

Observations on *Protodorylaimus dalmassoi* (Loof, 1985) Andrassy, 1988 (Nematoda: Dorylaimoidea)

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Summary – *Protodorylaimus dalmassoi* (Loof, 1985) Andrassy, 1988 is described and illustrated from material collected in two localities of peninsular Spain. Its relationships with species of the genera *Prodorylaimus* Andrassy, 1959 and *Oxydiroides* Altherr, 1972 is briefly discussed and its inclusion in *Protodorylaimus* Andrassy, 1988 is supported. © Orstom/Elsevier, Paris

Résumé – *Observations sur Protodorylaimus dalmassoi* (Loof, 1985) Andrassy, 1988 (Nematoda: Dorylaimoidea) *Protodorylaimus dalmassoi* (Loof, 1985) Andrassy, 1988 est décrit et figuré à partir de matériel collecté dans deux localités d'Espagne péninsulaire. Ses relations avec les espèces des genres *Prodorylaimus* Andrassy, 1959 et *Oxydiroides* Altherr, 1972 sont brièvement discutées et son appartenance au genre *Protodorylaimus* Andrassy, 1988 confirmée. © Orstom/Elsevier, Paris

Keywords : nematode, *Oxydiroides*, *Prodorylaimus*, *Protodorylaimus dalmassoi*, taxonomy.

Loof (1985) described *Prodorylaimus dalmassoi*, an atypical species of the genus, from pastures in Bois de Vergnes, France. Later, the taxonomic position of this species became a subject of controversy: Andrassy (1988) proposed it as a type species of the new genus *Protodorylaimus*, Jiménez Guirado (1990) studied a few specimens from southern Spain and transferred the species to *Oxydiroides* Altherr, 1972, and, very recently, Loof (1996) included it in a key for females of the genus *Prodorylaimus* but without questioning the validity of *Protodorylaimus*.

One of the authors (DJG) collected additional material of the species in a locality from the Cantabria region, northern Iberian Peninsula. The study of the Spanish specimens has allowed us to complete the available information on the species and to discuss its taxonomy.

Nematodes were extracted from soils or sediments by Baermann's method or Flegg's technique somewhat modified, killed by heat, fixed in 4% formaldehyde, and mounted in anhydrous glycerin according to Seinhorst (1962) or Siddiqi (1964) techniques.

***Protodorylaimus dalmassoi* (Loof, 1985)
Andrassy, 1988
(Figs 1, 2)**

MEASUREMENTS

See Table 1.

DESCRIPTION

Female: Very large and slender nematodes, 4.0-5.6 mm long. Body cylindrical, tapering towards both extremities but more so towards the posterior end. Habitus variable after fixation, more curved ventrad in the posterior body region. Outer cuticle layer thin throughout the body and with very fine transverse striations. Inner cuticle layer wider than the outer one and somewhat thickened on tail. Lateral chord occupying one-third of the midbody diameter, its margins irregular at level of the vagina. Lateral pores obscure. Lip region rounded, continuous with body or offset by a very weak depression, 2.0-2.3 times as wide as high and about one-fourth of the body diameter at neck base. Labial and cephalic papillae well visible but hardly noticeable on the head outline. Cheilostoma cylindrical, 2.7 times as long as wide; its walls somewhat thickened and weakly sclerotized in the perioral area. Odontostyle rather short, as long (0.9-1.0 times) as the lip region width, and 6-7 times as long as wide; aperture about two-fifths (42-43%) of the total neck length. Odontophore rod-like, a little longer than the odontostyle. Guiding ring apparently double. Pharynx consisting of a slender but muscular anterior part expanding gradually into the basal bulb. Pharyngeal bulb cylindrical, 12-14 times as long as wide and occupying about two-fifths of the body diameter at neck base and 49-58% of the total neck length. Pharyngeal gland nuclei and outlets often well visible in the four specimens examined: DO = 49-52%, S₁N =

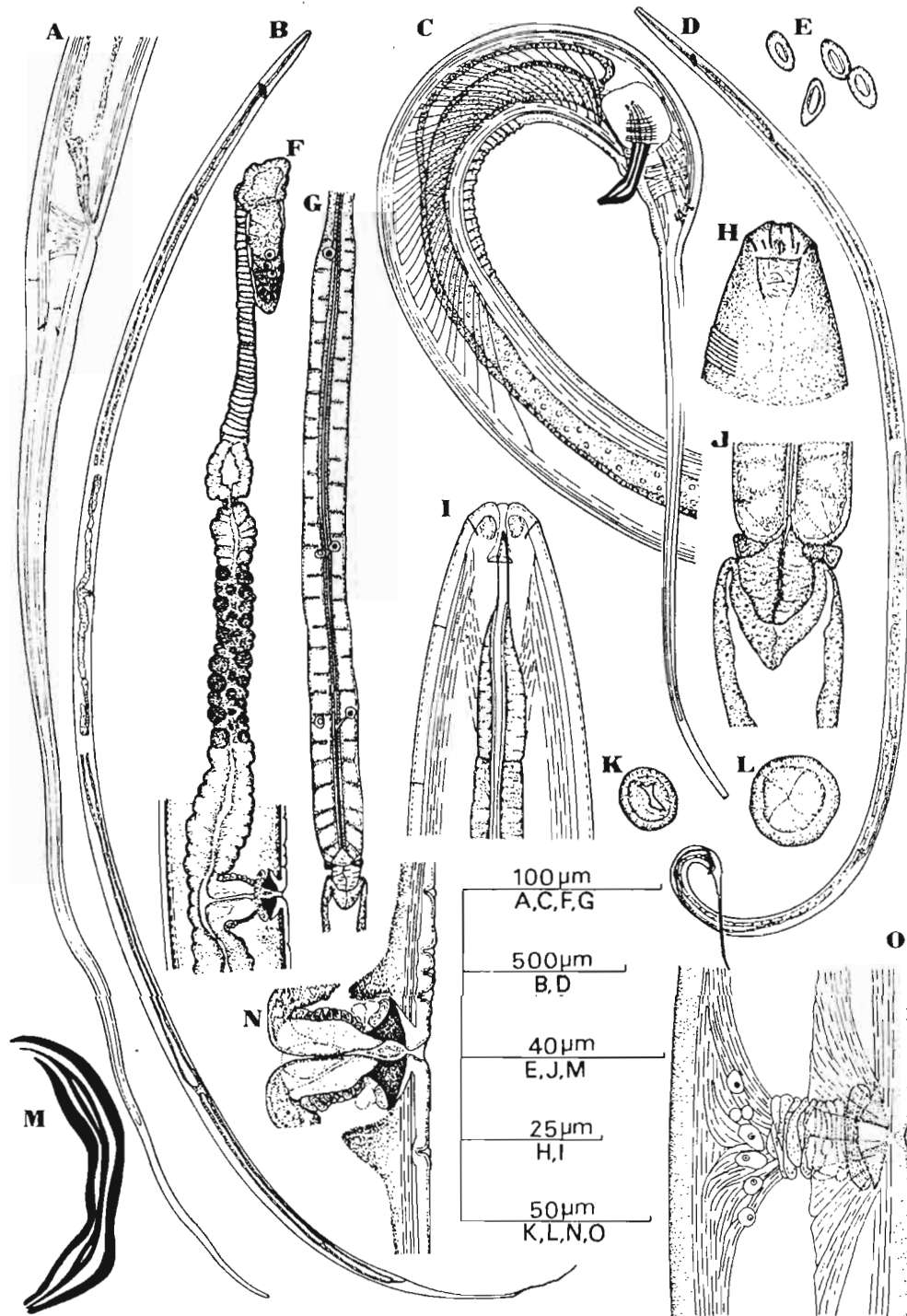


Fig. 1. *Protodorylaimus dalmassoi* (Loof, 1985) Andrassy, 1988. A: Female tail; B: Entire female; C: Male posterior body region; D: Entire male; E: Spermatozoa; F: Female anterior genital branch; G: Pharyngeal bulb; H: Lip region in surface view; I: Same in median view; J: Pharyngeal bulb base and cardia; K: Vulva in ventral view; L: Vagina in ventral view; M: Spicule; N: Vagina in lateral view; O: Same in submedian lateral view.

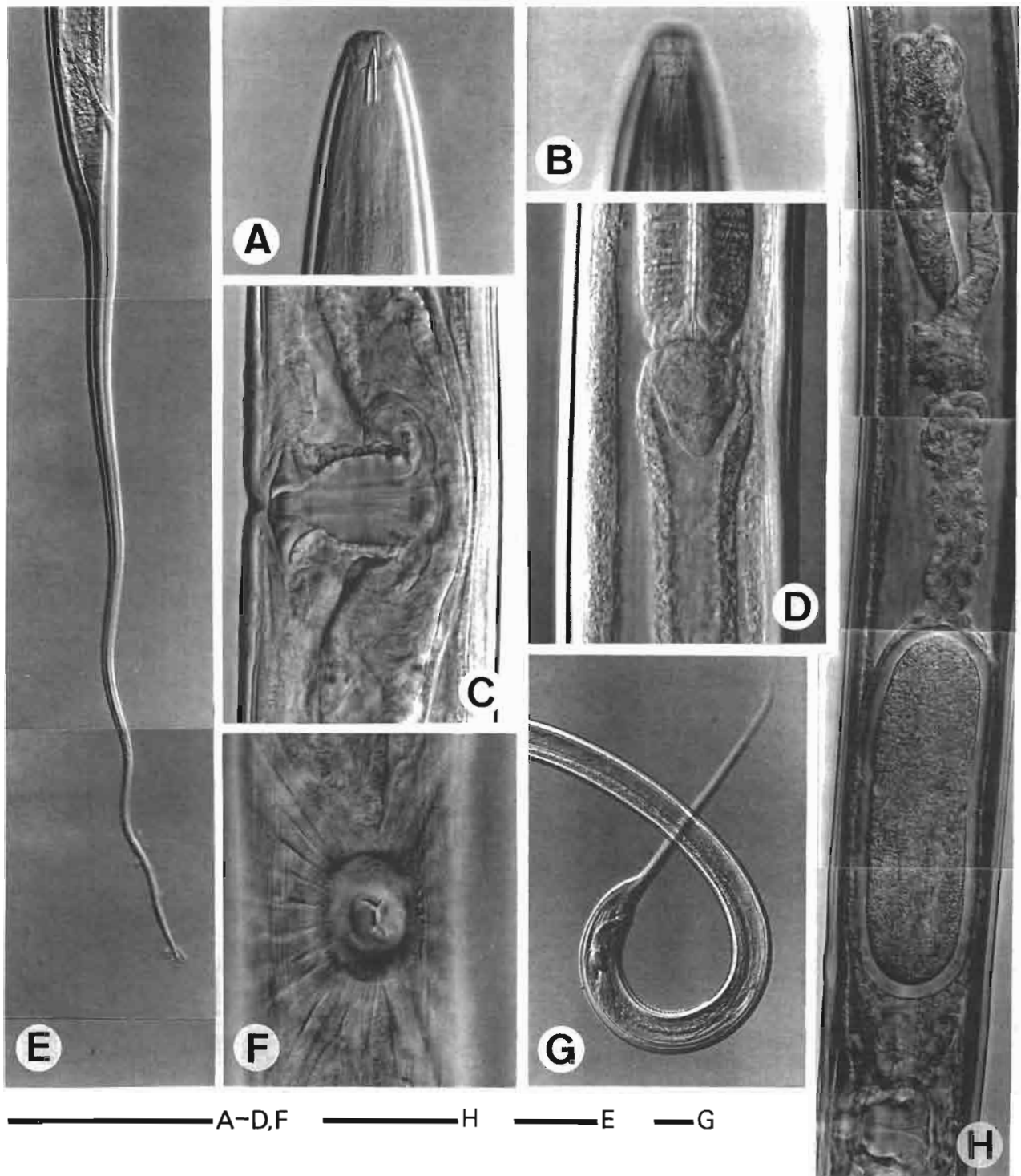


Fig. 2. *Protodorylaimus dalmassoi* (Loof, 1985) Andrassy, 1988. A: Lip region in median view; B: Same in surface view; C: Vagina; D: Cardia; E: Female tail; F: Vulva in ventral view; G: Male posterior body region; H: Female anterior genital branch (Scale bars: 50 μ m).

Table 1. Measurements and diagnostic features of *Protodorylaimus dalmassoi* (Loof, 1985) Andrassy, 1988 (All measurements in μm except L in mm).

	Vejo stream Vega de Liébana Cantabria, Spain	Yeguas river Cardena Córdoba, Spain		Valdeseñor stream Saldaña Palencia, Spain (Jiménez Guirado, 1990)	Pasture Bois de Vergnes France (Loof, 1985)		
	Female	Female	Male	Female	Female (Holotype)	Female	Males
n	10	4	1	2	1	4	2
L	4.9±0.4 (3.9-5.5)	(4.3-5.4)	4.1	(5.01-5.04)	4.7	(4.03-4.7)	4.5, 4.7
a	82.4±7.8 (69.5-92.7)	(58.3-74.5)	68.6	(70.4-72.5)	80.0	(73.0-81.0)	65.0, 80.0
b	7.9±0.4 (6.9-8.5)	(7.0-8.8)	7.1	(7.7-7.8)	7.9	(6.8-7.9)	7.8, 8.1
c	9.5±0.7 (8.6-11.4)	(7.0-9.7)	12.6	(7.5-8.0)	9.4	(9.4-14.1)	10.8, 13.9
c'	14.7±1.3 (11.7-16.1)	(11.3-17.6)	9.8	(15.3-16.8)	14.3	(12.2-14.3)	8.5, 10.1
V	40.2±1.8 (38.0-43.4)	(34.6-38.0)	-	(35.7-36.6)	38.0	(38.0-41.0)	-
G1/T1	8.3±0.5 (7.9-9.6)	(10.0-13.0)	?	9.7			
G2/T2	9.2±0.4 (8.7-10.1)	(11.0-13.9)	?	11.0			
Lip region:							
- diam.	(10.5-14.5)	15.0	12.5	15.0			
- height	(4.0-5.5)	?	4.0				
Amphid aperture	(6.3-8.4)	?	8.0				
Odontostyle	13.8±0.6 (11.5-13.5)	(12.5-13.5)	2.1	(13.5-14.5)	12.0	(11.0-12.0)	11.0, 12.0
Odontophore	15.7±1.5 (13.0-18.0)	?	14.0	?	14.0	(13.0-15.0)	14.0
Guiding ring	(8.0-10.5)	?	9.0	?			
Nerve ring-ant. end	184±8.3 (174-203)	?	149	?			
Neck length	601±30.6 (551-640)	?	561	?			
Pharyngeal bulb length	315±24.5 (273-353)	?	346	?			
Cardia: width	(12.0-17.0)	?	?	?			
length	(8.0-19.5)	?	?	?			

End of Table 1 next page.

Table 1. (continued)

Cuticle: head	(2.0-3.5)	(2.5-3.5)	3.5	2.5		
- midbody	(2.0-5.0)	?	3.5	?		
- anus	(3.0-7.5)	?	4.0	?		
Body diam.: neck base	(54.0-64.0)	?	?	?		
- midbody	(55.0-71.0)	?	60.0	?		
- anus	36.0	(40.0-42.0)	33.5	(17.5-18.0)		
Lateral chord	(11.0-24.0)	?	14.5	?		
Ant. ovary/testes	99.9±16.5 (74.0-123)	?	?	?		
Ant. genital branch	368±89.2 (138-440)	?	?	?		
Post. ovary/testes	98.2±19.1 (77.0-129)	?	?	?		
Post. genital branch	388±89.6 (368-486)	?	?	?		
Vagina: length	(29.0-40.5)	?	-	?		
Vulva-ant. end	1986±167 (1628-2202)	(954-1494)	-	(1788-1844)		
Prerectum	867±118 (648-1063)	(691-815)	918	(716-740)		
Rectum/cloaca	43.0±2.5 (38.0-46.0)	(34.5-39.7)	46.5	(40.0-41.0)		
Tail	520±52.6 (411-574)	(450-736)	327	(625-664)	504	317, 442
Spicules	-	-	73.5	-	-	76.0, 78.0
Lat. guid. piece	-	-	13.5	-	-	
Ventr. suppl	-	-	20	-	-	21, 22
Spermatozoa	-	-	9.0	-	-	
Tail hyal. part	(92.0-145)	?	?	?		

73-77%, S₂N = 86-88%, DO-S₁N = 23-27%, DO-S₂N = 34-38%; S₁N-S₂N = 11-14%. Nerve ring located at one-third (29-33%) of the total neck length. Junction between pharyngeal bulb and cardia surrounded by a weak ring-like structure surrounding the bulb base. Cardia rounded conoid, as long as wide; intestine tissue involving it somewhat behind the base of the pharyngeal bulb and forming a rounded-conoid to conoid extension 12-16 µm long (combined length with the cardia 22-30 µm) projecting into the intestine lumen. Three to five separated cell masses (probably pseudocoelomocytes) well visible at different sites along the body. Genital system didelphic-amphidelphic. Ovaries relatively short, not reaching the oviduct-uterus junction; oocytes not very numerous, first in two rows, then in a single row. Oviduct joining the ovary subterminally and consisting of a slender part with prismatic cells and a moderately developed *pars*

dilatata. Conspicuous sphincter present between oviduct and uterus. Uterus a relatively wide tube, 2.8-4.1 times the corresponding body diameter long; its portion adjacent to the sphincter somewhat dilated (*pars dilatata uteri*), followed by an intermediate portion with a rather creased wall and narrow lumen, and by distal portion with less creased wall and clear lumen. Vagina extending inwards 2/3 - 3/4 of the corresponding body diameter; *pars distalis vaginae* 18-22 × 24-30 µm or 1.3-1.4 times as long as wide; its walls slightly sigmoid, convergent proximally and divergent distally, and surrounded by weak musculature; *pars refringens vaginae* with two well separated peculiar-shaped (triangular) sclerotizations measuring 6 × 8 µm and with a combined width of 26-28 µm; *pars proximalis vaginae* 6 µm long. Several cells visible in submedian view in subdorsal position at level of the vagina. Vulva longitudinal. Cuticle with abundant irregularities near the

vulva. Uterine egg $44 \times 140 \mu\text{m}$ (3.2 times as long as wide). Prerectum very long, 22.5-24 times the anal body diameter. Rectum a little longer (1.2-1.3 times) than the anal body diameter. Tail long, filiform, tapering first rather abruptly and then very gradually to the finely rounded tip; hyaline terminal part 88-92 μm . Two pairs of caudal pores, one subdorsal, the other lateral.

Male: General morphology similar to female but with posterior part of the body strongly curved ventrad and odontostyle slightly longer (1.2 times) than the lip region diameter. Prerectum 27.1 anal body diameters long. Genital system diorchic with opposed testes. In addition to the adanal pair, twenty contiguous ventromedian supplements present beginning outside the spicules range. Spicules protruding ($n=1$), somewhat curved ventrad and about 1.5 anal body diameter long. Lateral guiding pieces not observed. Tail and caudal pores as in female.

REMARKS

P. dalmassoi has been collected in two localities in northern Spain: Vejo stream, Vega de Liébana, Cantabria, and Valdeseñor stream, Saldaña, province of Palencia; and one site in southern Spain: Yeguas river, Cardena, province of Córdoba.

The material studied is very similar to the type population, with only small differences (odontostyle slightly longer, irregularities of the cuticle near the vulva) which are interpreted as intraspecific variability.

Loof (1985) described this species and recently (1996) included it in the species list of *Prodorylaimus*. This genus, as understood by Loof (1996), is quite heterogeneous and it certainly includes several morphological patterns whose evolutionary origin could not possibly be a very recent common ancestor. In this sense, it seems evident that *P. dalmassoi* is an atypical species within the genus: its very slender body, peculiar lip region (resembling other taxa as *Dorylaimoides* or some leptonchid and belondirid

genera), very short odontostyle, and excessively long prerectum constitute a series of peculiar traits which could well belong to one of those morphological patterns. On the other hand, *P. dalmassoi* shares (cf. Jiménez Guirado, 1990) some important features with species of *Oxydiroides* (very slender body, shape of the lip region, short odontostyle), but it differs from them in other characters with higher taxonomic value (longer pharyngeal bulb, heavily sclerotized vagina, very long prerectum, and male supplements numerous and contiguous). In our opinion, *P. dalmassoi* represents a morphological pattern well differentiated from the species of both *Prodorylaimus* and *Oxydiroides* and it must be classified in a separate genus. Therefore, we support Andrassy's (1988) proposal of the new genus *Protodorylaimus* to accommodate this species (as type species of the genus) together with *Protodorylaimus kazakhstanicus* (Sagitov, 1973) Andrassy, 1988.

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