

Xiphinema coronatum sp. n. (Nematoda : Longidoridae) from Italy

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SUMMARY

Xiphinema coronatum sp. n. is described and illustrated. It was found in the rhizosphere of grapevine at Limiti, province of Perugia, Italy. The new species belongs to the *X. coxi*-group and is similar to *X. clavatum* Heyns, 1965, *X. colombiense* Hunt, 1982, *X. globosum* Sturhan, 1978, *X. guillaumeti* Germani, 1989, *X. guirani* Luc & Williams, 1978, *X. porosum* Roca & Agostinelli, 1986 and *X. turcicum* Luc & Dalmaso, 1964. *X. coronatum* sp. n. is characterized by the presence of spines in the uteri and pseudo-Z-organ.

RÉSUMÉ

Xiphinema coronatum sp. n. (Nematoda : Longidoridae) provenant d'Italie

Xiphinema coronatum sp. n. est décrit et figuré. Cette nouvelle espèce a été prélevée dans la rhizosphère de vigne à Limiti, province de Pérouse, Italie. *X. coronatum* sp. n. appartient au groupe des espèces à vulve médiane, branches génitales également développées et pourvues d'une différenciation utérine (pseudo-organe Z et épines), queue hémisphérique sans mucron terminal. Cette nouvelle espèce est proche de *X. clavatum* Heyns, 1965, *X. colombiense* Hunt, 1982, *X. globosum* Sturhan, 1978, *X. guillaumeti* Germani, 1989, *X. guirani* Luc & Williams, 1978, *X. porosum* Roca & Agostinelli, 1986 et *X. turcicum* Luc & Dalmaso, 1964. *X. coronatum* sp. n. est caractérisé par la présence d'épines dans l'utérus et dans le pseudo-organe Z.

In 1978 Roca and Lamberti reported *Xiphinema clavatum* Heyns, 1965 from Italy. The species was subsequently identified as *Xiphinema globosum* Sturhan, 1978 (Roca & Lamberti, 1985). The comparison of Italian populations with the original description confirmed the presence of *X. globosum* in northern Italy, but revealed substantial differences in the population found in Umbria, central Italy. Detailed observations evidenced the presence of spines in the uterus of specimens from Umbria, besides differences in biometrical values as total body length, odontophore and tail.

The differences are sufficient to separate, at specific level, the Umbria population from the type population of *X. globosum*. This is therefore described here as a new species named *Xiphinema coronatum* sp. n., due to the particular appearance of the tubular portion of the uterus.

Only one male has been found at the type locality.

Nematodes were extracted from soil samples by the Cobb wet sieve technique, killed and fixed in 5 % hot formalin and mounted in glycerin by the slow method on nematology slides. Specimens were measured with the aid of a camera lucida.

Xiphinema coronatum sp. n.

= *X. clavatum* apud Roca & Lamberti, 1978

= *X. globosum* apud Roca & Lamberti, 1985

(Fig. 1)

MEASUREMENTS

Female and juveniles (see Table 1).

Holotype (female) : L = 4.3 mm; a = 72.5; b = 7.1; c = 118.2; c' = 0.75; V = 49.5; odontostyle = 157 µm; odontophore = 99 µm; total spear length = 256 µm; oral aperture to guiding ring = 145.5 µm; tail length = 36.5 µm; h (hyaline portion of the tail) = 10 µm; body diameter at lip region = 13.5 µm; body diameter at guiding ring = 50 µm; body diameter at base of oesophagus = 60.5 µm; body diameter at vulva = 59.5 µm; body diameter at anus = 49 µm; body diameter at beginning of h = 34 µm.

Allotype (male) : L = 4.3 mm; a = 74.4; b = 8.0; c = 102.7; c' = 0.93; odontostyle = 154.5 µm; odontophore = 100 µm; total spear length = 254.5 µm; oral aperture to guiding ring = 151 µm; tail length =

42 µm; h = 8.8 µm; body diameter at lip region = 12.5 µm; body diameter at guiding ring = 47.5 µm; body diameter at base of oesophagus = 57.5 µm; body diameter at mid-body = 57.5 µm; body diameter at anus = 44.5 µm; body diameter at beginning of h = 30.5 µm; spicules = 75.5 µm; gubernaculum = 16 µm; cloaca to double papilla = 19 µm; double papilla to first supplement = 105 µm.

DESCRIPTION

Female : Habitus in specimens killed by gentle heat usually almost straight anterior to the vulva, more curved behind the vulva, occasionally C-shaped; body cylindrical, tapering very gradually towards the anterior extremity. Cuticle with very fine transverse striations in the innermost layer, more evident in the caudal region, less so in the rest of the body; cuticle 3-3.5 µm thick along the body, more thickened in the neck region, where it measures 5.5-6 µm at the base of the lip region, and in the caudal region where it is 7-7.5 µm ventrally and 9.5-10 µm dorsally in the post anal portion. Lateral hypodermal cords readily visible throughout the length of the body, 11.5-12 µm wide at mid-body or 18-20 % of the corresponding body diameter; lateral body pores, 6-7 in the range of the odontostyle, arranged in a single row in the neck region and in a double row in the rest of the body from the level of the intestine, distributed irregularly along the dorsal and ventral sides of the lateral chords; three dorsal and three ventral body pores in the range of the odontostyle. Labial region 7-7.5 µm high, almost hemispherical, broadly rounded laterally and less so frontally, offset from the rest of the body by a shallow constriction; amphids stirrup-shaped, with aperture a straight, transverse slit, occupying slightly more than three fifths of the lip region width, situated on the lip region at just less than half of the lip region height. Odontostyle well developed, 2-2.5 µm in diameter; odontophore with basal flanges 18-19 µm wide and guiding "tube" well evident, variable in length from 12 to 20 µm, with guiding ring 5-5.5 µm wide; oesophagus dorylaimoid with the anterior part tubular; basal enlarged portion 100-110 µm long and 15.5-16 µm wide, containing three nuclei well evident : the dorsal located at the beginning of the oesophageal bulb, the two subventral almost at the middle of the glandular oesophagus; oesophageal-intestinal valve inconspicuous, surrounded by intestinal tissue. Reproductive system amphidelphic, with both branches equally developed; ovary small; oviduct with a slender part consisting of discoid cells, and a *pars dilatata oviductus* not containing sperm; conspicuous sphincter muscle; uterus consisting of an ovejector, a tube, a pseudo-Z-organ and a *pars dilatata uteri* very wide and long, not containing sperm. Uterine tube long and straight with bulging cells. Spines are present in the uterus in the portion adjoining the ovejector and in the pseudo-Z-organ. The spines

varying in length and shape, needle-like with broad base, somewhat lanceolate, appear irregularly pointed and rarely attached to the uterine wall. A few small globular bodies are visible among the spines in the pseudo-Z-organ, more evident in the portion adjacent to the *pars dilatata uteri*. Prerectum 530 (470-570) µm long; rectum extending two thirds of the anal body width. Tail rounded, hemispherical, bearing three caudal pores on each side.

Male : General appearance similar to female with posterior part of the body more curved. Morphology and anatomy similar to female except in the genital apparatus and the somatic structures associated with it; testis well developed; spicules curved, not cephalated; lateral guiding pieces moderately sclerotized, almost straight, slightly rounded proximally and bifid at the distal end. Preloacal pair of papillae preceded by four ventral supplements. Tail similar to that of female but slightly more elongated, with the rounded extremity ventrally located in relation to the body axis; four caudal pores are visible on each side of the tail.

Juveniles : Morphologically similar to adult but smaller; tail of first stage elongate-conoid with a long clavate peg, and bearing two caudal pores on each side.

TYPE HOST AND LOCALITY

Rhizosphere of grapevine at Limiti, province of Perugia, Umbria, Italy.

TYPE SPECIMENS

Holotype, allotype, six paratype females and juveniles in the Collection of the Istituto di Nematologia Agraria del Consiglio Nazionale delle Ricerche, Bari, Italy; one paratype female in the collection of Muséum national d'Histoire naturelle, Laboratoire des Vers, Paris, France; one paratype female in the Nematology Department, Rothamsted Experimental Station, Harpenden, Herts, England; one paratype female in the Plant Nematology Laboratory Collection, United States Department of Agriculture, Beltsville, Maryland, USA.

DIAGNOSIS AND RELATIONSHIPS

Xiphinema coronatum sp. n. is characterized by two female genital branches equally developed, almost equatorial vulva, pseudo-Z-organ, spiniform structures in the uteri and tail hemispherical. By the presence of spines in the uteri *X. coronatum* sp. n. can be easily distinguished from the closely resembling species.

The code in the polytomous key (Loof & Luc, 1990) is the following : A4 B2 + 3 C7b D6 E56 F45 G34 H2 I3 J7b K2 L1.

The new species belongs to the *X. coxi*-group (group 5 in Loof & Luc, 1990), among whose species it resembles *X. globosum* Sturhan, 1978, and *X. turcicum* Luc &

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

	$\mathcal{J}1$	$\mathcal{J}2$	$\mathcal{J}3$	$\mathcal{J}4$	Female
n	9	11	9	8	9
L (mm)	1.5-1.8 (1.7 \pm 0.10)	1.8-2.1 (1.9 \pm 0.09)	2.4-3.1 (2.8 \pm 0.23)	3.3-3.8 (3.6 \pm 0.18)	3.8-4.6 (4.3 \pm 0.29)
a	51.2-60.4 (55.8 \pm 3.24)	48.2-62.1 (59.4 \pm 3.98)	52.9-66.2 (62.4 \pm 4.25)	67.7-72.8 (69.5 \pm 1.80)	65.5-75.5 (71.2 \pm 3.23)
b	3.9-5.0 (4.5 \pm 0.39)	4.3-4.9 (4.6 \pm 0.24)	4.8-6.0 (5.4 \pm 0.39)	5.6-6.7 (6.1 \pm 0.38)	6.6-8.4 (7.2 \pm 0.52)
c	18.9-23.4 (21.2 \pm 1.52)	45.4-61.2 (51.1 \pm 4.24)	57.9-83.6 (71.7 \pm 8.74)	87.7-108.6 (93.7 \pm 6.58)	94.4-131.2 (115.3 \pm 11.4)
c'	3.1-3.7 (3.3 \pm 0.18)	1.1-1.6 (1.4 \pm 0.14)	0.9-1.3 (1.1 \pm 0.14)	0.8-1.0 (0.9 \pm 0.05)	0.7-0.9 (0.8 \pm 0.08)
V	—	—	—	—	47.1-51.8 (49.6 \pm 1.63)
Odontostyle	73.0-89.4 (76.7 \pm 5.08)	85.9-101.8 (90.2 \pm 4.27)	104.7-117.1 (111.7 \pm 3.84)	126.5-135.3 (131.8 \pm 2.75)	147.1-154.1 (150.8 \pm 2.66)
Odontophore	45.9-65.9 (52.4 \pm 5.84)	60.0-67.7 (64.0 \pm 2.41)	71.7-79.4 (75.6 \pm 2.79)	85.3-88.8 (87.4 \pm 1.30)	90.0-101.2 (97.6 \pm 3.37)
Total spear length	122.4-155.3 (129.1 \pm 10.49)	145.9-169.4 (154.1 \pm 6.10)	178.2-196.5 (187.3 \pm 5.81)	211.8-222.4 (219.3 \pm 3.40)	238.8-253.5 (248.4 \pm 5.10)
Replacement odontostyle	85.9-118.8 (92.9 \pm 10.00)	106.5-132.4 (115.9 \pm 6.85)	127.6-144.1 (135.1 \pm 5.34)	152.9-165.9 (156.4 \pm 4.21)	—
Oral aperture to guiding ring	60.6-90.0 (68.1 \pm 8.75)	74.1-89.4 (81.9 \pm 4.19)	97.6-104.1 (101.1 \pm 2.00)	110.6-127.7 (121.0 \pm 6.44)	142.3-154.1 (148.0 \pm 3.64)
Tail	73.0-91.7 (78.8 \pm 6.16)	30.6-43.5 (38.0 \pm 3.42)	34.1-47.1 (38.9 \pm 3.90)	33.5-41.8 (38.1 \pm 2.49)	34.1-40.6 (37.6 \pm 2.12)
h (hyaline portion of the tail)	27.1-44.1 (36.2 \pm 6.18)	5.9-7.7 (6.3 \pm 0.59)	5.9-8.8 (7.9 \pm 0.98)	8.8-10.6 (9.6 \pm 0.54)	9.4-13.5 (10.9 \pm 1.25)
Body diameter at lip region	7.1-8.8 (8.0 \pm 0.60)	8.8-11.8 (9.8 \pm 0.88)	9.4-11.2 (10.3 \pm 0.52)	10.6-13.5 (12.0 \pm 0.89)	11.8-15.9 (13.7 \pm 1.49)
Body diam. at guiding ring	23.0-26.5 (23.7 \pm 1.06)	25.9-31.8 (28.4 \pm 1.47)	32.4-43.5 (36.4 \pm 3.29)	39.4-42.9 (41.4 \pm 1.22)	45.3-50.0 (47.8 \pm 1.81)
Body diam. at base of oesophagus	25.3-31.2 (28.8 \pm 2.12)	28.2-39.4 (32.5 \pm 2.79)	38.2-49.4 (44.2 \pm 4.17)	47.1-54.7 (51.5 \pm 2.85)	54.1-64.7 (59.4 \pm 3.73)
Body diam. at mid-body or vulva	27.1-31.8 (29.8 \pm 1.69)	28.2-39.4 (32.7 \pm 2.79)	38.2-50 (44.5 \pm 4.57)	47.1-55.3 (51.2 \pm 2.50)	57.6-65.3 (60.7 \pm 3.04)
Body diam. at anus	20.6-27.7 (23.9 \pm 2.46)	23.5-32.3 (27.1 \pm 2.22)	31.2-40.0 (36.3 \pm 3.19)	40.6-44.7 (42.3 \pm 1.37)	43.5-51.2 (47.8 \pm 3.01)
Body diam. at beginning of h	8.8-13.5 (11.6 \pm 1.81)	15.3-19.4 (17.8 \pm 1.29)	21.2-28.8 (25.8 \pm 2.42)	29.4-31.2 (30.2 \pm 0.54)	30.6-37.7 (34.3 \pm 2.63)

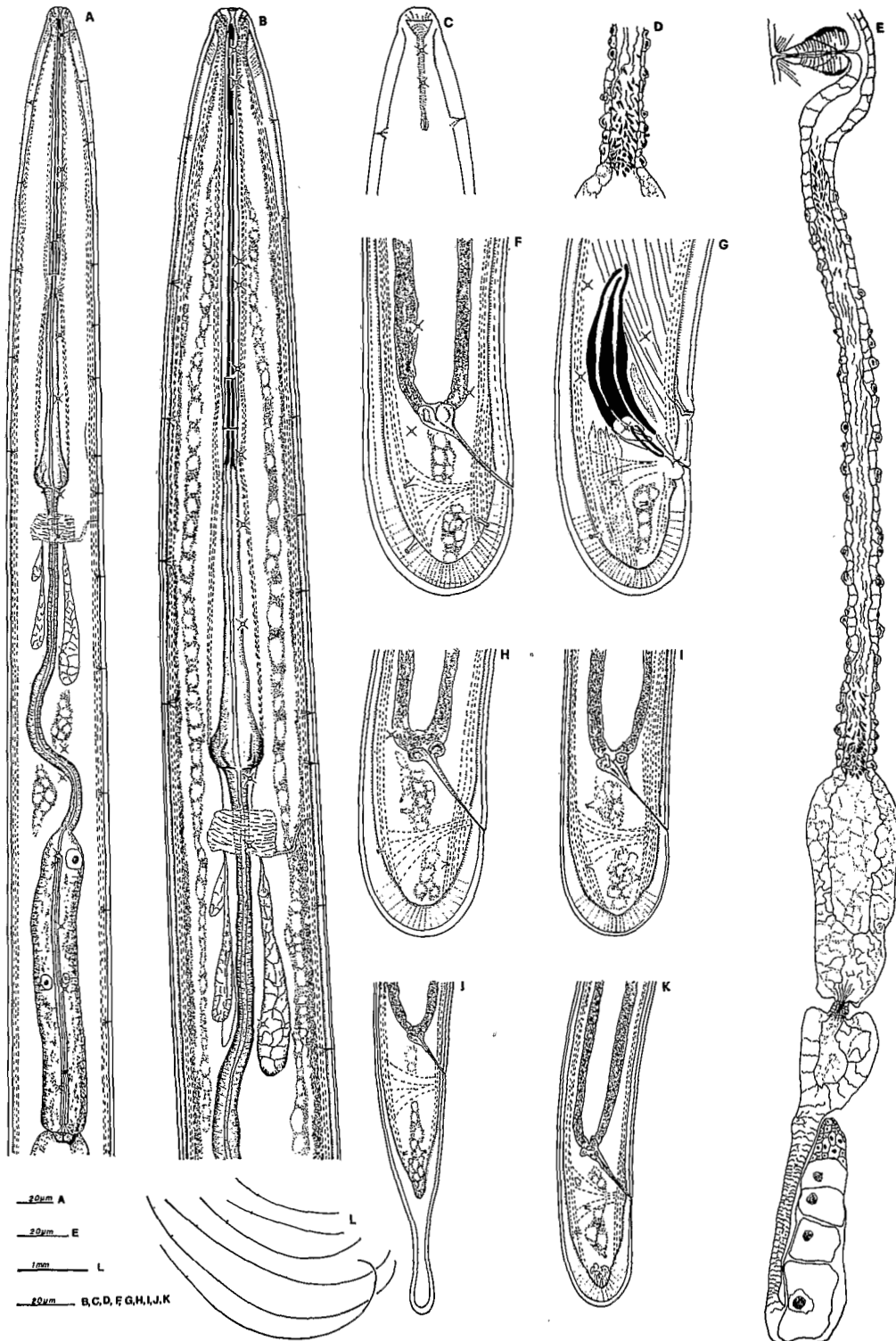


Fig. 1. *Xiphinema coronatum* sp. n., A, B : Female, anterior region; C : Head end (surface view); D : Pseudo-Z-organ; E : Posterior branch of the genital tract; F : Female posterior region; G : Male posterior region; H-K : Posterior region of the four juvenile stages; L : Posture of juvenile and adult stages.

Dalmasso, 1964. From *X. globosum* it differs in having longer body (L of *X. globosum* : female 2.6-3.9 mm, male 3.03-3.54 mm), longer odontophore (90-101.2 vs 79-92 μ m), longer distance from oral opening to guiding ring (142.3-154.1 vs 111-141 μ m), longer tail (34.1-40.6 vs 27-34 μ m), posteriorly situated vulva (47.1-51.8 vs 37.6-43.8), presence of spiniform structures in the uteri, differently shaped pseudo-Z-organ and absence of a peg in the second larval stage. From *X. turcicum* the new species differs in having shorter odontostyle (147-154 vs 152-160 μ m), presence of spiniform structures in the uteri (absent in *X. turcicum*) and differently shaped pseudo-Z-organ.

Similarities with species without uterine differentiations belonging to other groups were observed. Among those, the most significant are : *X. clavatum* Heyns, 1965, *X. colombiense* Hunt, 1982, *X. guillaumeti* Germani, 1989, *X. guirani* Luc & Williams, 1978, and *X. porosum* Roca & Agostinelli, 1986.

X. coronatum sp. n. differs from *X. clavatum* in having longer body (3.8-4.6 vs 3.0-3.7 mm), longer odontostyle (147-154 vs 107-127 μ m), longer odontophore (90-101.2 vs 78-90 μ m), more slender body (a = 65.5-75.5 vs 56-63), longer distance from oral opening to guiding ring (142.3-154.1 vs 104-144 μ m) and absence of the peg in second and third stage; from *X. colombiense* in having longer body (3.8-4.6 vs 2.6-3.6 mm), longer odontophore (90-101.2 vs 74-83 μ m), longer distance of oral opening to guiding ring (142.3-154.1 vs 111-140 μ m), slender body (a = 65.5-75.5 vs 48.5-66.8)

and presence of the male; from *X. guillaumeti* in having longer body (3.8-4.6 vs 3.2-3.7 mm), shorter odontostyle and odontophore (147-154 vs 190-202 μ m and 90-101.2 vs 100-108 μ m, respectively), longer tail (34.1-40.6 vs 25-26 μ m) and anteriorly situated vulva (V = 47.1-51.8 vs 51.9-54.8); from *X. guirani* in having longer body (3.8-4.6 vs 2.16-2.57 mm), longer odontostyle and odontophore (147-154 vs 103-118 μ m and 90-101.2 vs 61-68 μ m, respectively) and longer tail (34.1-40.6 vs 22-30 μ m); from *X. porosum* in having shorter body (3.8-4.6 vs 4.8-5.3 mm), shorter odontostyle (147-154 vs 168-200 μ m), anteriorly situated vulva (V = 47.1-51.8 vs 51-53) and presence of the male (absent in *X. porosum*).

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