

Longidorus seinhorsti sp.n. (Nematoda: Dorylaimoidea) from The Netherlands

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Summary – A description is provided of *Longidorus seinhorsti* sp.n., a bisexual species associated with grass growing in coarse alluvial sand in The Netherlands. The species is characterised by its medium body length (4.6-6.2 mm), slightly expanded and anteriorly flattened head region, symmetrically bilobed amphidial pouches, odontostyle 110-128 μ m long, and elongate, conoid tail (36-46 μ m). Males have short spicules (50-57 μ m) and a row of fourteen to sixteen supplements. © Orstom/Elsevier, Paris

Résumé – *Longidorus seinhorsti* sp. n. (Nematoda: Dorylaimoidea) provenant des Pays-Bas – Description est donnée de *Longidorus seinhorsti* sp. n., espèce bisexuée associée aux graminées poussant sur un sol alluvial grossier des Pays Bas. Cette espèce est caractérisée par: corps de longueur moyenne (4,6-6,2 mm), région antérieure en relief et légèrement aplatie frontalement, poches amphidiennes à bilobation symétrique, odontostyle long de 100-128 μ m, queue allongée-conoïde (36-46 μ m). Les mâles présentent des spicules courts (50-57 μ m) et une rangée de quatorze à seize suppléments. © Orstom/Elsevier, Paris

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As part of a study of morphological variability present in *Longidorus vineacola* Sturhan & Weischer, 1964 (see Brown *et al.*, 1997) the late Dr J.W. Seinhorst provided one of us (DJFB) with specimens from several populations of *Longidorus* occurring in The Netherlands, which had been tentatively identified as representing *L. vineacola*. Amongst this material were several slides containing specimens from a population from Vortum-Mullem, which Dr Seinhorst had identified as being similar to, but not identical with, *L. vineacola*. Dr Seinhorst also provided some preliminary drawings and measurements (Fig. 1) of these nematodes which suggested that the specimens were not *L. vineacola* but represented an undescribed species. Also, on one slide he indicated a female specimen as the potential holotype. Brown *et al.* (1997) referred to this species as *L. pseudoelongatus* Altherr, 1976 but subsequently, whilst preparing a redescription of that species (unpubl.) one of us (P.A.A.L.) confirmed that the specimens from Vortum-Mullem represented an undescribed species. Here we provide a description of this species.

Specimens were provided mounted in glycerine on permanent aluminium double slides by the late Dr J.W. Seinhorst.

*Longidorus seinhorsti** sp.n.

(Figs 1, 2)

MEASUREMENTS

See Table 1.

DESCRIPTION

Female. Body very slender, C- or G-shaped when heat relaxed. Head region slightly expanded, anteriorly flat, rounded laterally, set-off by a shallow depression. Labial papillae prominent, nerve canals very thick. Cuticle with two layers of equal thickness and with fine transverse striae; cuticle along the body about 2.5 μ m thick, 3 μ m at postlabial region and 6 μ m on tail. Hypodermal chord 16 (14-18) μ m wide (n=10). Numerous lateral body pores, five to seven in the odontostyle region, six dorsal and eight ventral cervical pores. Amphidial pouches large, extending more than half the distance between anterior end and guide ring, symmetrically bilobed. Nerve ring single. Muscular bulb plump, oesophago-intestinal valve elongate, bluntly conoid. Location of oesophageal gland nuclei typical for genus. Nuclei of dorsal and subventral glands situated at 35 (29-39) (n=7) and 52 (48-56) % (n=11); opening of the dorsal gland (DGO) at 11-13% (n=4) and opening of the subventral glands (SVO) 86-92% (n=4) of the distance from

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* Named in memoriam of the late Dr J.W. Seinhorst.

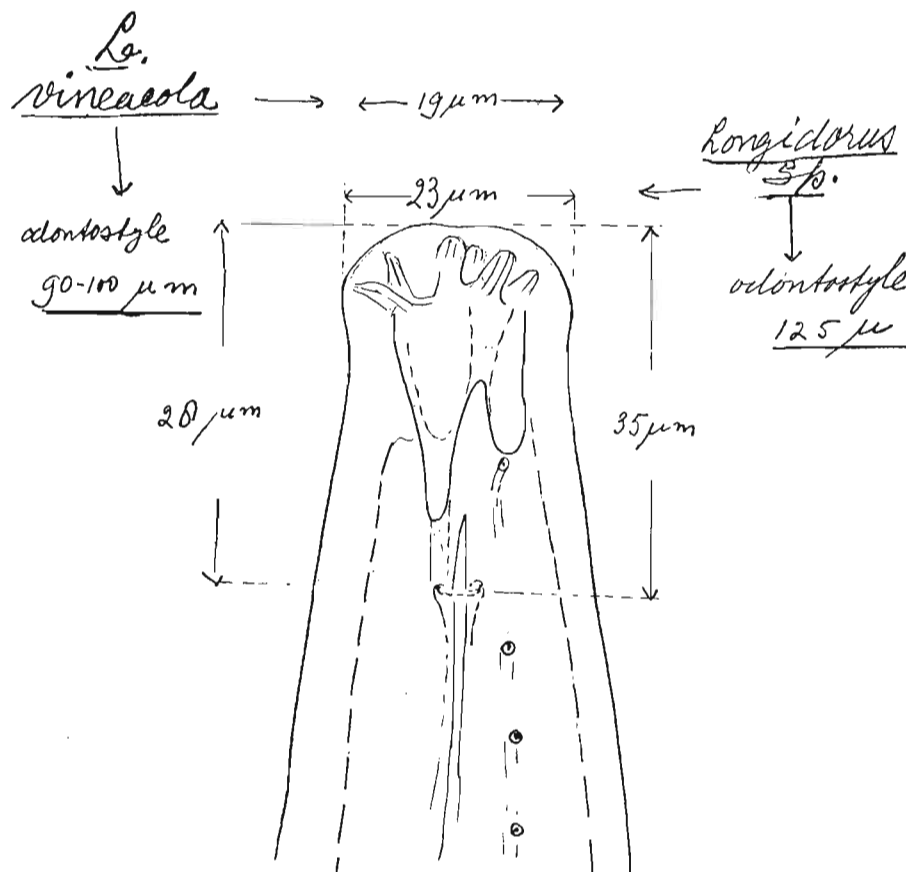


Fig. 1. The original figure drawn by the late Dr J.W. Seinhorst showing a stylised representation of the anterior end of a *Longidorus* nematode in which the differences between *Longidorus vineacola* and *L. seinhorsti* sp. n. are displayed.

anterior end of oesophageal bulb, respectively. Dorsal gland nuclei 1.5 μm diam. and subventral glands nuclei 3 μm diam. Vulva a transverse slit, vagina extending to *ca* half a corresponding body diameter, or slightly less; *pars distalis vaginae* and moderately thick walled *pars proximalis vaginae* 13-15 μm and 8-11 μm long, respectively. Uteri 180-289 μm long, thick walled, with conspicuous lumen, filled with sperm cells in fertile females; well developed sphincter between uterus and *pars dilatata oviductus*. *Pars dilatata oviductus* 75-134 μm long, containing sperm cells in fertile females, slender part of oviduct 92-154 μm long; caecum 43-70 μm long and ovarium 87-193 μm long. Prerectum 526 (396-633) μm long ($n=5$), rectum about 0.8 (0.7-0.9) of body diameter at anus. Tail elongate conoid, slightly ventrally curved, terminus broadly rounded; two pairs of lateral pores present.

Male: Body C-shaped, more strongly curved at posterior end. Two pairs of adanal supplements followed

by a row of twelve to fourteen. Postcloacal papilla well developed. Tail bluntly conoid with a rounded terminus.

Juveniles: Only four specimens available. On the basis of lengths of body, odontostyle, replacement odontostyle and developing gonad, and the position of the replacement odontostyle in relation to the odontophore, they can be assigned to three stages (J2, J3, and J4). In J2 the head region is less expanded than in the subsequent stages and adults.

DIAGNOSIS AND RELATIONSHIPS

Longidorus seinhorsti sp.n. is a bisexual species characterised by its medium body length (4.6-6.2 mm), slightly expanded and anteriorly flattened head region, symmetrically bilobed amphidial pouches, odontostyle 113-128 μm long and elongate conoid tail (41-46 μm). Male with short spicules (50-57 μm) and two pairs of adanal supplements followed by a row of twelve to fourteen supplements.

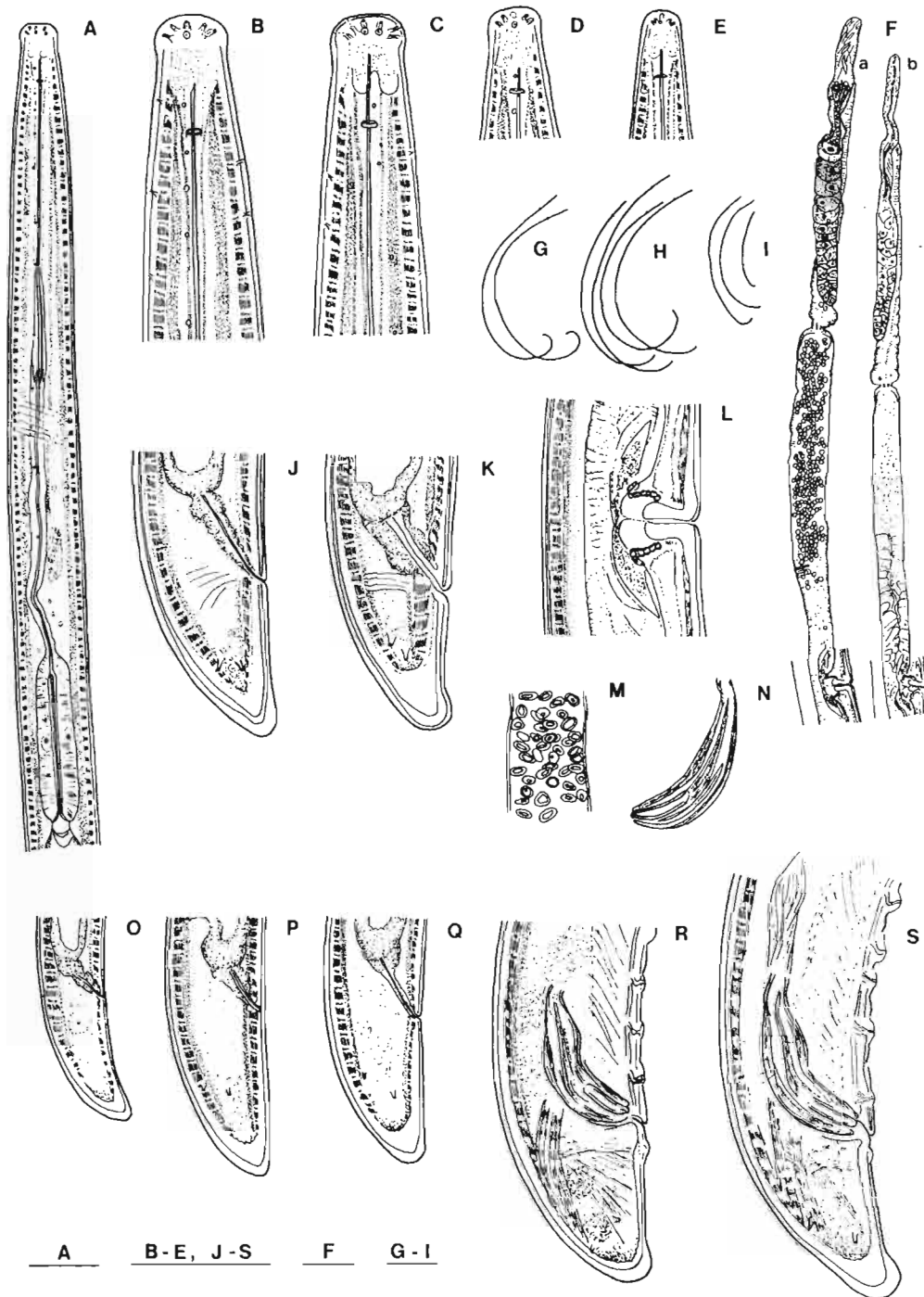


Fig. 2. *Longidorus seinhorsti* sp. n. A: Female oesophageal region; B: Female head region; C: Male head region; D: Third stage juvenile head region; E: Second stage juvenile head end; F: Anterior genital branches of, a) fertile, and b) virgin females; G-I: Habitus of males, females and juveniles fourth, third and second stage, respectively; J, K: Female tail ends; L: Vaginal region; M: Sperm cells; N: Spicule; O-Q: Juvenile tail ends, second, third and fourth stage, respectively; R, S: Male tail ends (Scale bars: A, B - E, J - S = 40 μ m; F = 20 μ m; G - I = 1 mm).

Table 1. Measurements of *Longidorus seinhorsti* sp.n. (All measurements in μm , except L in mm).

	Holotype	Females	Males	J2	J3	J4
n		13	4	1	2	1
L	5.1	5.5 \pm 0.35 (4.6-6.2)	5.3-5.6	1.7	2.6,3.0	3.4
a	118	122 \pm 7.8 (107-133)	108-138	69	89,91	113
b	11.7	13.1 \pm 0.9 (11.7-15.3)	11.3,12.3*	5.7	7.1,8.5	8.9
c	113	129 \pm 7.8 (113-140)	121-146	50	58,78	85
c'	1.3	1.3 \pm 0.11 (1.0-1.4)	1.1-1.3	1.8	1.6,1.8	1.4
V/T	53	49 \pm 2.0 (47-53)	32, 33*	-	-	-
Odontostyle	125	121 \pm 4.7 (113-128)	110-124	76	93, -	105
Odontophore	61	65 \pm 3.8 (55-69)	59-70	42	54, -	54
Repl. od. style	-	-	-	83	101,103	120
Bulb length	88	91 \pm 5.5 (84-102)	79-92**	62	66,73	77
Bulb diam.	21	22 (21-29)	19-22**	13	17,18	18
Tail	45	42 \pm 3.1 (41-46)	42-47	33	44,45	40
h	17	15 (9-19)	6-12**	8	10,12	10
Ant. end to guide ring	32	32 \pm 0.8 (30-33)	31-32	18	23,24	25
Neck length	435	418 \pm 27.5 (375-457)	443-476**	291	354, 364	384
Ant. end to nerve ring	192	200 \pm 9.1 (192-218)	203-208**	133	170, 168	174
Diam. at lip region	21	21 (21-22)	21-22**	11	14,15	15
Diam. at mid-body	43	45 \pm 3.1 (40-49)	39-49	24	29,33	30
Diam. at anus	36	33 \pm 1.4 (31-36)	33-38	18	25,28	28
G1/T1	8	9 (7-11)	8-11**	-	-	-
G2/T2	7	9 (6-12)	7-9**	-	-	-
Spicules	-	-	50-57	-	-	-

* n = 2; ** n = 3.

The code for identifying the new species when using the identification key of Chen *et al.* (1997) is: A-45, B-4, C-3, D-2, E-2, F-23, G-23, H-4, I-2.

Based on the codes provided in the identification key, the new species is similar to *Longidorus dunensis* Brinkman, Loof & Barbez, 1987, which is a parthenogenetic species having a shorter odontostyle (95-106 μm) and odontophore (54-63 μm), a narrower lip region (14-16 μm), DN is situated more anteriorly (20-29%), and SVN more posteriorly (51-60%) than in the new species. The new species is also similar to: *L. paraelongatus* Altherr, 1974, which was described from a single female, and which has a longer body (7.35 mm) and odontostyle (140 μm), a slightly narrower labial region (calculated from Fig. 10a of Altherr, 1974, who did not provide information in the text), amphids not bilobed, and tail broader at the tip; *L. cylindricaudatus* Kozłowska & Seinhorst, 1979 which differs by having a longer odontostyle (128-140 μm), a narrower lip region (12 μm), a more posterior guide ring (33-38 μm), different tail shape, and males extremely rare; *L. cohni* Heyns, 1969 in which the lip region is narrower (16-18 μm), the body is longer (7.8-8.8 mm) and more slender ($a=165-225$), and the location of the oesophageal gland nuclei is abnormal; *L. closelongatus* Stoyanov, 1964 which has a narrower (17 μm) and more expanded lip region, males are rare, and the location of the oesophageal gland nuclei is abnormal; *L. arenosus* Kankina & Ivanova, 1986 has a longer body (7.13-9.16 mm), a narrower (18 μm , measured from the illustration) and more expanded, strongly off-set lip region, and a more anterior guide ring (22-27 μm).

TYPE HOST AND LOCALITY

Rhizosphere of grass growing in coarse alluvial sand, 1000 m from the southern bank of the river Maas, Vortum-Mullem, The Netherlands (51°38'N, 05°59'E).

TYPE MATERIAL

Holotype (slide number WT 3251), three paratype females, two paratype males and four juveniles deposited in the collection of the Agricultural University, Wageningen, The Netherlands (slide numbers WT 5231 to WT 5235). The holotype female designated by Dr Seinhorst was in poor condition which required us to designate a different specimen as the holotype. Three paratype females and one paratype male deposited in the nematode collection of the International Institute of Parasitology, St. Albans, UK; four paratype females deposited in the collection at the Muséum National d'Histoire Naturelle, Paris, France; two paratype females and one paratype male deposited in the USDA Nematode Collection, Beltsville, MD, USA.

REMARK

A relatively long caecum is present in all females (Fig. 2 Fa, b). In fertilised females, this structure becomes thicker, presumably as a result of physiological changes induced in the spindle-shaped epithelial cells (Coomans, 1965) as a pre-requisite for receiving fertilised eggs from the ovary. In one specimen an oocyte was observed partly entered into the caecum and with two sperm cells associated with invaginations of the oocyte. Thus, the caecum appears to be the place in the reproductive tract where fertilisation of oocytes occurs.

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References

- ALTHERR, E. (1974). Nématodes de la nappe phréatique du réseau fluvial de la Saale, Thuringe. II. *Limnologica*, 9: 81-132.
- ALTHERR, E. (1976). La faune des eaux profondes interstitielles de la région de Wiesbaden. *Bull. Soc. vaudoise Sci. nat.*, 73: 97-116.
- BRINKMAN, H., LOOF, P.A.A. & BARBEZ, D. (1987). *Longidorus dunensis* n. sp. and *L. kuiperi* n. sp. from sand dunes coastal region of the Netherlands (Nematoda: Longidoridae). *Revue Nématol.*, 10: 299-308.
- BROWN, D.J.F., NEILSON, R., CONNOLLY, T. & BOAG, B. (1997). An assessment of morphometric variability between the populations of *Longidorus vineacola* Sturhan & Weischer, 1964 (Nematoda: Longidoridae) and morphologically related species. *Syst. Parasit.*, 37: 93-103.
- CHEN, Q., HOOPER, D.J., LOOF, P.A.A. & XU, J. (1997). A revised polytomous key for the identification of the genus *Longidorus* Micoletzky, 1922 (Nematoda: Dorylaimoidea). *Fundam. appl. Nematol.*, 20: 15-28.
- COOMANS, A. (1965). Structure of the female gonads in members of the Dorylaimina. *Nematologica* (1964), 10: 601-622.
- HEYNS, J. (1969). *Longidorus cohni* n. sp., a parasite of alfalfa and Rhodes grass in Israel. *Israel J. agric. Res.*, 19: 179-182.
- KANKINA, V.K. & IVANOVA, T.S. (1986). [A new nematode species of the genus *Longidorus* Micoletzky, 1922 in southern Tajikistan]. *Izv. Akad. Nauk Tadzhikskoi SSR*, 2: 60-62.
- KOZŁOWSKA, J. & SEINHORST, J.W. (1979). *Longidorus elongatus* and closely related species in The Netherlands and Lower Saxony (Germany), with the description of two new species, *L. cylindricaudatus* and *L. intermedius* (Nematoda: Dorylaimida). *Nematologica*, 25: 42-53.
- STOYANOV, D. (1964). [A contribution to the nematode fauna of grapevine]. *Rastit. Zash.*, 6: 16-24.
- STURHAN, D. & WEISCHER, B. (1964). *Longidorus vineacola* n.sp. (Nematoda: Dorylaimida). *Syst. Parasit.*, 5: 21-24