

NEMATODES OF THE ORDER DORYLAIMIDA FROM ANDALUCÍA ORIENTAL, SPAIN. THE GENUS *MESODORYLAIMUS* ANDRÁSSY, 1959. IV. TWO RELATIVELY SMALL SIZED NEW SPECIES WITH A COMPENDIUM OF THEIR RELATIVES

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Abstract.— Two new species of the genus *Mesodorylaimus* Andrassy, 1959 are described from natural areas from southeastern Spain. *M. brzeskii* sp. nov. is distinguished by its body 1.14–1.44 mm long, quite thin cuticle, lip region continuous or offset by weak depression, odontostyle 11–13 μm or 0.9–1.2 times as long as the lip region width, pharyngeal bulb 79–105 μm long, $V = 50$ –55, uterus 70.4 (55–87) μm or 2.1 (1.8–2.4) body diameters long, female tail first tapering abruptly and then gradually (53–80 μm , $c = 16$ –28, $c' = 2.4$ –4.1) with its slender portion usually dorsad bent, male tail rounded conoid (18–22 μm , $c = 58$ –65, $c' = 0.7$ –0.9), spicules 33–38 μm long and 7–8 (rarely 9) regularly spaced ventromedian supplements. *M. malacitanus* sp. nov. is characterized by having body 1.00–1.39 mm long, lip region slightly angular and offset by depression, odontostyle 11–13 μm long or almost equal to the lip region width, pharyngeal bulb 109–132 μm , junction between pharyngeal bulb and cardia with a weak ring-like structure, $V = 48.5$ –56.1, peculiar morphology of the vagina-vulva area (vulva preceded of a funnel-like cavity; pars proximalis vaginae involved by developed musculature, pars refringens vaginae with two somewhat separated sclerotizations), uterus 49 (39–71) μm or 1.3 (0.9–1.9) times as long as the corresponding body width, female tail elongated (80–126 μm , $c = 9.5$ –16.9, $c' = 3.2$ –5.1), and males unknown. A compendium of their relatives and comparison of the new species with them are also provided.



Key words.— Description, *Mesodorylaimus*, new species, southeastern Spain, taxonomy.

INTRODUCTION

A general nematological survey carried out mainly in natural areas of southeastern Spain yield huge number of *Mesodorylaimus* specimens. Several populations were initially identified as belonging to *M. bastiani* (Bütschli, 1873) Andrassy, 1959 although they displayed smaller general size. Taking into consideration the new diagnosis of *M. bastiani* recently proposed (see Peña Santiago et al., in press) those populations can be separated from this species. On the other hand, populations can be divided in two groups showing small but reliable differences. In this fifth paper of the series on *Mesodorylaimus* species of Andalucía Oriental two new specific taxa are proposed to classify these two groups of populations.

We refer to Abolafia and Peña Santiago (1996) for methods used and additional information. Description of the vagina is made according to De Ley et al. (1993).

DESCRIPTIONS

Mesodorylaimus brzeskii sp. nov.
(Fig. 1)

Measurements. See Table 1.

Female. Slender to very slender nematodes, 1.14–1.44 mm long. Body cylindrical, tapering towards both extremities but more so towards the posterior end. Habitus after fixation almost straight or somewhat ventrad curved. Outer cuticle layer thin throughout the body and with fine transverse striations which are very clear in some specimens and less distinct in others. Inner cuticle layer quite thin too, little wider than the outer layer along the entire body except at level of caudal region where it becomes more thickened. Lateral chord occupying one-fourth to two-fifths (27–41%) of the midbody width. Lateral pores obscure. Lip region slightly angular, sometimes more rounded, almost continuous with the adjacent body or offset by weak depression; it is 1.8–2.4 times as wide as high and about one-third as wide as the body diameter at neck base. Lips amalgamated, with slightly angular or rounded contour. Labial and cephalic papillae in general well visible, with clear innervation. Amphid fovea cup-shaped, opening at level of the cephalic depression and occupying one-third to two-fifths of the corresponding body width. Cheilostoma a truncate cone, three to four times as long as wide. Odontostyle typical of the genus, 0.9–1.2 times as long as

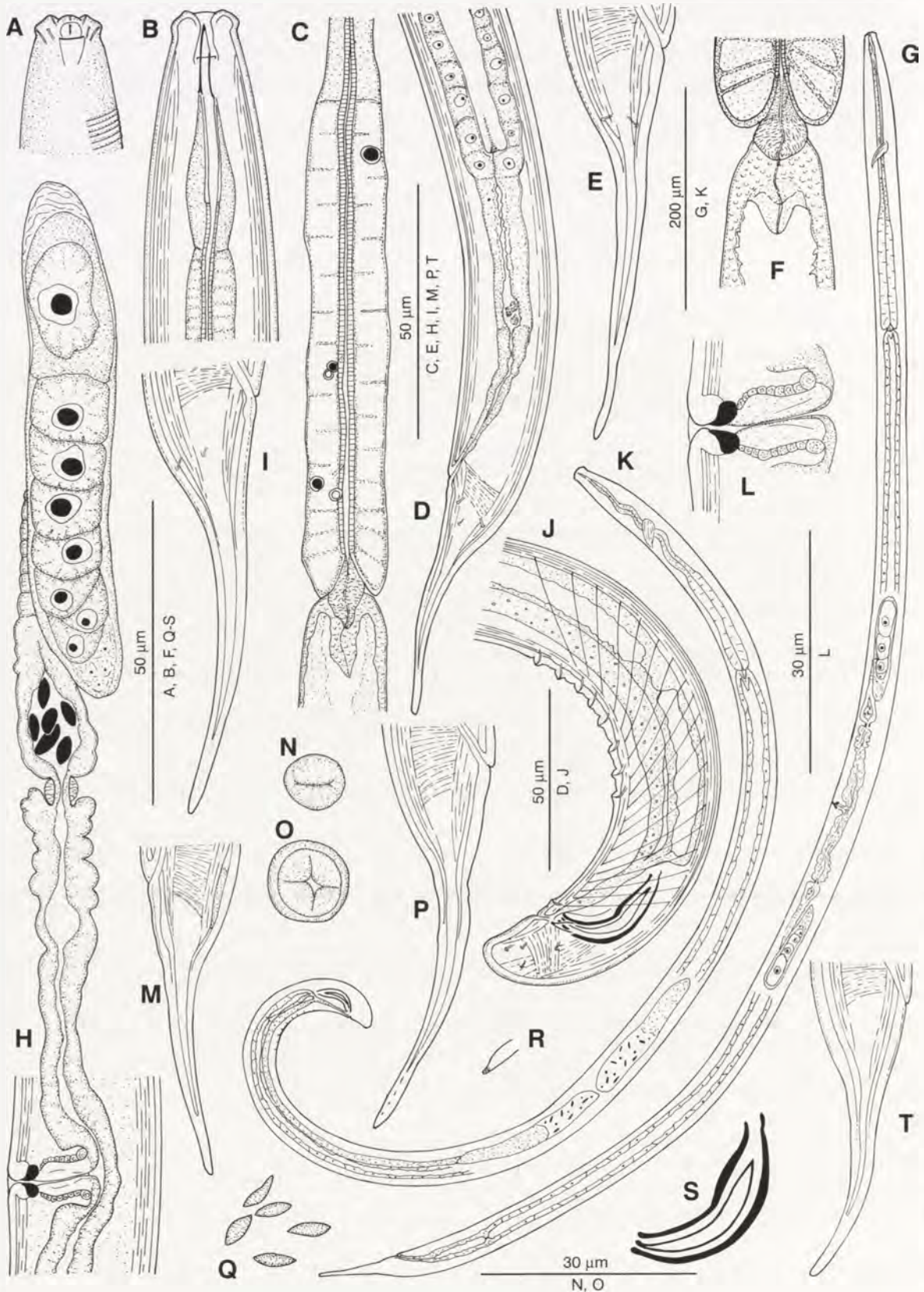


Figure 1. *Mesodorylaimus brzeskii* sp. nov. A: Lip region in surface lateral view. B: Anterior region in lateral median view. C: Pharyngeal bulb and cardia. D: Female posterior body region. E, I, M, P and T: Female tail. F: Cardia. G: Female anterior genital branch. H: Female anterior genital branch. J: Male posterior body region. K: Male entire. L: Vulva and vagina in lateral view. N: Vulva in frontal view. O: Vagina in frontal view. Q: Sperm. R: Lateral guiding pieces. S: Spicule.

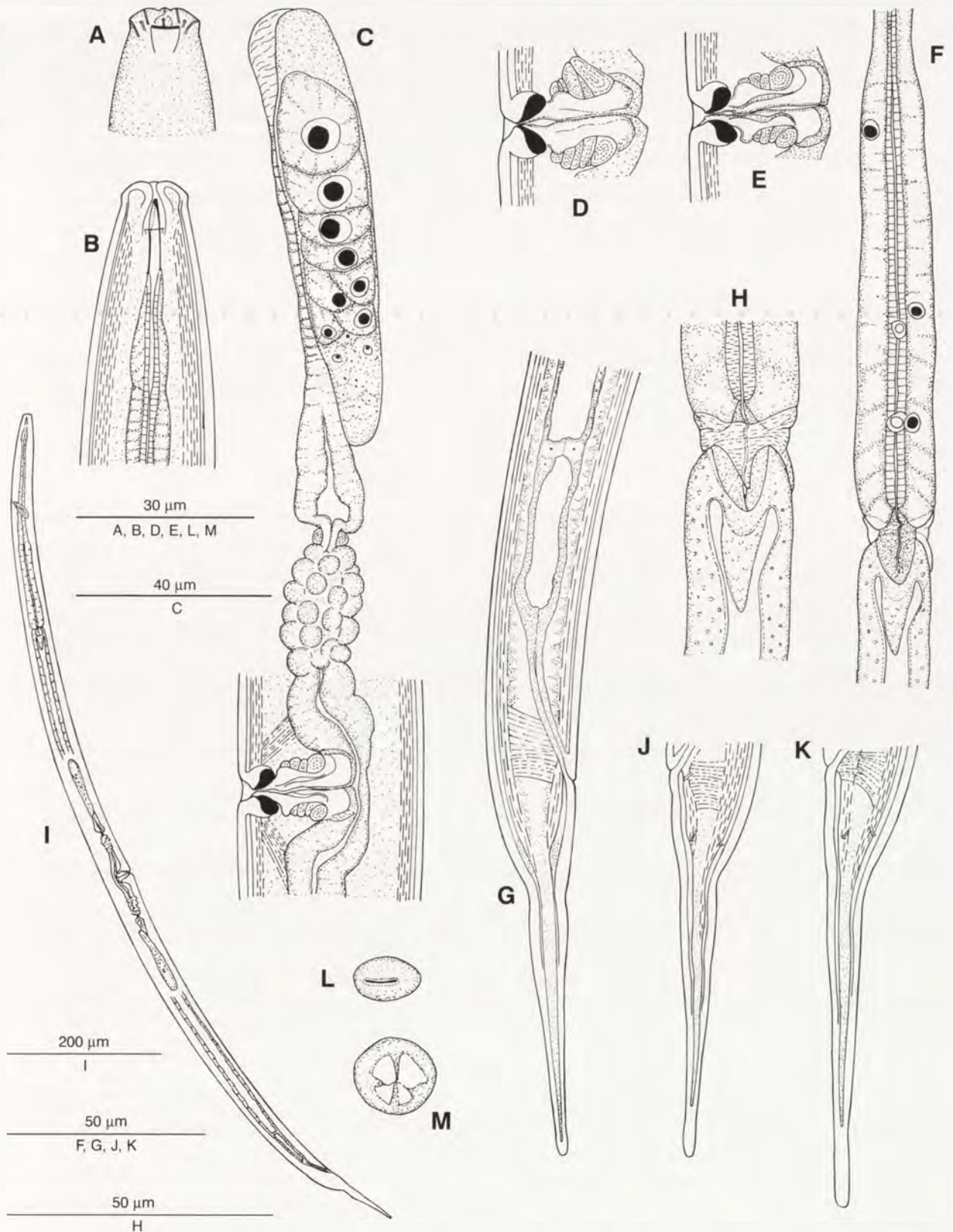


Figure 2. *Mesodorylaimus malacitanus* sp. nov. (female). A: Lip region in surface lateral view. B: Anterior region in lateral median view. C: Anterior genital branch. D and E: Vulva and vagina in lateral view. F: Pharyngeal bulb and cardia. G: Posterior body region. H: Cardia. I: Entire body. J and K: Tail. L: Vulva in frontal view. M: Vagina in frontal view.

Table 1. Measurements and diagnostic features of *Mesodorylaimus brzeskii* sp. nov. and *M. malacitanus* sp. nov. (all measurements in μm except L in mm).

Habitat Locality Province	<i>M. brzeskii</i>			<i>M. malacitanus</i>			
	Stream bank Los Genoveses Almería			<i>Eucalyptus</i> tree Road Alfarnatejo-El Colmenar Málaga		Almond tree Vélez-Málaga Málaga	Vineyard Vados Málaga
n	Holotype	Paratypes 17 ♀ ♀	Paratypes 8 ♂ ♂	Holotype	Paratypes 11 ♀ ♀	3 ♀ ♀	♀
L	1.38	1.32±0.11 (1.14-1.44)	1.23±0.07 (1.1-1.4)	1.18	1.30±0.06 (1.20-1.39)	1.23±0.07 (1.14-1.32)	1.07
a	46.2	38.2±2.4 (34.5-43.4)	38.4±1.7 (34.7-40.4)	31.0	32.7±2.4 (29.1-37.4)	33.0±3.1 (28.8-36.1)	29.0
b	5.2	5.2±0.3 (4.7-5.9)	5.0±0.2 (4.7-5.3)	?	4.6±0.2 (4.1-5.1)	4.2±0.2 (3.9-4.5)	?
c	17.3	19.5±3.4 (14.5-27.5)	62.1±2.3 (58.3-65.3)	11.8	13.7±1.8 (10.6-16.9)	9.5, 11.7	13.0
V(%)	50.5	50.5±8.5 (49.6-54.6)	–	53.8	52.5±1.9 (48.5-56.1)	52.7±0.5 (52.0-53.2)	53.4
G1/T1	14.2	14.9±1.0 (13.4-16.7)	58.9±5.5 (52.4-71.8)	13.2	13.9±1.3 (11.4-15.5)	13.6±0.7 (12.7-14.5)	11.4
G2/T2	10.4	15.2±1.5 (13.2-17.9)	34.7±3.9 (28.8-40.7)	13.7	12.7±0.7 (11.6-14.0)	13.1±0.9 (11.8-14.1)	10.9
c'	3.9	3.2±0.5 (2.4-4.1)	0.8±0.1 (0.7-0.9)	4.2	4.0±0.6 (3.2-5.3)	4.5, 5.1	3.8
Lip region: width	11	(10-12)	(11-12)	11.5	(11.5-12)	(11.5-12)	11
height	5	(5-6)	(4-5)	4.5	(3-5)	5	5
Amphid aperture	5	5	5	7.5	(5.5-7.5)	(5-6.5)	6.5
Odontostyle	11.5	12.0±0.7 (11-13)	11.5±0.4 (11-12)	13	12.5±0.2 (12-13)	11.8±0.2 (11.5-12)	12
Odontophore	20.5	21.4±2.3 (17-23.5)	18.8±0.9 (17.5-19.5)	?	?	?	?
Guiding ring	8	(8-9.5)	8	8	8	(6.5-8)	8
Nerve ring-ant. end	105	99.0±4.5 (93.5-110)	96.2±5.3 (87-102)	?	108±4.7 (102-118)	103±4.4 (99.5-110)	?
Neck length	266	248±16.4 (213-280)	244±13.6 (226-264)	280	284±14.3 (260-306)	290, 293	?
Pharyngeal bulb length	105	93.6±8.1 (79-105)	92.4±2.2 (90-96.5)	122	120±3.5 (115-128)	110, 118	112
Cardia: width	6	(5-8)	(7-10)	11	(8-12.5)	(8-11)	7
length	14	(6.5-17)	(6.5-14)	12.5	(9.5-20.5)	(11-14)	17.5
Cuticle: head	1.5	(1-1.5)	(1-1.5)	1.5	1.5	1.5	1.5
midbody	1.5	(1-1.5)	(1-1.5)	1.5	1.5	1.5	1.5
tail	2	(1.5-2)	(1.5-2)	2.5	(2-3)	(2-2.5)	2.5
Body width: neck base	30	(27-34.5)	(28.5-33)	35.5	(34-41)	(33-37)	34.5
midbody	30	(31.5-38)	(28-34.5)	38	(36.5-44)	(36.5-39.5)	37.0
anus	20.5	(18-23.5)	(22-26)	23.5	(22-27)	23.5	22.0
Lateral chord	9.5	(9.5-14)	(8-12)	7.5	(7.5-12.5)	(8-12.5)	11.5
Anterior ovary/testis	115	93.9±25.1 (50.5-129)	158±42.4 (120-244)	76	101±28.1 (71-170)	86.1±18.3 (71-112)	47.5
Anterior genital branch	197	194±18.7 (153-225)	729±109 (594-982)	156	182±19.6 (153-210)	168±16.7 (145-181)	132
Posterior ovary/testis	107	112±29.5 (71-183)	140±30.6 (82-182)	96.5	99.5±17.4 (72.5-139)	98.6±29.2 (77-140)	53
Posterior genital branch	145	199±24.4 (154-232)	430±69.0 (335-556)	162	166±11.8 (156-192)	163±9.8 (156-177)	117
Vagina: width	10	(9.5-12.5)	–	12	(9.5-15.5)	(10-13.5)	14
length	17.5	(15.5-19)	–	20.5	(19-22)	(17.5-20.5)	20.5
Vulva-ant.end	700	667±50.5 (566-746)	–	636	684±44.6 (613-760)	663±39.9 (610-706)	573
Prerectum	47.5	48.0±7.3 (36.5-63)	65.2±14.9 (50.5-87.5)	?	72.7±17.4 (49-94.5)	72.6±16.4 (51.5-91.5)	60.5
Rectum/Cloaca	34.5	29.5±9.4 (23.5-36.5)	11.2±0.8 (9.5-12)	39.5	38.7±2.3 (34.5-42.5)	38.6±2.3 (35.5-41)	33
Tail	80	67.4±11.1 (53.5-80)	19.8±1.1 (18-22)	100	96.3±13.5 (80-126)	98, 120	83
Spicules	–	–	(33-36.5)				
Lateral guiding piece	–	–	(8-11)				
Spermatozoa	–	–	(7-9)				
Ventr.suppl.	–	–	(10-12)				

<i>M. malacitanus</i>						
Brushwood Road Archidona-Villanueva del Trabuco Málaga	Orange tree El Trapiche Málaga	Brushwood San Pedro de Alcántara Málaga	Several Yunquera Málaga	<i>Nerium oleander</i> Yunquera-El Burgo Málaga	Pine Casarabonela-Ardales Málaga	Range
2 ♀ ♀	♀	14 ♀ ♀	5 ♀ ♀	♀	2 ♀ ♀	41 ♀ ♀
1.24, 1.31	1.35, 1.38	1.19±0.10 (1.00-1.36)	(1.07-1.39)	1.22	1.26, 1.44	1.00-1.44
34.1, 34.5	34.2, 31.5	32.8±3.2 (27.1-37.2)	(31.0-36.6)	33.4	30.7, 36.6	27.1-37.4
4.3, 4.4	4.5, 4.6	4.2±0.3 (3.7-4.6)	(3.9-5.2)	4.4	4.0, 4.7	3.7-5.2
11.7, 16.4	13.5, 13.0	12.7±1.2 (11.4-15.4)	(8.9-11.9)	13.0	12.6, 13.3	8.9-16.9
48.2, 53.5	54.1, 51.9	54.0±2.1 (51.3-60.8)	(52.2-54.8)	54.6	52.0, 52.3	48.2-60.8
11.7, 14.4	13.8, 11.9	15.1±2.1 (12.1-19.7)	(14.5-19.3)	15.9	11.2, 16.8	11.2-19.7
10.6, 13.4	11.1, 12.5	14.2±2.0 (11.9-18.9)	(10.4-16.8)	13.8	13.0, 17.6	10.6-18.9
3.2, 4.5	4.0, 4.1	4.2±0.3 (3.7-4.8)	(4.2-5.7)	4.2	4.2, 4.9	3.2-5.7
12 5	12, 11 5, 4.5	(10.5-11) 4.5	(10.5, 11) 4.5	11 4.5	12 4.5	10.5-12 3-5
5.5, 6	6.5, 4.5	(5.5-7.5)	5.5	7	5.5	5.5-7.5
11, 12	12, 11.5	12±0.3 (11-12.5)	(11-12)	12	12.5	11-13
?	15.5	9.5, 16	(12.5-14)	18	17.5	9.5-16
8, 11	8, 8.5	(6.5-8.5)	(6.5-8)	7.5	7, 8	6.5-11
113, 115	115, 110	116±9.9 (99.5-140)	(96.5-107)	99.5	118	96.5-140
286, 293	300, 300	287±14.2 (273-306)	(266-273)	273	306, 313	260-313
120, 128	126, 126	117±7.4 (109-132)	(105-143)	112	126, 145	105-145
9.5 11, 12	8.5, 11 15.5, 24.5	(5.5-11) (5.5-19)	(6.5-9.5) (8-9.5)	9.5 9.5	8, 12.5 16	5.5-12.5 5.5-20.5
1.5 1.5 2.5, 3	1.5, 1.5 1.5, 1.5 3, 3	1.5 1.5 (2-3)	1.5 1.5 2	1.5 1.5 2.5	1.5 1.5 2	1.5 1.5 2-3
35.5, 36.5 36.5, 38 23.5, 25	36.5, 39.5 39.5, 44.0 25.0, 26.0	(30-35.5) (32-39.5) (21-24)	(31-34.5) (33-38) (21-22)	34 36.5 22	36.5, 38 39.5, 41 22, 23.5	30-41 32-44 21-27
10, 12.5	11, 15.5	(9.5-20.5)	(12.5-13)	13.5	10, 12.5	7.5-20.5
59, 74.5	98, 107	109±38.4 (85-170)	(123-151)	128	104, 131	47.5-170
147, 189	188, 165	175±46.8 (143-229)	(165-270)	194	142, 244	132-270
50.5, 73.5	96.5, 104	108±37.1 (72.5-189)	(82-150)	132	134, 139	50.5-189
132, 177	151, 173	171±34.2 (127-237)	(118-235)	169	164, 255	117-255
11, 14 20.5	12.0, 12.0 22.0, 23.5	(12-20.5) (17.5-20.5)	(12.5-20.5) (16-18)	12.5 22	12.5, 14 22	9.5-20.5 16-22
633, 667	733, 720	656±41.2 (607-726)	(560-740)	667	660, 753	560-760
44, 85	66.5, 72.5	74.5±17.4 (50.5-120)	(58.5-74)	50.5	63, 74	49-120
38.5, 42.5	45.5, 39.5	37.3±4.3 (27-43.5)	(27-38)	42.5	39.5, 41	27-43.5
80, 106	100, 106	95.5±8.9 (80-106)	(93-120)	93.5	100, 109	80-126

the lip region width, seven to eight times as long as wide, and wider than the cuticle at its level; aperture one-third to half of the total length. Guiding ring simple, well visible. Odontophore rod-like, about 1.5 times as long as the odontostyle but its precise length is difficult to measure in most specimens examined. The pharynx consists of a slender but muscular anterior part which expands very gradually into the basal bulb. Pharyngeal bulb cylindrical, six to seven times as long as wide and occupying 35–40% of the total neck length and about four-sevenths of the body diameter at neck base. Pharyngeal gland nuclei observed only in four specimens: DN = 64–66%, S₁N = 81–83%, S₂N = 89–91%, DN-S₁N = 14–18%, DN-S₂N = 22–27%, S₁N-S₂N = 8–9%; their outlets undistinct. Nerve ring situated at 37–42% of the neck length. Cardia rounded to conoid, surrounded by intestinal tissue. Reproductive system didelphic-amphidelphic. Ovaries large, often reaching and surpassing the sphincter level; oocytes first in two rows, then in a single row. Oviduct consisting of a slender part with prismatic cells and a developed pars dilatata with clear lumen and with function of spermatheca since it often contains sperm. Sphincter present between oviduct and uterus. Uterus a wide tube 70.4±9.96 (55–87) µm or 2.1±0.23 (1.8–2.4) times as long as the corresponding body width (n = 7); its part adjacent to the oviduct of alveolar appearance and without visible lumen, other part a simple tube with clear lumen, sometimes containing sperm too. Vagina extending inwards half to three-fifths (52–60%) of the corresponding body width. Pars proximalis vaginae 7–8 × 10–12 µm, 1.5–1.7 times as long as wide and with somewhat sigmoid walls, surrounded by moderately developed musculature. Pars refringens vaginae with two very close trapezoid or drop-shaped sclerotizations measuring 2.5 × 4 µm and with a combined width of 6–8 µm. Pars distalis vaginae 3.5–4 µm long. Vulva a transverse slit. Uterine egg 27 × 81 µm, about three times as long as wide. Prerectum 1.5–3.2 anal body widths long. Rectum 1.0–1.5 anal body widths long. Tail elongated, first rapidly tapering, then gradually to a more or less acute or cylindrical terminal portion; dorsal side tapering more clearly than the ventral one which sometimes is almost straight; slender part of the tail almost always dorsad bent, seldom more straight; hyaline part less than one-fourth of the total length. Caudal pores two pairs: one subdorsal, another lateral or subventral.

Male. General morphology similar to female but with rounded tail and the posterior body region more ventrad curved. Genital system diorchic. Testes opossited. In addition to the adanal pair a series of seven or eight (nine in only one male) regularly separated (6–11 µm) ventromedian supplements situated out the spicules range. Spicules curved ventrad, 4.1–4.7 times as long as wide and 1.3–1.6 anal body widths long. Lateral guiding pieces quite stout, about three times as long as wide and with acute tip. Tail rounded conoid, dorsally convex, ventrally almost straight. Caudal pores as illustrated.

Diagnosis. The new species can be distinguished by its body 1.14–1.44 mm long, quite thin cuticle, lip region continuous or offset by weak depression, odontostyle 11–13

µm or 0.9–1.2 times as long as the lip region width, pharyngeal bulb 79–105 µm long, V = 50–55, uterus 70.4 (55–87) µm or 2.1 (1.8–2.4) body diameters long, female tail first tapering abruptly and then gradually (53–80 µm, c = 16–28, c' = 2.4–4.1) with dorsad bent slender portion, male tail rounded conoid (18–22 µm, c = 58–65, c' = 0.7–0.9), spicules 33–38 µm long and 7–8 (rarely 9) regularly spaced ventromedian supplements.

Relationships. The new species is very similar to *M. malacitanus* sp. nov. (see below) but it can be distinguished from this in its more slender body [body diameter 31–38 mm (n = 18; but only four females more than 34 µm) vs 34.5–43.0 (n = 39; only one female 32 µm)], shorter pharyngeal bulb (79–105 vs 109–132 µm), different morphology of the vulva-vagina region (vs vulva preceded of a distinct funnel-like depression, pars refringens vaginae with separated sclerotizations, and pars proximalis vaginae enveloped by a well developed musculature), longer uterus [2.1 (1.8–2.4) vs 1.3 (0.9–1.9) times as long as the corresponding body diameter], shorter female tail (53–80 vs 80–126 µm) with different shape (vs always straight), and presence of males (vs absence).

For separation of the new species from other close *Mesodorylaimus* species see a special epigraph below.

Type locality and habitat. Sandy volcanic soils near Genoveses Beach (close to the Mediterranean coast line), Cabo de Gata Natural Park, province of Almería, south-eastern Spain.

Type material. Twelve females (holotype and paratypes) and six males (paratypes) on slides 0274-0284 deposited in Departamento de Biología Animal, Universidad de Jaén, Spain. Three paratype females and two paratype males in Instituut voor Dierkunde, Rijksuniversiteit Gent, Belgium; and in USDANC, Beltsville, Maryland, USA.

Etymology. The species is dedicated to the memory of Prof. M. W. Brzeski for his significant contribution to our science.

Mesodorylaimus malacitanus sp. nov.

(Fig. 2)

Measurements. See Table 1.

Type population (twelve females from road Alfarnatejo-El Colmenar, province of Málaga).

Female. Slender nematodes, 1.18–1.39 mm long. Body cylindrical, tapering towards both extremities but more so towards the posterior end. Habitus after fixation quite variable, frequently ventrad curved, in general C- or J-shaped, seldom S-shaped. Outer cuticle layer thin along the entire body, with fine transverse striations more visible at level of head and tail. Inner cuticle layer wider than the outer layer, becoming thickened at the caudal region. Lateral chord one-fifth to one-fourth of the midbody width. Lateral pores obscure. Lip region slightly angular, offset by a more or less marked depression, 2.5–2.8 times as wide as high and about one-third of the body diameter at neck base. Lips amalgamated. Labial and cephalic papillae with clear innervation

and slightly protruding on head contour. Cheilostoma cylindrical or a truncate cone, three to four times as long as wide. Amphid fovea cup-shaped, opening at level of the cephalic depression and occupying one-third to two-fifths of the midbody width. Odontostyle typical of the genus, little longer (1.0–1.1 times) than the lip region width, five to six times as long as wide and almost as wide as the body cuticle at its level; aperture one-third to half of the total length. Odontophore rod-like, 1.5–1.6 times as long as the odontostyle. Guiding ring simple. Pharynx consisting of a slender but muscular anterior part which expands very gradually into the basal bulb. Pharyngeal bulb cylindrical, six to seven times as long as wide, occupying 39–45% of the total neck length, and about half of the body width at neck base. Pharyngeal gland nuclei observed in a few specimens, their outlets more obscure: DO = 60–63%; DN = 62–66%; S₁N = 81–83%; S₂N = 90–92%; DO-DN = 2–3%; DN-S₁N = 17–19%; DN-S₂N = 26–28%; S₁N-S₂N = 9%. Nerve ring situated at two-fifths (34–44%) of the total neck length. Cardia conoid to subcylindrical, 1.5–2.0 times as long as wide, and involved by intestinal tissue which forms a conical projection measuring (together with the cardia) 20–30 µm; a delicate ring-like structure is present between the pharyngeal bulb base and cardia. Reproductive system didelphic-amphidelphic. Ovaries of variable length, in general not reaching the oviduct-uterus junction but sometimes surpassing it; oocytes first in two rows, then in a single row. Oviduct with a slender part of prismatic cells and a well developed pars dilatata with scarce lumen. Sphincter separating oviduct and uterus. Uterus a relatively short tube, 49±9.2 (39–71) µm or 1.30±0.29 (0.9–1.9) times as long as the corresponding body diameter (n = 20), with wrinkled walls and scarce lumen, sometimes with alveolar aspect, and without sperm. Vagina extending inwards to three-fifths of the corresponding body width. Pars proximalis vaginae twice (8 × 16 µm) as long as wide, with straight or sigmoid walls, and enveloped by a well developed circular musculature. Pars refringens vaginae with two trapezoid to triangular more or less separated sclerotizations measuring 2.5–3.0 × 4.0–6.0 µm, and with a combined width of 10–12 µm. Pars distalis vaginae rather short, about 4 µm long. Vulva a transverse slit which is preceded by a funnel-like depression of the body surface. Prerectum 1.6–4.3 anal body widths long. Rectum relatively long, 1.5–1.7 anal body widths. Tail long, tapering first more quickly (mainly at the dorsal side), then gradually to a quite cylindrical and straight slender portion with more or less (in general well) rounded terminus; hyaline part 7–24 µm or 8–21% of the total length; a few specimens present a slightly swollen tail terminus, and one female shows a spine-like projection at the tail tip. Caudal pores two pairs: one subdorsal, another subventral.

Male. Unknown.

Other material examined (all localities of the province of Málaga):

1. Three females from Vélez-Málaga. With the vulva preceded by a shorter depression, and one female having longer tail (120 µm, c = 9.5, c' = 5.1).

2. One female from Vados. With the lip region somewhat asymmetrical, higher at the dorsal side.
3. Two females near road from Archidona-Villanueva del Trabuco: No difference with type population has been observed.
4. Two females from El Trapiche: No significant difference with type population.
5. Population (fourteen females) from San Pedro de Alcántara: A quite homogeneous group of specimens, being very similar to the type population but having little shorter body and slightly narrower lip region. One female containing an uterin egg 30 × 88 µm.
6. Five females from Yunquera area: With slightly more offset lip region and longer tail. One female containing an uterine egg 29 × 82 µm.
7. One female near road from Yunquera to El Burgo: Similar to type population.
8. Two females near road from Casarabonela to Ardales: Also similar to type population.

Diagnosis. The new species is characterized by having body 1.00–1.39 µm long, lip region slightly angular and offset by depression, odontostyle 11–13 mm long or almost equal to the lip region width, pharyngeal bulb 109–132 µm, junction between pharyngeal bulb and cardia with a weak ring-like structure, V = 48.5–56.1, peculiar morphology of the vagina-vulva structure (vulva preceded of a funnel-like cavity, pars proximalis vaginae involved by a developed musculature, pars refringens vaginae with two somewhat separated sclerotizations), uterus 49 (39–71) µm or 1.3 (0.9–1.9) times the corresponding body width, female tail elongated (80–126 µm, c = 9.5–16.9, c' = 3.2–5.1), and males unknown.

Relationships. The new species is very similar to *M. brzeskii* sp. nov. (see above) but it can be distinguished from this in having more stouter body [body diameter 34.5–43.0 (n = 39; only one female 32 µm) vs 31–38 µm (n = 18; but only four females more than 34 µm)], longer pharyngeal bulb (109–132 vs 79–105 µm), different morphology of the vulva-vagina region (vs vulva not preceded of a distinct funnel-like depression, pars refringens vaginae with close together sclerotizations, and pars proximalis vaginae enveloped by a moderately developed musculature), shorter uterus [1.3 (0.9–1.9) vs 2.1 (1.8–2.4) times as long as the corresponding body diameter], longer female tail (80–126 vs 53–80 µm) with different shape (vs almost always dorsad bent), and absence of males (vs presence).

For separation of the new species from other close *Mesodorylaimus* species see a special epigraph below.

Type locality and habitat. Near road from Alfarnatejo to Colmenera, province of Málaga; soil around roots of *Eucalyptus* sp.

Other localities and habitats. (All localities in province of Málaga.) **i)** Vélez-Málaga, in association with almond tree. **ii)** Vados, with vineyard. **iii)** San Pedro de Alcántara, with Mediterranean brushwood. **iv)** Near road Archidona-Villanueva del Trabuco, with Mediterranean brushwood. **v)** El Trapiche, with orange tree. **vi)** Yunquera area, with several wild plants. **vii)** Near road Yunquera-El

Table 2. Measurements and ratios of several *Mesodorylaimus* species close to the new species here described.

Species	N (f + m)	L	a	c	c'	V	odont.	ph. bulb %	tail	supp.	spicules	country	reference
<i>mesonyctius</i>	2 + 1	0.95-1.04	25-31	17-20 / 52	2.7-3.4	52-55	10.5-13	?	56, 53 / 18*	10	29	China	Kreis 1930
	1+1	1.1	23-25	18 / 50	2.5	51	?	?	61 / 22*	9	44*	USA	Thorne and Swanger 1936
	8 + 4	1.11-1.70	29-46	13-21 / 50-68	2.7	50-67	13.5-15	40-43	?	7-10	31-39	Hungary	Andrássy 1952
	12 + 6	1.02-1.56	29-37	13-41 / 56-65	1.4-5.0*	51-55	11-13	40	?	7-10	33-55	Venezuela	Loof 1964
	3 + 2	1.00-1.55	28-48	16-18 / 38-42	?	52-54	?	?	?	?	?	Italy	Vinciguerra 1972
	6 + 6	1.40-1.58	27-33	14-15 / 62-74	?	51-55	18	?	102-105/?	7-9	?	Italy	Vinciguerra and de Francisci 1973
	?	0.75-1.18	21-24.5	16.8-21	?	?	?	?	?	?	?	Soviet Union	Nesterov 1979
	38+22	0.85-1.23	24-33	8-25 / 41-74	3-8 / 0.7-1	50-56	10-13.5	37-46	42-127/15-22	9-12	38-49	South Africa	Basson and Heyns 1984
	2+ 0	1.12, 1.20	34, 30	25, 9	2.3, 6.2	54, 51	11	?	45, 131	–	–	South Africa	Heyns and Kruger 1983
?	0.8-1.2	23-33	15-20 / 45-70	3-5 / 1.2	50-56	10-16	?	?	9-12	?	Netherlands	Bongers 1988	
<i>nigritulus</i>	7+0	0.87-0.93	26-33	12-15	3.5-4.5	51-59	11-12	48*	62-78	–	–	Sumatra	Schneider 1937
<i>parasubulatus</i>	?	0.9-1.2	28-33	18 / 50-61	2.5	52			50 / 18-20*	8		Germany	Meyl 1954 **
<i>pendschikenticus</i>	?	1.2	22	12	4.0	49			100*			Uzbekistan	Tulaganov 1949 **
<i>usitatoides</i>	8 + 5	1.14-1.32	37-46	12-18 / 72-81	3.7-5.7	47-53	13-14	39-49	70-103/14-18	7-10	31-36	South Africa	de Bruin and Heyns 1992
<i>usitatus</i>	9 + 9	0.9-1.4	28-41	9-15 / 45-79	3.7-8.8	47-53	10-15	37-44	92-110/15-22	5-9	28-46	South Africa	Basson and Heyns 1984

* Calculated from drawings or other measurements.

** Data taken from literature (mainly Andrásy 1988) since original description was not available to the authors.

Burgo, with Nerium oleander. And viii) near road Casarabonela-Ardales, with pine.

Type material. Eight females (holotype and paratypes) on slides 0272–0273 deposited in Departamento de Biología Animal, Universidad de Jaén, Spain. Two paratype females in Instituut voor Dierkunde, Rijksuniversiteit Gent, Belgium; and in USDANC, Beltsville, Maryland, USA.

Etymology. The specific epithet refers to *Malaca*, Latin name of Málaga, Spanish province where the species was found.

RELATIONSHIPS OF THE TWO NEW SPECIES WITH THEIR RELATIVES

Several *Mesodorylaimus* species are close to the two new here described and altogether constitute a group of difficult taxonomy and separation. This group is formed by species sharing these features: body length under 1.4 mm, odontostyle under 13 μm long, female tail 60–120 μm long (and/or $c = 10\text{--}30$, $c' = 2.5\text{--}5.0$), and 7–10 separated ventromedian supplements. Then, the group is formed by *M. mesonyctius* (Kreis, 1930) Andrásy, 1959, *M. nigritulus* (Schneider, 1937) Andrásy, 1959, *M. parasubulatus* (Meyl, 1954) Andrásy, 1959, *M. pendschikenticus* (Tulaganov, 1949) Andrásy, 1959, *M. usitatoides* de Bruin et Heyns, 1992 and *M. usitatus* Basson et Heyns, 1974. A compendium of their main measurements and diagnostic features is presented in Table 2. This group of species is easily distinguished from *M. bastiani* and their relatives by its shorter body (vs almost always $L > 1.4$ mm) and odontostyle (vs > 13 μm). Relationships of *M. brzeskii* sp. nov. and *M. malacitanus* sp. nov. with them are:

1. *M. mesonyctius*. Some confusion exists on the identity of this species since it is questionable whether all data from literature really refer to only and the same taxon.

Comparison with original description by Kreis (1930) – although based only on two females and one male – shows some important differences with the two new species. **i) *M. brzeskii* sp. nov.** has longer (1.14–1.44 vs 0.95–1.04 mm) and more slender ($a = 35\text{--}43$ vs $a = 25\text{--}31$) body, fewer ventromedian supplements (7–9 vs 10), and longer spicules (33–38 vs 29 μm). **ii) *M. malacitanus* sp. nov.** has longer tail (80–126 μm , $c = 9.5\text{--}16.9$, $c' = 3.2\text{--}5.1$ vs 53, 56 μm , $c = 17$, 20, $c' = 2.7$, 3.4 respectively) and absence of males (vs presence) with females not containing sperm. These differences are small but reliable, justifying the proposal of new taxa.

Material described by Andrásy (1952) from Hungary certainly is not (at least in part) identical to *M. mesonyctius* since odontostyle is 13.5–15.0 μm long.

Specimens described by Loof (1964) from Venezuela show wide variability affecting body length ($L = 1.02\text{--}1.56$ mm), female tail morphology and length ($c = 13\text{--}41$, $c' = 1.4\text{--}5.0$ calculated from figures), and spicules length (33–55 μm). Because specimens were collected in several (six) localities, it is possible that two or more species are represented in this material, one of them being *M. mesonyctius*; so, comparison with Spanish new species is difficult.

However, **i) *M. brzeskii* sp. nov.** has more slender female body ($a = 35\text{--}43$ vs $a = 29\text{--}35$), and female tail almost always bent dorsad (vs practically straight); and **ii) *M. malacitanus* sp. nov.** has cylindrical female tail (vs “the tip usually tapering and subacute”), and males unknown with females not containing sperm (vs male known and “uteri in most specimens filled with spermatozoa”);

Italian specimens described by Vinciguerra (1972) could belong to more than one species due to the very wide range of body length ($L = 1.00\text{--}1.55$ mm) and width ($a = 28\text{--}48$, three females and two males). Two additional females also collected from Italy by Vinciguerra and de Francisci (1973) certainly are not conspecific with *M. mesonyctius* since their odontostyle is excessively long (18 μm).

Basson and Heyns (1982) studied abundant material from several Southafrican localities whose measurements and description agree well to Kreis' original data except for the wide variability in several important taxonomical features. Southafrican populations may be not conspecific – in fact, Basson and Heyns distinguished two distinct groups with different female tail length –, being *M. mesonyctius* present together with other(s) species. Then a comparison between Spanish and Southafrican specimens becomes difficult; however, **i) *M. brzeskii* sp. nov.** has more slender body ($a = 34\text{--}43$, $n = 28$ vs $a = 24\text{--}33$, $n = 60$), fewer ventromedian supplements (7–9 vs 9–12), and shorter spicules (33–38 vs 38–49 μm), and **ii) *M. malacitanus* sp. nov.** has pars refringens vaginae with two quite separated sclerotizations (vs close together in Southafrican females), shorter uterus (0.9–1.8 vs 1.8–2.4 body diameters), and males unknown.

2. *M. nigritulus*. A poorly known species from Sumatra. New species differ from this by having longer body (vs $L = 0.87\text{--}0.93$ mm), absence of dark granules filling intestinal cells (vs its presence), and female tail with different morphology (vs spicate, with very acute terminus and its hyaline part occupying half of the total length).

3. *M. parasubulatus*. This species has lip region offset by deep constriction (vs continuous or weakly offset in the two new species), quite stout body compared to *M. brzeskii* sp. nov. ($a = 28\text{--}33$ vs $a = 34\text{--}46$), and very short female tail compared to *M. malacitanus* sp. nov. (50 μm , $c' = 2.5$ vs 80–126 μm , $c' = 3.2\text{--}5.1$ respectively).

4. *M. pendschikenticus*. It is characterized by its lip region offset by constriction (vs continuous or weakly offset in the two new species), stout body [$a = 22$ vs $a > 27$ (and almost always more than 30) in the two new species], and absence of male and longer tail (100 vs 53–86 μm) in comparison to *M. brzeskii* sp. nov.

5. *M. usitatoides*. The two new species differ from this in their lip region continuous or weakly offset (vs offset by constriction). Moreover, **i) *M. brzeskii* sp. nov.** has shorter female tail [68 (53–86) μm , $c' = 2.8$ (2.4–4.1) vs 85 (70–103), $c' = 4.8$ (3.7–5.7) respectively], and **ii) *M. malacitanus* sp. nov.** has stouter body ($a = 29\text{--}37$ vs $a = 39\text{--}46$ in females), and presence of males (vs absence).

6. *M. usitatus*. *M. brzeskii* sp. nov. is distinguished from this by its shorter female tail (53–86 μm , $c' = 2.4\text{--}4.1$ vs

92–110 μm , $c' = 3.5\text{--}8.8$ respectively) with different shape (bent dorsad vs practically straight). *M. malacitanus* sp. nov. is separated from this in having a ring-like structure surrounded the junction between cardia and pharyngeal bulb base (vs without a such structure), pars refringens vaginae with somewhat separated sclerotizations (vs close together), and absence of males (vs presence).

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