

# *Longidorus brevis* sp. n. (Nematoda: Longidoridae) from Senegal, West Africa

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**Summary.** *Longidorus brevis* sp. n. is described from the rhizosphere of *Guiera senegalensis*, *Pennisetum pedicellatum*, *Cordyla pinnata* and *Blumea aurita* in Senegal. It is a small longidorid, morphologically resembling *L. juveniloides*, *L. juvenilis*, *L. reneyii* and *L. laeovicapitatus*. The new species can be distinguished from these species by combinations of the following characters: short, thick body ( $L = 1.71\text{--}2.13$  mm and  $a = 54.2\text{--}68.9$ ), short odontostyle ( $40\text{--}43$   $\mu\text{m}$ ), lobed amphidial pouches, distance of guide ring from anterior end ( $23\text{--}25.5$   $\mu\text{m}$ ) and an elongate conoid tail with a slightly digitated terminus ( $c' = 1.89\text{--}2.61$ ).

**Key words:** Senegal, *Longidorus brevis* sp. n., new species, SEM.

Compared to other species within the genus *Longidorus*, *L. brevis* sp. n. is at present the smallest member. It was collected during a survey conducted in the Niore du Rip region in southern Senegal on land that had been left fallow for 18 years and fenced for the last six years to prevent human access. The soil is typically shallow and ferruginous.

## MATERIAL AND METHODS

Specimens for light microscopy (LM) study were killed by heat (Seinhorst, 1966) fixed in FP 4G (40% formaldehyde, propionic acid, glycerol, distilled water and one drop of picric acid), processed to glycerol by a slow method (Hooper & Evans, 1993) and mounted on cover slip slides. When calculating the b-value (total body length/oesophagus length), the neck length (anterior to base of oesophagus) was measured instead of the oesophagus length, as in the specimens the slender part of the oesophagus was convoluted and difficult to measure accurately. In some specimens where the length of the odontophore was difficult to determine, this structure was not measured.

For scanning electron microscopy (SEM) two specimens were fixed in FP 4G, dehydrated in a graded ethanol series, critical point dried with  $\text{CO}_2$  as intermediate fluid and coated with gold-palladium (25 nm). Specimens were viewed with a Jeol-35 scanning electron microscope at 15 kV.

## DESCRIPTION

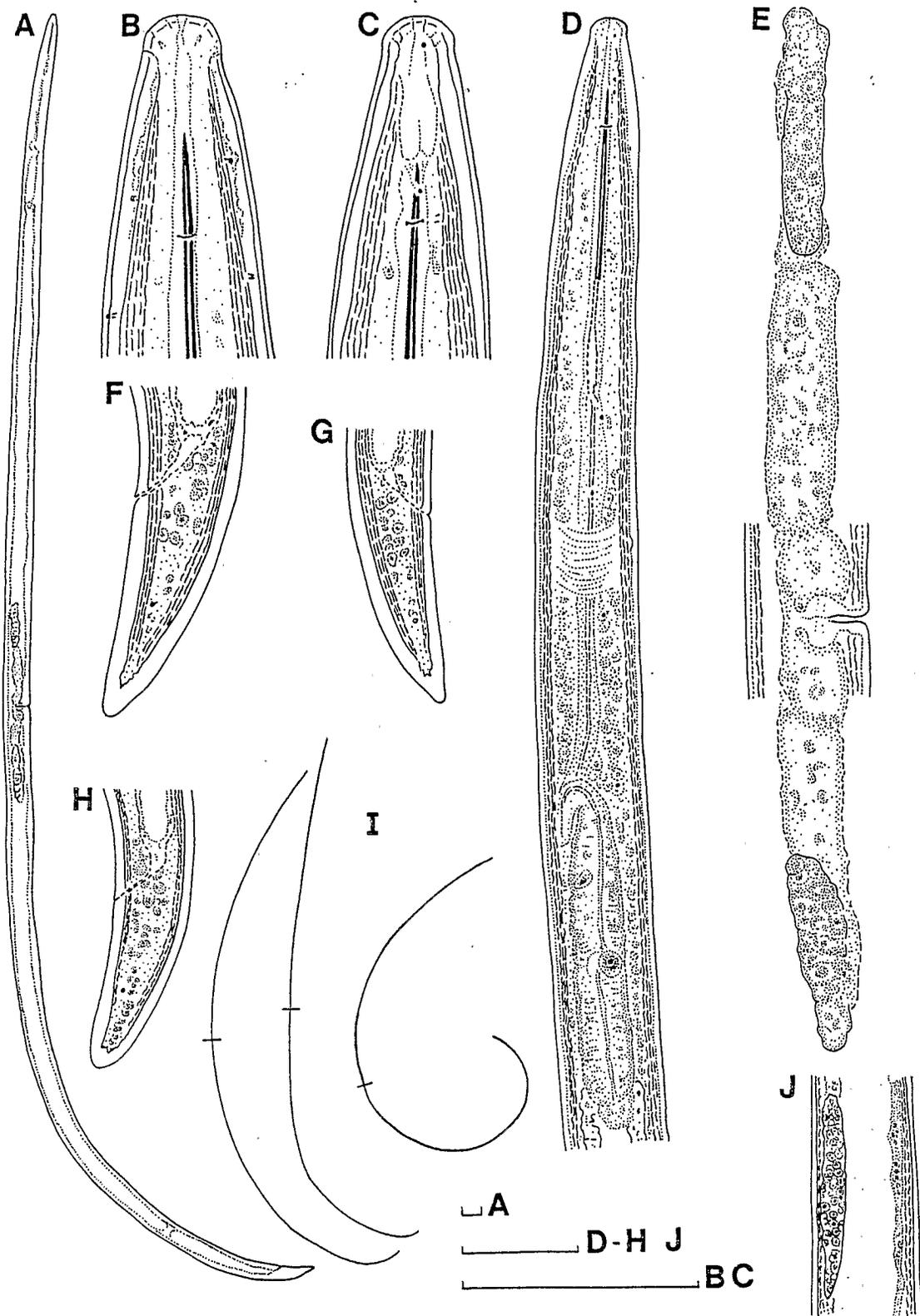
### *Longidorus brevis* sp. n. (Figs. 1 & 2; Table 1)

**Holotype female:**  $L = 2.13$  mm;  $a = 68.6$ ;  $b = 8.4$ ;  $c = 42.2$ ;  $c' = 2.5$ ;  $V = 48.2\%$ ; odontostyle length =  $43.5$   $\mu\text{m}$ ; odontophore length =  $34.5$   $\mu\text{m}$ ; tail length =  $50.5$   $\mu\text{m}$ .

Measurements and other biometrical data of the type population are in Table 1.

**Female.** Habitus weakly to strongly curved ventrally with curvature in some specimens more pronounced posteriad. Body small, tapering to both ends. Cuticle appears smooth with LM; faintly annulated with SEM. Annules  $0.5$   $\mu\text{m}$  apart (Fig. 2B). Hypodermal lateral chords  $9\text{--}18$   $\mu\text{m}$  wide at mid-body, occupying up to 40% of body width. Chords with characteristic glandular appearance. Lateral body pores indistinct, apparently in a single row along the body, with three to seven pores discernable in neck region. One dorsal and one ventral body pore occasionally seen at about  $25\text{--}30$   $\mu\text{m}$  from anterior end. Cuticle  $1.5\text{--}2.0$   $\mu\text{m}$  thick over largest part of body, thickening visibly towards the lip and tail regions where it measures  $2.5\text{--}3.0$   $\mu\text{m}$  and  $3.0\text{--}3.5$   $\mu\text{m}$  respectively. Lip region about 36% of body width at base of oesophagus, offset from rest of body by a slight depression, its anterior margin rounded. Am-





**Fig. 1.** *Longidorus brevis* sp. n. A: Entire female; B: Head region, dorso-ventral view; C: Head region, lateral view; D: Anterior region (neck region); E: Reproductive system; F & G: Tail regions of two females; H: Tail region of juvenile, probably a J<sub>4</sub>; I: Habitus of three different females; J: Undeveloped gonad in juvenile. Bars - 25 µm.

**Table 1.** Morphometric data of *Longidorus brevis* sp. n.

	Holotype	Paratypes	Juvenile
n	1	10	1
L (mm)	2.13	1.90±0.11 (1.71-2.13)	1.4
a	68.6	62.9±4.5 (54.2-68.9)	56.4
b	8.4	8.1±0.9 (7.5-10.1)	7.0
c	42.2	42.8±2.4 (39.7-48.5)	37.1
c'	2.5	2.3±0.2 (1.8-2.6)	2.2
OV <sub>1</sub>	41.0	40.8±0.7 (39.8-42.0)	-
V	48.0	48.0±0.7 (46.7-49.1)	-
OV <sub>2</sub>	54.4	54.1±1.1 (52.6-55.4)	-
Lip width (µm)	9.0	8.5±0.4 (8.0-9.0)	7.5
Lip height (µm)	5.0	4.7±0.4 (4.0-5.0)	3.7
Odontostyle length (µm)	43.5	42.4±1.0 (40.0-43.5)	34.5
Replacement odontostyle (µm)	-	-	41.0
Odontophore length (µm)	34.5	34.8±2.7 (30.0-40.0)	29.0
Total stylet length (µm)	78.0	77.3±2.8 (73.0-80.0)	63.5
Guide ring from anterior (µm)	24.5	24.1±0.7 (23.0-25.5)	19.0
Guide ring from anterior/lip width	2.7	2.8±0.1 (2.6-3.1)	2.5
Nerve ring from anterior (µm)	120	115±4.7 (104-120)	96.0
Tail length (µm)	50.5	44.5±2.5 (42.0-50.5)	36.5
Length of hyaline tail tip (µm)	9.0	7.4±0.8 (6.0-9.0)	4.0

phid aperture pore-like, situated at base of lip region. Amphidial pouch sac-like, somewhat asymmetrically bilobed, the lobes extending to 60-70% of distance between stomatal aperture and guide ring. Odontostyle short, well sclerotized; odontophore short, its posterior extent in some specimens obscure. Nerve ring wide, well demarcated, situated at 104-120 µm from anterior end, at same level as the hemizonid. Neck 188-315 µm long, occupying 9-17% of body length. Slender part of oesophagus convoluted in all specimens; basal expanded part muscular, 59-69 µm long, 11.5-14 µm wide. Dorsal oesophageal gland nucleus and paired ventrosublateral gland nuclei situated at 25-30% and about middle of basal bulb, respectively. Prerectum well demarcated, 52-196 µm long, occupying 2.4-10% of total body length. Rectum about 15 µm long, usually less than one anal body width in length. Tail elongate-conoid, ventrally slightly concave, dorsally convex, with a rounded, slightly digitate terminus. One pair of caudal pores observed, situated laterally, slightly more than halfway between anal opening and tail terminus. Reproductive system amphidelphic, ovaries reflexed. Vulva a transverse slit; vagina muscular, extending about halfway across the body. Ovejector 1.5-2 times vulval body widths long. No sperm observed in uterus.

**Male.** Not found.

**Juvenile.** Only one specimen recovered. The length of the replacement odontostyle only slightly less than that of the odontostyles in the adults. The

undeveloped gonad was long (42 µm), tubular and multicellular. This juvenile, probably a J<sub>4</sub>, resembles the adults except for having a shorter body, stylet and tail, smaller hyaline tail tip and undeveloped gonads.

**Diagnosis and relationships.** *Longidorus brevis* sp. n. can be distinguished from other *Longidorus* spp. by the combination of the following characters: short, relatively thick body (a = 54.2-68.9); short odontostyle (40.0-43.5 µm); posterior position of guide ring (23-25.5 µm); slightly offset, rounded head; bilobed amphidial pouch and elongate-conoid tail with a rounded, slightly digitate tip.

*Longidorus brevis* sp. n. is, especially in body length, similar to *L. juvenilis* Dalmasso, 1969, *L. reneyii* Raina, 1966, *L. juveniloides* Jacobs & Heyns, 1987 and *L. laevicapitatus* Williams, 1959. From *L. juvenilis* it differs mainly by having a shorter body (1.71-2.13 mm vs 2.8-3.61 mm); lower a - value (54.2-68.9 vs 76-90); shorter odontostyle (40.0-43.5 µm vs 64-68 µm) and length of amphidial pouches (two or just more than two head width vs just more than one head width). The extent of the pouches in *L. juvenilis* were measured from Fig. 9A (Dalmasso, 1969). *Longidorus brevis* sp. n. can be distinguished from *L. reneyii*, another short longidorid, mainly by its slightly shorter body (2.1-2.6 mm in *L. reneyii*); lower a - value (70-80 in *L. reneyii*); lower c - value (39.7-48.5 vs 70-80); lower V-value (46.7-49.1% vs 50-52%); shorter odontostyle (50-58 µm in *L. reneyii*) and number of caudal pores (one pair vs three pairs). *Longidorus brevis* sp. n. differs from *L. ju-*

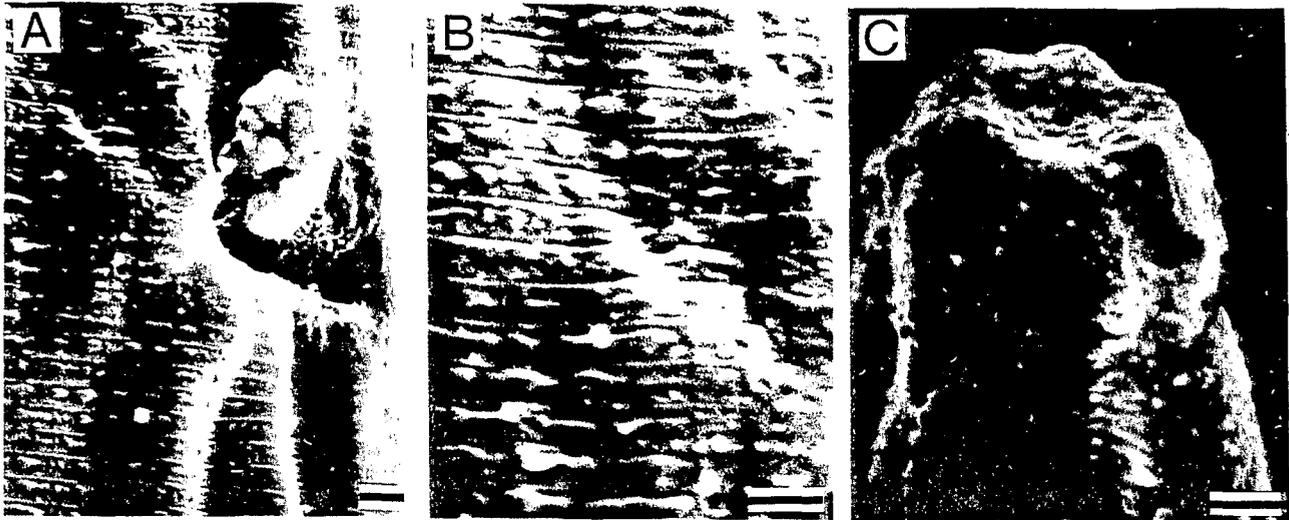


Fig. 2. *Longidorus brevis* sp. n. A: Vulval region; B: Cuticle at midbody; C: Head region, latero-ventral view. Bars - 1  $\mu$ m.

*veniloides* in having a shorter body (2.86-3.06 mm in *L. juveniloides*); lower a - value (76-88 in *L. juveniloides*); width of lip region (8-9  $\mu$ m vs 11-12  $\mu$ m); posterior position of guide ring from anterior end (23-25.5  $\mu$ m vs 17-19  $\mu$ m); higher c'-value (1.8-2.6 vs 1.3-1.5) and slightly shorter odontostyle (44-50  $\mu$ m in *L. juveniloides*). *Longidorus brevis* sp. n. can be differentiated from *L. laevicapitatus* mainly in head shape (offset by slight depression vs continuous with body contour); shorter body (2-3.2 mm in *L. laevicapitatus*); lower c- value (61-76 in *L. laevicapitatus*); tail shape (elongate-conoid with slightly digitate tip vs convex-conoid with bluntly rounded tip) and shorter odontostyle (about 60  $\mu$ m in *L. laevicapitatus*).

**Type material.** Holotype female on slide 30843 and eight paratype females on slides 30842 and 30843 deposited in the National Collection of Nematodes, Plant Protection Research Institute, Pretoria. One paratype female and one juvenile deposited in the collection of the Muséum National d'Histoire Naturelle; Laboratoire de Biologie, Parasitaire, Protistologie, Helminthologie, Paris, France.

**Type host and locality.** Samples taken at Sonkorong, near Thyssé Kaymor (Nioro du Rip region), Senegal, from among the roots of *Guiera senegalensis*, *Pennisetum pedicellatum*, *Cordyla pinnata* and *Blumea aurita*. Collected by E. Pate and N. N'Diaye on 13.07.1994.

**Etymology.** The specific name is from the Latin word *brevis*, referring to the short body and short odontostyle.

**Remarks.** The SEM results were poor and no amphidial aperture and only a few body pores could be discerned. The body annulations of *L. brevis* sp. n. are extremely fine (Fig. 2) and are in accordance with those of other *Longidorus* species, for example *L. africanus* Merny, 1966 where the distance between annulations is approximately 0.4  $\mu$ m (calculated from Fig. 2D in Zeidan & Coomans, 1991).

A few morphological features were difficult to see in the present specimens, e.g. the posterior extent of the odontophore and the number and distribution of body pores. Similar problems however, have been encountered by previous authors. Heyns (1966 and 1969) mentioned that the exact extent of the spear extension is difficult to determine in *L. monile* Heyns, 1966; *L. moniloides* Heyns, 1966 and *L. cohni* Heyns, 1969. Body pores have also been found to be indistinct or not readily visible on parts of the nematode body in *L. alvegus* Roca *et al.*, 1989; *L. jiangsuensis* Xu & Hooper, 1990 and *L. reneyii* Raina, 1966 (Raina, 1966; Roca *et al.*, 1989; Xu & Hooper, 1990). The above morphological characters appear therefore not to be reliable for species identification, especially for those with short-bodied adults.

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**Swart A., Cadet P., N'Diaye S. B.** *Longidorus brevis* sp. n. (Nematoda: Longidoridae) из Сенегала, Западная Африка.

**Резюме.** Описывается *Longidorus brevis* sp. n. из ризосферы *Guiera senegalensis*, *Pennisetum pedicellatum*, *Cordyla pinnata* и *Blumea aurita* из Сенегала. Нематоды нового вида представляют собой небольших лонгидорид, морфологически близких к *L. juveniloides*, *L. juvenilis*, *L. reneyii* и *L. laevicapitatus*, и могут быть дифференцированы от этих видов следующим набором признаков: тело короткое и толстое ( $L=1,71-2,13$  мм при  $a=54,2-68,9$ ), короткий одонгостиль (40-43 мкм), разделяющийся на две полости карман амфида, расстояние от головного конца до направляющего кольца - 23-25,5 мкм и удлинненно-конический хвост со слабо намеченным пальцевидным терминусом ( $c'=1,89-2,61$ ).

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