Fundam. appl. Nematol., 1996, **19** (5), 481-497

Nematodes of the order Dorylaimida from Andalucía Oriental, Spain. The families Leptonchidae Thorne, 1935 and Aulolaimoididae Jairajpuri, 1964

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Accepted for publication 28 September 1995.

Summary – In this sixth paper of the series on leptonchid nematodes from Andalucía Oriental (Southeastern Spain) we present eigth previously known species belonging to six different genera : *Adenolaimus* (Leptonchidae), *Basirotyleptus, Funaria, Leptonchus, Proleptonchus* and *Meylis* (Aulolaimoididae). Excepting for the two species of *Funaria,* descriptions, measurements and illustrations of the material studied are given. Four species are new records to the European fauna.

Résumé – ***Nématodes de l'ordre des Dorylaimida d'Andalousie orientale, Espagne. Les familles Leptonchidae Thorne, 1935 et Aulolaimoididae Jairajpuri, 1964*** – Ce sixième article de la série sur les nématodes Leptonchides d'Andalousie orientale (Espagne du sud-est) traite de huit espèces déjà décrites appartenant à six genres différents : *Adenolaimus* (Leptonchidae), *Basirotyleptus, Funaria, Leptonchus, Proleptonchus* et *Meylis* (Aulolaimoididae). A l'exception des deux espèces de *Funaria,* les descriptions, mensurations et illustrations du matériel étudié sont données. Quatre espèces sont nouvelles pour la faune européenne.

Key-words : *Adenolaimus,* Andalucía Oriental, *Basirotyleptus,* description, *Funaria, Leptonchus, Meylis, Proleptonchus,* Spain, taxonomy, nematodes.

Nematodes of the family Leptonchidae have been only recently found in Spain. Jiménez Millán *et al.* (1965, 1967) and Gómez Barcina and Jiménez Millán (1967) recorded *Xiphinemella* sp. in several localities; however, this genus was not collected again during the last 20-30 years and we are not certain of its presence in the Iberian Peninsula. Peña Santiago *et al.* (1982) recorded *Funaria cf. cacti* Goseco, Ferris & Ferris, 1974 from Sierra Nevada (province of Granada); this material was later identified as belonging to a new species *(F. barcinai).* Hernández *et al.* (1988) found *F. obtusa* van der Linde, 1938 in Sansoain (province of Navarra). Peña Santiago (1991) described *F. millani* from Valdepeñas (province of Jaén) and *F. barcinai* from Sierra Nevada (province of Granada). Very recently, Jiménez Guirado and Arcos (1994) described *Proleptonchus fagi* from Valdezcaray (province of La Rioja).

With exception of the *Funaria* species, leptonchs seem to be very rare in Southeastern Spain; in fact, most species have been found in a single locality among almost 500. However, several of the species studied present biogeographical interest since they have not been previously recorded in Europe, and they are described below.

For methods used see Peralta and Peña Santiago (1995).

Leptonchus granulosus Cobb, 1920

= *Leptonchus scintillans* Loof, 1964

(Fig. 1)

MEASUREMENTS

See Table 1.

DESCRIPTION

Female : Slender nematodes of small to medium size. Body cylindrical, slightly tapering towards the anterior end. Habitus slightly ventrally curved. Outer layer of the cuticle thin and smooth. Inner layer thicker, with irregular outline and detached from the outer layer; radial refractive elements abundant, very conspicuous at the tail. Lateral chord occupying about one-third of the midbody diameter. Lateral pores coarse, arranged in two rows and located in the borders of the lateral chord. Lip region cap-like, with angular contour and offset from the adjacent body by a marked constriction, twice as wide as high and about one-third of the body diameter at neck base. Lips moderately separated; their inner parts prominent. Cephalic and labial papillae distinct. Amphid funnel-shaped, its aperture located at level of the cephalic constriction, two-thirds of the lip region diameter in length. Stoma a truncate cone; its wall appearing strongly sclerotized in the perioral area. Guiding

Table 1. *Measurements of females of* Leptonchus granulosus *Cobb, 1920 and* Funaria barcinai *Peña Santiago, 1991* (all measurements in μm except L in mm).

Habitat Locality Province	*Leptonchus granulosus* Tropical cultures Almuñecar Granada	*Funaria barcinai*			
		Pinus Despeñaperros Jaén	*Quercus* S. Nevada Granada	*Quercus* S. Nevada Granada	*Quercus* S. Nevada Granada
n	6	18	12	20	10
L (mm)	0.96 ± 0.08 (0.86-1.09)	1.58 ± 0.10 (1.44-1.87)	1.53 ± 0.13 (1.20-1.91)	1.50 ± 0.07 (1.39-1.63)	1.44 ± 0·11 (1.29-1.73)
a	30.5 ± 2.24 (28.3-33.9)	35.7 ± 1.53 (33.3-39.7)	35.3 ± 1.72 (32.5-37.3)	37.3 ± 1.83 (34.0-40.0)	33.9 ± 1.12 (31.9-35.8)
b	4.6 ± 0.29 (4.3-5.2)	6.62 ± 0.40 (5.9-7.3)	6.50 ± 0.43 (5.5-7.1)	6.30 ± 0.28 (5.8-6.8)	6.00 ± 0.38 (5.6-7.0)
c	66.2 ± 6.00 (57.6-76.1)	52.2 ± 4.16 (46.7-61.2)	49.6 ± 2.98 (43.6-54.2)	48.8 ± 2.68 (41.3-52.9)	56.5 ± 3.68 (49.7-62.9)
V	60.7 ± 1.14 (58.4-62.0)	53.6 ± 1.42 (51.3-57.0)	52.5 ± 1.90 (48.2-55.0)	53.5 ± 1.11 (51.1-55.0)	56.5 ± 2.07 (52.7-58.8)
G1/T1	10.3 ± 2.11 (7.50-13.3)	14.3 ± 1.45 (12.5-17.0)	13.5 ± 1.52 (11.5-16.5)	13.8 ± 0.94 (11.6-15.0)	15.6 ± 0.96 (14.4-17.3)
G2/T2	9.9 ± 1.32 (8.2-11.9)	12.6 ± 1.57 (8.5-15.2)	12.4 ± 1.33 (10-15)	13.1 ± 0.99 (9.7-14.3)	13.8 ± 1.48 (10.0-15.5)
c'	0.74 ± 0.03 (0.7-0.8)	1.04 ± 0.06 (0.90-1.15)	1.04 ± 0.08 (0.90-1.20)	1.09 ± 0.06 (1.0-1.3)	0.83 ± 0.04 (0.8-0.9)
Lip region : width height	11 5.5	(11.5-13.0) (5-6)	(11.0-12.5) (5.0-5.5)	(11.5-12.5) (5.5-6.0)	(11.5-12.5) 5.5
Amphid	6.7 ± 0.3 (6.5-7.0)	7.0 ± 0.2 (6.5-7.5)	7.4 ± 0.2 (7.0-7.5)	7.1 ± 0.3 (6.5-7.5)	7.3 ± 0.2 (7.0-7.5)
Odontostyle	9.5	11.2 ± 0.49 (10.5-12.5)	10.7 ± 0.23 (10.5-11.0)	10.5 ± 0.23 (10-11)	11.0
Odontophore	15.5	(12.0-12.5)			(11.5-12.0)
Stylet length		(23.5-25)			(22.5-23.0)
Guiding ring-ant. end	(6.5-7.0)	(7-8)	(7.0-7.5)	(7-8)	(7.5-8.0)
Nerve ring-ant. end	82 ± 5 (75-90)	106 ± 3.0 (100-110)	104 ± 3.4 (100-110)	103 ± 2.2 (100-106)	104 ± 2.8 (100-109)
Neck length	209 ± 11.7 (194-228)	237 ± 7.9 (222-253)	238 ± 13.4 (221-267)	239 ± 4.8 (231-247)	239 ± 5.3 (231-247)
Pharyngeal basal bulb	40.5 ± 1.11 (40-43)	54.2 ± 3.90 (48-59)	54.8 ± 2.44 (51-59)	56.0 ± 1.52 (53-59)	57 ± 2.2 (53-59)
Cardia : width length	9 5	(10-12) (6.0-7.5)	(11-14) (7.0-8.5)	(11-13) (6.5-9.5)	(11-12) (7.0-8.5)
Body width : at neck base	28.5 ± 1.38 (26-30)	35.5 ± 1.58 (32-38)	36.0 ± 2.98 (30-40)	33.0 ± 1.12 (31-35)	35.0 ± 1.75 (33-38)
at midbody	31.5 ± 1.80 (28-34)	44.3 ± 1.76 (42-48)	44.0 ± 3.82 (37-50)	40.4 ± 1.45 (37-43)	42.5 ± 2.97 (39-49)
at anus	19.5 ± 0.80 (18.0-20.5)	29.2 ± 1.46 (27-32)	30.0 ± 2.49 (26-33)	28.1 ± 1.01 (26-30)	30.7 ± 1.58 (29-35)
Cuticle : head midbody tail	1.5 2.0 4.0	(1.5-2.0) 2.0 2.5	1.5 2.0 (2.5-3.0)	1.5 2.5 3.0	1.5 2.0 3.0
Lateral chord	(11-13)	(11-15)	(12-14)	(12-13)	(12-14)

Table 1 *(continued).*

Ant. ovary	61.5 ± 5.40 (54-69)	83.6 ± 18.0 (59-125)	81.3 ± 17.5 (59-106)	81.0 ± 23.5 (50-137)	62.6 ± 5.52 (53-70)
Ant. genital branch	104 ± 24.1 (72-140)	225 ± 23.3 (188-278)	206 ± 16.8 (175-243)	207 ± 14.1 (171-231)	225 ± 22.1 (193-268)
Post. ovary	74 ± 6.3 (67-81)	86.5 ± 18.7 (62-128)	85.5 ± 16.9 (63-109)	85.5 ± 22.5 (58-124)	65 ± 7.8 (56-78)
Post. genital branch	98 ± 12 (78-109)	198 ± 20.6 (150-234)	192 ± 19.8 (153-222)	198 ± 18.5 (188-225)	198 ± 25.0 (184-240)
Vagina : width	(10-12)	(12-15)	(12-14)	(11-15)	(10-12)
length	(11-14)	(17-21)	(17-22)	(17-20)	18
Vulva-ant. end	586 ± 54.8 (520-673)	841 ± 53.8 (753-957)	804 ± 71.4 (620-987)	807 ± 38.9 (747-887)	810 ± 43.4 (740-913)
Prerectum	484 ± 94 (390-578)	221 ± 38.4 (125-275)	214 ± 53.1 (140-284)	174 ± 43.4 (109-245)	176 ± 30.3 (125-218)
Rectum	25 ± 2.1 (22-28)	26.2 ± 3.0 (19-30)	28 ± 2.7 (22-31)	27.3 ± 1.9 (25-30)	27.9 ± 1.92 (25-31)
Tail	14.5 ± 1.25 (12.0-15.5)	30.4 ± 1.29 (27-33)	31.6 ± 3.95 (26-39)	30.8 ± 1.88 (28-36)	25 ± 2.57 (20-30)

ring simple, slightly refractive. Odontostyle needle-shaped, slightly dorsally curved and with lumen visible, somewhat shorter than the lip region diameter. Odontophore slightly ventrally arched and enfolded by the pharyngeal tissue. Pharynx consisting of a slender and weakly muscular anterior part and a cylindrical or pear-shaped basal bulb, occupying about one-fifth of the total neck length; gland nuclei and outlets hardly visible. Cardia bilobed and surrounded by the intestinal tissue. Nerve ring located at 37-43 % of the total neck length. Genital system amphidelphic-didelphic. Ovaries reflexed, short and with low number of oocytes. Oviduct consisting of a slender distal part which joins the ovary subterminally and without a distinct *pars dilatata*. Oviduct-uterus junction marked by a tenuous sphincter. Uterus unspecialized. Vagina conical or pear-shaped, extending inwards to half of the corresponding body diameter; its wall encircled by muscles. Vulva a transverse slit. Sperms absent. Prerectum very long, its length equal to 22-29 anal body diameters; intestine-prerectum junction anterior to the vulva and provided with three guard cells. Rectum slightly longer than anal body diameter. Tail shorter than the corresponding body diameter; rounded-conoid to hemispherical. Caudal pores two pairs : one subdorsal anteriorly located and the other almost lateral at the middle of the tail.

Male : Not collected.

DISTRIBUTION

The species was found in the rizosphere of *Persea gratissima* G. and *Anona reticulata* L. in Almuñécar, province of Granada.

Funaria barcinai **Peña Santiago, 1991**

= *Funaria* cf. *cacti apud* Peña Santiago *et al.*, 1982

MEASUREMENTS

See Table 1.

DISTRIBUTION

In addition to the type locality, the species has been recorded from the following localities and habitats : *i)* " El Empedraíllo ", Parque Natural de Despeñaperros (province of Jaén), associated with *Pinus* sp., *Cistus* sp., and *Thymus mastichina* (L.) L.; *ii)* road from Capileira to Veleta, Sierra Nevada (province of Granada) in association with *Quercus rotundifolia* Lam. and *Ulex parviflorus* Pourret; *iii)* road from Capileira to Trevélez, Sierra Nevada (province of Granada), in the rizosphere of *Quercus pyrenaica* Willd., *Castanea sativa* Miller, *Ulex parviflorus* Pourret and *Cistus* sp.

It should be noted that this species was always found in acid soil, a type of medium relatively less frequent in the region.

REMARKS

The abundant material examined agrees very well in the description of the original population. However, the range on several morphometric features have been greatly enlarged. The material identified as *F. cf. cacti* Goseco, Ferris & Ferris, 1974 by Peña Santiago *et al.* (1982) constituted the type population of *F. barcinai* but this fact was not mentioned by the author in the original description of the latter species.

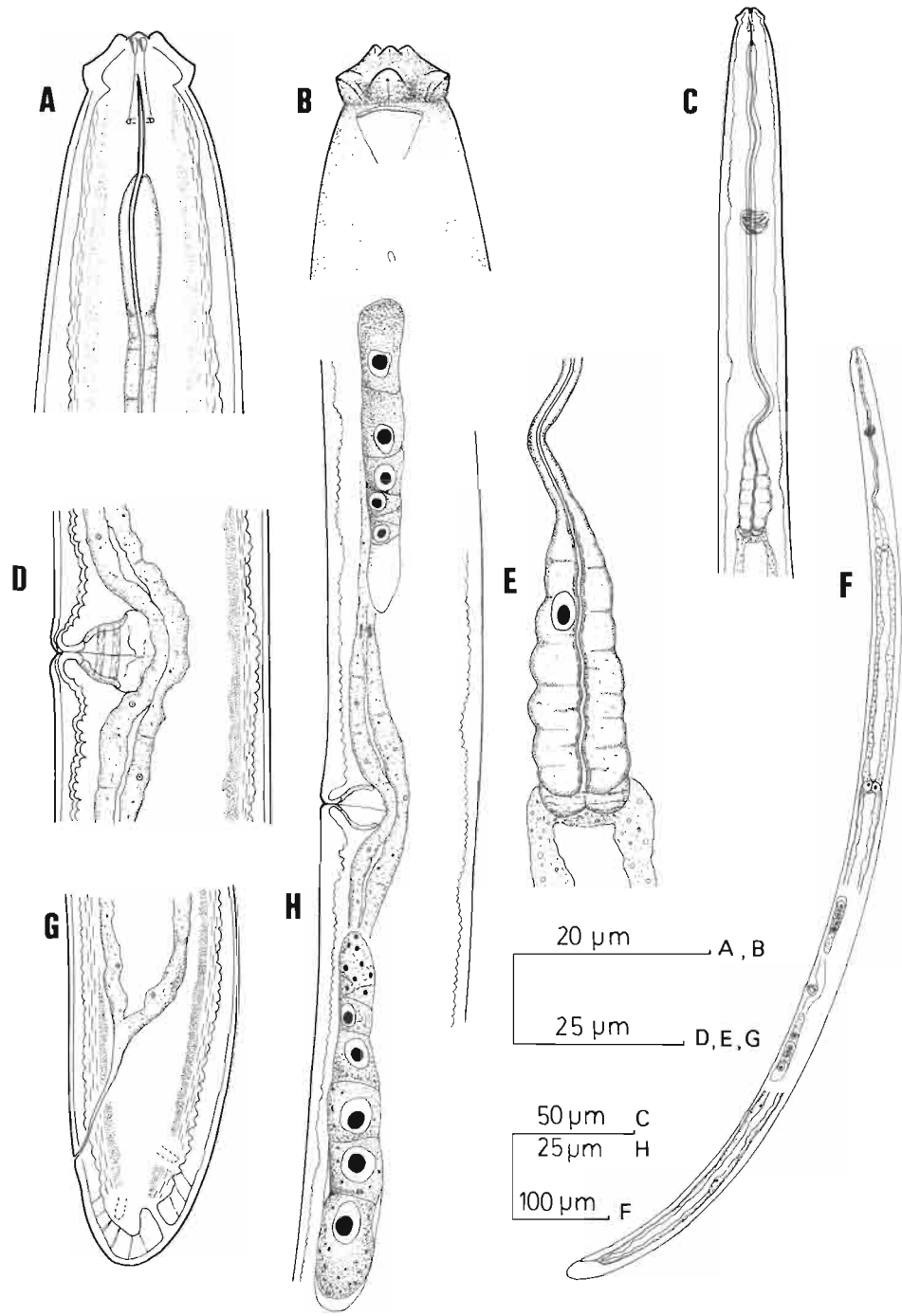

Fig. 1. Leptonchus granulosus *Cobb, 1920. A : Lip region in lateral view; B : Same in surface lateral view; C : Neck region; D : Vagina; E : Pharyngeal basal bulb and cardia; F : Entire female; G : Caudal region; H. : Genital system.*

Funaria millani Peña Santiago, 1991

MEASUREMENTS

See Table 2.

DISTRIBUTION

The species has been found in more than twenty localities of the provinces of Granada, Jaén, and Málaga in association with *Quercus coccifera* L., *Q. faginea* Lam., *Q. rotundifolia* Lam., *Q. pyrenaica* Willd., *Pinus nigra* Arnold, *Abies pinsapo* Boiss., *Juniperus sabina* L., *J. oxycedrus* L., *Cytisus scoparius* (L.) Link, *Teucrium polium* L., *Erinacea anthyllis* Link, *Crataegus monogyna* Jacq., *Thymus vulgaris* L., *Rosmarinus officinalis* L., *Ulex parviflorus* Pourret, *Cistus ladanifer* L., *Stipa tenacissima* L., and *Corylus avellana* L.

F. millani is by far the most widely distributed species of leptonchid nematode in our region, being present in very distant localities where it is associated with diverse wild plant communities.

REMARKS

No significative differences were observed with respect to the original description. The separation of this species from *F. barcinai,* morphologically very similar (see Peña Santiago, 1991), is here confirmed based on the study of numerous specimens and populations.

Proleptonchus shamimi Bajaj & Bhatti, 1980
(Fig. 2)

MEASUREMENTS

See Table 3.

DESCRIPTION

Female : Slender nematodes of medium size. Body cylindrical, slightly tapering towards the anterior end. Habitus slightly ventrally curved. Outer layer of the cuticle thin and smooth. Inner layer separated from the outer one. Lateral chord occupying one-third of the midbody diameter. Lateral pores coarse, arranged in two rows along the borders of the lateral chord. Radial refractive elements hardly visible. Lip region cap-like, offset from the adjacent body by a constriction, 2.3 times as wide as high and about one-third of the body diameter at neck base. Lips amalgamated, their inner parts not elevated. Labial and cephalic papillae not protruding. Amphid cup-shaped; its aperture located at level of the cephalic constriction, 70 % of the head diameter in length. Cheilostoma flask-shaped, distinctly cuticularised. Guiding ring simple, refractive. Odontostyle straight, needle-like and with lumen visible, slightly longer than two-thirds of the lip region diameter. Odontophore 1.7 times the odontostyle length and slightly ventrad curved. Anterior part of the pharynx slender and weakly muscular. Basal bulb cylindrical, with sclerotized lumen, occupying one-fifth to one-quarter of the neck length. Both parts of the pharynx separated by a more or less marked constriction. Pharyngeal gland nuclei inconspicuous. Cardia rounded and enfolded by the intestinal tissue. Nerve ring located at one-half of the neck length. Genital system pseudodidelphic-prodelphic. Ovary reflexed and provided with numerous oocytes. Oviduct joining the ovary subterminally, consisting of a slender distal part, with prismatic cells, and a moderately developed *pars dilatata.* Oviduct-uterus junction marked by a refractive sphincter. Uterus relatively long and not specialized. Posterior genital branch consisting of a uterine sac 3-5.5 body diameter long, a less distinct sphincter, and a cell chord with visible lumen representing a vestigial oviduct. Sperms present throughout the genital tract. Vagina cylindrical or pear-shaped, extending inwards to half of the midbody diameter; its wall encircled by strong muscles. Vulva apparently a transverse slit. Prerectum 5-8 anal body diameters long; its junction with the intestine with three guard cells. Rectum slightly longer than anal body diameter. Tail rounded-conoid, with ventral side straight and dorsal side convex. Caudal pores two pairs, coarse : one subdorsal more anterior and the other subterminal.

Male : Not seen.

DISTRIBUTION

The species was found in the following sites : *i)* " Robledo ", Sierra de Segura, province of Jaén, associated with *Pinus* sp., *Quercus coccifera* L., *Juniperus oxycedrus* L., *Rubia peregrina* L., *Thymus vulgaris* L. and *Cistus* sp.; *ii)* Parque Natural de Andújar, province of Jaén, in very moist soil with *Fraxinus angustifolia* Vahl and *iii)* Parque Natural de Andújar, province of Jaén, in the rizosphere of *Quercus rotundifolia* Lam.

REMARKS

The scarce material studied agrees very well in its description and measurements with the type population, but, in our opinion, the taxonomy of *P. shamimi* is not sufficiently settled. If we take in consideration the data of the literature, and specially the large intraspecific variability of the morphology of the posterior genital branch in *P. shamimi,* it is difficult to separate this species from two other previously known species : *P. indicus* Siddiqi & Khan, 1964 and *P. johnsoni* Goseco, Ferris & Ferris, 1974. *P. indicus* has been recorded only from India and it was described from a single female specimen whose description and measurements are very similar to those given for *P. shamimi.* However, these two species were not compared to each other in the differential diagnosis of the latter. Therefore, it would be necessary to confirm the existence of sphincter in the posterior genital branch of *P. indicus* (Fig. 7D and discussion in Goseco *et al.* [1974] suggest this fact) in order to establish the identity of these two species. A similar statement can be made in the case of *P. johnsoni,* which is known only from two females from USA and which was separated from *P. indicus* mainly by the length of the posterior genital

Table 2. *Measurements and diagnostic features of* Funaria millani *Peña Santiago, 1991* (all measurements in µm except L in mm).

Habitat	*Corylus*		*Quercus*		*Cistus ladanifer*		Meadow		*Pinus*	
Locality	Sierra de Segura		Sierra de la Sagra		Sierra Andújar		Sierra Nevada		La Zubia	
Province	Jaén		Granada		Jaén		Granada		Granada	
	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂
n	16	9	11	6	21	6	12	6	13	10
L (mm)	1.60 ± 0.09 (1.46-1.81)	1.53 ± 0.10 (1.38-1.73)	1.36 ± 0.12 (1.14-1.58)	1.26 ± 0.08 (1.18-1.37)	1.41 ± 0.13 (1.18-1.67)	1.35 ± 0.11 (1.18-1.53)	1.51 ± 0.11 (1.35-1.68)	1.51 ± 0.07 (1.42-1.62)	1.56 ± 0.13 (1.34-1.79)	1.55 ± 0.12 (1.42-1.77)
a	32.5 ± 2.30 (29.3-36.8)	35.4 ± 3.36 (31.2-42.7)	34.7 ± 1.47 (32.6-37.5)	36.3 ± 1.74 (34.1-39.2)	32.1 ± 2.26 ((28.8-36.8)	37.0 ± 1.18 (34.7-38.4)	32.3 ± 2.36 (28.8-36.3)	36.4 ± 3.51 (31.7-41.5)	33.2 ± 2.03 (30.6-37.4)	37.1 ± 3.56 (32.3-43.0)
b	6.50 ± 0.42 (6.10-7.30)	6.10 ± 0.40 (5.30-6.70)	6.20 ± 0.54 (5.20-7.10)	5.80 ± 0.12 (5.60-5.90)	6.20 ± 0.59 (5.1-7.4)	6.10 ± 0.43 (5.5-6.8)	6.20 ± 0.45 (5.6-6.9)	6.30 ± 0.41 (5.7-6.9)	6.40 ± 0.42 (5.7-7.3)	6.60 ± 0.47 (6.0-7.2)
c	56.3 ± 3.60 (49.9-61.8)	40.6 ± 3.28 (35.1-45.7)	54.4 ± 3.71 (48.5-61.5)	40.0 ± 2.18 (36.1-41.8)	51.6 ± 2.94 (44.8-58.5)	38.8 ± 2.25 (35.4-41.6)	48.6 ± 4.39 (41.0-54.2)	36.6 ± 2.30 (34.5-40.5)	54.7 ± 5.47 (46.4-63.0)	40.1 ± 2.84 (34.6-44.3)
V	54.1 ± 1.28 (52.0-56.6)	– –	54.5 ± 1.75 (51.0-57.5)	– –	53.1 ± 2.03 (48.2-56.0)	– –	52.0 ± 1.94 (47.6-55.8)	– –	54.5 ± 1.82 (51.7-58.1)	– –
G1/T1	18.3 ± 1.52 (15.9-20.8)	55.4 ± 3.10 (50.8-59.1)	15.3 ± 1.39 (13.3-17.9)	53.1 ± 2.44 (49.2-55.4)	15.7 ± 1.54 (12.3-19.3)	55.4 ± 2.90 (51.8-58.7)	15.7 ± 1.37 (13.4-17.3)	54.8 ± 0.97 (50.0-56.2)	15.9 ± 1.58 (13.6-19.0)	55.6 ± 3.65 (50.3-60.9)
G2/T2	15.3 ± 2.40 (9.60-18.7)	28.7 ± 3.30 (22.6-35.1)	14.9 ± 1.43 (12.9-17.1)	23.5 ± 2.58 (19.6-26.8)	15.0 ± 1.92 (13.4-21.2)	28.9 ± 2.77 (24.3-32.6)	14.7 ± 1.44 (12.5-17.9)	30.5 ± 2.04 (27.9-34.3)	15.3 ± 1.82 (10.7-23.0)	26.1 ± 3.73 (19.4-31.3)
c′	0.95 ± 0.09 (0.80-1.20)	1.28 ± 0.10 (1.20-1.40)	1.00 ± 0.05 (0.90-1.10)	1.27 ± 0.05 (1.20-1.30)	0.99 ± 0.06 (0.90-1.10)	1.30 ± 0.04 (1.25-1.40)	1.07 ± 0.10 (0.90-1.30)	1.49 ± 0.05 (1.40-1.60)	0.97 ± 0.11 (0.80-1.10)	1.41 ± 0.08 (1.24-1.52)
Lip region : width	(11.5-12.0)	(12.0-12.5)	(11.0-11.5)	(10.5-11.0)	(10.5-12.5)	(11.0-12.5)	(11.5-12.5)	(12.0-12.5)	(10.5-11.0)	(10.5-11.0)
height	(5.0-5.5)	(5.0-6.0)	(5.0-5.5)	(5.0-5.5)	5.0	(5.0-5.5)	5.5	(5.5-6.0)	(4.5-5.0)	(5.0-5.5)
Amphid	6.95 ± 0.15 (6.5-7.0)	7.30 ± 0.24 (7.0-7.5)	7.20 ± 0.24 (7.0-7.5)	6.75 ± 0.25 (6.5-7.0)	7.10 ± 0.26 (6.5-7.5)	7.40 ± 0.23 (7.0-7.5)	7.25 ± 0.25 (7.0-7.5)	7.50 ± 0.00 –	6.60 ± 0.20 (6.5-7.0)	6.70 ± 0.24
Odontostyle	10.8 ± 0.25 (10.5-11.0)	10.7 ± 0.25 (10.5-11.0)	10.6 ± 0.34 (10.0-11.0)	10.7 ± 0.38 (10.5-11.5)	10.7 ± 0.38 (10.0-11.0)	11.0 ± 0.00 –	10.9 ± 0.19 (10.5-11.0)	10.8 ± 0.24 (10.5-11.0)	10.6 ± 0.37 (10.0-11.0)	10.5 ± 0.37 (10.0-11.0)
Odontophore	(12.5-14.0)	(13.0-14.0)	(12.5-13.5)	(12.5-14.0)	(12.0-13.5)	13	(13-14)	(13-14)	(12.0-13.5)	(11.5-13.0)
Stylet length	(23-25)	(24-25)	(22-24)	(22.5-25.0)	(22.5-24.0)	24	(24-25)	(24-25)	(22-24)	(22-24)
Guiding ring-ant. end	(7.5-8.0)	(7.5-8.0)	(7.0-7.5)	(7.0-7.5)	(7.5-8.0)	(7.5-8.0)	(7.5-8.5)	(7.5-8.0)	(7.0-8.0)	(7.0-8.0)
Nerve ring-ant. end	111 ± 3.3 (106-115)	108 ± 3.3 (103-112)	95 ± 2.0 (90-100)	94 ± 3.0 (91-100)	104 ± 4.10 (94-112)	102 ± 2.60 (97-106)	105 ± 1.76 (100-108)	103 ± 3.18 (98-106)	106 ± 4.29 (100-112)	108 ± 4.0 (103-115)
Neck length	244 ± 4.7 (238-250)	249 ± 6.5 (240-262)	218 ± 7.7 (200-225)	207 ± 6.6 (200-216)	232 ± 14.4 (220-267)	220 ± 7.36 (210-231)	243 ± 9.31 (234-258)	240 ± 11.5 (229-259)	246 ± 4.06 (241-253)	244 ± 7.53 (234-258)
Pharyngeal basal bulb	52 ± 2.0 (50-56)	52 ± 2.2 (50-56)	47 ± 1.6 (44-50)	45 ± 1.4 (43-46)	53.0 ± 2.67 (50-59)	50.5 ± 1.20 (49-52)	56.2 ± 2.56 (51-59)	54.5 ± 2.60 (52-58)	57.7 ± 2.60 (55-63)	56.0 ± 1.35 (53-58)
Cardia : width	(12-14)	(12-13)	(9-11)	(9-11)	(12.5-15.0)	(11-14)	12	(11-12)	(11-14)	(12-14)
length	(8-9)	(8-9)	(6-9)	(7-8)	(8-12)	(8.0-9.5)	9	7	(7-8)	(7-8)
Body width at neck base	36.5 ± 1.19 (35.0-39.0)	35.0 ± 1.80 (32.0-39.0)	32.5 ± 1.48 (31.0-35.0)	30.0 ± 1.21 (29.0-32.0)	34.0 ± 1.95 (32.0-39.5)	31.0 ± 1.64 (29.0-33.0)	39.1 ± 1.92 (36.0-42.0)	36.0 ± 1.96 (33.0-39.0)	37.4 ± 2.05 (33.0-40.0)	35.9 ± 1.73 (33.0-39.0)
at midbody	48.6 ± 1.69 (47.0-52.0)	43.4 ± 3.19 (37.0-47.5)	38.5 ± 2.90 (35.0-43.0)	34.5 ± 0.93 (33.0-36.0)	43.6 ± 2.65 (40.5-49.5)	36.5 ± 3.78 (32.0-44.0)	47.8 ± 3.27 (42.0-52.0)	41.6 ± 3.20 (37.0-45.0)	47.6 ± 2.68 (42.0-51.0)	43.7 ± 4.42 (39.0-50.0)
at anus	30.6 ± 1.50 (28.0-32.0)	29.4 ± 1.12 (28.0-31.0)	25.5 ± 1.21 (24.0-27.5)	25.0 ± 1.28 (23.0-27.0)	27.2 ± 1.30 (25.0-30.0)	26.0 ± 0.83 (25.0-27.0)	28.8 ± 1.16 (27.0-30.5)	27.3 ± 0.40 (26.5-27.5)	29.6 ± 1.48 (27.0-31.0)	27.8 ± 0.74 (27.0-29.0)
Cuticle : head	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
midbody	2.0	2.0	2.0	2.0	(2.0-2.5)	(2.0-2.5)	2.0	2.0	2.5	2.5
tail	(5-6)	(4-5)	(4-5)	(4-5)	(4-5)	(4-5)	(4.0-4.5)	4.5	(4.5-5.0)	(4-5)

***Table 2** (continued).*

Lateral chord	(13-18)	(12-16)	(12-15)	(11-15)	(13-17)	(10-15)	(14-17)	(14-16)	(12-16)	(13-17)
Ant. ovary/testis	140 ± 24.7 (112-188)	205 ± 37.4 (150-250)	73.5 ± 18.6 (59-112)	184 ± 21.8 (156-212)	79.0 ± 8.90 (66-103)	182 ± 28.9 (130-231)	91.0 ± 23.9 (60-146)	184 ± 20.3 (156-222)	122 ± 25.2 (77-165)	231 ± 40.5 (188-303)
Ant. gen. branch	292 ± 25.3 (250-346)	850 ± 85.4 (716-990)	209 ± 31.6 (175-281)	669 ± 60.9 (594-761)	224 ± 25.7 (163-250)	747 ± 70.4 (637-845)	232 ± 26.4 (181-269)	815 ± 53.2 (716-872)	250 ± 32.5 (188-294)	870 ± 83.0 (719-971)
Post. ovary/testis	134 ± 39.6 (82-206)	202 ± 39.7 (140-249)	77.5 ± 20.5 (60-130)	188 ± 21.7 (153-218)	77.8 ± 10.2 (63-94)	174 ± 21.1 (132-206)	99.7 ± 19.0 (78-131)	172 ± 30.3 (148-237)	109 ± 27.9 (75-168)	219 ± 45.6 (162-306)
Post. gen. branch*	240 ± 35.3 (150-285)	443 ± 68.6 (312-556)	204 ± 34.0 (172-270)	297 ± 42.2 (238-368)	211 ± 19.2 (178-250)	391 ± 64.0 (323-469)	217 ± 26.6 (178-281)	460 ± 40.8 (400-517)	237 ± 45.5 (175-340)	408 ± 58.0 (276-463)
Vagina : width	(12-15)	–	(11-14)	–	(10-13)	–	(10-15)	–	(12-15)	–
length	(14-18)	–	(12-16)	–	(14-17)	–	(17-19)	–	(16-20)	–
Vulva-ant. end	854 ± 46.8 (786-939)	– –	744 ± 76.8 (607-880)	– –	749 ± 76.6 (613-913)	– –	709 ± 61.7 (673-892)	– –	851 ± 86.3 (740-1007)	– –
Prerectum	215 ± 25.2 (175-256)	244 ± 40.0 (162-284)	167 ± 23.3 (130-206)	170 ± 18.8 (144-194)	187 ± 51.4 (103-262)	216 ± 33.6 (175-250)	186 ± 28.7 (170-225)	230 ± 7.48 (222-240)	189 ± 26.1 (150-225)	225 ± 33.8 (187-281)
Rectum/Cloaca	28.6 ± 1.29 (28.0-31.0)	44.9 ± 2.51 (41.0-50.0)	27.0 ± 1.90 (24.0-30.0)	43.0 ± 1.49 (40.0-44.0)	27.6 ± 2.00 (22-31)	48.0 ± 6.87 (38-57)	26.6 ± 1.49 (25-29)	41.0 ± 2.00 (38-44)	27.8 ± 2.64 (23-34)	42.0 ± 3.58 (37-47)
Tail	28.4 ± 2.66 (25.0-33.5)	37.8 ± 2.16 (34.5-40.0)	25.0 ± 1.72 (22.0-28.0)	31.5 ± 2.69 (29.0-36.0)	27.3 ± 1.75 (25-31)	35.0 ± 2.94 (32.0-39.5)	30.9 ± 2.80 (26.0-35.5)	41.3 ± 1.67 (39.5-44.0)	28.7 ± 3.25 (22-33)	39.0 ± 2.40 (34.0-42.5)
Spicules at arc	– –	46.2 ± 1.25 (45.5-48.5)	– –	39.5 ± 1.06 (38.0)41.5)	– –	43.0 ± 1.53 (41-45)	– –	44.0 ± 1.30 (42-46)	– –	43.5 ± 1.36 (42-46)
Ventromedian supplements	–	6-9	–	5-7	–	6-7	–	7-9	–	5-7
Sperm	–	8.0-8.5	–	6.5-7.0	–	7-5	–	7-8	–	8.0-8.5
Copulatory muscles	–	(13-20)	–	(14-17)	–	15-18	–	16-19	–	17-18

* In males, this measurement is the distance from the posterior end of the testis to the cloacal aperture.

branch. A revision of the entire material of these species would be necessary to clarify their taxonomy.

In any case, the species is new to the European fauna.

***Proleptonchus* sp.**

(Fig. 3)

MEASUREMENTS

See Table 3.

DESCRIPTION

Female : Slender nematode of medium size. Body cylindrical, slightly tapering towards the anterior end. Habitus slightly ventrally curved. Outer cuticle thin and smooth. Inner cuticle thicker and detached from the outer one. Radial refractive elements visible, especially in the caudal region. Lateral chord occupying one-third of the midbody diameter. Lateral pores coarse, arranged in two rows along the margin of the lateral chord. Lip region cap-like, offset from the adjacent body by a constriction, 2.3 times as wide as high and one-third of the body diameter at neck base. Lips completely amalgamated, with their inner parts not elevated. Labial and cephalic papillae not interfering with the head contour. Amphid cup-shaped, its aperture located at level of the cephalic constriction, three-quarters of the head diameter in length. Cheilostoma flask-shaped, with perioral thickening. Guiding ring simple, refractive. Odontostyle needle-like with lumen visible, two-thirds of the lip region diameter in length. Odontophore about twice the odontostyle length and slightly ventrally curved. Pharynx consisting of a slender and weakly muscular anterior part expanding abruptly in a cylindrical basal bulb with sclerotized lumen, and occupying one-fifth of the neck length. Pharyngeal gland nuclei and outlets hardly visible. Cardia obscure in the female studied but apparently short and bilobed. Nerve ring located midway the neck length. Genital system pseudodidelphic-prodelphic. Ovary reflexed, provided with numerous oocytes and occupying 60 % of the genital branch length. Oviduct joining the ovary subterminally, consisting of a slender distal part, with prismatic cells, and a moderately developed *pars dilatata* with lumen visible. Oviduct-uterus junction marked by a refractive sphincter. Uterus short, not specialized. Posterior genital branch consisting of an uterine sac 3.8 body diameters long, a less distinct sphincter, and a cellular mass with visible lumen representing a vestigial oviduct. Sperms present throughout the genital tract. Vagina cylindrical or pear-

Table 3. *Measurements of several species of the genera* Proleptonchus, Meylis, Basirotyleptus *and* Adenolaimus (all measurements in μm except L in mm).

	P. shamimi			*Proleptonchus* sp.		*M. multipapillatus*		*B. lieberi*	*A. orthus*
Habitat	*Pinus*	*Fraxinus*	*Quercus*	*Pinus*		Gramineous plants		*Abies pinsapo*	Moss
Locality	S. Segura	S. Morena	S. Morena	S. Morena		Genoveses beach		Sierra de las Nieves	Sierra Nevada
Province	Jaén	Jaén	Jaén	Jaén		Almería		Málaga	Granada
	♀♀	♀	♀	♀	♂	♀♀	♂♂	♀♀	♀♀
n	2	1	1	1	1	4	6	17	6
L (mm)	1.20, 1.41	1.27	1.20	1.70	1.73	1.71 ± 0.15 (1.49-1.90)	1.59 ± 0.19 (1.36-1.94)	0.81 ± 0.05 (0.73-0.90)	1.19 ± 0.07 (1.10-1.28)
a	36.9, 43.5	34.7	40.7	44.7	48.1	34.7 ± 4.35 (29.2-40.0)	39.2 ± 3.56 (33.2-44.1)	31.2 ± 1.35 (27.8-33.4)	33.0 ± 1.78 (30.2-35.5)
b	6.4, 7.5	7.7	7	7.1	6.4	? ?	5.4 ± 0.4 (4.9-6.2)	5.2 ± 0.22 (4.6-5.6)	6.7 ± 0.4 (6.3-7.1)
c	63.1, 74.4	61.8	72.7	71	62	92 ± 14 (78.3-115)	75.8 ± 3.17 (70.8-80.8)	28.5 ± 2.4 (22.1-32.1)	29.9 ± 1.90 (27-32)
V	53.9, 57.5	53.2	58.3	58	–	46.2 ± 1.53 (44.6-48.4)	– –	65.0 ± 1.16 (62.2-66.8)	23.8 ± 0.78 (22.7-25.0)
G1/T1	21.8, 19.9	19.3	15.6	14.7	49.2	20.7 ± 3.51 (15.1-24.2)	60.9 ± 4.55 (54.7-65.5)	23.5 ± 4.15 (18.8-33.1)	– –
G2/T2	8.6, 6.7	15.8	?	8.5	27.6	15.5 ± 2.73 (13.1-19.3)	36.2 ± 4.0 (32.7-41.8)	7.5 ± 0.5 (6.7-8.6)	39 ± 7.3 (30.5-52.0)
Post. gen. branch/Body diam.	3.17, 3.0	5.5	?	3.8				2.30 ± 0.18 (2.0-2.6)	
c'	0.9, 0.9	0.9	0.9	0.9	1.1	0.66 ± 0.08 (0.50-0.70)	0.88 ± 0.05 (0.80-0.90)	1.70 ± 0.14 (1.5-2.1)	1.69 ± 0.14 (1.60-1.90)
Lip region : width	10.5	10.5	10.5	11.5	11	(15.0-15.5)	(14.5-17.0)	(10-11)	(12.5-13.0)
height	4.5, 4.0	4.5	4.5	5	5	6.5	(6.5-7.5)	(4-5)	(8-9)
Amphid	7.5	7.5	7.5	8	9	10.7 ± 0.5 (10.5-11.0)	10.7 ± 0.4 (10-11)	7	3
Odontostyle	7.5	7.5	8.0	7.0	7.5	15.2 ± 0.65 (14.0-15.5)	14.3 ± 0.56 (13.5-15.0)	16.3 ± 0.30 (16-17)	5.1 ± 0.2 (5.0-5.5)
Odontophore	12.5	14.5	12.5	13	14	13.8 ± 0.23 (13.5-14.0)	14.9 ± 0.58 (14.5-16.0)	12.8 ± 0.70 (12-14)	20.1 ± 0.19 (20.0-20.5)
Stylet length	20	22	20	20	21.5	(28-29)	(28-30)	(28-30)	(25.0-25.5)
Guiding ring-ant. end	7.5	7.5	7.0	7.5	8.5	(11.0-11.5)	(11-12)	(12.5-13.0)	(3.5-4.5)
Nerve ring-ant. end	84	84	81	109	103	n = 1 86	104 ± 3.8 (100-110)	n = 2 94	n = 1 122
Neck length	188	163	172	239	269	? ?	305 ± 3.9 (300-311)	159 ± 5.8 (149-175)	182 ± 4.0 (178-186)
Pharyngeal basal bulb	39, 40	?	36	50	47	55 ± 1.6 (52-56)	57.5 ± 2.42 (54-62)	26.3 ± 1.87 (25-31)	33.4 ± 0.80 (32-34)
Cardia : width	8, 10	9.5	11	10	9.5	(9-10)	(10-11)	(4.5-5.0)	(5-6)
length	4, 5	4	7	7	7	(12-13)	(11-13)	7.5	(9-11)
Body diameter : at neck base	29.5, 28.0	32	25.5	31	31	43.2 ± 0.83 (42-44)	38 ± 3 (33-43)	24.3 ± 1.57 (20.0-26.5)	31.2 ± 2.54 (26-34)
at midbody	32.5	36.5	29.5	38	36	47.7 ± 2.65 (44.5-51.0)	40 ± 3.7 (34.5-46.0)	26.5 ± 1.71 (23-30)	36.5 ± 2.57 (31-39)
at anus	20.5	22.5	18	26	26	28.5 ± 1.06 (27.0-29.5)	23.5 ± 1.88 (21-26)	17.0 ± 1.05 (15-19)	23.8 ± 1.67 (21-25)

Table 3. *(continued).*

Lateral chord	10.5	12	10	11	12	(19-23)	(17-20)	n = 1 9	(7.5-9.0)
Anterior ovary/testis	219, 153	84	118	154	200	169 ± 56 (94-231)	193 ± 28 (160-230)	139 ± 31 (95-177)	
Ant. gen. branch	262, 281	244	187	250	853	354 ± 66 (253-431)	1 028 ± 140 (871-1 212)	192 ± 36.5 (137-269)	-
Posterior ovary/testis	-	-	-	-	175	158 ± 2.0 (156-160)	217 ± 42 (168-270)	-	418 ± 139 (210-590)
Post. gen. branch	103,94	200	?	166	478	? ?	618 ± 138 (500-812)	60.5 ± 3.62 (56-68)	438 ± 112 (247-597)
Vagina : width	9.5, 11	11	10	15	-	(14-20)	-	(7-9)	13.5
length	14	14	13	15	-	(20-21)	-	(10-12)	15
Vulva-ant. end	647, 813	673	700	986	-	788 ± 47 (720-853)	- -	530 ± 29.6 (469-580)	283 ± 13.2 (267-307)
Prerectum	100, ?	170	?	265	219	?	?	53 ± 7.2 (41-64)	78.6 ± 1.70 (77-81)
Rectum/Cloaca	25, 26	28	23	31	40	33.8 ± 3.0 (30.0-37.5)	n = 1 40	22.5 ± 1.16 (21-25)	22.8 ± 2.63 (21-28)
Tail	19	20.5	17	24	28	18.9 ± 2.30 (16-22)	20.8 ± 1.95 (18-24)	29 ± 2.4 (25-33)	40 ± 0.6 (39-41)
Spicules at arc	-	-	-	-	39	-	35.1-2.10 (31.5-38.0)		
Ventromedian supplements	-	-	-	-	4	-	(12-16)		
Sperm	-	-	-	-	9.5	-	(6.5-7.0)		
Copulatory muscles	-	-	-	-	12	-	(18-24)		

shaped, extending inwards to half of the midbody diameter; its wall encircled by strong muscles. Vulva apparently a transverse slit. Prerectum ten anal body diameter long; its junction with the intestine guarded by three guard cells. Rectum slightly longer than anal body diameter. Tail rounded-conoid, convexe in both sides. Caudal pores two pairs : one subdorsal more anterior and the other lateral.

Male : General morphology similar to female, but with the caudal region more ventrally curved. Diorchic with testes opposed. Apart from the adanal pair, a series of four regularly spaced ventromedian supplements present, beginning outside the range of the spicules. Sperms spindle-shaped or elliptical. Spicules ventrally arched, 1.5 anal body diameters long. Lateral guiding pieces sigmoid and with furcate terminus. Tail somewhat longer than in female; its ventral side straight. Caudal pores as in female.

Distribution

Associated with *Pinus* sp. and brushwood in acid soil from Parque Natural de Andújar, Sierra Morena, province of Jaén.

Remarks

We think that the two specimens studied probably belong to a previously unknown species of the genus, but because of the scarce material available we prefer not to propose a new taxon. The female and male collected were found in a geographical area where *P. shamimi* is also present and initially we considered the possibility that the two specimens belong to this species; however, they have longer body (L = 1.14-1.47 mm in *P. shamimi*, n = 48), pharyngeal bulb (30-40 µm in *P. shamimi*), and spicules (27-34 µm in *P. shamimi*, n = 42).

***Meylis multipapillatus* (Meyl, 1956) Goseco, Ferris & Ferris, 1974**

(Fig. 4)

Measurements

See Table 3.

Description

Female : Moderately slender nematodes of medium size. Body cylindrical, slightly tapering towards the anterior end. Habitus often straight but sometimes regularly ventrally arched. Outer cuticle smooth. Inner cuticle

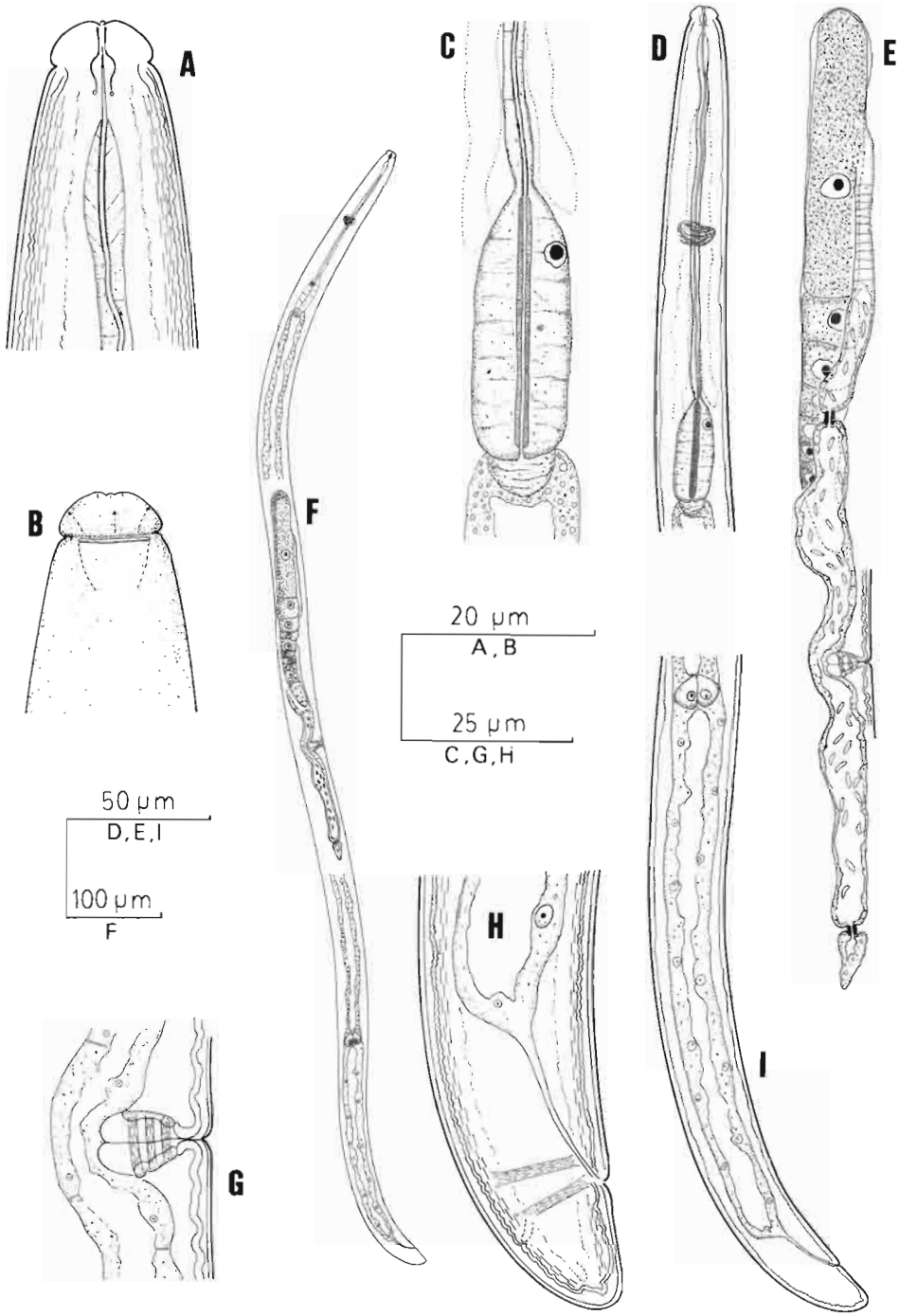

Fig. 2. Proleptonchus shamimi *Bajaj & Batti, 1980. A : Lip region in lateral view; B : Same in surface lateral view; C : Pharyngeal basal bulb and cardia; D : Neck region; E : Genital system; F : Entire female; G : Vagina; H : Caudal region; I : Posterior body region.*

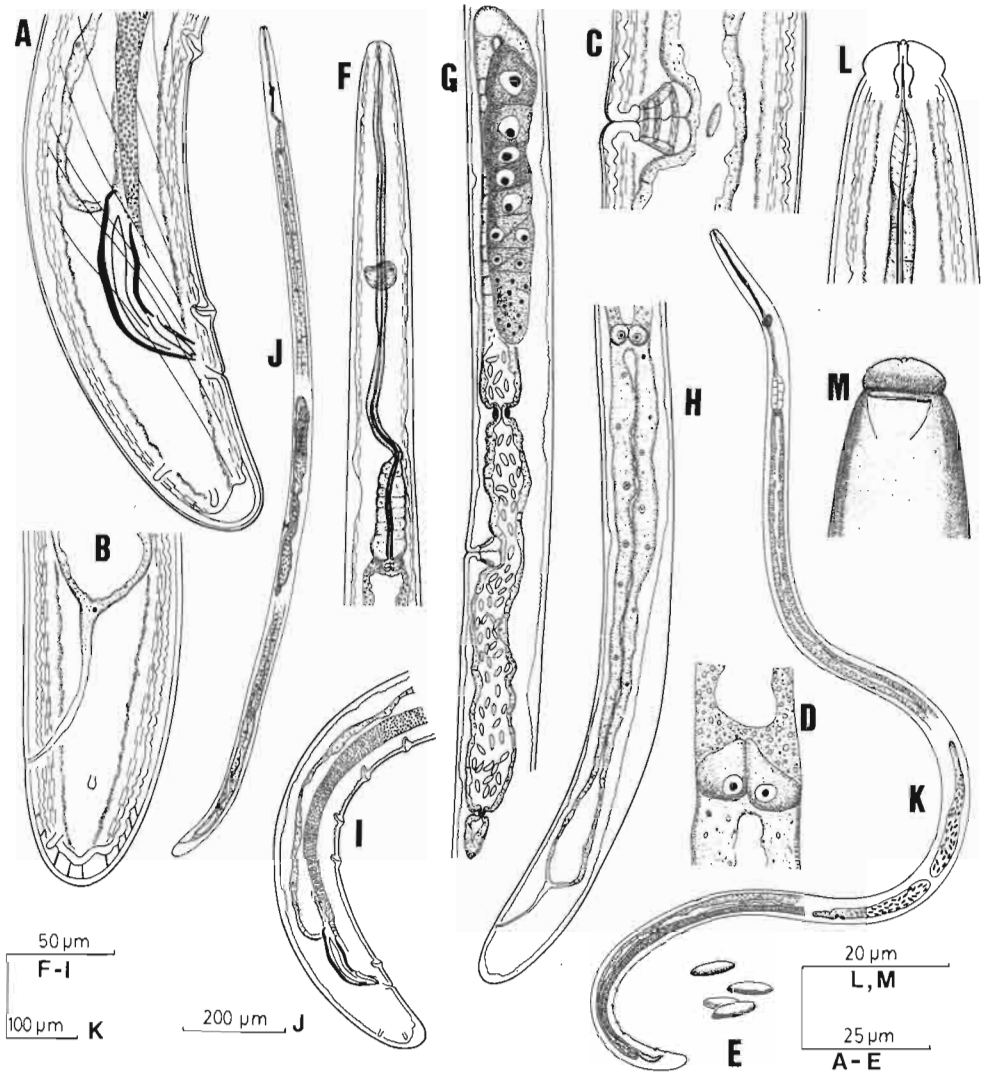

Fig. 3. Proleptonchus *sp.. A : Male tail; B : Female tail; C : Vagina; D : Intestine-prerectum junction; E : Sperms; F : Neck region; G : Female genital system; H : Female posterior body region; I : Male posterior body region; J : Entire female; K : Entire male; L : Lip region in lateral view; M : Same in surface view.*

coarsely striated and separated from the outer cuticle. Radial refractive elements present but scarce, more visible in the caudal region. Lateral chord occupying the half of the midbody diameter. Lateral pores very coarse, arranged in two rows located along the margins of the lateral chord. Lip region with rounded contour, offset from the adjacent body by a deep constriction, 2-2.5 times as wide as high and one-third to one-half of the body diameter at neck base. Lips almost amalgamated, their inner parts transformed in a perioral disc set off by a groove. Labial and cephalic papillae distinct and located inside cuticle depressions. Amphid cup-shaped, occupying three-quarters of the lip region diameter. Cheilostoma conoid-truncate or cylindrical; its wall presenting perioral thickening. Guiding ring simple, refractive. Odontostyle attenuated, as long as the lip region diameter; with ventral side somewhat dorsally bent and dorsal side completely straight. Odontophore slightly ventrally curved and shorter than the odontostyle length. Anterior part of the pharynx slender and weakly muscular, slightly wider in the posterior end and joining the basal bulb by a weak constriction. Pharyngeal basal bulb pear-shaped, with sclerotized lumen, occupying one-sixth to one-fifth of the total neck length. Gland

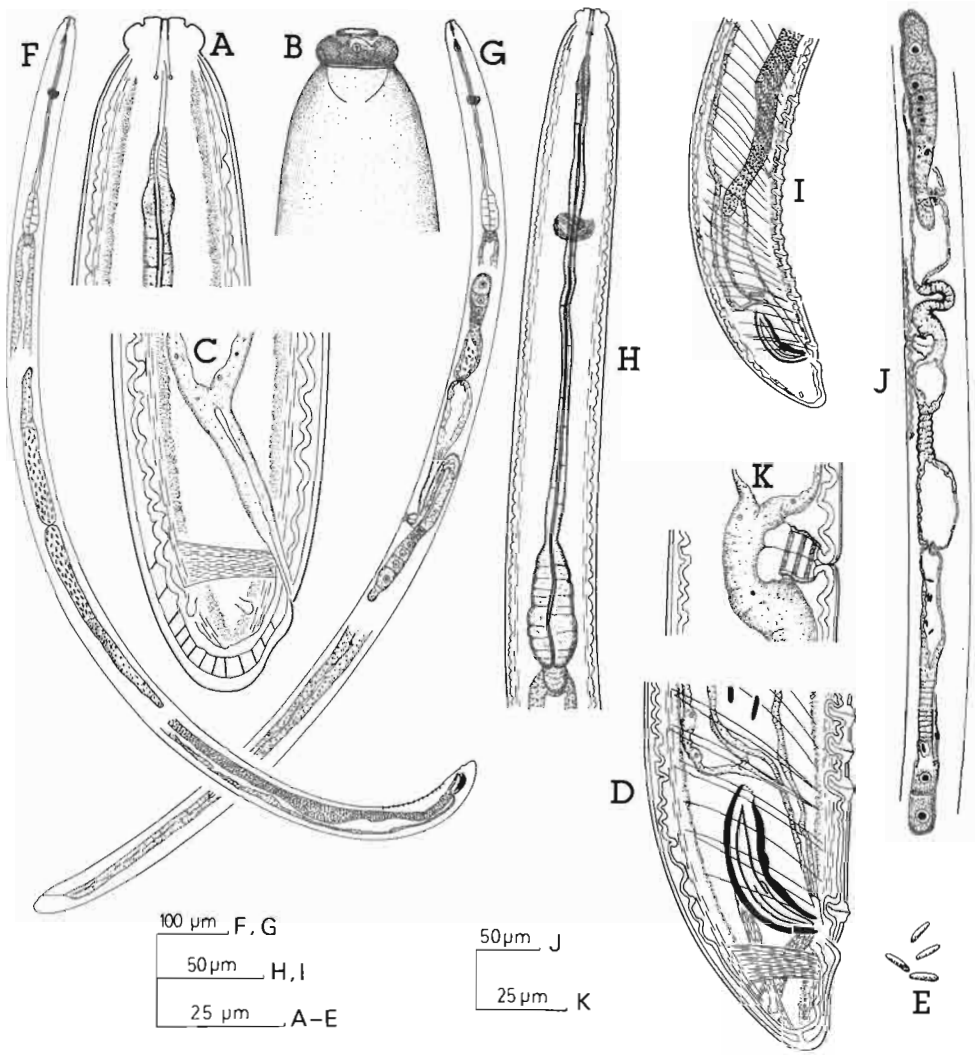

Fig. 4. Meylis multipapillatus *(Meyl, 1956) Goseco, Ferris & Ferris, 1976. A : Lip region in lateral view; B : Same in surface view; C : Female tail; D : Male tail; E : Sperm; F : Entire male; G : Entire female; H : Neck region; I : Male posterior body region; J : Female genital system; K : Vagina.*

nuclei and outlets obscure. Cardia rounded and enfolded by intestinal tissue. Nerve ring located at one-third of the neck length. Genital system amphidelphic-didelphic. Ovaries reflexed and provided with numerous oocytes. Oviduct consisting of a slender distal part, joined to the ovary subterminally, and a *pars dilatata* with distinct lumen. Oviduct-uterus junction marked by a refractive sphincter. Uterus a tube with one or two expanded (with wide lumen) portions. Vagina cylindrical or pear-shaped, extending inwards to half of the corresponding body diameter; vagina-vulva junction surrounded by the inner cuticle which extends inwards; vaginal wall encircled by muscles. Vulva transverse. Sperms present throughout the genital tract. Prerectum not clearly observed in the material studied. Rectum longer than anal body diameter. Tail convex-conoid, shorter than the corresponding body diameter. Caudal pores two pairs : one subdorsal and the other subventral.

Male : Morphology similar to female. Habitus more ventrally curved, particularly in the posterior region. Diorchic with testes opposed. Apart from the adanal pair, a series of twelve to sixteen practically contiguous ventromedian supplements begining at level of the distal end of the spicules. Sperm elliptical. Spicules ventrally arched, 1.5 anal body diameter long. Lateral guiding pieces slightly longer than one-third of the spicules and

with acute terminus. Tail somewhat more conical than in female. Caudal pores as in female.

DISTRIBUTION

The material examined was collected from " Genoveses beach " province of Almería, associated with gramineous plants in sandy soil.

This is the first record of the species in Europe.

Basirotyleptus (Trichonchium) lieberi Goseco, Ferris & Ferris, 1974

(Fig. 5)

MEASUREMENTS

See Table 3.

DESCRIPTION

Female : Slender nematodes of small size. Body cylindrical, tapering sligthly towards both extremities. Habitus ventrally curved to C-shaped. Outer cuticle layer very thin and with fine transverse striations, often inconspicuous. Inner layer wider than the outer one. Radial refractive elements obscure. Lateral chord occupying one-third of the midbody diameter. Lateral pores obscure. Lip region cap-like, offset by a distinct constriction, 2.2.-2.6 times as wide as high, about one-third to one-half of the body diameter at neck base. Lips separated and rounded; their inner parts somewhat elevated. Labial and cephalic papillae clear and slightly raised above the head contour. Amphid cup-shaped, opening at level of the cephalic constriction, about two-thirds of the corresponding body diameter in length. Cheilostoma a slender truncate cone, weakly sclerotized in the perioral region. Odontostyle needle-like, 1.4-1.6 times as long as the width of the lip region. Odontophore length three-quarters to four-fifths of the odontostyle length. Guiding ring simple, refractive. Pharynx with a slender and weakly muscular anterior part expanding abruptly into a pear-shaped basal bulb which occupies 16-18 % of the total neck length. Pharyngeal gland nuclei obscure. Cardia rounded-conoid and surrounded by the intestine. Nerve ring located at 60 % of the neck length. Genital system monodelphic-prodelphic. Ovary long, provided with numerous oocytes arranged first in two rows, then in a single one. Oviduct joining the ovary subterminally and consisting of a slender fore part and a poorly developed *pars dilatata*. Sphincter present at the oviduct-uterus junction. Uterus unspecialized. Posterior branch reduced to a simple sac, its length equal to 2.0-2.6 times the corresponding body diameter. Genital tract without sperms. Vagina cylindrical, encircled by muscles and extending inwards to half of the corresponding body diameter. Vulva a transverse slit. Prerectum 2.3-3.5 anal body diameter long. Rectum slightly longer than anal body width. Tail conical with rounded tip, very slightly ventrally curved and dorsally convex. Caudal pores two pairs, one lateral and more anterior and the other dorsal.

Male : Not found.

DISTRIBUTION

The species was found associated with *Abies pinsapo* Boiss. in " Cañada del Cuerno ", Sierra de las Nieves, province of Málaga.

REMARKS

We have noted some differences between this Spanish population and the type population : longer body (L = 0.63-0.75 mm in the type population), wider lip region (8.5 µm in the type population), different length of odontostyle and odontophore (16-17 + 12-14 µm, respectively, *vs* 10 + 19 µm), and absence of males (almost as frequent as the females in the type population). However, in our opinion, this variability can be considered intraspecific; only the different measurements of the odontostyle and odontophore could be important but we have probably interpreted in a different way this structure since the total stylet length is practically identical and it is not easy to measure the exact length of its two parts in this species.

This species is also new to the European fauna.

Adenolaimus orthus (Thorne, 1939) Goseco, Ferris & Ferris, 1975

(Fig. 6)

MEASUREMENTS

See Table 3.

DESCRIPTION

Female : Slender nematodes of medium size. Body cylindrical, slightly tapering towards both extremities. Habitus almost straight when relaxed. Outer layer of the cuticle thin and smooth. Inner layer slightly thicker than the outer one, especially in the caudal region. Lateral chord occupying about one-quarter of the body diameter. Lateral pores obscure. Lip region continuous with the adjacent body, rounded, 1.5 times as wide as high and about two-fifths of the body diameter at neck base. Lips amalgamated, with inner parts transformed into a low peri-oral disc. Strongly refractive longitudinal rib-like elements present, forming an incipient cephalic framework. Six outer labial papillae present, each one inside a hole-like structure excavated in the cuticle. Inner labial papillae less distinct; cephalic papillae obscure. Amphid aperture oval, occupying about one-quarter of the lip region diameter; its walls strongly refractive and probably provided with stiffening rod-like structures. Stoma a short truncate cone followed by a basket-like structure consisting of sclerotized rib-like elements. Odontostyle dorsally curved and slightly shorter than one-half of the lip region diameter. Odontophore straight, four times the length of the odontostyle and provided with basal knobs. Pharynx with a slender

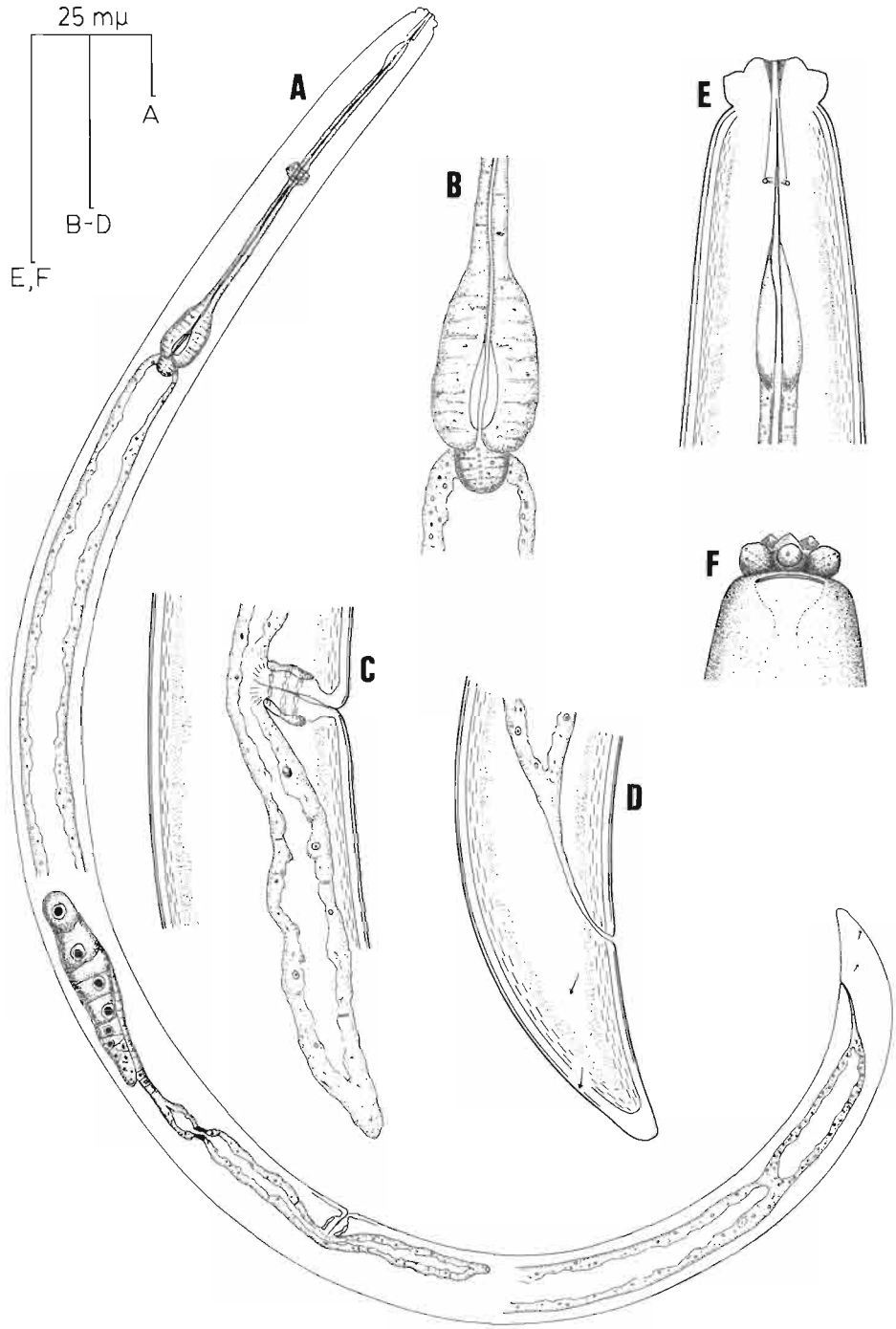

Fig. 5. Basirotyleptus lieberi *Goseco, Ferris & Ferris, 1974. A : Entire female; B : Pharyngeal basal bulb and cardia; C : Vagina and postvulval sac; D : Caudal region; E : Lip region in lateral view; F : Same in surface view.*

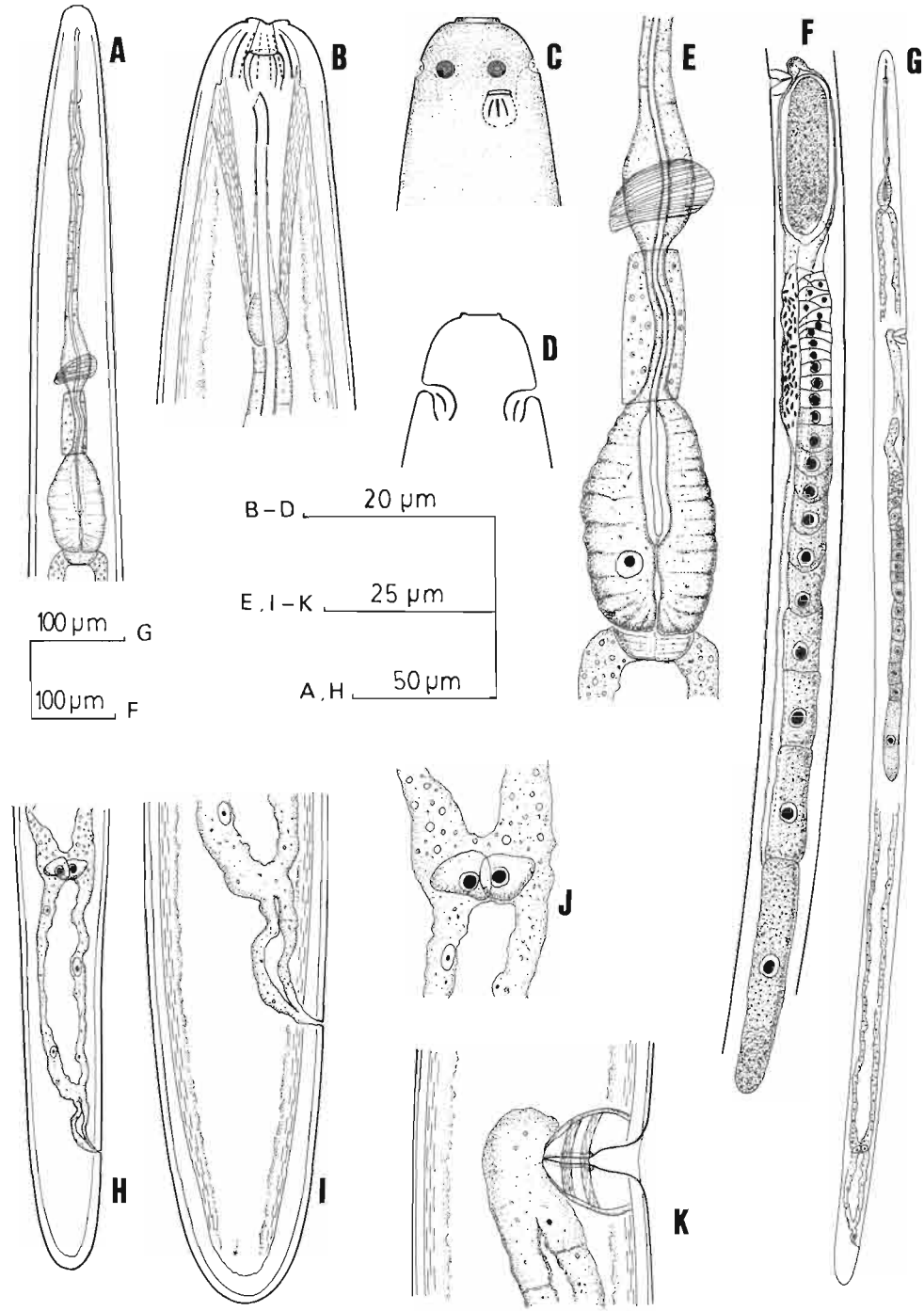

Fig. 6. Adenolaimus orthus *(Thorne, 1939) Goseco, Ferris & Ferris, 1975. A : Neck region; B : Lip region in lateral view; C : Same in surface lateral view; D : Same in dorsal view; E : Pharyngeal bulb and cardia; F : Genital system; G : Entire female; H : Posterior body region; I : Caudal region; J : Intestine-prerectum junction; K : Vagina.*

anterior part, a median region, and a basal bulb; anterior part with a bulb-like thickening at its basal end around which is located the nerve ring; median region slender and relatively short (isthmus-like), appearing enfolded by a glandular (?) tissue; basal bulb pyriform, one-sixth to one-fifth of the total neck length and with a valvular chamber in its anterior half. Pharyngeal gland nuclei barely visible. Cardia rounded to hemispherical, partially surrounded by the intestine. Nerve ring located at 65 % of the total neck length. Genital system monodelphic-opisthodelphic. Ovary very long, provided with numerous oocytes arranged first in several rows then in a single one. Oviduct joining the ovary subterminally, consisting of a slender duct. Sphincter not seen in the material examined. Uterus unspecialized, often containing sperms. Anterior genital branch absent. Vagina V-shaped, extending inwards to half of the corresponding body diameter; its wall appearing surrounded by muscles and with the outer lining slightly sclerotized. Vulva probably transverse oval or circular (not seen in frontal view), followed by a funnel-like cavity. Prerectum short, 3-3.5 anal body diameter long; intestine-prerectum junction with three guard cells. Rectum scarcely shorter than anal body width. Tail subcylindrical and very rounded at the end, 1.5-2 anal body diameter long. Caudal pores : one pair located subterminally.

Male : Not seen.

Distribution

The species was found associated with moss in a very moist soil near a rivulet in the road from Capileira to Veleta summit, Sierra Nevada, province of Granada.

Remarks

The material examined agrees well with other previously described populations (see Goseco *et al.,* 1975) but we have noted some interesting morphological features which have not been mentioned before : *i)* a low perioral disc is present; *ii)* the existence of a cephalic framework is clear due to the presence of holes which make perceptible the anterior sensilla; a rather similar framework has been described in species of the subfamily Thornenematinae and the genus *Margollus* (see, for exemple, Carbonell & Coomans, 1985, 1987; Peña Santiago & Coomans, 1990; Peña Santiago *et al.,* 1993), although here, this framework is only partially sclerotized by the presence of rib-like structures; *iii)* the amphidial fovea wall also is reinforced by small longitudinal ribe-like structures; *iv)* the valvular chamber of the pharyngeal bulb is located in its anterior half (in posterior half in previous populations). It is possible that some of these observations are a result of the subjective interpretation of the same reality; therefore, we think that our material belongs to the species in which it has been classified.

This species is also new to the European fauna.

Acknowledgement

Authors thanks projects DGICYT PB92-0121 (Fauna Ibérica III) and PB91-0712 for financial support.

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