

DORYLAIMOIDES ISTVANI, A NEW DORYLAIMID (NEMATODA) SPECIES FROM WEST BENGAL, INDIA

P. Dattaray^{1*}, T. Jana^{}, A. Chatterjee^{***} and B. Manna^{*}**

^{*}Department of Zoology, Parasitology Laboratory, University of Calcutta, B.C. Road, Kolkata-700019, West Bengal, India

^{**}Department of Zoology, Raja N. L. Khan Women's College, Gope Palace, Midnapore-721102, West Bengal, India

^{***}Nemathelminthes Section, Zoological Survey of India, 'M'-Block, New Alipore, Kolkata-700053, West Bengal, India

Summary. A new nematode species, *Dorylaimoides istvani* sp. n., is described and illustrated herein. It was collected from the rhizospheric soil of *Lagenaria vulgaris* from the village of Duttapukur, district North-24-Parganas, West Bengal, India. It is characterized by medium size (female 1.35-1.68 mm; male 1.29-1.44 mm) with slightly angular lip region, offset from the adjacent body by a constriction; amphid cup-shaped and its opening at the level of the head constriction; odontostyle relatively long and stout; pharynx consisting of a moderately slender and weakly muscular anterior region and basal bulb; genital system didelphic, both genital branches equally developed, ovary reflexed, vulva transverse, vagina occupying more than half (60%) of the corresponding body diameter. An ad-anal pair and 5-7 ventro-medial supplements regularly spaced. Tail elongated, filiform with acute terminus similar in sexes (female 112.5-135 µm; male 95-102.5 µm).

Keywords: Description, Dorylaimida, new nematode species.

During a nematode survey in the district North-24-Parganas, West Bengal, India, conducted during 2007, different populations of nematodes were collected. Specimens collected from the rhizospheric soil of gourd, *Lagenaria vulgaris* Ser., belonging to the genus *Dorylaimoides* Thorne et Swanger 1936, family Dorylaimidae De Man, 1876, appeared to be a new species and is, therefore, described as *Dorylaimoides istvani* below.

MATERIALS AND METHODS

Nematodes were extracted from soil samples by using the Baermann's funnel method (Christie and Perry, 1951), fixed in hot 4% FA (formalin-acetic acid mixture) (Seinhorst, 1966), mounted in anhydrous glycerin and sealed properly with good quality nail polish. Preserved specimens were observed under different magnifications with an Olympus BX-41 trinocular light microscope. Figures were drawn with the aid of a camera lucida attached to the microscope. Images were captured with a CCD digital camera system (CoolSnapPro) integrated with the microscope.

DESCRIPTION

DORYLAIMOIDES ISTVANI sp. n.
(Figs 1 and 2; Tables I and II)

Female. Slender nematodes of medium size (1.35-1.68

mm), body cylindrical, tapering towards anterior end. Habitus ventrally curved, 'c' shaped, outer cuticle thin with fine transverse striations, inner cuticle thicker and much thickened near tail. Lateral chord one third to one fourth of mid-body width. Lip region with slightly angular contour, offset from the adjacent body by a constriction, 0.5-0.6 times as wide as high. Lips amalgamated, elevated. Amphid cup-shaped, opening at the level of the head constriction, odontostyle relatively long and stout, 1.2-1.4 lip widths long. Odontophore 1.2-1.4 times the length of the odontostyle; guide ring single. Pharynx consisting of a moderately slender and weakly muscular anterior region and basal bulb. Pharyngeal bulb cylindrical, occupying 26-31% of total neck length. The anterior part becomes thin at the level of the nerve ring. Pharyngeal gland nuclei often visible, one dorsal and two ventro sub-lateral pairs; cardia rounded, occupying 22-27% of the maximum body width, nerve ring located at 26-37% of the neck length. Genital system didelphic, both genital branches equally developed, ovary reflexed, oocytes arranged in several rows at the tip and then arranged in a single row. Oviduct joining the ovary sub terminally, absence of *pars dilatata* and sphincter muscles at oviduct-uterus junction. Vulva transverse, vagina occupying more than half (60%) of the corresponding body diameter; *pars proximalis vaginae* pear-shaped (12.5-15 µm long), *pars distalis vaginae* 7.5 µm long, absence of sclerotisation at vulval region. Pre-rectum 3-5 anal body diameters long, rectum 1.11-1.94 anal body diameters long; tail elongated, filiform with acute terminus, terminal part dorsally bent, two pairs of caudal pores located in the anterior third of the tail.

Male. Morphological features similar to females, an ad-anal pair and 5-7 regularly spaced ventro-medial

¹ Corresponding author e-mail: payeldattaray@gmail.com

supplements. Spicules about 1.2-2.0 anal body diameters long. Pre-rectum about 2.5-3.5 anal body diameters long. Tail similar to females.

Etymology. The new species has been named after the renowned nematologist, Professor István Andrassy, Hungary.

Type Habitat and Locality. *Dorylaimoides istvani* sp. n. was collected in September, 2007 from the rhizos-

pheric soil of *Lagenaria vulgaris*, from the village Duttapukur, district North-24-Parganas, West Bengal, India.

Type specimens. All of the type specimens are deposited in the National Zoological Collections of the Zoological Survey of India, Kolkata, West Bengal, India, under the Registration Nos WN1070 (1 Holotype female, 2 paratype males), WN 1079 (4 paratype males), WN 1080 (4 paratype males), WN 1081 (3 paratype females), WN 1082 (1 paratype female, 1 paratype male).

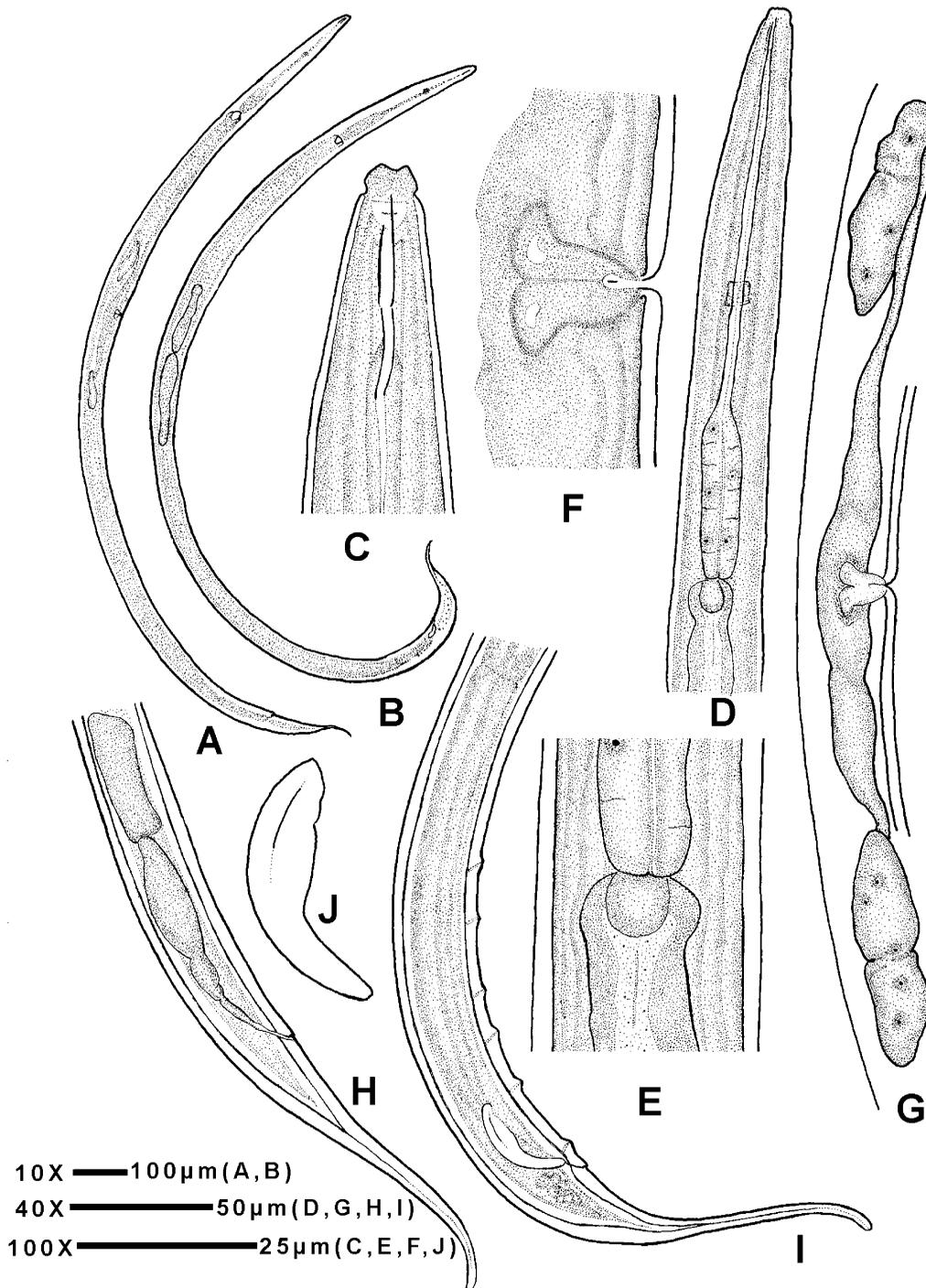


Fig. 1. Camera lucida drawings of *Dorylaimoides istvani* sp. n. Female: A, whole body; C, lip region and odontostyle; D, pharynx; E, cardia; F, vulval region; G, gonads (amphidelphic); H, tail region. Male: B, whole body; I, caudal region; J, spicules.

Differential diagnosis and relationships. *Dorylaimoides istvani* sp. n. closely resembles *D. parvus* Thorne *et Swanger*, 1936, in body length, values of 'a', 'c', 'c', 'V', length of tail in both the sexes, but differs from it in having a wider lip region (7.5-8.8 μm *vs* 6.5 μm), comparatively long and robust stylet (8.8-12.5 μm *vs* 5-10 μm), larger pharyngeal bulb (52.5-68.5 μm *vs* 50 μm), pear-shaped vagina (*vs* cylindrical), an ad-anal pair and ventro-median supplements greater in number (5-7 *vs* 3-4), usually longer spicules (35-45.5 μm *vs* 27-36 μm).

It resembles *D. similis* Thorne, 1964 in the values of

'a', 'c', 'c', lip width, expanded part of pharynx, male tail and number of ventro-median supplements and the shape of the vagina, but differs from it in having a longer body (1.29-1.68 mm *vs* 1.2-1.3 mm), much longer odontostyle (8.8-12.5 μm *vs* 6-6.5 μm), and larger spicules (35-45.5 μm *vs* 34 μm).

It also closely resembles *D. paulbuchneri* Meyl, 1956 in body length, value of 'a', 'c', 'c', lip width, female and male tail, number of ventro-median supplements and length of spicules, but differs from it in having a longer odontostyle (8.8-12.5 μm *vs* 5-7 μm), anterior

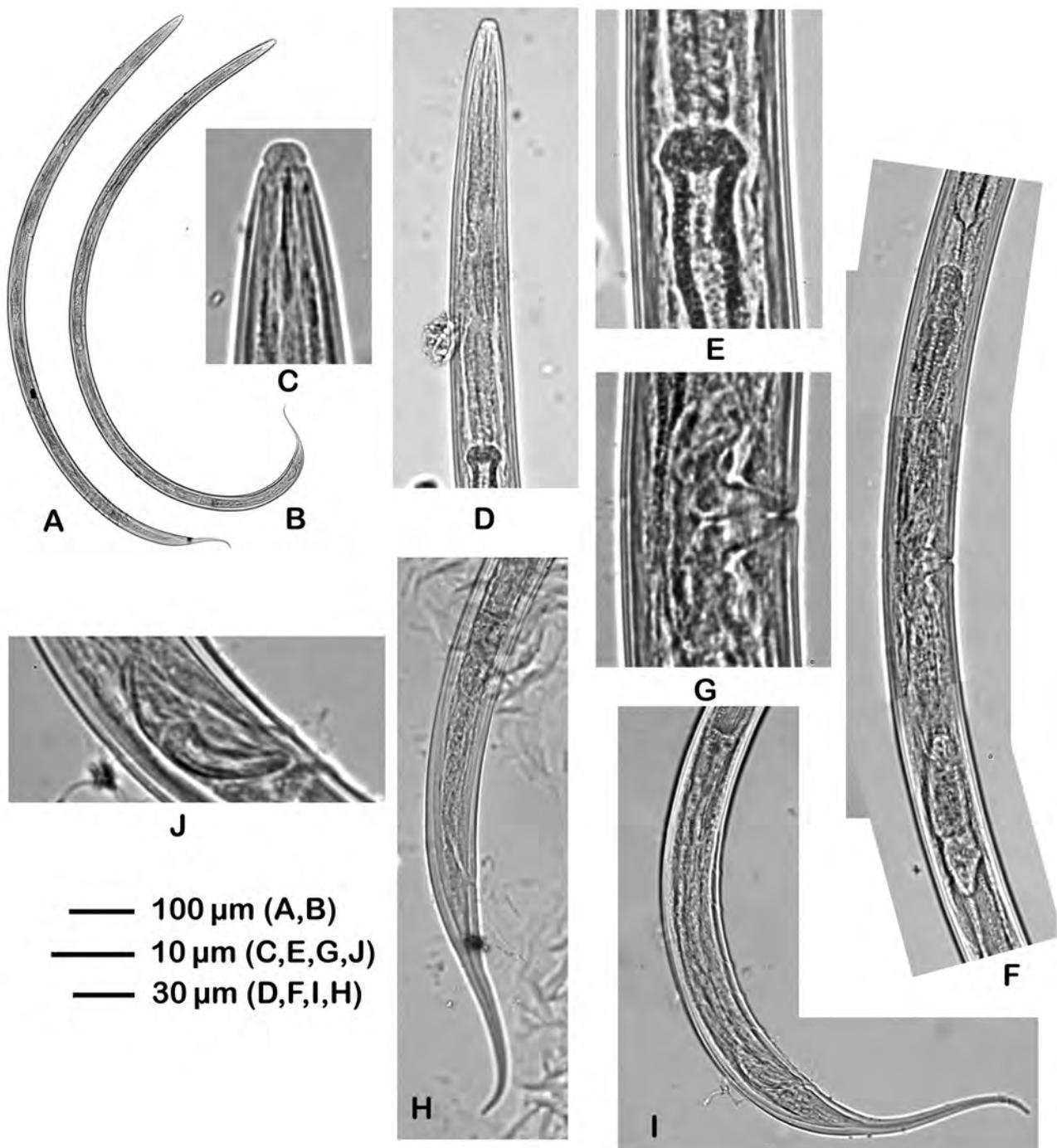


Fig. 2. Photomicrographs of *Dorylaimoides istvani* sp. n. Female: A, whole body; C, lip region and odontostyle; D, pharynx; E, cardia; F, gonads (amphidelphic); G, vulval region; H, tail region. Male: B, whole body; I, caudal region; J, spicules.

Table I. Morphometrics of females and males of *Dorylaimoides istvani* sp. n (all measurements are in μm , except where indicated).

Character	Holotype female	Paratype females (5)		Paratype males (11)	
		Range	Mean \pm SD	Range	Mean \pm SD
Length (mm)	1.43	1.36 - 1.68	1.55 \pm 0.15	1.29 - 1.44	1.37 \pm 0.07
a	42.5	40.5 - 49.8	44.61 \pm 3.96	29.7 - 41.1	37.84 \pm 5.48
b	6.6	6.6 - 8.1	7.35 \pm 0.66	6.4 - 7	6.79 \pm 0.27
c	11.5	11.5 - 13.3	12.43 \pm 0.70	12.9 - 14.8	13.76 \pm 0.87
c'	5.6	5.3 - 6.0	5.59 \pm 0.30	3.2 - 4.4	3.93 \pm 0.54
V%	38.9	37.5 - 38.9	38.52 \pm 0.60	63.4 - 70	66.98 \pm 2.77
G1	14	14 - 20.2	16.36 \pm 2.63	-	-
G2	14.5	14.5 - 25.5	19.24 \pm 4.29	-	-
Height of lips	3.8	3.8 - 4.3	3.95 \pm 0.27	-	3.75 \pm 0
Lip width	7.5	7.5 - 8.8	7.75 \pm 0.56	-	7.5 \pm 0
Amphid position	3.8	3.8 - 5	4.17 \pm 0.72	3.8 - 5	4.17 \pm 0.72
Guide ring	6.3	6.3 - 7.5	6.67 \pm 0.72	6.3 - 7.5	6.67 \pm 0.72
Nerve ring	82.5	75 - 87.5	83.13 \pm 5.91	62.5 - 87.5	80 \pm 11.90
Stylet length	8.8	8.8 - 12.5	10.7 \pm 1.47	11.3 - 12.5	12 \pm 0.61
Stylet aperture	2.5	2.3 - 2.5	2.45 \pm 0.11	1.8 - 2.5	2.13 \pm 0.43
Odontophore	12.5	12.5 - 15	13.5 \pm 1.37	12.5 - 15	13.43 \pm 1.19
Oesophageal length	217.5	202.5 - 217.5	210.5 \pm 6.71	190 - 207.5	201.5 \pm 7.77
Expanded Oesophagus	68.5	52.5 - 68.5	60.2 \pm 6.68	52.5 - 57.5	55 \pm 2.04
DO	173.8	158.5 - 175	168 \pm 7.96	147.5 - 157.5	154.5 \pm 4.74
AS ₁	17.5	12.5 - 17.5	15 \pm 2.5	12.5 - 20	16.25 \pm 4.33
AS ₂	25	17.5 - 25	20 \pm 3.54	15 - 22.5	19.38 \pm 3.75
PS ₁	37.5	27.5 - 37.5	32.5 \pm 4.56	25 - 35	30 \pm 4.08
PS ₂	42.5	32.5 - 42.5	38 \pm 4.35	27.5 - 40	31.87 \pm 5.54
Cardia	10	7.5 - 10	9.06 \pm 1.20	-	10 \pm 0
Max. body width	35	33.5 - 37.5	34.7 \pm 1.67	32.5 - 47.5	36.87 \pm 7.18
Vulval length	557.5	527.5 - 645	594 \pm 51.76	-	-
Vaginal length	20	20 - 22.5	20.5 \pm 1.12	-	-
Vaginal width	12.5	12.5	12.5 \pm 0	-	-
<i>Pars distalis</i>	7.5	7.5	7.5 \pm 0	-	-
<i>Pars proximalis</i>	12.5	12.5 - 15	13.33 \pm 1.44	-	-
Anterior Gonad	235	222.5 - 337.5	252.5 \pm 47.78	-	-
Uterus	80	67.5 - 105	83.75 \pm 13.57	-	-
Oviduct	107.5	80 - 162.5	103.5 \pm 34.75	-	-
Ovary	47.5	47.5 - 80	69.5 \pm 12.80	-	-
Posterior Gonad	244	230 - 425	298.8 \pm 80.8	-	-
Uterus	72.5	72.5 - 107.5	91.5 \pm 13.98	-	-
Oviduct	125	85 - 230	130.5 \pm 57.94	-	-
Ovary	46.5	46.5 - 107.5	80.3 \pm 22.62	-	-
Testis length	-	-	-	842.5 - 1007.5	916.5 \pm 73.10
Spicule length	-	-	-	35 - 45.5	40.6 \pm 3.86
Ventromedian	-	-	-	-	5 - 7
Supplements					
Anal length (mm)	1.31	1.2 - 1.56	1.37 \pm 0.29	1.19 - 1.34	1.26 \pm 0.07
Rectum	25	20 - 25	24 \pm 2.24	25 - 27.5	25.83 \pm 1.44
Pre-rectum	112.5	75 - 117.5	96.25 \pm 21.84	75 - 80	76.67 \pm 2.88
Tail length	125	112.5 - 135	124.5 \pm 8.73	95 - 102.5	99.38 \pm 3.15

vulval position ($V = 37.5-38.9\%$ *vs* $40-45\%$), longer expanded part of pharynx ($26-31\%$ *vs* 24% of the total oesophageal length) and slightly ventrally curved spicules *vs* clearly ventrally curved.

Remarks. The genus *Dorylaimoides* Thorne *et Swanger*, 1936 is an intriguing dorylaimid genus due to its controversial taxonomic position and wide morphological variability. Thorne *et al.* (1936), Goseco *et al.* (1976) and Jairajpuri and Ahmad (1992) included it in the superfamily Leptonchoidea or in Tylencholaimoidea (Peralta and Peña Santiago, 1997), due to the presence of a short pharyngeal bulb. However, Andrassy (1976) classified it under the family Dorylaimidae in Dorylaimoidea because of the morphology of the stylet and cuticle, which clearly demarcate it from Tylencholaimoidea. Peralta and Peña Santiago (1997) supported the classification of Andrassy, stating that, although it possesses a short pharyngeal bulb, this bulb is relatively longer than that found in leptonchs. Also, they considered the reduction of the bulb as an evolutionary trend in the history of dorylaims.

Peralta and Peña Santiago (1997) moreover did not support the proposal of Jairajpuri and Ahmad (1992), who divided *Dorylaimoides* into six subgenera (*Dorylaimoides*, *Digitidorylaimoides*, *Longidorylaimoides*, *Arclidorylaimoides*, *Tarjania*, *Shamimonema*) mainly on the basis of morphology of the female genital system and tail because the apomorphic states of several morphological features originated independently in different species and at different moments of the evolutionary history in the group. Thus, morphological similarity does not necessarily represent a recent origin from the same ancestor.

Peralta and Peña Santiago (1997a) also assembled a compendium of the genus *Dorylaimoides* and provided

a dichotomous key to the species and groups.

ACKNOWLEDGEMENTS

We are thankful to the director, Zoological Survey of India and Head of the Department of Zoology, Calcutta University, for providing facilities to do this work and also to the friends of Aligarh Muslim University for providing valuable literature.

LITERATURE CITED

- Andrassy I., 1976. *Evolution as the basis for systemization of nematodes*. Pitman Publishing, London, UK, 287 pp.
- Goseco C.G., Ferris V.R. and Ferris J.M., 1976. Revisions in Leptonchoidea (Nematoda: Dorylaimida). *Dorylaimoides* in Dorylaimoididae, Dorylaimoidinae; *Calolaimus* and *Timmus* n. gen. in Dorylaimoididae, Calolaiminae; and *Miranima* in Miranematidae. *Purdue University, Agricultural Experiment Station Research Bulletin*, 941: 46 pp.
- Jairajpuri M.S. and Ahmad W., 1992. *Dorylaimida. Free living, predaceous and plant-parasitic Nematodes*. Brill, Leiden, The Netherlands, 458 pp.
- Peralta M. and Peña Santiago R., 1997. The genus *Dorylaimoides* Thorne *et Swanger*, 1936 (Nematoda: Dorylaimida). 1. Taxonomy and variability. *Fundamental and Applied Nematology*, 20: 243-251.
- Peralta M. and Peña Santiago R., 1997a. The genus *Dorylaimoides* Thorne *et Swanger*, 1936 (Nematoda: Dorylaimida). 2. A compendium and key to the species. *Fundamental and Applied Nematology*, 20: 253-259.
- Thorne G. and Swanger Helen H., 1936. A monograph of the nematode genera *Dorylaimus* Dujardin, *Aporcelaimus* n.g., *Dorylaimoides* n.g. and *Pungentus* n.g. *Capita Zoologica*, 6: 223 pp.