

# *Longidorus dunensis* n. sp. and *L. kuiperi* n. sp. from the sand dune coastal region of the Netherlands (Nematoda : Longidoridae)

Henk BRINKMAN, Pieter A. A. LOOF and Dirk BARBEZ

Plantenziektenkundige Dienst, Geertjesweg 15, 6706 EA Wageningen;  
Netherlands Laboratorium voor Nematologie, Landbouwhogeschool, P.O. Box 8123, 6700 ES Wageningen, and  
Institut voor Dierkunde, Rijksuniversiteit, K. L. Ledeganckstraat 35, B-9000 Gent, Belgium.

## SUMMARY

Two new species of the genus *Longidorus* Micoletzky, 1922 are described. *L. dunensis* n. sp., found associated with sea buckthorn (*Hippophae rhamnoides* L.) and probably a factor in its decline, is unisexual, very slender (L = 5.4-7.4 mm), has an expanded lip region and a conoid tail. *L. kuiperi* n. sp. is bisexual, 6.3-8.5 mm long, with very broad lip region, short *vas deferens*, L-shaped spicules and the posterior eight supplements arranged into two subventral rows. It shares all these characters with *L. edmundsi* Hunt & Siddiqi, 1977 but can be differentiated from it by a series of characters. The population described by Lamberti, Roca and Agostinelli (1985) from Italy as *L. edmundsi* is, in fact, *L. kuiperi* n. sp. The species was found in the coastal zones of the Netherlands and France, associated exclusively with marram grass (*Ammophila arenaria* Link.), but the Italian population occurred on pea and olive.

## RÉSUMÉ

*Longidorus dunensis* n. sp. et *L. kuiperi* n. sp. provenant de la région des dunes côtières des Pays-Bas (Nematoda : Longidoridae)

Deux nouvelles espèces appartenant au genre *Longidorus* Micoletzky, 1922 sont décrites. *L. dunensis* n. sp., associé au nerprun (*Hippophae rhamnoides* L.) et causant probablement le déclin de celui-ci, est unisexué, très allongé (L = 5,4-7,4 mm) et présente une région labiale en relief et une queue conoïde. *L. kuiperi* n. sp., bisexué, est long de 6,3-8,5 mm, avec une région labiale très élargie; les mâles montrent un *vas deferens* court, des spicules en forme de L et les huit suppléments postérieurs disposés en deux rangées subventrales. Il partage ces caractères avec *L. edmundsi* Hunt & Siddiqi, 1977 mais peut en être différencié par plusieurs autres caractères. La population venant d'Italie décrite par Lamberti, Roca et Agostinelli (1985) comme *L. edmundsi* appartient en fait à *L. kuiperi* n. sp. Cette espèce a été trouvée dans les zones côtières des Pays-Bas et de France, en association exclusive avec l'oyat (*Ammophila arenaria* Link.), mais la population provenant d'Italie est associée aux pois et à l'olivier.

In the spring of 1981 the late P. Oremus (Institute for Ecological Research, Department of Dune Research "Weevers' Duin", Oostvoorne, Netherlands), when investigating the cause of a decline in sea buckthorn, *Hippophae rhamnoides* L. (see Maas, Oremus & Otten, 1983) sent soil samples from this shrub, which contained per 100 ml of soil, 55 specimens of an undescribed species of *Longidorus*, and low numbers of other plant-parasitic nematode species.

Over several years Dr. K. Kuiper, Plantenziektenkundige Dienst, Wageningen, Netherlands, had collected samples from marram grass (*Ammophila arenaria* Link.) on the Island of Texel. These samples contained another undescribed *Longidorus* species. Both species are described hereunder. The specimens were fixed in F.A. 4 : 1 and mounted in dehydrated glycerin.

## *Longidorus dunensis* n. sp. (Figs 1 and 2)

### DIMENSIONS

Females and juveniles : see Table 1.

*Holotype* (female) : L = 6.60 mm; a = 133; b = 14.3; c = 171; V =  $^{\circ}517$ ; odontostyle = 101  $\mu$ m; odontophore = 59  $\mu$ m; spear = 160  $\mu$ m; GR = 32  $\mu$ m; pharynx = 460  $\mu$ m; tail = 39  $\mu$ m; ABW = 35  $\mu$ m; c' = 1.1.

### DESCRIPTION

*Female* : Body very slender, curved widely into C- or J-shape when relaxed. Cuticle 2  $\mu$ m thick, increasing to 3  $\mu$ m in anterior part of neck and to 7  $\mu$ m on base of

Table 1  
Dimensions of *L. dunensis* n. sp. with standard deviations

	♂-1	♂-2	♂-3	♂-4	Females
n	15	14	12	9	25
L	1.20 mm ± 63 µm (1.12-1.35 mm)	1.92 mm ± 159 µm (1.73-2.23 mm)	3.25 mm ± 447 µm (2.70-3.88 mm)	4.20 mm ± 293 µm (3.78-4.62 mm)	6.51 mm ± 454 µm (5.39-7.40 mm)
a	61.7 ± 2.85 (58-68)	68.9 ± 4.94 (55-74)	87.9 ± 9.14 (75-109)	107.3 ± 3.11 (103-111)	137.5 ± 9.17 (120-160)
b	4.9 ± 0.86 (3.6-5.9, n = 11)	6.5 ± 0.80 (5.4-7.7)	9.4 ± 1.16 (7.4-11.2)	11.1 ± 1.12 (9.8-13.3)	15.2 ± 1.57 (12.5-18.3)
c	27.4 ± 2.10 (25-31)	39.1 ± 3.09 (34-45)	64.2 ± 7.49 (52-78)	85.6 ± 5.39 (80-96)	157.9 ± 16.53 (136-193)
c'	3.1 ± 0.27 (2.5-3.5)	2.5 ± 0.13 (2.2-2.7)	1.9 ± 0.21 (1.6-2.3)	1.6 ± 0.13 (1.5-1.8)	1.19 ± 0.10 (1.0-1.4)
V	—	—	—	—	50.9 ± 1.62 (47-54)
G <sub>1</sub>	—	—	—	—	7.6 ± 0.97 (6-9)
G <sub>2</sub>	—	—	—	—	8.8 ± 1.69 (7-13)
odontostyle	58.1 µm ± 1.77 (54-60 µm)	64.0 µm ± 1.66 (62-66 µm)	77.1 µm ± 3.03 (70-80 µm)	88.4 µm ± 2.26 (85-92 µm)	100.2 µm ± 2.83 (95-106 µm)
odontophore	—	39.8 µm ± 1.60 (37-42 µm, n = 12)	45.8 µm ± 2.79 (41-48 µm, n = 6)	51.9 µm ± 1.21 (51-54 µm)	58.1 µm ± 1.87 (54-63 µm)
spear	—	103.8 µm ± 1.90 (101-107 µm, n = 12)	122.5 µm ± 5.82 (111-127 µm, n = 6)	140.4 µm ± 1.99 (137-143 µm)	158.5 µm ± 3.32 (135-165 µm)
spare odst.	64.8 µm ± 1.47 (62-67 µm)	76.0 µm ± 2.83 (69-79 µm)	86.8 µm ± 3.35 (81-92 µm)	100.0 µm ± 4.40 (95-108 µm)	—
GR	18.6 µm ± 0.74 (18-20 µm)	21.5 µm ± 0.76 (20-23 µm)	25.1 µm ± 1.04 (23-26 µm)	27.6 µm ± 1.51 (25-30 µm)	31.2 µm ± 1.38 (29-33 µm)
pharynx	254 µm ± 39 (205-311 µm, n = 11)	297 µm ± 39 (243-372 µm)	347 µm ± 34 (306-427 µm)	381 µm ± 29 (339-433 µm)	435 µm ± 38 (353-506 µm)
tail length	44.1 µm ± 2.59 (40-48 µm)	49.1 µm ± 3.06 (44-54 µm)	50.8 µm ± 3.96 (44-58 µm)	49.3 µm ± 1.83 (46-50 µm)	41.5 µm ± 3.31 (35-48 µm)
lip region width	9 µm	11.0 µm ± 0.39 (10-12 µm)	12.6 µm ± 0.70 (12-14 µm)	13.7 µm ± 0.50 (13-14 µm)	15.1 µm ± 0.40 (14-16 µm)
BWGR <sup>(1)</sup>	12.8 µm ± 0.56 (12-14 µm)	15.3 µm ± 0.61 (14-16 µm)	17.5 µm ± 0.71 (16-18 µm)	19.3 µm ± 1.22 (18-22 µm)	21.0 µm ± 0.52 (20-22 µm)
BWPB <sup>(2)</sup>	19.7 µm ± 0.49 (19-20 µm)	26.9 µm ± 1.86 (24-30 µm)	33.4 µm ± 1.43 (32-36 µm)	38.0 µm ± 3.28 (34-44 µm)	42.6 µm ± 1.96 (40-47 µm)
anal body width	14.1 µm ± 0.59 (13-16 µm)	20.1 µm ± 1.27 (18-22 µm)	26.8 µm ± 2.63 (23-31 µm)	30.4 µm ± 2.26 (27-33 µm)	34.8 µm ± 1.44 (32-38 µm)
thickness of terminal cuticle	7.3 µm ± 0.88 (6-9 µm)	9.6 µm ± 0.84 (8-11 µm)	11.8 µm ± 1.09 (10-13 µm)	12.7 µm ± 1.00 (11-14 µm)	14.0 µm ± 1.15 (12-16 µm)

(1) BWGR = body width at level of guiding ring.

(2) BWPB = body width at level of base of pharynx.

tail. Transverse striae almost imperceptible. Thin outer layer. Lateral chord about 40 % of body width. Lateral pores : on each side about 20 in neck region, 140-160 between pharynx base and vulva; 150-180 between vulva

and anus; two on the tail. Total number per body side 320-370. Dorsal cervical pores none or one; ventral ones 4 to 10. Lip region offset by distinct expansion, its edges rounded, with the usual 6 + 10 sensillae. Amphids

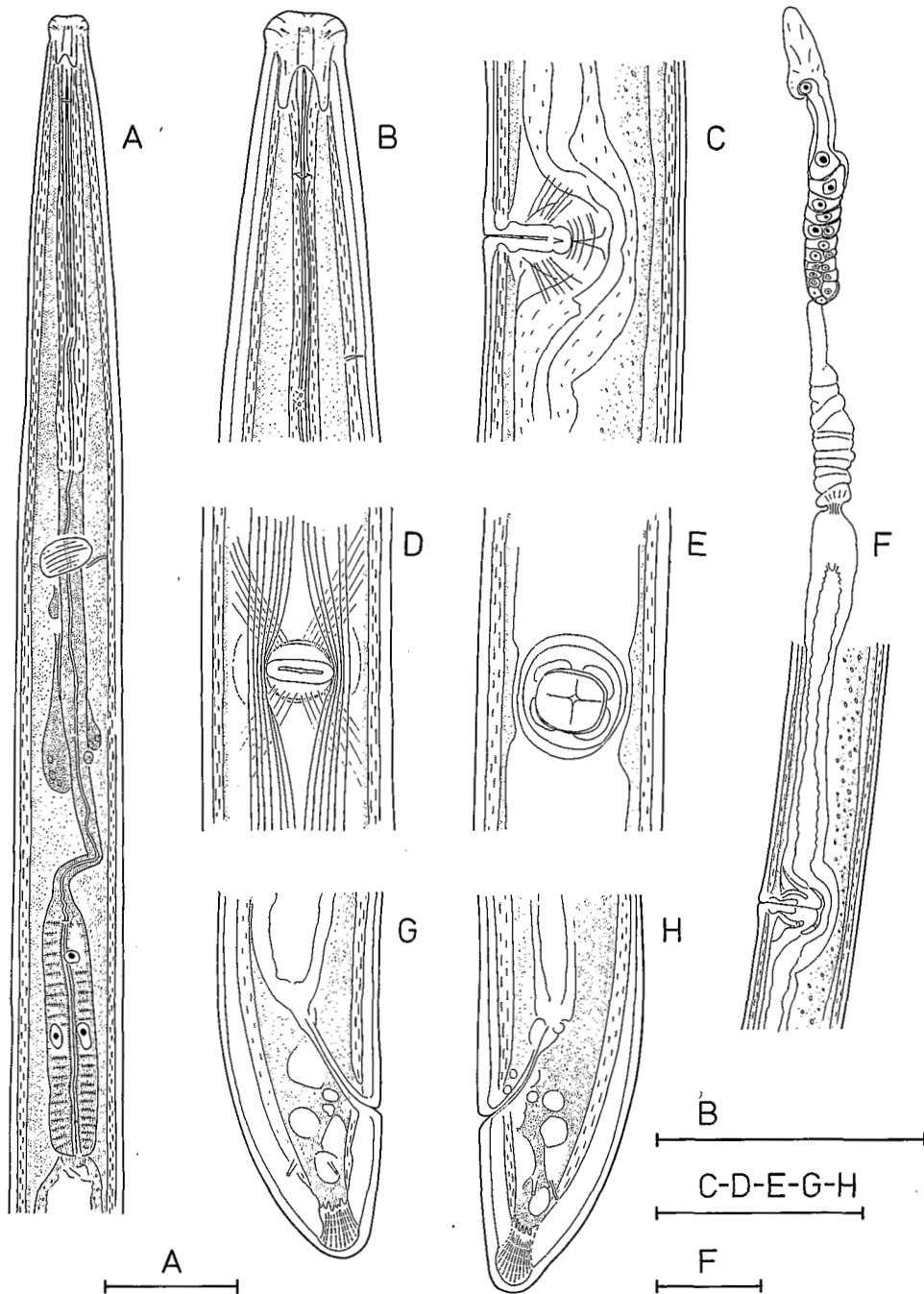


Fig. 1. *Longidorus dunensis* n. sp. Female. A : neck region; B : anterior end, lateral view; C : vulva, lateral view; D : vulva, ventral view; E : optical section through vagina; F : vulva and anterior genital branch; G-H : tails, lateral view. (The scale lines correspond to 50  $\mu$ m.)

evenly bilobed, the lobes extending just over halfway to guiding ring. Odontostyle, odontophore and guiding ring typical for genus. Nerve ring single, a short distance behind base of odontophore. The pharyngeal bulb measures 90-121 × 18-23 μm; generally it is 5-6 × as long as wide. DO lies at 6-13 %, DN at 20-29 %, SN at 51-60 % and SO at 84-92 % of bulb length. Cardia small.

Vulva a transverse slit 14-17 μm long. Vagina almost one-half body width deep. Genital tubes two, opposed, reflexed, of normal structure, without special differentiations. No sperm in the uteri. None of the females bore eggs. Length of prerectum 407 μm (291-505). Tail broadly convex-conoid, tip broadly rounded, the ter-

minal cuticle is 12-16 μm thick. Two sublateral caudal pores.

*Juveniles* : In the J-1 the tail is elongate-conoid, often slightly subdigitate. The J-2 has an elongate-conoid tail, in the J-3 and J-4 the tail gradually approaches the shape in the adult female.

*Male* : were not found and probably do not exist.

TYPE MATERIAL

*Holotype* : Female on slide WT 2447 in the nematode collection of the Landbouwhogeschool, Wageningen, Netherlands.

*Paratypes* : 14 females on slides WT 2448-2456, same collection; one female deposited at each of the following addresses : Rothamsted Experimental Station, Harpenden, England; Instituut voor Dierkunde, Rijksuniversiteit, Gent, Belgium; Istituto di Nematologia agraria, Bari, Italy; Nematologisch Instituut, Münster, Federal Republic of Germany; Muséum national d'Histoire naturelle, Paris, France; Plantenziektenkundige Dienst, Wageningen, Netherlands; USDA, Beltsville, USA, University of California, Davis, USA; University of California, Riverside, USA.

TYPE HABITAT AND LOCALITY

Soil around roots of sea buckthorn (*Hippophae rhamnoides* L.), calcareous dune soil, Oostvoorne, Netherlands.

DIAGNOSIS AND RELATIONSHIPS

*L. dunensis* n. sp. is characterized by the very slender body; expanded lip region; evenly bilobed amphids; odontostyle length 95-106 μm; anterior location of DN in the bulb; short convex-conoid tail with broadly rounded tip; and absence of males.

In having an expanded lip region, conoid tail, and index "a" over 100, *L. dunensis* resembles *L. attenuatus* Hooper, 1961 and *L. protae* Lamberti & Bleve-Zacheo, 1977. It can be differentiated from these species as follows :

*L. attenuatus* is slenderer (a = 120-210 vs 120-160), has a shorter odontostyle (73-84 μm vs 95-106 μm) and the tail is much narrower, with a finely rounded tip. *L. protae* has a shorter odontostyle (73-83 μm vs 95-106 μm), the guiding ring lies more anterior (25-29 μm from head end vs 29-33 μm), the tail is shorter (32-37 μm vs 35-48 μm), the terminal cuticle is thinner (6-9 μm vs 12-16 μm), the female tail is much broader, almost hemispherical; the J-1 tail is curved ventrad much more strongly; furthermore in all stages *L. protae* is more slender than *L. dunensis* and the odontostyle and odontophore are shorter.

Two other *Longidorus* species have an expanded lip region : *L. euonymus* Mali & Hooper, 1974 and *L.*

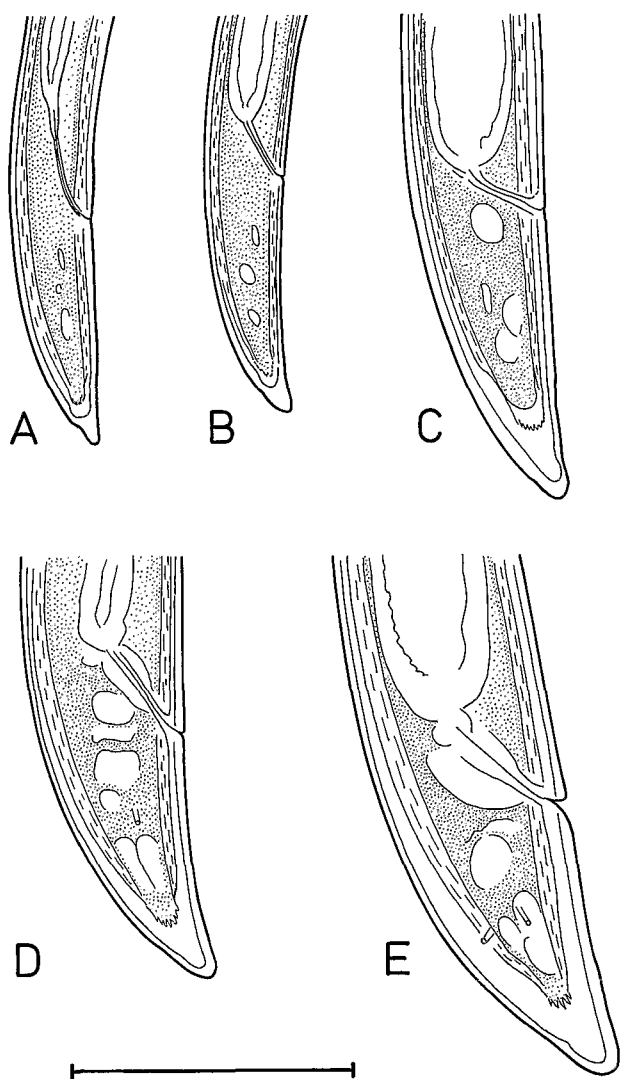


Fig. 2. *Longidorus dunensis* n. sp. Juveniles tails lateral view. A-B : J-1; C : J-2; D : J-3; E : J-4. (The scale line corresponds to 50 μm.)

*closelongatus* Stoyanov, 1964. *L. dunensis* differs from the former by the distinctly bilobed amphid and longer odontostyle, from the latter by the shorter odontostyle and anterior location of DN (see Sturhan & Argo, 1983).

Finally *L. dunensis* should be compared with *L. apulus* Lamberti & Bleve-Zacheo, 1977. There are no clear dimensional differences between adult females. The lip region of *L. apulus* is, according to the illustration, offset by depression, but not expanded as in *L. dunensis*; however, comparison of paratypes showed that the difference is less clear (Hooper, *in litt.* 24-1-1986). Clear differences exist between juveniles. Those of *L. apulus* have consistently a longer body and higher index "c"; in the J-1 to J-3 the odontostyle is longer, in J-2 and J-3 also the odontophore; in J-1 the index "b" is higher, in J-2 the index "a". In addition, J-3 and J-4 of *L. apulus* have the tail end rounded much more broadly than those of *L. dunensis*. Finally, "c'" is 1.1-1.3 in J-4 of *L. apulus*, 1.5-1.8 in J-4 of *L. dunensis*.

#### BIOLOGICAL OBSERVATIONS

An inoculation experiment was set up by the Nematology Department of the Plantenziektenkundige Dienst in cooperation with "Weevers' Duin". In pots of one litre, filled with sterilized soil, sea buckthorn was planted, and four series of nine replicates were established: with 0, 80, 360 and 870 *L. dunensis*. There was a positive correlation between numbers of *L. dunensis* and growth retardation. The plants showed deformed lateral roots which are characteristic symptoms of infestation by Longidoridae; again the incidence of these roots increased with increasing number of nematodes. The number of nodules of the endophyte *Frankia* decreased from 15 per plant in nematode-free soil to one per plant in pots with the highest number of *L. dunensis*. After 20 and 46 days, only about 20% of the nematodes inoculated were recovered; after 76 days the numbers of *L. dunensis* had increased in the pots with 80 and 360 nematodes, but not in those with 870.

#### *Longidorus kuiperi* n. sp.

= *L. edmundsi* apud Lamberti *et al.*, 1985.

(Figs 3-5)

#### DIMENSIONS

*Females, males and juveniles*: see Table 2.

*Holotype* (female):  $L = 7.4$  mm;  $a = 140$ ;  $b = 17.1$ ;  $c = 259$ ;  $V = 850^5$ ; odontostyle = 106  $\mu$ m; odontophore = 61  $\mu$ m; spear = 167  $\mu$ m; GR = 26  $\mu$ m; pharynx = 432  $\mu$ m; tail = 29  $\mu$ m; ABW = 37  $\mu$ m;  $c' = 0.8$ .

#### DESCRIPTION

*Female*: Body widely curved when relaxed, very slender. Cuticle 2  $\mu$ m thick in mid-body, increasing to

4  $\mu$ m in anterior part of neck and 11-12  $\mu$ m on base of tail. Transverse striae imperceptible except posteriorly. Thin outer layer. Amphids very short and wide, not bilobed in adults, slightly in juveniles; extending to about 50-60% of the distance between oral aperture and guiding ring. Lateral chord about 30% of body width. Lateral organs: on each body side 8-9 in the neck region (preceded by 3-5 lateral pores not emerging from distinct lateral organs), 100-140 between pharynx base and vulva, 140-150 between vulva and anus and two on the tail. The lateral organs are of granular structure and are difficult to see in the region of the genital tubes in both sexes. There are about 9 ventral cervical pores, and one or two dorsal ones.

Lip region massive, very broad, flattened anteriorly, with very thick cuticle (5  $\mu$ m), hence the sensillae (6 + 10) are very conspicuous. The body hardly tapers anteriorly, the lip region is offset by a slight but distinct depression. Guiding ring strongly sclerotized. Odontostyle and odontophore typical for genus. The odontophore opens (see Taylor *et al.*, 1970) at about 30-35  $\mu$ m behind base of odontostyle. Nerve ring single, located a short distance posterior to base of odontophore. The pharyngeal bulb measures 116-132  $\times$  21-26  $\mu$ m; generally it is 5  $\times$  as long as wide. DO lies at 7-15%, DN at 23-30%, SN at 52-61% and SO at 80-85% of the bulb. Cardia small (12  $\times$  13  $\mu$ m).

Vulva a transverse slit about 13  $\mu$ m wide. Vagina heavily sclerotized, vaginal cuticle separated from body cuticle. Genital tubes paired, opposed, reflexed; uteri without special differentiations, packed with sperm. Length of prerectum 390-520  $\mu$ m. Tail very broadly convex-conoid to hemispherical. Terminal cuticle 11-14  $\mu$ m thick.

*Male*: Body strongly curved ventrad posteriorly. The distance from cloacal aperture to junction of testes with *vas deferens* is conspicuously short. Testes two, dorylamid. Spicules thick, heavily sclerotized, L-shaped. Lateral guiding pieces 12  $\mu$ m long. The eight posterior precloacal supplements are arranged into two irregular subventral rows of 4 each; anterior to these there are 12-13 midventral supplements. The tail is strongly asymmetrical; the outer layer of the terminal cuticle is thickened to 4  $\mu$ m, drop-shaped. The prerectum is 506-583  $\mu$ m long and extends 323-406  $\mu$ m anteriorly to anteriormost supplement.

*Juveniles*: Body straight or nearly so. Tail shape of all stages similar to that of adult females. The lip region is wholly continuous in the J-1; during J-2 and J-3 the depression develops. The posterior end of the odontophore is often difficult to discern in juveniles.

#### TYPE MATERIAL

*Holotype*: Female on slide WT 2457 in the nematode collection of the Landbouwhogeschool, Wageningen, Netherlands.

Table 2  
Dimensions of *L. kuiperi* n. sp. with standard deviations

	♂-1	♂-2	♂-3	♂-4	Females	Males
n	17	18	13	7	20	10
L	1.15 mm ± 65 µm (1.05-1.29 mm)	1.87 mm ± 169 µm (1.58-2.17 mm)	3.10 mm ± 135 µm (2.80-3.30 mm)	4.80 mm ± 387 µm (4.25-5.38 mm)	7.47 mm ± 552 µm (6.48-8.48 mm)	6.90 mm ± 575 µm (6.32-8.10 mm)
a	42.0 ± 2.78 (38-48)	51.8 ± 3.02 (46-56)	75.7 ± 7.39 (69-92)	106.7 ± 7.43 (97-119)	147 ± 11.6 (125-171)	160 ± 16.0 (132-185)
b	4.0 ± 0.26 (3.6-4.3)	5.6 ± 0.71 (4.1-7.1)	8.8 ± 1.17 (7.5-11.3)	11.7 ± 1.51 (8.8-13.4)	16.4 ± 1.17 (13.0-18.2)	16.2 ± 1.31 (14.1-18.5)
c	49.8 ± 4.29 (42-59)	75.9 ± 6.30 (66-87)	115.3 ± 8.88 (102-136)	171.9 ± 10.3 (158-187)	266 ± 19.9 (231-314)	243 ± 25.7 (198-286)
c'	0.7 ± 0.07 (0.6-0.8)	0.8 ± 0.05 (0.7-0.9)	0.8 ± 0.58 (0.7-0.9)	0.8 ± 0.08 (0.7-0.9)	0.76 ± 0.68 (0.6-0.9)	0.78 ± 0.63 (0.7-0.9)
V	—	—	—	—	52.7 ± 1.45 (50-55)	VD 30.0 ± 4.08 (25-37)
G <sub>1</sub>	—	—	—	—	8.6 ± 2.15 (6-15, n = 18)	9.6 ± 2.92 (6-15, n = 9)
G <sub>2</sub>	—	—	—	—	7.7 ± 1.42 (5-11, n = 19)	8.0 ± 1.66 (6-11, n = 9)
odontostyle	61.2 µm ± 2.39 (56-65 µm)	72.9 µm ± 2.85 (68-78 µm)	86.2 µm ± 2.65 (82-91 µm)	96.7 µm ± 2.14 (94-100 µm)	106.6 µm ± 3.05 (101-113 µm)	104.9 µm ± 5.47 (99-117 µm)
odontophore	—	—	—	—	61.4 µm ± 2.89 (57-67 µm)	60.0 µm ± 4.64 (52-64 µm)
spear	—	—	—	—	168.0 µm ± 4.33 (158-175 µm)	163.6 µm ± 7.78 (151-175 µm)
spare odst.	73.4 µm ± 2.09 (70-76 µm)	85.5 µm ± 1.76 (80-88 µm)	96.0 µm ± 2.05 (93-100 µm)	105.7 µm ± 2.98 (100-110 µm)	—	—
GR	17.2 µm ± 1.19 (15-20 µm)	19.6 µm ± 1.09 (18-22 µm)	22.3 µm ± 1.25 (20-24 µm)	24.9 µm ± 1.57 (23-27 µm)	27.6 µm ± 1.39 (25-31 µm)	26.2 µm ± 1.40 (24-29 µm)
pharynx	292 µm ± 18 (262-333 µm)	338 µm ± 21 (308-381 µm)	356 µm ± 38 (277-407 µm)	415 µm ± 46 (370-512 µm)	449 µm ± 25 (403-507 µm)	426 µm ± 24 (398-476 µm)
tail length	23.1 µm ± 0.99 (22-25 µm)	24.2 µm ± 1.03 (23-26 µm)	27.1 µm ± 2.27 (23-31 µm)	28.1 µm ± 2.27 (26-32 µm)	28.3 µm ± 2.32 (25-32 µm)	28.5 µm ± 1.90 (26-32 µm)
lip region width	18.0 µm ± 0.56 (17-19 µm)	21.9 µm ± 0.64 (21-23 µm)	23.6 µm ± 0.87 (22-25 µm)	24.7 µm ± 0.76 (23-25 µm)	28.6 µm ± 1.27 (27-31 µm)	27.4 µm ± 1.58 (25-29 µm)
BWGR <sup>(1)</sup>	23.4 µm ± 0.50 (23-24 µm)	26.3 µm ± 0.96 (25-28 µm)	28.7 µm ± 1.80 (25-31 µm)	30.7 µm ± 1.80 (27-32 µm)	32.9 µm ± 1.18 (31-35 µm)	31.0 µm ± 1.25 (29-33 µm)
BWPB <sup>(2)</sup>	28.0 µm ± 1.84 (26-31 µm)	34.9 µm ± 2.35 (32-39 µm)	39.7 µm ± 2.24 (36-44 µm)	43.4 µm ± 4.50 (37-50 µm)	45.2 µm ± 3.25 (41-53 µm)	42.6 µm ± 2.40 (39-45 µm)
anal body width	27.4 µm ± 1.93 (25-31 µm)	31.6 µm ± 1.93 (26-35 µm)	34.4 µm ± 1.41 (32-37 µm)	36.7 µm ± 1.97 (35-39 µm)	36.9 µm ± 2.49 (33-42 µm)	37.9 µm ± 4.09 (33-45 µm)
thickness of terminal cuticle	5.3 µm ± 0.84 (4-7 µm)	6.9 µm ± 0.73 (6-9 µm)	8.5 µm ± 0.97 (7-10 µm)	9.1 µm ± 0.38 (9-10 µm)	11.9 µm ± 0.99 (10-14 µm)	9.0 µm ± 0.82 (8-10 µm)
spicules	—	—	—	—	—	64.5 µm ± 2.92 (59-68 µm)

(1) BWGR = body width at level of guiding ring.

(2) BWPB = body width at level of base of pharynx.

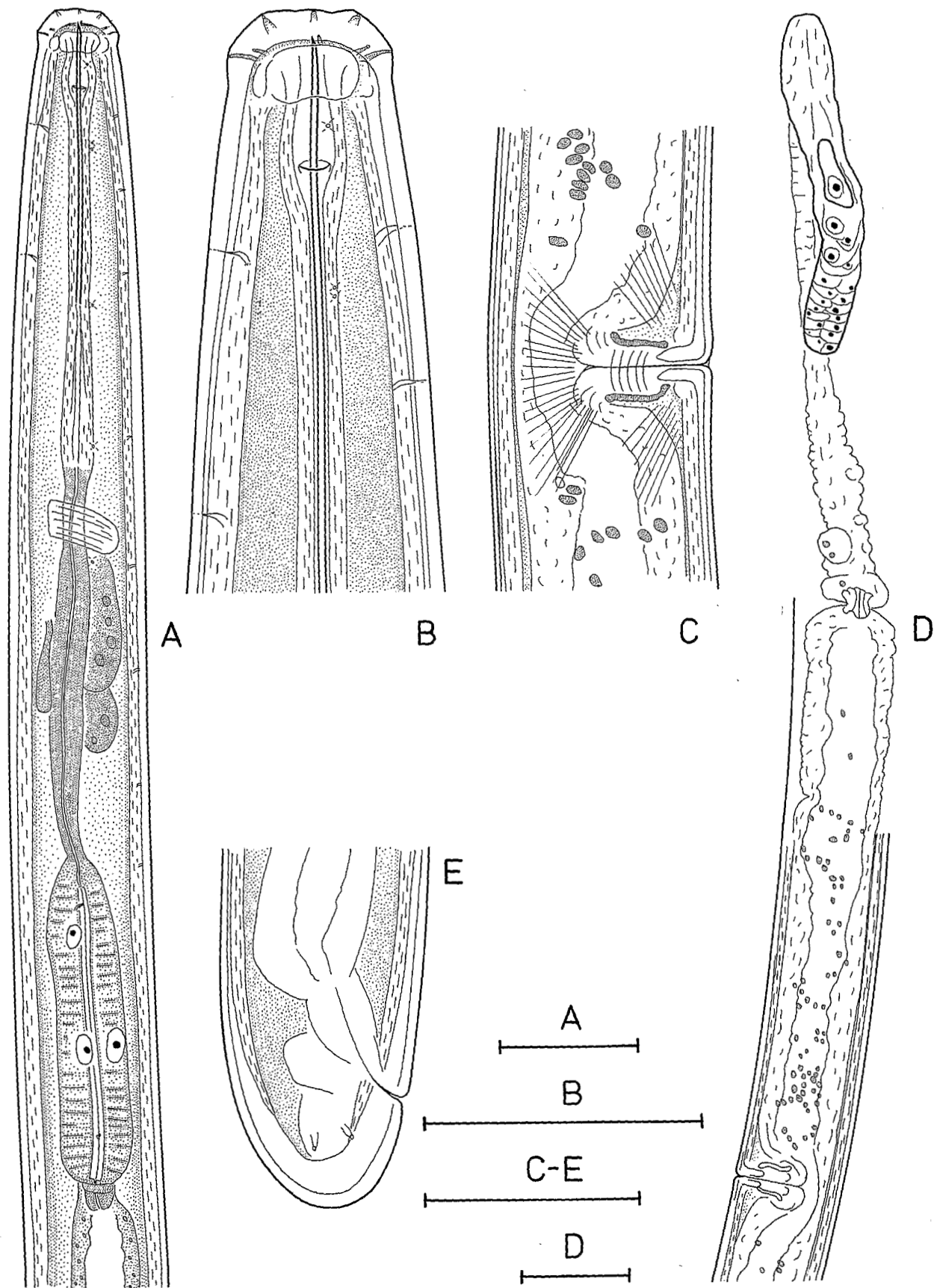


Fig. 3. *Longidorus kuiperi* n. sp. Female. A : neck region; B : anterior end, lateral view; C : vulva, lateral view; D : vulva and anterior genital branch; E : tail. (The scale lines correspond to 50  $\mu$ m.)

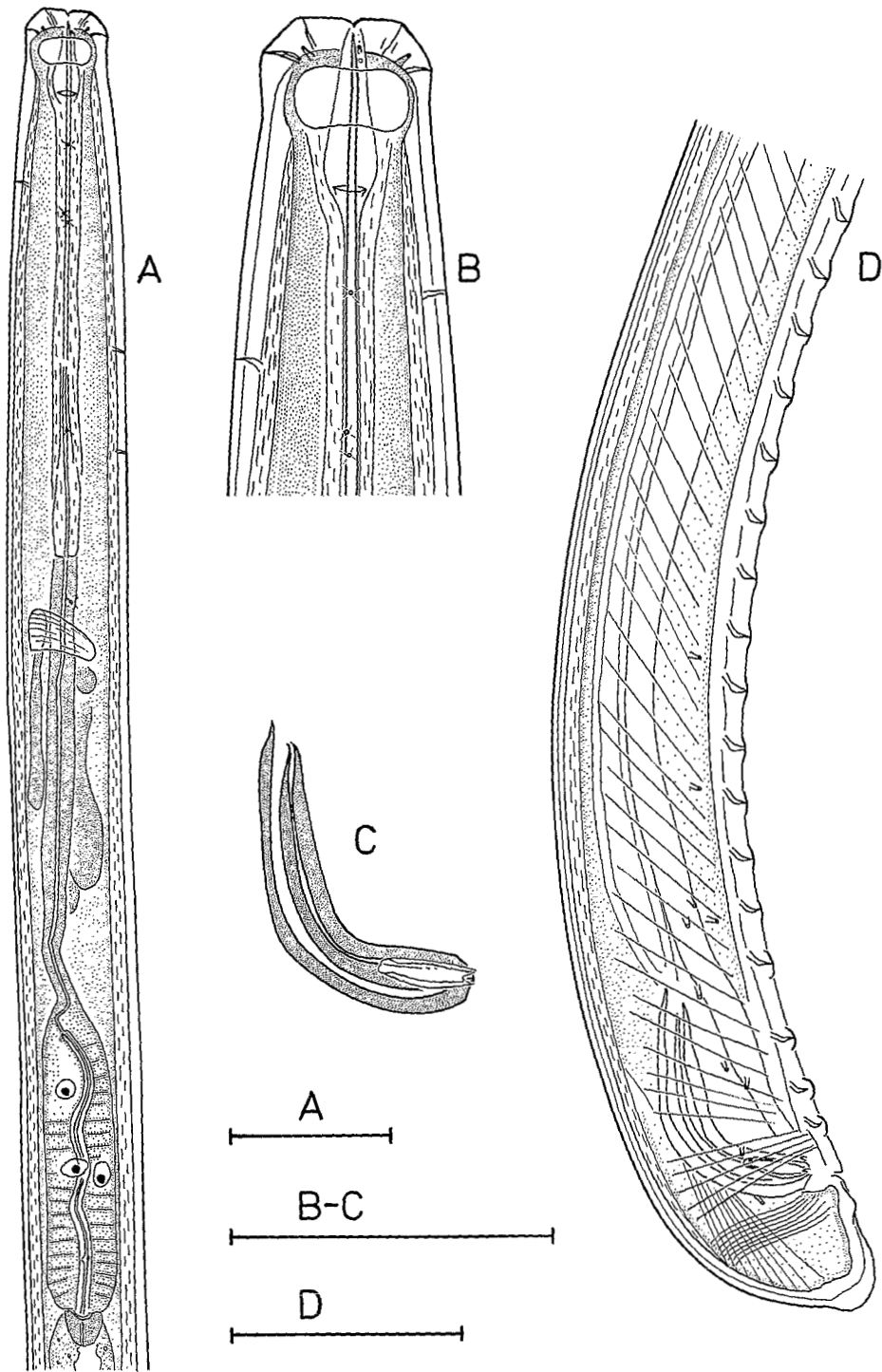


Fig. 4. *Longidorus kuiperi* n. sp. Male. A : neck region; B : anterior end, lateral view; C : spiculum and lateral guiding piece; D : posterior part of body. (The scale lines correspond to 50  $\mu$ m.)



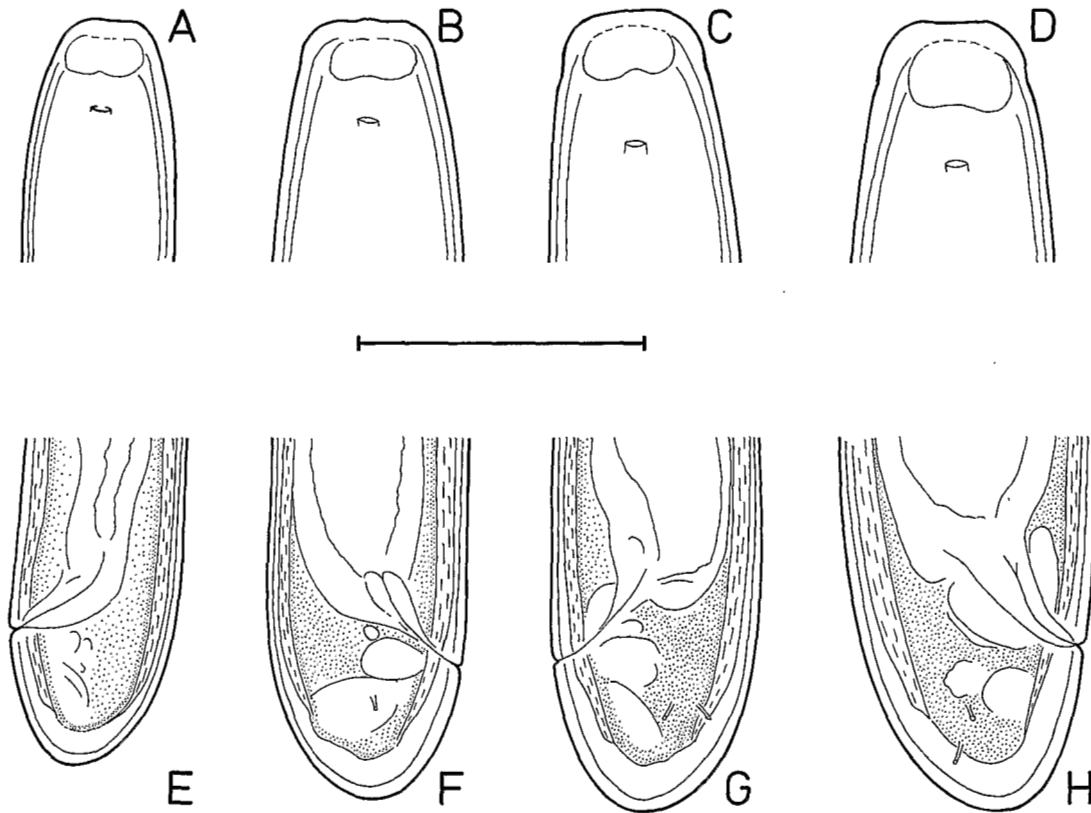


Fig. 5. *Longidorus kuiperi* n. sp. Juveniles. A-D head ends; E-H tails, lateral view. A and E : J-1; B and F : J-2; C and G : J-3; D and H : J-4. (The scale line corresponds to 50  $\mu\text{m}$ .)

*Paratypes* : ten females and four males on slides WT 2458-2469, same collection; one male and one female at each of the following addresses : Plantenziektenkundige Dienst, Wageningen, Netherlands; University of California, Davis, USA; Nematologisch Instituut, Münster, Federal Republic of Germany; Muséum national d'Histoire naturelle, Paris, France; Instituut voor Dierkunde, Rijksuniversiteit, Gent, Belgium; Istituto di Nematologia agraria, Bari, Italy. One female deposited at : Rothamsted Experimental Station, Harpenden, England; University of California, Riverside, USA; and USDA, Beltsville, USA.

#### TYPE HABITAT AND LOCALITY

Light dune-sand soil around roots of marram grass (*Ammophila arenaria* Link.), De Muy, Island of Texel, The Netherlands. Found also at Oostvoorne, The Netherlands, and in Wimereux, France; in both localities also associated with marram grass.

#### DIAGNOSIS AND RELATIONSHIPS

*L. kuiperi* n. sp. is characterized by the very slender body, curved in adults, straight in juveniles; very broad lip region (25-31  $\mu\text{m}$ ); very broad and short amphids; short hemispherical tail; body length 6.2-8.5 mm; vulva position 50-55; odontostyle length 99-117  $\mu\text{m}$ . Males are common; they have VD 25-37; spicules L-shaped; supplements 12-13 ventrosubmedians plus two ventral rows of four each; terminal cuticle bulging.

*L. kuiperi* shares a great number of conspicuous characters with *L. edmundsi* Hunt & Siddiqi, 1977 from Santa Lucia, West Indies. Indeed, the population of *L. edmundsi* described from Italy by Lamberti *et al.* (1985) is *L. kuiperi* (specimens examined); curiously this population was associated with roots of pea and olive. The common peculiarities are :

— the body tapers only slightly anteriorly, the lip region is conspicuously broad;

- the spicules are L-shaped;
- the amphids are very broad and short;
- the body posture of juveniles is almost or wholly straight;
- VD is very short;
- the posterior supplements are arranged into two longitudinal rows.

*L. kuiperi* and *L. edmundsi* can be distinguished by the following features :

- adults of *L. kuiperi* often assume a widely curved posture, whereas those of *L. edmundsi* usually lie almost straight;
  - in males of *L. kuiperi* the terminal cuticle is thickened, drop-like; in *L. edmundsi* this thickening is less pronounced or absent;
  - the number of ventromedian supplements is 12-13 in *L. kuiperi*, 7-8 in *L. edmundsi*;
  - the lip region is more distinctly offset in *L. kuiperi* than in *L. edmundsi*;
  - body length of females is 6.5-8.5 mm in *L. kuiperi*, 4.6-6.7 mm in *L. edmundsi*;
  - vulva position : in *L. kuiperi* 48-55 (generally over 50), in *L. edmundsi* 46-51 (generally under 50);
  - a = 125-185 in *L. kuiperi*, 101-138 in *L. edmundsi*;
  - c = 231-314 in *L. kuiperi*, 154-238 in *L. edmundsi*;
  - the distance from head end to guiding ring is 25-31  $\mu\text{m}$  in *L. kuiperi*, 23-25  $\mu\text{m}$  in *L. edmundsi*.
- The species is named in honour of the collector.

#### ACKNOWLEDGMENT

The authors thank Mr. D. J. Hooper, Rothamsted Exper-

*Accepté pour publication le 12 novembre 1986.*

imental Station, Harpenden, England, for loaning specimens of *L. attenuatus* and for giving information about *L. apulus*, and Prof. Dr. F. Lamberti, Bari, Italy, for loaning specimens of *L. kuiperi* from Italy.

#### REFERENCES

- HOOPER, D. J. (1961). A redescription of *Longidorus elongatus* (de Man, 1876). Thorne & Swanger, 1936 (Nematoda, Dorylaimidae) and descriptions of five new species of *Longidorus* from Great Britain. *Nematologica*, 6 : 237-257.
- HUNT, D. J. & SIDDIQI, M. R. (1977). *Longidorus edmundsi* n. sp. (Dorylaimida : Longidoridae) from seagrass in Windward Islands. *Nematologica*, 7 : 32-35.
- LAMBERTI, F. & BLEVE-ZACHEO, T. (1977). Two new species of *Longidorus* (Nematoda : Longidoridae) from Italy. *Nematol. medit.*, 5 : 73-83.
- LAMBERTI, F., ROCA, F. & AGOSTINELLI, A. (1985). I Longidoridae (Nematoda, Dorylaimida) delle regioni italiane I. La Puglia. *Nematol. medit.*, 13 : 21-60.
- MAAS, P. W. T., OREMUS, P. A. I. & OTTEN, H. (1983). Nematodes (*Longidorus* sp. and *Tylenchorhynchus microphasmis* Loof) in growth and nodulation of sea buckthorn (*Hippophae rhamnoides* L.). *Plant and Soil*, 73 : 141-147.
- STURHAN, D. & ARGO, D. (1983). Studies on *Longidorus closelongatus* Stoyanov and *L. cohnii* Heyns, with description of *L. proximus* sp. nov. (Nematoda, Dorylaimida). *Revue Nématol.*, 6 : 57-64.
- TAYLOR, C. E., THOMAS, P. R., ROBERTSON, W. M. & ROBERTS, I. M. (1970). An electron microscope study of the oesophageal region of *Longidorus elongatus*. *Nematologica*, 16 : 6-12.