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Nematodes of some salt affected areas from Romania (Nematoda: Dorylaimoidea)

Marcel Ciobanu*, Iuliana Popovici* and Wilfrida Decraemer,*****

***Institute of Biological Research, Department of Taxonomy and Ecology, 48 Republicii Street, 3400 Cluj-Napoca, Romania,**
****Royal Belgian Institute of Natural Sciences, Rue Vautierstraat 29, B-1000 Brussels, Belgium,**
*****University of Gent (RUG) Department of Biology, Ledeganckstraat 35, B-9000 Gent, Belgium,**
e-mail : Wilfrida.Decraemer@naturalsciences.be

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Summary. One new species, *Labronema plica* sp. n. and six known species of Dorylaimoidea: *Laimydorus parabastiani* (Paetzold, 1958), Siddiqi, 1969, *Discolaimus major* Thorne, 1939, *Doryllium zeelandicum* (de Man, 1876), *Tylencholaimellus eskei* Siddiqi & Khan, 1964, *Tylencholaimus teres* Thorne, 1939 and *Mesodorylaimus potus* Heyns, 1963, were collected from three inland salt affected habitats located in Romania. *Labronema plica* sp. n. is characterized by its body length, slightly over 1 mm, short odontostyle, conoid-rounded tail, less than one anal body diameter long and similar in both sexes; in female, by a sclerotized *pars refringens vaginae* and the presence of pre- and post-advulval plicae; in male, by 53 µm long spicules and 16 contiguous precloacal mid-ventral supplements. *Laimydorus parabastiani, Doryllium zeelandicum, Tylencholaimus teres* and *Mesodorylaimus potus* are new records for the Romanian nematofauna. Descriptions, morphometric data, illustrations and data referring to the ecological conditions are provided.

Key words: Dorylaimoidea, nematodes, new species, Romania, salt affected habitat, taxonomy.

Preliminary data on terrestrial nematodes, to genus level, from salt-affected areas in Romania have been given in Ciobanu & Popovici (1998). The present study provides additional information on the Dorylaimoidea, including the description and illustration of one new species, *Labronema plica* sp. n., and six known species of Dorylaimoidea: *Laimydorus parabastiani* (Paetzold, 1958), Siddiqi, 1969, *Discolaimus major* Thorne, 1939, *Doryllium zeelandicum* (de Man, 1876) Loof, 1996, *Tylencholaimellus eskei* Siddiqi & Khan, 1964, *Tylencholaimus teres* Thorne, 1939 and *Mesodorylaimus potus* Heyns, 1963. *Laimydorus parabastiani*, *Doryllium zeelandicum*, *Tylencholaimus teres* and *Mesodorylaimus potus* are new records for the Romanian nematofauna.

MATERIAL AND METHODS

Four sites from three inland salt affected habitats located in the Transylvania province were investigated (Table 1). Nematode specimens were collected by the first author during a nematological survey carried out in three salt affected areas located in Transylvania (Romania) between 1996 and 2000. Nematodes were extracted using the centrifugation method of De Grisse (1969), killed and preserved in a 4% formaldehyde solution heated at 65°C, and mounted in anhydrous glycerin (Seinhorst, 1959). Drawings and photographs were made using a Reichert Polyvar light microscope with interference contrast.

Plant associations' classification was used according to Coldea (1991, 2000). Soil types were classified according to the Romanian System of Soil Classification (Conea *et al.*, 1980).

DESCRIPTION

Labronema plica sp. n. (Figs. 1 A-F ; 2 A-G)

Type specimens. Female holotype and one male paratype deposited in the nematode collection of the Institute of Biological Research in Cluj-Napoca, Romania. One female paratype deposited in the nematode collection of the Royal Belgian Institute of Natural Sciences in Brussels, Belgium (slide RIT675).

Measurements. Table 2.

Table 1. Site locations, vegetation and soil types of a nematological survey in Romania.

Site no.	Locality	Altitude (m)	Geographical position	Plant association	Soil type
1	Cojocna	335	46°45'N-23°50'E	*Staticeto-Artemisietum salinae*	Halomorphic soil
2	Cojocna	335	46°45'N-23°50'E	*Puccinellietum peisonis*	Halomorphic soil
3	Ocna Sibiului	400	45°53'N-24°30'E	*Artemisio-Festucetum pseudovinae*	Halomorphic soil
4	Turda	350	46°34'N-23°48'E	*Achilleo-Festucetum pseudovinae*	Halomorphic soil

Female. Body length slightly over 1 mm; body ventrally arcuate. Lips distinct, liplets small, lip region marked by a slight constriction. Body cuticle with fine transverse striae. Amphid openings at level of the cephalic depression. Odontostyle length slightly less than one lip region width, odontophore more than two times longer than odontostyle. Odontostyle opening about 40 % of its length. Guiding ring double. Oesophagus with the posterior expanded part 38-40 % of its total length. Cardia with well-developed rounded anterior valve and conical posterior part. Prerectum about 3 times as long as anal body diameter. Rectum 1.4-1.5 times longer than anal body diameter. Genital system didelphic-amphidelphic, ovaries reflexed. Oviduct typical dorylaimoid, spermatheca with few sperm, uterus not differentiated. *Pars refringens vaginae* more or less cylindrical, surrounded by well developed constrictor muscles; *pars proximalis vaginae* well sclerotized; vulva dilatator muscles well marked. Mid-ventral pre- and post-advulval body cuticle wrinkled, resembling papillae but no sensorial element observed. Vulva longitudinal. Tail convex-conoid with blunt terminus and shorter than anal body diameter.

Male. Spicule dorylaimoid, 16 ventromedian contiguous supplements present, spaced from the adanal pair; lateral guiding piece, 15 µm long. Transition intestine-prerectum just anterior to series of mid-ventral precloacal supplements. Tail conoid-rounded, shorter than anal body diameter.

Diagnosis and relationships. *Labronema plica* sp. n. is characterized by a medium sized body (1315-1380 µm), vulva at mid-body, odontostyle rather short (11-12 µm) and tail conoid-rounded, less than anal body diameter and similar in both sexes. In female, by well sclerotized *pars proximalis vaginae* and presence of pre- and post-adanal plicae of body cuticle; in male, by 16 contiguous precloacal mid-ventral supplements, spicules, 53 µm long and lateral guiding piece, 15 µm long.

Labronema plica sp. n. is closely related to *L. digiturum* Vinciguerra, 1984 in body size (1460-1580 µm), length odontophore (28-29 µm) and cardia shape; in female, by the wrinkled cuticle in the advulval region and sclerotized *pars proximalis vaginae*; in male, by the number of ventro-median contiguous precloacal supplements, 14. The new species differs from *L. digiturum* in tail shape (short conoid-rounded *vs* short digitate), a shorter odontostyle (11-12 µm *vs* 19-20 µm), shorter spicules (53 µm *vs* 67 µm). Comparable differentiations of the cuticle in the advulval region described as advulval papillae are present in *L. vulvapapillatum* (Meyl, 1954) Loof & Grootaert, 1981, *L. varicaudatum* (Thorne, 1929) Thorne, 1939 and *L. goodyei* Altherr & Delamare, 1972, but all these species are much longer, with longer odontostyle and longer spicules in male.

Type locality and habitat. Type specimens collected in June 1996 from a salt-affected field located in the locality Cojocna, Cluj county, site no. 1 (Table 1).

Etymology. *Labronema plica* sp. n.; plica, noun in apposition. Species name refers to the wrinkled mid-ventral advulval body cuticle.

Laimydorus parabastiani (Paetzold, 1958), Siddiqi, 1969 (Figs. 3 A-F; 4 A-D)

Material examined. Two females and one male specimen collected from a salt affected field located in the locality Cojocna, Cluj County, site no. 2 (Table 1).

Measurements. Table 2.

Female. Body slightly ventrally arcuate and about 2 mm long. No longitudinal ridges on the body. Lip region offset by constriction. Amphid

Table 2. Morphometric data (mean and range) for *Labronema plica* sp.n., *Laimydorus parabastiani* and *Discolaimus major*; [1]site no. 1; [2]site no. 2 (all measurements in μm).

Species	*Labronema plica* sp.n.			*Laimydorus parabastiani*		*Discolaimus major*
Site location	Cojocna[1]			Cojocna[2]		Turda
	Holotype	Paratype	Paratype			
N	♀	1 ♀	1 Male	2 ♀♀	1 ♂	1 ♀
L	1315	1380	1315	1995, 2000	1795	1660
a	30.5	30.7	30.5	36,4, 36.9	31.5	38.6
b	4.2	4.5	4.6	4.8, 5.1	4.4	4.7
c	52.5	53.1	52.5	13.9, 15.6	71.8	72.9
c'	0.9	0.9	0.7	4.3, 4.8	0.7	0.9
Head -vulva	700	687	–	900, 940	–	847.0
V/T	53.3	49.8	–	45.1, 46.9	–	51.1
Anterior branch	316	280	–	485, 540	–	–
G1%	24.1	20.3	–	24.3, 27.1	–	–
Posterior branch	302	315.0	–	440, 590	–	–
G2%	23.0	22.8	–	22.0, 29.6	–	–
Lip width	13.5	13.0	–	15.0, 15.0	16.0	27.5
Odontostyle	11.0	12.0	11.0	21.0, 21.0	21.0	22.0
Odontophore	27.0	26.0	26.0	33.0, 36.0	37.0	44.0
Odontostyle aperture	4.5	5.0	–	8.0, 8.0	–	13.0
Odonstostyle width	2.0	2.0	–	2.5, 2.5	–	4.0
Guiding ring	4.0	8.0	–	13.0, 13.0	–	10.0
Amphid width	5.0	–	–	7.5, 7.5	–	–
Oesophagus	312	310	287	390, 418	405	355.0
- length 'bulb'	127	115	110	183, 185	–	148.0
- width 'bulb'	25.0	26.0	–	30.0, 35.0	–	24.0
Cardia	27.0	24.0	–	23.0, 24.0	–	18.0
Cardia/oes.exp.width	1.1	0.9	–	0.7, 0.8	–	–
DN	200	203	182	225, 253	–	–
DN%	64.1	65.5	63.4	57.7, 60.5	–	–
DO	192	196	180	220, 246	–	–
DO%	61.5	63.2	62.7	56.4, 58.9	–	–
S_1N_1	250.0	241.0	218.0	–	–	–
S_1N_1%	80.1	77.7	76.0	–	–	–
S_1N_2	277	276	246	–	–	–
S_1N_2%	88.8	89.0	85.7	–	–	–
K	64.9	52.1	56.3	–	–	–
Body width mid-body	43.0	45.0	–	54.0, 55.0	57.0	43.0
Body width vulva	44.0	46.0	–	53.0, 56.0	–	44.0
Width cuticle near	1.0	1.0	–	2.0, 2.0	–	2.0
Width cuticle mid-body	2.5	2.0	–	6.0, 6.0	–	2.0
Vagina length	27.0	29.0	–	29.0, 30.0	–	15.0
Prerectum	95.0	140.0	–	106, 163	–	78.0
Rectum	43.0	42.0	–	40.0, 45.0	–	45.0
Tail	25.0	26.0	25.0	128, 144	25.0	23.0
Anal body diameter	28.0	30.0	34.0	30.0, 30.0	35.0	25.0
Spicule	–	–	53.0	–	50.0	–
Lateral guiding piece	–	–	15.0	–	10.5	–
Number of supplements	–	–	15	–	22	–

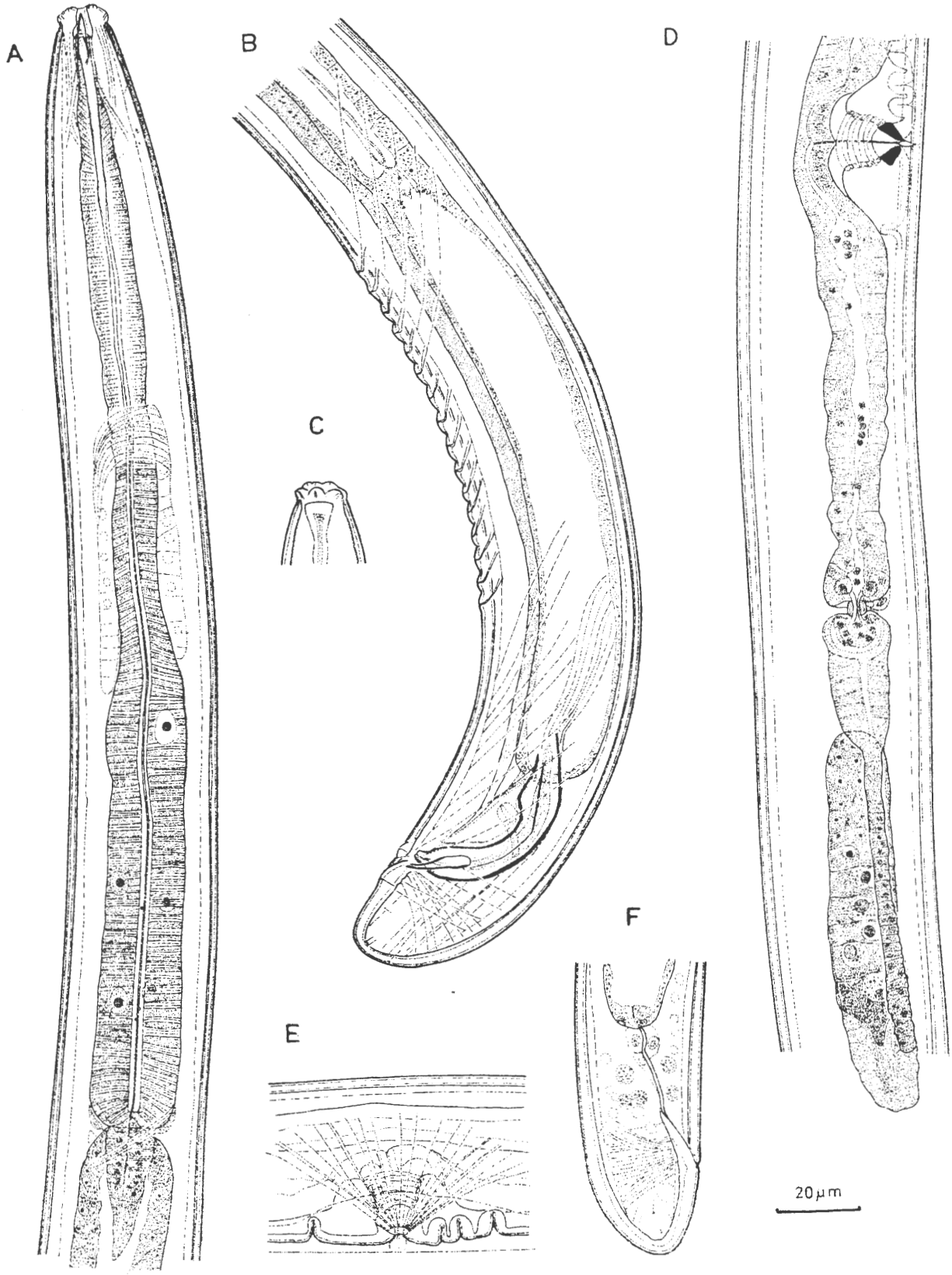


Fig. 1. *Labronema plica* sp. n. Male paratype. A: Neck region; B: Posterior body region with copulatory muscles partim; C: Anterior end, surface view. Holotype female. D: Reproductive system, posterior branch; E: Vulva region; F: Tail region.

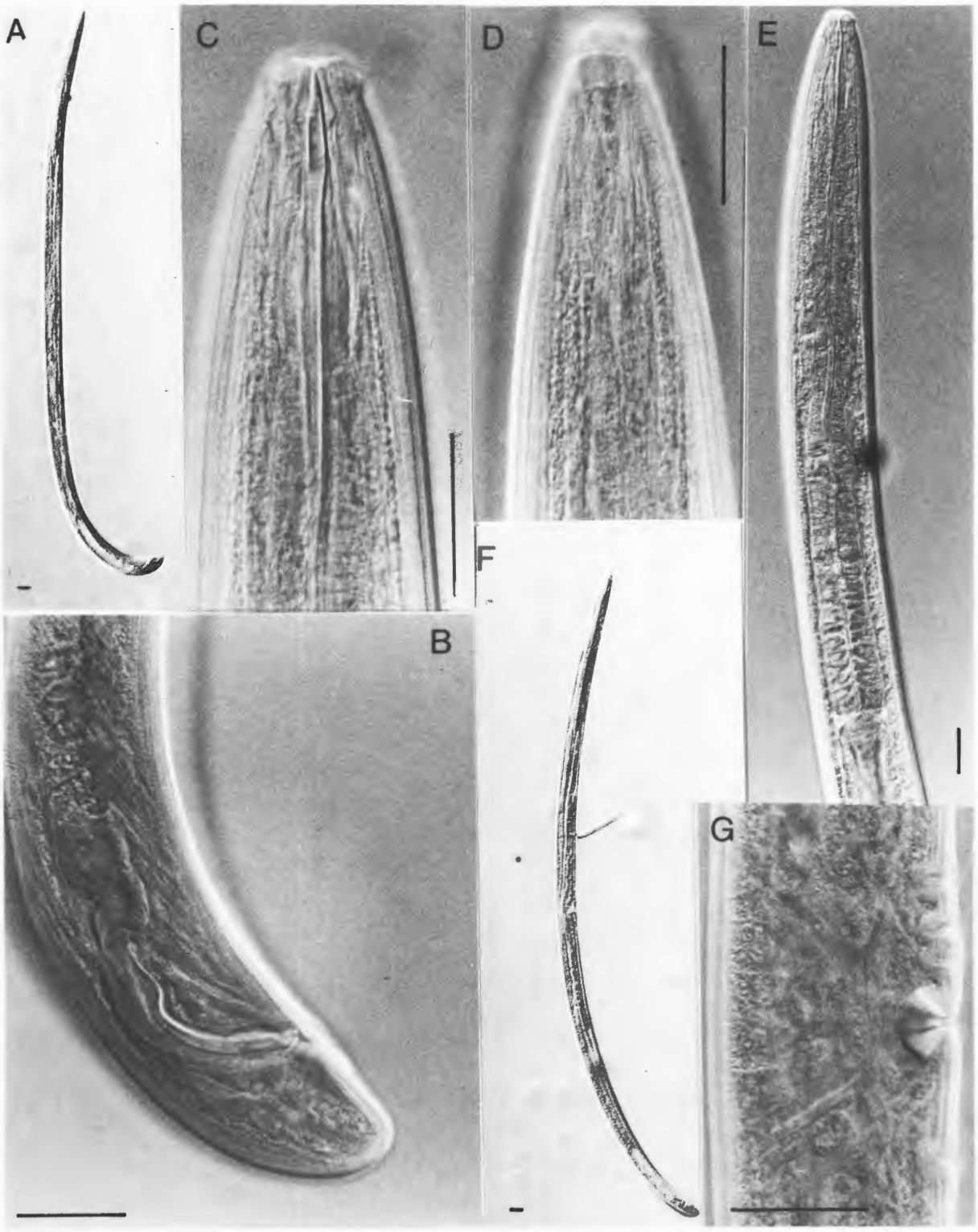


Fig. 2. *Labronema plica* sp. n. Male paratype. A: Entire specimen; B: Posterior body region with copulatory apparatus; C: Stylet region; D: Anterior body region, surface view; E: Neck region. Holotype female. F: Entire specimen; G: Vulva region. Scale bar - 10 μm.

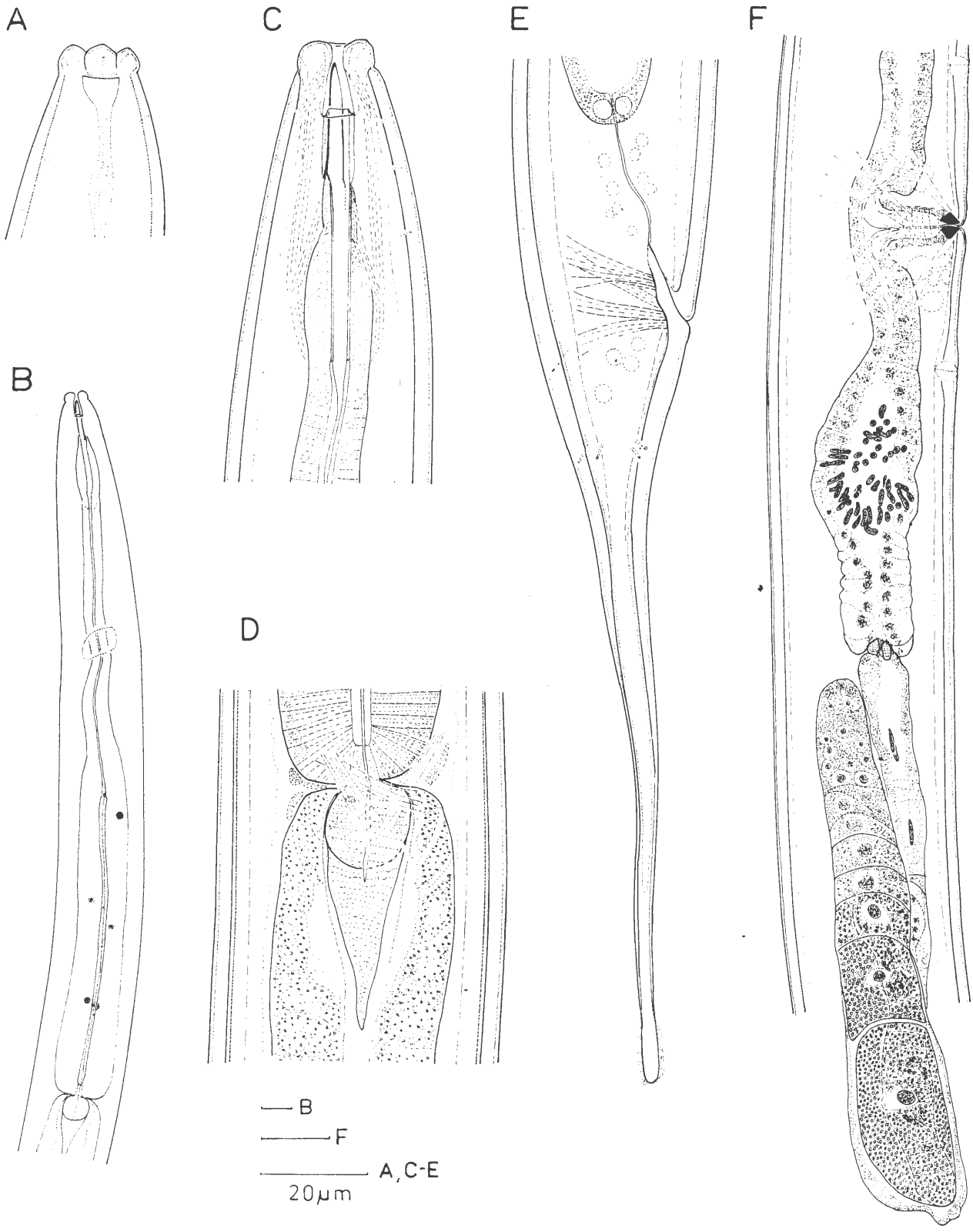


Fig. 3. *Laimydorus parabastiani* (Paetzold, 1958) Siddiqi, 1969 (female). A: Anterior end, surface view; B: Neck region; C: Stylet region; D: Cardia region; E: Tail; F: Reproductive system, posterior branch.

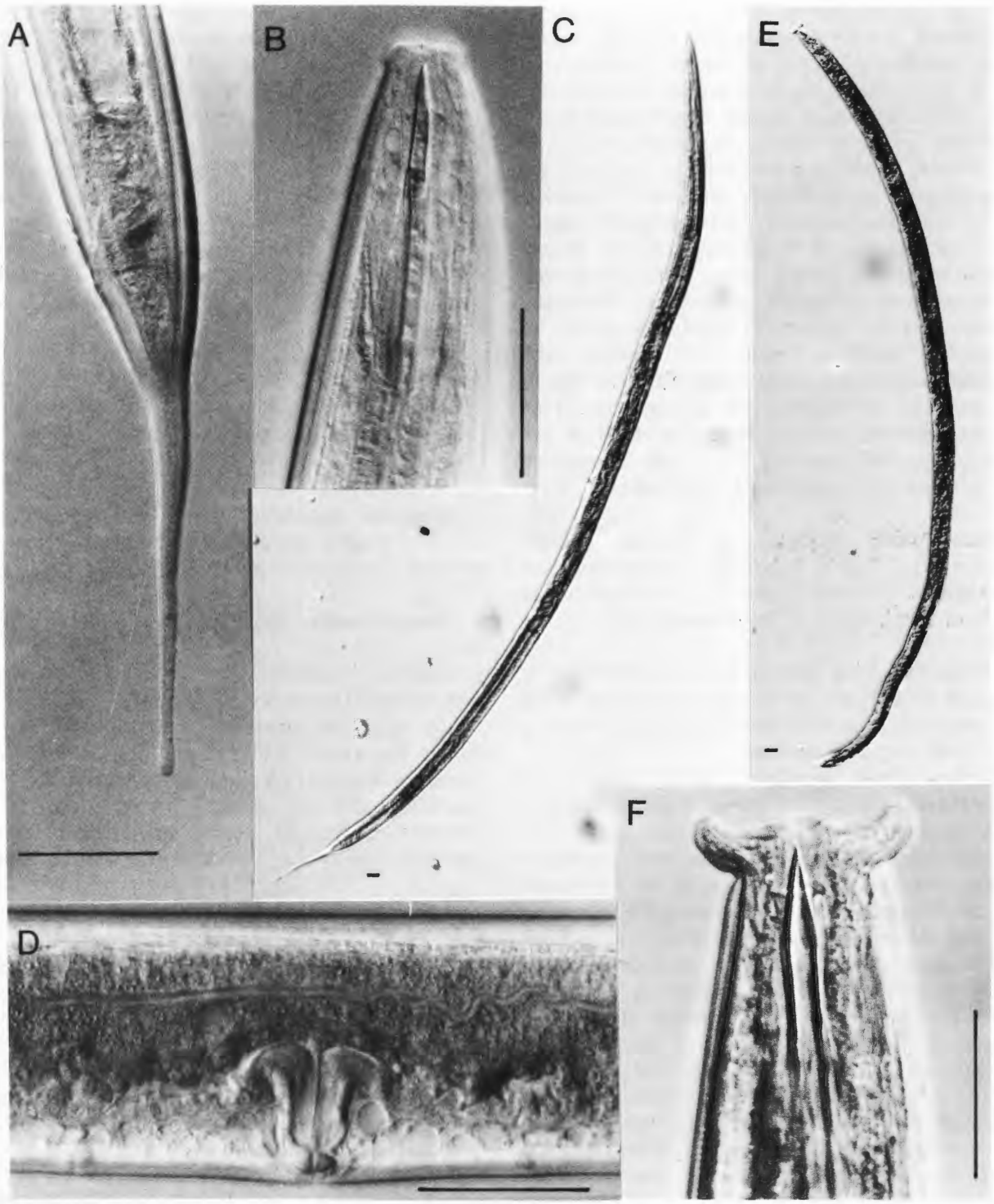


Fig. 4. *Laimydorus parabastiani* (Paetzold, 1958) Siddiqi, 1969 (female). A: Tail region; B: Stylet region; C: Entire female; D: Vulva region. *Discolaimus major* Thorne, 1939 (female). E: Entire female; F: Anterior end. Scale bar - 10 µm.

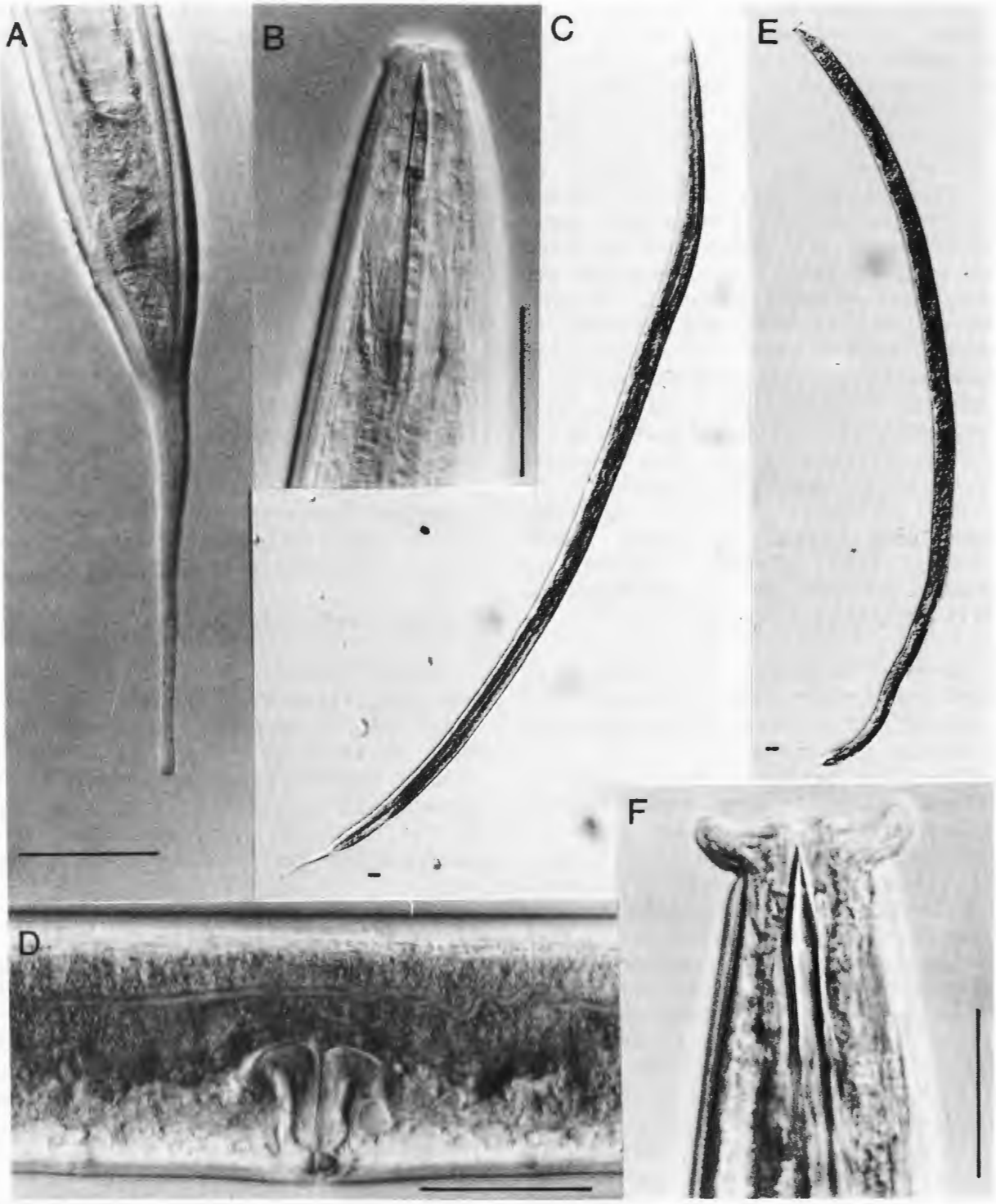


Fig. 4. *Laimydorus parabastiani* (Paetzold, 1958) Siddiqi, 1969 (female). A: Tail region; B: Stylet region; C: Entire female; D: Vulva region. *Discolaimus major* Thorne, 1939 (female). E: Entire female; F: Anterior end. Scale bar - 10 μm.

aperture at the level of the cephalic constriction, 50% of corresponding body diameter wide. Odontostyle 1.3-1.4 times longer than lip region width, aperture 38 % of its length. Guiding ring double. Oesophagus starts to expand at about 53-56 % of its total length. Cardia dorylaimoid: a well developed rounded valve, posteriorly with an imperforate, non-muscular sheath. Rectum 1.5 times longer than anal body diameter. Prerectum 3.5-5.4 anal body diameter. Genital system didelphic-amphidelphic, with reflexed ovaries. Sperm present in female genital tract. Vagina with well sclerotized *pars proximalis vaginae*; *pars refringens vaginae* largely cylindrical and encircled by constrictor muscles. Uterus with swollen *pars musculosa uteri* with sperm; sperm also observed in enlarged part of oviduct. Vulva transverse. Pre- and post-advulval papillae present at about 40 µm from vulva. Tail tapering first, then attenuated resulting in a blunt, slightly clavate terminus.

Male. Body shorter than female. Spicule dorylaimoid, 22 contiguous ventromedian supplements. Prerectum extending well beyond the region of supplements at its proximal end.

Discussion. This species was first reported by Paetzold (1958) as D*orylaimus parabastiani* from soil collected in a salt-affected habitat located in the central part of Germany.

Siddiqi (1969) transferred the species to the newly created genus *Laimydorus*, which accommodated those species of *Dorylaimus sensu lato*, which lack longitudinal ridges over the body. Andrássy (1986) transferred *L. parabastiani* to the genus *Mesodorylaimus* without comment. This transfer was not followed by Bongers (1988) and Loof (1996). *Laimydorus parabastiani* is closely related to *L. cryptosperma* (Loof, 1969) Baqri & Coomans, 1973. The differentiating characters of the two species in the key by Loof (1996a) are the presence of the advulval papillae and transverse vulva in *L. parabastiani vs* advulval papillae absent and longitudinal vulva in *L. cryptosperma*. Andrássy (2002) redescribed the species as *Mesodorylaimus parabastiani* from Hungary. The morphometric data are largely similar to those of the type population for males and females, the males of de Man described by Loof (1961) and the Romanian male and female specimens. The main difference observed lies in the shape of the vulva: longitudinal with the sclerotized pieces of the *pars refringens vaginae* well separated in optical section in the Andrássy (2002) *vs* vulva transverse and sclerotized pieces close in the Romanian specimens and the original illustration by Paetzold (1958). Further, our specimens slightly differ from the type population by a slightly shorter female tail (126-160 µm *vs* 156-202 µm) and lower c and c′ ratio (c=13.9-15.6; c′=4.3-4.8; c=10.4-13.6 *vs* c= 10.4-13.6; c′=7) but are similar to the Hungarian specimens (t=126-160 µm; c=12-17; c'=5.0-6.3). We consider these differences as geographical variation and identified our specimens as *L. parabastiani*.

By reporting *L. parabastiani* from the same type of habitat as the original population, we confirm the preference of this species for halomorphic soils (halophilic species).

This is the first record of *L. parabastiani* in Romania.

Discolaimus major Thorne, 1939 (Fig. 4 E-F)

Material examined. One female specimen collected from a salt affected field located near the town of Turda, Cluj county, site no. 4 (Table 1).

Measurements. Table 2.

Female. Largely agrees with previous descriptions. Odontostyle length about 80 % of lip region width, its aperture more than half of its length. Prerectum 3.1 times as long as anal body diameter. Rectum 1.8 times longer than anal body diameter. Genital system typical; no sperm observed in female genital tract. Tail conoid rounded, slightly shorter than anal body diameter.

Male. Not found.

Discussion. Andrássy (1959) found two females and one juvenile of a *Discolaimus* species in soil around roots of *Artemisia* sp., collected from Dobrudscha (Romania). He identified the specimens as *Discolamus major* Thorne, 1939. According to Thorne (1939) the odontostyle length in *D. major* is equal to lip region width but in Andrássy's specimens it is shorter. Also the odontostyle aperture in *D. major* in Thorne (1939) is half as long as the odontostyle while Andrássy described and illustrated the nematodes with odontostyle aperture more than half the odontostyle length.

Siddiqi (1964) considered the specimens of Andrássy as different from *D. major* and to belong to a new species *D. perplexans*.

Peña-Santiago *et al.* (2002) made a revision of *D. major*, the most widely distributed *Discolaimus*

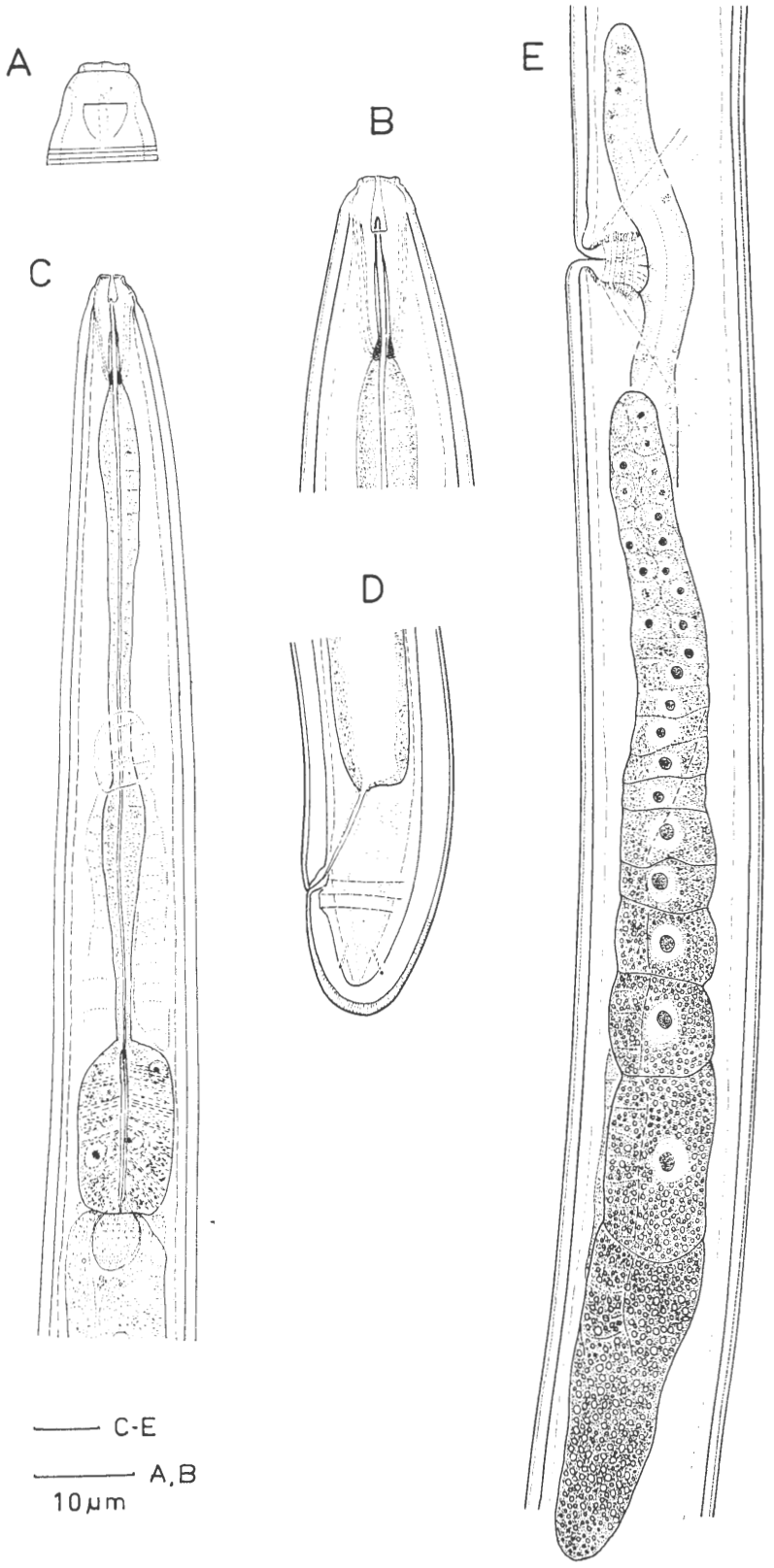


Fig. 5. *Doryllium zeelandicum* (de Man, 1876) (female). A: Anterior end, surface view; B: Stylet region; C: Neck region; D: Tail region; E: Reproductive system.

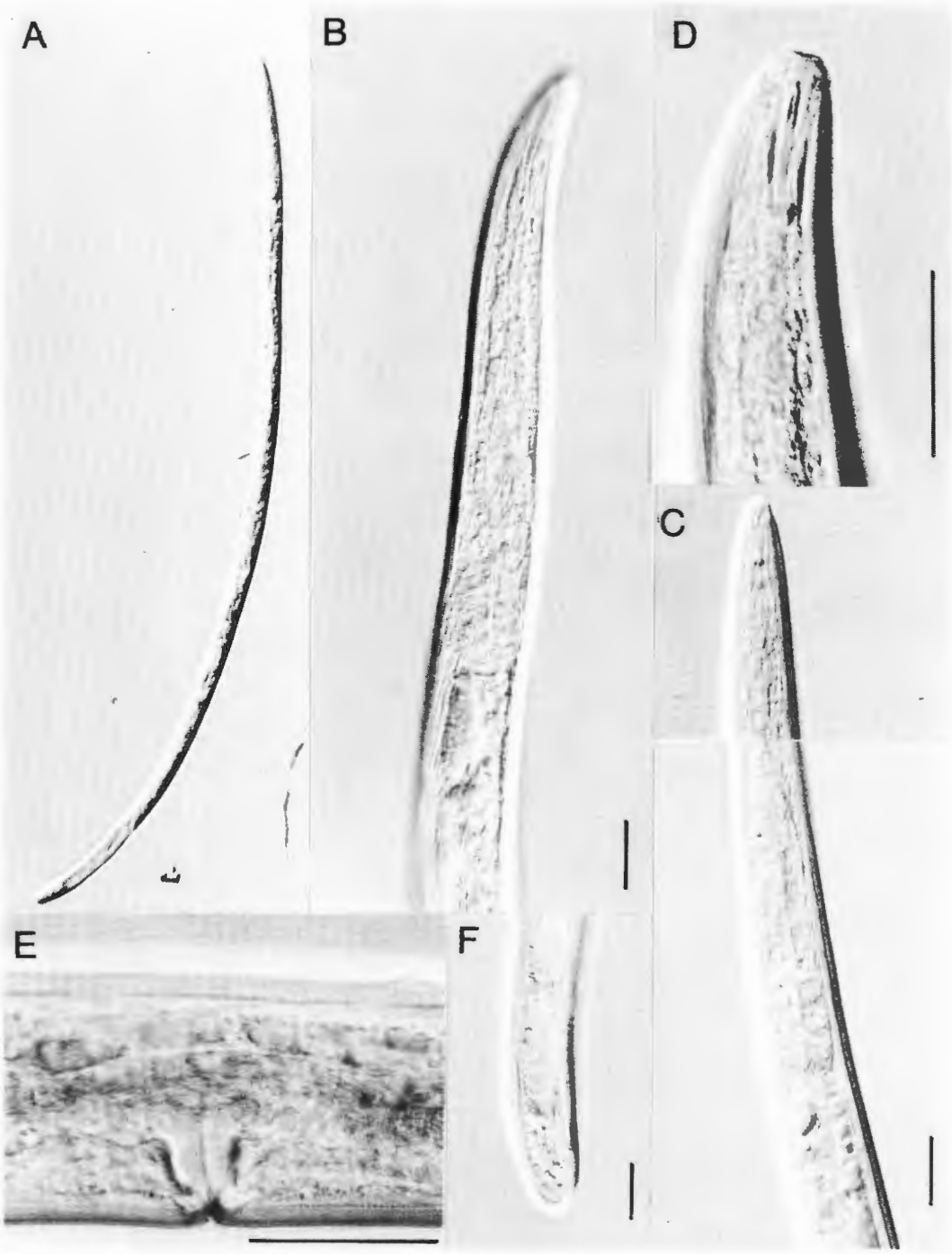


Fig. 6. *Doryllium zeelandicum* (de Man, 1876) (female). A: Entire specimen; B, C: Neck region; E: Vulva region; F: Posterior body region. Scale bar 10 μm.

species and synonymized *D. perplexans* Siddiqi, 1964 and *D. paramajor* Coomans, 1966 with *D. major*. They considered the differences in stylet length in relation to the lip region width not relevant, and less to the proposal of a new taxon taking the wide variability of the species into account. Peña-Santiago et al. (2002) suspect that the smaller specimens with slightly shorter odontostyle described as *D. major* belong to *D. agricolus* Sauer & Annells, 1985. However, the ranges (real and mean values) for body length of both species overlap (*D. major*: L=1.38-2.34 mm, mean L=1.38-1.93 mm; *D. agricolus*: L=1.23-1.98 mm, mean L=1.28-1.68 mm) as does the range of real values for the odontostyle length (*D. major*: odontostyle =22-29 µm; *D. agricolus* =21-27 µm); the range of mean value of the stylet length is smaller in *D. agricolus* (21-22 µm *vs* 24-28 µm).

Discolaimus major has been previously reported from Suatu botanical reserve located in the Cluj county, Roumania as *D. perplexans* from the (Ciobanu & Popovici, 1999).

Doryllium zeelandicum (de Man, 1876) Loof, 1996 (Figs. 5 A-E; 6 A-F)

Material examined. Two females and one fourth stage juvenile collected in June 1996 from a salt-affected field located in the locality Cojocna, Cluj county, site no. 1 (Table 1).

Measurements. Table 3.

Female. Largely similar to previous descriptions. Habitus almost straight to slightly curved ventrad. Cuticle, 2-3 rm thick at mid-body, with fine transverse striae; lateral chord 1/3rd of mid-body diameter. Labial and cephalic papillae not protruding but visible under light microscope. Amphidial fovea cup-shaped, aperture about half the corresponding body width. Oesophagus anteriorly muscular, narrowing towards the nerve ring; posterior to the nerve ring oesophagus again wider, till tapering posteriorly towards the basal bulb. Basal oesophageal bulb sharply marked off, short cylindrical, 14-19 % of total oesophageal length; three gland nuclei observed, the ventrosublateral pair just posterior to mid-bulb. Nerve ring located at 43 % of the oesophageal length from anterior end. Cardia short, rounded. Prerectum relatively short, 3-5 times the anal body diameter. Rectum equal to or shorter than anal body diameter.

Female reproductive system monodelphic-opisthodelphic. Ovary reflexed, its tip almost reaching the vagina region. Oviduct joins ovary subterminally, its *pars dilatata* poorly developed. No sperm observed. Uterus uniform, short, its junction with the oviduct marked by a weak sphincter. Anterior genital branch reduced to a blind uterine sac, one body width long. Vagina largely cylindrical, surrounded by well developed vulval constrictor muscles and widening towards the uteri; *pars refringens vaginae* absent. Vulva a transverse slit.

Tail cylindroid and relatively short, its length equal to anal body diameter.

Males. Not found.

Discussion. *Doryllium zeelandicum* was originally described as *Tylencholaimus zeelandicum* from a ditch bank in moist clayish meadow, Island of Walcheren, The Netherlands. Loof (1996b) restudied the species based upon topotypes. He transferred the species to the genus *Doryllium* and designated a neotype. He discovered that *D. zeelandicum* was not only widely spread along the Dutch coast but had also been described as Doryllium labiatum Andrássy, 1987 from freshwater habitats in Hungary and Spain (Andrássy, 1987; Peralta & Peña-Santiago, 1996). *Doryllium labiatum* was considered a junior synonym of *D. zeelandicum*. Other redescriptions of *T. zeelandicum* probably also refer to *Doryllium* species. The record of Meyl (1955) was from a silt location in Germany. The species appears to have a wide tolerance to different ecological conditions.

The Romanian specimens largely agree with the topotype specimens. This record is new for the Romanian nematofauna.

Tylencholaimus teres Thorne, 1939 (Figs. 7 A-E; 8A-E)

Material examined. Two female specimens collected from a salt affected habitat located in the Ocna Sibiului salt water spa, Sibiu county, site no. 3 (Table 1).

Measurements. Table 3.

Female. Largely similar to previous descriptions. Radial refractive elements between inner and outer cuticle visible in head and tail region. Amphid cup-shaped, its opening at the level of the cephalic constriction and less than half of the corresponding body diameter. Odontostyle shorter than lip region width, its aperture almost 1/3rd of its length. Oesophagus with narrow anterior part gradually expanding in a bulb, 45% of

Table 3. Morphometric data (mean and range) for *Doryllium zeelandicum*, *Tylencholaimellus eskei*, *Tylencholaimus teres* and *Mesodorylaimus potus* (all measurements in µm) [1] site no. 1

Species	*Doryllium zeelandicum*		*Tylencholaimellus eskei*	*Tylencholaimus teres*	*Mesodorylaimus. potus*	
Site location	Cojocna[1]		Turda	Ocna Sibiului	Cojocna[1]	
n	2 ♀♀	1 J4	4 ♀♀	2 ♀♀	3 ♀♀	1 ♂
L	855-1050	1140	580 (525-650)	1210, 1275	1110 (1050-1155)	1170
a	31.6-33.9	34.5	21.2 (19.4-22.5)	30.3, 34.5	31.1 (30.0-32.9)	33.4
b	3.7-5.8	6.4	6.4 (5.8-7.5)	5.1, 5.4	5.0 (4.5-5.3)	5.4
c	45.7-47.4	45.6	29.6 24.3-32.1)	55.0, 67.2	8.9 (8.6-9.2)	53.1
c'	1.0	1.1	1.0 (0.9-1.3)	0.8, 0.9	6.0 (5.8-6.4)	1.0
Head -vulva	315-345	360	213 (195-230)	660, 685	510 (460-535)	–
V/T	32.9-36.7	31.6	36.8 (35.6-38.6)	53.7, 54.6	45.8 44.0-46.9)	–
Anterior branch	25.0-28.0	43.0	31.8 (27.0-35.0)	340, 460	295 (295-295)	–
G1%	2.7-2.9	3.8	5.5 (4.9-6.3)	26.6, 38.0	25.4 (25.4-25.4)	–
Posterior branch	260-395	350	188 (155-225)	310, 420	205 (205-205)	–
G2%	30.4-37.6	30.7	32.5 (27.7-37.5)	25.6, 32.9	17.8 (17.8-17.8)	–
Lip width	7.5-0.8	7.0	7.9 (7.5-8.0)	10.0, 10.0	9.0 (9.0-9.0)	8.5
Lip height	–	–	3.4 (3.0-3.7)	4.0, 4.0	-	–
Odontostyle	6.0-7.0	5.5	11.5 (11.0-12.0)	6.5, 7	11.0 (11.0-11.0)	10.0
Odontophore	10.5	10.0	7.3 (7.0-8.0)	8.0, 8.0	18.3 (16.0-20.0)	19.0
Odontostyle aperture	–	–	1.5	2.2, 2.2	4.0 (3.5-4.5)	4.8
Odonstostyle width	–	–	1.0	1.0, 1.5	2.0 (2.0-2.0)	2.2
Guiding ring	5.0	–	7.5 (7.0-8.0)	6.0, 6.5	8.7 (8.5-9.0)	–
Amphid width	–	5.0	–	4.0, 4.0	3.5 (3.5-3.5)	–
Nerve ring-anterior	–	–	–	74.0, 107	–	–
Oesophagus	181-233	177	91.5 (87.0-95.0)	226, 250	222 (213-233)	–
- length 'bulb'	31.0-33.0	34.0	21.0 (19.0-25.0)	96.0, 110	65.3 (63.0-68.0)	–
- width 'bulb'	19-22	17	–	21.0, 23.0	21.7(19.0-26.0)	–
Cardia	7-11	11	–	10.0, 16.0	9.0 (7.0-10.0)	–
DN	–	–	–	–	165 (160-175)	–
DN%	–	–	–	–	74.3 (72.7-75.1)	–
DO	–	–	–	–	162 (154-173)	–
DO%	–	–	–	–	73.1(72.3-74.2)	–
S_1N_1	–	–	–	–	186 (186-186)	–
S_1N_1%	–	–	–	–	79.8 (79.8-79.8)	–
S_1N_2	–	–	–	–	186 (186-186)	–
S_1N_2%	–	–	–	–	79.8 (79.8-79.8)	–
Body width at neck	15.0-16.0	13.0	–	33.0, 34.0	–	–
Body width mid-body	28.0-30.0	30.0	27.3 (26.0-29.0)	37.0, 40.0	35.7 (34.0-38.0)	35.0
Body width vulva	27.0-31.0	33.0	27.8 (27.0-30.0)	37.0, 38.0	36.7 (36.0-38.0)	–
Width cuticle near	1.0	1.0	–	1.0, 1.0	1.3 (1.1-1.5)	1.5
Width cuticle mid-	2.0-3.0	3.5	–	3.5, 3.5	2.7 (1.2-3.5)	–
Lateral chord width	5.5-6.0	7.0	–	12.0, 15.0	-	–
Vagina length	15-20	14	14.5 (13.0-15.0)	12.0, 13.0	18.7 (15.0-21.0)	–
Prerectum	75.0-85.0	117.0	74.7 (49.0-100.0)	65.0, 75.0	68.3 (50.0-85.0)	–
Rectum	12.0-18.0	19.0	24.7 (16.0-33.0)	26.0, 27.0	32.7 (30.0-35.0)	–
Tail	18.0-23.0	25.0	19.8 (17.0-23.0)	19.0, 22.0	124 (117-135)	22.0
Anal body diameter	18.0-23.0	23.0	19.8 (18.0-21.0)	24.0, 24.0	20.7 (20.0-21.0)	22.0
Spicule	–	–	–	–	–	37.0
Lateral guiding piece	–	–	–	–	–	10.0
Num. of supplements						17
Num. of supplements						17

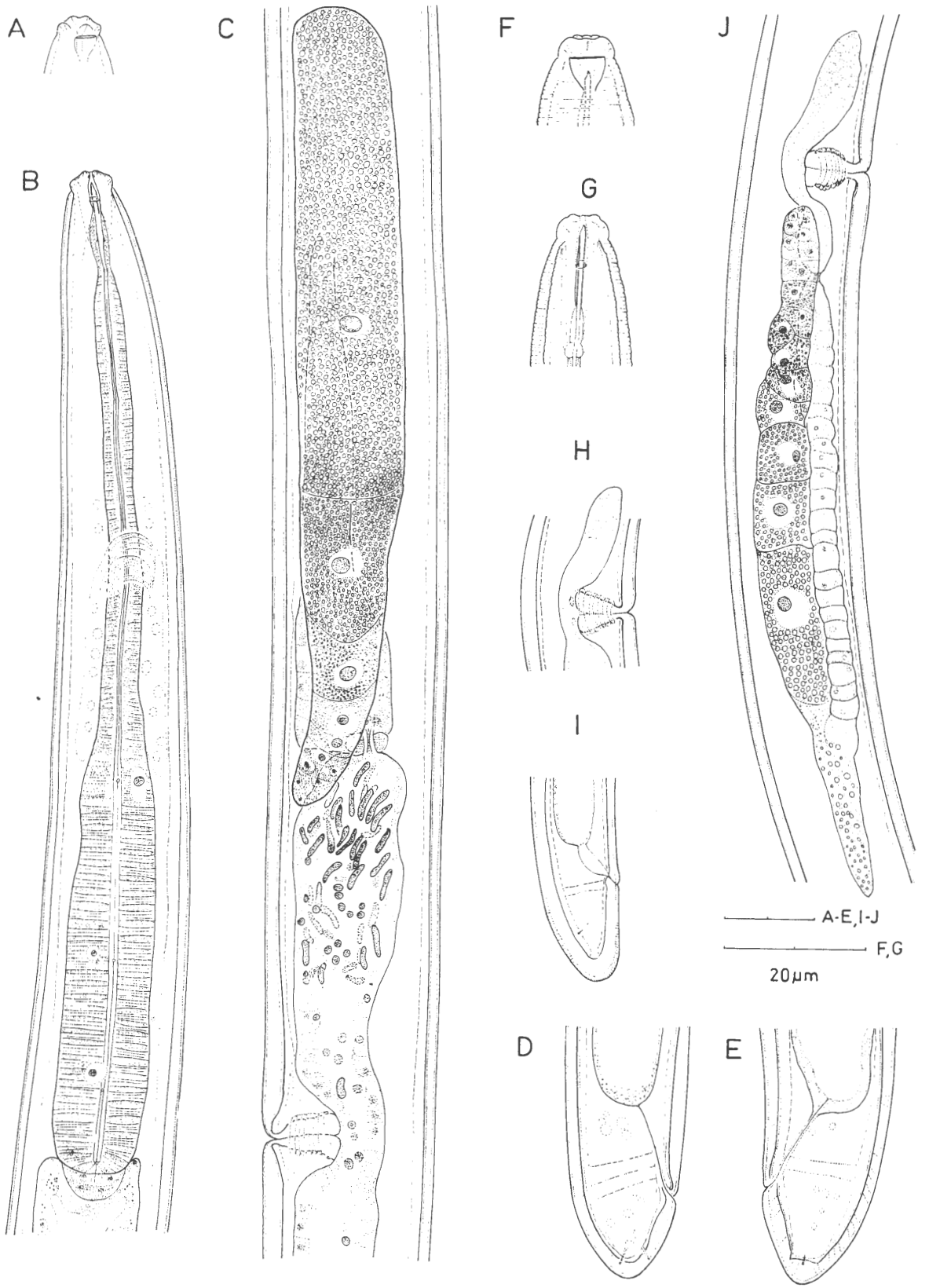


Fig. 7. *Tylencholaimus teres* Thorne, 1939 (female). A: Anterior end, surface view; B: Neck region; C: Reproductive system, anterior branch; D, E: Tail region. *Tylencholaimellus eskei* Siddiqi & Kahn, 1964 (female). F: Anterior end, surface view; G: Stylet region; H: Vulva region; I: Tail region; J: Reproductive system, posterior branch.

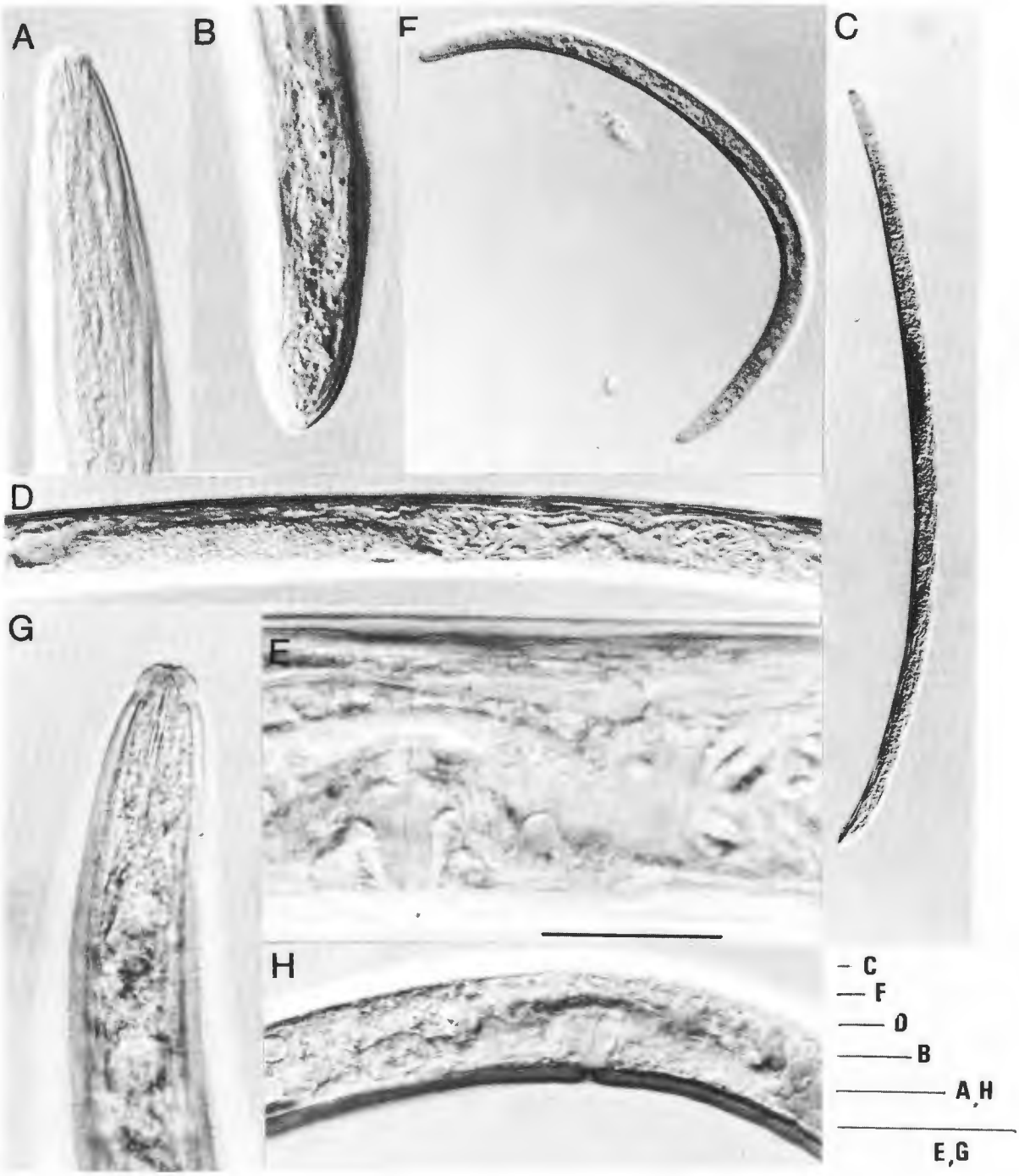


Fig. 8. *Tylencholaimus teres* Thorne, 1939 (female). A: Anterior region; B: Posterior region; C: Entire female; D: Reproductive system, anterior branch and part of posterior branch; E: Detail of vulva region. *Tylencholaimellus eskei* Siddiqi & Khan, 1964 (female). F: Entire female; G: Neck region; H: Vulva region. Scale bar 10 μm.

total neck region; cardia rounded. Rectum slightly longer than anal body diameter, prerectum about 9 times longer than anal body diameter. Genital system didelphic-amphidelphic with reflexed ovaries, extending beyond the well developed sphincter between oviduct and uterus. Sperm present in *pars dilatate oviductus* and in uterus. Vagina about cylindrical but narrower at level of constrictor muscles; vulva a transverse slit. Tail conoid rounded, slightly shorter than anal body diameter.

Males. Not found.

Discussion. *Tylencholaimus teres* was originally described by Thorne (1939) from U.S.A. Since then, this species has been reported from Hungary, Germany, India, Spitzbergen, Soviet Union, Italy and Spain. It appears to be one of the most frequent and widely distributed species of the genus (Peña-Santiago & Coomans, 1994).

Our morphometric data correspond well with those of the type population, the Italian populations (Vinciguerra, 1986, Vinciguerra & Giannetto, 1987) and Spanish populations (Peña-Santiago & Coomans, 1994). However, some differences can be noted with the specimens from Italy and Spain: a slightly more anteriorly located vulva (V%=53.7-54.6 *vs* V%=58.8-66.0) and thicker body (37-40 µm *vs* 26-34.5 µm at mid-body) and slight variation in shape of vulva, tail and cardia. We subscribe to their opinion considering these differences as intraspecific variation, the general morphology of American and European specimens being almost identical.

By reporting *T. teres* from a salt affected habitat we certify that this species has a wide range of tolerance to soil salt content (euryhaline species).

This is the first record of *T. teres* in Romania.

Tylencholaimellus eskei Siddiqi & Khan, 1964 (Figs. 7F-J; 8 F-H)

Material examined. Four females collected from Salt affected field located near the town of Turda, Cluj county, site no. 4 (Table 1).

Measurements. Table 3.

Female. Body length slightly over 1 mm; body ventrally curved upon fixation. Body cuticle with fine transverse striae. Lip region set off by slight constriction, with protruding inner labial papillae around oral opening. Amphid large stirrup-shaped with wide opening, more than 50% of corresponding body width and situated at level of the constriction at base of lip region. Odontostyle 58-63% of total stylet length, tubular with small opening (1 µm) and dorsally provided with a stiffening piece; odontophore with rounded basal knobs. Oesophagus with slender anterior part and basal bulb marked off as in original description. Cardia small, rounded. Prerectum about 3-5 times the anal body diameter. Genital system monodelphic-opisthodelphic, posterior ovary reflexed up to vagina region, oviduct with long tubular part and moderately developed *pars dilatata* separated from a short uniform uterus by a sphincter muscle; no sperm present. Anterior genital branch reduced to a blind uterine sac, one body width long. Vagina largely cylindrical, widened at the transition to the ovejector, rarely conical, surrounded by well developed constrictor muscles. Vulva transverse. Tail conoid-rounded, about one anal body width long.

Male. Not found.

Remarks. The specimens examined largely agree with the original description (Siddiqi & Khan, 1964) and redescription of the holotype by Goseco *et al.* (1975) except for being stouter (a=19.4-22.5 *vs* 25-29 in type specimens).

Tylencholaimellus eskei has been previously recorded from Romania from Suatu Botanical Reserve in Cluj county (Ciobanu & Popovici, 1999) and recently from mountainous spruce forest on acid soil from Pietrosul Rodneri (Ciobanu *et al.*, 2003). The Rodneri population showed some variation with the type population in possessing a slightly smaller but stouter body and a less marked lip region. However, the authors did not refer to the difference in proportion of the length of the odontostyle in relation to the total stylet length. The odontostyle is about as long as the odontophore (uncommon within the genus) instead of longer as in the type specimens. Further the illustrated tail region is clearly shorter (c'=0.7 based on the figure but not represented by morphometric data) than in the original description (c'=1-1.5) and our specimens (c'= 0.9-1.3).

The recent populations from Romania reveal a wider intraspecific variability than the type population, possibly in relation to the distribution of the species in a wide range of different soil types and habitats, even within a geographically restricted area (Romania).

Concerning the polytomous key of Peña-Santiago & Peralta (1999) in the revision of the genus *Tylencholaimellus*, the character B (lip

region morphology) is described with two possible types: B1, cap-like, offset by constriction and B2, rounded and continuous, two extremes. *T. eskei* is coded B2 i.e. rounded and continuous. Looking at other species coded B2, for example, *T. polonicus* Szczygiel, 1962, it became evident that a switch had occurred between the explanation of the coding and the data in table 2 (see Peña-Santiago & Peralta, 1999).

Mesodorylaimus potus Heyns, 1963 (Figs. 9 A-G, 10 A-H)

Material examined. Three females and one male specimen collected from a salt affected field located in the locality Cojocna, Cluj county, site no. 1 (Table 1).

Measurements. Table 3.

Female. Body about 1.5 mm long and ventrally arcuate. Cuticle with fine transverse striae and post labial sclerotization. Lip region rounded, offset. Labial framework slightly sclerotized. Amphid aperture at base of lip region and less than half of the corresponding body diameter wide. Odontostyle, twice as thick as the body cuticle. Guiding ring weakly sclerotized, double but giving the appearance of being single. Cheilostome wall in some specimens slightly thickened. Oesophagus largely cylindrical, starts to expand at about 2/3rd of its length; cardia rounded, surrounded by intestine tissue. Prerectum 2.3-4.2 anal body diameter long. Rectum 1.5 times longer than anal body diameter. Genital system didelphic-amphidelphic, with reflexed ovaries. *Pars refringens vaginae* largely cylindrical, encircled by constrictor muscles, *pars proximalis vaginae* sclerotized; vulva a transverse slit. Sperm present at level of *pars dilatata oviductus* and *pars dilatata uteri*; egg 67x18 µm. Ventral advulval pores absent. Tail anteriorly convex-conoid to elongate conoid, then tapering more or less uniformly to a finely rounded tip.

Male. Largely similar to female except for the short tail, bluntly rounded, dorsally convex and ventrally slightly concave, and the reproductive system. Transition to prerectum at level of anterior most mid-ventral precloacal supplements. Spicule dorylaimoid; 17 contiguous ventromedian supplements and one adanal pair.

Discussion. *Mesodorylaimus potus* was originally described from Transvaal, South Africa and based upon several additional records it appears most widely distributed in this South African province (Basson & Heyns, 1974; Heyns & Kruger, 1983; Botha & Heyns, 1992) with only one record from the Cape Province (Basson & Heyns, 1974). *Mesodorylaimus potus* was also reported outside South Africa, namely from Venezuela as *M. globiceps* (Loof, 1964), from several localities in the Soviet Union (Gagarin, 1971) and recently also from India (Ahmad & Ahmad, 2001).

Loof & Heyns (1982) discussed the variation in *M. potus*. They observed that ventral advulvar body pores in female may be present or absent in specimens of a single population and thus the character was not considered a diagnostic feature at species level. In this they agreed with Gagarin (1971) that *M. potus* (without advulval body pores) and *M. globiceps* (with such body pores) are conspecific. The consistently shorter tail of females from Venezuela was interpreted as geographical variation.

Botha & Heyns (1992) gave a detailed description of four new populations from Krüger National Park, Transvaal, South Africa and observed some new features such as the presence of slightly sclerotized post labial areas, reminiscent of the characteristic post labial sclerotization in the genus Thornenema Andrássy, 1959. Despite of these characteristics in the lip region typical of Thornenematinae, the species is still classified within the genus *Mesodorylaimus*, largely based on the features of the female reproductive system with two equally developed genital branches, a transverse slit-like vulva, the presence of a sclerotized *pars proximalis vaginae* and in males, by the presence of a large number of contiguous ventromedian supplements, and also by tail being dissimilar in male and female (Baqri & Jairajpuri, 1967; Siddiqi, 1969, Andrássy, 1986; Coomans & Carbonell, 1987). Botha & Heyns (1992) confirmed the absence of post labial sclerotization in the type specimens, but revealed their presence in the populations of Basson & Heyns (1974) and Heyns & Kruger (1983). The morphometric data of the various records from South Africa enlarged the range of the original data though each record is based on a small number of specimens. Similar extension of range occurred by the synonymization of *M. globiceps* with *M. potus*, especially in relation to the tail length, c and c' ratios in female and the spicule length and number of precloacal supplements in male.

Recently, Ahmad & Ahmad (2001) described a population of *M. potus* from soil around roots of *Oryza sativa* L. from India. Although, the Indian population had a comparable smaller size and a smaller number of supplements, the authors considered the Indian specimens to agree well with *M. potus* in the characteristic shape of the lip re-

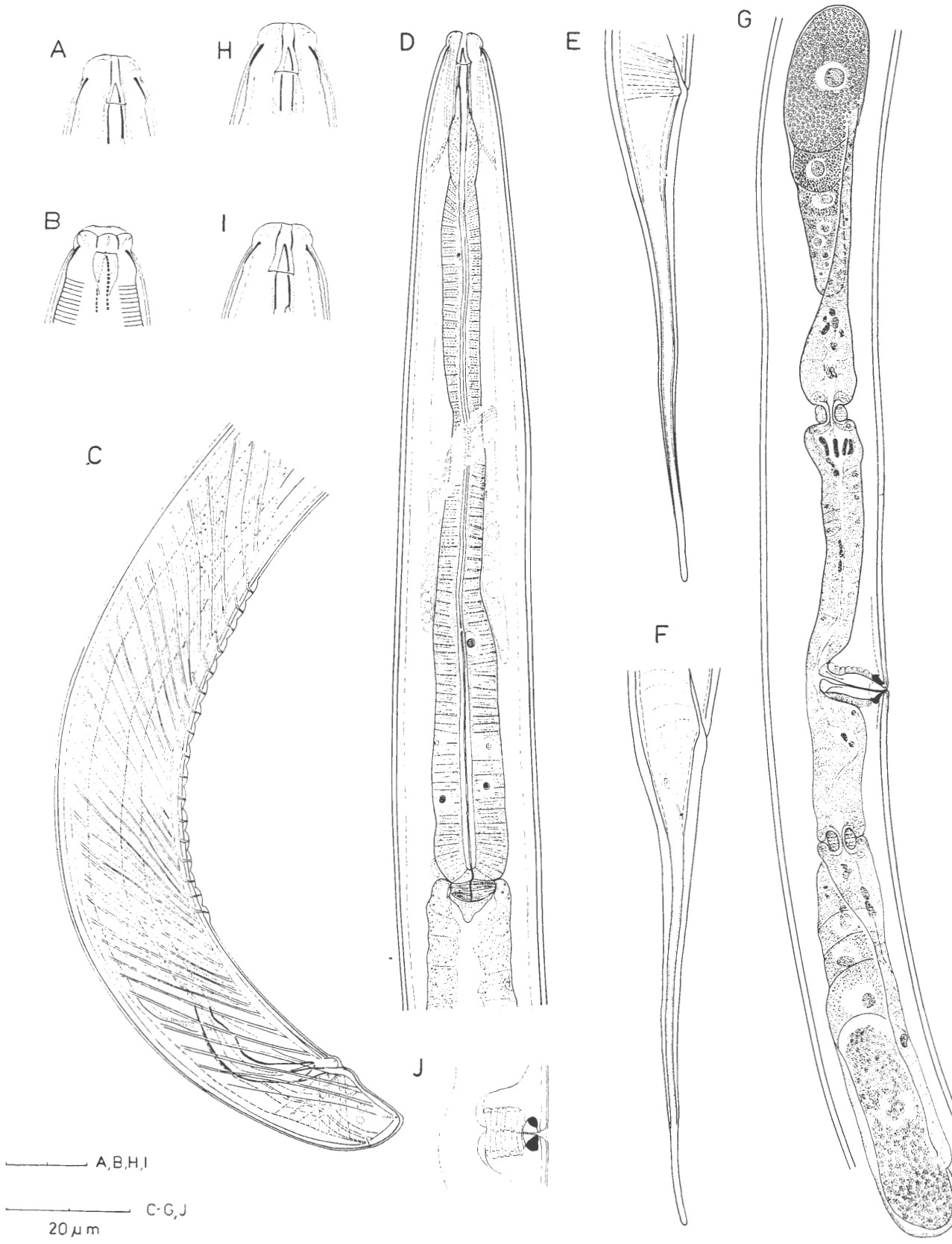


Fig. 9. *Mesodorylaimus potus* Heyns, 1963. Male. A-B: Anterior end, surface view and optical section respectively; C: Posterior body region. Female. D: Neck region; E, F: Tail region; G: Reproductive system; J: Vulva region; H, I: Anterior end.

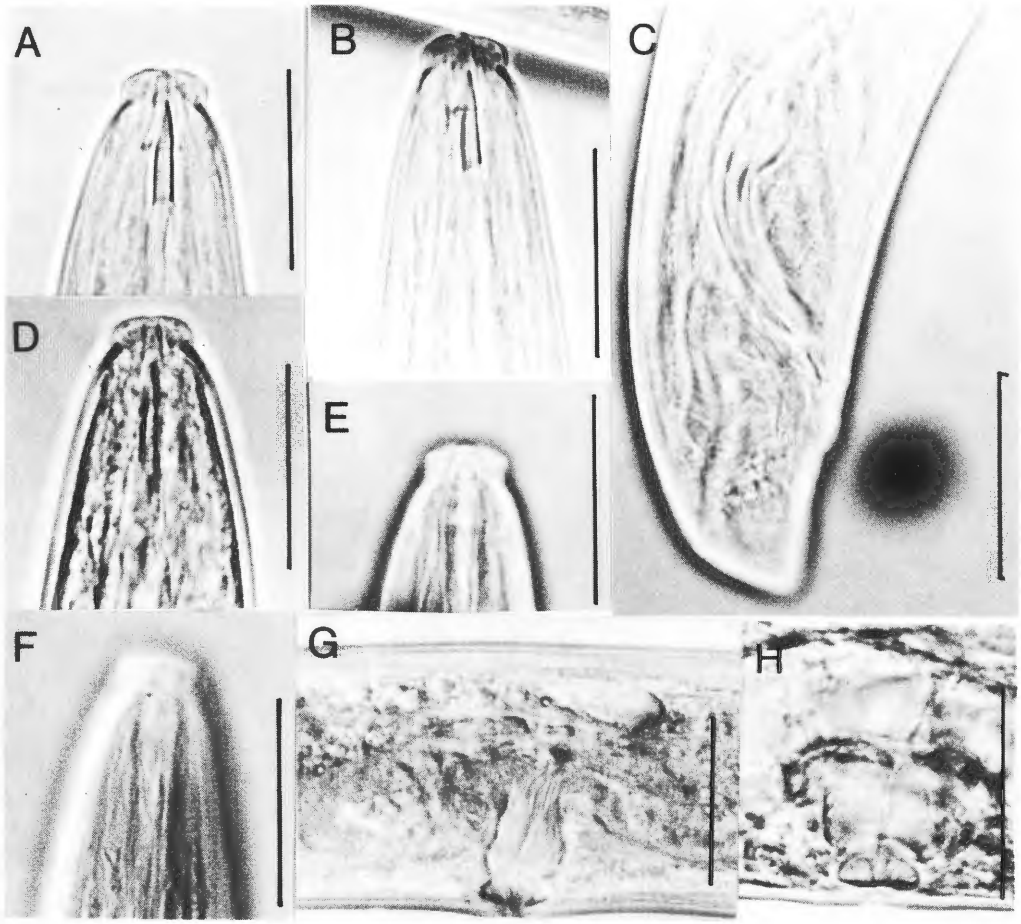
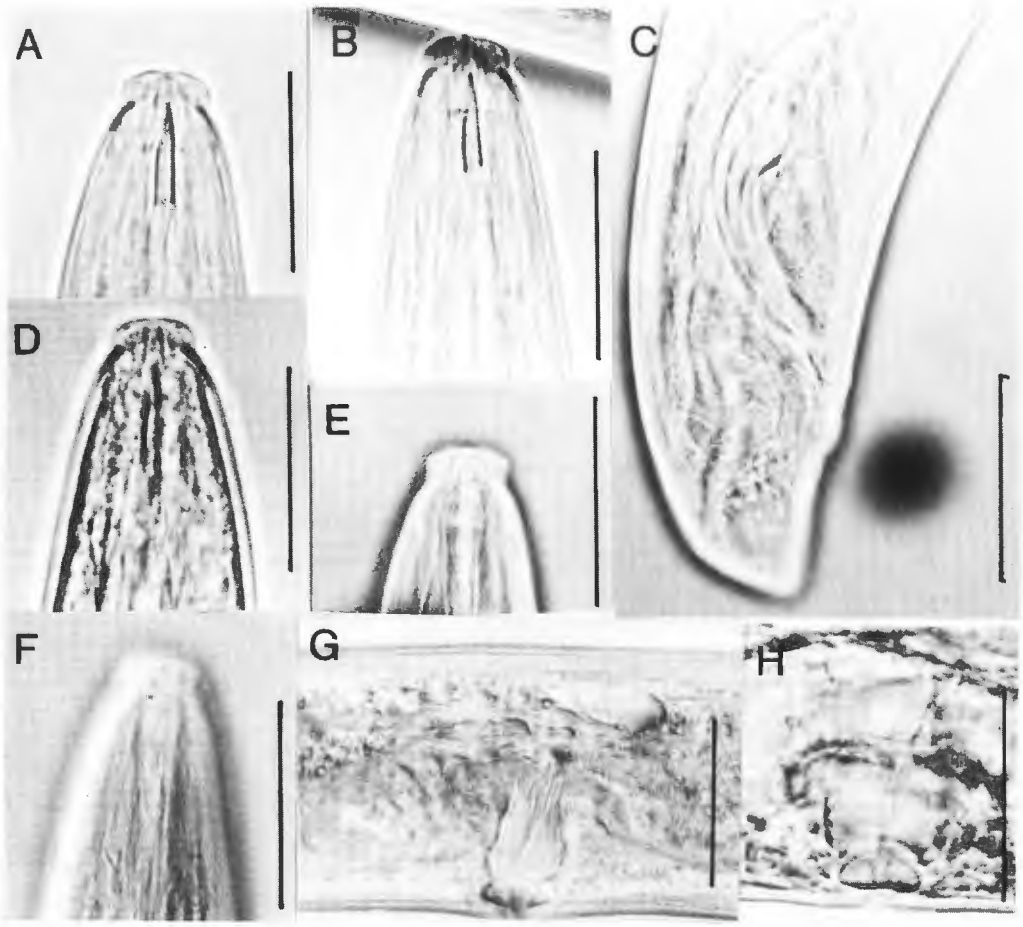


Fig. 10. *Mesodorylaimus potus* Heyns, 1963. Female. A, D: Stylet region; E, F: Anterior end, surface view; G, H: Vulva region. Male. B: Stylet region; C: Copulatory apparatus and tail. Scale bar 10 µm.

gion and presence of post labial sclerotization; short expanded oesophagus, presence of advulval body pores in female and prerectum extending beyond the range of supplements in males. In the same paper, the authors described a new species *Mesodorylaimus parapotus* also from the rhizosphere of *Oryza sativa* but from a different locality than *M. potus*. *Mesodorylaimus parapotus* is characterized by an offset lip region, weak labial and post labial sclerotization, a transverse vulva, long filiform tail in female and prerectum in male terminating within the range of supplements. It differs from *M. potus* by the absence of advulvar body pores, a smaller and differently shaped tail in female, smaller spicules and prerectum in male terminating within the range of supplements. Taking the previously described variations of *M. potus* (Loof & Heyns, 1982; Botha & Heyns, 1992) into account, some of the differential characters of *M. parapotus* fall within the range of the known variation of *M. potus*, for example, the advulvar body pores (present or absent), the tail length (long or shorter subject to geographic variation) in female and the more posterior position of the beginning of the prerectum i.e. within the range of supplements or beyond (described of the Russian populations) and smaller spicules (when considering the mean values, but still largely within the known range for the species, see table 4) in male. There remains only the tail shape of the female, which in our opinion is largely due to its smaller size. Apart from the described



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differences in Ahmad & Ahmad (2001) lying largely within the range of variation of the *M. potus,* we observed some other differences. The stirrup-shaped amphid is clearly wider with an aperture of 50% of the corresponding body with *vs* 1/3rd in former descriptions of *M. potus*, the odontophore is shorter than in the South African specimens, the male tail has a more pronounced ventral curvature and in the female reproductive system the sphincter muscles (well developed in *M. potus*) is not illustrated nor described in *M. parapotus*.

The Romanian specimens largely agree with the South African populations of *Mesodorylamus potus* in general habitus, presence of post labial sclerotization and most morphometric data taking the known variation of the tail length (with c ratio similar as the Venezuelan specimens) into account. They differ, however, by the smaller c' ratio (c'=5.8-6.4 *vs* c'=6.3-14.7 in *M. potus*) and the shape of the tail (short tail with rounded terminus *vs* a long tail with acute tip in *M. potus*). The weakly sclerotized labial frame work and the slightly thickened cheilostome wall in some of the Romanian specimens were not mentioned in Botha & Heyns (1992).

Because of the small number of differences with previous descriptions of *M. potus* and the restricted information available on intraspecific variation (e.g. resulting from impact of different habitats, geographical distribution) and the majority of the records being based upon a small number of specimens, we consider the Romanian specimens to belong to *Mesodorylaimus potus*.

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Ciobanu M., Popovici I., Decraemer W. Нематоды (Nematoda: Dorylaimoidea) из районов Румынии с высокой засоленностью почв.

Резюме. Один новый вид - *Labronema plica* sp. n. - и шесть известных видов Dorylaimoidea: *Laimydorus parabastiani* (Paetzold, 1958), Siddiqi, 1969, *Discolaimus major* Thorne, 1939 *Doryllium zeelandicum* (de Man, 1876), *Tylencholaimellus eskei* Siddiqi & Khan, 1964, *Tylencholaimus teres* Thorne, 1939 и *Mesodorylaimus potus* Heyns, 1963, - были собраны в трех внутриконтинентальных местностях Румынии с высокой засоленностью почв. *Labronema plica* sp. n. характеризуется длиной тела, несколько превышающей 1 mm, коротким одонтостилем, закругленно-коническим хвостовым концом, длина которого у обоих полов менее одного диаметра тела на уровне анального отверстия. Самки нового вида отличаются по склеротизации *pars refringens vaginae,* а также - по наличию пост-адвульварных складок, а самцы - спикулами длиной 53 µm и 16 смыкающимися преклоакальными вентральными супплементами. *Laimydorus parabastiani, Doryllium zeelandicum, Tylencholaimus teres* и *Mesodorylaimus potus* обнаружены в Румынии впервые. Для всех видов даны описания, данные морфометрии, рисунки и сведения по экологическим особенностям.