France and Instytut Warzywnictwa, Skierniewice, Poland.

*Diagnosis*: *H. iberica* sp. n. is characterized by two lines on lateral field, truncate lip region composed of three annuli, a long stylet 85 µm (79-94), absence of males, tail elongate-triangular with distal part offset and 258 (242-277) annuli on body.

*Relationship*: *H. iberica* sp. n. is very close to *H. triangulum* Loof, 1968, to the extent that we considered describing it as a subspecies of the latter. However, the subspecies concept is hardly applicable to these unisexual populations, and therefore we prefer to regard the Cazorla population as a distinct species.

It differs from *H. triangulum* by: longer stylet (79-94 µm vs 66-83 µm); sheath on terminal part of tail usually somewhat loose vs. usually closely adpressed; terminal part of tail elongate-triangular vs. short-triangular (Fig. 3); the oral disc in *H. triangulum* shows a higher inner and a lower outer collar (Fig. 4). In addition, the lip region tends to be slightly narrower in *H. iberica* (10-13 µm) than in *H. triangulum* (14-15 µm), both measured along inner cuticle.

### *HEMICYCLIOPHORA CONIDA* Thorne, 1955 (Table II)

Nine females were found in wet soil around the roots of *Juncus* sp. in a small stream near Coto Rios in the Sierra de Cazorla (Jaén).

TABLE I - *Morphometrics of* Hemicycliophora iberica *sp. n., female (measurements in µm)*

| | n = 32 females | | |
|---|---|---|---|
| | $\bar{X}$ ± DS | Extr. Val. | CV % |
| L | 828.6±63.6 | 672–953 | 7.7 |
| a | 24.9±2.2 | 20.4–28.2 | 9.0 |
| b | 5.5±0.4 | 4.5–6.4 | 7.4 |
| V | 84.4±1.5 | 81–87 | 1.8 |
| $G_1$ | 41.7±7.1 | 23–61 | 17.1 |
| c | 10.4±1.3 | 7.9–13.9 | 12.1 |
| c' | 2.9±0.4 | 2.1–3.7 | 12.9 |
| stylet | 85.3±3.9 | 79–94 | 4.5 |
| stylet % L | 9.9 | 9.1–11.7 | – |
| S | 3.0±0.3 | 2.1–3.7 | 13.4 |
| conus | 71.1±3.3 | 65–79 | 5.5 |
| R | 258.4±7.5 | 242–277 | 2.9 |
| Rst | 27.6±2.3 | 18–31 | 8.3 |
| Rex | 50.9±1.8 | 47–54 | 3.6 |
| ROes | 46.8±2.3 | 42–52 | 5.0 |
| Rhem | 48.2±1.2 | 46–50 | 2.5 |
| RB | 3.7±0.3 | 3.3–4.7 | 8.9 |
| RV | 50.8±4.6 | 41–59 | 9.1 |
| RVan | 16.2±2.1 | 13–22 | 13.2 |
| Ran | 34.6±4.3 | 24–44 | 12.5 |
| VL/VB | 4.0±0.3 | 3.2–4.7 | 8.4 |
| oesophagus | 150.4±7.5 | 122–162 | 5.0 |
| nerve ring | 125.7±7.7 | 110–142 | 6.1 |
| excretory pore | 165.9±13.7 | 137–195 | 8.2 |
| maximum width | 33.4±2.9 | 28.0–40.8 | 8.6 |
| ABW | 27.3±2.9 | 21–36 | 10.5 |
| PV/ABW | 5.5 | 4.4–6.4 | – |
| tail length | 80.4±9.0 | 61–97 | 11.2 |
| T % PV | 62 | 55–60 | – |
| Tail/vulva-anus | 1.8±0.5 | 1.1–3.7 | 29.0 |

TABLE II - *Morphometrics of* Hemicycliophora conida *female (measurements in µm)*

| | n = 9 females | | |
|---|---|---|---|
| | $\bar{X}$±DS | Extr. Val. | CV % |
| L | 817±83.6 | 719–945 | 10.2 |
| a | 21.0±1.0 | 19.8–22.5 | 4.8 |
| b | 5.7±0.4 | 5.1–6.2 | 7.6 |
| V | 84±1.0 | 84–87 | 1.8 |
| $G_1$ | 39±8.9 | 29–53 | 22.8 |
| c | 10.3±1.4 | 9.0–13.7 | 13.4 |
| c' | 2.7±0.4 | 1.9–3.2 | 13.1 |
| stylet | 85±6.0 | 77–94 | 7.0 |
| S | 2.6±0.2 | 2.3–2.8 | 6.1 |
| conus | 71±5.2 | 65–79 | 7.3 |
| R | 231±7.6 | 219–240 | 3.3 |
| Rst | 21±1.1 | 20–23 | 5.2 |
| Rex | 42±1.8 | 40–46 | 5.4 |
| ROes | 38±2.5 | 34–41 | 6.5 |
| Rhem | 40±2.1 | 37–43 | 5.2 |
| RB | 4.2±0.2 | 4.0–4.5 | 6.0 |
| RV | 46±2.6 | 41–51 | 5.7 |
| RVan | 14±1.8 | 11–17 | 12.5 |
| Ran | 32±3.3 | 28–37 | 10.4 |
| VL/VB | 3.3±0.3 | 2.7–3.6 | 9.0 |
| width lip region | 18.0±1.7 | 16–20 | 9.5 |
| oesophagus | 143±15.8 | 118–164 | 11.0 |
| nerve ring | 120±12.2 | 100–133 | 10.1 |
| excretory pore | 159±17.8 | 126–182 | 11.2 |
| maximum width | 39±2.6 | 35–42 | 6.9 |
| ABW | 29±3.2 | 25–35 | 10.9 |
| PV/ABW (n = 8) | 4.6 | 3.9–5.6 | – |
| T % PV (n = 8) | 70 | 59–76 | – |
| tail length | 80±9.6 | 60–93 | 12.0 |
| vulva-anus | 48±8.5 | 35–62 | 17.7 |
| Tail/vulva-anus | 1.7±0.3 | 1.2–2.3 | 19.7 |

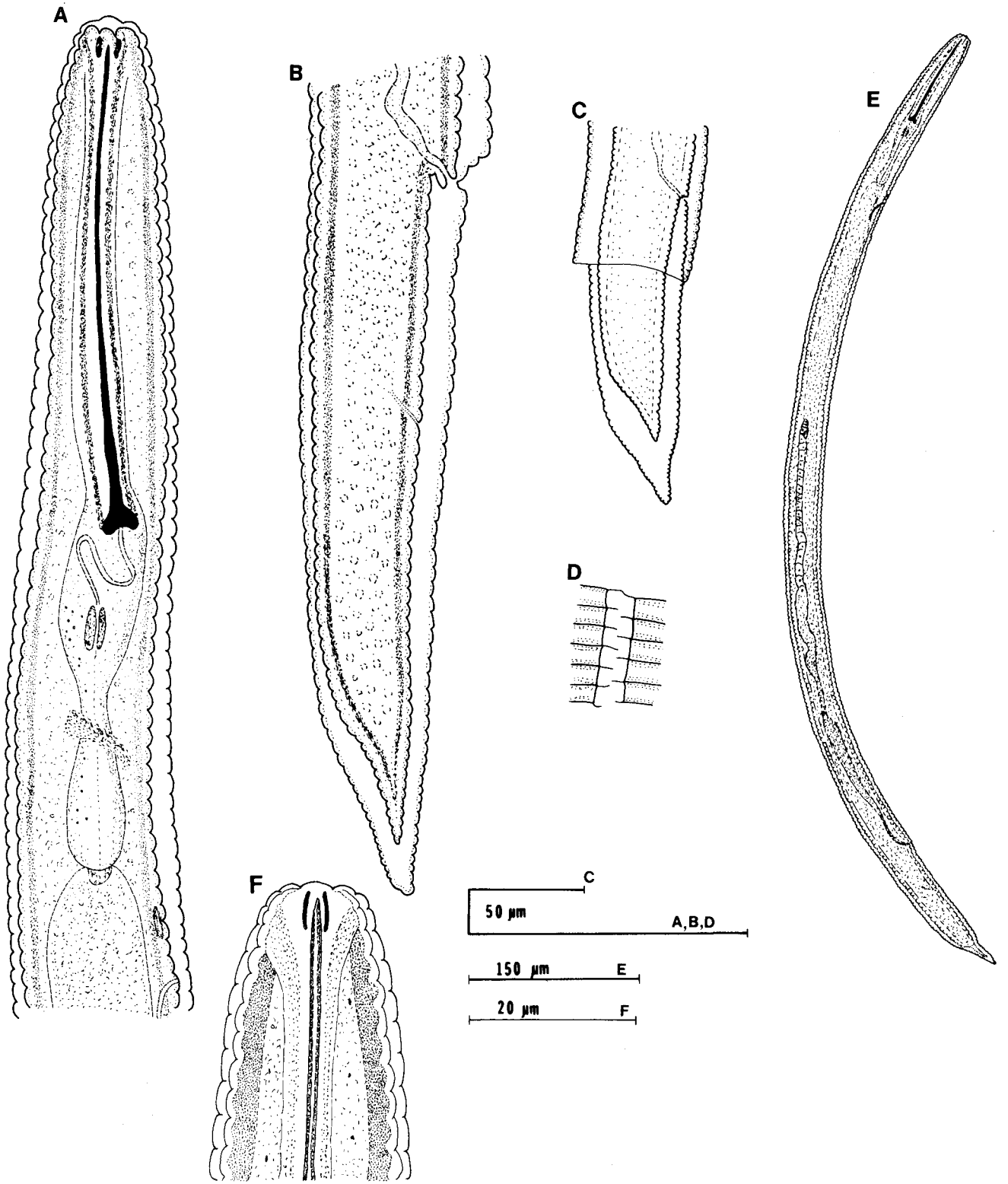


Fig. 1 - *Hemicycliophora iberica* sp. n. Female: A, oesophageal region; B, posterior region; D, lateral field; E, whole body; F, anterior end; juvenile: C, posterior region.

Since R = 219-240, stylet length = 77-94 µm and Rex = 42-46, we consider them as representing Form I (see Loof, 1968) except one specimen which has Rex = 40, R = 222 and stylet = 80 µm which rather might be Form II.

This species has been recorded in north and central region of Spain (Bello, 1979), this record being the first in the south region.

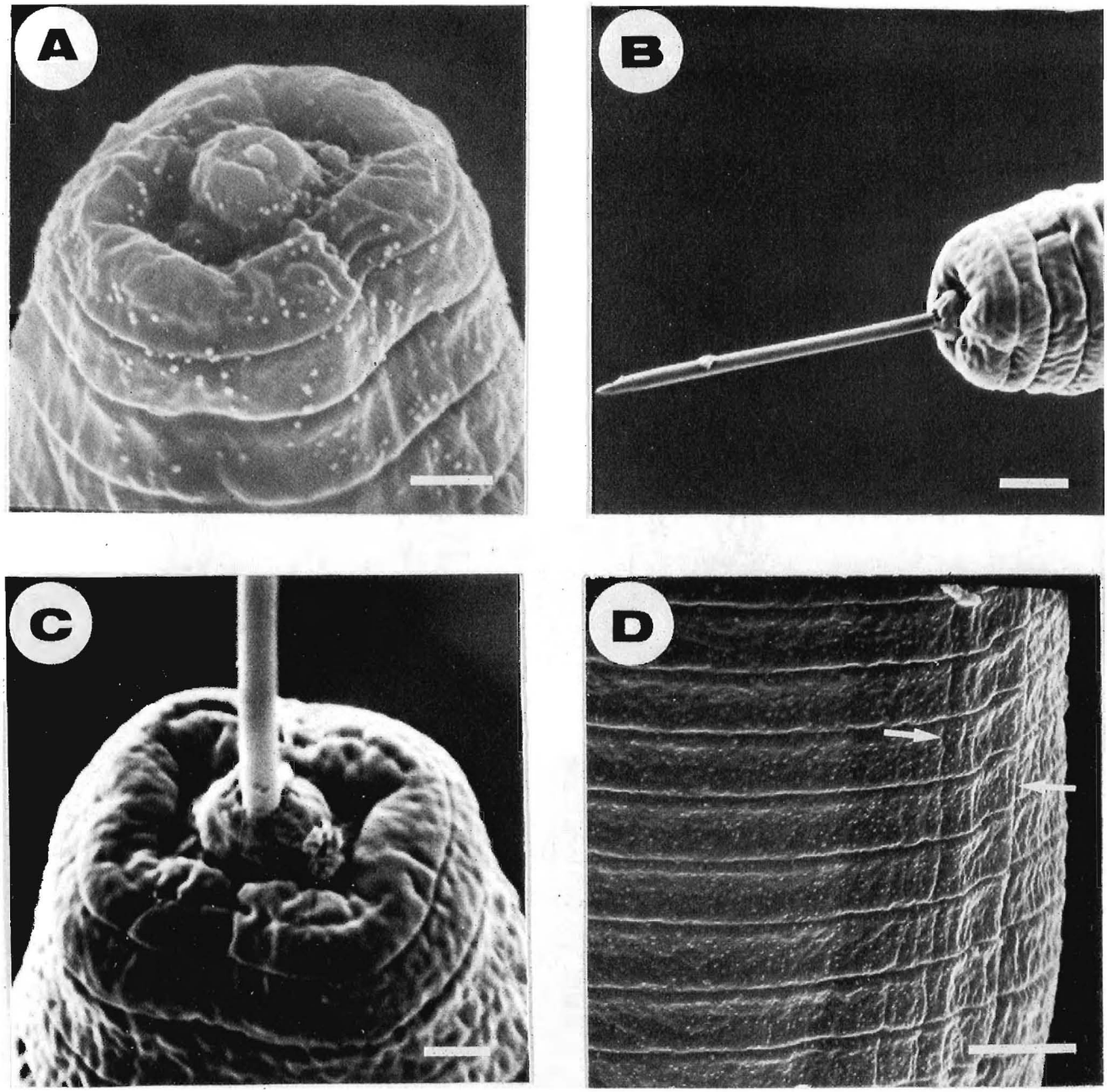


Fig. 2 - *Hemicycliophora iberica* sp. n. Female SEM micrographs: A, B, C, head end, 6402x, 200x, 5000x (bar = 2 µm, 5 µm and 2 µm respectively); D, lateral field, 3380x (bar = 5 µm).

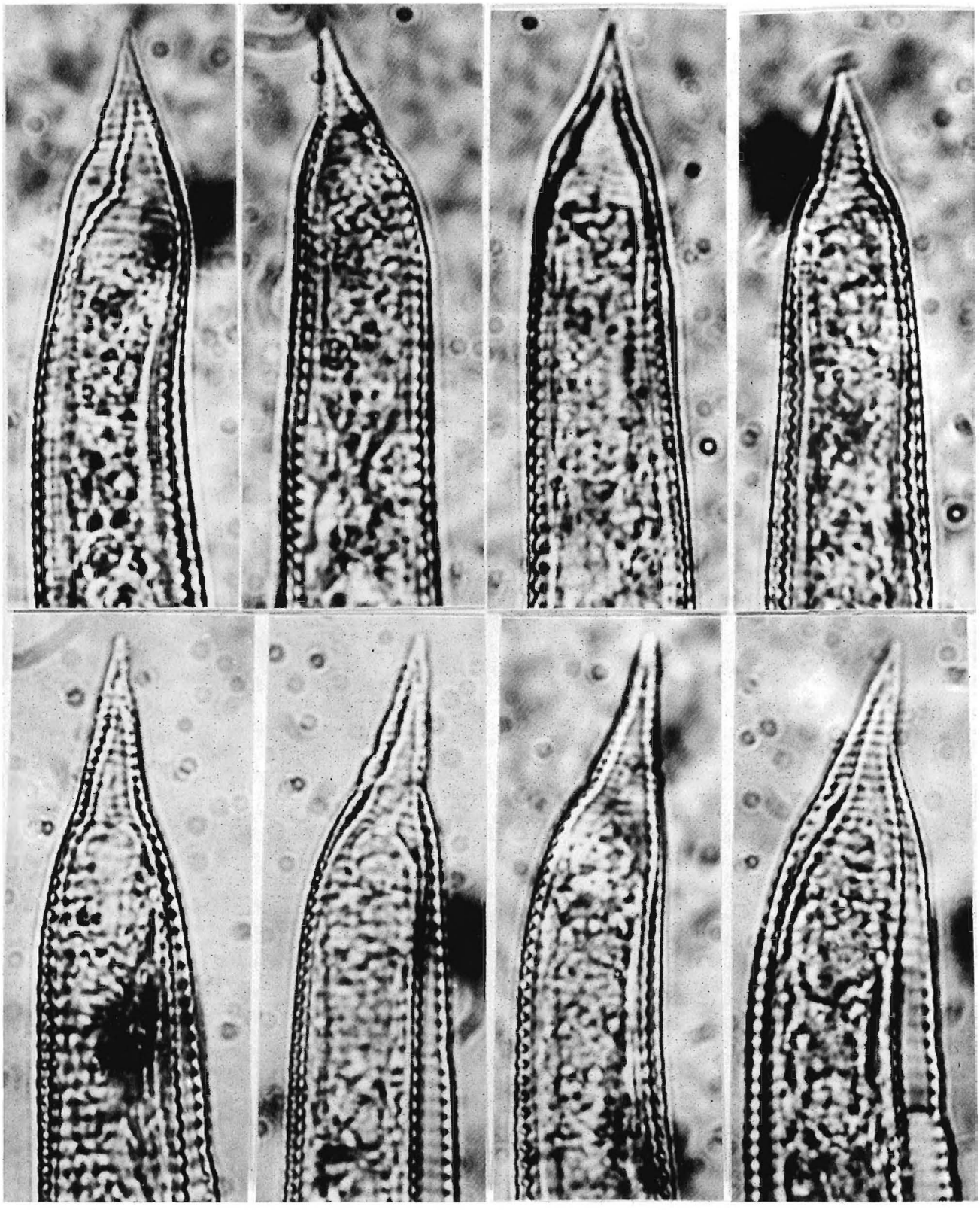

Fig. 3 - Tail of *Hemicycliophora iberica* (upper row) and *Hemicycliophora triangulum* (lower row).

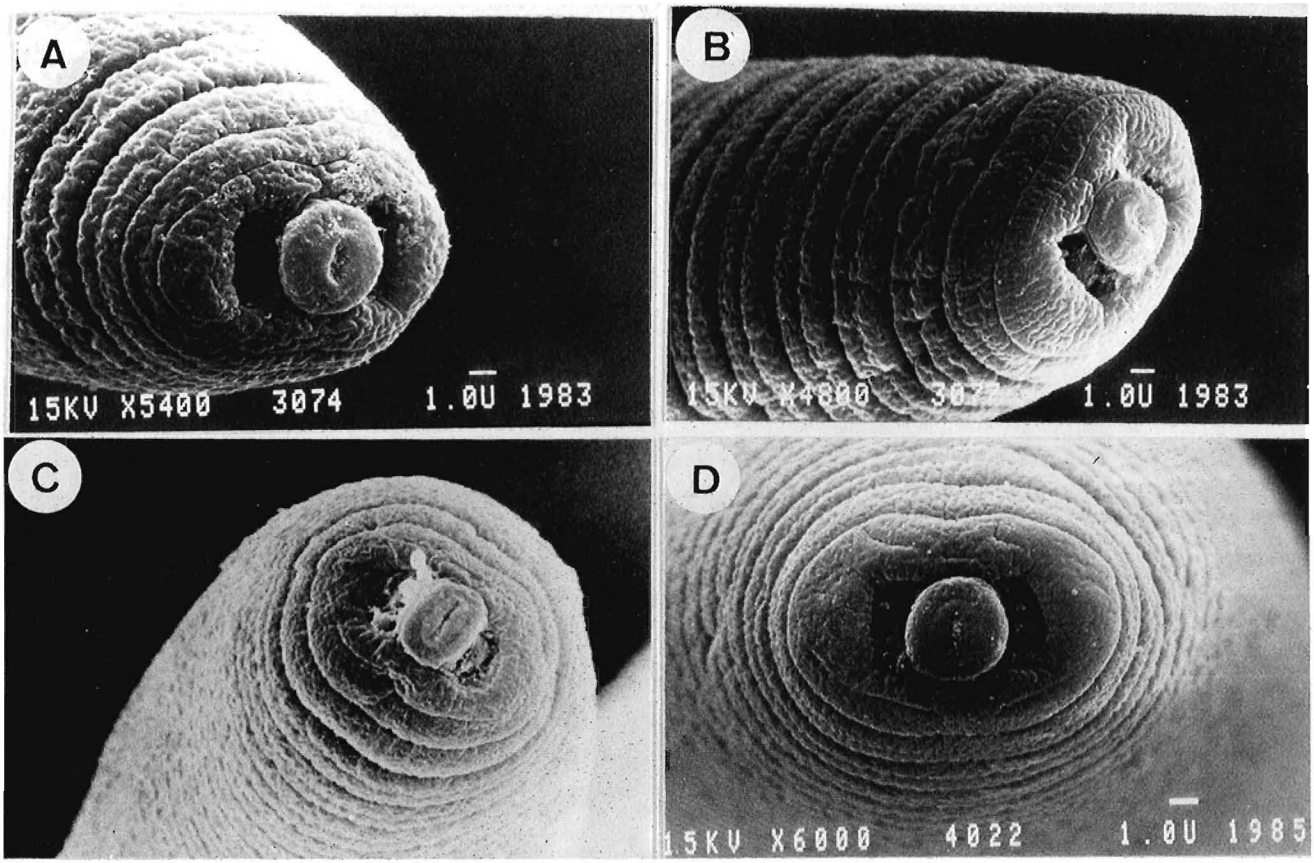


Fig. 4 - *Hemicycliophora triangulum* SEM photos of head end: A, B, From Lauwerszeepolder, Netherlands; C, from Overloon, Netherlands; D, from France, probably St. Emilion. (Photos TFDL, Wageningen).

## Literature cited


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