

Xiphinema cadavalense sp. n. (Nemata : Longidoridae) from Portugal

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Summary – The authors give a description of *Xiphinema cadavalense* sp. n. It was found in the rhizosphere of grapevine at Freixieiro, Cadaval, Portugal. The species is characterized by two female genital branches equally developed, a well differentiated pseudo-Z-organ, a short rounded-conoid and pegged tail and absence of the male. *X. cadavalense* sp. n. is very close to *X. lusitanicum* Sturhan, 1983 from which it differs mainly in a longer odontostyle. The new species resembles *X. pseudocoxi* Sturhan, 1985 in the shape of pseudo-Z-organ inclusion bodies and also *X. erriae* Hutsebaut, Heyns & Coomans, 1988, *X. hardingi* Joubert, Kruger & Heyns, 1988, *X. jomercium* Joubert, Kruger & Heyns, 1988 and *X. transkeiense* Joubert, Kruger & Heyns, 1988.

Résumé – *Xiphinema cadavalense* sp. n. (Nemata : Longidoridae) provenant du Portugal – *Xiphinema cadavalense* sp. n. provenant de la rhizosphère de vigne à Freixieiro, Cadaval, Portugal, est décrit. Cette nouvelle espèce est caractérisée par les deux branches génitales femelles également développées et pourvues d'un pseudo-organe Z, une queue courte, conoïde-arrondie avec mucron terminal et l'absence de males. *X. cadavalense* sp. n. est proche de *X. lusitanicum* Sturhan, 1983 – dont il se distingue par un odontostyle plus long – et de *X. pseudocoxi* Sturhan, 1985 par le type d'inclusions du pseudo-organe Z. *X. cadavalense* sp. n. est également proche de *X. erriae* Hutsebaut, Heyns & Coomans, 1988, *X. hardingi* Joubert, Kruger & Heyns, 1988, *X. jomercium* Joubert, Kruger & Heyns, 1988 et *X. transkeiense* Joubert, Kruger & Heyns, 1988.

Key-words : *Xiphinema*, taxonomy, description, Portugal, nematodes.

Specimens of *Xiphinema* collected by Dr. M. A. Bravo during a survey carried out in Portugal were sent to the Istituto di Nematologia Agraria, Bari, Italy for a collaborative taxonomic study. The examination of this material revealed the presence of an undescribed species recovered from soil around the roots of grapevine at Freixieiro, Cadaval, Portugal. Morphometric data, description and illustration of the new species named *Xiphinema cadavalense* sp. n. are given.

Nematodes were extracted from soil samples by Cobb's wet sieve technique, then killed and fixed in hot 5 % formaldehyde and mounted in glycerin by the slow method.

Xiphinema cadavalense sp. n. (Fig. 1)

MEASUREMENTS

Holotype and *Females* (paratype) : see Table 1.

DESCRIPTION

Female : Habitus in specimens killed by gentle heat as open C, more curved behind the vulva, with increasing curvature towards the posterior extremity, occasionally J shaped; body cylindrical, tapering very gradually towards the anterior extremity. Cuticle apparently smooth along the body, with very fine cross-striations in the tail

region, 5-5.5 μm thick along the body, more thickened in the neck region, where it measures 8-8.5 μm at the base of the lip region, and in the tail where it is 10-10.5 μm ventrally and 12.5-13 μm dorsally. Lateral hypodermal cords readily visible throughout the length of the body, 17.5-18 μm wide at mid body or 25.5-26 % of the corresponding body diameter. Lateral body pores, nine in the range of the odontostyle, arranged in a single row in the body region anterior to the vulva and in a double row in the rest of the body from the vulva or just anteriorly, distributed along the dorsal and ventral sides of the lateral cords; seven ventral and six dorsal body pores in the range of the odontostyle. Labial region hemi-elliptical, rounded laterally and less so frontally, almost continuous or separated from the rest of the body by a very slight depression; amphids stirrup-shaped, with aperture a transverse slit, occupying about 79 % of the lip region width, situated on the lip region at the level of the beginning of depression or just anteriorly, at almost 7 μm from the oral opening. Odontostyle nearly 2 μm in diameter; odontophore well developed with large basal flanges; guiding "tube" variable in length with guiding ring 5-5.5 μm wide. Oesophagus dorylaimoid with the anterior part tubular, oesophageal bulb containing three nuclei : the dorsal one located at the beginning, the two subventral ones almost at the middle;

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

	Paratype females (24)	Holotype
L (mm)	4.8 \pm 0.35 (4.0-5.3)	4.9
a	58.0 \pm 6.27 (45.5-68.0)	59.5
b	7.8 \pm 0.61 (6.7-8.7)	8.5
c	94.6 \pm 8.09 (72.5-108.0)	98.0
c'	0.9 \pm 0.07 (0.8-1.0)	0.9
V	52.5 \pm 1.81 (48.0-55.3)	54.0
Lip reg. diam.	18.0 \pm 1.04 (14.0-19.5)	19.0
Lip reg. height	9.0 \pm 0.68 (7.5-10.5)	9.5
Odontostyle	158.0 \pm 3.53 (150.5-164.5)	159.0
Odontophore	98.5 \pm 3.24 (90.0-106.0)	94.0
Stylet	256.0 \pm 5.74 (244.5-267.5)	253.0
Flanges width	18.5 \pm 1.30 (16.0-22.0)	17.0
Guide ring	141.0 \pm 4.71 (126.5-148.5)	139.0
Guide sheath	16.3 \pm 3.57 (7.5-22.5)	17.0
Phar. bulb length	156.5 \pm 11.64 (134.0-176.0)	136.0
Phar. bulb diam.	36.5 \pm 3.44 (29.5-45.5)	34.0
Ant. gen. br.	707.0 \pm 143.5 (423.5-959.0)	694.0
Post. gen. br.	698.5 \pm 114.98 (512.0-929.5)	723.5
Ant. gen. br. (%)	14.7 \pm 2.48 (10.5-19.5)	14.0
Post. gen. br. (%)	14.6 \pm 2.23 (11.7-19.7)	14.5
Body diam. (mid body)	83.5 \pm 11.12 (64.5-103.5)	82.5
Body diam. (anus level)	55.5 \pm 4.83 (47.5-72.5)	55.5
Rectum	49.0 \pm 5.20 (40.0-61.5)	47.0
Tail	50.5 \pm 3.57 (44.5-59.0)	50.0
Hyaline tail tip	21.5 \pm 1.36 (18.0-24.5)	20.0
Prerectum	598.0 \pm 129.30 (317.5-964.5)	517.5

oesophageal-intestinal valve inconspicuous, globe-shaped, surrounded by intestinal tissue. Reproductive system amphidelphic, with both genital branches equally developed and reflexed; ovary occupying about one seventh of the entire genital branch; oviduct with a slender part consisting of discoid cells, end a *pars dilatata oviductus* separated from the uterus by a conspicuous sphincter muscle; uterus consisting of a very wide and long *pars dilatata uteri*, a tube and an ovejector, separated by a slight constriction. The tubular portion of the uterus close to *pars dilatata* is narrow and muscularized with thick walls and forms a well developed pseudo-Z-organ, which consists of ten to fifteen sclerotized bodies of variable size, each body consisting of a central large and almost rounded hyaline portion surrounded by irregularly shaped refractive granules of variable thickness. Crystalloid structures are observed in the tubular portion of the uterus of some specimens (Fig. 1 D). No sperm found in the uteri. Prerectum distinctly offset, rectum as long as the anal body width or less. Tail short conoid, dorsally convex and ventrally almost straight or slightly convex, in line with the ventral profile, with an indistinct blind canal and a rounded terminal peg, 10-15 μm long, bearing three, seldom four, caudal pores on each side.

Males and juveniles : not found.

TYPE HOST AND LOCALITY

Rhizosphere of grapevine at Freixieiro, Cadaval, Portugal.

TYPE SPECIMENS

Holotype and twelve paratype females in the Collection of the Istituto di Nematologia Agraria del Consiglio Nazionale delle Ricerche di Bari, Italy; six paratype females in the Collection of Estação Agrónomica Nacional, Instituto Nacional de Investigação Agrária, Oeiras, Portugal; two paratype females in each of the following collections : Muséum National d'Histoire naturelle, Paris, France; Entomology and Nematology Department, Rothamsted Experimental Station, Harpenden, Herts, England; Plant nematology Laboratory Collection, United States department of Agriculture, Beltsville, Maryland, USA.

DIAGNOSIS AND RELATIONSHIPS

Xiphinema cadavalense sp. n. is characterized by two equally developed female genital branches, vulva almost at mid-body or just posterior to it, a well differentiated pseudo-Z-organ, a short tail, rounded-conoid with a terminal peg and absence of the male.

The code in the polytomous key (Loof & Luc, 1990) is the following :

A4 B2 C5A D6 E56 F(4)5 G(3)4 H1 I3 J- K- L-

The new species belongs to the *X. coxi*-group (group 5 in Loof & Luc, 1990), among whose species it very closely resembles *X. lusitanicum* Sturhan, 1983 by



Fig. 1. *Xiphinema cadavalense sp. n.* Female. A, B : Anterior region; C : Head end (surface view); D, E : Posterior branch of the genital tract (D : crystalloid structures in the uterus); F, G, H : Posterior region; I : Posture of the female.

the tail shape and the presence of a pseudo-Z-organ with very similar inclusion bodies. Morphologically *X. cadavalense* sp. n. differs from *X. lusitanicum* in head shape, being not so prominently hemispherical, but hemi-elliptical and almost continuous with the rest of the body, "dorsally and ventrally offset by a very slight depression" in the original description of *X. lusitanicum* (Sturhan, 1983). Lateral pores in the new species are 22 in the oesophagus region and 3-4 on the tail (16-20 and 2-3 respectively in *X. lusitanicum*); the tail mucro is shorter with a larger base and an indistinct blind canal, although not always clearly visible. Finally crystalloid structures, variable in length and shape, are observed in the uteri of some specimens (Fig. 1, D). Biometrically, *X. cadavalense* sp. n. has a slightly shorter (L = 4.0-5.3 vs 4.4-5.9 mm in *X. lusitanicum*) and more robust body ("a" value 45.5-68.0 vs 66-78), the "c" value ranges more widely (72.5-108 vs 87-94), and so also the vulva position, although it is more posteriorly situated in some specimens of *X. cadavalense* sp. n. The "c'" value is less than 1; the odontostyle is shorter (150.5-164.5 vs 168-175 μm); shorter also are the odontophore (90-106 vs 108-115 μm), the distance of guiding ring from anterior end (126.5-148.5 vs 141-159 μm) and the tail (44.5-59 vs 51-63 μm).

In the shape of pseudo-Z-organ inclusion bodies *X. cadavalense* sp. n. resembles also *X. pseudocoxi* Sturhan 1985, from which it differs mainly in the tail shape, having a "c'" value less than 1. Moreover, the new species has longer body (4.0-5.3 vs 3.5-4.2 mm), longer odontostyle (150.5-164.5 vs 104-114 μm), odontophore (90-106 vs 58-64 μm) and distance of oral aperture to guiding ring (126.5-148.5 vs 100-112 μm); the vulva is more posteriorly situated (48-55.3 vs 45.2-47.5). *X. cadavalense* sp. n. is also similar to *X. erriae* Hutsebaut, Heyns & Coomans, 1988, *X. hardingi* Joubert, Kruger & Heyns, 1988, *X. jomercium* Joubert, Kruger & Heyns, 1988 and *X. transkeiense* Joubert, Kruger & Heyns, 1988. It differs from *X. erriae* in having longer body (4.0-5.3 vs 2.9-3.3 mm), longer odontostyle (150.5-164.5 vs 112-119.5 μm), odontophore (90-106 vs 76-82 μm) and tail (44.5-59 vs 31-35.5 μm), the

vulva is more posteriorly situated (48-55.3 vs 44.9-47.5) and the pseudo-Z-organ inclusion bodies are differently shaped (Hutsebaut *et al.*, 1988); from *X. hardingi* in having longer body (4.0-5.3 vs 3.36-4.0 mm), longer odontostyle (150.5-164.5 vs 107-120 μm), odontophore (90-106 vs 76-79 μm), tail (44.5-59 vs 26.3-30 μm) and longer distance of oral opening to guiding ring (126.5-148.5 vs 81-94 μm), differently shaped pseudo-Z-organ inclusion bodies and absence of the male (Joubert *et al.*, 1988); from *X. jomercium* in having longer body (4.0-5.3 vs 3.2-3.85 mm), longer odontostyle (150.5-164.5 vs 103-113 μm), odontophore (90-106 vs 62-72 μm) and tail (44.5-59 vs 26.3-32.5 μm), the vulva is more posteriorly situated (48-55.3 vs 43-48); from *X. transkeiense* in having longer body (4.0-5.3 vs 2.6-3.1 mm), longer odontostyle (150.5-164.5 vs 120-133 μm), odontophore (90-106 vs 75-88 μm), longer distance of oral opening to guiding ring (126.5-148.5 vs 94-119 μm) and longer tail (44.5-59 vs 21.3-26.3 μm), the vulva is more posteriorly situated (48-55.3 vs 44-49).

References

- HUTSEBAUT, M., HEYNS, J. & COOMANS, A. (1988). The genus *Xiphinema* in South Africa. XVI. New species related to *X. meridianum* (Nematoda: Dorylaimida). *Nematologica*, 33: 127-148.
- JOUBERT, A. P., KRUGER, J. C. DE W. & HEYNS, J. (1988). The genus *Xiphinema* in South Africa. XVII. A study of the *X. imitator* group with descriptions of five new species (Nematoda: Dorylaimida). *Phytophylactica*, 19: 419-432.
- LOOF, P. A. A. & LUC, M. (1990). A revised polytomous key for the identification of species of the genus *Xiphinema* Cobb, 1913 (Nematoda: Longidoridae) with exclusion of the *X. americanum*-group. *Syst. Parasit.*, 16, 35-36.
- STURHAN, D. (1983). Description of two new *Xiphinema* species from Portugal with notes on *X. pachtaicum* and *X. opisthohysterum* (Nematoda, Longidoridae). *Nematologica*, 29: 270-283.