

A review of the genus *Euteratocephalus* Andrassy, 1958, with a description of *E. punctatus* n.sp. ⁽¹⁾

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SUMMARY

Specimens of *Euteratocephalus* Andrassy, 1958 from localities in Africa (Kenya and South Africa), South America (Bolivia and Brazil), Australia and Europe (Belgium, The Netherlands, Germany) were studied. The ornamentation on the subcuticle overlying the lateral field was used as the main character to distinguish the three species of the genus. *Euteratocephalus spiralooides* (Micoletzky, 1913) Heyns, 1977 is re-instated as a valid species. *Euteratocephalus capensis* Heyns, 1977 and *E. hirschmannae* Heyns, 1977 are synonymized with *E. palustris* (de Man, 1880) Andrassy, 1958 and *E. spiralooides*, respectively. *Euteratocephalus punctatus* n. sp. is described from Kenya, Bolivia and Brazil. This new species is characterized by the subcuticular ornamentation overlying the lateral field : a smooth area, 2.5-4 μm wide, comprising 60-95 % of the total body length and bordered by large punctations.

RÉSUMÉ

Révision du genre *Euteratocephalus* Andrassy, 1958 et description d'*Euteratocephalus punctatus* n. sp.

Des spécimens d'*Euteratocephalus* Andrassy, 1958, provenant d'Afrique (Kenya, Afrique du Sud), d'Amérique du Sud (Bolivie, Brésil), d'Australie et d'Europe (Belgique, Pays-Bas, Allemagne) ont été étudiés. Les trois espèces du genre *Euteratocephalus* peuvent être différenciées par le type de l'ornementation sous-cuticulaire au niveau du champ latéral. *Euteratocephalus spiralooides* (Micoletzky, 1913) Heyns, 1977 est revalidé. *Euteratocephalus capensis* Heyns, 1977 et *E. hirschmannae* Heyns, 1977 sont considérés comme des synonymes mineurs de *E. palustris* (de Man, 1880) Andrassy, 1958 et *E. spiralooides*, respectivement. *Euteratocephalus punctatus* n. sp. provenant du Kenya, de Bolivie et du Brésil est décrit; cette nouvelle espèce est caractérisée par le type de l'ornementation sous-cuticulaire au niveau du champ latéral : partie centrale sans ornementation large de 2,5 à 4 μm , s'étendant sur 60-95 % de la longueur du corps et bordée de larges points.

In 1958, Andrassy erected the genus *Euteratocephalus* to accommodate two species of the genus *Teratocephalus* de Man, 1876 with finely annulated cuticles, large spiral amphids and paired ovaries : *E. palustris* (de Man, 1880) Andrassy, 1958 (type species) and *E. crassidens* (de Man, 1880) Andrassy, 1958. He also synonymized *Teratocephalus cornutus* Cobb, 1914 and *T. spiralooides* Micoletzky, 1913 with *E. palustris* and erected the family Teratocephalidae to accommodate *Euteratocephalus* and *Teratocephalus*. Eroshenko (1973) transferred *E. crassidens* to the genus *Metateratocephalus* Eroshenko, 1973 and placed this genus, together with *Euteratocephalus*, in the subfamily Metateratocephalinae Eroshenko, 1973. As a result *Euteratocephalus* contained only one species : *E. palustris*. Heyns (1977) re-instated *T. spiralooides* as a valid species of *Euteratocephalus*. He also regarded the

specimens from Germany which Hirschmann (1952) had identified as *E. palustris*, as different from de Man's *E. palustris* but conspecific with a new species from South Africa which he named *E. hirschmannae*. Heyns (1977) further described a new species from South Africa, *E. capensis*, so that the genus then contained four species. Anderson (1969) placed *Teratocephalus demani* Stefanski, 1924 in *Euteratocephalus*, but Andrassy (1984) transferred it to the genus *Steratocephalus*. Mukhina (1981) described a new species, *Euteratocephalus minor*; Andrassy (1984) however, synonymized it with *Metateratocephalus crassidens* de Man, 1880.

In the present paper, the results are presented of a study of about 90 specimens of *Euteratocephalus* from eight countries on four continents and the re-examination of the type material of *E. hirschmannae* and *E. ca-*

(1) Part of this work was carried out at the Laboratorium voor Morfologie en Systematiek der Dieren, Rijksuniversiteit Gent, Belgium.

penis. It is concluded that today the genus *Euteratocephalus* consists of three species: *E. palustris*, *E. spiralooides* and *E. punctatus* n. sp., whereas *Euteratocephalus capensis* and *E. hirschmannae* are synonymized with *E. palustris* and *E. spiralooides*, respectively.

Specimens were killed and fixed in hot 4 % formalin and transferred to anhydrous glycerin (De Grisse, 1969). For SEM studies, specimens mounted in glycerin were hydrated to distilled water, post-fixed in 1 % OsO₄, dehydrated in a graded ethanol-series, critical point dried, sputter-coated with gold and viewed with an ISI SS 60 SEM at 6 kV. Measurements of body length and all curved structures were made along the curved median line.

Euteratocephalus palustris
(de Man, 1880) Andr ssy, 1958
(Figs 1-3)

MEASUREMENTS

See Table 1.

DESCRIPTION (based on the specimens from Belgium; n = 15; Fig. 1 D, E, H)

Female: Body moderately curved when heat-relaxed, curvature slightly more pronounced in tail region. Body tapering from vulva towards both extremities. Lip region confluent with body. Six well developed lips with six outer labial setae (5 µm long) and four slightly shorter cephalic setae. No inner labial setae observed.

Amphideal aperture a small, oval opening. Anterior part of stoma 3-4 µm wide with sclerotized walls, tapering posteriorly. Cuticle overlying lateral field in anterior region demarcated by a narrow (1 µm wide) smooth area bordered on either side by two rows of slightly larger dots. This smooth area stretches from about 12 µm posterior of head and ends about 170 µm posterior to head. From this point onwards to 60-80 µm anterior to the anus, the four rows of dots remain close together, increasing to six rows at mid-body. A narrow smooth area (about 2 µm wide) appears again between the two innermost rows of dots just anterior to the anus. This smooth area ends about 50 µm from the tail tip. Along the lateral field this smooth area constitutes 24-26 % of the total body length. Oesophagus cylindrical, narrowing anteriorly of basal bulb. Nerve ring well developed. Excretory pore almost on same level as nerve ring. Dense gland-like tissue surrounds oesophagus just anterior to basal bulb. A laterally situated organ resembling a spiral situated 10-15 µm anterior to the basal bulb. The small tubule seen in some specimens running from this organ towards the excretory pore suggests an excretory function for this organ. Basal bulb well-developed, with strong valves. Intestine expanded in its anteriormost part where it joins the basal bulb. Lumen of intestine thin-walled. Reproductive system didelphic, amphidelphic. Ovaries reflexed, their tips usually not touching each other. G₁ = 49-116 µm; G₂ = 41-139 µm. Vagina short. Other parts of reproductive system difficult to discern. Both gonads on left side of intestine, except in one female where both are on right side. Rectum 15-20 µm long. Tail elongate-conoid, ventrally curved. Caudal

Table 1

Morphometrical data of *Euteratocephalus palustris* (de Man, 1880) Andr ssy, 1958.

	The Netherlands <i>E. palustris</i> (de Man, 1880)	Belgium	The Netherlands	Germany	Australia	Bolivia	Kenya	South Africa Types of <i>E. capensis</i>
		15	14	10	2	3	3	20
n		15	14	10	2	3	3	20
L (µm)	800-1 000	738.7 (685.0-967.5)	882 (720-950)	888 (830-920)	555 (550-560)	788 (683-875)	681 (650-740)	680 (640-740)
a	35-52	27.5 (23.5-29.8)	42.3 (25-52)	33.9 (29.8-36.8)	19.6 (18.9-20.3)	31.4 (24.4-35.1)	22.5 (20.0-24.6)	27 (24-34)
b	4.0-4.5	4.5 (4.3-4.9)	4.5 (4.0-4.5)	4.7 (4.7-4.9)	4.6 (4.5-4.6)	4.4 (4.3-4.5)	4.2 (4.16-4.26)	4.4 (3.9-4.8)
c	6-10	8.0 (7.6-8.9)	9.6 (7.3-10.0)	8.9 (8.2-9.6)	8.0 (7.9-8.1)	8.8 (8.5-9.5)	8.0 (7.0-8.8)	9.9 (8.3-11.3)
c'		7.7 (6.2-9.6)	7.2 (6-9)	6.0 (5.5-6.7)	5.2 (4.8-5.5)	6.3 (5.1-7.2)	5.6 (4.5-6.0)	5.8 (4.8-6.8)
Tail length (µm)		92.9 (82.5-108.8)	91.9 (82-101)	99.8 (96-108)	68.5 (68-69)	89.5 (81-94)	80.1 (74-84)	67 (58-82)
Oesophagus length (µm)		164 (159-194)	196.9 (179-208)	187.7 (177-195)	120.5 (120-121)	180 (159-195)	163 (157-173)	154.5 (150-160)
Lip height (µm)		3.9 (3.5-4.5)	3.3 (2.9-3.5)	4.5 (4.4-4.8)	4.4	3.0	3.8 (3-4)	3.8 (3-4)
Lip width (µm)	8	7.8 (7.0-8.5)	7.3 (7-8)	9.0 (7.0-8.5)	9.1 (8.5-9.6)	7.5 (7.5-8.0)	7.2 (7.0-7.5)	8.4 (8-9)
V	50-52	51.2 (49.0-54.4)	52.5 (50.0-55.5)	49.3 (47.8-51.3)	50.3 (49.5-51.5)	53.1 (50-55)	51.3 (49.6-52.0)	52.5 (50-55)
Amphid to anterior end (µm)	14.3 (12.5-17.5)	14.3 (12.5-17.5)	14.3 (13.5-16.0)	16.7 (15.5-17.5)	10.9 (10.3-11.5)	13.7 (12.5-14.5)	15.1 (14.0-16.5)	13.9 (13-15)
Excretory pore to anterior end (µm)		90.4 (80.0-107.5)	103.4 (92-109)	123.2 (117.5-131.5)	73.8 (71.5-76.0)	90.6 (81-100)	76 (71-80)	77.3 (72-85)

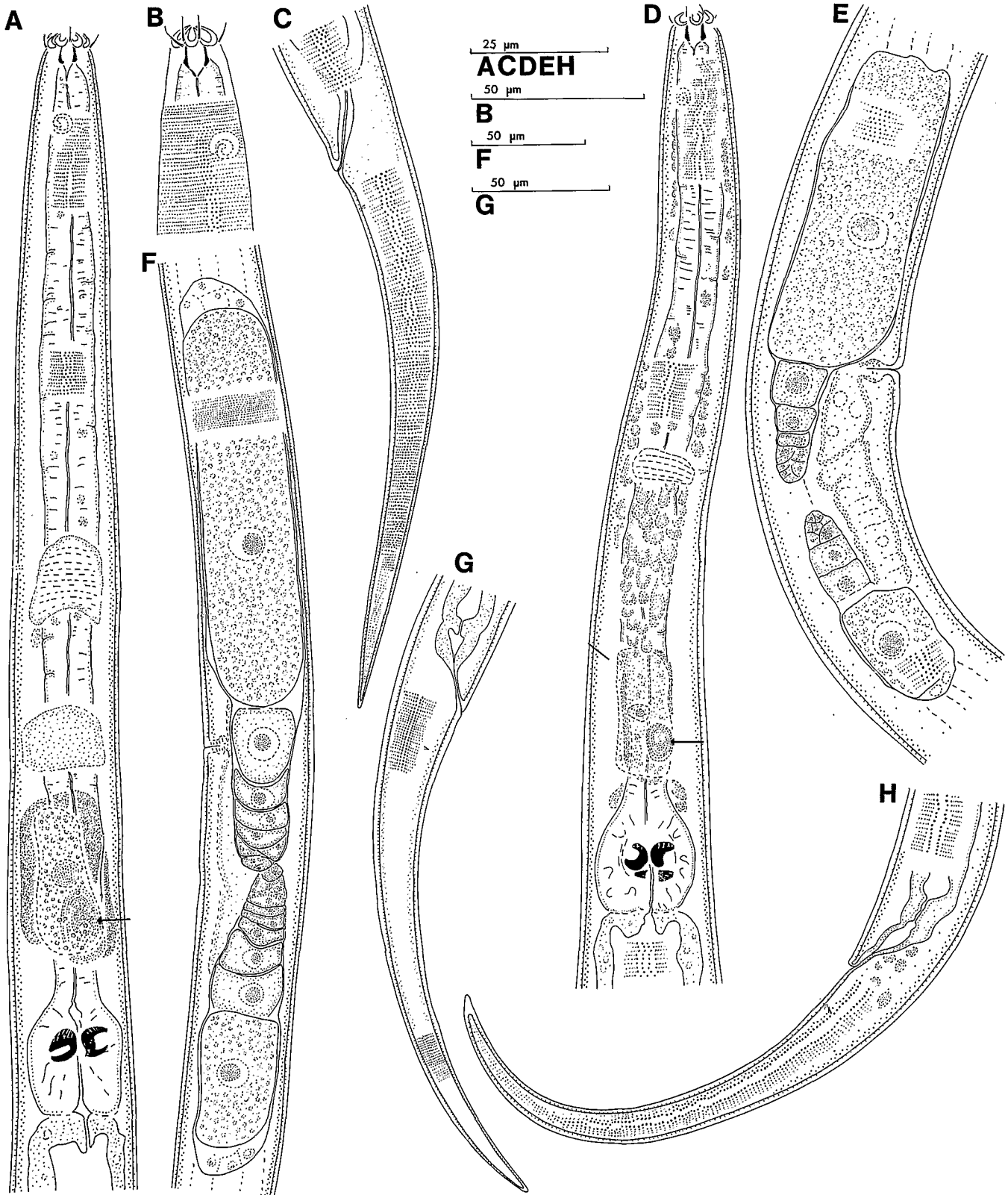


Fig. 1. *Euteratocephalus palustris* (de Man, 1880) Andrassy, 1958 — A, B, C, F, G : Population from the Netherlands. A : Anterior region showing spiral organ (arrow); B : Head region showing amphid, cuticular punctations (forming striations) and punctations overlying the lateral field; C : Tail showing cuticular punctations and punctations overlying the lateral field; F : Mid-body region; G : Tail of another female showing smaller punctations on lateral field. — D, E, H : Population from Belgium. D : Anterior region showing spiral organ (arrow); E : Mid-body region; H : Tail showing cuticular striations and punctations overlying the lateral field.

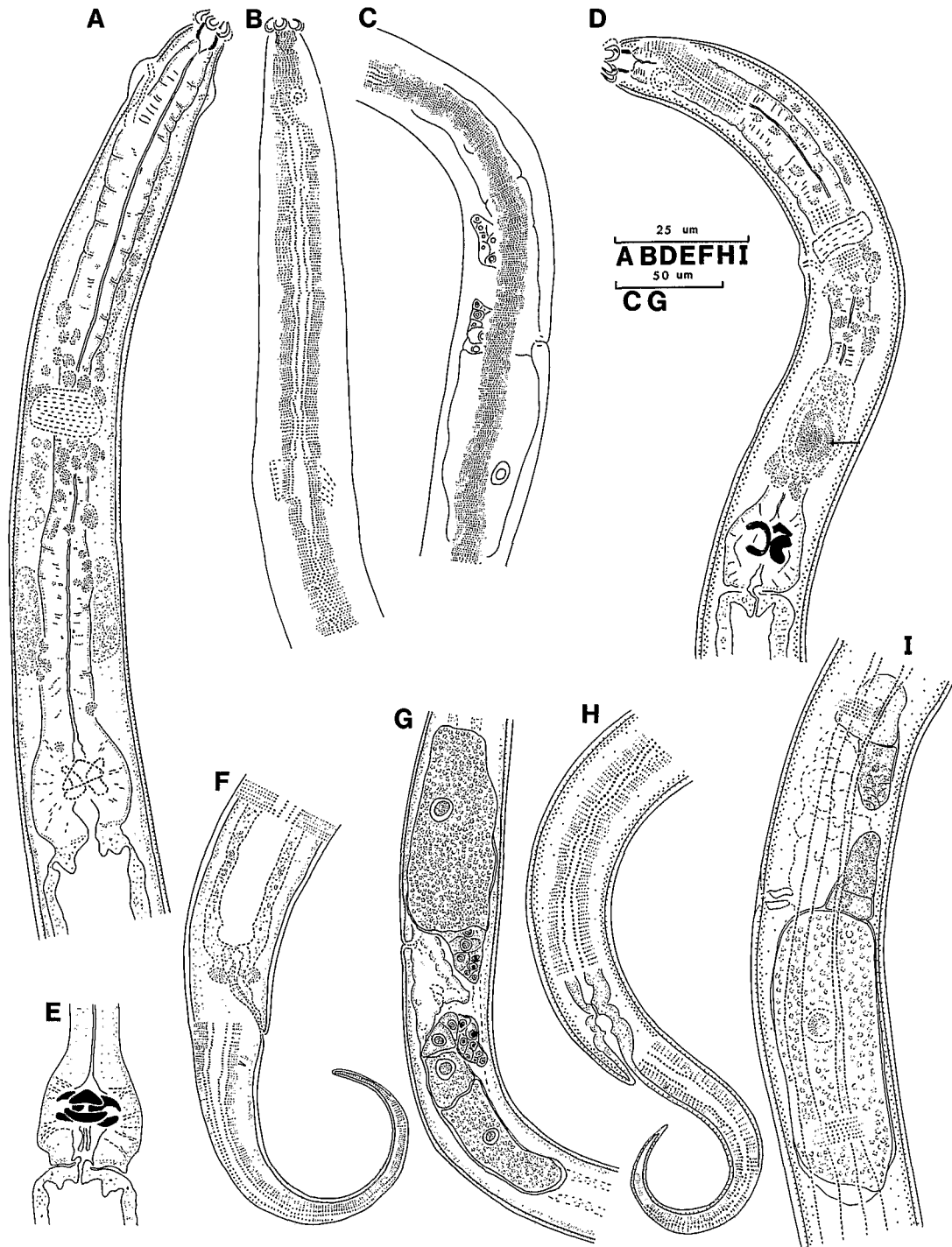


Fig. 2. *Euteratocephalus palustris* (de Man, 1880) Andrassy, 1958 — A, B, C, E, F, G : Population from Kenya. A : Anterior region; B : Anterior region (external view); C : Mid-body region (external view) showing the absence of prominent punctations overlying the lateral field in this region; E : Detail of valves within basal bulb; F : Tail region, internal and external view; G : Mid-body region showing didelphic reproductive system — D, H, I : Population from Australia. D : Anterior region showing spiral organ (arrow); H : Tail; I : Mid-body region.

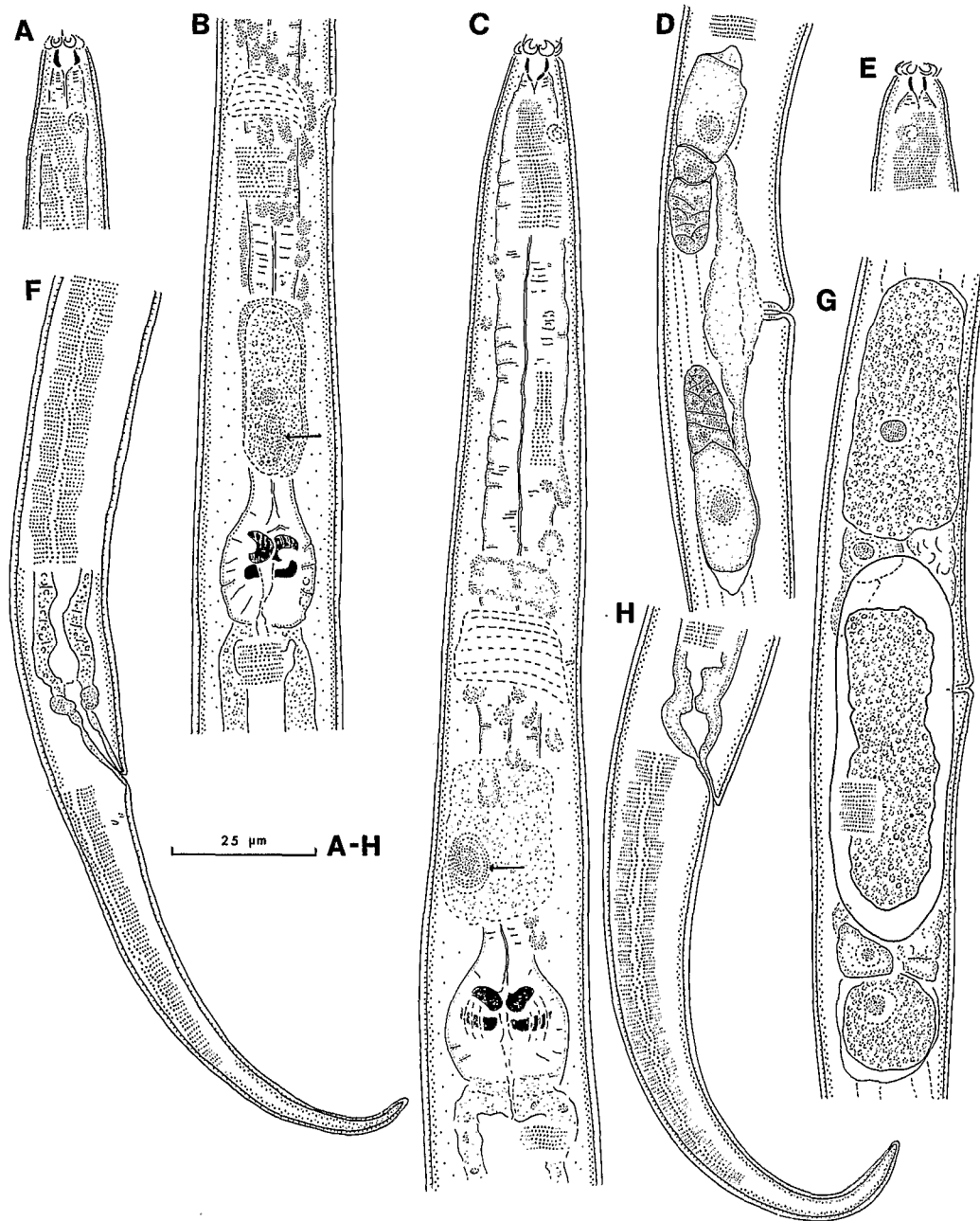


Fig. 3. *Euteratocephalus palustris* (de Man, 1880) Andrassy, 1958 — A, B, F : Population from Bolivia. A : Head; B : Anterior region showing excretory pore, spiral organ (arrow) and basal bulb with prominent valves; F : Tail — C, D, H : Population from Germany. C : Anterior region showing spiral organ (arrow); D : Mid-body region; H : Tail — E, G : Population from South Africa (originally described as *E. capensis* Heyns, 1977). E : Head; G : Mid-body region.

ventro sublateral setae situated 7-10 μm posterior to anus.

Male : not found.

COMPARISON WITH OTHER POPULATIONS (FEMALES)

Population from South Africa, originally described as E. capensis (n = 20; Table 1, Fig. 3 E, G).

Body shorter and tail slightly shorter in relation to body length resulting in a higher c-ratio. Almost no cuticular ornamentation over lateral field in anterior part and at mid-body. Smooth area occupies 18-23 % of body length, starting about 100 μm anterior to anus and ending 50 μm from tail tip (see Fig. 2 B in Heyns, 1977).

Population from The Netherlands (n = 14; Table 1; Fig 1 A-C, F, G) :

Smooth area overlying the lateral field occupies only 10-12 % of the total body length in anterior 50-60 μm of body. Lateral field elsewhere demarcated by four rows of prominent punctations. In the midbody region of some specimens no cuticular ornamentation could be observed on lateral field. Tips of reflexed ovaries usually touching each other.

Population from Kenya (n = 3; Table 1; Fig. 2 A-C, E-G) :

Body shorter and broader, tail slightly shorter, and smooth area overlying the lateral field occupying about 33 % of total body length. Smooth area (1-2 μm wide) starts 12-15 μm from head and extends posteriorly to 50-53 μm from anterior end. It starts again at 140 μm from anus and ends 50 μm from tail tip. Caudal latero-subventral setae situated 5-13 μm posterior to anus.

Population from Australia (n = 2; Table 1; Fig. 2 D, H, I) :

Body shorter and broader. Smooth area overlying the lateral field occupies 30-35 % of total body length. This smooth area (1-2 μm wide) starts from 10 μm to about 100 μm posterior to head, and again from 100 μm anterior to anus to 25-30 μm from tail tip. Caudal laterosubventral setae at 6-10 μm posterior to anus.

Population from Bolivia (n = 3; Table 1; Fig. 2 A, B, F) :

The smooth area overlying the lateral field extending over 25-30 % of the total body length, occupying about 100 μm of the lateral field anteriorly and about 200 μm posteriorly. Caudal latero-subventral setae situated 7-9 μm posterior to anus.

Population from Germany (n = 10; Table 1; Fig. 3 C, D, H) :

Body more slender. The smooth area overlying the lateral field occupies only about 18 % of the total body length. The smooth area itself is also narrower (1-1.5 μm wide) and starts posteriorly only 10 μm from anus.

Remark

It is interesting to note (Table 1) that nearly all specimens from the southern hemisphere are on average shorter and broader than the specimens from the northern hemisphere.

HABITATS AND LOCALITIES

Belgium : Wet soil, brooklet, 12 m altitude, Morkhoven, Antwerpen province (collected by D. De Waele on 5-6-1978); wet soil around roots of grasses, brooklet, 420 m altitude, Amberloup, Luxembourg province (collected by D. De Waele on 24-4-1980); wet soil around roots of reed (*Phragmites* sp.), brooklet, 280 m altitude, Bertrix, Luxembourg province (collected by D. De Waele on 22-5-80).

South Africa : White sand among the roots of bulrush (*Prionium* sp.) in the Palmiet River, near Hermanus; soil on the bottom of a small stream near Kleinmond; soil, small river in the Elgin district; soil, mountain stream in the Cederberg mountains; all localities are situated in the southwestern Cape Province.

The Netherlands : Soil from pastures near Biesbosch, Sijdersveerbeek (Aalten); rhizosphere grasses in moist soil near Bennekom; moist soil among cranberry roots near Terschelling.

Kenya : Mosses, *Aulacomnium turgidum* (Wahl) Schwgz., along the border of Thompson Taren, Mount Kenya, altitude 4310 m (collected by A. Coomans on 31-7-1975).

Australia : Soil rhizosphere among ferns growing around a small pool in a mangrove swamp, near Algen, eastern Australia.

Bolivia : Benthic sample from the littoral zone of Lago Khara Khota, Cordillera Real, altitude 3992 m (collected by D. De Waele on 11-7-1979); benthic sample from the littoral zone of Lago Khota, near to the Rio Pauchintani, Cordillera Real, altitude 4450 m (collected by D. De Waele on 7-8-1979).

Germany : In moist soil at Waltersberg, Murnau.

Euteratocephalus spiralooides
(Micoletzky, 1913) Heyns, 1977
= *E. hirschmannae* Heyns, 1977
(Fig. 4 D, E, G, H)

MEASUREMENTS

See Table 2.

DESCRIPTION (based on the female from Bolivia).

Female : Body slightly ventrally curved with curvature

more pronounced in posterior third. Body tapering towards both extremities. Lip region confluent but narrower than body, 4 μm high and 8 μm wide. Six outer labial setae 5 μm long, as well as four slightly shorter cephalic setae present in lip region. No inner labial setae observed. Amphideal aperture an oval-shaped pore, located 14 μm from anterior end. Subcuticle overlying lateral field with four to six irregular rows of prominent punctations, diminishing in size away from lateral field. Lateral subcuticular ornamentation extends from 10 μm posterior to head to 50 μm from tail tip. Anterior part of stoma wide, well-sclerotized, 5 μm wide and about as long. Posterior part of stoma tapering, thin-walled. Oesophagus cylindrical, narrowing slightly anterior to basal bulb. Nerve ring conspicuous, about 100 μm from anterior end. Excretory pore at about same level as nerve ring. A peculiar spiral organ, situated laterally in body cavity just anterior to basal bulb, 157 μm from anterior end. A broad band of tissue surrounds the oesophagus in this area, obscuring the tubule from the spiral organ. Basal bulb well developed with strongly-developed valves. Intestine widens slightly just after junction with oesophagus. Lumen of intestine thin walled. Reproductive system amphidelphic, didelphic. Vagina short, ovaries reflexed, tips almost touching. Gonads on left side of intestine. Tail elongate-conoid, ventrally curved, tapered to fine point. Caudal laterosubventral setae 8-11 μm behind anus.

Table 2

Morphometrical data of *Euteratocephalus spiralooides* (Micoletzky, 1914) Heyns, 1977

	East Alps <i>E. spiralooides</i> (Micoletzky, 1914)	South Africa Paratypes <i>E. hirschmannae</i>	Bolivia
n	4	6	1
L (μm)	890 (855-965)	860 (820-910)	920
a	29.7 (27.8-31.5)	35 (33-39)	31.3
b	4.6 (4.4-4.8)	4.5 (4.2-4.9)	4.9
c	10.7 (9.3-11.7)	10.3 (9.6-11.0)	9.2
c'		6.0 (5.3-6.4)	6.2
Tail length (μm)		84 (80-95)	100.1
Oesophagus length (μm)		191.3 (185-195)	187.5
Lip height (μm)		3-4	4
Lip width (μm)		8-9	8
V	52.8 (51.5-54.2)	51 (48-53)	52
G ₁ (μm)		5.7-7.2	14.3
G ₂ (μm)		5.5-8.5	12.8
Amphid to anterior end (μm)		16-19	13
Excretory pore to anterior end (μm)		96-102.5	99
Nerve ring to anterior end (μm)		93-97.5	100

Male : Not found.

COMPARISON WITH OTHER POPULATION (FEMALES)

Population from South Africa, originally described as E. hirschmannae (n = 6; Table 2) :

Distance from anterior end to excretory pore 96-102.5 μm ; distance from anterior end to nerve ring 93-97.5 μm and distance from anterior end to spiral organ (situated before basal bulb) 150-154 μm . Lateral subcuticular ornamentation extends from 10 μm posterior to head and consists of about four irregular rows of prominent punctations. These prominent punctations become obscure towards the vulval region but can again be distinguished as four to six irregular rows of prominent punctations in the anal region. The punctations extends till 50 μm from the tail tip.

HABITATS AND LOCALITIES

Bolivia : Wet soil, aqueduct of the Cerro Mario Lloco, Cordillera Real, altitude 4800 m (collected by D. De Waele on 22-7-1979).

South Africa : Wemmer Pan, Johannesburg, South Africa; water among roots of a willow tree in a stream running into Wemmer Pan from the southern suburbs of Johannesburg.

Euteratocephalus punctatus n. sp.

(Figs 4 A, B, C, F; 5; 6)

MEASUREMENTS

See Table 3.

DESCRIPTION (based on the specimens from Kenya; n = 7; Figs 4 A-C, F; 5) :

Female : Body moderately ventrally curved, tail in some specimens excessively ventrally curved. Lip region confluent with, but narrower than body. Six conspicuous lips, each with a long outer labial setum (3-4 μm long) situated in a posterior and central position. Four cephalic setae (4 μm long), each situated on a subdorsal or subventral lip, just posterior to the outer labial setae. No inner labial setae observed. Amphideal apertures small, oval. Cuticle thin with fine annulations, about 0.5 μm apart. Rows of fine punctations on the subcuticle coinciding with annulations. Subcuticle overlying the lateral field with a large, smooth area (3.5-4 μm wide; stretching over 67-92 % of the body length) between innermost rows of large punctations except in vulval area where ornamentation consists of only four irregular rows of large punctations. These punctations and the smooth area can be seen clearly on the subcuticle in the oesophageal region of a damaged specimen. Several

small setae present on the body : one in a lateral position in the region of the excretory pore, one in the vulval region, usually two laterally between vulva and anus, and two caudal latero-subventral, 7-9 µm posterior to anus. Large, oval body pores randomly spaced in anterior region. More posteriorly pores are arranged in one row on each side of the lateral field. Pores end about 50-60 µm from tail tip. Stoma 3.5 µm wide and 3.5-4 µm long. Stoma walls well sclerotized. Oesophagus slightly constricted in region of nerve ring. Dense tissue obscures oesophagus 20-30 µm anterior to basal bulb. Laterally situated spiral organ situated 15-20 µm anterior to basal bulb. Basal bulb well-defined with well-defined valves. Intestine expanded where junction occurs with oesophagus. Lumen of intestine thick-walled. Reproductive system didelphic, amphidelphic. Vagina 4-6 µm long, ovaries reflexed, tips almost touching. Both gonads on left side of intestine. One egg observed, 25 µm × 86 µm. Tail elongate-conoid, tapering to a sharply pointed terminus, the annulations apparently extending to the tail tip. Rectum 13-18 µm or 1-1.4 anal body diameters long.

Male : Not found.

COMPARISON WITH OTHER POPULATIONS (FEMALES)

Population from *Sergine, Brazil* (n = 5; Table 3; Fig. 6 A, B, E) :

Smooth area overlying lateral field 1.5-3 µm wide, stretching over only 67 % of total body length. Sub-

cuticle overlying lateral field in mid-body demarcated by four rows of large punctations.

Population from *Iguassu River, Brazil* (n = 1; Table 3) :

Body longer and the amphid situated slightly more anteriorly. The smooth area overlying the lateral field extends uninterrupted over 78 % of the total body length. Smooth area is 3 µm wide, starts 13.5 µm posterior to head and ends 33.5 µm from tail tip.

Population from *Bolivia* (n = 5; Table 3; Fig. 6 C, D, F) :

Body on average longer and broader. The smooth area overlying the lateral field extends uninterrupted over 92 % of the total body length. Smooth area is 2.8-3.5 µm wide, starts 15 µm posterior to head and ends about 32 µm from tail tip.

TYPE SPECIMENS

Holotype female (slide RAU 5548) and six *paratype* females (slides RAU 5549-5554) deposited in the nematode collection of the Rand Afrikaans University, Johannesburg, Republic of South Africa.

TYPE HABITAT AND LOCALITY

Benthic sample from the littoral zone of Hut Tarn, Mount Kenya, altitude 4488 m (collected by D. De Waele on 27-7-1975).

Table 3

Morphometrical data of *Euteratocephalus punctatus* n. sp.

	Kenya Holotype	Paratypes	Bolivia	Brazil	Brazil Iguassu River
n	1	6	5	5	1
L (µm)	765	667 (570-800)	832 (790-888)	650 (635-657)	816
a	33.3	31.2 (27.5-35.0)	28.9 (28.7-29.6)	37.5 (33.5-44.0)	31.4
b	4.5	4.4 (4.0-4.5)	4.6 (4.4-4.6)	4	4.5
c	8.0	8.0 (7.5-9.0)	10.0 (9.0-11.2)	8 (8.0-8.5)	8.9
c'	6.0	6.5 (5.5-8.0)	5.6 (4.5-6.7)	7 (6.5-8.0)	6.1
Tail length (µm)	93	84.4 (69-102)	83.3 (79-88)	79 (77-82)	91.5
Oesophagus length (µm)	180	154.7 (138-182)	179.6 (167.5-192.8)	160 (158-163)	179.5
Lip height (µm)	3.0	3.2 (3.0-3.5)	3.8 (3.0-4.5)	3.4 (3.3-3.8)	4.0
Lip width (µ)	8.0	7.8 (7.5-8.0)	8.6 (8-9)	7.1 (7.0-7.5)	8.0
V	53	51.7 (48-53)	50.6 (49.6-52.2)	50.0 (48.5-51.0)	48.7
Amphid to anterior end (µm)	18.5	18.1 (15.5-20.5)	13.8 (13-15)	11 (10-12)	14.5
Excretory pore to anterior end (µm)	98	82 (66-101)	93.5 (87-102)	85 (82-89)	93
Nerve ring to anterior end (µm)	93	75.8 (63-94.5)	87.7 (84-92)	80 (75-83)	91

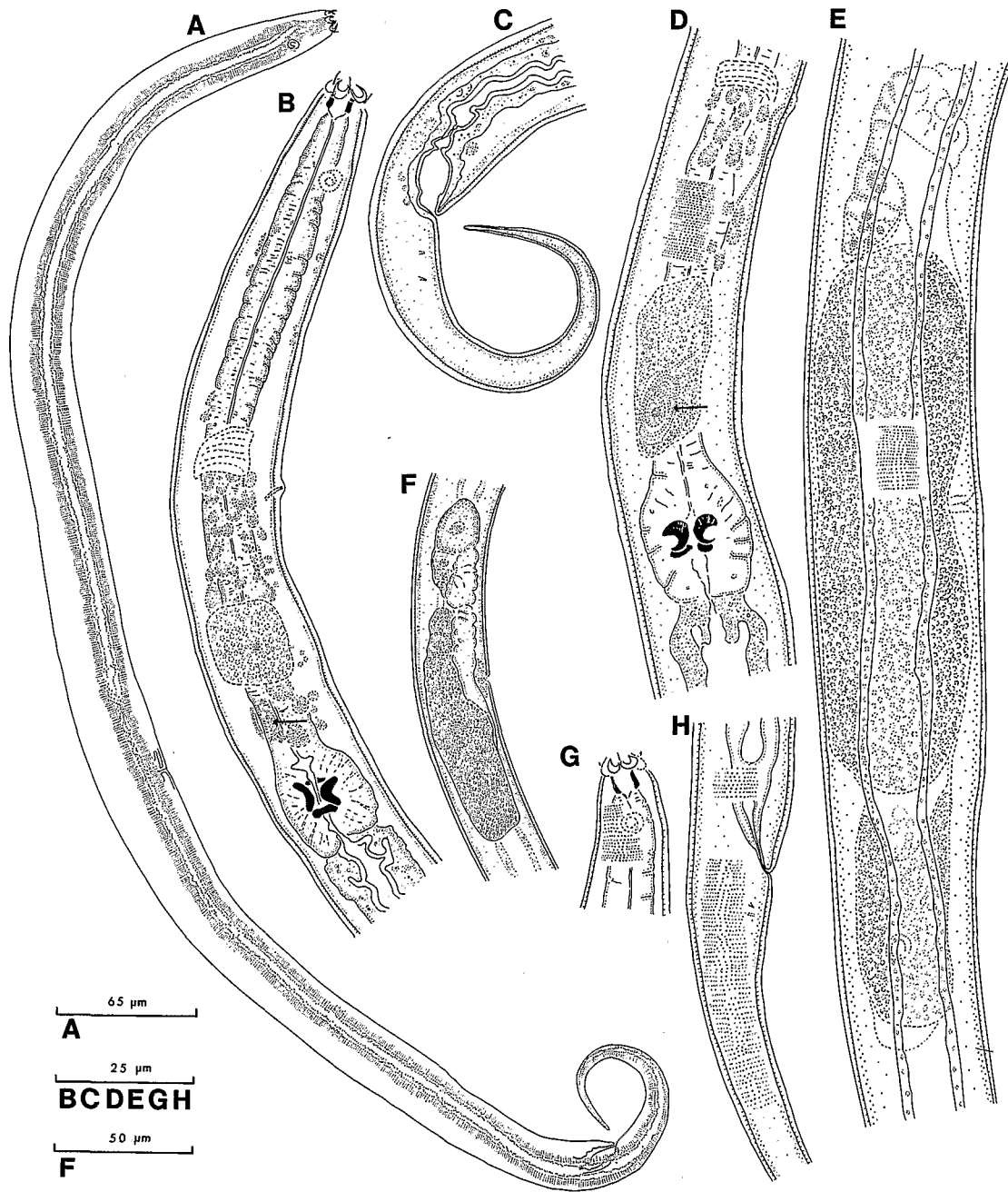


Fig. 4. A, B, C, F : *Euteratocephalus punctatus* n. sp.; (population from Kenya) : A : External view of body showing smooth area overlying lateral field; B : Anterior region showing spiral organ (arrow); C : Tail; F : Mid-body region — D, E, G, H : *Euteratocephalus spiralooides* (Micoletzky, 1913) Heyns, 1977 (population from Bolivia); D : Region of nerve ring and basal bulb showing spiral organ (arrow); E : Mid-body region; G : Head; H : Anal region showing punctations overlying the lateral field.

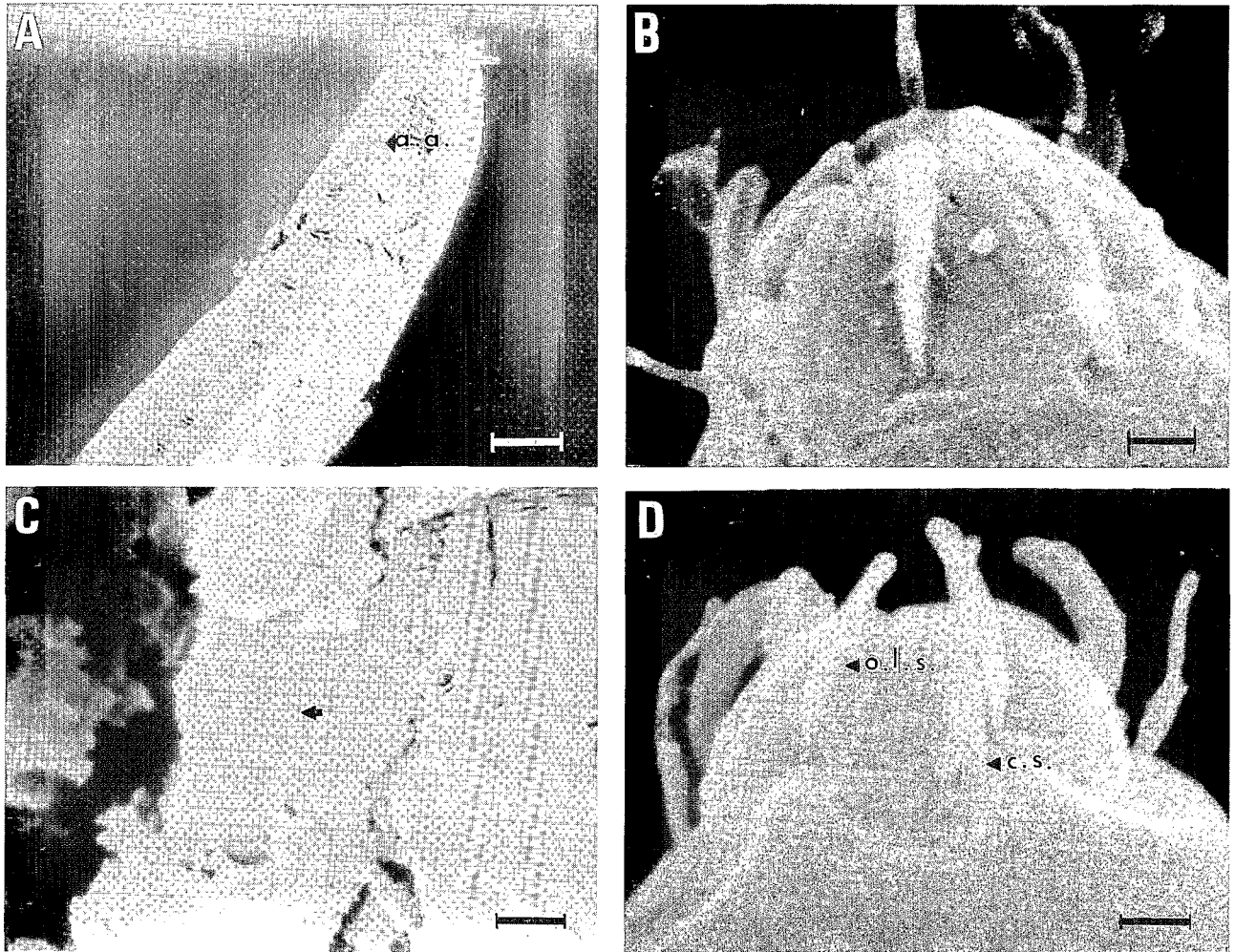


Fig. 5. *Euteratocephalus punctatus* n. sp. (Kenyan population). A : Anterior region. Arrow indicates amphideal aperture (a.a.); B : External morphology of the head; C : Punctations (arrow) on subcuticle overlying the lateral field; D : External morphology of the head (o.l.s. = outer labial setum; c.s. = cephalic setum). (Bars equal : A = 8 μ m; B, D = 1.3 μ m; C = 5 μ m)

OTHER HABITATS AND LOCALITIES

Brazil : Soil around the roots of coconut palms; sand around the roots of reeds on the bank of the Iguassu river (collected by J. Heyns).

Bolivia : Benthic sample from the littoral zone of the lake at the base of the Cerro Mullu Apacheta, Cordillera Real, altitude 4820 m (collected by D. De Waele on 12-7-1979).

Kenya : Benthic sample from the littoral zone of Hall Tarn, Mount Kenya, altitude 4293 m (collected by D. De Waele on 5.8.1975); benthic sample from the littoral zone of « Greatest » Hall Tarn, Mount Kenya, altitude 4293 m (collected by D. De Waele on 5.8.1975); benthic

sample from the littoral zone of Naro Moru Tarn, Mount Kenya, altitude 4190 m (collected by A. Coomans on 3-8-1975).

DIAGNOSIS AND RELATIONSHIPS

Euteratocephalus punctatus n. sp. is characterized by the ornamentation on the subcuticle overlying the lateral field. This area is demarcated by a broad 2.5-4 μ m wide, smooth area stretching over about 67-92 % of the total body length. The smooth area is bordered by two rows of large punctations on each side. The head is dominated by six well-developed lips with six outer labial setae and four slightly shorter cephalic setae. Amphideal aperture is a small, oval opening.

Euteratocephalus spiralooides does not have a smooth area overlying the lateral field. In *E. palustris* the smooth area is much narrower (1-2,5 µm wide) and stretches over only 10 % to about 40 % of the total body length. The lateral field in *E. spiralooides* is also demarcated by up to six rows of large dots or sometimes not demarcated at all. The body of *E. punctatus* is, on average, shorter than that of *E. spiralooides* (570-888 µm in *E. punctatus* n. sp. vs 820-965 µm in *E. spiralooides*).

DISCUSSION

The main character used in the present study for separation of the species is the ornamentation at the level of the lateral field. Features such as head width and height tend to vary even within populations depending also on whether the lips are in an « open » or « closed » position (Fig. 5 A, B). A protruding vulva, observed in many specimens of *E. hirschmannae*, also occurs in some specimens of *E. palustris* (Fig. 3 D). Furthermore, the morphometrical data are of limited value since much overlapping occurs between species (compare Tables 1, 2, 3).

In the body length and subcuticular ornamentation overlying the lateral field, the population of the Netherlands was intermediate between *E. palustris* and *E. spiralooides* (Table 1; Fig. 2 A-C). The population from Brazil was also intermediate between *E. palustris* and *E. punctatus* n. sp., especially in the width of the subcuticular ornamentation overlying the lateral field (Fig. 6 A, B, E).

In describing *E. capensis*, Heyns (1977) probably overlooked the fact that the smooth area overlying the lateral field stretches over only a relatively short distance in the anterior and posterior regions (Fig. 2 in Heyns, 1977). The same pattern of lateral ornamentation was also found in *E. palustris* populations from Belgium, The Netherlands, Germany, Australia and some specimens from Bolivia and Kenya (Figs 1-3). Therefore *E. capensis* is synonymized with *E. palustris*.

In his description of *T. spiralooides*, Micoletzky (1914) depicted the punctations constituting the transverse striae in the anterior region, as unbroken over the lateral field with no smooth area overlying the lateral field. We observed a similar pattern in the type specimens of *E. hirschmannae* and one specimen from Bolivia although the punctations overlying the lateral field tend to be slightly more pronounced in especially the anterior and posterior regions of some specimens. Therefore we synonymize *E. hirschmannae* with *E. spiralooides* and amend the description of *E. spiralooides* to include the specimens of *Euteratocephalus* with no smooth area demarcating the lateral field.

The taxonomic position of the teratocephalids has always been problematic since these nematodes possess a mixture of characters from different orders (Goodey,

1963; Andrásy, 1958, 1976, 1984). Andrásy (1958) considered the teratocephalids intermediate between the cephalobids and plectids (that is between the Phasmodia/Secernentea and Aphasmodia/Adenophorea). Goodey (1963) on the other hand, placed the teratocephalids between the Rhabditida and Araeolaimida, and stressed their affinities to both orders. Inglis (1983) splitted the Teratocephalidae Andrásy, 1958 into two families, the Teratocephalidae and Metateratocephalidae (Eroshenko, 1973) Ingles, 1983, and suggested their assignment to different orders. Boström (1989) also suggested a further separation of the genera *Metateratocephalus* and *Teratocephalus*. During the present study we found *Euteratocephalus* closer to *Metateratocephalus* than to *Teratocephalus*, this in accordance with Eroshenko (1973) and Andrásy (1976, 1984). The former two genera both have distinct body pores, no prominent body annules and a peculiar spiral-shaped organ with a possible excretory function (compare Fig. 1 A, D and 5 A of the present paper with Fig. 5 B and 6 A - I in Swart, Meyer and Heyns, 1989). In contrast, *Teratocephalus* has no distinct body pores nor a spiral-shaped excretory organ but has prominent body annules (see Fig. 1 A and 4 A-I in Swart, Meyer and Heyns, 1989).

The spiral-shaped, laterally situated organ, mentioned above, was observed within the body cavity of all species of *Euteratocephalus* just anterior to the basal bulb (Figs 1 A, D; 2 D; 3 B, C; 4 B, D; 6 A, C). The small tubule seen in some specimens, extending from this organ towards the excretory pore suggests a probable excretory function. Two caudal latero-subventral setae were observed in all species about 5-13 µm posterior to the anus. The setae bear no resemblance to phasmids, but a transmission electron microscope study would probably resolve their true nature, as was also suggested by Boström (1989) for *Metateratocephalus crassidens*.

SEM revealed the following additional information on *Euteratocephalus* (Fig. 5) : the cephalic sense organs are arranged in the normal configuration of six outer labial setae, four cephalic setae and two amphids (Fig. 5 B, D). No inner labial setae were observed. The amphids have small, oval apertures (Fig. 5 A), whilst the spiral aperture observed with the light microscope is situated subcuticularly. The punctations observed with the light microscope on the subcuticle overlying the lateral field could be seen with SEM on the subcuticle of a damaged specimen (Fig. 5 C). Another interesting observation is the presence of large oval body pores occurring along the lateral sides of the body (Fig. 5 A). These pores are irregularly arranged anteriorly, but forms one row on each side of the lateral fields posteriorly.

Euteratocephalus palustris seems to be the most widespread species occurring in Europe, Asia, Africa, Australia, USA and South America. *Euteratocephalus spiralooides*, also widespread, has been found in Europe,

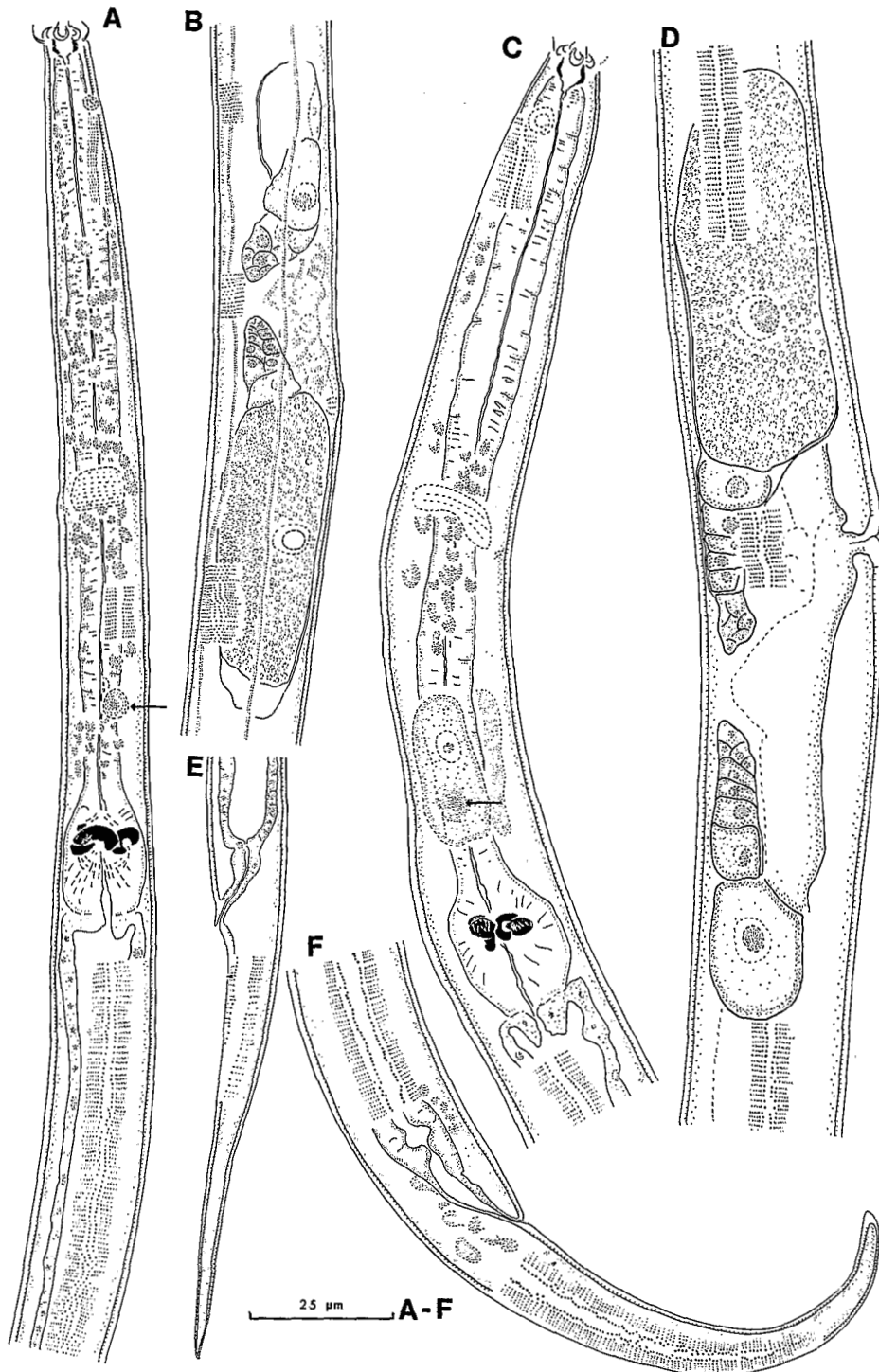


Fig. 6. *Euteratocephalus punctatus* n. sp. A, B, E : Population from Brazil. A : Anterior region showing spiral organ (arrow); B : Mid-body region; E : Tail — C, D, F : Population from Bolivia. C : Anterior region showing spiral organ (arrow); D : Mid-body; F : Tail.

Africa and South America, While *E. punctatus* n. sp. is known from Africa and South America only. Interestingly, all three species were found in Bolivia.

Key for the species of *Euteratocephalus* (based on the few relatively stable features found during the present study)

1. — Lateral field demarcated by a few rows of large, modified punctations or not demarcated at all *E. spiraloides*
 - Lateral field demarcated by a smooth area, bordered by large, modified punctations 2
2. — Smooth area comprising about 60-95 % of total body length. Width of smooth area 2.5-4 μm *E. punctatus* n. sp.
 - Smooth area comprising about 10-40 % of total body length. Width of smooth area 1-2.5 μm .. *E. palustris*

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