

*Istituto di Nematologia Agraria, C.N.R., 70126 Bari, Italy and
Institute of Subtropical Plants and Olive Tree, Chania, Greece*

LONGIDORIDS (NEMATODA: DORYLAIMOIDEA) OCCURRING IN THE RHIZOSPHERE OF OLIVE TREES IN WESTERN CRETE, GREECE

by

F. LAMBERTI, E. VOYOUKALOU and A. AGOSTINELLI

Summary. Of 50 soil samples collected from the rhizosphere of olive, grapevine, carob or walnut in the Province of Chania, Crete, 42 were positive for Longidoridae. *Xiphinema italiae* occurred only once in the rhizosphere of olive and *X. index* twice in the same locality in the rhizosphere of either grapevine or olive. *X. pachtaicum* was present in 41 of the positive samples, in the rhizosphere of all the four plant species considered. Three populations of *Longidorus closelongatus* occurred in the rhizosphere of olive. The four juvenile stages of this species are clearly separated on the basis of their odontostyle and replacement odontostyle length.

Olive (*Olea europaea* L.) is an important tree crop in the north-western region of Crete, where its nematofauna is almost unknown.

A survey of olive groves, in the Province of Chania, was carried out in November 1994. The results concerning Longidoridae are reported here.

Materials and methods

The survey consisted of 50 samples from 42 olive groves. Occasionally samples were collected from the rhizosphere of other perennials bordering the olive plantations or present in the area. Thus, three samples were collected from vineyards (*Vitis vinifera* L.), three from the rhizosphere of carob (*Ceratonia siliqua* L.) trees and two from the rhizosphere of walnut (*Juglans regia* L.) trees.

Composite soil samples were taken from the rhizosphere of three trees selected at random in each grove. Ca. 2 kg of soil containing feeder

roots were placed in plastic bags and transferred to the laboratory. Nematodes were extracted from ca. 1 l aliquots by Cobb's wet sieving technique and killed and fixed in 5% hot formalin, mounted in dehydrated glycerine and measured with the aid of a camera lucida.

Results

Four species of longidorids occurred: *Longidorus closelongatus* Stoyanov, 1964; *Xiphinema index* Thorne *et* Allen, 1950; *X. italiae* Meyl, 1953 and *X. pachtaicum* (Tulaganov, 1938) Kirjanova, 1951. A total of 42 samples, 84% of those collected, were found positive for Longidoridae; all positive samples, but one, contained *X. pachtaicum*, which is very widespread on the island and occurred in the rhizosphere of all the four plant species considered.

X. index was present in two samples collected in the same locality (near Chania airport) from the rhizosphere of both grapevine or olive.

X. italiae occurred in only one sample collected from the rhizosphere of olive on the edge of the river Tavronitis, near Kolibari.

Finally *L. closelongatus* was found in three samples from the rhizosphere of olive: the one which also contained *X. italiae*, and two other samples collected at Kolibari and Sirili.

The three species of *Xiphinema* have already been reported and illustrated from Crete (Vovlas and Avgelis, 1988).

Compared to the Mediterranean populations (Martelli and Lamberti, 1967), *X. index* (Table I) differs biometrically in its longer body and odontostyle (mean values ca. 3 mm and 125

µm, respectively, in other Mediterranean populations) and *X. italiae* (Table I) in its higher value of *c'* (mean values never more than 3.5 in other Mediterranean populations). Conversely, biometrics of *X. pachtaicum* from Crete (Table I) are in the range of the Mediterranean populations (Lamberti and Bleve-Zacheo, 1979).

Longidorus closelongatus is an uncommon species, redescribed by Sturhan and Argo on the basis of topotypes (1983). Following its original description from Bulgaria (Stoyanov, 1964), it has been reported only in Italy where it occurs in vineyards in the Trento Province (Coiro *et al.*, 1988).

TABLE I - *Biometric characters of three species of Xiphinema occurring in western Crete.*

Species	<i>X. index</i>	<i>X. italiae</i>	<i>X. pachtaicum</i>	
Locality (Host)	Chania airport (grapevine)	River Tavrotis edge (olive)	Modi (olive)	
n	10 ♀♀	10 ♀♀	10 ♀♀	* 1 ♂
L mm	3.4 (3.0-4.0)	3.1 (2.8-3.3)	(1.9 (1.8-2.0)	2.0
a	62 (57-69)	102 (93-109.5)	69 (66-72)	74
b	7.4 (6.7-8.5)	7.2 (6.8-8.0)	6.8 (5.6-8.0)	5.8
c	90 (77-100)	36 (33-40)	66 (58-74)	66
<i>c'</i>	1.0 (0.9-1.1)	4.0 (3.6-4.2)	1.7 (1.5-1.9)	1.5
V	39 (37-40)	47 (45-48)	56 (55-58)	—
Odontostyle µm	135 (125-141)	102 (99-105)	88 (83-91)	89
Odontophore µm	75 (73-79)	62 (59-67)	48 (46-51)	46
Oral aperture to guiding ring µm	123 (119-125)	92 (90-95)	77 (69-80)	78
Tail µm	38 (34-40)	85 (74-91)	29.5 (26-34)	30
J (hyalin portion of tail) µm	15 (14-17)	12 (9-15)	9 (7-11)	8
Body diam. at lip region µm	13 (12-14)	10 (10-11)	9 (9-9)	9
Body diam. at guiding ring µm	38 (35-40)	24 (23-25)	22 (20-24)	21
Body diam. at base of oesophagus µm	48 (44-52)	27 (26-29)	26 (24-28)	25
Body diam. at mid-body or vulva µm	55 (51-58)	30 (27-34)	28 (26-31)	27
Body diam. at anus µm	37 (34-39)	22 (19-25)	17.5 (16-19)	21
Body diam. at beginning of J µm	19 (15-21)	7 (6-8)	8 (7-10)	6
Spicules µm	—	—	—	40
Guiding piece µm	—	—	—	10

* The adanal pair of supplements is preceded by 6 in ventromedian position.

TABLE II - *Biometric characters of Longidorus closelongatus from the rhizosphere of olive in western Crete.*

Locality	Edge of river Tavronitis (near Kolibari)			Kolibari			
	20 ♀♀	1 ♂	2 ♀♀	22 J ₁	9 J ₂	6 J _a	4 J ₄
n							
L mm	6.6 (5.6-7.8)	7.7	6.8-7.8	2.2 (1.9-2.6)	3.7 (3.0-4.2)	4.5 (4.0-4.9)	5.7 (5.6-5.8)
a	146 (119-166)	158	136-135	77 (61-86)	106 (89-116.5)	116.5 (102-132)	114 (109-118)
b	15.4 (13.4-17.2)	17.9	15.4-15	7 (6-8)	9.9 (8.5-12)	10.8 (10-12)	13.8 (12-15)
c	152 (138-180)	168.5	140-210	49 (43-62)	76 (68-84.5)	98 (86-116)	132 (115-140)
c'	1.2 (1.1-1.3)	1.3	1.4-1.0	2.5 (2-2.9)	1.8 (1.6-2.2)	1.5 (1.3-1.8)	1.25 (1.2-1.4)
V	49 (46-51)	–	51-49	–	–	–	–
Odontostyle µm	116 (110-123)	125	123-130	85 (79-88)	96 (91-101)	107.5 (106-113)	111.5 (110-115)
Odontophore µm	59 (57-60)	63	57-60	45 (42-48)	49 (47-51)	56 (56-57)	57 (55-58)
Replacement odontostyle µm	–	–	–	94 (81-106)	111 (109-118)	123.5 (120-126)	125 (121-131)
Oral aperture to guiding ring µm	31 (30-33)	33	29-31	23 (21-25)	26 (24-29)	27.5 (26-29)	27.5 (26-29)
Tail µm	44 (37-50)	46	49-38	49 (43-55)	49 (48-53)	46 (42-51)	43.5 (40-49)
J (hyalin portion of tail) µm	11.5 (9-13)	9	13-15	8 (7-10)	10 (7-12)	9.5 (9-11)	13 (10-15)
Body diam. at lip region µm	14 (14-15)	14	14-14	10 (9-10)	11 (11-11)	12 (11-13)	13 (12-13)
Body diam. at guiding ring µm	21 (20-23)	21	22-23	16 (14-21)	17 (17-18)	19 (18-20)	19 (18-20)
Body diam. at base of oesophagus µm	39 (37-43)	38	36-46	26 (21-35)	31 (27-34)	34 (31-40)	40 (37-42)
Body diam. at mid-body or vulva mm	45 (41-55)	49	46-58	30 (26-36)	35 (30-40)	38 (33-43)	50 (49-51)
Body diam. at anus µm	35 (32-38)	34	34-40	19 (17-21)	27 (21-32)	31 (26-37)	36 (36-39)
Body diam. at beginning of J µm	21 (18-23)	15	21-31	8 (7-10)	8.5 (9-15)	16 (13-17)	20 (19-20)
Spicules µm	–	60	–	–	–	–	–
Guiding piece µm		16					

The three populations of *L. closelongatus* consisted of: numerous females, one male and several juveniles, except the first stages, in the population collected near Kolibari; two females and numerous juveniles, all stages, in the population from Kolibari and two females only in the population from Sirili.

It is thought useful to give a short description of the species, which is reported for the first time from the rhizosphere of olive (Lamberti and Vovlas, 1993) and from a Mediterranean island.

Measurements are reported in Table II and illustrations in Figs 1 and 2; the separation limits of the juvenile stages on the base of the odontostyle and replacement odontostyle lengths

plotted versus body length, of the Kolibari population, are shown in Fig. 3.

Description of *Longidorus closelongatus* from Crete

Female *habitus* an open C when killed, body robust, cylindrical, tapering gradually towards the anterior extremity. Lip region frontally rounded, separated from the rest of the body by a constriction. Amphidial pouches slightly asymmetrically bilobed. Odontostyle, odontophore and guiding ring typical of the genus. Enlarged basal portion of the oesophagus occupying about 1/5 of the

oesophagus total length. Vulva at mid-body, vagina as a slit, gonads equally developed, reflected. Tail conoid with rounded end, bearing on each side two pairs of caudal pores.

The male, hitherto undescribed, is ventrally more coiled than the female in the posterior region; no sperms visible in the testis. Spicules robust, arcuate. Tail ventrally concave and dorsally broadly rounded. The adanal pair of supplements is preceded by a row of 13 ventromedian supplements. The body is invaded by spores of *Pasteuria* sp.

The juveniles, clearly separated in four stages, have an elongated and more or less pointed

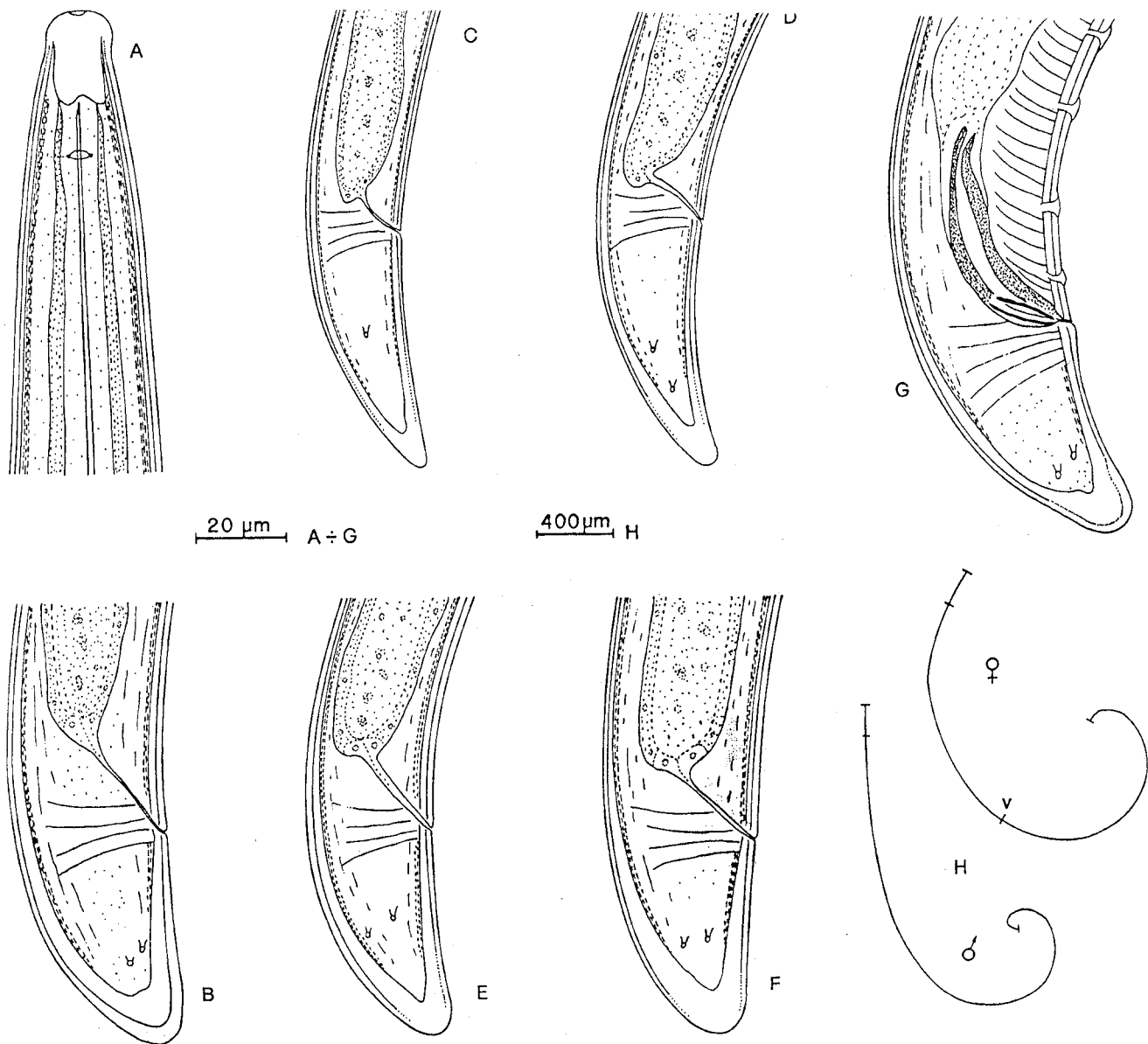


Fig. 1 - *Longidorus closelongatus* from Crete: A, female anterior region; B, female posterior region; C - F, L₁, L₂, L₃ and L₄ posterior region respectively; G, male posterior region; H, habitus.

- LAMBERTI F. and VOVLAS N., 1993. Plant parasitic nematodes associated with olive. *EPPO Bulletin*, 23: 481-488.
- MARTELLI G. P. and LAMBERTI F., 1967. Le specie di *Xiphinema* Cobb, 1913 trovate in Italia e commenti sulla presenza di *Xiphinema americanum* Cobb (Nematoda, Dorylaimoidea). *Phytopathol. medit.*, 6: 65-85.
- STOYANOV D., 1964. (A contribution to the nematofauna of the grapevine). *Rastit. Zasht. Sofia*, 12: 16-24.
- STURHAN D. and ARGO D., 1983. Studies on *Longidorus closei* Stoyanov and *L. cobni* Heyns, with description of *L. proximus* sp. nov. (Nematoda, Dorylaimida). *Revue Nématol.*, 6: 57-64.
- VOVLAS N. and AVGELIS A., 1988. Occurrence and distribution of *Xiphinema* species in vineyards of the Heraklion Province, Crete (Greece). *Nematol. medit.*, 16: 197-200.