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XIPHINEMA DIVERSUM AND *X. EXILE* (NEMATODA, DORYLAIMIDA) TWO NEW SPECIES FROM PORTUGAL

by
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Summary. *Xiphinema diversum* sp. n. and *X. exile* sp. n. from Portugal are described. *X. diversum*, found in the rhizosphere of *Cupressus lusitanica* Miller, is similar to *X. pseudocoxi* Sturhan, 1984, *X. malawiense* Brown, Luc *et* Saka, 1983, *X. lusitanicum* Sturhan, 1983, *X. diversicaudatum* (Micoletzky, 1927), Thorne, 1939 and *X. dissimile* Roca, Pereira *et* Lamberti, 1987. *X. exile*, found in the rhizosphere of *Pinus pinaster* Aiton, is similar to *X. fortuitum* Roca, Lamberti *et* Agostinelli, 1987, *X. pachydermum* Sturhan, 1983, *X. pachtaicum* (Tulaganov, 1938) Kirjanova, 1951 and *X. californicum* Lamberti *et* Bleve-Zacheo, 1979.

Soil samples collected from various localities in Portugal revealed the presence of two species of *Xiphinema* which to the best of our knowledge are new to the science. They are described and illustrated in this paper.

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 DIVERSUM sp. n. (Fig. 1 - Table I)

Holotype female: L = 2.9 mm; a = 73; b = 7.2; c = 65; c' = 1.7; V = 47.5; odontostyle = 104 μm; odontophore = 62 μm; oral aperture to guiding ring = 102 μm; tail length = 46 μm; J = 17 μm; body diameter at lip region = 12 μm; body diameter at guiding ring = 30 μm; body diameter at base of oesophagus = 34 μm; body diameter at vulva = 40.5 μm; body diameter at anus = 27 μm; body diameter at beginning of J = 16 μm; tail peg = 11.5 μm.

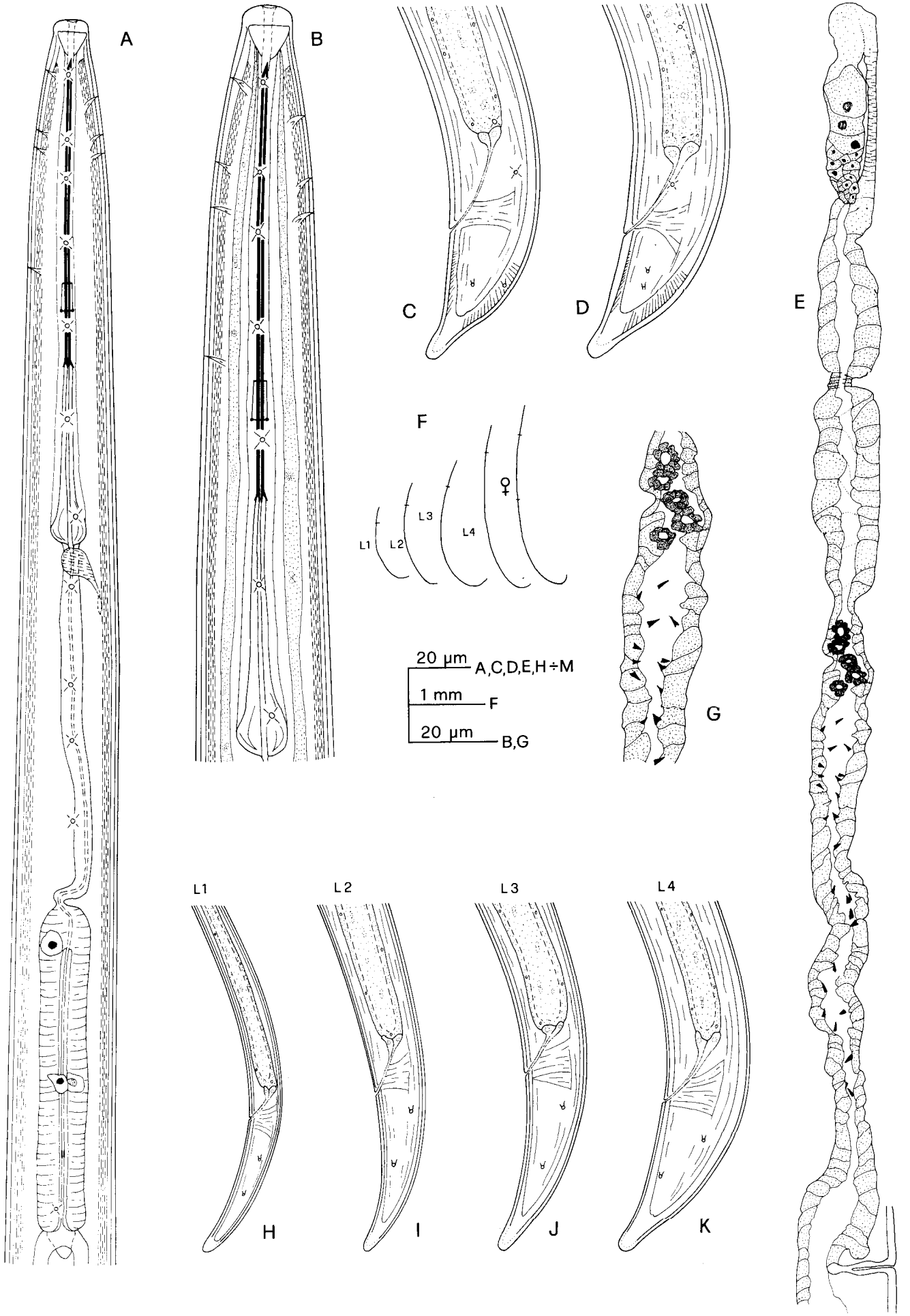
Description : female *habitus* almost straight as J shape, curved in the caudal region when heat-relaxed; body robust, cylindrical, tapering very gradually towards the anterior extremity, more abruptly posteriorly; cuticle smooth along the body with very fine striations in the caudal region, 2-2.5 μm thick along body, more thickened in the neck region where it measures 2.5-3 μm at the base of the lip region, and in the caudal region where it is 4-4.5 μm ventrally and 5.5-6 μm dorsally in the post anal portion; lateral hypodermal chords readily visible throughout the length of the body, 8.5- 9 μm wide at mid body or 24-25% of the corresponding body diameter; lateral body pores 5-6 in the range of the odontostyle, arranged in a single row in the neck region, in a double row in the rest of the body from the beginning of the basal bulb; four dorsal and three ventral body pores in the range of the odontostyle well evident in the neck region, less so in the rest of the body; labial region 4.5-5 μm high, almost hemispherical, offset from the rest of the body by a wide depression; amphids large, stirrup shaped, with wide aperture as a straight transverse slit; basal flanges 10.5-11 μm wide and «tube» not well evident, variable in length from 6 to 16 μm, with guiding ring slender 3-3.5 μm wide; oesophagus dorylaimoid with the anterior part tubular; basal enlarged portion occupying 1/4 of the total oesophagus length, 110-114 μm long and 15-18 μm wide, containing three large nuclei; oesophageal-intestinal valve heart-shaped; female reproductive system amphidelphic, with equally developed branches; vulva slit-like, situated slightly anterior to mid body; vagina extending to more or less 2/3 of the corresponding body diameter; gonads with reflexed ovaries; oviduct consisting of a cylindrical part and a large pouch separated from the uterus by a robust sphincter; uterus consisting of a well developed *pars dilatata* followed by a tubular part containing in the proximal part a well developed pseudo «Z» differentiation, comprising a central, spherical, sclerotized portion, surrounded by variously lobed or irregular pieces (Fig. 2); spiniform structures, some of them very large, distributed over the entire length of the tube-like portion (Fig. 3); no agglomerates of spermatozoa in the uterine pouch or in the uterus; rectum ex-

[1] The assistance of Mr. V. Radicci in preparing the illustrations is acknowledged.

TABLE I - *Morphometrics of* Xiphinema diversum sp. n. (*paratypes*).

	Range (Means ± Standard Deviation)				
STAGES	J1	J2	J3	J4	♀♀
n	9	9	8	20	14
L mm	0.8 - 1.2 (1.07 ± 0.14)	1.3 - 1.7 (1.5 ± 0.11)	1.5 - 1.8 (1.6 ± 0.08)	2.0 - 2.6 (2.3 ± 0.16)	2.7 - 3.2 (2.9 ± 0.16)
a	45.6 - 55.2 (50.9 ± 3.39)	53.5 - 66.7 (61.2 ± 4.08)	55.5 - 65.1 (60.2 ± 3.34)	61.0 - 75.5 (68.8 ± 4.34)	66.3 - 80.8 (72.8 ± 4.12)
b	3.9 - 5.6 (4.7 ± 0.47)	4.5 - 5.3 (4.9 ± 0.29)	4.7 - 6.1 (5.3 ± 0.54)	5.2 - 6.7 (6.0 ± 0.36)	6.7 - 7.8 (7.3 ± 0.33)
c	15.6 - 23.3 (19.6 ± 2.48)	22.0 - 29.5 (25.8 ± 2.32)	24.5 - 29.6 (27.6 ± 1.69)	35.2 - 50.0 (39.4 ± 3.37)	55.3 - 74.3 (63.2 ± 5.14)
c'	3.8 - 4.4 (4.2 ± 0.25)	2.9 - 3.8 (3.5 ± 0.31)	2.8 - 3.4 (3.1 ± 0.18)	1.9 - 2.8 (2.4 ± 0.20)	1.5 - 1.9 (1.7 ± 0.11)
V	—	—	—	—	43.7-53.2 (46.3 ± 2.36)
Odontostyle µm	43.5 - 57.6 (52.7 ± 4.87)	54.7 - 68.8 (64.6 ± 5.40)	63.5 - 71.8 (68.5 ± 2.47)	77.0 - 90.0 (83.7 ± 3.01)	97.7 - 105.3 (101.7 ± 2.02)
Odontophore µm	26.5 - 40.6 (34.5 ± 4.66)	37.0 - 54.7 (44.8 ± 4.98)	44.7 - 47.7 (45.6 ± 1.13)	50.0 - 57.1 (54.4 ± 2.19)	52.9 - 64.7 (60.5 ± 2.93)
Replacement odontostyle µm	51.8 - 68.8 (61.7 ± 7.25)	68.2 - 85.8 (80.8 ± 7.18)	78.2 - 88.2 (85.3 ± 3.22)	98.2 - 108.2 (103.0 ± 2.92)	—
Oral aperture to guiding ring µm	40.0 - 55.3 (47.5 ± 5.61)	53.5 - 68.2 (62.7 ± 5.85)	53.5 - 68.8 (63.5 ± 5.50)	72.4 - 90.0 (80.6 ± 4.37)	90.0 - 101.2 (96.8 ± 3.02)
Tail length µm	49.4 - 60.6 (54.6 ± 3.82)	51.8 - 65.3 (56.8 ± 4.35)	56.5 - 63.5 (59.1 ± 2.22)	49.4 - 64.1 (57.6 ± 3.99)	41.2 - 50.0 (46.2 ± 2.51)
J µm	6.5 - 11.2 (8.7 ± 1.37)	7.1 - 16.5 (11.6 ± 3.25)	10.6 - 16.5 (13.1 ± 1.71)	14.1 - 21.8 (17.3 ± 2.04)	15.3 - 24.7 (18.0 ± 2.28)
Body diam. at lip region µm	6.5 - 8.8 (7.6 ± 0.75)	8.2 - 10.0 (8.9 ± 0.64)	8.8 - 9.4 (9.2 ± 0.30)	9.4 - 11.8 (10.5 ± 0.55)	10.6 - 12.4 (11.6 ± 0.54)
Body diam. at guiding ring µm	13.5 - 17.7 (15.8 ± 1.60)	17.7 - 20.6 (19.7 ± 1.18)	20.0 - 23.5 (21.3 ± 1.08)	22.9 - 26.5 (25.2 ± 1.06)	27.7 - 31.2 (28.9 ± 1.05)
Body diam. at base of oesophagus µm	17.0 - 21.8 (19.6 ± 1.53)	21.2 - 25.3 (23.1 ± 1.37)	23.5 - 28.8 (25.6 ± 1.66)	26.5 - 32.9 (30.5 ± 1.99)	31.7 - 38.8 (34.5 ± 2.10)
Body diam. at mid body or vulva µm	17.7 - 23.0 (21.0 ± 1.61)	21.2 - 27.7 (24.0 ± 1.90)	24.1 - 31.8 (27.1 ± 2.48)	27.1 - 37.1 (33.0 ± 2.99)	35.9 - 48.8 (40.1 ± 3.67)
Body diam. at anus µm	11.2 - 14.1 (13.0 ± 1.12)	14.7 - 18.8 (16.5 ± 1.38)	17.7 - 21.8 (18.8 ± 1.26)	21.2 - 27.7 (24.1 ± 1.59)	24.7 - 29.4 (26.6 ± 1.43)
Body diam. at beginning of J µm	4.7 - 5.9 (4.9 ± 0.42)	5.3 - 7.0 (6.3 ± 0.72)	5.9 - 7.0 (6.4 ± 0.58)	5.3 - 10.6 (8.6 ± 1.41)	10.6 - 15.3 (12.7 ± 1.34)

Fig. 1 (front page) - *Xiphinema diversum* sp. n.: A and B, female anterior region; C and D, female posterior region; E, posterior branch of the female genital tract; F, posture of juvenile and adult stages; G, pseudo «Z» organ with spiniform structures in the uterus; H - K, posterior region of juveniles.


A
B
C
D
E
F
L1
L2
L3
L4
♀
G
20 µm
A,C,D,E,H÷M
1 mm
F
20 µm
B,G
L1
L2
L3
L4
H
I
J
K

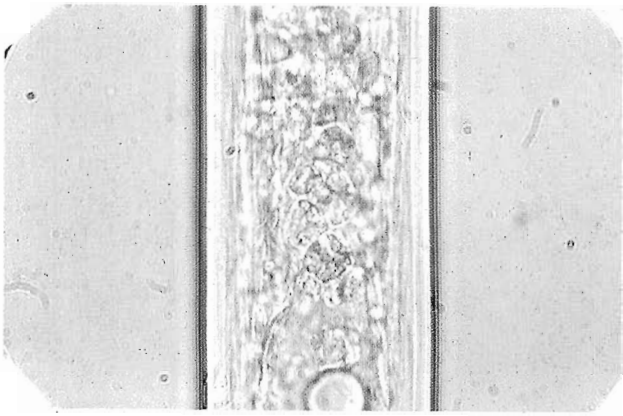


Fig. 2 - *Xiphinema diversum* sp. n.: pseudo «Z» organ.

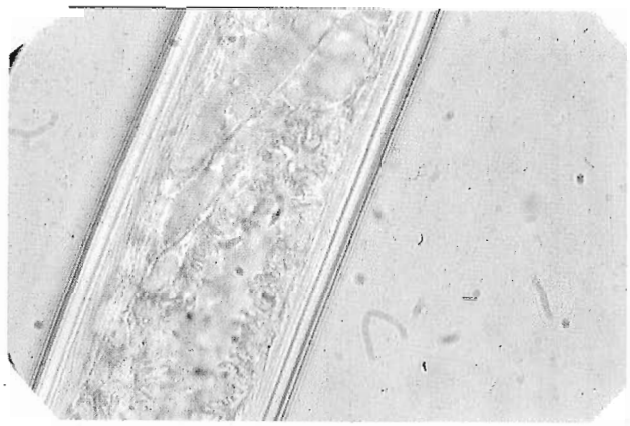


Fig. 3 - *Xiphinema diversum* sp. n.: spiniform structures in the uterus.

tending slightly more than the body width at anus; tail conoid,rounded dorsally and slightly arcuate ventrally, with long terminal peg connected to the tail through a large base; two caudal pores are evident on each side of the tail.

Male : not found.

Juveniles : morphologically similar to adult females but smaller; tail of first stage elongated and conoid.

Type habitat and locality : rhizosphere of *Cupressus lusitanica* Miller at Cruz Alta, Buçaco, Portugal.

Type material : holotype, ten paratype females and juveniles in the collection of the Istituto di Nematologia Agraria del Consiglio Nazionale delle Ricerche, Bari, Italy; two paratype females in the Nematology Department Rothamsted Experimental Station, Harpenden, Herts, England; two paratype females in the Plant Nematology Laboratory Collection, United States Department of Agriculture, Beltsville, Maryland, U.S.A.

Differential diagnosis : *Xiphinema diversum* sp. n. in the shape of the pseudo «Z» organ more closely resembles *X. pseudocoxi* Sturhan, 1984 and *X. malawiense* Brown, Luc *et* Saka, 1983. It is also similar to *X. diversicaudatum* (Micoletzky, 1927) Thorne, 1939, *X. dissimile* Roca, Pereira *et* Lamberti, 1987 and *X. lusitanicum* Sturhan, 1983. It differs from *X. pseudocoxi* in having a shorter body length (2.9 vs 3.4-4.1 mm in *X. pseudocoxi*), more slender body («a» value 72.8 vs 72-91), lower «c» ratio (63 vs 74-88) and slightly shorter odontostyle (102 vs 103.5-114 µm in *X. pseudocoxi*); *X. diversum* differs from *X. malawiense* in having a more slender body («a» value 72.8 vs 52 in *X. malawiense*), shorter odontostyle and odontophore (102 vs 111 µm and 60.5 vs 75 µm in *X. malawiense* respectively) and the presence of spiniform structures in the uteri, not found in *X. malawiense*; it differs from *X. diversicaudatum* in having a shorter body (2.9 vs 4.0-4.9 mm in *X. diversicaudatum*), lower «c» ratio (63 vs 78-96 in *X. diversicaudatum*), shorter odontostyle (102 vs 130-143 µm in *X. diversicaudatum*), spiniform structures in the uterus (absent in *X. diversicaudatum*) and being unisexual; it differs from *X. dissimile* in having a shorter body (2.9 vs 5 mm), more robust body («a» value 72.8 vs 102.2 in *X. dissimile*), lower «c» ratio (63 vs 111.6 in *X. dissimile*), shorter odontostyle and odontophore (101.7 vs 129 µm and 60.5 vs 74 µm in *X. dissimile*, respectively), presence of spiniform structures in the uterus (absent in *X. dissimile*) and being unisexual; finally it differs from *X. lusitanicum* in having a shorter body (2.9 vs 5.31 mm in *X. lusitanicum*), lower «c» ratio (63 vs 91 in *X. lusitanicum*), shorter odontostyle and odontophore (102 vs 172 µm and 60.5 vs 110.5 µm in *X. lusitanicum*, respectively) and presence of spiniform structures in the uterus.

XIPHINEMA EXILE sp. n. (Fig. 4 - Table II)

Holotype female: L = 2.5 mm; a = 89; b = 8.2; c = 55; c' = 2.6; V = 55; odontostyle = 61 µm; odontophore = 44 µm; oral aperture to guiding ring = 55 µm; tail length = 45 µm; J = 9 µm; body diameter at lip region = 10 µm; body diameter at guiding ring = 19 µm; body diameter at base of oesophagus = 25 µm; body diameter at vulva = 28 µm; body diameter at anus = 17 µm; body diameter at beginning of J = 7 µm.

Allotype male: L = 2.4 mm; a = 93; b = 8.2; c = 60; c' = 2; odontostyle = 62 µm; odontophore = 39 µm; oral aperture to guiding ring = 56 µm; tail length = 39 µm; J = 9 µm; body diameter at lip region = 10.5 µm; body diameter at guiding ring = 19.5 µm; body diameter at base of oesophagus = 25 µm; body diameter at mid body = 25 µm; body diameter at anus = 19 µm; body diameter at beginning of J = 6.5 µm; spicules = 39.5 µm; lateral guiding piece = 8.8 µm.

Description: female *habitus* as a closed C or a single spi

Fig. 4 (front page) - *Xiphinema exile* sp. n.: A and B, female anterior region; C, male posterior region; D, female posterior region; E, female genital tract; F, posture of juvenile and adult stages; G-J, posterior region of juveniles.

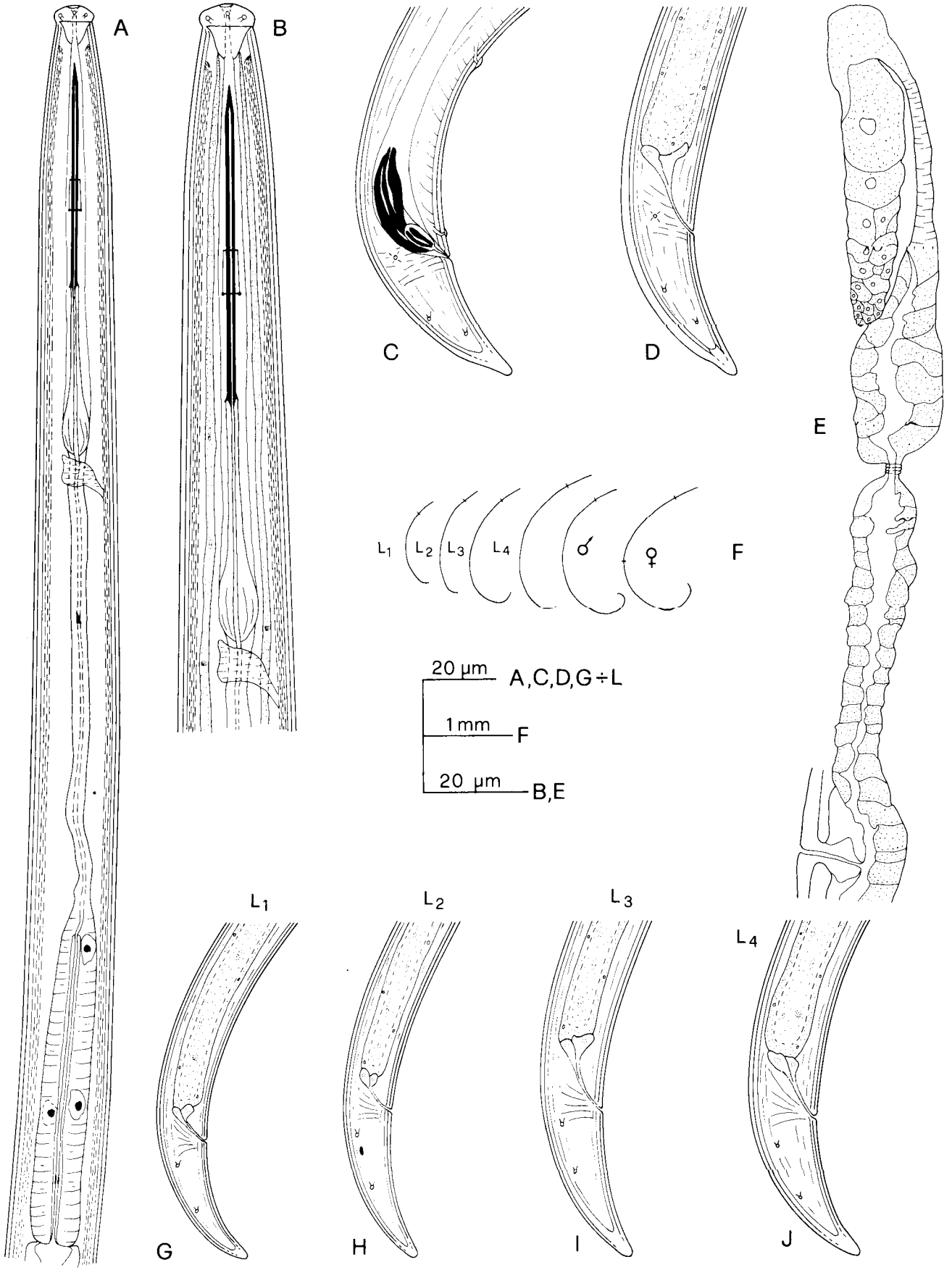

A
B
C
D
E
L1
L2
L3
L4
♂
♀
F
20 µm
A,C,D,G÷L
1 mm
F
20 µm
B,E
L1
L2
L3
L4
G
H
I
J

TABLE II - *Morphometrics of* Xiphinema exile sp. n. (*paratypes*).

STAGES	Range (Means ± Standard Deviation) L1	L2	L3	L4	♀♀	♂♂
n	3	7	7	18	13	13
L mm	0.85 - 0.85 (0.85 ± 0.0)	1.1 - 1.2 (1.1 ± 0.05)	1.2 - 1.6 (1.4 ± 0.13)	1.9 - 2.3 (2.0 ± 0.11)	2.3 - 2.9 (2.6 ± 0.14)	2.2 - 2.6 (2.4 ± 0.12)
a	45.3 - 48.3 (47.3 ± 1.74)	52.8 - 58.8 (55.8 ± 2.22)	55.3 - 66.7 (60.5 ± 4.05)	71.1 - 89.5 (79.6 ± 5.43)	78 - 92.5 (87.3 ± 4.22)	86 - 104.8 (94 ± 5.13)
b	4.4 - 6.3 (5.1 - 1.07)	5.1 ± 6.3 (5.5 ± 0.39)	5.3 - 6.3 (5.8 ± 0.36)	7.0 - 8.0 (7.5 ± 0.31)	8.2 - 9.8 (8.6 ± 0.45)	7.2 - 8.3 (7.8 ± 0.32)
c	22.3 - 31.5 (25.7 ± 5.04)	22.2 - 27.5 (25.0 ± 2.20)	29.2 - 38.7 (32.5 ± 3.31)	40.8 - 54.5 (46.2 ± 3.70)	49.4 - 65.1 (57.5 ± 4.69)	46.8 - 71.4 (55.1 ± 6.40)
c'	2.5 - 3.4 (3.0 ± 0.44)	2.3 - 3.7 (3.2 ± 0.43)	2.6 - 3.0 (2.9 ± 0.15)	2.2 - 3.4 (2.7 ± 0.50)	2.3 - 2.9 (2.5 ± 0.16)	1.6 - 2.5 (2.2 ± 0.20)
V	—	—	—	—	53.7 - 57.3 (55.2 ± 1.22)	—
Odontostyle µm	31.2 - 35.9 (34.3 ± 2.72)	31.2 - 37.7 (34.8 ± 2.13)	35.3 - 48.2 (41.4 ± 4.54)	45.9 - 54.7 (50.9 ± 2.14)	57.7 - 63.5 (61.2 ± 1.57)	58.2 - 63.5 (60.6 ± 1.36)
Odontophore µm	21.2 - 27.1 (23.9 ± 2.96)	28.8 - 33.5 (31.0 ± 1.88)	32.3 - 36.5 (34.7 ± 1.44)	57.1 - 63.5 (60.4 ± 1.90)	41.2 - 49.4 (44.0 ± 2.01)	40.6 - 46.5 (43.8 ± 1.81)
Replacement odontostyle µm	34.1 - 38.8 (37.1 ± 2.56)	41.8 - 48.2 (44.4 ± 2.17)	42.9 - 54.1 (49.2 ± 3.94)	30.0 - 42.9 (38.8 ± 2.88)	—	—
Oral aperture to guiding ring µm	26.5 - 38.2 (31.2 ± 6.23)	31.2 - 50.6 (35.6 ± 6.77)	33.5 - 43.5 (38.4 ± 3.62)	38.2 - 50.6 (46.8 ± 2.69)	52.4 - 58.2 (56.2 ± 1.62)	52.3 - 57.6 (55.9 ± 1.40)
Tail length µm	27.1 - 38.2 (33.9 ± 6.01)	40.6 - 52.9 (45.8 ± 4.52)	36.5 - 47.1 (41.8 ± 3.79)	38.2 - 48.2 (44.2 ± 3.14)	40.6 - 51.8 (45.1 ± 3.15)	32.9 - 48.8 (43.3 ± 4.38)
J µm	3.5 - 4.7 (4.1 ± 0.59)	2.9 - 5.3 (3.9 ± 0.82)	3.5 - 7.7 (5.0 ± 1.35)	4.7 - 9.4 (7.3 ± 1.07)	8.8 - 11.2 (9.8 ± 0.92)	8.8 - 11.7 (10.0 ± 0.85)
Body diam. at lip region µm	7.1 - 7.7 (7.2 ± 0.34)	7.1 - 8.2 (7.6 ± 0.53)	7.6 - 9.4 (8.4 ± 0.65)	8.2 - 10.0 (9.0 ± 0.58)	9.4 - 10.6 (10.1 ± 0.35)	9.4 10.6 (10.2 ± 0.37)
Body diam. at guiding ring µm	12.4 - 13.5 (12.7 ± 0.68)	13.5 - 15.3 (14.4 ± 0.57)	14.7 - 17.1 (15.8 ± 0.93)	16.5 - 18.8 (17.8 ± 0.71)	18.8 - 20.6 (19.8 ± 0.61)	18.2 - 20.6 (19.4 ± 0.68)
Body diam. at base of oesophagus µm	15.3 - 17.1 (16.5 ± 1.02)	18.2 - 19.4 (18.9 ± 0.53)	17.6 - 22.3 (20.2 ± 1.66)	21.2 - 25.9 (23.6 ± 1.26)	24.7 - 27.1 (25.8 ± 0.64)	22.9 - 25.3 (24.0 ± 0.55)
Body diam. at mid body or vulva µm	17.6 - 18.8 (18.0 ± 0.68)	20.0 - 21.2 (20.4 ± 0.44)	21.2 - 25.3 (22.4 ± 1.50)	22.9 - 27.6 (25.6 ± 1.39)	28.2 ± 32.4 (29.6 ± 1.06)	23.5 - 26.5 (25.1 ± 0.91)
Body diam. at anus µm	10.6 - 11.8 (11.2 ± 0.59)	12.3 - 20.0 (14.5 ± 2.51)	12.9 - 16.4 (14.6 ± 1.38)	10.6 - 19.4 (16.9 ± 1.82)	17.1 - 19.4 (17.9 ± 0.61)	18.8 - 21.2 (19.9 ± 0.75)
Body diam. at beginning of J µm	2.9 - 3.5 (3.3 ± 0.34)	3.5 - 4.1 (3.8 ± 0.31)	4.1 - 4.7 (4.4 ± 0.31)	4.1 - 6.5 (5.5 ± 0.66)	5.9 - 8.2 (7.1 ± 0.74)	5.3 - 7.6 (6.3 ± 0.69)
Spicules µm	—	—	—	—	—	32.9 - 44.7 (39.4 ± 3.51)
Lateral guiding piece µm	—	—	—	—	—	8.2 - 9.4 (8.8 ± 0.41)

ral, more coiled in the posterior half, when heat-relaxed; body slender, cylindrical, tapering very gradually towards the anterior extremity, more abruptly posteriorly; cuticle finely and transversely striated, 1.3-1.6 μm thick along the body, more thickened in the neck region where it measures 1.7- 1.8 μm at the base of the lip region, and in the caudal region where it is 2.3-2.4 μm ventrally and 2.4-2.5 μm dorsally in the post anal portion; lateral hypodermal chords 5.9-7.4 μm wide at mid body or 22-29% of the corresponding body diameter; lateral, dorsal and ventral body pores not visible; labial region expanded, wide to the full body width, or a little less in the neck region, slightly flattened frontally and rounded laterally, 1.7-1.9 μm high, offset from the rest of the body by a constriction; amphid large, stirrup shaped, with wide aperture as a transverse slit; odontostyle robust, 1.1-1.3 μm in diameter; basal flanges 5-5.5 μm wide and «tube» not well evident with guiding ring slender, 3.2-3.5 μm wide; oesaphagus dorylaimoid with the anterior part tubular; basal enlarged portion occupying 1/4 of the total oesophagus length and measuring 91-95 μm long and 14-15 μm wide, containing three large nuclei; oesophageal-intestinal valve heart-shaped; female reproductive system amphidelphic, with equally developed branches; vulva slit- like, situated slightly posterior to mid body; vagina extending more or less 3/4 of the corresponding body diameter; gonads with reflexed ovaries; oviduct consisting of a cylindrical part and a large pouch separated from the uterus by a robust sphincter; uterus consisting of a well evident *pars dilatata* followed by a tubular part without any inclusions or structures; no bacteria evident in the uterus; prerectum not evident; rectum very long, extending to one and half or double the body width at anus; tail conoid- elongated, ventrally arcuate, with rounded terminus, bearing two 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; spicules robust, curved, not cephalated with enlarged central portion; lateral guiding piece rounded proximally and bifid at distal end; precloacal pairs of papillae preceded by three ventromedian single supplements; tail similar to that of female, but a little shorter, arcuate, bearing two caudal pores on each side.

Juveniles: morphologically similar to adult females but smaller; tail of first stage elongated.

Type habitat and locality: rhizosphere of *Pinus pinaster* Aiton at Sameiro, Braga, Portugal.

Type material: holotype, allotype, nine paratype females and nine paratype males and juveniles in the collection of the Istituto di Nematologia Agraria del Consiglio Nazionale delle Ricerche, Bari, Italy; two paratype females and two paratype males in the Nematology Department Rothamsted Experimental Station, Harpenden, Herts, England; two paratype females and two paratype males in the Plant Nematology Laboratory Collection, United States Department of Agriculture, Beltsville, Maryland, U.S.A.

Differential diagnosis: *Xiphinema exile* sp. n. resembles *X. fortuitum* Roca, Lamberti *et* Agostinelli, 1987, *X. pachydermum* Sturhan, 1983, *X. pachtaicum* (Tulaganov, 1938) Kirjanova, 1951 and *X. californicum* Lamberti *et* Bleve-Zacheo, 1979. It differs from *X. fortuitum* in having a lower «c» ratio (57 vs 75.7), higher «c'» ratio (2.5 vs 1.9), longer tail (45 vs 35 μm), shorter odontostyle (61 vs 102 μm) and bisexual status; it differs from *X. pachydermum* in having a slightly longer body (2.6 vs 2.26 mm), more slender body («a» value 87.3 vs 67), lower «c» ratio (57.5 vs 79), higher «c'» ratio (2.5 vs 1.3); longer tail (45 vs 28 μm) and shorter odontostyle (61 vs 80 μm); it differs from *X. pachtaicum* in having longer body (2.6 vs 1.9 mm), shorter odontostyle (61 vs 86 μm), longer tail (45 vs 31 μm) and bisexual status (the male is rare in *X. pachtaicum*); it differs from *X. californicum* in having slightly longer body (2.6 vs 2 mm), more slender body («a» value 87 vs 60), shorter odontostyle (61 vs 90 μm), longer tail (45 vs 31 μm) and bisexual status (the male in *X. californicum* is very rare).

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