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

by
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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; G₁ = 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 $45. \pm 8.8$ 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, Landbouwwuniversiteit, 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

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

	n = 32 females		
	$\bar{X} \pm \text{DS}$	Extr. Val.	CV %
L	828.6 \pm 63.6	672-953	7.7
a	24.9 \pm 2.2	20.4-28.2	9.0
b	5.5 \pm 0.4	4.5-6.4	7.4
V	84.4 \pm 1.5	81-87	1.8
G ₁	41.7 \pm 7.1	23-61	17.1
c	10.4 \pm 1.3	7.9-13.9	12.1
c'	2.9 \pm 0.4	2.1-3.7	12.9
stylet	85.3 \pm 3.9	79-94	4.5
stylet % L	9.9	9.1-11.7	-
S	3.0 \pm 0.3	2.1-3.7	13.4
conus	71.1 \pm 3.3	65-79	5.5
R	258.4 \pm 7.5	242-277	2.9
Rst	27.6 \pm 2.3	18-31	8.3
Rex	50.9 \pm 1.8	47-54	3.6
ROes	46.8 \pm 2.3	42-52	5.0
Rhem	48.2 \pm 1.2	46-50	2.5
RB	3.7 \pm 0.3	3.3-4.7	8.9
RV	50.8 \pm 4.6	41-59	9.1
RVan	16.2 \pm 2.1	13-22	13.2
Ran	34.6 \pm 4.3	24-44	12.5
VL/VB	4.0 \pm 0.3	3.2-4.7	8.4
oesophagus	150.4 \pm 7.5	122-162	5.0
nerve ring	125.7 \pm 7.7	110-142	6.1
excretory pore	165.9 \pm 13.7	137-195	8.2
maximum width	33.4 \pm 2.9	28.0-40.8	8.6
ABW	27.3 \pm 2.9	21-36	10.5
PV/ABW	5.5	4.4-6.4	-
tail length	80.4 \pm 9.0	61-97	11.2
T % PV	62	55-60	-
Tail/vulva-anus	1.8 \pm 0.5	1.1-3.7	29.0

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 Ríos in the Sierra de Cazorla (Jaén).

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

	n = 9 females		
	$\bar{X} \pm \text{DS}$	Extr. Val.	CV %
L	817 \pm 83.6	719-945	10.2
a	21.0 \pm 1.0	19.8-22.5	4.8
b	5.7 \pm 0.4	5.1-6.2	7.6
V	84 \pm 1.0	84-87	1.8
G ₁	39 \pm 8.9	29-53	22.8
c	10.3 \pm 1.4	9.0-13.7	13.4
c'	2.7 \pm 0.4	1.9-3.2	13.1
stylet	85 \pm 6.0	77-94	7.0
S	2.6 \pm 0.2	2.3-2.8	6.1
conus	71 \pm 5.2	65-79	7.3
R	231 \pm 7.6	219-240	3.3
Rst	21 \pm 1.1	20-23	5.2
Rex	42 \pm 1.8	40-46	5.4
ROes	38 \pm 2.5	34-41	6.5
Rhem	40 \pm 2.1	37-43	5.2
RB	4.2 \pm 0.2	4.0-4.5	6.0
RV	46 \pm 2.6	41-51	5.7
RVan	14 \pm 1.8	11-17	12.5
Ran	32 \pm 3.3	28-37	10.4
VL/VB	3.3 \pm 0.3	2.7-3.6	9.0
width lip region	18.0 \pm 1.7	16-20	9.5
oesophagus	143 \pm 15.8	118-164	11.0
nerve ring	120 \pm 12.2	100-133	10.1
excretory pore	159 \pm 17.8	126-182	11.2
maximum width	39 \pm 2.6	35-42	6.9
ABW	29 \pm 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 \pm 9.6	60-93	12.0
vulva-anus	48 \pm 8.5	35-62	17.7
Tail/vulva-anus	1.7 \pm 0.3	1.2-2.3	19.7

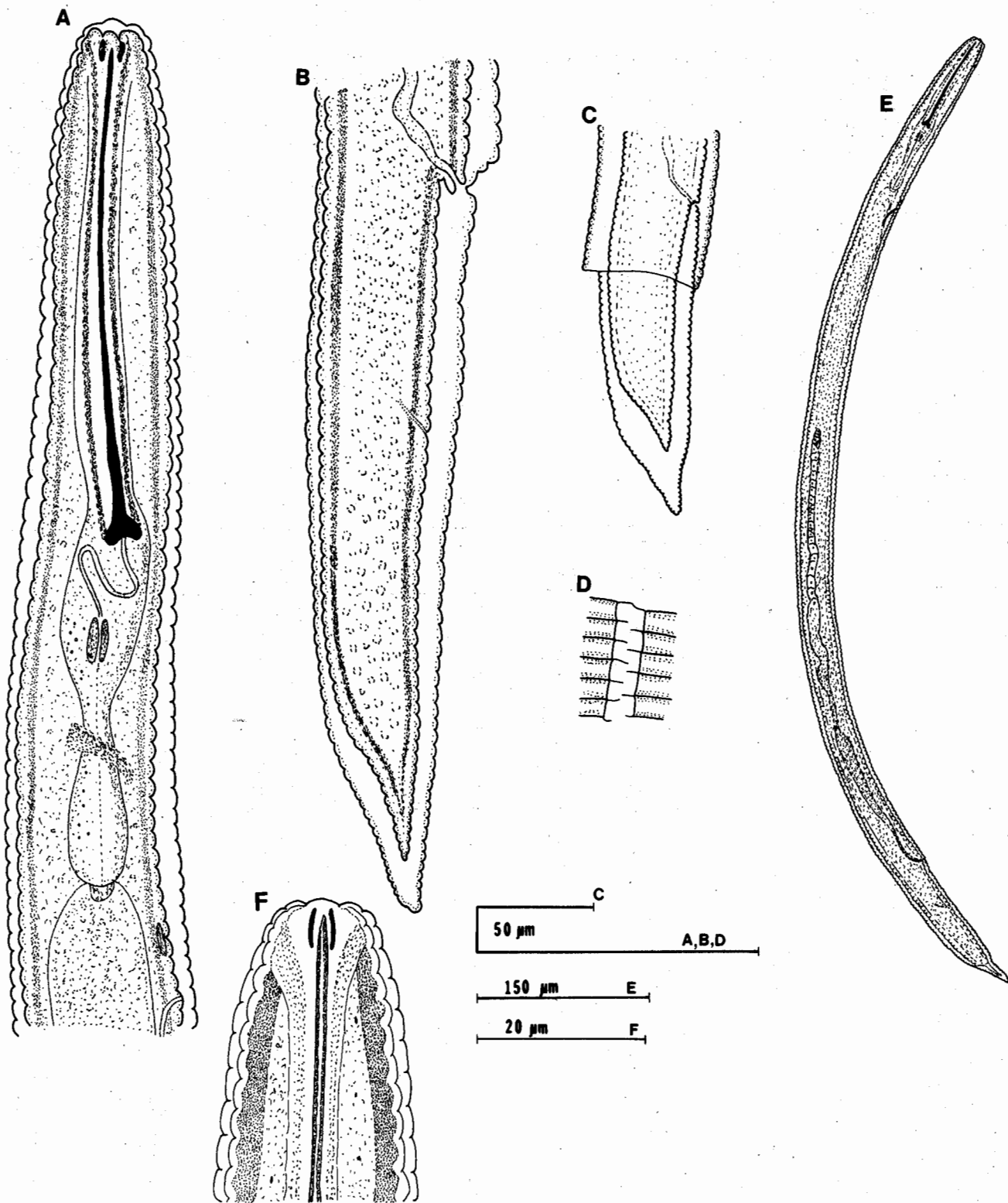


Fig. 1 - *Hemicycliophora iberica* sp. n. Female: A, oesophageal region; B, posterior region; D, lateral field; E, whole body; F, anterior end; juvenile: C, posterior region.

Since $R = 219-240$, stylet length = $77-94 \mu\text{m}$ and $R_{ex} = 42-46$, we consider them as representing Form I (see Loof, 1968) except one specimen which has $R_{ex} = 40$, $R = 222$ and stylet = $80 \mu\text{m}$ 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.

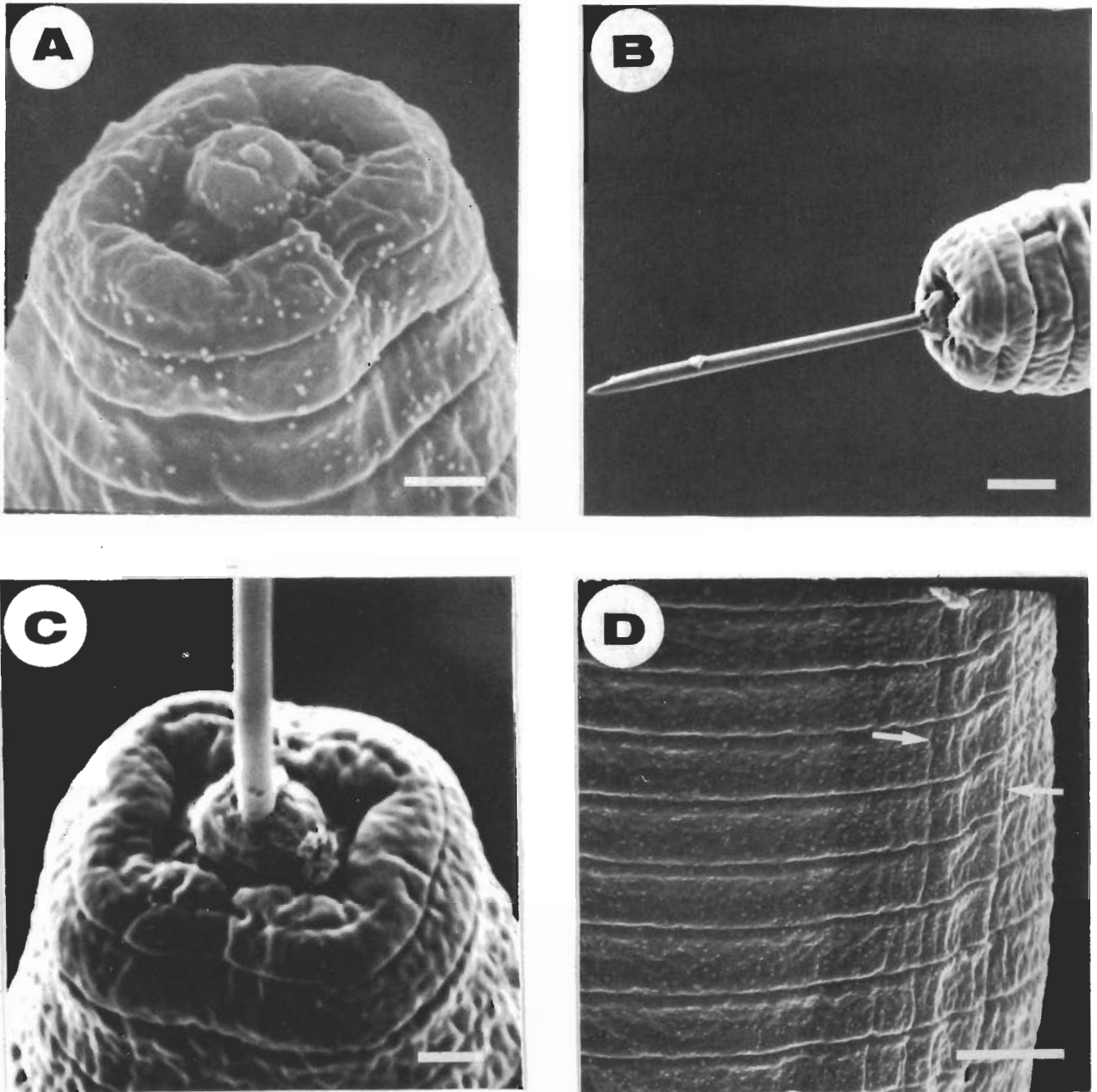


Fig. 2 - *Hemicycliophora iberica* sp. n. Female SEM micrographs: A, B, C, head end, 6402x, 200x, 5000x (bar = $2 \mu\text{m}$, $5 \mu\text{m}$ and $2 \mu\text{m}$ respectively); D, lateral field, 3380x (bar = $5 \mu\text{m}$).

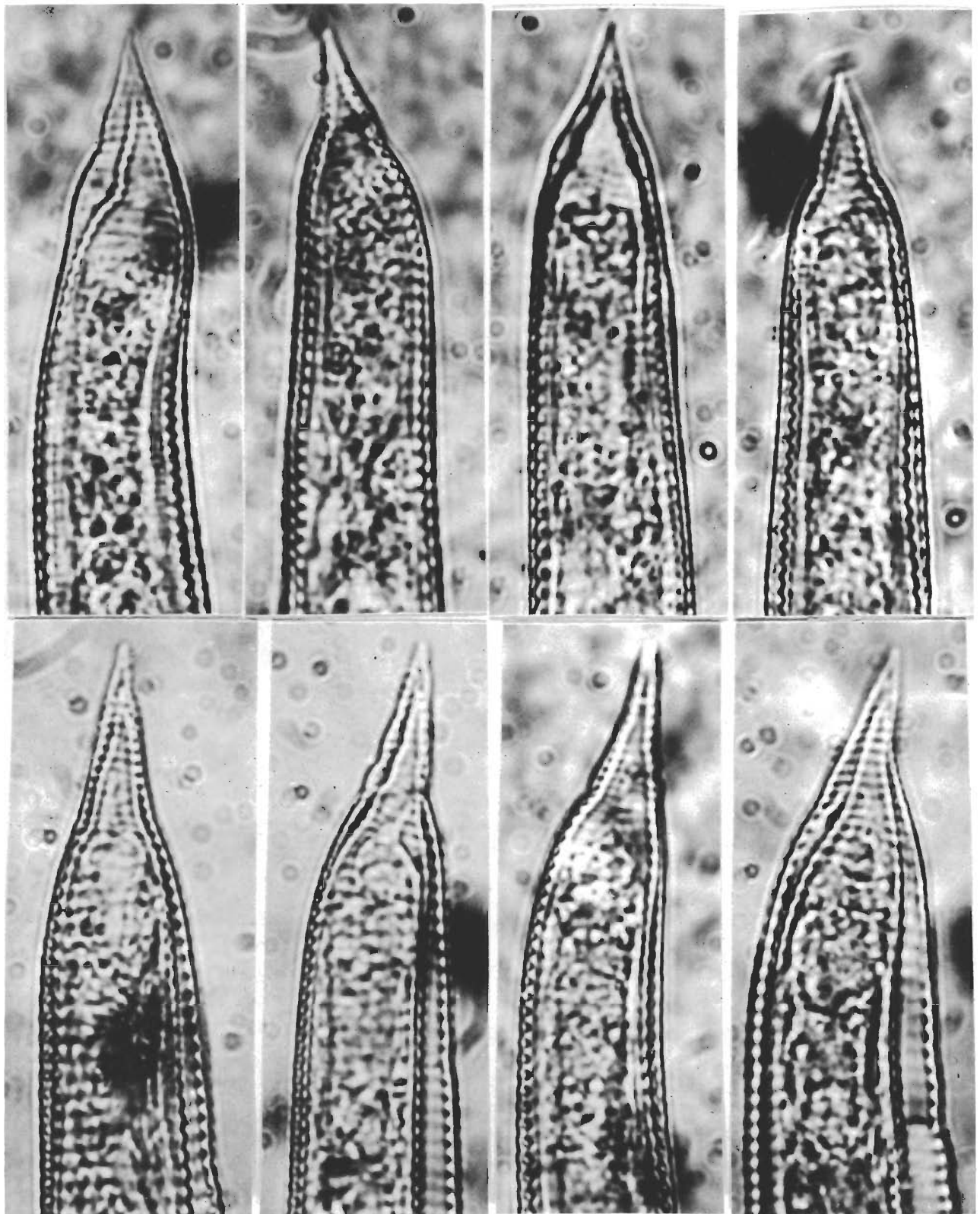


Fig. 3 - Tail of *Hemicycliophora iberica* (upper row) and *Hemicycliophora triangulum* (lower row).

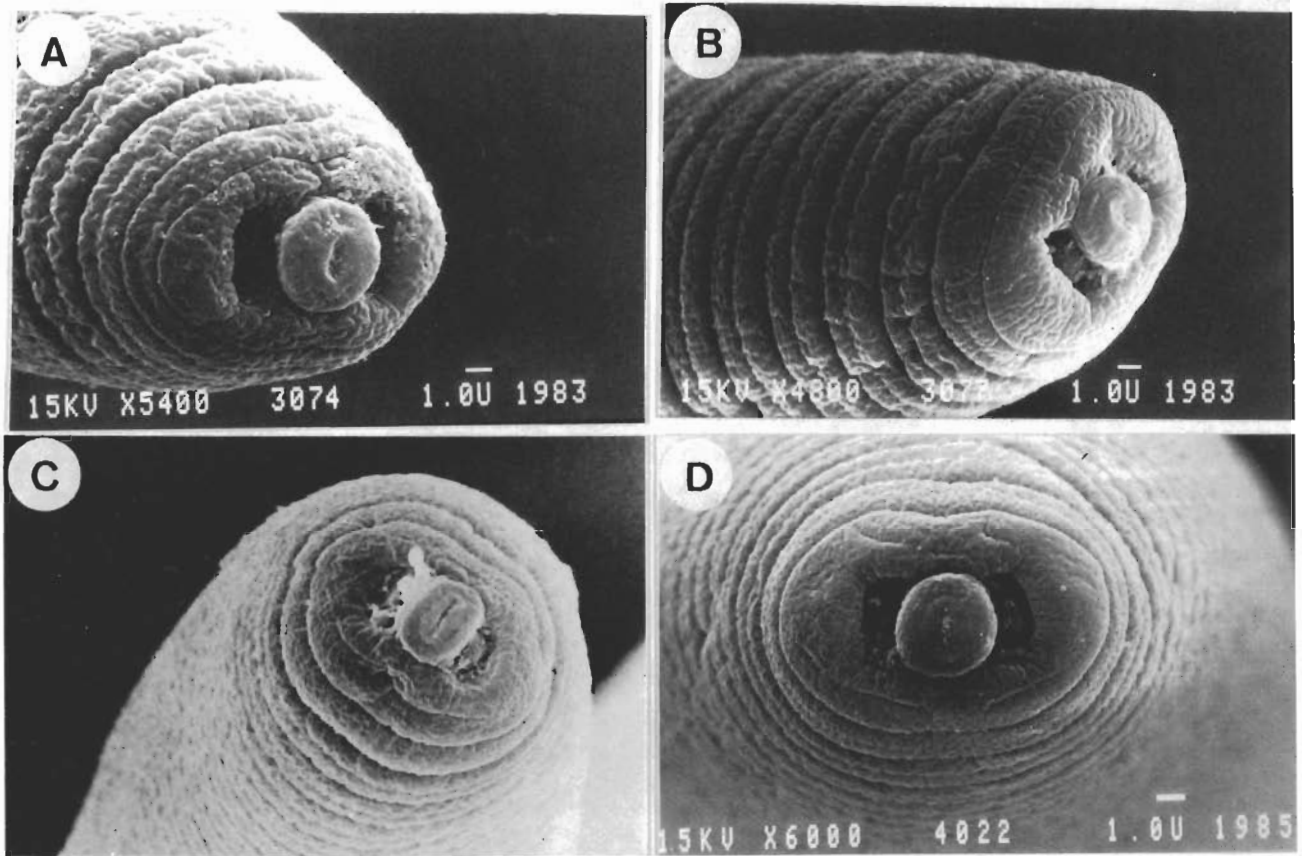


Fig. 4 - *Hemicycliophora triangulum* SEM photos of head end: A, B, From Lauwerszeepolder, Netherlands; C, from Overloon, Netherlands; D, from France, probably St. Emilion. (Photos TFDL, Wageningen).

Literature cited

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