

## ***XIPHINEMA CYNODONTIS* N.SP. (NEMATODA: LONGIDORIDAE) FROM PAKISTAN**

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### **Abstract**

Species of *Xiphinema cynodontis* n.sp. isolated from soil around the roots of turf grass (*Cynodon dactylon*) in Karachi, Pakistan is described. The new species is characterized by having a combination of characters: anteriorly situated vulva (29.9-32.7%); body length 2.1-2.4 mm; odontostyle length 90-100.4  $\mu$ m; sexual dimorphism in tail, convex conoid with rounded terminus in female and digitate in male. *X. cynodontis* is close to *X. elium* Khan, Chawla & Saha, 1978.

Longidorid nematodes are known to cause damage to many crops of economic importance both by direct feeding on the root system of plants and by transmitting viruses (Hewitt *et al.*, 1958). About 17 species of *Xiphinema* have been reported from Pakistan (Maqbool, 1992), which also include a new species *X. karachiense* Nasira, Firoza & Maqbool, 1992. Of the nematodes collected from turf grass (*Cynodon dactylon* (L.) Pers.) in Karachi, Pakistan, females, male and juvenile of an undescribed species of the genus *Xiphinema* have been found and identified as *Xiphinema cynodontis* n. sp. This new species is described and illustrated herein.

### **Materials and Methods**

Specimens were extracted from soil by decanting and sieving followed by modified Baermann funnels. Nematodes were killed by gentle heat, fixed in 4% hot formalin, mounted in glycerine by slow method. Illustrations were made by using a drawing tube attached to a compound microscope. Identification of *Xiphinema* species has been made with the help of the polytomous key given by Loof & Luc (1990).

*Xiphinema cynodontis* n.sp.  
( Fig. 1-3)

Measurements are given in Table 1.

Table 1. Morphometrics of *Xiphinema cynodontis* n. sp. (all measurements in  $\mu\text{m}$  except L).

	Holotype	Females (n = 8)	Male (n = 1)	J <sub>3</sub>
L(mm)	2.1	2.1 $\pm$ 0.13(2.0-2.4)	2.2	1.77
a	63.1	64.5 $\pm$ 3.2(59.9-68.8)	67.1	55
b	6.1	6.4 $\pm$ 0.41(5.6-7.2)	6.9	5.7
c	49.1	47.0 $\pm$ 2.8(40.5 $\pm$ 51.2)	51.1	34.1
c'	2.5	2.3 $\pm$ 0.2(2.2-2.5)	2.2	3.0
V	31.2%	31.1 $\pm$ 1.07(29.9-32.7)	-	-
Lip reg. diam.	9.6	10.3 $\pm$ 1.0(9.6-10.4)	9.6	8.8
Lip reg. height	4	4 $\pm$ 0.0(4-4)	4	3.2
Odontostyle	94.4	97.3 $\pm$ 5.0(90.4-104.8)	93.6	83.2
Odontophore	56	56.3 $\pm$ 1.7(53.6-58.4)	57.6	48
Stylet	150.4	153.6 $\pm$ 4.11(150-160)	151.2	131.2
Rep. odontostyle	-	-	-	100.8
Flanges width	8.8	9.0 $\pm$ 0.7(8.0-10.4)	8.8	8.8
Oral aperture to guide ring	95.2	92.1 $\pm$ 4.0(88.6-100)	88.6	56
Phar. bulb length	96	90.5 $\pm$ 5.8(80-96)	88	75.2
Phar. bulb diam.	19.2	18.1 $\pm$ 1.6(15.2-20.0)	19.2	18.4
Ant. gen. br.	156	168 $\pm$ 13.3(156-186.4)	-	-
Post. gen. br.	268	214.3 $\pm$ 55.6(140-295.2)	-	-

	Holotype	Females (n = 8)	Male (n = 1)	J <sub>3</sub>
Ant. gen. br. (%)	36.7%	44.7 $\pm$ 5.7(36.7-51.2)	-	-
Post. gen. br. (%)	63.2%	55 $\pm$ 6.54(44.8-63.9)	-	-
Body diam. at guiding ring	27.2	28.2 $\pm$ 1.05(27.2-29.6)	27.2	21.6
Body diam. at base of oesophagus	32.8	33 $\pm$ 0.93(32 -34.4)	32.8	32.8
Body diam. at mid body	33.6	34.2 $\pm$ 0.87(33.6-36.0)	33.6	32
Body diam. at anus	16.8	19.6 $\pm$ 0.56(16.8-20.8)	20	16.8
Body diam. at beginning of h	8.8	8.7 $\pm$ 1.01(8.0-10.4)	5.6	6.4
Rectum	30.4	31.7 $\pm$ 3.52(28-36.6)	28	24
Tail	43.2	47.1 $\pm$ 3.6(43.2-53.2)	44	52
Hyaline tail tip	5.6	6.3 $\pm$ 0.56(5.6-7.2)	12	4.8
Prerectum	516	470 $\pm$ 58.7(385-516)	480	400
Spicules	-	-	42.4	-
Lateral guiding piece	-	-	11.2	-

*Description female:* Heat relaxed body almost straight anterior to vulva, more curved posteriorly, with increasing curvation towards the tail end, occasionally c-shaped. Body cylindrical, tapering very gradually towards the anterior extremity. Cuticle with fine transverse striations, more evident in the caudal region, less so in the rest of the body. Cuticle thickened at mid body  $1.6-2.0 \mu\text{m}$ , in the sublabbial area  $2.0-2.4 \mu\text{m}$ , and more thickened  $3.0-3.2 \mu\text{m}$  ventrally and  $3.2-4.0 \mu\text{m}$  dorsally in the postanal portion. Lateral hypodermal chords readily visible throughout the body length  $12-13.6 \mu\text{m}$  wide at mid body or  $34.8-39.5\%$  of the corresponding diameter, lateral body pore, 10-11 in the range of the stylet and 17 pores in the oesophageal region, arranged in a single row while in the rest of the body, distributed irregularly along the dorsal and ventral sides of the lateral chords; 5 dorsal and 6 ventral pores in the range of the odontostyle. Labial region  $9.6-10.4 \mu\text{m}$  wide and  $4.0-4.2 \mu\text{m}$  high, almost hemispherical broadly rounded, offset from the rest of the body by a shallow depression; amphid stirrup-shaped, with aperture a straight transverse slit  $5.6-6.4 \mu\text{m}$  wide i.e.,  $53.8-61\%$  of the corresponding diameter. Odontostyle  $1.6-1.8 \mu\text{m}$  in diameter; odontophore well developed with basal flanges  $8-9.6 \mu\text{m}$  wide. Guiding tube well evident  $3-4.8 \mu\text{m}$  long. Guiding ring at  $88.6-100 \mu\text{m}$  from the anterior end. Hemizonid flat  $4-4.8 \mu\text{m}$  wide at  $153.6-156 \mu\text{m}$  from anterior end; hemizonion not observed. Nerve ring conspicuous  $168-184 \mu\text{m}$  from the anterior end. Oesophagus dorylamoid with the anterior part tubular, basal enlarged portion  $80-96 \mu\text{m}$  long and  $15.2-20 \mu\text{m}$  wide, containing three well evident nuclei. Gland nuclei and their outlets located as follows ( $n=8$ ): DO =  $9.4(8.8-11.6)$ ; DN =  $7.6(6.4-8.8)$ ; LSN =  $45.9(45-48)$ ; RSN =  $48.6(48-49.6)$ ; SO =  $73.7(72-76)$ . Cardia distinct, conoid, vulva situated more anteriorly. Vagina reaching less than half the body diameter; well demarcated ovejector. Reproductive system amphidelphic, with both genital branches almost equally developed, sometimes convoluted. Uteri without 'Z' organ. Each sexual branch consisting of a reflexed ovary with oocytes; expanded oviduct separated from the uterus by a conspicuous sphincter muscle, and expanded and slender part of uterus which is connected to vagina. The vagina opens through vulva at  $29.9-30.2\%$  of total body length. In 2 females an egg was found in the uterine tubular portion near the ovejector, but no sperms were observed inside the uteri. Eggs measuring  $156, 168.8 \mu\text{m} \times 28.8, 27.2 \mu\text{m}$  (including holotype). Tail bluntly conoid, with rounded terminus, hyaline terminal portion  $5.6-7.2 \mu\text{m}$  long or  $12.9-15\%$  of tail length, with 2 or 3 caudal pores on each side.

*Male:* Similar to female in general appearance, in cephalic region and stylet length, but different tail shape i.e., convex conoid with peg (digitate). Morphology and anatomy similar to that of female except for genital apparatus and the structures linked to it; posterior part of body

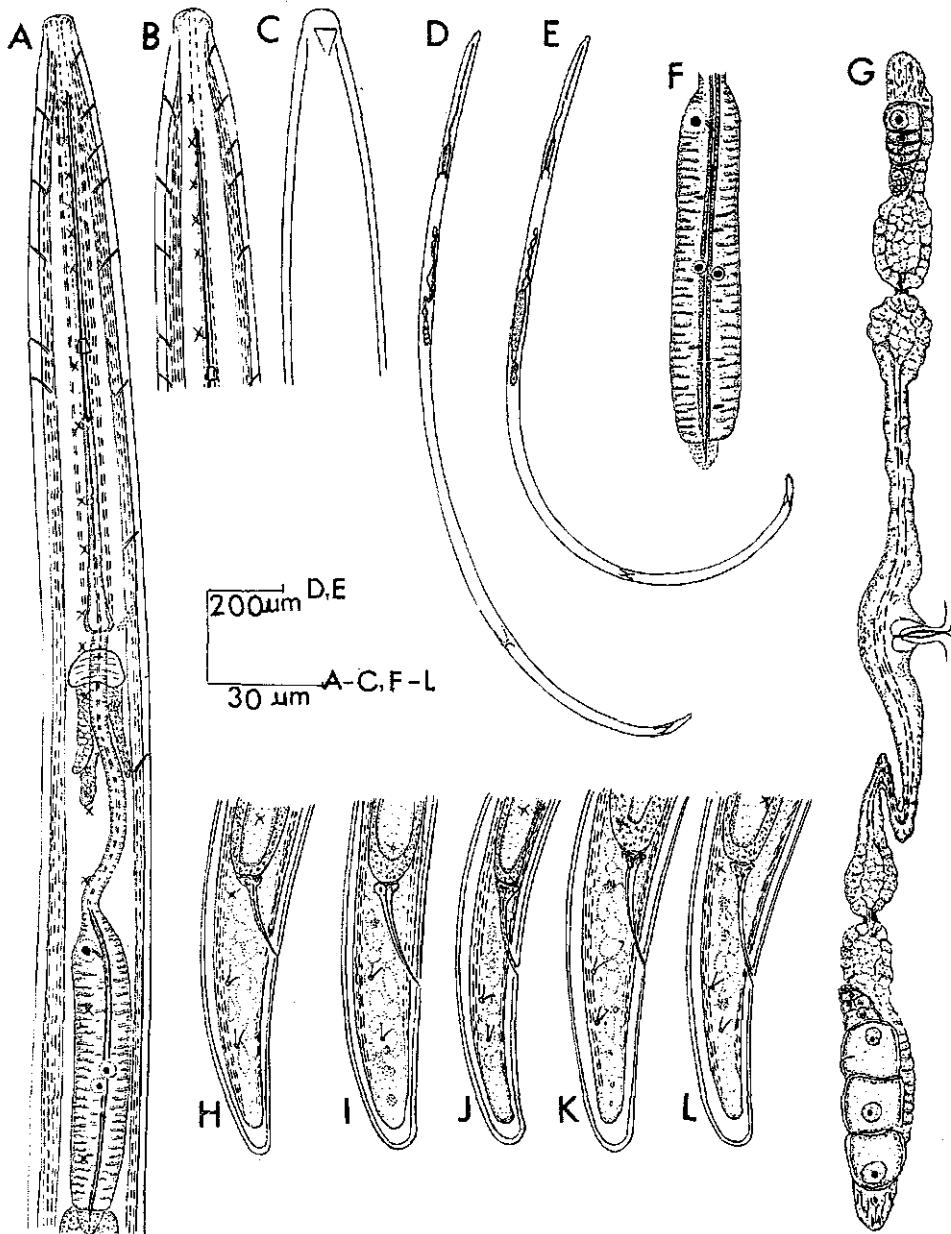


Fig. 1. *Xiphinema cynodontis* n.sp. (Female) A. Oesophageal region. B. Anterior region. C. Anterior region showing amphid. D, E. Entire body. F. Pharyngeal bulb. G. Reproductive system. H, I. Tail.

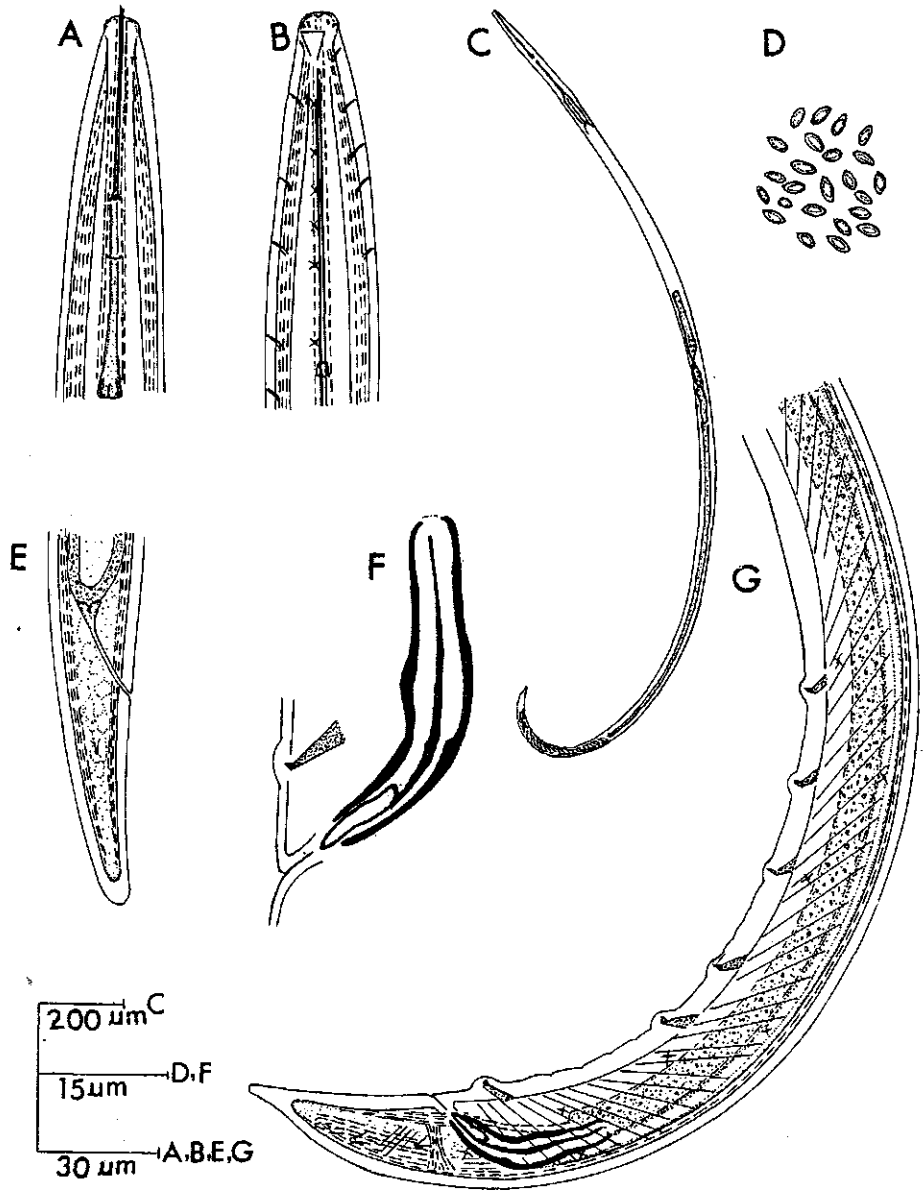


Fig. 2. *Xiphinema cynodontis* n.sp. (Male & Juvenile) A. Head end of juvenile. B. Head end of male. C. Entire body (male). D. Sperm. E. Tail of juvenile. F. Spicule and lateral guiding piece of the gubernaculum. G. Posterior region of male.

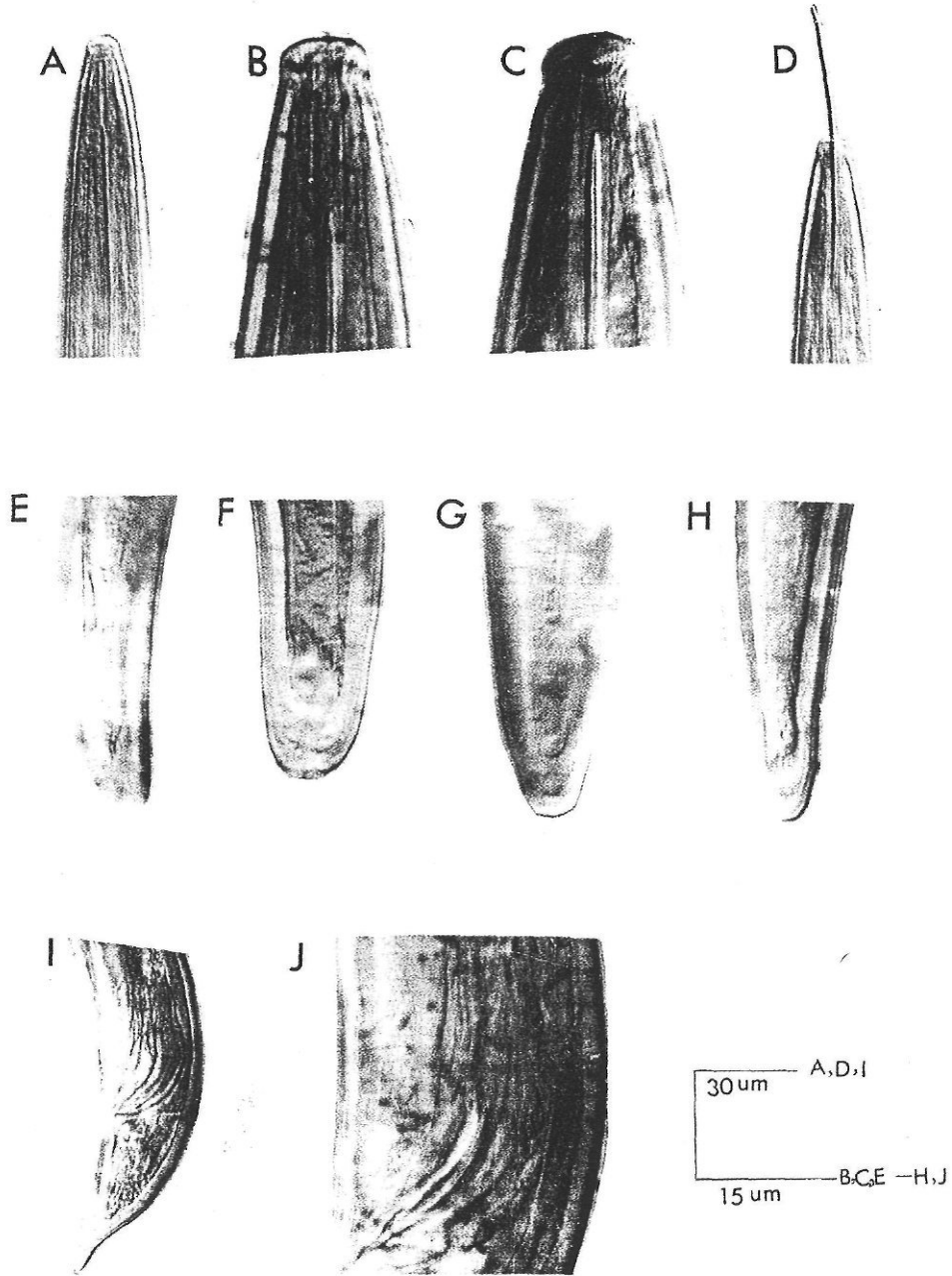


Fig. 3. *Xiphinema cynodontis* n.sp. A,B. Anterior region of female. C. Anterior region of male. D. Anterior region of juvenile. E-G. Tails of female. H. Tail of juvenile. I,J. Tail of male.

curved ventral more strongly than in female; amphidial slit 5.6  $\mu\text{m}$  long or 58.3% of the corresponding diameter. Testis long, well developed, with sperms inside. Spermatozoa uniform, round to oval shaped, 3-4  $\mu\text{m}$  in length. Spicules strongly developed, curved, not cephalated; lateral guiding pieces moderately sclerotized, slightly rounded proximally and narrow at distal end. Adanal pair of papillae 12  $\mu\text{m}$  anterior to anus. Precloacal pair of papillae preceded by 5 ventral supplements. Tail with the terminal peg ventrally located in relation to the body axis, body more curved dorsally, 2 to 3 caudal pores are visible on each side of the tail.

*Juvenile:* Only a single third stage juvenile was found, morphologically similar to adult females except in size ( $L = 1.77\text{mm}$ ), in body posture; and in tail shape (elongated and conoid).

*Type habitat and locality:* From soil around the roots of grass (*Cynodon dactylon*(L.) Pers.) at Karachi.

*Type specimens:* Holotype (female): Slide No. NNRC-121/124 and paratype slides Nos. NNRC-121/125-129 (five females, one male and one juvenile) deposited in the National Nematode Collection of NNRC, University of Karachi, Karachi, Pakistan. Slide No. NNRC-121/130 (two females) deposited in USDA Nematode collection, Beltsville, Maryland, USA.

*Diagnosis and relationships:* *Xiphinema cynodontis* n.sp. is characterized by anteriorly situated vulva; body length 2.1-2.4mm; odontostyle length 90-100.4  $\mu\text{m}$ ; female tail bluntly conoid with rounded terminus and a male with digitate tail.

In the polytomous key for *Xiphinema* species (Loof & Luc, 1990) *X. cynodontis* n.sp. has been coded as follows:

A4, B4, C3, D4, E2, F2, G2, H2, I2, J?, K?, L1,

*X. cynodontis* n.sp. belongs to the "group 7" of Loof & Luc (1990) i.e., the species having both female genital branches equal, without uterine differentiation; tail elongate to conoid; among those species it resembles to only one species *X. elitum* Khan, Chawla & Saha, 1978. It differs from *X. elitum* in more anteriorly situated vulva ( $V = 30-30\%$  vs 47-50%), shorter odontostyle (90.4-104.8 vs 110-120  $\mu\text{m}$ ), in tail shape (bluntly conoid with rounded terminus vs dorsally convex-conoid ending in a subacute terminus) and in the presence of male.



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