

Dipartimento di Biologia Animale, Università di Catania, 95124 Catania, Italy

NEMATODES FROM ITALIAN SAND DUNES. 4. FOUR NEW AND ONE RARE SPECIES OF DORYLAIMINA

by

L. ORSELLI and M. T. VINCIGUERRA

Summary. Four new and one known species of Dorylaimida (Nematoda), found in coastal sand dunes in Sicily (Italy), are described and illustrated. *Aporcelaimellus littoralis* sp. n. is characterized by its expanded lip region, presence of numerous ventral and dorsal papillae, odontostyle 13-15 μm long, tail conoid with sub-digitate terminus, eight to ten precloacal papillae in male. *Longidorella longicaudata* sp. n. is characterized by its small size, lip region set off from adjoining body, odontostyle 20-25 μm long, tail relatively long. *Longidorella obtusicaudata* sp. n. is characterized by its medium size, lip region well set off from adjoining body, odontostyle 33-37 μm long, tail very short, conoid, with bluntly rounded terminus. *Longidorella parvibulbata* sp. n. is characterized by its moderately small size, lip region well set off from adjoining body, odontostyle 18-21 μm long, expanded part of pharynx very short, bulb-like, tail straight, conoid, with rounded terminus. The male of *Meylis bunti* Siddiqi, 1995 is described for the first time.

During a survey of nematodes of coastal sand dune systems of Sicily (Italy) four new and one rare species of Dorylaimida (Nematoda) were found, which are here described and illustrated.

Materials and methods

Samples were collected with a plexiglass soil corer to a depth of 60 cm. Nematodes were extracted by centrifugation, killed and fixed in hot 4% formalin and processed to anhydrous glycerin. Measurements were made with the aid of a camera lucida. Length (L) is expressed in mm and all other biometric characters are expressed in μm .

Descriptions

***APORCELAIMELLUS LITTORALIS* sp. n.**

(Fig. 1; Table I)

Female. Body robust, ventrally curved in fixed specimens, often C-shaped. Body width at cardia 3.0-3.3 lip region widths. Cuticle 2.5-3.5 μm at midbody. Amphidial fovea cup-like; amphidial opening 50% of corresponding body width. Lip region broader than adjoining body and set off by a constriction; lips distinct, globose, with prominent inner and outer papillae. Odontostyle shorter than lip region width; its aperture 2/3 of its length. Guide ring single. Pharynx gradually expanding at 53-57% of its length. Location of pharyngeal glands as fol-

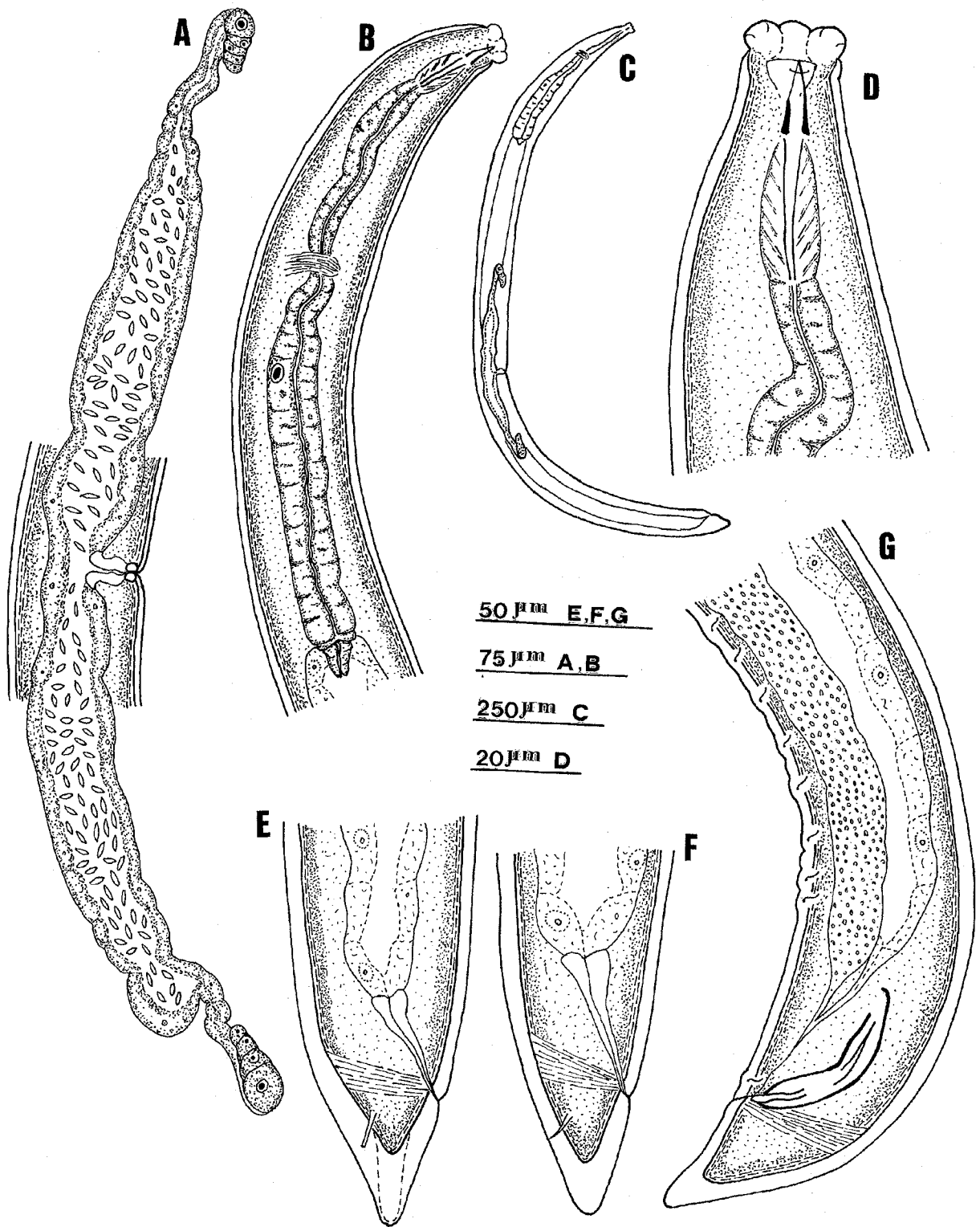


Fig. 1 - *Aporcelaimellus littoralis* sp. n.: A, female genital apparatus; B and D, anterior regions; C, female body; E and F, female tails; G, male posterior region.

TABLE I - *Measurements of Aporcelaimellus littoralis* sp. n.

	Holotype	Manfria (paratypes)		Irminio	Vendicari		Simeto
	♀	2 ♀♀	2 ♂♂	1 ♂	1 ♀	♂	1 ♂
L	1.45	1.32-1.48	1.31-1.54	1.5	1.43	1.51	1.57
a	23	18-24	25-26	27	24	26	25
b	4.3	3.7-4.2	3.7-4.9	3.9	4.1	3.9	4
c	36.2	31-36.2	31.6-35.3	40.7	45.8	33.5	41.8
c'	1	1-1.4	1.2	1.1	1.1	1.2	1
V	56.5	55.4-56.8			53.8		
ph-V/ph	1.4	1.1-1.3			1.1		
V-a/t	15	12.4-14.5			19.2		
lip height	5.5	5.5-7.3	5.5-6.4	5.5	6.4	6.4	6.4
lip width	17.4	18.4	17.4-19.3	18.4	17.4	16.5	15.6
amphid	8.2	7.3-8.2	6.4-7.3	10.1	9.2	9.2	
odontostyle	13.8	12.8-15	13.8-14.7	12.8	12.8	14.7	14.7
odontophore	31.2	35.8-36.8	30.3-39.5	39.5	40.4	35.8	34.9
nerve ring	122	117-131	120-125	137	137	135	120
pharynx	330	350	320-380	377	350	382	390
ant. pharynx	187	185-187	210-220	202	200	225	182
prerectum	60	59.8-69.9			62		
rectum	42.3	38.6-41.4			34		
anal b.w.	40	30-42.5	35-37.5	32.2	27.6	35.8	35
tail	40	42.5	45	36.8	31.2	45	37.5
spicules			47.5-62.5	54.2		57.9	49.6
precl. pap.			8-9	9		10	10

lows: (n=3): DO=59.6-71.3%; DN=60.1-71.8%; S₁N₁=69.9-82.4%; S₁O₂=71-78.3%; S₁N₂=69.9-83.2%; S₂O=85.7-88%; S₂N=85.5-89.1%. Nerve ring located at 33-40% of pharynx length. Cardia conoid, 16.5-18.5 µm long. Prerectum 1.4-2.5 anal body widths long; rectum 1-1.2 anal body widths long. A series of 24-25 ventral prevulval and of 5-8 dorsal papillae is visible. Reproductive apparatus paired and reflexed. Numerous small spindle-shaped sperms in uteri. Vulva pore-like; vagina with sclerotised pieces. Tail convex-conoid with sub-digitate terminus.

Male. Similar to female. Testes paired. The ventromedian papillae are 31-37, the dorsal ones 7-8. Spicules ventrally curved, 1.4-1.6 times as long as cloacal body width. Accessory pieces 14.5-17.5 µm long. Besides the adanal pair, a series of 8-10 ventral precloacal papillae

is present, the posteriormost 49-68 µm from cloaca. Tail conoid, slightly ventrally curved and sub-digitate.

Diagnosis and relationship

Aporcelaimellus littoralis sp. n. is characterized by its expanded lip region, presence of numerous ventral and dorsal papillae, tail conoid with sub-digitate terminus, eight to ten precloacal papillae. In general aspect it resembles *A. cylindricus* Ahmad, 1995, *A. shamimi* Ahmad, 1995 and *A. paraobtusicaudatus* (Micoletzky, 1922); from all of them it differs in the number of precloacal papillae and in the plumper body; from the former two species it differs also in the smaller size; from *A. paraobtusicaudatus* in the relatively longer tail.

Type locality and habitat

Manfria (Caltanissetta); sand dunes. Other localities: Vendicari (Siracusa), mouth of River Iriminio (Ragusa) and mouth of River Simeto (Catania).

Type specimens

Holotype, two female and two male paratypes deposited in the collection of the Dipartimento di Biologia Animale, University of Catania.

Derivatio nominis

The specific epithet is the Latin word *littoralis*= coastal.

***LONGIDORELLA LONGICAUDATA* sp. n.**

(Fig. 2; Table II)

Female. Body straight C-shaped or S-shaped in fixed specimens. Body width at cardia 2.0-2.3

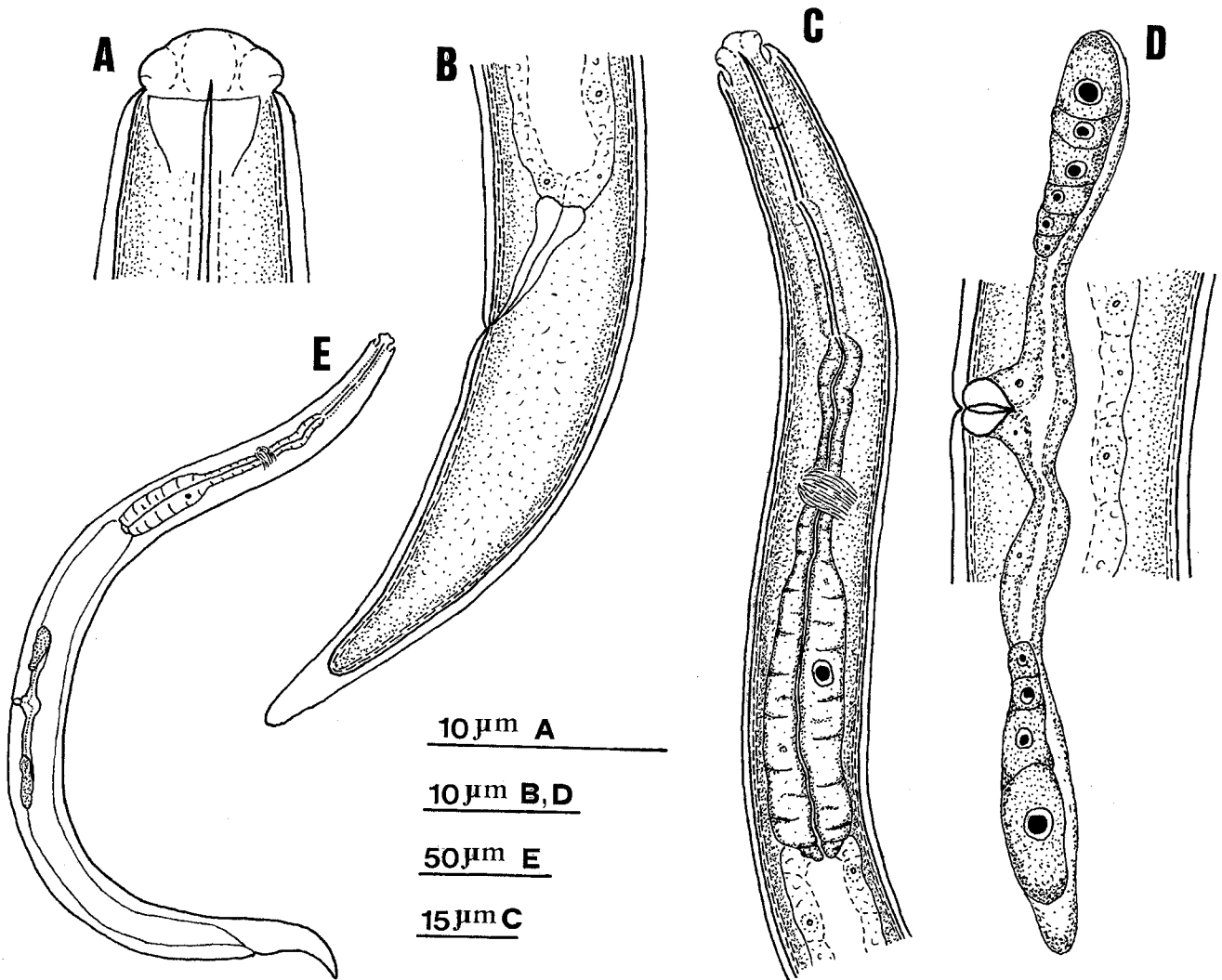


Fig. 2 - *Longidorella longicaudata* sp. n.: A, anterior end; B, female tail; C, anterior region; D, female genital apparatus; E, female body.

TABLE II - *Measurements of Longidorella longicaudata sp. n.*

	Simeto Holotype ♀	Selinunte Paratype ♀	Manfria Paratype ♀	Siciliana Paratype ♀
L	0.39	0.43	0.35	0.42
a	17	29	20	20
b	3.2	3.2	?	3.5
c	12.1	12	9.2	10.3
c'	3.6	3.5	3.7	3.1
V	53.1	51.7	51.4	53.8
ph-V/ph	0.6	0.6	0.7	0.9
V-a/t	4	4.4	3.1	3.9
lip height	3.6	3.2	2.7	3.6
lip width	7.3	5.8	6.2	7.3
amphid	?	4.4	3.9	?
odontostyle	22	24.8	20	22
odontophore	21.1	18.4	17.4	22
nerve ring	69	72	69	62
pharynx	120	132	?	117
ant. pharynx	78	91	?	79
prerectum	23.9	?	20.2	?
rectum	8.3	?	13.8	?
anal b.w.	8.8	10.1	10.1	12.8
tail	32	35.8	37.7	40.4

lip region widths. Cuticle smooth and thin, 1.0-1.5 μm at mid-body. Amphidial fovea deep, cup-like; amphidial opening 60-75% of corresponding body width. Lip region rounded, cap-like, set off by a constriction; lips round and amalgamated, with low inner and outer papillae. Odontostyle slender, slightly curved, about three times as long as lip region width; odontophore slightly shorter. Guide ring single. Pharynx expanding at 65-69% of its length. Of the pharyngeal glands only the dorsal is visible (DO=77.4%; DN=78-79.6%). Nerve ring located at 54-59% of pharynx length. Cardia small. Prerectum 2-2.7 anal body widths long; rectum about as long as anal body width. Reproductive apparatus paired and reflexed. No sperms were seen in uteri. Vulva transverse;

vagina with weakly sclerotised pieces. Tail elongate conoid, ventrally curved, with rounded terminus.

Male. Not known.

Diagnosis and relationship

Longidorella longicaudata sp. n. is characterized by its small size (L=0.35-0.43 mm), lip region cap-like, set off from adjoining body, odontostyle 20-25 μm long, tail relatively long. The most similar species are *L. europea* Dalmasso, 1966 and *L. frontiniani* (Dalmasso, 1966) Jairajpuri *et* Hooper, 1969. It differs from the former species by the lip region well set off, from the latter by the more anterior vulva, from both by the longer tail and shorter odontostyle.

Type locality and habitat

Mouth of River Simeto (Catania), Selinunte (Trapani), Siculiana (Agrigento), Manfria (Caltanissetta); sand dunes.

Type specimens

Holotype and three paratypes deposited in the collection of the Dipartimento di Biologia Animale, University of Catania.

Derivatio nominis

The specific epithet is composed from the Latin words *longus*=long and *cauda*=tail.

LONGIDORELLA OBTUSICAUDATA sp. n.

(Fig. 3; Table III)

Female. Body ventrally curved in fixed specimens. Body width at cardia 2.5-3.2 lip region widths. Cuticle slightly transversely striated, mainly in the tail region, and rather thick, 1.5-2.0 μm at mid-body. Amphidial fovea cup-like; amphidial opening 58-60% of corresponding body width. Lip region well set off by a deep constriction; lips rounded, with prominent inner and outer papillae. Odontostyle slender, straight or slightly curved (dorsally concave), almost three times as long as lip region width; odontophore about as long. Guide ring single. Pharynx expanding at 65-70% of its length. Of the pharyngeal glands only the dorsal is visible (DO=70.7-71.7%; DN=73.5-74.2%). Nerve ring located at 51-56% of pharynx length. Cardia hemispherical 6.5-9.0 μm long. Prerectum 1.3-1.8 anal body widths long; rectum 0.8-1.2 anal body widths. Reproductive apparatus paired and reflexed. Numerous spindle-shaped sperms were seen in uteri. Vulva transverse; vagina with sclerotised pieces and walls. Tail shorter than anal body width, convex-conoid with bluntly rounded terminus.

Male. Similar to female in general aspect. Testes paired. Spicules ventrally curved, 1.2-1.5 times as long as anal body widths; accessories

pieces 7.5-10 μm long. Besides the adanal pair, a series of eight-nine ventral pre-cloacal papillae is present, the posterior-most 38-44 μm from cloaca. Tail convex-conoid as in female, but with blunter terminus.

Diagnosis and relationship

Longidorella obtusicaudata sp. n. is characterized by its medium size (L=0.63-0.91 mm), lip region well set off from adjoining body, odontostyle 33-37 μm long, tail very short, conoid, with bluntly rounded terminus. It resembles *L. arenicola* Vinciguerra et Zullini, 1980, from which it can be easily distinguished by the shorter and blunter tail, the shorter odontostyle (33-37 μm vs. 40-42 μm) and the shorter pharyngeal bulb (30-35% vs. 40-45% of pharyngeal length).

Type locality and habitat

Selinunte (Trapani); sand dunes. Other localities: mouth of River Irmínio (Ragusa).

Type specimens

Holotype, four female and two male paratypes deposited in the collection of the Dipartimento di Biologia Animale, University of Catania; one female and one male paratype in the Állatrendszertani Intézet, University of Budapest, Hungary; one female and one male paratype in the Nematology Laboratory, Beltsville, U.S.D.A., Maryland, U.S.A.; one female and one male paratype in the Institut voor Dierkunde, University of Gent, Belgium.

Derivatio nominis

The specific epithet is composed from the Latin words *obtusus*=blunt and *cauda*=tail.

LONGIDORELLA PARVIBULBATA sp. n.

(Fig. 4; Table IV)

Female. Body straight or ventrally curved in fixed specimens. Body width at cardia 2.3-2.7

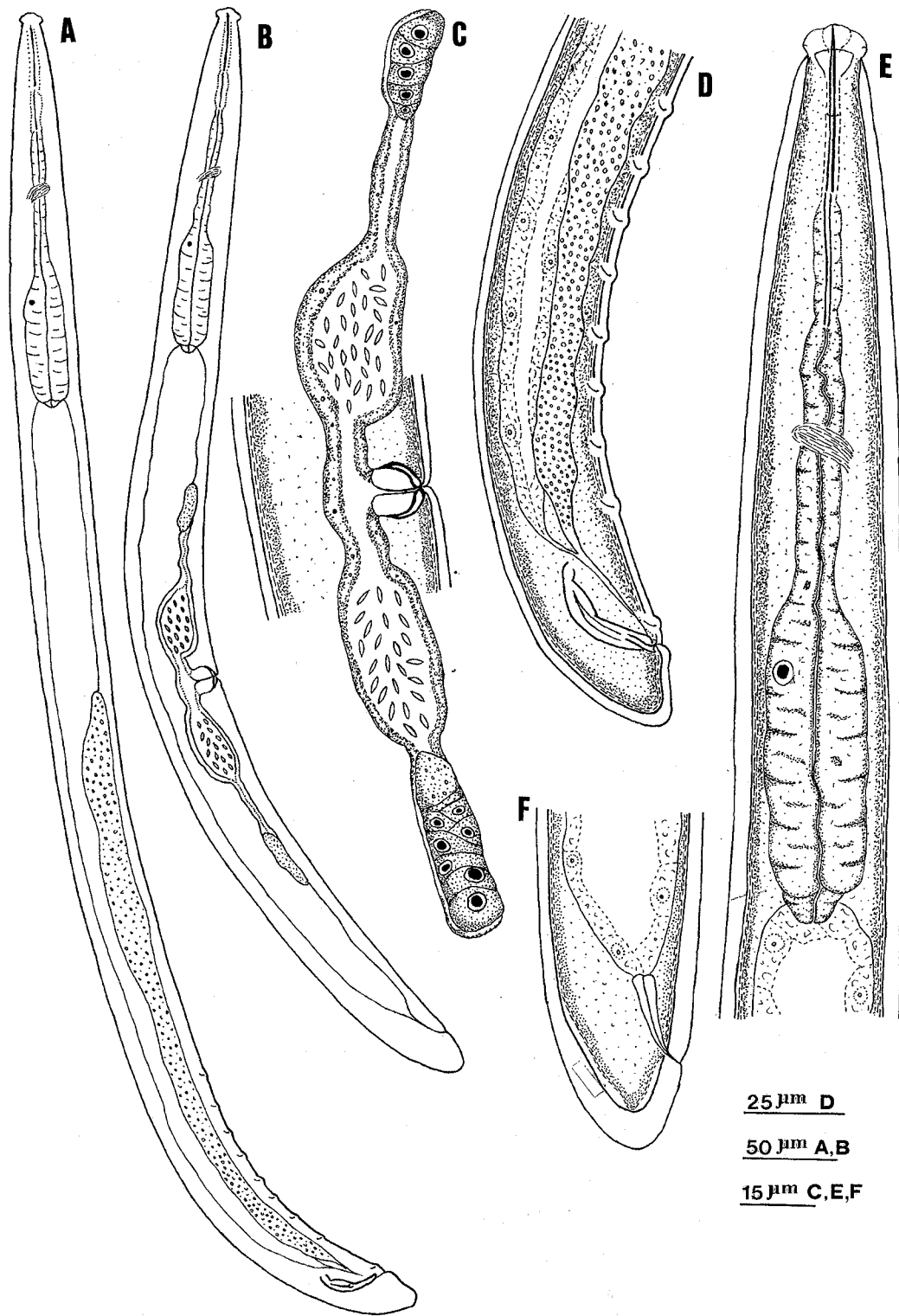


Fig. 3 - *Longidorella obtusicaudata* sp. n.: A, male body; B, female body; C, female genital apparatus; D, male posterior region; E, anterior region; F, female tail.

TABLE III - *Measurements of Longidorella obtusicaudata sp. n.*

	Holotype	Selinunte (paratypes)		Irminio	
	♀	7 ♀♀	5 ♂♂	2 ♀♀	1 ♂
L	0.66	0.67-0.9 (0.78±0.1)	0.65-0.87 (0.78±0.1)	0.81-0.91	0.63
a	17	17-21 (19±1.6)	18-22 (19.4±2.1)	22-23	19
b	3.6	3.8-4.5 (4.1±0.2)	3.3-4.5 (4±0.4)	3.9-4.2	4.3
c	37.9	40.3-51.9 (44.5±4.1)	32.2-45.4 (37±6.2)	46.5-55.1	32.6
c'	0.7	0.5-0.7 (0.6±0.1)	0.6-0.8 (0.7±0.1)	0.6	0.6
V	59.1	56-62.5 (58.4±2.1)		55.5-57.1	
ph-V/ph	1	1.1-1.3 (1.2±0.1)		1-1.3	
V-a/t	14.2	14-20.2 (17.6±2.4)		14.5-18.1	
lip height	5	5.5-6.4 (5.7±0.6)	5.5-6.4 (6.1±0.5)	5.5-6.4	5
lip width	11.9	11.9-13.8 (13.3±1.3)	12.8-13.8 (13.4±0.5)	13.8-14.7	12.8
amphid	6.9	7.3-10.1 (8.6±1.1)	7.3-9.2 (8.2±0.9)	7.3	6.9
odontostyle	33.1	33.1-36.8 (35±1.3)	34.9-35.8 (35.2±0.4)	31.2-35.8	31.2
odontophore	34	31.2-34.5 (32.6±1.4)	29.4-39.5 (33.3±4.4)	34-34.9	23
nerve ring	94	93-119 (102.6±11.1)	86-110 (99.2±10.5)	101-103	83
pharynx	183	176-208 (192.6±11.4)	186-200 (192.2±5.4)	205-214	145
ant. pharynx	119	121-140 (131.1±7.4)	123-138 (130.9±6.1)	133-145	105
prerectum	60	56-90 (70.7±14.5)		60-67	
rectum	29.4	26.6-36.8 (30.6±5.4)		24.8-25.7	
anal b.w.	24	24-31.2 (26.6±2.8)	25.7-30.3 (28.1±2.1)	24.8-27.6	28.5
tail	19.3	15.6-20.2 (17.4±1.7)	20-27.5 (23.2±3.2)	16.5-17.4	19.3
spicules			28.5-38.6 (34.6±4.1)		38.6
precl. pap.			8-9 (8.4±0.5)		8

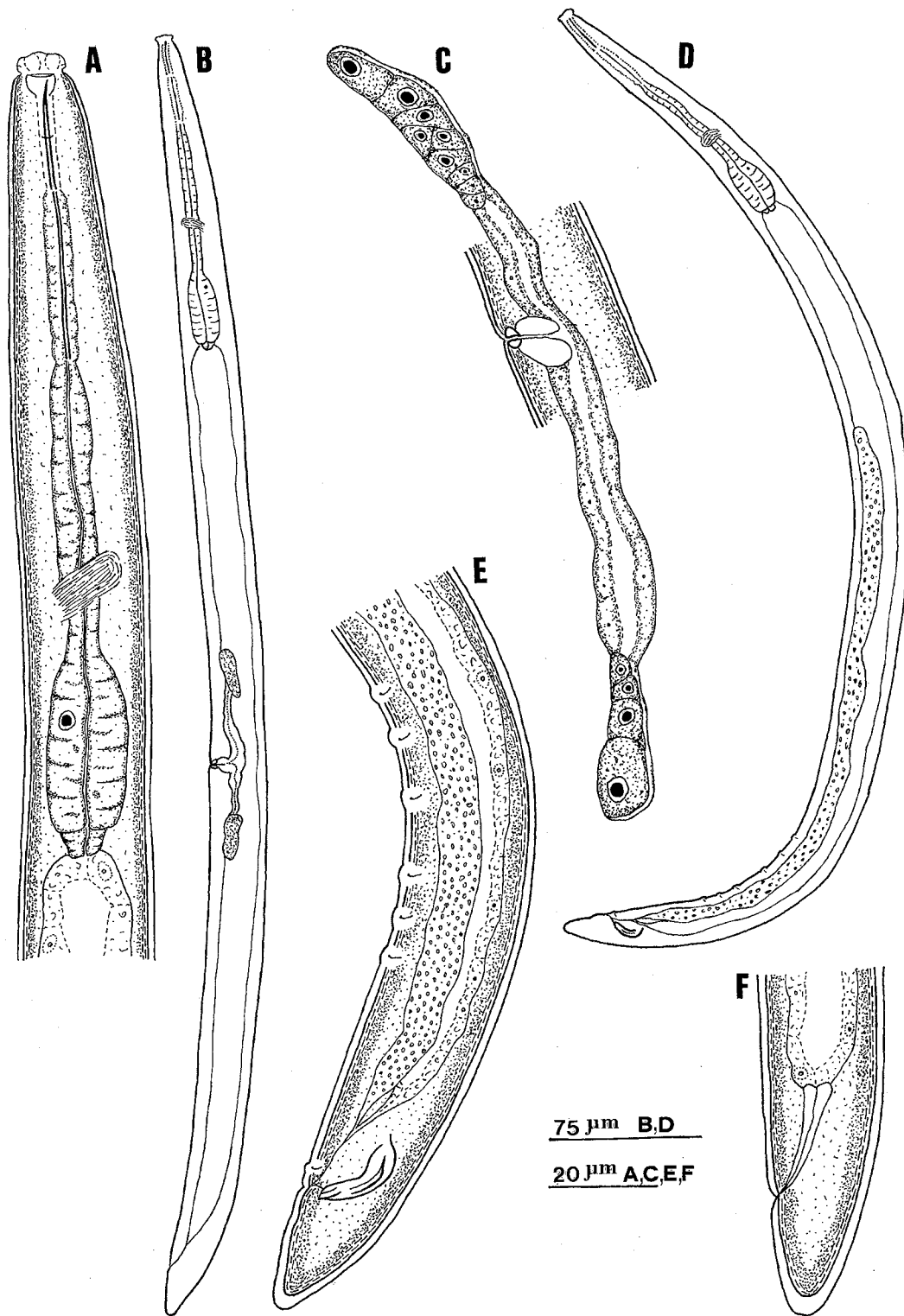


Fig. 4 - *Longidorella parvibulbata* sp. n.: A, anterior region; B, female body; C, female genital apparatus; D, male body; E, male posterior region; F, female tail.

TABLE IV - *Measurements of Longidorella parvibulbata sp. n. and Meylis huntii Siddiqi 1995.*

	<i>L. parvibulbata</i>			<i>M. huntii</i>		
	Holotype ♀	Eraclea (paratypes) 7 ♀♀ 1 ♂		Manfria 1 ♀	Irminio 1 ♀	Siciliana 1 ♂
L	0.58	0.55-0.68 (0.6±0.04)	0.66	2.12	2.0	2.07
a	21	21-27 (23.1±2)	24	35	47	52
b	3.6	3.7-4.5 (4.2±0.3)	4.3	7.1	6.1	6.7
c	27.4	26-32.1 (28.6±1.9)	28.6	96.3	122.6	90
c'	1.2	1.2-1.5 (1.3±0.1)	1.2	0.7	0.6	0.9
V	53	49.2-56.3 (53.4±2.3)		43.3	43	
ph-V/ph	1	0.9-1.5 (1.1±0.2)		1.7	1.5	
V-a/t	11.4	10.8-13.8 (12.2±1.1)		60	76	
lip height	3.6	3.6-5.1 (4±0.5)	3.6	6.4	4.6	5.5
lip width	8.2	8.2-10.1 (9±0.5)	9.2	17.4	16.5	15.6
amphid	3.6	3.2-5.5 (4.5±0.9)	3.6	11	9.2	?
odontostyle	20.2	17.9-20.2 (18.6±0.7)	19.3	16.3	15.6	13.8
odontophore	19.3	15.6-17.9 (18.6±0.7)	20.2	16	14.7	13.8
nerve ring	85	69-81 (76.6±4.9)	94	120	140	?
pharynx	157	140-149 (145.2±4.1)	153	327	300	307
ant. pharynx	121	80-115 (106.1±11.8)	118	266	249	255
prerectum	44	47.8-74.5 (61.4±10.5)		?	50.6	
rectum	23.9	22.1-26.6 (23.5±2.1)		?	34.9	
anal b.w.	16.5	15-17.4 (16.1±1.1)	18.4	28.5	26.6	25
tail	21.1	19.3-23 (21.6±1.7)	23	22	16.3	23
spicules			21.1			33.6
precl. pap.			6			15

lip region widths. Cuticle finely transversely striated, mainly in anterior region, and thin, 0.5-1.0 μm at mid-body. Amphidial fovea deep, cup-like; amphidial opening 45-50% of corresponding body width. Lip region low, well set off by a deep constriction; lips rounded, with low inner and outer papillae. Odontostyle slender, slightly curved, about twice as long as lip region width; odontophore about as long. Guide ring single. Pharynx expanding at 76-80% of its length. Of the pharyngeal glands only the dorsal is visible (DO=83.6-84.4%; DN=84.7-86.6%). Nerve ring located at 54-69% of pharynx length. Cardia hemispherical 4.5-6.5 μm long. Prerectum 3.0-4.5 anal body widths long; rectum 1.2-1.5 anal body widths. Reproductive apparatus paired and reflexed. Vulva transverse; vagina with sclerotised pieces. Tail straight, convex-conoid, with rounded terminus, slightly longer than anal body width.

Male. Similar to female in general aspect. Testes paired. Spicules ventrally curved, about as long as anal body widths; accessories pieces 3.8 μm long. Besides the adanal pair, a series of six ventral precloacal papillae is present, the posteriormost 46 μm from cloaca, well anterior to spicule proximal part. Tail straight, convex-conoid with rounded terminus, as in female.

Diagnosis and relationship

Longidorella parvibulbata sp. n. is characterized by its rather small size (L=0.55-0.66 mm), lip region well set off from adjoining body, odontostyle 18-21 μm long, pharynx expanded part very short, bulb-like, tail straight, conoid, with rounded terminus. In many characters it resembles *L. oklabensis* (Jairajpuri *et A. H. Siddiqi*, 1964) Jairajpuri *et Hooper*, 1969, from which it can easily be distinguished by the much shorter pharyngeal bulb (20-24% vs. 35%), the blunter tail and the more slender body.

Type locality and habitat

Eraclea (Agrigento); sand dunes.

Type specimens

Holotype and four paratypes deposited in the collection of the Dipartimento di Biologia Animale, University of Catania; one paratype in the Állatrendszertani Intézet, University of Budapest, Hungary; one paratype in the Nematology Laboratory, Beltsville, U.S.D.A., Maryland, U.S.A.; one paratype in the Instituut voor Dierkunde, University of Gent, Belgium.

Derivatio nominis

The specific epithet is composed by the Latin words *parvus*=small and *bulbus*=bulb.

MEYLIS HUNTI Siddiqi, 1995

(Fig. 5; Table IV)

Female. Body cylindroid, slightly ventrally curved in fixed specimens. Body width at cardia 2.5 lip region widths. Cuticle finely transversely striated; 2-3 μm thick at mid-body; subcuticle annulated. Amphidial fovea cup-like; amphidial opening 50-53% of corresponding body width. Lip region set off by a deep constriction and consisting of two parts separated by a further constriction, the more anterior smaller than the posterior. Lips distinct, round, with low inner and outer papillae. Odontostyle thin, needle-like, with visible lumen, almost as long as lip region width. Odontophore flanged. Guide ring single. Stoma tubular, weakly sclerotised. Pharynx with short cylindroid basal bulb, set off by a constriction, 16-18% of pharynx length. Nerve ring located at 37-46% of pharynx length. Cardia cylindroid, 7.5 μm long. Prerectum 1.8 anal body widths long; rectum 1.3 anal body widths long. Reproductive apparatus paired and reflexed. Uteri filled with sperms. Vulva transverse; vagina with weakly sclerotised pieces. Tail shorter than anal body width, conoid with blunt terminus.

Male. Similar to female. Testes paired. Spicules ventrally curved, 1.3 times as long as cloacal body width. Accessory pieces 11 μm long.

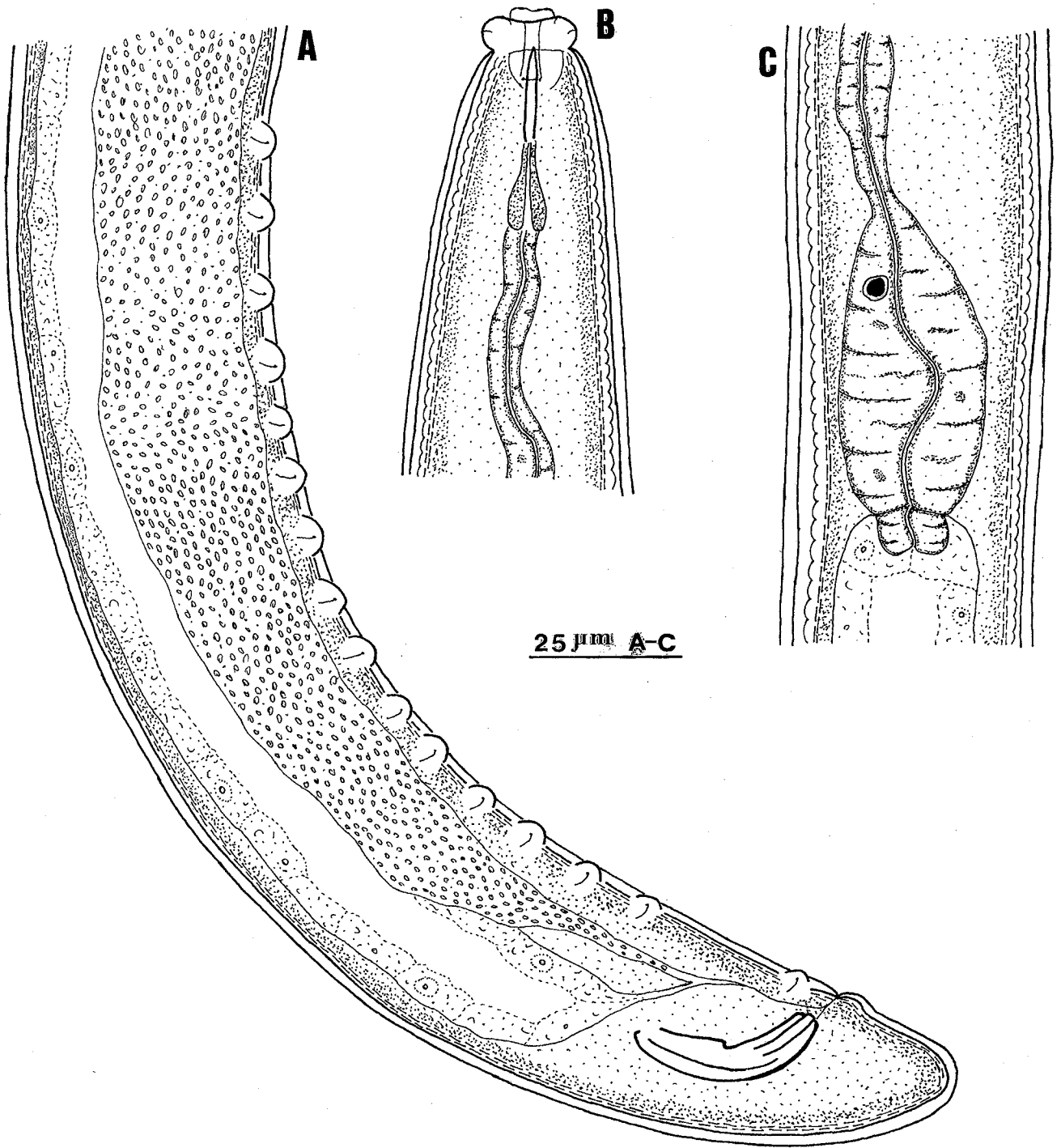


Fig. 5 - *Meylis huntii*. A, male posterior region; B, anterior end; C, pharyngeal bulb.

Besides the adanal pair, a series of 15 ventral precloacal papillae, very close to each other, is present, the posteriormost 33 μm from cloaca, at the level of the proximal end of spicules. Tail convex-conoid with blunt terminus, slightly longer than in female.

Localities and habitat

Island of St. Lucia (Antille): sandy soil; Manfria, Siculiana, mouth of River Irminio (Italy): sand dunes.

Remarks

This species was until now known only from sandy soil of the island of St. Lucia (Antille). Our specimens fit the original description fairly well, except for the pharynx length which is given as 750-865 μm ; since this value, however, does not correspond to the b values given by

the author (6.8-7.6), it is regarded as a misprint. The male is here described for the first time.

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