

# Nematodes of the order Dorylaimida from Andalucía Oriental, Spain. The genus *Prodorylaimus* Andrassy, 1959. I. Monosexual species

Reyes Peña Santiago\*, Joaquín Abolafia\* and Domingo Jiménez Guirado\*\*

\*Departamento de Biología Animal, Vegetal y Ecología, Universidad de Jaén, Paraje "Las Lagunillas" s/n, Edificio nº 5, 23071-Jaén, Spain,

\*\*Departamento de Biología Animal (Sección Zoología), Facultad de Ciencias, Universidad de Córdoba, Avenida San Alberto Magno s/n, 14004-Córdoba, Spain.

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**Summary.** Four species of the genus *Prodorylaimus* Andrassy, 1959 were recovered from soil samples collected mainly in natural areas from south-eastern Spain. Descriptions, measurements and illustrations of *P. acris* (Thorne, 1939) Loof, 1985, *P. cantabricus* sp. n., *P. uliginosus* Loof, 1985 and *Prodorylaimus* sp. are presented. *Prodorylaimus cantabricus* sp. n. is distinguished by the body being 1.7-2.1 mm long, lip region truncate and continuous with the body and 14-16 µm wide, odontostyle 29-33 µm long or 1.9-2.1 times the lip region width, pharyngeal bulb 180-226 µm long, V% = 45.8-52.0, prerectum 88-104 µm long, and tail filiform (325-412 µm, c=4.8-6.1, c'=10.9-15.0). These represent the first records of the occurrence of *P. acris* and *P. uliginosus* in Spain.

**Key words:** *Prodorylaimus cantabricus* sp. n., Iberian Peninsula, taxonomy.

During the last fifteen years we have collected numerous samples containing specimens of the genus *Prodorylaimus* as part of a general nematological survey carried out mainly in natural areas in Andalucía Oriental in the south-eastern area of the Iberian Peninsula, but also occasionally in other localities of Spain. This paper is one of a series on dorylaims from Andalucía Oriental, and with the inclusion of one species found in Northern Spain.

Several species belonging to *Prodorylaimus* (*sensu* Loof, 1996) have previously been recorded in Spain: *P. brigdammensis* (de Man, 1876) Goodey, 1963 by Palomo (1979), Hernández *et al.*, (1988) and Hernández and Jordana (1990); *P. dalmassoi* Loof, 1985 by Jiménez Guirado (1990); *Prodorylaimus filiarum* Andrassy, 1964 by Jiménez Guirado (1989, 1990); *Prodorylaimus cf. flexus* (Thorne & Swanger, 1936) Loof, 1985 by Jiménez Guirado (1990); and *P. longicaudatus* (Bütschli, 1874) Andrassy, 1959, [*species dubia* after Loof (1980), and *species inquirenda* after Andrassy (1988)] by Gadea (1953 & 1962) and Palomo (1979). Examination of the material collected during the present survey revealed the presence of an eighth species of the genus in Spain. In this paper descriptions of four monosexual species are presented.

## MATERIAL AND METHODS

Nematodes were extracted from soil or sediment by Baermann's method or a modification of Flegg's technique, killed by heat, fixed in 4% formaldehyde and mounted in anhydrous glycerin according the methods of Seinhorst (1962) or Siddiqi (1964).

## DESCRIPTIONS

### *Prodorylaimus acris* (Thorne, 1939) Loof, 1985 (Fig. 1 & Table 1)

**Female.** Relatively slender to very slender nematodes of medium size, 1.4-2.0 mm long. Body cylindrical, tapering towards both ends but more clearly towards the posterior extremity and less so towards the anterior. Habitus curved ventrad, more so in the posterior half to "J"-shaped. Outer cuticle layer rather thin throughout the body and with very fine transverse striations, more conspicuous in the anterior region. Inner cuticle layer wider than the outer, thickened in the caudal region. Lateral chord occupying one-third to two-fifths of the midbody width, granular. Lateral pores obscure. Lip region practi-

cally continuous or offset by a weak depression, 1.8-2.3 times as wide as high and one-fourth to one-third of the body diameter at neck base. Lips amalgamated, somewhat angular. Labial and cephalic papillae visible, not clearly interfering with the head contour. Amphid fovea cup-shaped, opening at level of the cephalic depression and occupying about one half of the lip region width. Odontostyle 1.4-1.5 times the lip region diameter long; aperture one-fourth to one-third of total neck length. Odontophore about 1.5 times the odontostyle length, rod-like. Guiding ring double, very fine, frequently difficult to observe. Pharynx consisting of a slender but muscular anterior part extending gradually into the basal bulb. Pharyngeal bulb cylindrical, 6-8 times as long as wide and occupying 50-60% of body width at neck base and 40-46% of the total neck length. Pharyngeal gland nuclei and outlets visible in only some specimens: DO=61-62%; S<sub>1</sub>N=80%; S<sub>2</sub>N=89-90%; DO-S<sub>1</sub>N=18-20%; DO-S<sub>2</sub>N=27-30%; S<sub>1</sub>N-S<sub>2</sub>N=9-10%. Cardia conoid, almost as long as wide, it appearing enveloped by the intestinal tissue which forms a relatively long conical projection into the intestinal lumen. Nerve ring located at one-third of the total neck length. In some specimens a long dorsal cell mass is present next to the pharyngeal bulb base and the anterior part of the intestine, about twice the corresponding body width in length. Intestine with a conspicuous bacillary inner layer, easily visible in the anterior portion. Reproductive system didelphic-amphidelphic. Ovaries relatively large, frequently reaching or extending past the oviduct-uterus junction; oocytes numerous, situated as a double and then a single row. Oviduct joins the ovary subterminally and consists of a slender part with prismatic cells and a well developed *pars dilatata*. Sphincter separating oviduct and uterus. Uterus a wide tube, little longer than the corresponding body width and without modifications. Uterine eggs 29 x 59 µm or about twice as long as wide. Vagina extending inwards to half the midbody diameter. *Pars proximalis vaginae* 8-11 x 10-12 µm, little longer than wide, and with somewhat convergent or sigmoid contours; it appears encircled by weak musculature. *Pars refringens vaginae* consisting of two weakly developed and rather close triangular to almond-shaped sclerotizations measuring 2 x 4 µm. *Pars distalis vaginae* very short. Vulva a transverse slit. Prerectum 1.5-3.5 anal body widths long. Rectum somewhat longer than anal body width. Tail filiform, sometimes straight but more often curved ventrad, tapering very gradually from anus to the tip; inner cuticle layer; hyaline terminal part occupying about one-fourth of the total length. Three pairs of caudal pores: two subdorsal, one subventral.

**Male.** Unknown.

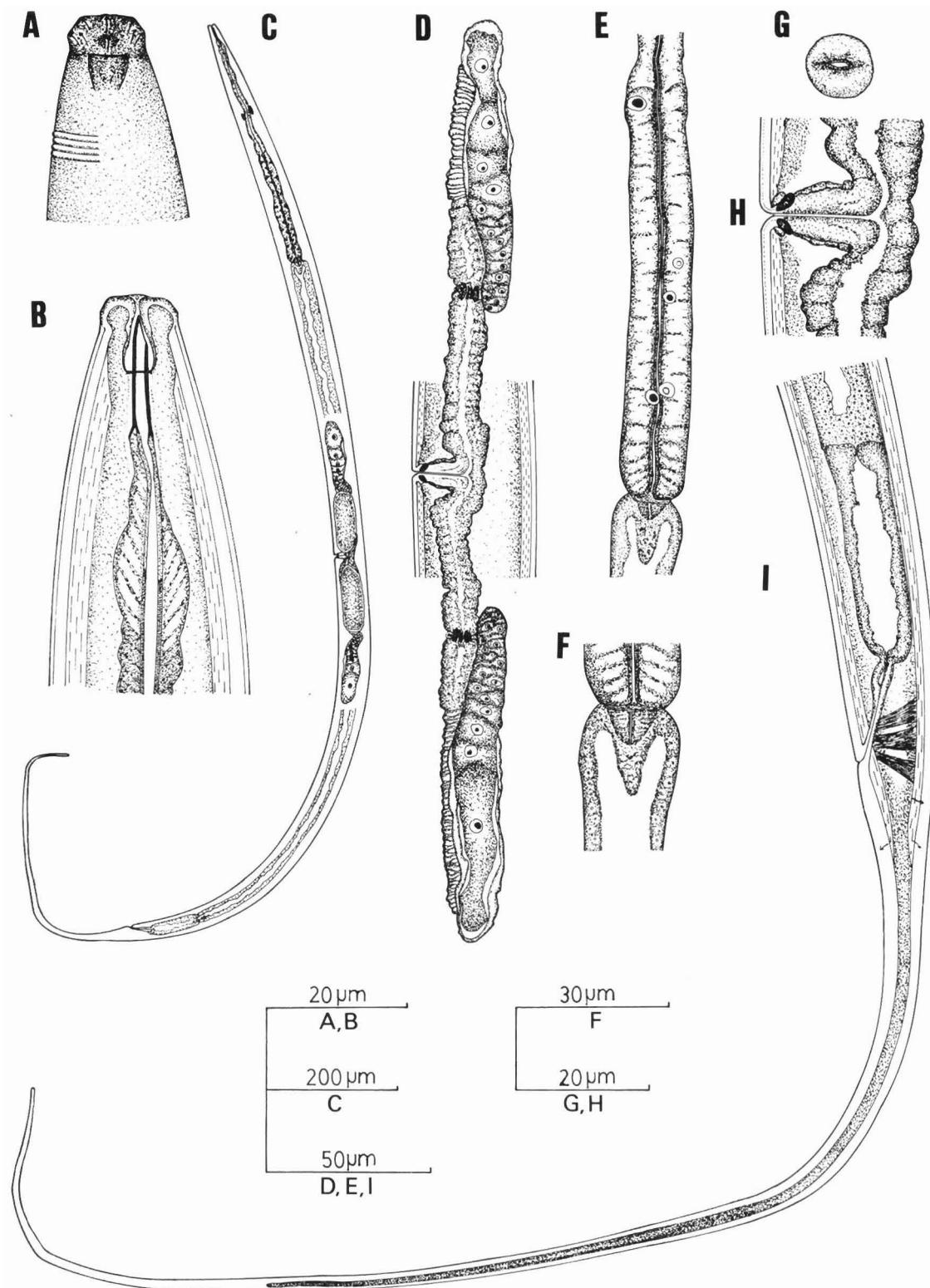
**Distribution.** *Prodorylaimus acris* is the most widely distributed species of the genus in south-eastern Spain, having been collected in soils from fourteen localities of the provinces of Granada, Jaén and Málaga in association with several forest trees (*Fraxinus angustifolia* Vahl, *Quercus faginea* Lam., *Q. pyrenaica* Willd., *Q. suber* L., *Populus alba* L., *Pinus nigra* Arnold, *Corylus avellana* L., *Castanea sativa* Miller, *Eucalyptus* sp., *Ulmus minor* Miller and *Platanus* sp.), Mediterranean garigues (*Cistus* sp., *Juniperus oxycedrus* L. and *Rubus* sp.) and a mango (*Mangifera indica* L.) culture.

**Remarks.** Our description and measurements are similar to those reported for other populations of the species (see, for instance, Loof, 1985), but the odontostyle of Spanish specimens is somewhat shorter (14-17 vs 17-18 µm). This is the first record of *P. acris* occurring in Spain.

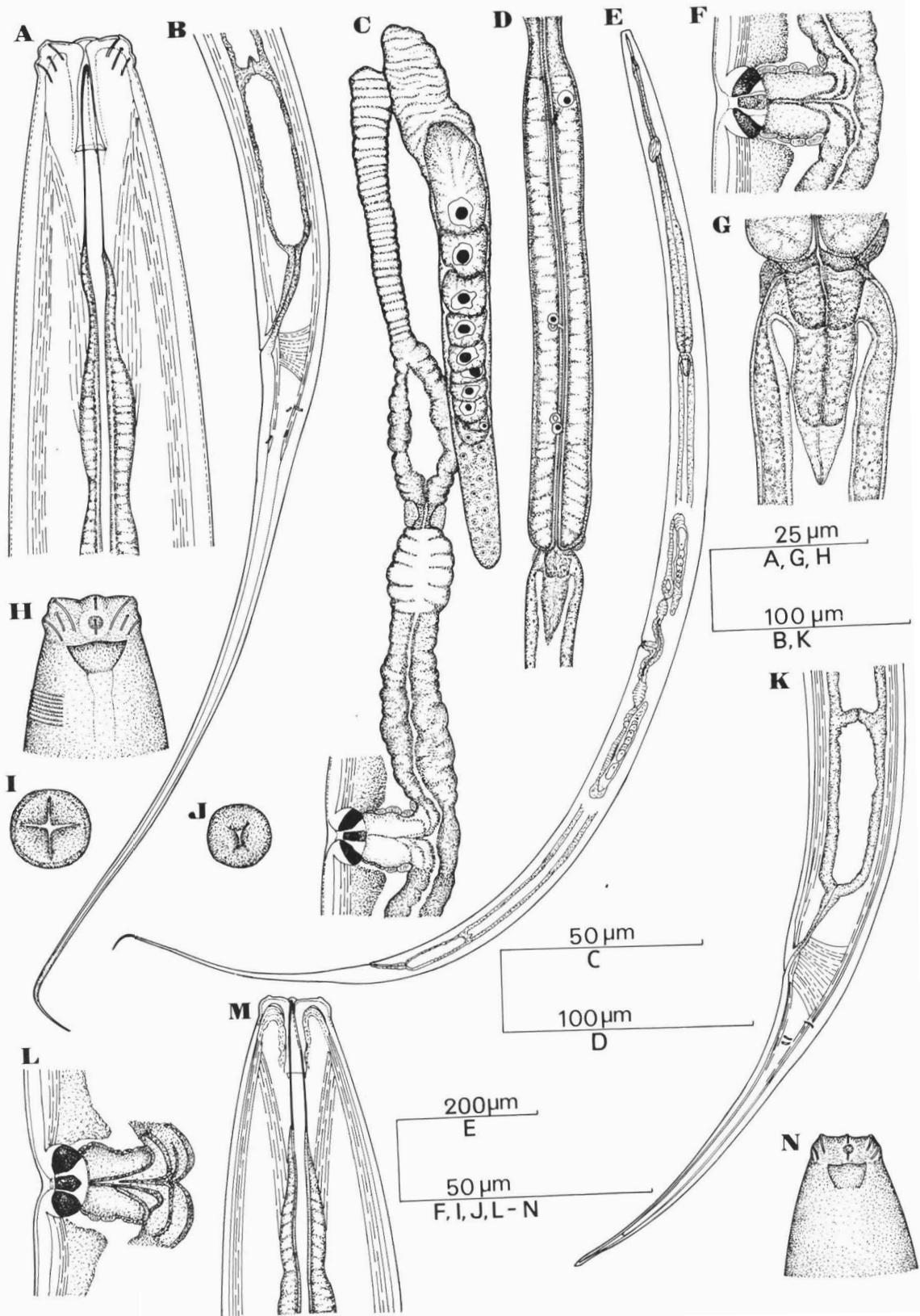
### *Prodorylaimus cantabricus* sp. n. (Figs. 2A-J & 3, Table 1)

**Synonym:** *P. szekessyi apud* Zullini, 1971.

**Female.** Slender to very slender nematodes of medium to great size, 1.8-2.1 mm long. Body cylindrical, tapering towards both extremities but more so clearly towards the posterior end. Habitus after fixation curved ventrad, in general an open "C". Outer cuticle layer very fine throughout the body and apparently smooth. Inner cuticle layer much wider than the outer one, more so at midbody and caudal region. Lateral chord about one-fourth (24-27%) of the midbody width. Lateral pores obscure. Lip region truncate, somewhat angular and practically continuous with the adjacent body or slightly offset by a very weak depression; 2.3-2.7 times as wide as high or less than one-third (27-28%) of body width at neck base. Labial and cephalic papillae visible due to their clear innervation, and interfering the head contour, which becomes angular. Amphid fovea cup-shaped, its opening about three-fifths (55-60%) of the corresponding body width. Odontostyle large, 9.5-10.5 times as long as wide and 1.9-2.1 times the lip region width long, sometimes somewhat sigmoid; dorsal side somewhat longer than the ventral side; aperture one-fourth to one-third of the total length. Odontophore rod-like, practically as long as odontostyle. Guiding ring double. Two dorsal and two ventral pores present in the range of the odontostyle. Pharynx consisting of a slender but clearly muscular anterior part which expands gradually into the basal bulb. Pharyngeal bulb cylindrical, 7.4-8.0 times as long as wide, occupying half of the body width at neck base and 45-50% of total neck length. Pharyngeal gland nuclei and outlets visible in the specimens



**Fig. 1.** *Prodorylaimus acris* (Thorne, 1939) Loof, 1985 (female). A: Lip region in surface view; B: Lip region in median view; C: Entire body; D: Genital system; E: Pharyngeal bulb; F: Cardia; G: Vulva in frontal view; H: Vagina; I: Tail.



**Fig. 2.** A-J: *Prodorylaimus cantabricus* sp. n. (female). A: Lip region in median view; B: Tail; C: Anterior genital branch; D: Pharyngeal bulb; E: Entire body; F: Vagina; G: Cardia; H: Lip region in surface view; I: Vagina in frontal view; J: Vulva in frontal view; K-N: *Prodorylaimus* sp. (female). K: Tail; L: Vagina; M: Lip region in median view; N: Lip region in surface view.

**Table 1.** Measurements and diagnostic features of *Prodorylaimus acris* (Thorne, 1939) Loof, 1985  
(all measurements in  $\mu\text{m}$  except L in mm).

Habitat	Ash grove	Lusitanian oak forest	Black poplar grove	Hazel coppice	Several	Several	Poplar grove
Locality Province	Cazorla Jaén	Cazorla Jaén	Cazorla Jaén	S. Segura Jaén	Several Jaén	Several Granada	Ronda Málaga
n	12 females	female	4 females	3 females	7 females	6 females	2 females
b	17±0.1 (1.4-1.9) 40.2±5.1 (32.5-49.5)	1.4 44.3	1.6±0.1 (1.5-1.7) 47.3±2.3 (44.8-50.3)	1.6-1.9 39.5-43.5	1.5-1.9 42.8-51.2	1.6-2.0 38.5-50.5	1.7, 1.7 47.3, 49.5
c	5.3±1.2 (5.0-5.5)	?	?	5.5	4.9-6.9	5.3-6.1	5.5, 5.9
V%	4.6±0.3 (4.2-5.2)	?	4.5±0.4 (4.0-5.0)	4.2-5.5	4.5-5.5	4.5-5.1	4.9, 5.2
G1/T1	37.7±11.4 (38.2-46.0)	44.6	41.7±2.1 (34.0-44.9)	39.9-45.0	41.2-44.7	41.1-48.8	40.5, 43.7
G2/T2	8.5±1.6 (5.9-10.8)	15.7	9.5±1.6 (8.6-12.0)	9.6-13.9	7.8-10.6	7.7-14.4	8.4, 8.8
c'	8.8±1.7 (7.6-13.2)	10.3	8.4±0.7 (6.3-12.1)	5.3-11.1	5.3-11.1	7.3-11.4	8.9, 9.4
Lip reg: width	17.8±2.0 (15.3-21.5)	?	16.8±1.1 (15.5-18.1)	14.5-18.8	14.5-18.9	15.5-19.2	15.5, 16.2
height	10.0-10.5	10.5	10.5-11.0	10.0-11.0	10.0-10.5	9.0-11.5	10.0, 10.5
Amphid aperture	4.1-6.0	5.0	5.0-6.0	5.5-6.0	5.0-7.5	4.5-6.0	6.0, 7.0
Odontostyle	5.1-6.0	5.0	5.0-7.0	5.0-7.0	6.0	6.0	6.0
Odontophore	15.0	14.5	15.5±0.8 (15.0-17.0)	14.5-15.5	15.0	?	14.0, 15.0
Guiding ring	9.0±3.0 (6-12)	?	?	24.5	?	23.0	?
Nerve ring	9.0-10.5	9.0	9.0	11.5	9.0-17.5	9.0-10.5	8.5
Neck length	119±11.2 (87.5-138)	102	?	117, 149	107-120	100-117	100
Pharyngeal bulb length	330±12.9 (310-346)	?	?	333	316-373	320-356	320
Cardia width	132±10.3 (118-149)	?	?	132-146	129-161	132-160	134, 140
Cardia length	10.5-24.5	12.0	7.5-18.5	12.0-15.0	10.5-18.5	7.5-20.5	12.0, 17.0
Cuticle: head	8.5-17.0	10.5	9.0-12.0	10.5-20.0	9.0-15.0	10.5-13.0	9.0, 10.5
midbody	1.5	1.5	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5
anus	1.5-2.0	1.5	1.5	1.5-2.0	1.5-2.0	1.5	1.5
Body width:	2.0-4.5	3.0	4.0-4.5	3.0-4.0	2.0-4.5	2.0-4.0	3.0
neck base	36.0-44.5	32.5	34.0-38.5	39.0-47.5	32.0-43.0	30.5-44.0	35.0, 37.0
midbody	34.0-47.5	31.5	32.0-40.0	38.0-47.5	32.0-43.0	31.5-41.0	34.0, 37.0
anus	19.0-25.0	19.0	20.0-23.0	20.0-23.0	19.0-23.0	20.0-23.0	21.5
Lateral chord	10.5-17.5	9.0	17	10.5-14.0	10.5-14.0	9.0-12.0	15.0
Anterior ovary	89.4±47.3 (48.5-186)	186	129±38.1 (92.0-184)	112-189	63.0-189	95.0-130	106, 127
Anterior genital branch	149±34.3 (98.5-198)	221	161±26.7 (134-190)	153-261	130-195	123-230	149, 153
Posterior ovary	118±32.8 (50.5-166)	106	90.5±16.5 (72.0-114)	138-155	63-200	66.0-142	110, 157
Posterior genital branch	156±26.9 (119-204)	144	145±22.5 (120-180)	120-229	104-207	135-206	157, 164
Vagina: width	9.0-17.5	11.5	10.5-11.5	7.5-10.5	7.5-13.0	10.5-18.5	9.0
length	10.5-17.0	12.0	10.5-17.0	14.0-17.0	14.0-17.0	11.0-20.0	17.0
Vulva-ant. end	651±198 (573-823)	626	701±61.3 (613-783)	633-847	703-826	673-853	710, 760
Prerectum	55.1±12.5 (41.5-83.0)	44.0	41.7±9.6 (30.5-52.0)	43.0-75.0	41.5-66.0	52.0-69.0	30.5, 41.5
Rectum	31.0±4.1 (26.0-38.5)	27.0	30.7±3.2 (27.5-34.0)	27.5-30.5	23.0-37.0	26.0-35.0	21.5, 32.0
Tail	365±32.8 (306-413)	253	379±9.4 (373-393)	340-387	340-386	311-400	333, 353
Tail hyaline part	103-122	?	95.0-108	98-123	103-115	108-120	102, 112

examined: DO=60-62%; S<sub>1</sub>N=79-80%; S<sub>2</sub>N=87-90%; DN-S<sub>1</sub>N=18-19%; DN-S<sub>2</sub>N=26-28%; S<sub>1</sub>N-S<sub>2</sub>N=8-9%. Cardia conical, about four (3.3-4.4) times as long as wide, projecting into the intestine lumen; its anterior third encircled by intestinal tissue; a weak ring-like structure apparently surrounding its

junction with the bulb base. Intestine with a bacillary layer, more visible in the anterior portion. Genital system didelphic-amphidelphic. Ovaries relatively small, not reaching the uterus-oviduct junction. Oocytes numerous, first as a double then as a single row. Oviduct joining the ovary subterminally, con-

sisting of a slender part and a poorly developed *pars dilatata*. A narrowing (often difficult to observe) separates the oviduct from the uterus. Uterus a short, 1.2-1.4 times the corresponding body width, and relatively slender tube, without modifications. Vagina extending inwards to three-fifths of the body width. *Pars proximalis vaginae* 14-15 x 18-20  $\mu\text{m}$ , 1.2-1.4 times as long as wide; its walls divergent proximally; surrounded by weak circular musculature. *Pars referricens vaginae* with two well separated drop-shaped to trapezoid sclerotizations measuring 6 x 4  $\mu\text{m}$  and with a combined width of 13.5-15.0  $\mu\text{m}$ ; a less sclerotized area present between the two sclerotizations, probably representing the sclerotized ring in median view. *Pars distalis vaginae* 6  $\mu\text{m}$  long. Vulva longitudinal; in lateral view it is preceded by a small cavity surrounded by the *pars distalis vaginae*. Spermatozoa not seen in the genital tract. Prerectum 2.7-3.1 anal body widths long. Rectum length 1.6-1.8 times the anal body width. Tail long, filiform; tapering suddenly and then very gradually to fine terminal. Two pairs of caudal pores: one subdorsal, another lateral.

**Male.** Unknown.

**Type habitat and locality.** Vejo stream bank, San Glorio pass, Vega de Liébana, Cantabria, Spain.

**Type material.** Nineteen females (holotype and paratypes) deposited in i) Departamento de Biología Animal, University of Córdoba, Spain (holotype and ten paratypes); ii) Departamento de Biología Animal, University of Jaén, Spain (four paratypes), slides n° 233 and 234; iii) Instituut voor Dierkunde, Rijksuniversiteit Gent, Belgium (two paratypes); and iv) USDANC, Beltsville, Maryland, USA (two paratypes).

**Etymology.** The specific epithet "cantabricus" is the Latin genitive adjective of Cantabria, the Spanish region where the species was found.

**Diagnosis and relationships.** The new species is characterized by the body being 1.7-2.1 mm long, lip region truncate and continuous with the body and 14-16  $\mu\text{m}$  wide, odontostyle 29-33  $\mu\text{m}$  long or 1.9-2.1 times the lip region width, pharyngeal bulb 180-226  $\mu\text{m}$  long, V% = 45.8-52.0, prerectum 88-104  $\mu\text{m}$  long, tail filiform (299-412  $\mu\text{m}$ , c=4.8-6.1, c'=10.9-15.0), and male unknown. The corresponding codes in Loof's (1996) polytomous key are: A6-7, B4, C2-3, D1, E2, F1, G2, H3-4, I5-7, J5-6, K9-10, L9-11, M1, N1.

*Prodorylaimus cantabricus* sp. n. is most similar to *P. szekessyi* (Andrássy, 1960) Loof, 1985 and *P. renwicki* (van der Linde, 1938) Loof, 1985, and the

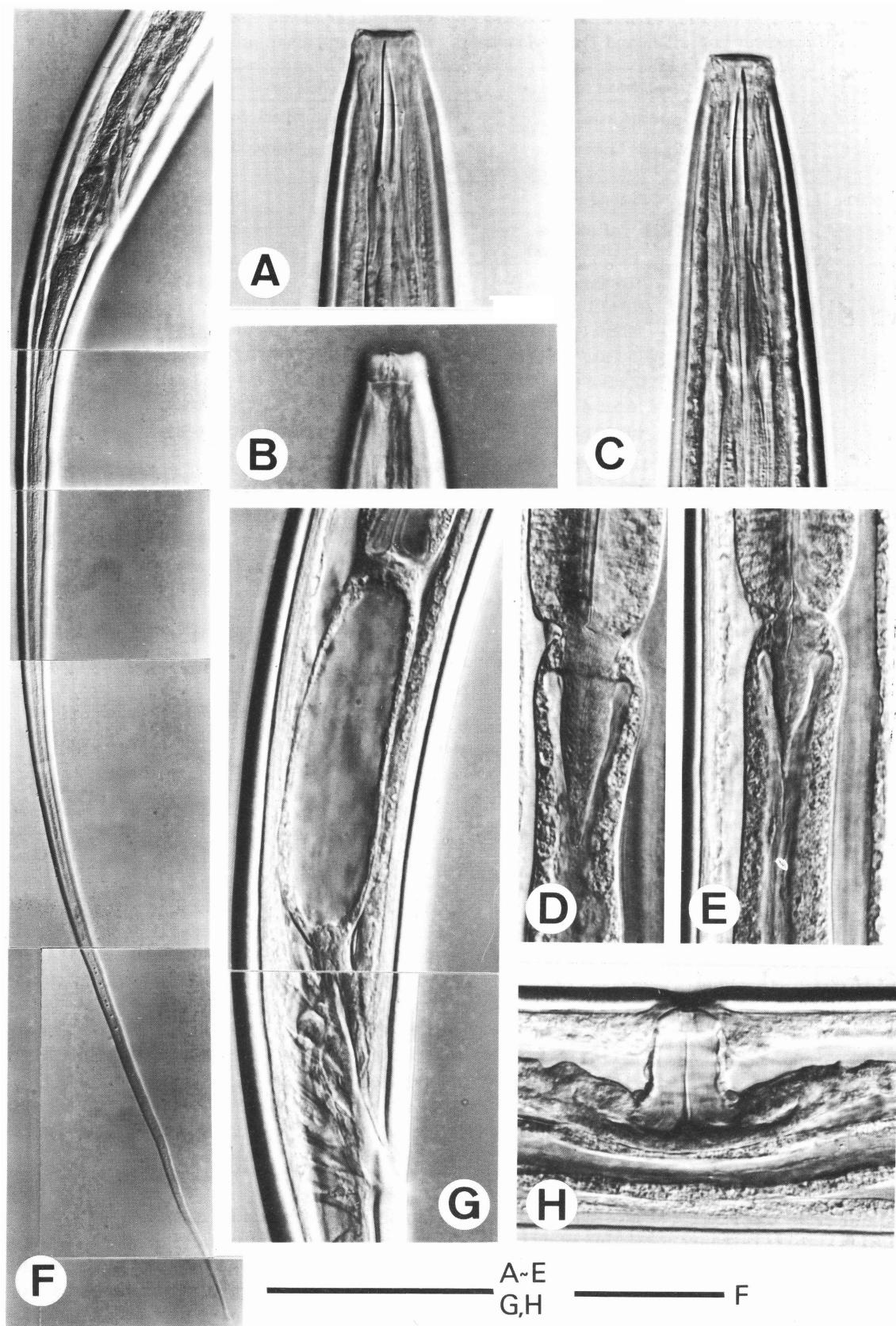
females also resemble those of two species belonging to the genus *Afrodorylaimus* Andrássy, 1964. The new species differs from *P. szekessyi* (see Andrássy 1960 & 1967) by having a longer body (1.79-2.12 vs 1.56-1.64 mm), longer odontostyle (29.5-33  $\mu\text{m}$  vs 25-28 mm), guiding ring double (vs simple), longer prerectum (2.5-2.8 vs 1-2 anal body widths) and separate geographic distribution (Spain and Italy vs China and Argentina). From *P. renwicki* it can be distinguished by its longer odontostyle aperture (one-third to two-fifths of the total length vs less than one quarter), longer tail (325-412  $\mu\text{m}$  vs 197-310  $\mu\text{m}$ ; c=4.8-6.1 vs 6.1-8.1; c'=10.9-15.0 vs 7.5-10) with different morphology (very fine terminal portion vs finely rounded), and longer prerectum (78-137  $\mu\text{m}$  vs 56  $\mu\text{m}$ ). From *Afrodorylaimus beaumonti* (Altherr, 1952) Andrássy, 1969 the new species differs by having a longer tail (325-412  $\mu\text{m}$  vs < 300  $\mu\text{m}$ ), and from *A. bizane* Kleynhans, 1970 by having a longer (29-33  $\mu\text{m}$  vs 25-27  $\mu\text{m}$ ) and thinner odontostyle.

**Remarks.** No important difference has been observed between our material and the population described by Zullini (1971) as *P. szekessyi*. Thus, we consider both populations to represent the same species.

It is possible that *P. szekessyi* and the new species are conspecific but we consider them to represent two discrete taxons. Synonymizing them would result in the single taxon being inappropriately heterogeneous.

### *Prodorylaimus uliginosus* Loof, 1985 (Fig. 4 & Table 2)

**Female.** Very slender nematodes of medium to great size, 1.9-2.3 mm long. Body cylindrical, tapering towards both extremities but more so towards the posterior end. Habitus after fixation varying from almost straight to more or less curved ventrad, more so in the posterior body region, adopting a "J" shape. Outer cuticle layer thin throughout the body and with very fine transverse striations not always clearly visible. Inner cuticle layer wider than the outer layer, thickened at level of tail. Lateral chord occupying one-eighth to two-ninths of the midbody width, granular. Lateral pores obscure. Lip region almost continuous with the adjacent body and rounded; twice as wide as high and about one-third of the body width at neck base. Lips amalgamated. Labial and cephalic papillae visible in surface view but not interfering with the head contour. Amphid fovea an elongate cup, its aperture occupying half of the lip region width. Odontostyle straight, 6-7 times as long as wide and 1.3-1.6 times the lip region long, aperture one-third to two-fifths of the total length. Odontop-



**Fig. 3.** *Prodorylaimus cantabricus* sp. n. (female). A, C: Lip region in median view; B: Lip region in surface view; D, E: Cardia; F: Tail; G: Prerectum and rectum, H: Vulva.

**Table 2.** Measurements and diagnostic features of *Prodorylaimus cantabricus* sp. n., *P. uliginosus* Loof, 1985 and *Prodorylaimus* sp. (all measurements in  $\mu\text{m}$  except L in mm).

Species	<i>P. cantabricus</i> sp. n		<i>P. uliginosus</i>		<i>Prodorylaimus</i> sp.
Habitat	Stream bank		Holm oak forest	Black poplar grove	Meadow
Locality	Vega de Liébana		Fuensanta-Valdepeñas road	Segura de la Sierra	Sierra Nevada
Province	Cantabria		Jaén	Jaén	Granada
	Holotype (female)	Paratypes (18 females)	10 females	4 females	4 females
L	2.0	1.9 $\pm$ 0.1 (1.7-2.1)	2.1 $\pm$ 0.1 (1.9-2.3)	1.9 $\pm$ 0.4 (1.9-2.3)	2.0 $\pm$ 0.2 (1.8-2.3)
a	41.3	39.1 $\pm$ 3.1 (31.2-43.6)	34.9 $\pm$ 3.7 (29.1-39.7)	46.3 $\pm$ 3.5 (41.7-50.8)	32.7 $\pm$ 3.1 (30.6-38.2)
b	4.4	4.2 $\pm$ 0.1 (3.9-4.5)	5.1 $\pm$ 0.4 (4.5-6.0)	4.9 $\pm$ 0.0 (4.9)	4.1 $\pm$ 0.2 (3.9-4.5)
c	4.8	5.5 $\pm$ 0.5 (4.9-6.8)	6.3 $\pm$ 0.5 (6.0-7.5)	6.2 $\pm$ 0.2 (6.0-6.5)	8.0 $\pm$ 1.1 (7.1-10.0)
V%	46.3	47.9 $\pm$ 1.6 (45.8-52.0)	43.1 $\pm$ 1.7 (41.1-47.2)	44.7 $\pm$ 0.4 (44.3-45.2)	49.4 $\pm$ 1.9 (47.9-52.8)
G1/T1	10.2	10.5 $\pm$ 0.6 (9.2-11.6)	8.5 $\pm$ 1.0 (7.2-10.7)	8.5 $\pm$ 0.5 (8.5-9.1)	11.2 $\pm$ 1.1 (10.3-13.2)
G2/T2	11.5	10.9 $\pm$ 0.6 (9.7-12.1)	8.5 $\pm$ 1.6 (7.7-10.1)	7.7 $\pm$ 1.1 (6.4-9.4)	11.9 $\pm$ 0.3 (11.5-12.4)
c'	15.0	12.8 $\pm$ 1.0 (10.9-13.8)	11.5 $\pm$ 1.4 (9.5-13.5)	12.2 $\pm$ 0.3 (11.9-12.5)	8.6 $\pm$ 1.5 (6.1-10.3)
Lip region: width height	15.6	14.0-16.2	14.0-16.0	14.0-15.0	13.1-16.7
Amphid aperture	5.0	5.0-8.6	6.0-7.5	6.0-7.5	4.5-5.2
Odontostyle	8.8	8.1-9.9	7.5	6.0-7.5	7.8, 8.1
Odontophore	32.9	31.3 $\pm$ 1.0 (29.3-33.0)	21.0 $\pm$ 0.7 (20.0-22.0)	21.7 $\pm$ 0.7 (21.0-23.0)	26.9 $\pm$ 0.6 (26.2-27.9)
Guiding ring	32.3	30.7 $\pm$ 1.4 (27.8-34.1)	25.0	?	25.9 $\pm$ 3.4 (21.1-30.6)
Nerve ring-ant.end	20.1	18.8-21.4	7.5-12.0	10.5	14.4-16.0
Neck length	192	166 $\pm$ 8.5 (155-192)	147 $\pm$ 14.8 (134-183)	113, 132	155 $\pm$ 6.2 (149-165)
Pharyngeal bulb length	400	432 $\pm$ 21.9 (396-475)	420 $\pm$ 16.2 (393-446)	390	454 $\pm$ 33.9 (408-493)
Cardia: width length	180	203 $\pm$ 11.7 (180-226)	201 $\pm$ 15.9 (161-223)	184	220 $\pm$ 11.3 (205-232)
Cuticle: head midbody tail	19	8.5-19.0	15.0-37.0	14.0-17.0	12
Body width: neck base midbody anus	34.5	19.0-44.0	10.5-20.0	10.5-12.0	24-34
Lateral chord	3.2	2.0-3.5	1.5-3.0	1.5-2.0	1.0-3.0
Anterior ovary	3.3	3.0-6.0	1.5-3.0	1.5-2.5	3.5-5.5
Anterior genital branch	3.6	3.0-7.0	4.0-5.0	4.5-5.0	3.5-4.0
Posterior ovary	49.0	49.0-58.0	52.0-69.0	38.5-43.0	62.0-79.0
Posterior genital branch	52.0	50.0-60.5	50.5-62.0	39.0-47.0	65.0-83.0
Vagina length	30.0	28.0-32.0	22.5-34.5	24.5-26.0	32.5-40.0
Vulva-ant. end	12.5	12.5-16.0	7.5-10.5	6.0-9.0	23.4-27.7
Prerectum	101	108 $\pm$ 20.9 (80.5-147)	113 $\pm$ 19.5 (78.5-152)	111 $\pm$ 10.2 (95.0-123)	127 $\pm$ 23.9 (96.0-150)
Rectum	211	205 $\pm$ 13.5 (180-219)	183 $\pm$ 29.2 (147-227)	175 $\pm$ 9.6 (166-189)	209 $\pm$ 21.1 (188-241)
Tail	82.0	109 $\pm$ 28.5 (69.5-161)	120 $\pm$ 19.5 (90.5-162)	110 $\pm$ 11.2 (96.0-124)	138 $\pm$ 15.9 (119-158)
Tail hyaline part	199	197 $\pm$ 15.4 (162-218)	191 $\pm$ 13.4 (169-209)	163 $\pm$ 24.6 (126-195)	243 $\pm$ 13.1 (230-265)
	23.2	22.0-32.5	10.0-17.0	12.0-18.5	32.0-40.0
	919	944 $\pm$ 51.2 (863-1036)	900 $\pm$ 69.6 (826-1041)	881 $\pm$ 26.3 (863-926)	1009 $\pm$ 71.8 (924-1120)
	87.2	94.3 $\pm$ 6.5 (88.0-104)	72.6 $\pm$ 12.9 (61.5-101)	89.6 $\pm$ 31.5 (43.0-120)	92.0 $\pm$ 10.9 (81.8-109)
	47.0	51.3 $\pm$ 2.6 (47.0-56.0)	39.4 $\pm$ 3.4 (23.0-46.0)	29.2 $\pm$ 3.7 (23.0-33.0)	56.5 $\pm$ 5.7 (50.0-64.0)
	409	361 $\pm$ 28.8 (299-412)	325 $\pm$ 12.9 (303-346)	305 $\pm$ 8.2 (296-313)	258 $\pm$ 45.9 (183-302)
	117	115-135	158-183	130, 170	?

hore little longer than the odontostyle, rod-like. Guiding ring simple. Pharynx consisting of a slender but muscular anterior part which extends gradually into the basal bulb. Pharyngeal bulb cylindrical, 6-7 times as long as wide and occupying about 44-50% of the total neck length. Pharyngal gland nuclei and outlets hardly visible in the specimens examined: (n=1) DO=55%; S<sub>1</sub>N=72%; S<sub>2</sub>N=90%. Cardia rat-

her short, enveloped by intestinal tissue which forms a short conical projection. Nerve ring situated at one-third (31-36%) of the total neck length. In one well preserved specimen a dorsal cell mass one body width long was observed next to the cardia. Reproductive system didelphic-amphidelphic. Ovaries relatively small, not reaching the oviduct-uterus junction; oocytes numerous, first in two rows, then

as a single row. The oviduct, joining the ovary subterminally, comprised of a slender part with prismatic cells and a developed *pars dilatata*. A clear sphincter separates the oviduct from the uterus. Uterus a wide tube, 1-2 times the corresponding body width long but without any special modifications. Vagina extending inwards less than half of the corresponding body width. *Pars distalis vaginae* 18 x 16  $\mu\text{m}$ , with somewhat divergent walls at its proximal end, and surrounded by weak musculature. *Pars refringens vaginae* consisting of two rather close trapezoid sclerotizations measuring 5 x 3  $\mu\text{m}$ , with a combined width of 11  $\mu\text{m}$ , extending along the lumen by 3  $\mu\text{m}$ . *Pars distalis vaginae* about 4  $\mu\text{m}$  long. Vulva a transverse slit. Prerectum 1.5-4.5 anal body widths long. Rectum little longer than the anal body diameter. Tail filiform, curved ventrad, tapering gradually towards the terminal end; hyaline part rather long, occupying about half the total length. Three pairs of caudal pores: two subdorsal, one subventral.

**Male.** Unknown.

**Distribution.** The species was collected from four localities in the province of Jaén: i) roadside between Fuensanta and Valdepeñas de Jaén, near "La Montesina", associated with *Quercus rotundifolia* Lam.; ii) Sierra de la Pandera, associated with *Q. rotundifolia* Lam.; iii) "Prado de la Presa", Segura de la Sierra, in the rhizosphere of *Populus alba* L., *Trifolium* sp., *Scirpus holoschoenus* L., *Rubus* sp. and ferns; and iv) "El Vadillo", Sierra de Cazorla, in association with *Quercus faginea* Lam., *Crataegus monogyna* Jacq. and *Festuca* sp.

**Remarks.** *Prodorylaimus uliginosus* is new to the Iberian fauna and its discovery constitutes only the second record of the species world-wide.

### *Prodorylaimus* sp. (Fig. 2K-N & Table 2)

The following brief description is based on four females which were clearly flattened.

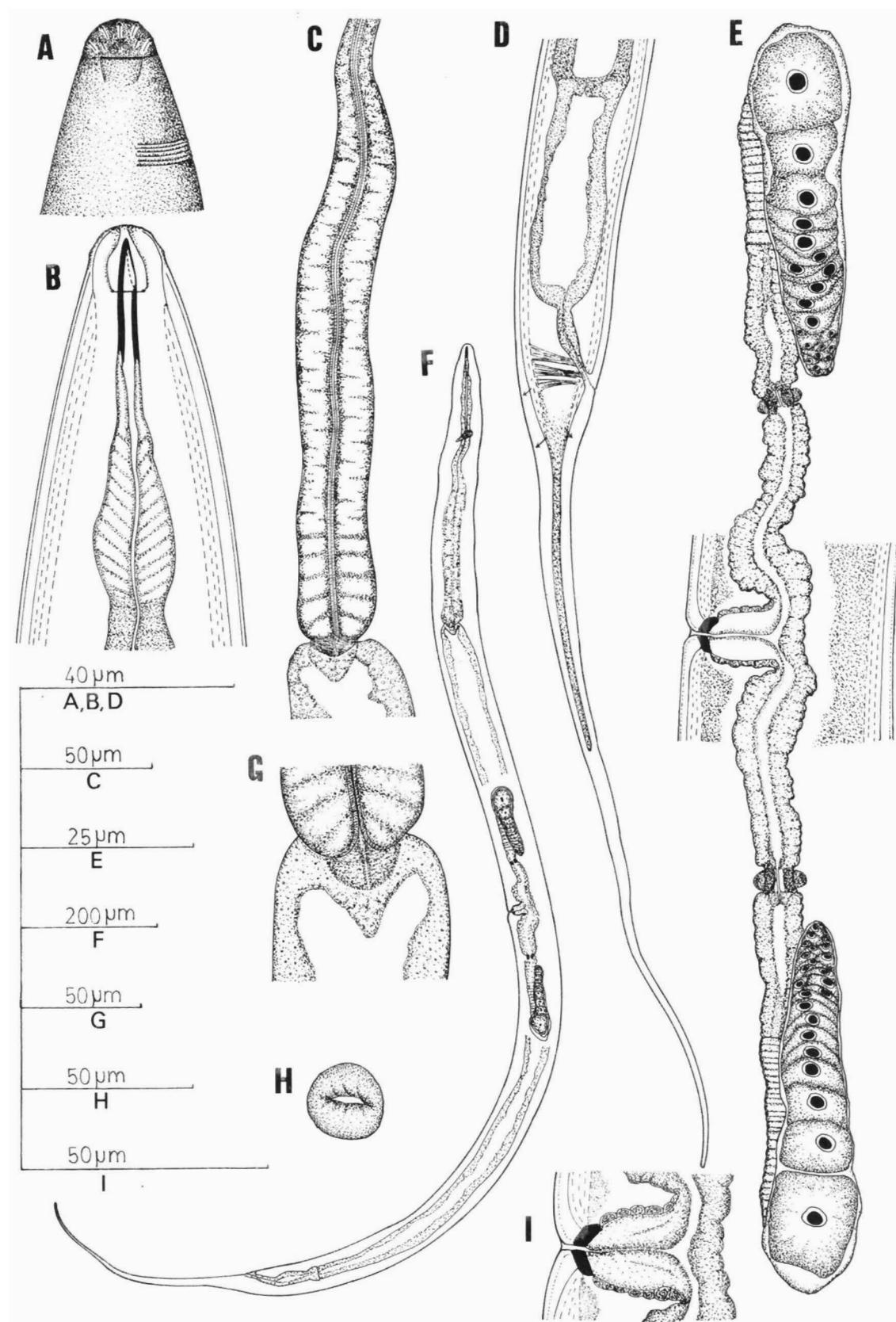
**Female.** Habitus after fixation curved ventrad to an open "C". Outer cuticle layer thin, with very fine transverse striations. Inner cuticle layer much wider than the outer one. Lip region truncate, somewhat angular, continuous or slightly offset by a very weak depression, 2.7-2.9 times as wide as high. Amphid fovea aperture occupying about three-fifths of the lip region width. Odontostyle rather large, 8.3-9.0 times as long as wide, 1.6-1.9 lip region widths long; aperture one-third of the total length. Odontophore rod-like, as long as the odontostyle. Guiding ring simple. Pharyngeal basal bulb about half (48-50%) of the total neck length. Cardia conoid, 2.0-2.8 times

as long as wide. Genital system didelphic-amphidelphic; some details of its morphology obscure because of the poor condition of the specimens examined. Oviduct consisting of a slender part and a moderately developed *pars dilatata*. A narrowing separates the oviduct and uterus, but a clear sphincter not observed. Uterus equal in length to the oviduct, about the corresponding body width long. Vagina extending inwards to half (46-50%) of the corresponding body diameter. *Pars proximalis vaginae* 14-16 x 20-26  $\mu\text{m}$  or 1.2-1.8 times as long as wide, with its walls straight or convergent distally; encircled by weak musculature. *Pars refringens vaginae* with two drop-shaped or rounded triangular 4 x 6  $\mu\text{m}$  sclerotizations which are well separated by an intermediate and less sclerotized area; its combined width 13-15  $\mu\text{m}$ . *Pars distalis vaginae* 4-6  $\mu\text{m}$  long. Vulva apparently a short longitudinal slit but not observed in ventral view. Prerectum 2.0-2.9 anal body widths long. Rectum 1.5-1.6 anal body widths long. Tail long, filiform, tapering gradually towards the terminal portion which is rather fine.

**Male.** Unknown.

**Distribution.** The four females were obtained from a high mountain wet meadow in Dílar, Sierra Nevada, province of Granada, Spain.

**Remarks.** Jiménez Guirado (1990) described these four females as *Drepanodorylaimus cf. D. flexus* (Thorne & Swanger, 1936) Andrassy, 1969. However, identification of the material presents difficulties as: (i) the specimens are similar to several species viz., *P. brzeskii* Winiszewska-Slipinska, 1987, *P. cantabricus* sp. n.; *P. renwicki* (Van der Linde, 1938) Loof, 1985 and *P. szekessyi* (Andrassy, 1960) Loof, 1985 and also *Afrodorylaimus beaumonti* (Altherr, 1952) Andrassy, 1969, whose separation is problematic (see Loof, 1996); and (ii) only a few specimens in poor condition were available for study. The specimens differ from *P. brzeskii* in having longer bodies (vs  $L=1.4-1.6$  mm;  $n=11$ ), guiding ring simple (vs double), longer vagina (vs 18-22  $\mu\text{m}$ ) with different morphology, and longer prerectum (vs 45-80  $\mu\text{m}$ ) and tail (vs 180-256  $\mu\text{m}$ ). From *P. cantabricus* sp. n. the specimens differ by having shorter odontostyles (vs 29-33  $\mu\text{m}$ ;  $n=19$ ), guiding ring simple (vs double), and longer tail (vs 325-412  $\mu\text{m}$ ;  $c=4.8-5.9$ ;  $c'=10.9-14.2$ ). From *P. renwicki* they differ in their longer bodies (vs  $L=1.60-1.88$  mm), guiding ring simple (vs double in text; however simple in illustration), longer pharyngeal bulb (48-50% vs 40-41%), longer prerectum (vs 51-56  $\mu\text{m}$ ) and longer tail (vs 197-213  $\mu\text{m}$ ,  $c'=7.5-7.8$ ). From *P. szekessyi* by their longer bodies (vs  $L=1.58-1.64$  mm), more posterior vulva (vs  $V\%=45-48$ ), longer prerectum (vs 1.6-2.0



**Fig. 4.** *Prodorylaimus uliginosus* Loof, 1985 (female). A: Lip region in surface view; B: Lip region in median view; C: Pharyngeal bulb; D: Tail; E: Genital system; F: Entire body; G: Cardia; H: Vulva in frontal view; I: Vagina.

anal body widths) and shorter tail (vs 335-388  $\mu\text{m}$ ,  $c=4.1-5.1$ ,  $c'=14-17$ ). From *A. beaumonti* they differs by having shorter odontostyles (vs 30  $\mu\text{m}$  in the original description, although Andrassy (1978) gave 26-29  $\mu\text{m}$  for its specimens from Nepal), guiding ring simple (vs double), and absence of males (vs males present in the two known populations). We conclude that the Spanish specimens probably belong to an undescribed species which is not named here due to the poor condition of the specimens available for study.

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**Peña Santiago R., Abolafia J., Jiménez Guirado D.** Нематоды отряда Dorylaimida из Восточной Андалусии. Род *Prodorylaimus* Andrassy, 1959. I. Однополые виды.  
**Резюме.** Четыре вида рода *Prodorylaimus* Andrassy, 1959 были выявлены в почвенных образцах, собранных главным образом в естественных ценозах юго-восточной Испании. Приводятся описания, морфометрические данные и иллюстрации для *P. acris* (Thorne, 1939) Loof, 1985, *P. cantabricus* sp. n., *P. uliginosus* Loof, 1985 и *Prodorylaimus* sp. Отличительными особенностями *Prodorylaimus cantabricus* sp. n. является длина тела 1,7-2,1 мм, широкий, не отделенный перетяжкой от контуров тела губной отдел шириной 14-16 мкм, одонтостиль длиной 29-33 мкм (1,9-2,1 ширины губного отдела), бульбус пищевода длиной 180-226 мкм, V% = 45,8-51, преректум длиной 88-104 мкм, хвостовой конец длиной 325-412 мкм с нитевидным терминусом,  $c=4.8-6.1$ ,  $c'=10.9-15.0$ . Данная работа - это первое сообщение об обнаружении *P. acris* и *P. uliginosus* в Испании.