Longidorus fursti n. sp. from South Africa with a discussion of its relationships (Nematoda : Longidoridae)

Juan HEYNS*, August COOMANS**, Mieke HUTSEBAUT* and Antoinette SWART*

* *Department of Zoology, Rand Afrikaans University, P.O. Box 524, Johannesburg 2000, South Africa and*
** *Laboratorium voor Morfologie en Systematiek, Rijksuniversiteit Gent, Ledeganckstraat 35, 9000 Gent, Belgium.*

SUMMARY

Longidorus fursti n. sp. is characterized by an expanded lip region, posterior guiding ring at 60 % odontostyle length, rather well developed flanges at base of odontophore, and roughly stirrup-shaped amphidial fovea with small pore-like opening. It comes closest to *L. pisi*, and together with *L. pisi*, *L. mobae* and *L. latocephalus* represents a rather distinct group within *Longidorus*. The new species is somewhat reminiscent of the genus *Xiphidorus*.

RÉSUMÉ

Longidorus fursti *n. sp. provenant d'Afrique du Sud, et discussion de ses affinités (Nematoda : Longidoridae)*

Longidorus fursti n. sp. est caractérisé par une région labiale renflée, la position postérieure de l'anneau-guide (à 60 % de la longueur de l'odontostyle), la présence d'ailettes assez développées à la base de l'odontophore et une fovea amphidienne en forme d'étrier, dont l'ouverture est un pore. *L. fursti* n. sp. est proche de *L. pisi* et, avec cette dernière espèce, *L. mobae* et *L. latocephalus*, forme un groupe assez distinct à l'intérieur du genre *Longidorus*. La nouvelle espèce rappelle quelque peu le genre *Xiphidorus*.

Specimens used for this study were killed in hot FAA (about 70°) and processed into dehydrated glycerine by Cobb's slow method. Measurements of curved structures were made with the aid of a curvimetre along their median line. For SEM study specimens were fixed in 2,5 % buffered glutaraldehyde, post-fixed in 1 % buffered osmium tetroxide and dehydrated in an ethanol series. The critical-point dried specimens were coated with gold and observed in a ISI-SS 60 scanning electron microscope operated at 4kV. Dissected stylets were prepared according to a slightly modified method (Swart & Heyns, 1987) as described by Eisenback and Hirschmann (1982).

Longidorus fursti n. sp.
(Figs 1 & 2)

MEASUREMENTS

Biometrical data for holotype female, paratypes and juvenile stages are given in Table 1.

consisting of several layers; outer layer of about same thickness throughout, but inner layers thickening towards lip region and on tail, where cuticle is 4-4.5 µm on dorsal side of tail. Cuticle with faint, sometimes irregular, transverse striae; inner radial striae well visible on tail. Dorsal and ventral pores not observed. Lateral body pores indistinct, apparently in a single row along greater part of body, except on tail; with ten to fourteen pores on the neck, and two or three caudal and adanal pores; lateral chord with 63-67 more or less discrete glandular areas between base of neck and vulva, and 64-71 between vulva and anus (n = 4); glandular areas larger and more conspicuous towards tail. Lip region expanded, clearly separated from the body by a broad depression. Inner and outer labial papillae distinct, cephalic papillae slightly less distinct; all of them with an apical pore (Fig. 2). Amphid indistinct, the fovea roughly stirrup-shaped; aperture not visible under light microscope, but seen as a circular pore under SEM (Fig. 2). Under the light microscope some specimens seem to have a very short slit-like opening, but this could

Table 1

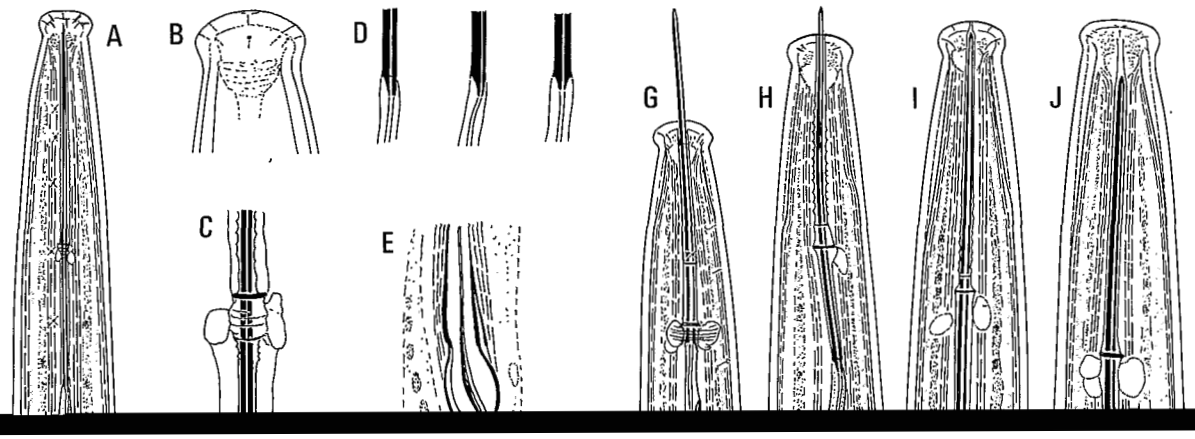
Biometrics of *Longidorus fursti* n. sp. females and juveniles

	Holotype Female	*Paratype females*	*n*	*J1*	*n*	*J2*	*n*	*J3*	*n*	*J4*	*n*
L (mm)	4.42	4.57 (3.93-5.08)	8	1.26 (1.21-1.41)	4	1.75 (1.61-1.87)	12	2.35 (2.19-2.54)	6	3.45 (3.30-3.57)	5
a	116	121 (105-137)	8	55.8 (54-58)	4	65 (62-69)	12	77.6 (68-84)	6	99 (87-104)	5
b	10.5	11.2 (10.3-12.3)	7	5.9 (5.4-7.1)	4	6.4 (5.8-7.1)	11	7.0 (5.2-8.5)	5	9.3 (8.3-10.8)	5
c	164	173 (148-220)	7	27.5 (26.8-28.0)	3	40.3 (36.8-46.8)	9	59.8 (54.1-68.6)	6	104 (96-115)	3
c′	1.02	1.01 (0.90-1.14)	7	2.88 (2.84-2.93)	3	2.18 (1.90-2.34)	11	1.79 (1.67-1.95)	6	1.31 (1.24-1.42)	3
V	53.6	52.6 (51.5-53.6)	8	–		–		–		–	
Lip region : width (µm)	15	14.7 (14.5-16)	8	10.4 (10-11)	4	12.2 (11-13)	13	12.5 (12-13)	6	13.9 (13.5-14)	4
height (µm)	7	6.7 (6-7)	8	4.1 (3.5-4.5)	4	5.8 (4.5-6)	13	6.0 (5.5-7)	6	6.3 (6-7)	4
Odontostyle (µm)	108	104.3 (99.5-108)	8	58.8 (56-60)	4	66.2 (64-69)	13	78.8 (77.5-81)	6	92.2 (89.5-95)	5
Odontosphore (µm)	66	66.6 (63-70)	8	43.1 (42-44.5)	4	50.9 (48-55)	13	55.9 (51-60)	6	59.8 (59-61)	5
Total stylet (µm)	171	168 (164-174)	8	101.6 (98-104.5)	4	115.6 (110-119)	13	133 (130-136)	6	150 (149-151)	5
Replacement odontostyle (µm)	–	–		67.3 (65.5-69)	4	79.4 (76.5-83)	13	90.9 (90-92.5)	6	104.3 (103-106)	5
Flanges width (µm)	8	6.7 (5-8)	8	5.8 (5.5-6.5)	4	6.8 (5-8)	12	7.2 (6-9)	6	7.2 (6-8)	5
Guide ring (µm)	65	67.5 (64-73)	8	36.9 (36-38)	4	42.6 (39-47)	12	51.4 (45-56)	6	58.5 (57-61.5)	5
Vestigium position (µm)	240	232 (205-263)	5	–		–		–		–	
Nerve ring (µm)	198	202 (194-213)	8	129.5 (127-131)	4	145 (136-154)	12	163 (142-182)	6	185 (179-192)	5
Hemizonid (µm)	188	183 (172-194)	8	120.3 (117-123)	3	140 (135-146)	12	153 (139-163)	5	173 (165-178)	5
Hemizonion (µm)	239	233 (224-240)	5	154	1	166	1	196	1	207 (192-219)	3
Basal bulb :											
length (µm)	76	74 (67-84)	8	50.5 (48-53)	3	53.1 (48-60)	11	60 (52-70)	5	65 (60-70)	5
width (µm)	16.5	16.8 (16-17)	8	11.8 (11.5-12)	3	13.7 (12-15)	12	14.2 (12-15)	5	15.4 (13.5-16.5)	5
Body width :											
middle (µm)	35	38.2 (35-44)	8	22.5 (21-26)	4	26.7 (24-30)	13	27.2 (28-37)	6	36.3 (32-38)	5
anus (µm)	26.5	26.8 (25-29)	7	15.6 (15-17)	4	20.1 (19-21)	12	22.0 (21-24)	6	25.7 (25-26)	3
Tail (µm)	27	26.9 (23-32)	7	43.2 (42-44)	4	44.0 (38-49)	11	39.5 (36.5-43)	6	33.7 (31-37)	3
Rectum (µm)	26	24.0 (22-26)	5	–		12.9 (12-14)	9	18.7 (16-28)	6	24.7 (23-28)	3

the orientation (Fig. 1D). Beyond this ring-like projection the odontostyle base tapers to a conoid point which is inserted into the anterior end of the odontophore, as in the genus *Xiphinema.* Odontophore base broadened and provided with rather well developed flanges (Figs 1 E & 2 I-J). Guiding ring situated around posterior half of odontostyle, i. e. at about 61 % (58-65) of the length of the retracted odontostyle. Guiding sheath visible when stylet is protruded; partly inserted in the cheilostome and forming a guiding tube (" double guide ring "). Compensation sacs present. Cheilostome wall folded concertina-like when stylet is protruded (see Fig. 1 C, H & I). Cheilostome retractor muscles (= *dilatores*

by varying amounts of intestinal tissue, giving the cardia a variable appearance (Fig. 1 L-N). Rectum slightly shorter than anal body width. Tail convex-conoid, bluntly rounded.

Female reproductive system amphidelphic, with both branches about equally developed, the anterior branch comprising 6.2 % (4.2-8.4) and the posterior one 6.7 % (4.8-12.4) of the body length (n = 8). Each branch composed of a relatively large ovary [anterior = 126 µm (92-188); posterior = 153 µm (88-376), n = 7 or 8], oviduct [anterior = 108 µm (97-125); posterior 131 µm (115-160); n = 5], sphincter, uterus without special features [anterior = 128 µm (85-227); posterior = 115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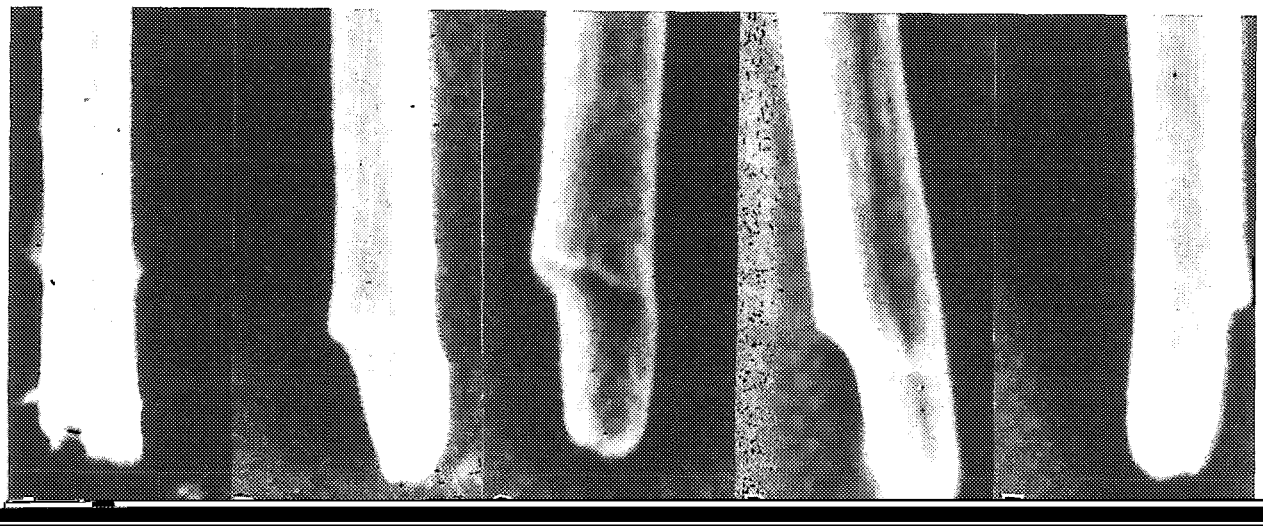

Juveniles

All juvenile stages were found. In general, they resemble adults in body posture and shape. Juvenile tails become progressively broader and shorter after each moult, with a very significant change in c' ratio. In J2, J3 and J4 the odontostyle base is constructed as in the adult, with an incomplete ring near the base and a conically tapered part projecting into the anterior end of the odontophore (Fig. 2B-D). In J1 no such ring is evident, and the base of the odontostyle is truncate, very slightly broadened and jointed to the anterior end of the odontophore in a similar manner as in most known *Longidorus* species (Fig. 2A). In J1 the anus is very indistinct and the rectum not visible at all.

Type locality and habitat

Collected from sandy soil rich in organic matter, about 30 m above high water mark spring tide, 400 m west of the small bathing area at The Willows Holiday Resort, south of Port Elizabeth, 25° 35' E and 24° 5' S, in the rhizosphere of *Cynodon dactylon, Mesembryanthemum aitonis, Chrysanthemoides monilifera* and *Acacia cyclops* (*legit* J. Heyns; June and December 1984).

TYPE MATERIAL

Holotype on slide 1641, seven paratype females on slides 964, 973, 1097, 1098, 1426 and 1427 and 28 juveniles on slides 965, 1428-1431, 1611, 1612, 1626, 1629-1643 in the collection of the Department of Zoology, Rand Afrikaans University, Johannesburg. One female paratype and some juveniles in the nematode collection of the Instituut voor Dierkunde, Rijksuniversiteit Gent, Gent, Belgium.

Diagnosis and relationship

Longidorus fursti n. sp. is characterized by the following combination of characters : expanded lip region; guiding ring situated at about 60 % of odontostyle length; rather well developed flanges at base of odontophore; and roughly stirrup-shaped amphidial fovea with small pore-like opening. *L. fursti* n. sp. comes closest to *L. pisi* Edward, Misra & Singh, 1964 from which it can be differentiated by larger body length (L = 2.7-4.1 mm in *L. pisi*), longer odontostyle (56-86 µm in *L. pisi*), longer odontophore (33-52 µm in *L. pisi*) and more posteriorly located guiding ring (around 50 % in *L. pisi*), and the absence of prerectal structures (Heyns *et al.*, 1984) which are so characteristic of *L. pisi.* (Data for body length, odontostyle and odontophore of *L. pisi* for various populations from South Africa, Nigeria, Cameroon, Israel, Iran and India, from Jacobs, 1985.)

DISCUSSION

Together with *L. pisi, L. mobae* Jacobs & Heyns, 1987 and *L. latocephalus* Lamberti, Choleva & Agostinelli, 1983 (possibly conspecific with *L. pisi*) this new species represents a group of *Longidorus* species characterized by a posterior guide ring and rather well developed flanges. The guiding sheath forms an intra-cheilostomal tube and double ring upon protraction of the stylet, but the concertina-like foldings of the cheilostomal wall indicate that this also compensates for the protraction of the stylet, bringing the guide ring more anterior in position.

These species may represent a remnant of an ancient stock (with *P. xiphinemoides* Heyns, 1965 and *P. sandellum* (Heyns, 1966) of the Longidorini) with posterior guiding ring, which separated into *Paralongidorus* and *Longidorus-Longidoroides.* In each branch there are only a few species with this ancestral character, while most evolved to an apparently more efficient system with anterior guide ring. The ancient stock seems to be better represented in South Africa than anywhere else. *L. pisi* is not only the commonest, but also the most widespread species.

In having a guiding ring situated at about 60 % of the odontostyle length, and odontophore with rather well developed flanges and a roughly stirrup-shaped amphidial fovea with pore-like opening *L. fursti* n. sp. is somewhat reminiscent of *Xiphidorus.* The main difference remains nevertheless the clearly forked base of the odontostyle in the latter genus. Probably the ancestral Longidorinae originated in the southern part of Gondwanaland giving rise to the Xiphidorini in South America and the Longidorini in Africa.

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