

Xiphinema smoliki n. sp. and *Longidorus pawneensis* n. sp. (Nemata : Longidoridae) from Colorado, USA

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SUMMARY

Two new longidorids are described from grassland in Colorado, USA. *Xiphinema smoliki* n. sp. is characterized by the hemispherical tail and the presence of both a weakly developed pseudo-Z-organ and long uterine spines. *Longidorus pawneensis* n. sp. differs from all species in the genus by the prominent vulva lips forming a tube. Males are not known for either of these species.

RÉSUMÉ

Xiphinema smoliki n. sp. et *Longidorus pawneensis* n. sp. (Nematoda : Dorylaimina) provenant du Colorado, USA

Deux nouveaux Longidorides sont décrits provenant de pâturages du Colorado, USA. *Xiphinema smoliki* n. sp. est caractérisé par une queue hémisphérique et la présence simultanée d'un pseudo-organe Z peu développé et de longues épines utériennes. *Longidorus pawneensis* n. sp. diffère de toutes les espèces du genre par des lèvres vulvaires très en relief, formant un tube. Les mâles sont inconnus pour les deux espèces.

Dr. J. D. Smolik sent to one of the authors (M. L.) specimens of two longidorids he sampled in a natural grassland in Colorado, USA, which he suspected to represent undescribed species. Examination of this material confirmed Dr. Smolik's opinion and the species are described below as *Xiphinema smoliki* n. sp. and *Longidorus pawneensis* n. sp.

Xiphinema smoliki n. sp. (Fig. 1)

MEASUREMENTS

Females (n = 11). L = 4.33 mm \pm 0.36 (3.86-5.02); a = 75.9 \pm 4.64 (66.9-85.1); b = 10.0 \pm 0.43 (8.8-10.6); tail = 31.5 μ m \pm 2.76 (25-36); c = 140.0 \pm 19.7 (107.2-167.2); c' = 0.8 \pm 0.01 (0.7-1.1); V = 44.2 \pm 1.33 (42.2-46.9); odontostyle = 111 μ m \pm 2.94 (108-115); odontophore = 68 μ m \pm 2.37 (65-74); stylet = 179 μ m \pm 3.38 (174-185).

Holotype (female) : L = 4.02 mm; a = 78.8; b = 9.8; tail = 34 μ m; c = 118.2; c' = 0.9; V = 43.3; odon-

tostyle = 110 μ m; odontophore = 69 μ m; stylet = 179 μ m.

DESCRIPTION

Female : When heat-relaxed, body habitus varies from loose J- to C-shaped, curvature being always more pronounced in the posterior fourth. Cuticle composed of two optically different layers, unusually thick mainly at mid-body, [4.5-6 μ m (5.5)], and on dorsal side of tail [9-11 μ m (10)], not so in the post-labial region [3.5-4.5 μ m (4)]. Body pores difficult to locate (n = 5); lateral body pores : 141-168 (152.4), 17-19 (18.2) of these in the neck region, 45-53 (49.8) between cardia and vulva, 74-94 (81.8) between vulva and anus and 2-3 caudal pores; ventral body pores; 47-59 (54), 10-14 (11.6) in the neck region, 18-23 (20.4) between cardia and vulva and 18-25 (22) between vulva and anus; dorsal pores : 1-3 (2). Lip region anteriorly rounded, 14-15 μ m wide, separated from the rest of the body by a shallow depression. Amphidial slits very wide, nearly encircling the head (confirmed by examination of specimens in dorso-ventral view, and by face view), situated 3.5-5 μ m from anterior end, i. e. in front of the depression. Hemizonid very flat, 5-7 μ m wide, situated at 185-219 μ m (195)

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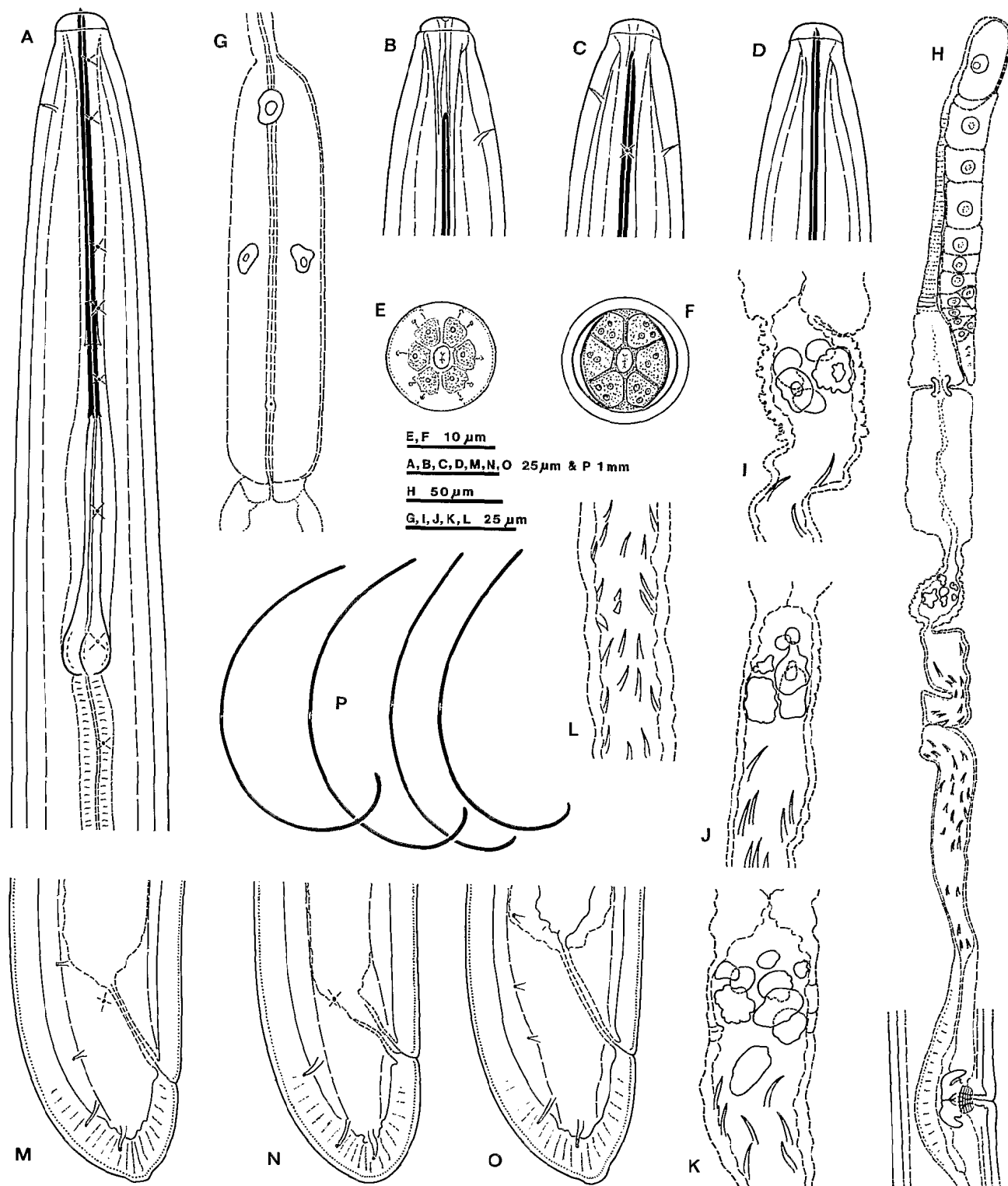


Fig. 1. *Xiphinema smoliki* n. sp. Female. A : Anterior portion; B : Anterior end (dorso-ventral view); C, D : Anterior end (lateral view); E : En face view of the labial area; F : Transverse section just behind amphid apertures; G : Pharyngeal bulb; H : Anterior genital branch; I, J, K : Pseudo-Z-organs; L : Portion of uterus showing spines; M, N, O : Tails; P : Entire animals.

from anterior end. Hemizonion not seen. Stylet typical; flanges of the odontophore normally developed, 12-14 μm wide. Pharyngeal bulb well demarcated anteriorly, cylindrical; nuclei of the pharyngeal glands without any special feature concerning their size or position; pharyngo-intestinal valve small, flat. Vulva a transverse slit; vagina perpendicular to long body axis; internal cuticularization of vagina well developed; perivaginal sphincter roughly conical-truncated; ovejector well muscularized; circular muscles present at the junction with uterus. Tubular portion of the uterus long (convoluted in all specimens), thinwalled, provided with numerous, distinct and long spines directed away from vulva; pseudo-Z-organ present, with weakly muscularized wall and containing five to nine "globules" of various sizes, the biggest ones apparently composed of a central body surrounded by elements having a different optical appearance; uterus pouch wide, joined to the pouch of the oviduct by a strong sphincter; pouch and cylindrical part of the oviduct, as well as ovary, without any particular characteristic. No sperm observed in the female genital tractus. Tail short, nearly hemispherical, with curvature essentially dorsal; extremity perfectly rounded or presenting a very slight bulge; cuticle very thick; no blind canal; two or three caudal pores; one or two pores at anus level.

Male : unknown.

TYPE DATA

Holotype : female, slide 15822, deposited in the collection of Muséum national d'Histoire naturelle, Laboratoire des Vers, Paris, France.

Paratypes : one female deposited in each of the following collections : Instituut voor Dierkunde, Gent, Belgium; Laboratorium voor Nematologie, Landbouwhogeschool, Wageningen, Nederland; USNC, Beltsville, Md, USA; UCR, Nematology Division, Davis, Ca, USA. Remaining paratypes in Paris Muséum collection.

Type locality : grassland, near Nunn, Native Range Pawnee Natl., Colorado, USA (*rec. & leg.* J. D. Smolik).

DIAGNOSIS AND RELATIONSHIPS

X. smoliki n. sp. is characterized by the following combination of characters : *i*) the two equally developed female genital branches provided with uterine spines and a pseudo-Z-organ; *ii*) the very large amphidial slit; *iii*) the tail hemispherical or with a very slight bulge and devoid of a blind canal. Such a combination of characters makes this species unique in the genus.

Two other species present a female genital tractus provided with both uterine spines and a pseudo-Z-organ, and a tail hemispherical or nearly so : *X. ingens*

Luc & Dalmasso, 1963 and *X. melitense* Lamberti, Blevé-Zacheo & Arias, 1982. *X. smoliki* n. sp. differs from them by the following characteristics : in *X. ingens* the stylet is longer (247-265 vs 174-185 μm); the amphidial slit is of medium width; the tail presents a conspicuous blind canal; the pseudo-Z-organ is better developed and its composite globules are wider and more numerous; males are frequent. In *X. melitense* the stylet is longer (about 250 μm); the amphidial slit is of medium width; the uterine spines are short; the pseudo-Z-organ contains both spines and a few small, compact granules; the tail is provided with a blind canal, although often indistinct (see Luc, Loof & Coomans, 1986).

Longidorus pawneensis n. sp. (Figs 2 & 3)

MEASUREMENTS

Females (n = 10). L = 5.03 mm \pm 0.41 (4.25-5.63); a = 112.0 \pm 7.29 (106.8-122.2); b = 14.9 \pm 1.59 (12.8-16.7); tail = 34.5 μm \pm 3.06 (30-38); c = 147.5 \pm 14.4 (127.8-163.9); c' = 1.2 \pm 0.11 (1.0-1.3); V = 50.3 \pm 1.65 (47.7-53.2); odontostyle = 70 μm \pm 1.91 (68-73); odontophore = 50.5 μm \pm 4.92 (41-58); stylet = 120.5 μm \pm 4.55 (111-126); body diam. at stylet guide level = 20 μm \pm 0.67 (19-21); at pharyngo-intestinal junction level = 36.5 μm \pm 1.90 (34-40); at anus level = 30.5 μm \pm 1.29 (29-33).

Juveniles st. 4 (n = 5). L = 3.47 mm \pm 0.35 (3.19-4.05); a = 89.2 \pm 4.52 (81.8-92.4); b = 12.1 \pm 0.81 (11.4-13.5); tail = 39.5 μm \pm 3.97 (37-46); c = 88.4 \pm 12.46 (76.5-109.5); c' = 1.4 \pm 0.18 (1.2-1.7); odontostyle = 61 μm \pm 2.59 (58-64); odontophore = 44 μm \pm 4.32 (38-50); stylet = 105 μm \pm 3.74 (102-110); repl. odontost. = 72 μm \pm 3.70 (67-77); body diam. at stylet guide level = 18.5 μm \pm 0.49 (18-19); at pharyngo-intestinal junction level = 35.5 μm \pm 2.06 (33-38); at anus level = 30.5 μm \pm 1.74 (29-33).

Holotype (female). L = 5.50 mm; a = 122.2; b = 15.7; tail = 38 μm ; c = 144.7; c' = 1.2; V = 50.2; odontostyle = 69 μm ; odontophore = 52 μm ; stylet = 121 μm .

DESCRIPTION

Female : Body slender, C-shaped to spiral, progressively narrowing at anterior end. Cuticle composed of two main layers, 2-2.5 μm thick at mid-body, 3-4 μm at anterior part of the neck, increasing progressively in thickness on tail (11-13 μm at tail extremity); cuticle bearing very fine transverse striae, often only visible on far posterior part and on tail. Lateral chord variable :

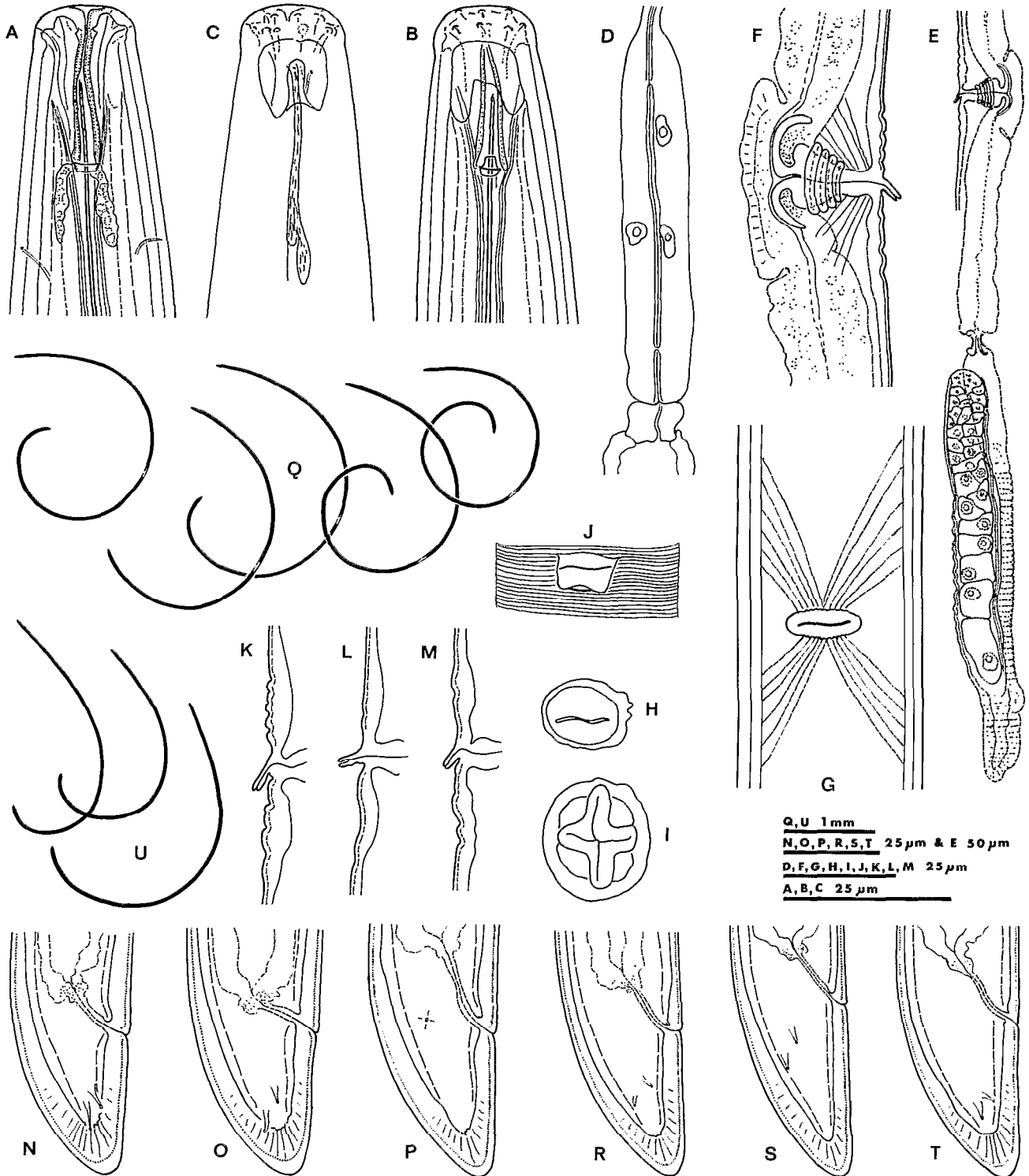


Fig. 2. *Longidorus pawneensis* n. sp. Female. A, B : Anterior end (median view); C : Anterior end (sub-surface view); D : Pharyngeal bulb; E : Posterior genital branch; F : Ovejector and vaginal area (lat. view); G, H, I : Vagina at different levels (ventral view); J : Vulva lips (ventral view); K, L, M : Vulva lips (lat. view); N, O, P : Tails; Q : Entire animals. Juveniles : R, S, T : Tails; U : Entire animals.

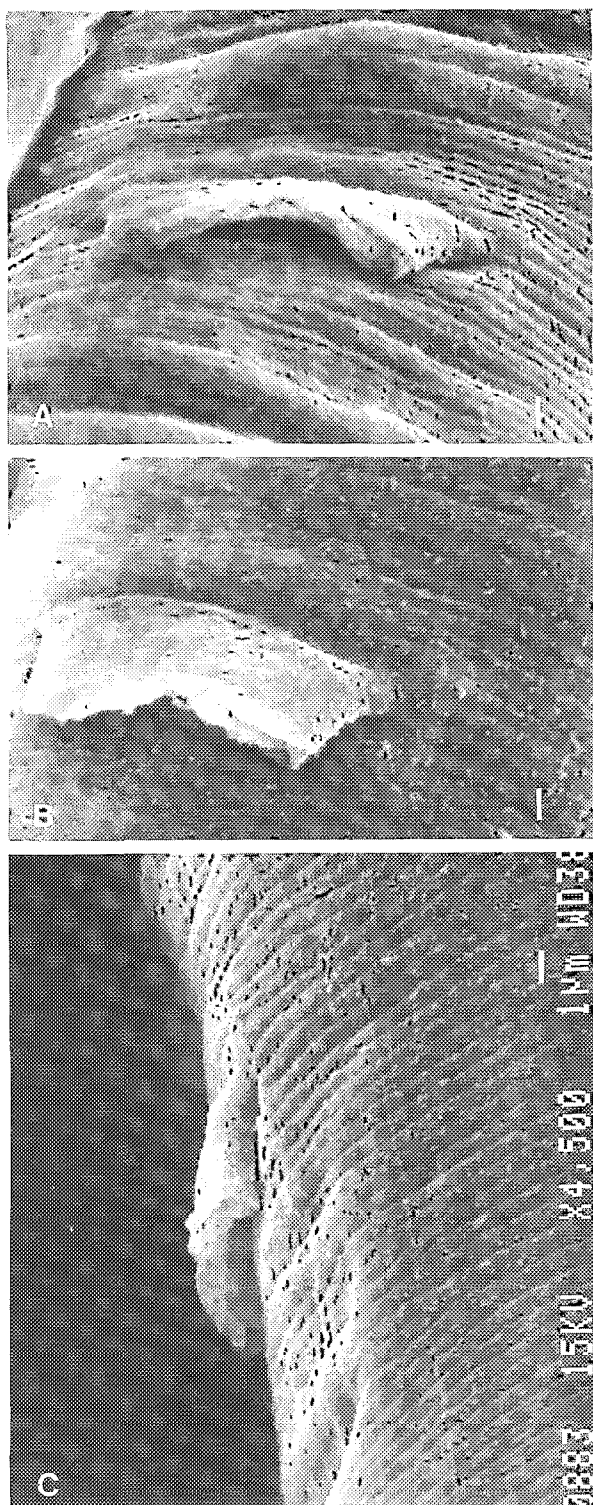


Fig. 3. *Longidorus pawneensis* n. sp. SEM pictures showing the vulva lips forming a tube. A, B : Ventral view; C : Lateral view.

11-19 μm (16) at mid-body or 25-45 % (36.5) of the corresponding diameter. Body pores very faint and difficult to see in the anterior body region, but more prominent posteriorly. Usually two dorsal pores present in the neck region ($n = 4$), but none in one female and three in the holotype; three to four ventral pores ($n = 6$) and five lateral pores ($n = 3$) discernable between anterior extremity and hemizonid. Lip region 13.5-15.5 μm , wide, flatly rounded anteriorly, separated from the rest of the body by a very shallow depression. Labial sensillae prominent, cephalic ones smaller; amphid long, bilobed, with lobes equal to subequal; amphidial pore minute, sometimes collapsed. Stylet typical for the genus. Guiding ring situated at 22-25 μm from anterior end. Stylets were either retracted or slightly protracted; in the latter case the guiding sheath was normally folded concertina-like behind the guiding ring, but in one female (Fig. 2 B) there was a short intracheilostomal fold, giving a « double » guiding ring. Nerve ring wide, at a short distance from base of the stylet. Hemizonid flat, located at 142-154 μm from anterior end; 4-5 μm wide. Pharyngeal bulb cylindrical, not sharply separated from anterior tubular part of the pharynx, measuring 79 μm (68-88) long, and 16 μm (15-18) in diameter. Positions of gland nuclei and outlets typical, with DN situated anteriorly in the bulb; pharyngeal gland nuclei about equal in size. Pharyngo-intestinal valve cylindrical, prominent. Vulva lips prominent, protruding (5.5-9 μm), fused together to form a flattened tube (as seen using SEM) generally directed backward; vaginal slit transverse, more or less straight at surface, then becoming cross-shaped at level of the perivaginal sphincter. Vagina perpendicular to body axis, heavily cuticularized; perivaginal sphincter truncated-conical; ovejector weakly muscularized, of medium size, separated at each extremity from uterus by a deep constriction on dorsal side; uterus short, stout, not differentiated and with an inconspicuous lumen; prominent sphincter joining uterus and oviduct; pouch of the oviduct long; tubular part of oviduct and ovary without special features. No sperm observed in the genital tract. No eggs present. Tail conical-rounded, main curvature dorsal, ventral profile straight in continuity with body profile; two caudal pores (one exceptional female without caudal pores at the left side and with only one caudal pore at the right side).

Male : unknown.

Juveniles, st. 4. Resembling female except genital structures, habitus in open C- or J- shape and longer tail.

TYPE DATA

Holotype : female, slide 15814, deposited in the collection of Muséum national d'Histoire naturelle, Laboratoire des Vers, Paris, France.

Paratypes : as for *Xiphinema smoliki* n. sp. (see above).

Type locality : grassland, near Nunn, Native Range Pawnee Natl., Colorado, USA (*rec. & leg.* J. D. Smolik).

DIAGNOSIS

Longidorus pawneensis n. sp. differs from all species described in the genus by the prominent vulva lips, forming a tube, a character unique in the family Longidoridae (and even in the Dorylaimina).

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REFERENCE

- LUC, M., LOOF, P.A.A. & COOMANS, A. (1986). Description of *Xiphinema thorneanum* n. sp. and observations on some species of the genus (Nemata : Longidoridae). *Revue Nématol.*, 9 : 337-346.