

TWO KNOWN SPECIES OF DORYLAIMIDA (NEMATODA) FROM SEWAGE SYSTEM OF CALCUTTA, WEST BENGAL, INDIA.

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INTRODUCTION

Nematodes occur in a wide range of habitats which is perhaps unsurpassed by any other metazoan group. However, reports by Cobb, 1918 ; Chang and Kabler, 1962 ; and Zullini, 1976, conclude that nematodes of sewage and waste water plants predominantly belong to the order Rhabditida and in lesser numbers to Order Dorylaimida which are mostly predators.

According to Calaway (1963), the occurrence of these nematodes in the polluted areas is for maintaining the filter-beds porous by feeding on biological films. they further influence the decomposition process as a result of metabolism.

Keeping in view the functional role of nematodes in the sewage activated system, the present study was undertaken in the Central sewage canal of Calcutta near Rajabazar area, Calcutta, West Bengal, during May and December, 1987. These soil samples overlying with stagnant and dark water yielded two known nematode species belonging to the genera *Mesodorylaimus* Andrassy, 1959 and *Laevides* Heyns, 1968, under the families Dorylaimidae and Nygolaimidae, respectively. It appears that these two species are being reported from this extreme degraded ecosystem for the first time from India. The occurrence of these nematode species in these ecologically disturbed area permits to conclude about their high range of tolerance.

Mesodorylaimus pizai Lordello, 1965

(Fig. 1)

Dimensions :

Females (6) : L=1.15-1.27 mm ; a=32-35.5 ; b=4.4-4.9 ; c=30-40 ;
c'=1.6-1.8 ; V=52.5-55.6.

Males (2) : L=1.07-1.15 mm ; a=33.5-38 ; b=3.9-4.6 ; c=60-76 ;
c'=0.8-0.85.

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Description :

Female : Body ventrally arcuate in the posterior half of its length. Cuticle finely striated, about 1.5-2.0 μm on mid-body and 2.5-3 μm on tail. Lip region 10-10.5 μm wide, set off, rounded. Amphids cup-shaped, 5 μm or about half of the corresponding body-width.

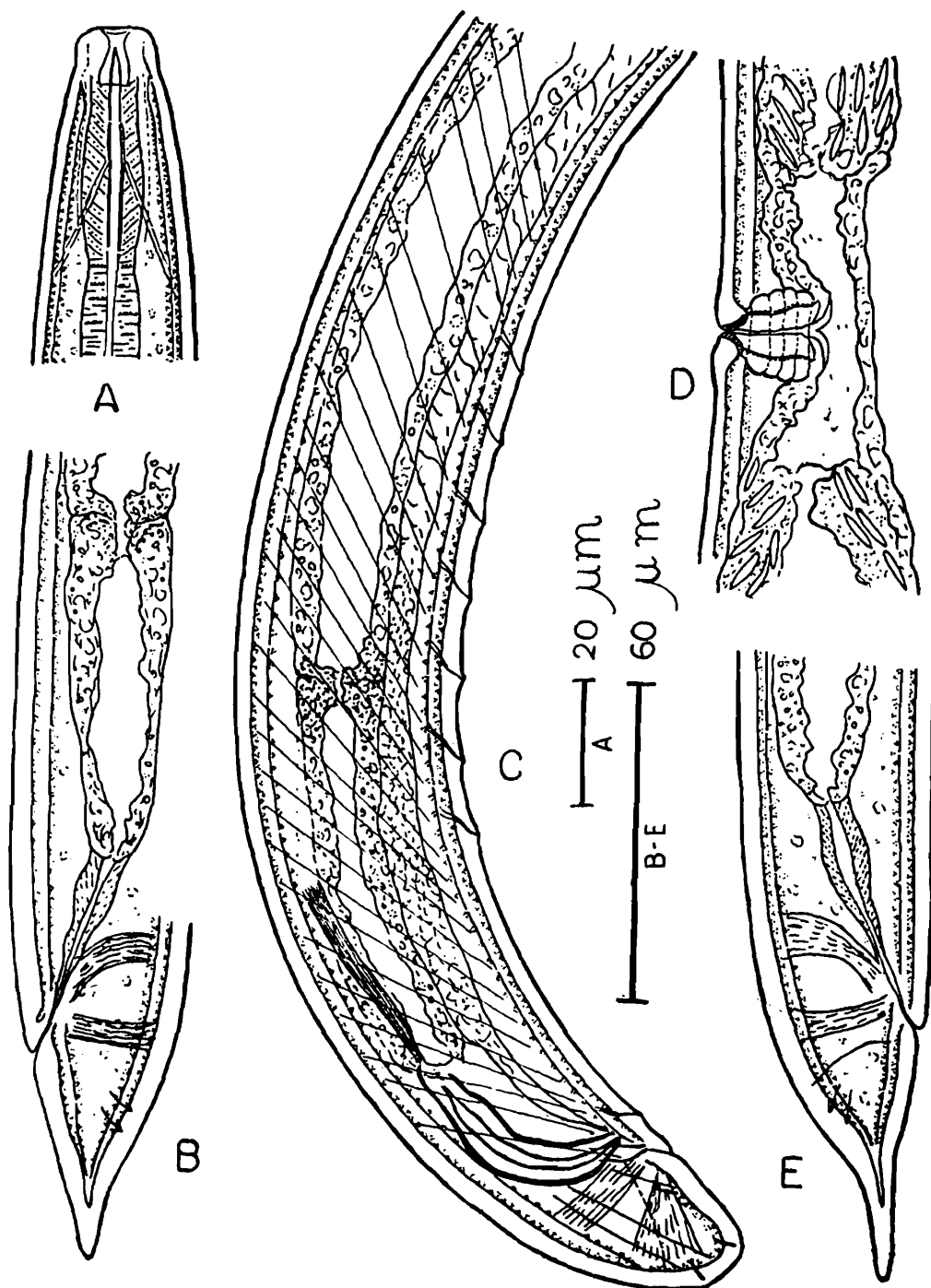


Fig. 1. *Mesodorylaimus pizai* Lordello, 1965

- A. Anterior end B. & E. Posterior ends of female
 C. Posterior region of male D. Vulvar region showing sperm

Odontostyle 10.5-12.0 μm or 1-1.2 head-width long, about as wide as cuticle of the corresponding body ; aperture occupying more than 1/3rd of odontostyle length. The fixed guiding ring not sclerotised, about 7.5 μm from anterior extremity. Odonotophore 18-20 μm or about 1.7-1.8 times the odontostyle length. The basal expanded part of oesophagus occupies about 40% of the total oesophageal length. Cardia conoid. Prerectum 47-60 μm or 2.4-3.3 anal body-widths long. Rectum 30-32 μm or 1.4-1.8 anal body-widths long.

Vulva a transverse slit, vagina 14-18 μm long or 40-50% of corresponding body-width, strongly cuticularised distally. Reproductive system amphidelphic ; ovaries reflexed, spermatheca filled with spindle shaped-sperms.

Tail 30-40 μm or 1.7-2.1 anal body-widths long, first convex conoid then gradually tapering to the rounded tip.

Male : Similar to female in general shape and morphology except the reproductive system and tail shape. Spicules 36-42 μm or 1.8-2.2 anal body-widths long. In addition to the precloacal supplements, 7 ventromedian supplements present, spaced nearly at regular intervals, 8-10 μm apart from each other ; the first supplement 120-128 μm and the last at 50-54 μm from cloacal opening. Prerectum starts at the level of 5th-6th ventromedian supplements, 80-85 μm or about 7 anal-body widths long. Tail bluntly rounded, 15-18 μm or 0.79-0.85 anal body-width long, with two caudal pores on each side.

Habitat and locality : Soil from the sewage canal of Calcutta at Rajabazar area, Calcutta, West Bengal.

Remarks : The present population differs from the type population of *M. pizai* Lordello, 1965 in having shorter tail in female and male with lesser number of supplements ($c=17-18$; $c'=2.0-2.5$ and supplements 11-12 after Lordello, 1965). We consider these differences as variations. The species is being reported for the first time from India.

***Laevides timmi* (Heyns, 1968) Ahmad & Jairajpuri, 1982**

(Figs. 2)

Dimension :

Female L=2.25 mm ; a=39 ; b=4 ; c=70.4 ; V=50 ; $G_1=13$; $G_2=10.5$.

Male L=2.235 mm ; a=37.2 ; b=4.2 ; c=74.5 ; T=50.7.

Description :

Female : Body ventrally curved in posterior half upon fixation. Cuticle 2 μm thick at mid body and 4 μm thick on tail with finely striated subcuticle. Lip region slightly marked by a depression ; lips with usual number of papillae. Amphid

apertures slit-like, occupying more than half of corresponding body-width. Tooth moderately slender, dorylaimoid type, $12\ \mu\text{m}$ or about $3/4$ th of head-width, with a distinct dorsal aperture. The basal expanded part of oesophagus enveloped by a sheath, occupying about 48% of the total oesophageal length; nerve ring surrounding the anterior part. Cardia hemi-spherical. Cardiac glands well developed, ovoid, $5\text{--}6\ \mu\text{m} \times 10\text{--}11\ \mu\text{m}$. Hemizonids indistinct.

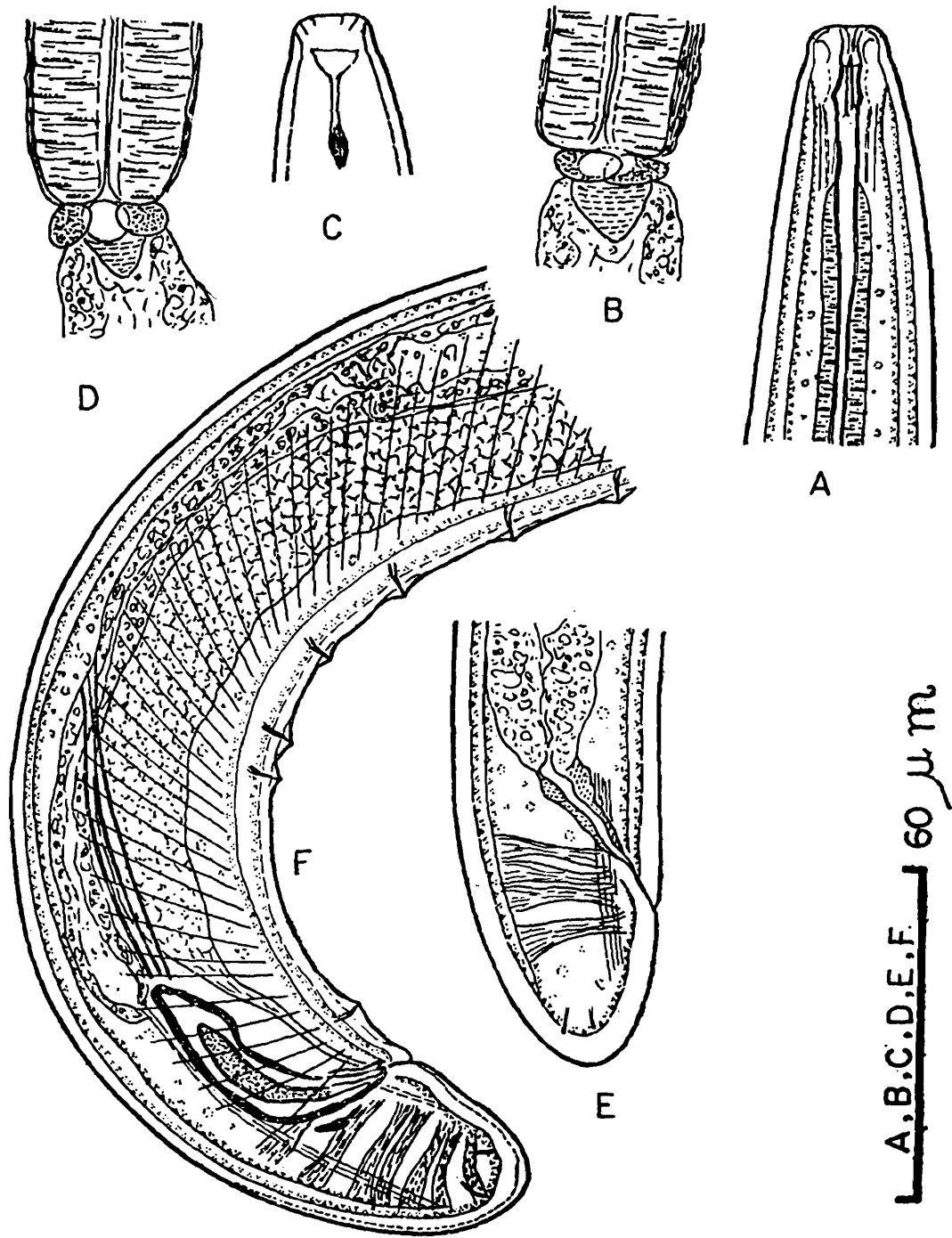


Fig. 2. *Levides tlmmi* (Heyns, 1968) Ahmad & Jairajpuri, 1982

- A. Anterior end
- B. & D. Oesophago-intestinal junction
- C. Amphids
- E. Tail end of female
- F. Posterior region of male

Reproductive system amphidelphic. Ovaries reflexed, with oocytes arranged in a single row except in growth region. Pre-rectum 108 μm or about 3 anal body-widths long. Tail short, bluntly rounded, 32 μm or 0.95 anal body-width long, with two caudal pores on each side.

Male : Similar to female in general shape and morphology except the reproductive system and tail shape. Spicules 60 μm or about 1.6 anal body-width long along the median line. Lateral guiding pieces 10 μm with concave proximal end. Gubernaculum 9 μm long. Supplements consist of an adanal pair and six ventromedians which are irregularly spaced. Pre-rectum 138 μm or about 3.7 anal body-widths long. Tail bluntly rounded, 30 μm or less than one anal body-width long, with two caudal pores on each side.

Habitat and locality : Soil from the sewage canal of Calcutta near Rajabazar, Calcutta, West Bengal.

Remarks : The females of the present population agree with the original description provided by Heyns (1968). Ahmad and Jairajpuri (1982) reported the males of *L. timmi* for the first time from Gulaba Army Camp, Manali, District Kulu, Himachal Pradesh. The present male fits well with the description of male provided by these authors. The female is being reported for the first time from India.

SUMMARY

During the survey of soil inhabiting nematodes from a branch of circular sewage canal near Rajabazar area of Calcutta, two nematode species of the genera *Mesodorylaimus* Andrassy, 1959 and *Laevides* Heyns, 1968 (one each) are being reported. The former has been identified as *M. pizai* Lordello, 1965 while the latter as *L. timmi* (Heyns, 1968) Ahmad & Jairajpuri, 1982.

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REFERENCES

- Ahmad, M. and Jairajpuri, M. S. (1982). Nematodes of India. *Rec. Zool. Surv. India*. (Occasional Paper) 34 : 71 pp.
- Andrassy, I. (1966). The genus *Mesodorylaimus* Andrassy, 1959 and its relatives (Nematoda : Dorylaimida). *Acta. Zool. Hung.*, 32 (3-4) : 207-261
- Calaway, W T. (1963). Nematodes in waste water treatment. *J. Water Pollut. Control Fed.*, 35 : 1006-1015.

- Chang, S. L. and Kabler, P. W (1962). Free living nematodes in aerobic treatment plant effluent. *J. Water Pollut. Control. Fed.*, **34** : 1256-1261.
- Cobb, N. A. (1918). Nematodes of the slow sand filter beds of American cities. *Contrib. Sci. Nematol.* **7** : 189-212.
- Heyns, N. (1968). A monographic study of the nematode families Nygolaimidae and Nygolaimellidae. *Entomol. Mem. S. Africa*, **19** : 1-144.
- Lordello, L. G. E. (1965). Contribution to the knowledge of Brazilian nematodes of the family Dorylaimidae (Portuguese Text) : Thesis No. 9 (*Zool., Anat. Fisiol. Compar. Anim. Domes) Esc. Sup. Agr. "Luiz de Queiroz"*, Univ. Sao Paulo, Pracicaba, Brazil : 1-68, pls. 1-2.
- Zullini, A. (1976). Nematodes as indicators of river pollution. *Nematol. Medit.* **4** 262-270.