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Description of *Xiphinema silvesi* n. sp. from Portugal (Nematoda: Longidoridae)

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Summary - *Xiphinema silvesi* n. sp. is described and figured. Specimens were recovered from the rhizosphere of broad beans (*Vicia faba* L.) growing at Quinta do Rogelo, Silves, Portugal. The new species is characterized by females with two genital branches equally developed, a differentiated pseudo-Z-organ, and a short conical tail with subdigitate terminus. *X. silvesi* n. sp. most closely resembles *X. malawiense* Brown, Luc & Saha, 1983 and *X. belmontense* Roca & Pereira, 1992. It differs from the first species in having a more slender body, a shorter odontophore, and by differences in the position of the guiding ring, the number of inclusions bodies in the pseudo-Z organ, and the shape of the lip region. It differs from the second species in having a shorter body and odontophore and by absence of small spiniform structures inside the uteri and rarity of males. *X. silvesi* n. sp. is also similar to *X. coxi europaeum* Sturhan, 1985, *X. dissimile* Roca, Pereira & Lamberti, 1988, *X. diversicaudatum* (Micoletzky, 1927) Thorne, 1939, and *X. pseudocoxi* Sturhan, 1985, but differs from these species by several morphological and morphometrical characters. © Orstom/Elsevier, Paris

Résumé - Xiphinema silvesi *sp. n. (Nematoda: Longidoridae) provenant du Portugal* - Description est donnée de *Xiphinema silvesi* n. sp. provenant de la rhizosphère de *Vicia faba* L. à Quinta do Rogelo, Silves, Portugal. Cette nouvelle espèce est caractérisée par deux branches génitales également développées et pourvues d'un pseudo-organe Z, une queue conoïde, dorsalement convexe et pourvue d'une digitation terminale. *X. silvesi* n. sp. est proche de *X. malawiense* Brown, Luc & Saha, 1983 dont il diffère par le corps plus mince, l'odontophore plus court, la position de l'anneau guide, le nombre d'inclusions dans le pseudo-organe Z et la forme de la tête ; il est voisin de *X. belmontense* Roca & Pereira, 1992 dont il diffère par la longueur plus faible du corps et de l'odontophore, l'absence de petites épines dans l'utérus et la rareté des mâles. *X. silvesi* n. sp. est également proche de *X. coxi europaeum* Sturhan, 1985, *X. dissimile* Roca, Pereira & Lamberti, 1988, *X. diversicaudatum* (Micoletzky, 1927) Thorne, 1939 et *X. pseudocoxi* Sturhan, 1985, mais diffère de ces espèces par plusieurs caractères morphologiques et biométriques. © Orstom/Elsevier, Paris

Key-words: Longidoridae, nematode, Portugal, *Xiphinema silvesi*.

Xiphinema specimens were collected from the rhizosphere of broad beans (*Vicia faba* L.) at Silves, Faro, Algarve region, Portugal, and tentatively identified as *X. diversicaudatum* (Micoletzky, 1927) Thorne, 1939. The specimens were sent to Istituto di Nematologia Agraria di Bari, Italy, for confirmation of the identification. It was found that adult specimens of this population resembled *X. belmontense* Roca & Pereira, 1992 in several morphological characters, but some morphometric values were different from those of the type population of that species. We propose the Portuguese population as a new species, described herein as *Xiphinema silvesi* n. sp.

Nematodes were extracted from soil samples by Cobb's wet sieve technique, killed and fixed in 5% hot formaldehyde solution, processed by the glycerol-ethanol method of Seinhorst (1959), and mounted in glycerine on Cobb's slides. Measurements were taken with a camera lucida.

*Xiphinema silvesi** n. sp.

(Fig. 1)

MEASUREMENTS

See Table 1.

DESCRIPTION

Female: In specimens killed by gentle heat, habitus almost straight anteriorly, more curved behind the vulva, occasionally C-shaped; body cylindrical, tapering very gradually towards the anterior extremity. Cuticle apparently smooth, but inner layer with very fine transverse striations, distinctly criss-crossing in the tail region. Cuticle 3-µm thick along the body, thicker in the neck region (4.0-4.5 µm at base of lip region) and in the caudal region (5.5-6.0 µm ventrally and 7.0-8.5 µm dorsally in the post anal region). Lateral hypodermal cords readily visible throughout the

* from the name of the type locality, Silves.

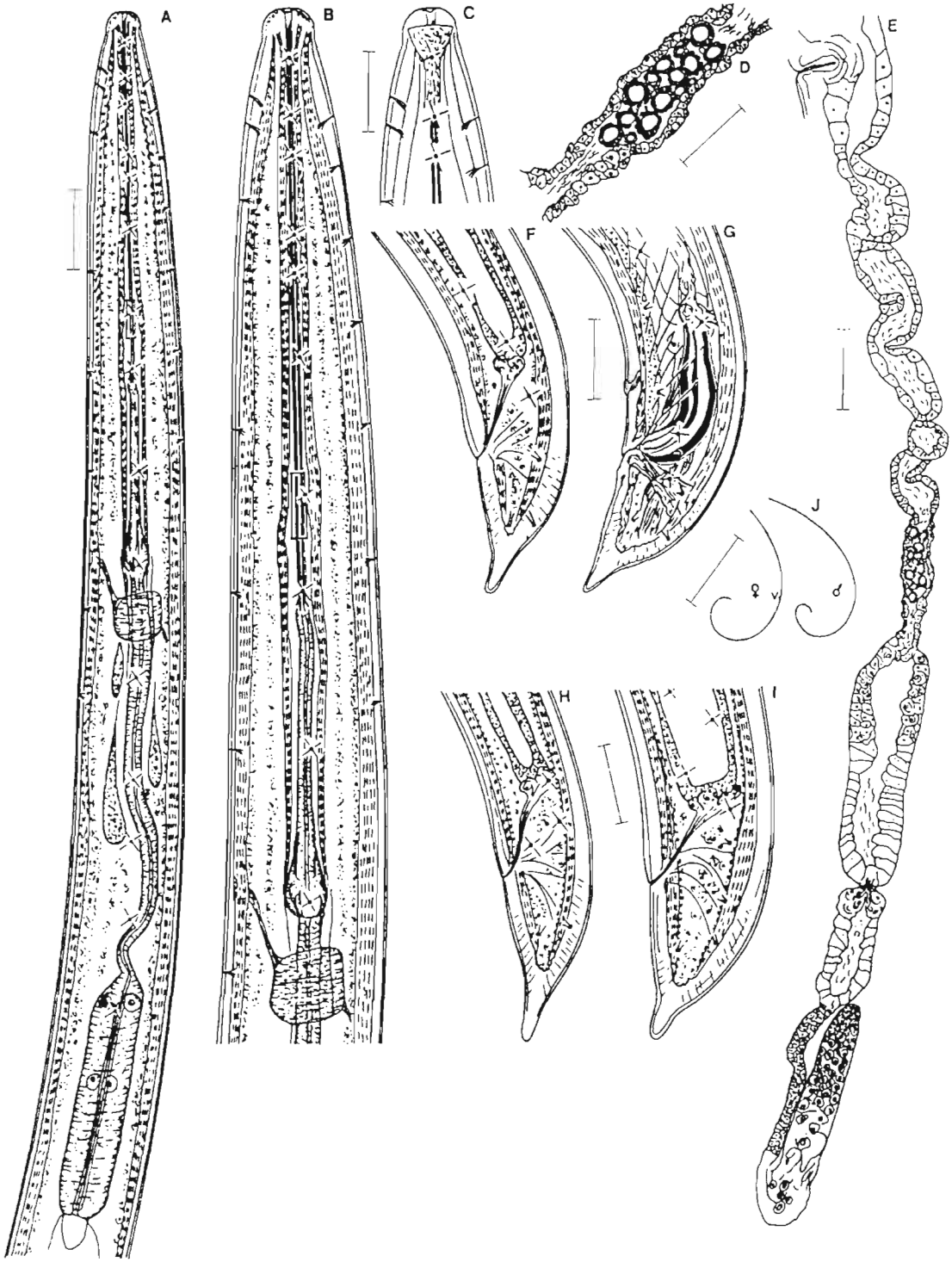

Fig. 1. Xiphinema silvesi *n. sp. A, B: Female, anterior region; C: Head (surface view); D: Pseudo-Z-organ; E: Anterior branch of the female genital tract; F, H, I: Female posterior region; G: Male posterior region; J: Posture of adult stages. (Scale bars: A-I = 20 µm; J = 1 mm).*

Table 1. *Morphometrics of* Xiphinema silvesi *n. sp. (all measurements in µm, except L in mm).*

	Females		Males
	Holotype	Paratypes	
n	1	26	1
L	3.2	3.1±0.28 (2.6-3.5)	4.0
a	72.3	64.5±6.42 (53.1-82.1)	78.0
b	7.5	7.3±0.80 (6.5-8.9)	9.5
c	68.0	63.2±6.44 (46.2-76.0)	79.5
c'	1.5	1.5±0.13 (1.3-1.8)	1.4
V	41.5	42.9±1.79 (39.8-47.5)	----
Lip reg. diam.	10.0	11.0±0.48 (10.6-13.0)	11.5
Lip reg. height	3.0	3.0±0.24 (2.3-3.5)	4.0
Odontostyle	134.5	133.7±5.06 (121.2-143.0)	140.0
Odontophore	66.5	67.0±3.06 (58.2-70.0)	67.5
Stylet	201.0	200.7±5.94 (185.8-211.2)	207.5
Flanges width	9.5	10.5±0.93 (9.0-12.5)	11.0
Guide ring	114.5	116.5±4.16 (104.5-124.0)	130.5
Guiding sheath	13.0	15.0±4.23 (8.8-30.0)	14.5
Phar. bulb length	93.0	87.4±5.01 (79.4-103.5)	87.0
Phar. bulb diam.	20.0	20.4±1.91 (17.0-24.5)	21.0
Ant. gen. br.	335.5	439.6±64.58 (323.5-594.1)	------
Post. gen. br.	406.0	430.0±68.57 (311.7-594.1)	------
Ant. gen. br. % L	10.5	13.5±1.69 (10.5-18.5)	------
Post. gen. br. % L	12.5	13.5±1.69 (10.0-18.0)	------
Body diam. (mid body)	44.0	48.5±5.06 (41.0-66.5)	------
Body diam. (at anus)	30.0	33.0±2.82 (28.0-42.5)	36.5
Rectum	30.0	33.2±2.41 (28.8-39.4)	40.0
Tail	47.0	49.3±4.55 (43.0-60.0)	50.5
Hyaline tail tip	19.0	20.0±2.18 (16.0-24.0)	18.0
Prerectum	417.5	449.1±86.32 (276.5-711.7)	494.0
Spicules	-------	-------	68.0
Lat. guid. piece	-------	-------	16.5

End of Table 1 next column

Table 1. *(End).*

length of the body, 14-15 µm wide at mid body or 27-28% of the corresponding body diameter. Lateral body pores: seven in the odontostyle region, arranged in a single row in the neck region and in a double row towards the posterior region, distributed irregularly along the lateral cords; six dorsal and five ventral body pores visible in the odontostyle region. Labial region hemispherical, broadly rounded frontally and more so laterally, separated from the rest of the body by a very slight depression. Amphid stirrup-shaped, aperture a transverse slit occupying more than 80% of the lip region width, slightly anterior to the level of depression. Odontostyle almost 2.5 µm in diameter; odontophore with large basal flanges; guiding 'tube' variable in length with basal guiding ring 3.0-3.5 µm wide. Nerve ring immediately posterior to odontophore base. Oesophagus with anterior part tubular; oesophageal bulb containing three gland nuclei: dorsal nucleus located anteriorly in the bulb and two subventral nuclei situated almost at, or just anterior to mid-bulb. Oesophago-intestinal valve inconspicuous, heart-shaped, usually surrounded by intestinal tissue. Amphidelphic reproductive system with both genital branches equally developed and flexed. Ovary occupying less than one-fifth of the total length of the genital branch; oviduct with a slender part consisting of discoid cells and a *pars dilatata oviductus* separated from the uterus by a sphincter. Uterus consisting of a very wide and long *pars dilatata uteri*, a tube, and an ovejector, separated from the vagina by a constriction. Tubular portion of the uterus close to the *pars dilatata uteri* narrow and muscular with thick walls forming a well developed pseudo-Z-organ comprising 20 to 25 globular bodies of variable size, each body consisting of a central very large and almost rounded hyaline portion surrounded by irregularly shaped refractive granules of variable thickness. A few crystalloid structures present in the tubular portion of the uterus in some specimens. No spiniform structures seen attached to the uterine wall; sperm not present in the uteri. Pre-rectum variable in length. Rectum length approximately equal to anal body width. Tail short, conical, convex dorsally and less so ventrally, with distinctly digitate terminus, ventrally oriented in the

caudal axis, bearing two or three caudal pores on each side.

Male: Similar to females but with the posterior part of the body more curved. Morpho-anatomy similar to that of female except for the genital apparatus and associated somatic structures. Spicules curved, not cephalated; lateral guiding pieces of the gubernaculum well sclerotized, slightly curved, rounded proximally and with distal end bifid. Precloacal pair of papillae at 23 µm from the cloacal aperture, preceded by three medioventral supplements, at 140, 181, and 218 µm from the cloacal aperture, respectively. Tail similar to that of female, with four caudal pores on each side.

TYPE HOST AND LOCALITY

Soil samples collected in the rhizosphere of broad beans (*Vicia faba* L.), Quinta do Rogelo, Silves, Portugal.

TYPE SPECIMENS

Holotype (female), one male and twenty paratype females in the Collection of the Istituto di Nematologia Agraria del Consiglio Nazionale delle Ricerche di Bari, Italy; two paratype females in the following collection: Muséum National d'Histoire Naturelle, Laboratoire de Biologie Parasitaire, Protistologie, Helminthologie, Paris, France; Entomology and Nematology Department, Rothamsted Experimental Station, Harpenden, Herts, UK; Plant Nematology Laboratory Collection, USDA, Beltsville, MD, USA.

DIAGNOSIS AND RELATIONSHIPS

Xiphinema silvesi n. sp. is characterized by two equally developed female genital branches, vulva situated anterior to mid-body, pseudo-Z-organ in the uterus consisting of 20-25 globular bodies, absence of uterine spines and sperms in the uteri, and tail short conical, curved dorsally and almost straight ventrally, with subdigitate terminus.

In the polytomous key of Loof and Luc (1990), the species has the following code: A4, B2, C4, D5(4), E4, F3(4), G23, H2, I3, J?, K?, L1.

This code is very similar to that of *X. malawiense* Brown, Luc & Saha, 1983, but the new species differs from *X. malawiense* in having a slightly more slender body ("a" value 53-82 *vs* 46-64), longer odontostyle (121-143 *vs* 103-117 µm), shorter odontophore (58-70 *vs* 72-76 µm), longer distance between guiding ring and anterior end (104-124 *vs* 77-95 µm), higher number of globular bodies of pseudo-Z-organ (20-25 *vs* 6-15), and differently shaped lip region (hemispherical, separated from the rest of the body by a very slight depression in *X. silvesi* n. sp. and by a weak, smooth constriction in *X. malawiense*).

The new species belongs to the *X. coxi*-group, or group 5 in Loof and Luc (1990). In this group, it closely resembles *X. belmontense* Roca & Pereira, 1992, but it differs from this species in having shorter body (L = 2.6-3.5 *vs* 3.1-4.7 mm), higher "c'" value (1.3-1.8 *vs* 1.0-1.4), slightly more posteriorly located vulva (V = 39.8- 47.5 *vs* 36.3-41.9), shorter odontophore (58-70 *vs* 70-115 µm), smaller distance between guide ring and oral opening (104-124 *vs* 118-138 µm), and shorter spicules (68 *vs* 89-112 µm). Males are rare and no sperm was found inside the uteri. There are more globular bodies in the pseudo-Z-organ (20-25 *vs* 8-10 in *X. belmontense*) and they are smaller. No small spiniform structures were observed inside the uteri.

Some similarities were observed with other species with pseudo-Z-organ in the same group, and particularly *X. coxi europaeum* Sturhan, 1985, *X. dissimile* Roca, Pereira & Lamberti, 1988, *X. diversicaudatum* (Micoletzky, 1927) Thorne, 1939, and *X. pseudocoxi* Sturhan, 1985. *X. silvesi* n. sp. differs from *X. coxi europaeum* in having a shorter body (2.6-3.5 *vs* 3.9-5.1 mm), a shorter odontophore (58-70 *vs* 70-84 µm), and differently shaped pseudo-Z organ; from *X. dissimile* in having shorter and more robust body (L = 2.6-3.5 *vs* 4.6-5.9 mm, 'a' value 53-82 *vs* 89-118), lower "c" value (46-76 *vs* 97-135), more anteriorly located vulva (V = 39.8-47.5 *vs* 43.0-48.6), shorter odontophore (58-70 *vs* 72-78 µm), and shorter distance between guiding ring and anterior end (104-124 *vs* 116-127 µm); from *X. diversicaudatum* in having shorter body (L = 2.6-3.58 *vs* 4.0-5.5 mm) lower 'c' value (46-76 *vs* 61-134), shorter odontostyle and odontophore (121- 143 *vs* 130-157 µm, 58-70 *vs* 70-97 µm, respectively), and smaller distance from oral aperture to guiding ring (104-124 *vs* 115-143 µm); from *X. pseudocoxi* in having more robust body ('a' value 53-82 *vs* 80-98), longer odontostyle (121-143 *vs* 104-114 µm), and longer distance from oral aperture to guiding ring (104-124 *vs* 100-112 µm).

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