Nematol. medit. (1996), 24: 253-259

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XIPHINEMA POMBALENSE (NEMATODA, DORYLAIMIDA), A NEW SPECIES FROM PORTUGAL

by
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Summary. *Xiphinema pombalense*, an hitherto undescribed bisexual species found in the rhizosphere of *Rubus* sp. at Cavada de Carride, Pombal, Portugal, is characterized by body length of 4.3 mm, lip region continuous with the rest of the body, odontostyle length of 132 µm, unusually long odontophore (ca. 45% of the spear total length), slightly postequatorial vulva (V = 54), two equally developed female genital branches devoid of any "Z" differentiation or spines, and short broadly rounded tail. *X. pombalense* n. sp. is similar to *X. coronatum*, *X. lanceolatum*, *X. macrogastrum* and *X. nuragicum*.

An undescribed species of *Xiphinema* was recovered from soil collected from around the roots of *Rubus* sp. in uncultivated land bordering a vineyard at Cavada de Carride, Pombal, during a nematode survey in Portugal. The binomial *Xiphinema pombalense* sp. n. is proposed.

Nematodes were extracted from soil samples by means of Cobb's wet sieving technique, killed and fixed in hot 5% formalin and mounted in glycerine. Measurements were taken with the aid of a camera lucida.

XIPHINEMA POMBALENSE sp.n.

(Figs 1-3; Table I)

Description

Female *habitus* as an open C, occasionally J-shaped, when killed by heat; body tapering gradually towards the extremities, but more abruptly in the odontostyle region. Cuticle with very fine transverse striation, 4-5.5 µm thick along the body, but more thickened in the prelabial portion where it is 6-9 µm just behind the lip region, and in the caudal region, where it is 10-13 µm dorsally at the anus level. Lip region continuous with the rest of the body, broadly rounded frontally; amphidial pouches stirrup-shaped with aperture as a narrow transverse slit occupying more or less one half of the lip region width. Odontostyle 3.5-4 µm in diameter at its base, odontophore with robust flanges, 16-22 µm wide at the base, almost as long as the odontostyle, comprising 44% (43-46) of the total spear length. Guiding sheath of variable length, with two well evident rings. The posterior oesophageal bulb occupies ca. 1/3 of the total oesophagus length and measures 185-203 µm long and 30-35 µm wide; dorsal gland nucleus always well evident, the two subventral nuclei often obscure; oesophageal-intestinal gland broadly and irregularly rounded. Reproductive system amphidelphic with two equally developed branches; vulva slit-like, slightly posterior to mid-body; vagina extending almost 1/2 of body diameter; ovejector robust, connected with the slender tubular portion of the uterus

TABLE I - *Morphometric characters of* Xiphinema pombalense *sp. n.*

	holotype	paratypes ♀♀	males ♂♂	J1	J2	J3	J4
n		16	16	1	4	11	21
L (mm)	4.3	(3.95-4.73) 4.32±0.22	(3.99-4.70) 4.30±0.22	1.58	(1.95-2.10) 2.00±0.06	(2.32-2.77) 2.51±0.12	(2.91-3.67) 3.29±0.18
a	64.9	(59.9-71.9) 65.7±3.17	(64.5-75.0) 68.7±3.28	46.5	(42.4-50.4) 47.0±2.90	(51.7-55.3) 53.7±1.20	(51.8-62.4) 59.6±2.48
b	6.8	(6.66-8.05) 7.23±0.43	(6.44-7.97) 7.24±0.38	4.16	(4.38-4.69) 4.54±0.13	(4.80-5.38) 5.03±0.18	(4.89-6.41) 5.75±0.34
c	115.9	(111-147) 128.9±9.03	(104-155) 132.2±15.48	14	(20-23) 21.4±0.90	(49-73) 57.7±5.85	(71-99) 86.4±7.20
c'	0.75	(0.6-0.8) 0.69±0.03	(0.65-0.9) 0.74±0.19	5.3	(3.0-3.4) 3.24±0.19	(1.0-1.4) 1.22±0.10	(0.8-1.1) 0.87±0.07
V	54	(51.5-58.5) 53.9±1.53	–	–	–	–	–
Odontostyle µm	134.3	(128-135) 132.3±2.17	(125-134) 129.6±2.50	66	(79-85) 83.3±2.49	(93-103) 97.5±3.17	(110-126) 115.7±3.14
Odontophore µm	106.3	(100-110) 105.7±2.69	(100-110) 105.8±2.46	65	(70-78) 74.3±2.86	(80-87) 84.5±2.10	(84-98) 93.8±2.83
Replacement odontostyle µm	–	–	–	79	(97-104) 102.0±2.92	(111-118) 115.0±2.37	(125-138) 131.6±3.55
Oral aperture to guiding ring µm	117	(115-124) 118.7±2.11	(115-120) 117.0±1.54	60	(72-78) 74.8±2.77	(83-92) 87.0±2.22	(97-114) 103.5±3.58
Tail µm	37	(30-37) 33.6±1.90	(28-39) 32.9±3.08	117	(92-96) 93.5±1.66	(32-49) 44.0±4.61	(34-47) 38.3±3.38
J (hyalin portion of tail) µm	13.7	(12-16) 14.9±0.90	(11-15) 13.8±1.14	40	(36-49) 44.0±4.95	(13-16) 14.8±0.89	(13-17) 14.9±0.96
Body diam. at lip region µm	18	(17.5-20) 18.5±0.72	(17-20) 18.9±0.86	13	(15-16) 15.3±0.43	(15-17) 15.9±0.63	(16-19) 17.3±0.73
Body diam. at guiding ring µm	49.7	(48-52) 50.1±0.83	(46-50) 48.2±1.29	27	(30-35) 33.3±1.92	(35-40) 37.6±1.37	(42-46) 44.1±1.19
Body diam. at base of oesophagus µm	66	(61-70) 64.9±2.34	(57-66) 62.3±2.17	34	(39-44) 42.3±2.05	(43-52) 46.2±2.25	(53-62) 56.9±2.89
Body diam. at mid-body or vulva µm	66.3	(62-72) 65.8±2.77	(57-66) 62.6±2.60	34	(39-46) 42.8±2.59	(43-53) 46.8±2.62	(53-63) 57.2±3.23
Body diam. at anus µm	49	(46-51) 49.0±1.54	(42-46) 44.3±1.40	22	(27-31) 28.5±1.50	(31-40) 36.0±2.26	(42-49) 44.1±1.77
Body diam. at beginning of J µm	36	(35-40) 37.6±1.66	(29-34) 31.7±1.49	12	(18-19) 18.5±0.50	(24-30) 27.1±1.73	(30-36) 33.4±1.62
Spicules µm	–	–	(67-77) 72.6±2.37	–	–	–	–
Guiding piece µm	–	–	(16-20) 17.7±1.03	–	–	–	–

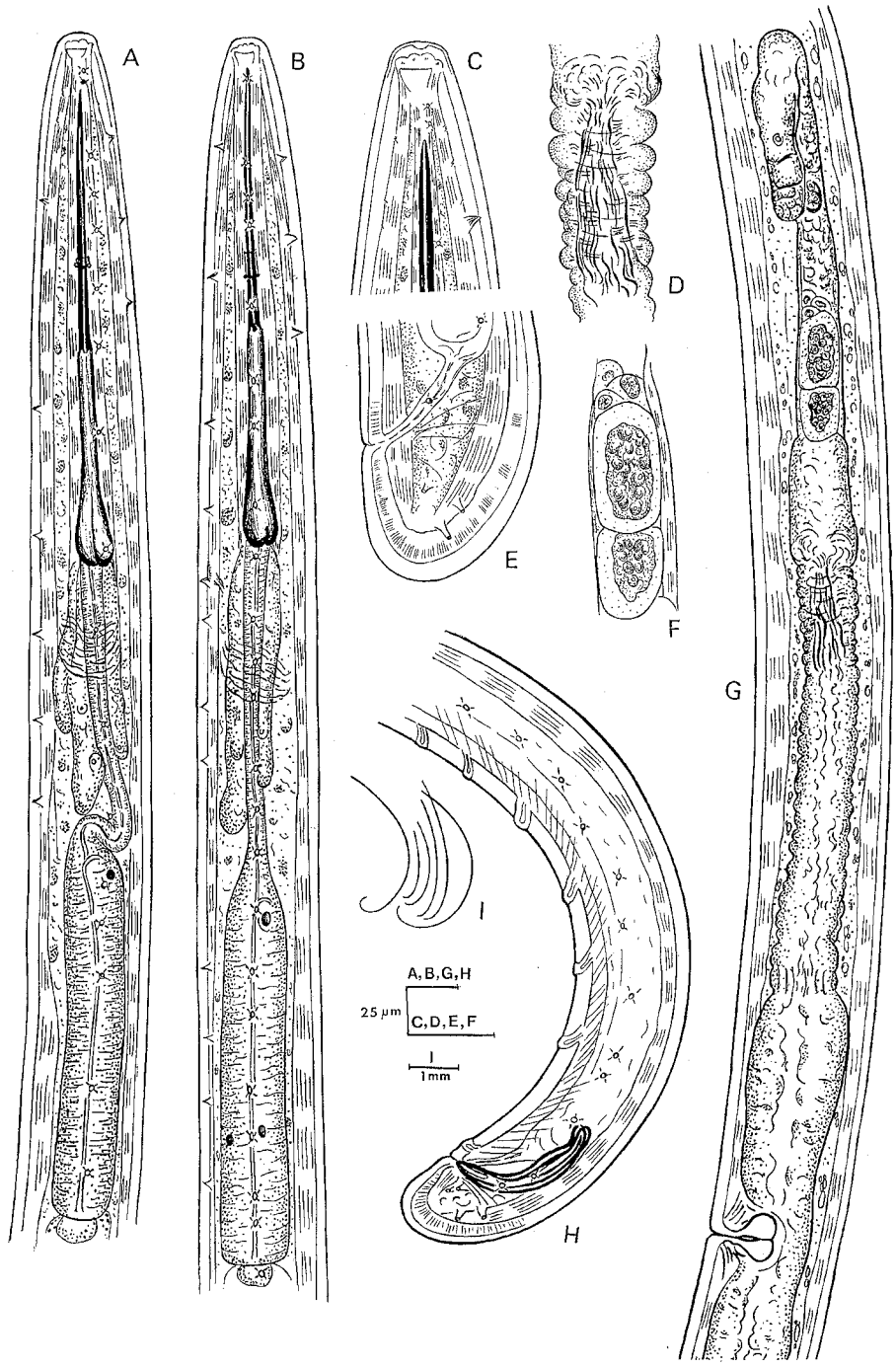

Fig. 1 - *Xiphinema pombalense* sp. n.: A, anterior body region of female; B, anterior body region of male; C, detail of the lip region of female; D, detail of uterus sphincter; E, tail of female; F, detail of developing eggs in the oviduct; G, anterior branch of female genital tract; H, posterior region of male; I, body postures of male, first, second, third and fourth juvenile stages and female (from the left to the right).

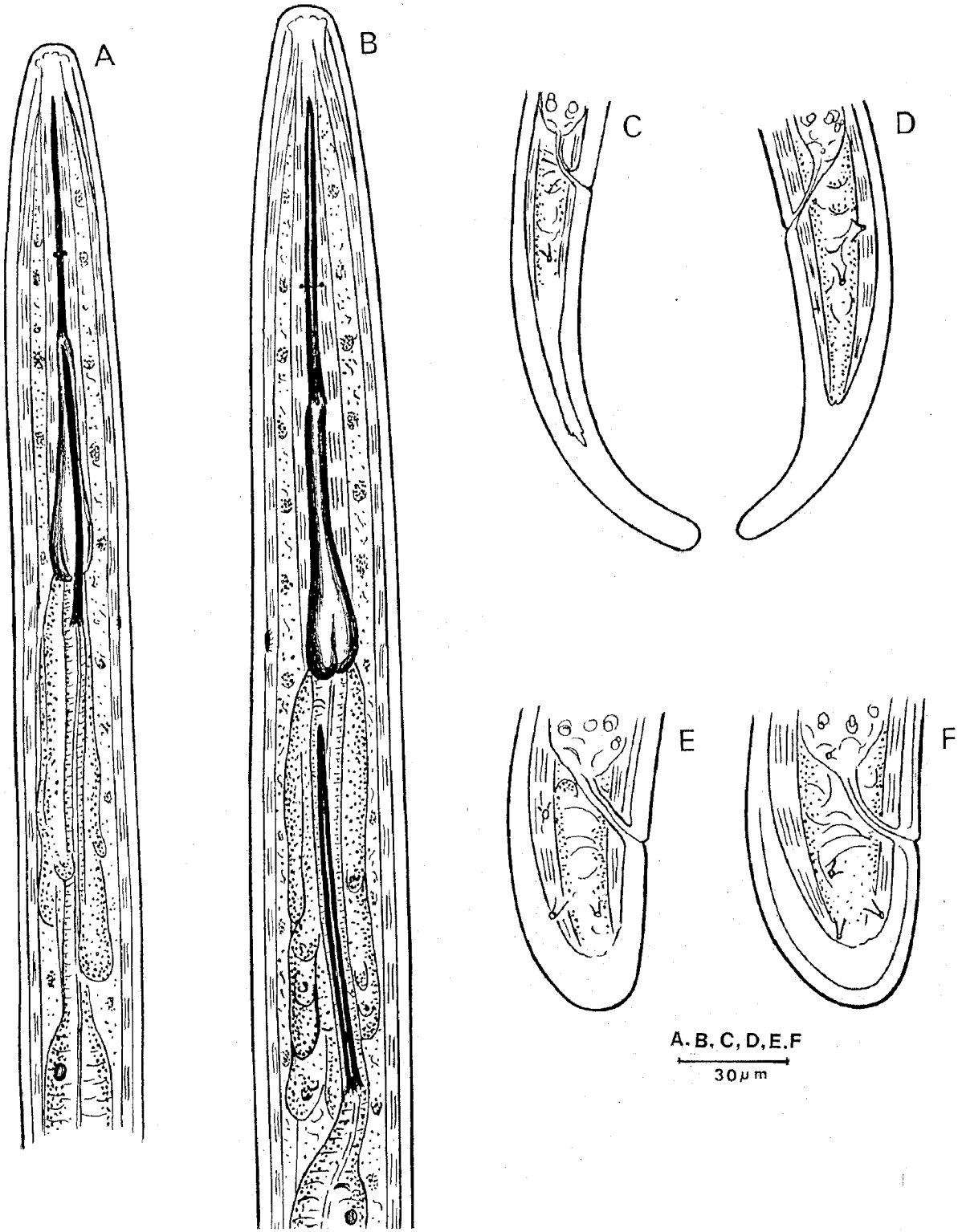

Fig. 2 - *X. pombalense* sp.n.: A, anterior region of the first juvenile stage; B, anterior region of second juvenile stage; C, D, E, F, tail shapes of first, second, third and fourth juvenile stages respectively.

by a very slight constriction; no "Z" structures nor spines are evident, but a conspicuous sphincter separates the uterus from the uterine pouch; oviduct wide with developing eggs in some females; ovaries short, reflexed. Prerectum variable in length, generally very long; rectum slightly shorter than anal body width. Tail short, broadly and asymmetrically rounded, bearing 3-4 caudal pores on each side.

Male generally similar to female, with the posterior region of the body more coiled. Testis well developed, functional, filled with sperms. Spicules strong, deeply arcuate, not cephalated, with guiding pieces well sclerotized, almost straight or only slightly curved. Adanal pair of supplements ca. 10 µm anterior to the cloacal aperture, preceded by a row of 4 to 8, most frequently 6, ventromedian supplements. Tail broadly rounded with 3-4 caudal pores on each side.

Juveniles clearly separated into four stages (Fig. 4) with J1 and J2 having elongate subdigitate tail and J3 and J4 rounded tail, similar to that of adult female.

Type habitat and locality: rhizosphere of *Rubus* sp. and other natural vegetation at Cavada de Carride, Pombal, Portugal.

Type material: holotype female, 10 female, 11 male and juvenile paratypes at the Istituto di Nematologia Agraria, Consiglio Nazionale delle Ricerche, Bari, Italy; 2 female, 2 male and juvenile paratypes at Estação Agronómica Nacional, Department of Phytopathology, Oeiras, Portugal; 2 female and 2 male paratypes at Rothamsted Experimental Station, Entomology and Nematology Department, Harpenden, United Kingdom; 2 female and 2 male paratypes in

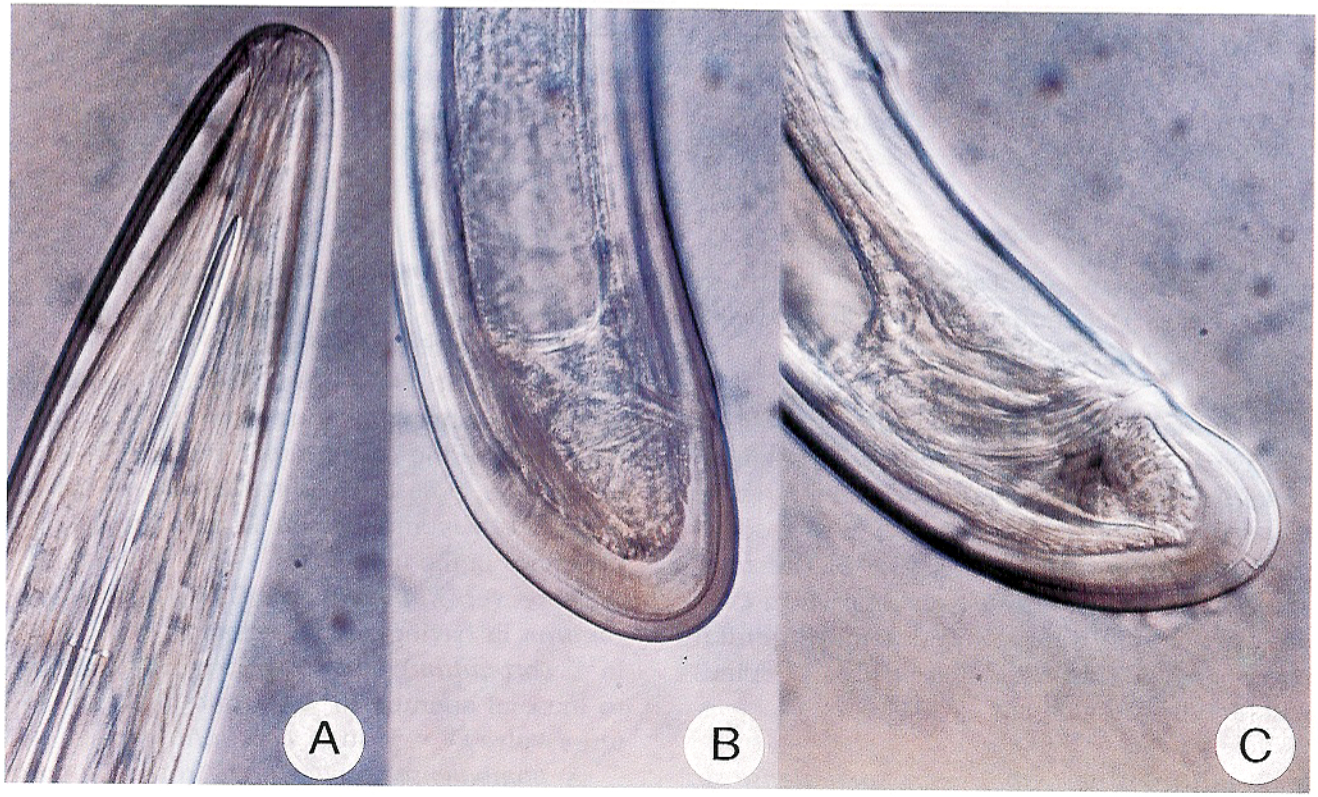

Fig. 3 - Photomicrographs of *X. pombalense* sp. n.: A, female anterior region; B, female posterior region; C, male posterior region.

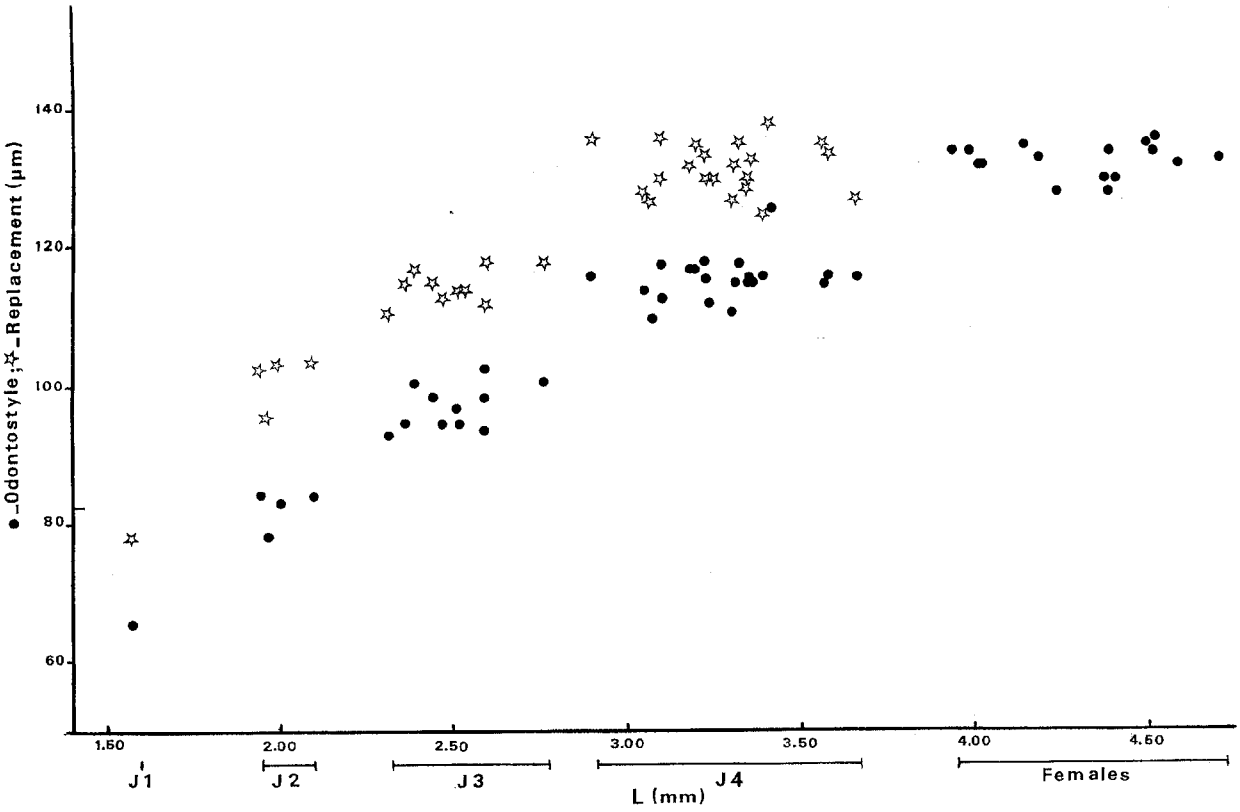

Fig. 4 - Scatter plot of odontostyle, replacement odontostyle and body lengths of individual juvenile specimens and females of *X. pombalense* sp. n.

the Plant Nematology Laboratory Collection, United States Department of Agriculture, Beltsville, Maryland, United States of America.

Diagnosis: *Xiphinema pombalense* sp. n. is a bisexual species characterized by body length of 4.3 µm, lip region continuous with the rest of the body, odontostyle length of 132 µm, odontophore length comprising 45% of the total spear length, slightly post-equatorial vulva (V = 54), two equally developed female genital branches devoid of "Z" differentiation or spines and broadly rounded tail.

Relationships: *Xiphinema pombalense sp. n.* is similar to *X. coronatum* Roca, 1991; *X. lanceolatum* Roca *et* Bravo, 1993; *X. macrogastrum* Lamberti, Castillo, Gomez-Barcina *et* Agostinelli, 1992 and *X. nuragicum*, Lamberti, Castillo, Gomez-Barcina *et* Agostinelli, 1992.

However, it differs from all these species in having an unusually long odontophore: 80% compared to the odontostyle length (65% in *X. coronatum*, 53% in *X. lanceolatum*, 62% in *X. macrogastrum* and 57% in *X. nuragicum*) and no spines in the uterus.

Moreover, *X. pombalense* differs from *X. coronatum* in having shorter odontostyle (151 µm in *X. coronatum*), anterior guiding ring (148 µm to the oral aperture in *X. coronatum*) and posterior vulva (V = 50 in *X. coronatum*).

X. pombalense further differs from *X. lanceolatum* in having much shorter odontostyle (178 µm in *X. lanceolatum*), anterior guiding ring

(155 µm from oral aperture in *X. lanceolatum*), posterior vulva (V = 45 in *X. lanceolatum*), shorter tail (44 µm in *X. lanceolatum*), higher value of 'c' (97 in *X. lanceolatum*) and tail without bulge.

X. pombalense further differs from *X. macrogastrum* in having shorter odontostyle (160 µm in *X. macrogastrum*), anterior guiding ring (150 µm from oral aperture in *X. macrogastrum*), posterior vulva (V = 47 in *X. macrogastrum*), shorter tail (42 µm in *X. macrogastrum*) and higher value of 'c' (111 in *X. macrogastrum*).

Finally *X. pombalense* further differs from *X. nuragicum* in having shorter odontostyle (144 µm in *X. nuragicum*), anterior guiding ring (129 µm from oral aperture in *X. nuragicum*), posterior vulva (V = 50 in *X. nuragicum*), higher value of 'c' (104 in *X. nuragicum*) and without bulge tail terminus.

Accepted for publication on 25 June 1996.