



TWO NEW SPECIES OF THE GENUS *LABRONEMA* THORNE, 1939 (NEMATODA: DORYLAIMIDA) FROM WEST BENGAL, INDIA

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INTRODUCTION

The genus *Labronema* was erected by Thorne (1939). It belongs to the family Qudsianematidae under the order Dorylaimida. Andr ssy (1991) compared and provided a key to species of the genus, described and reported before 1989-90 (29 species). Jairajpuri and Ahmad (1992) listed 36 species under this genus. Andr ssy (2011) made short comments on the nominal species of *Labronema*, described after 1989-90 (20 species). He opined that out of the twenty species, described under this genus in the last two decades, eleven belong in all probability to the genus, but eight certainly do not. During a taxonomic survey in different districts of North 24 Parganas, West Bengal, India during March, 2005 to February, 2007 nematode specimens belonging to the genus *Labronema* were collected and identified. They are considered to represent two new species, which are described and illustrated herein.

MATERIALS AND METHODS

Specimens were collected from rhizospheres of cucurbitaceous plants from different localities of the district North 24-Paganas, West Bengal, India. Nematodes were extracted from soil by Cobb's sieving technique (Cobb, 1918) and decanting method followed by Modified Baermann's funnel technique (Christie and Perry, 1951); processed by Seinhorst's slow dehydration method (Seinhorst,

1959); mounted on slides in anhydrous glycerin and sealed. Specimens were identified following the taxonomic key, made by Jairajpuri and Ahmad (1992). Measurements were taken with the help of an ocular micrometer using Olympus research microscope with drawing-tube attachment, model no. BX 41. Dimensions were presented in accordance with De Man's formula (De Man, 1884). Positions of the oesophageal gland nuclei were presented according to Andr ssy's formula (Andr ssy, 1998). Diagrams were drawn with the help of a camera lucida.

De Man's Formula

L = body length

a = body length / maximum body width

b = body length / oesophageal length

b' = body length / distance from head end to posterior end of oesophageal glands

c = body length / tail length

c' = tail length / body width at anus

V = distance from head end to vulva x 100 / body length

V' = distance from head end to vulva x 100 / distance from head end to anus

G₁ = anterior genital branch x 100 / body length

G₂ = posterior genital branch x 100 / body length

Andrássy's formula

Glandularium = distance between dorsal oesophageal gland and oesophago - intestinal junction which contains two pairs of oesophageal gland nuclei

D = distance between head end and dorsal oesophageal gland x 100 / oesophageal length

AS₁ = distance between dorsal oesophageal gland and first anterior sub-ventral oesophageal gland x 100 / glandularium

AS₂ = distance between dorsal oesophageal gland and second anterior sub-ventral oesophageal gland x 100 / glandularium

PS₁ = distance between dorsal oesophageal gland and first posterior sub ventral oesophageal gland x 100 / glandularium

PS₂ = distance between dorsal oesophageal gland and second posterior sub ventral oesophageal gland x 100 / glandularium

SYSTEMATIC ACCOUNTS**SYSTEMATIC POSITION**

Order DORYLAIMIDA Pearse, 1942

Suborder DORYLAIMINA Pearse, 1936

Superfamily DORYLAIMOIDEA De Man, 1876

Family QUDSIANEMATIDAE Jairajpuri, 1965

Subfamily QUDSIANEMATINAE Jairajpuri, 1965

Genus *Labronema* Thorne, 1939

***Labronema minimus* n. sp.**

(Table-1; Figs. 1 & 2)

Material examined: 8 females.

Measurements: Shown in Table-1.

Description: Female: Body ventrally curved upon fixation. Body only slightly tapered towards tail but more strongly tapered towards lip region. Lip region offset, somewhat angular with amalgamated lips. Lip region width about 40% of body width at base of the oesophagus. Cuticle of about equal width throughout the body except around tail region where it is slightly more

thickened. Body pores indistinct. Amphids stirrup-shaped, its aperture 4-5 µm or about one-third of the corresponding body width. Odontostyle about 1.3 lip-width long, its aperture less than half of its length. Odontophore 2.0-2.5 lip region width long. Guiding ring double and located at 0.6-0.7 lip width from anterior end of body. Nerve ring encircling the anterior slender part of oesophagus at 33-34% of the oesophageal length from anterior end. Oesophageal expansion gradual, expanded part occupying about 42-44% of the total oesophageal length. Cardia broadly conoid and enveloped by intestinal tissue. Its length about one-

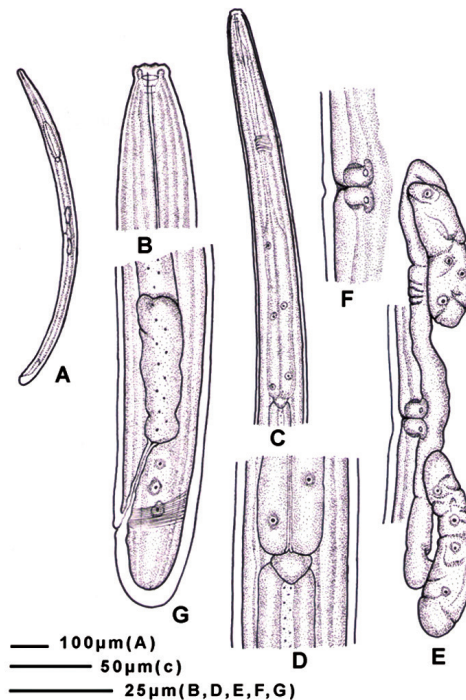


Fig. 1. Camera lucida drawings of *Labronema minimus* n. sp. A: Entire female; B: Lip region and Odontostyle; C: Oesophagus; D: Cardia; E: Gonads; F: Vulval region; G: Tail region.

fourth of the corresponding body width. Genital system amphidelphic, both sexual branches almost equally developed. Reflexed ovary with oviduct joining the ovary subterminally and unspecialized uterus. Transverse vulva with absence of *pars refringens vaginae* at vulva-vagina junction. Vagina occupies 37-38% of corresponding body width. Prerectum 4.1-4.5 and rectum 1.2-1.3 times anal body width long. Tail short and rounded about one anal width long. Three to four pairs of caudal papillae posterior to anal opening.

Male: Not found.

Type habitat and locality: Specimens were collected by the first author on 24.07.2006 from the rhizospheric soil of bitter gourd (*Momordica charantia* L.) from the Village Garulia, district North 24 Parganas, West Bengal, India.

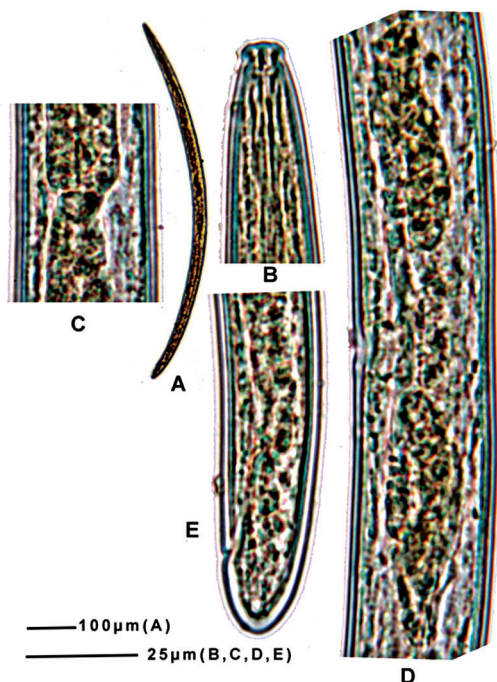


Fig. 2. Photomicrographs of *Labronema minimus* n. sp. A: Entire female; B: Lip region and Odontostyle; C: Cardia; D: Gonads; E: Tail region.

Type materials: Specimens were deposited in the National Zoological Collections of the Zoological Survey of India, Kolkata, West Bengal, India under the Registration No. WN1355 (Holotype) and WN1356 (Paratypes) on glass slide.

Differential diagnosis and relationships: The proposed species is characterized by its small size ($L = 0.8-0.9$ mm). Amalgamated and somewhat angular lips set off from the adjoining body by constriction, $12.5-13.75$ μm long odontostyle,

double guiding ring, rounded cardia, transverse vulva with absence of *pars refringens vaginae* at vulva-vagina junction. Short and rounded tail with cuticle more thickened at the tail terminus. Three to four pairs of caudal papillae posterior to anal opening. Out of all the known valid species, the present species closely resembles the following species.

The present species in its general morphology bears a close resemblance with *Labronema seychellense* Furstenberg *et al.*, 1993 regarding its labial region, position and type of guiding ring, length of odontophore, length of prerectum, tail shape and length. However it differs from it in having a smaller body length (*vs* 1.01-1.10 mm), narrow lip width (*vs* $16.3-18.3$ μm), longer odontostyle (*vs* $21-22$ μm), anteriorly located nerve ring (*vs* $114-131$ μm), rounded cardia (*vs* conoid), anteriorly located vulva (*vs* 57-60%) and shorter rectum (*vs* $29-35$ μm).

The species under discussion also closely resembles *Labronema ibarakiense* Khan and Araki, 2002 regarding its value of a,b,c and c', oesophageal length, position and type of vulva and length of prerectum but differs from it in having a narrow lip region (*vs* $15-16$ μm), longer odontostyle (*vs* $20-22$ μm) and odontophore (*vs* $26-28$ μm), anteriorly located nerve ring (*vs* $99-110$ μm), rounded cardia (*vs* broadly conoid), vagina without sclerotisation (*vs* with sclerotisation) and rounded tail (*vs* digitate). Considering the above differences in the characteristics with the existing valid species and the newly created species in this report, it is obvious that the present species is new to science.

Etymology: The authors suggest its name *Labronema minimus* due to its smaller body size related to other species of this genus.

Table-1. Measurements of *Labronema minimus* n. sp. (all measurements in μm except L in mm).

Morphometric characters	Holotype female	Paratype females (n=7)	Mean \pm SD
L	0.844	0.844 – 0.863	0.854 \pm 0.08
a	25.96	25.96 – 27.44	26.52 \pm 0.65
b	3.5	3.5 – 3.61	3.54 \pm 0.05

Table 1. contd.

Morphometric characters	Holotype female	Paratype females (n=7)	Mean \pm SD
c	48.25	48.25 – 49.43	48.77 \pm 0.43
c'	0.93	0.93 – 0.95	0.94 \pm 0.01
V	50.96	50.85 – 51.31	51.11 \pm 0.24
G1	14.52	13.70 – 14.52	14.21 \pm 0.38
G2	10.96	10.96 – 16.03	13.6 \pm 2.48
Height of lip	3.75	–	3.75 \pm 0
Lip width	10	–	10 \pm 0
Amphid position	5	–	5 \pm 0
Guiding ring	6.25	6.25 – 6.75	6.44 \pm 0.24
Nerve ring	81.25	78 – 82.5	82.19 \pm 0.63
Stylet length	12.5	12.5 – 13.75	12.88 \pm 0.59
Stylet aperture	1.5	1.25 – 2.25	1.88 \pm 0.48
Odontophore	20	20 – 25	23.13 \pm 2.39
Oesophageal length	241.5	237.5 – 245	241.06 \pm 3.08
Expanded oesophagus	107.5	105 – 107.5	106.88 \pm 1.25
Position of DO	150	145 – 152.5	148.63 \pm 3.30
Position of AS1 from DO	42.5	42.5 – 45	43.75 \pm 1.44
Position of AS2 from DO	47.5	45 – 47.5	46.88 \pm 1.25
Position of PS1 from DO	85	72.5 – 85	79.38 \pm 5.54
Position of PS2 from DO	87.5	77.5 – 87.5	83.75 \pm 4.79
Cardia	8.5	6.25 – 8.5	7.19 \pm 0.63
Maximum width	32.5	31.25 – 32.5	32.19 \pm 0.63
Anterior end to vulva	430	430 – 442.5	436.25 \pm 5.95
Vaginal length	12.5	11.75 – 12.5	12.31 \pm 0.38
Vaginal width	12.5	11.25 – 12.5	12 \pm 0.61
Pars distalis	2.5	-	5.2 \pm 0
Pars proximalis	10	8.75 – 10	9.68 \pm 0.63
Anterior gonad	122.5	117.5 – 125	121.25 \pm 3.22
Uterus	10	12.5 – 17.5	15 \pm 2.44
Oviduct	62.5	55 – 62.5	59.38 \pm 3.15
Ovary	50	45 – 50	47.5 \pm 2.89
Posterior gonad	92.5	92.5 – 137.5	116.25 \pm 22.13
Uterus	12.5	12.5 – 20	16.88 \pm 3.75
Oviduct	32.5	32.5 – 60	48.75 \pm 13.62
Ovary	47.5	45 – 57.5	50.63 \pm 5.54
Rectum	23.5	23.5 – 27.5	26.87 \pm 1.25
Prerectum	77.5	77.5 – 95	93.13 \pm 2.39
Tail length	20.5	17.5 – 20.5	19.5 \pm 0.86

***Labronema mannai* n. sp.**

(Table-2; Figs. 3 & 4)

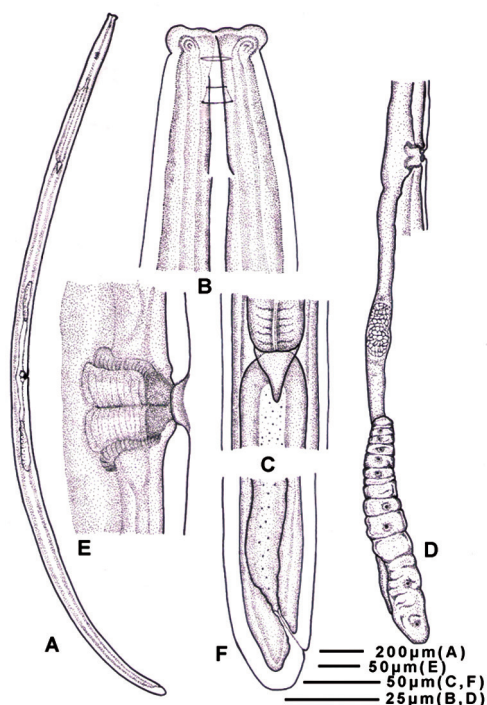
Material examined: 2 females.*Measurements*: Shown in Table-2.

Fig. 3. Camera Lucida drawings of *Labronema mannai* n. sp. A: Entire female; B: Lip region and odontostyle; C: Cardia; D: Gonads; E: Vulval region; F: Tail region.

Description: Female: Body ventrally curved upon fixation. Cuticle marked by radial striae, especially prominent on tail. Lateral chords about one-third of total body width at mid body. Body pores distinct. Lips amalgamated, set off from the adjoining body by constriction and with visible lip flaps. Lip width wider than the adjoining body width. Amphids stirrup-shaped, its aperture 9-10 μ m or about one-third of the corresponding body width. Odontostyle about 1.5 lip width long, its aperture about one-third of its length. Odontophore 2.2-2.3 lip region width long. Guiding ring double, sclerotised and located at 0.7-0.8 lip width from anterior end of body. Nerve ring encircling the anterior slender part of oesophagus at 26-27% of the oesophageal length from anterior end. Oesophageal expansion gradual, expanded part occupying about 52-54% of the total oesophageal length. Cardia conoid with pointed tip and

enveloped by intestinal tissue. Its length about one-fourth of the corresponding body width. Genital system amphidelphic, both sexual branches almost equally developed. Ovary reflexed with oocytes arranged in single row. Oviduct joins the ovary subterminally. Longitudinal vulva with presence of moderately sclerotised *pars refringens vaginae* at vulva vagina junction. Vagina occupies 30-32% of corresponding body width. Posterior part of uterus highly muscular, absence of sphincter at uterus oviduct junction, presence of sperms in uteri of one specimen. Prerectum 4.1-4.2 and rectum 0.7 times anal body width long. Tail short and rounded with cuticle more thickened at the tail terminus. Three to four pairs of caudal papillae posterior to anal opening.

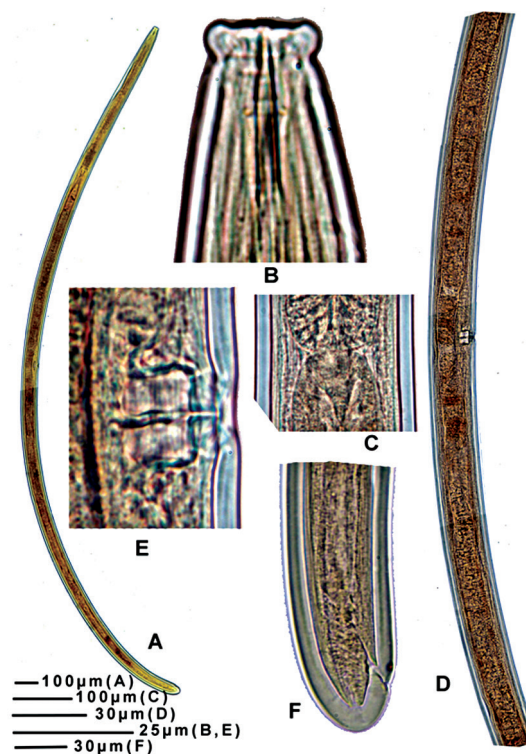


Fig. 4. Photomicrographs of *Labronema mannai* n. sp. A: Entire female; B: Lip region and odontostyle; C: Cardia; D: Gonads; E: Vulval region; F: Tail region.

Male: Not found.

Type habitat and locality: Specimens were collected by the first author on 08-8-2007 from the rhizospheric soil of bitter melon (*Momordica charantia* L.) from Titagarh of the district North 24-Parganas, West Bengal, India.

Type materials: Specimens were deposited in the National Zoological Collections of the Zoological Survey of India, Kolkata, West Bengal, India under the Registration No. WN1357 (Holotype) and WN1358 (Paratype) on glass slide.

Differential diagnosis and relationships: The present species is characterized by its large and robust size (L= 3.4-3.7 mm). Amalgamated lips set off from the adjoining body by constriction and with visible lip flaps. Labial region wider than the adjoining body width. Long and robust odontostyle (37.5 μ m). Double and sclerotised guiding ring. Conoid and pointed cardia. Longitudinal vulva with presence of moderately sclerotised *pars refringens vaginae* at vulva-vagina junction. Posterior part of uterus highly muscular, absence of sphincter at uterus oviduct junction, presence of sperms in uterus. Short and rounded tail with cuticle more thickened at the tail terminus. Three to four pairs of caudal papillae posterior to anal opening. Out of all the known valid species, the present species closely resembles the following species.

The present species in its general morphology bears a close resemblance with *Labronema deoriaensis* Khan *et al.*, 1989 regarding its body length, body width, length of odontostyle and odontophore, position of nerve ring, vulval shape,

prerectal length and anal body diameter. However, it differs from the latter in having a narrow lip width (*vs* 26-27 μ m), anteriorly located guiding ring (*vs* 19-23 μ m), different shape of cardia (*vs* conoid), anteriorly located vulva (*vs* 49-56%), short rectum (*vs* 45-59 μ m) and tail length (*vs* 23-29 μ m).

The present species also closely resembles *Labronema thornei* Ferris, 1968 regarding its body length, body width, lip width, position of nerve ring, shape of cardia and length of prerectum and rectum but differs from it in having a longer odontostyle (*vs* 32 μ m), anteriorly located vulva (*vs* 51-54%), moderate sclerotisation of vagina (*vs* heavy sclerotisation), absence of sphincter in uterus-oviduct junction (*vs* presence) and different tail shape (*vs* convex conoid).

Thus from the above discussion it is obvious that the present species differs from the existing and valid species of the genus in more than one characters and is new to science.

Etymology: The authors suggest its name as *Labronema mannai* n. sp. after the name of Dr. Buddhadev Manna, Professor, Department of Zoology, University of Calcutta, Kolkata, West Bengal, India for his significant contributions in the field of Zoology.

Table-2. Measurements of *Labronema mannai* n. sp. (all measurements in μ m except L in mm)

Morphometric characters	Holotype female	Paratype female
L	3.396	3.567
a	45.28	46.03
b	4.76	4.72
c	113.21	109.75
c'	0.71	0.72
v	48.65	46.95
G1	25.84	19.76
G2	26.57	27.02
Height of lip	7.5	7.5
Lip width	25	25
Amphid position	8.75	8.75
Guiding ring	17.5	18.75

Table 2. *contd.*

Morphometric characters	Holotype female	Paratype female
Nerve ring	190	202.5
Stylet length	37.5	37.5
Stylet aperture	11.5	12.5
Odontophore	55	57.5
Oesophageal length	712.5	755
Expanded oesophagus	387.5	395
Position of DO	357.5	362.5
Position of AS1 from DO	167.5	165
Position of AS2 from DO	195	202.5
Position of PS1 from DO	238	292.5
Position of PS2 from DO	305	315
Cardia	33.75	35
Maximum width	75	77.5
Anterior end to vulva	1652.5	1675
Vaginal length	22.5	25
Vaginal width	20	20
Pars distalis	-	-
Pras refringes	6.25	6.5
Pars proximalis	16.25	18.5
Anterior gonad	877.5	705
Uterus	92.5	85
Oviduct	482.5	367.5
Ovary	302.5	252.5
Posterior gonad	902.5	714
Uterus	67.5	82.5
Oviduct	585	364
Ovary	250	267.5
Rectum	40	45
Prerectum	180	187.5
Tail length	30	32.5

SUMMARY

Two new species of dorylaimid nematodes viz. *Labronema minimus* n. sp. and *L. mannai* n. sp. collected from rhizospheric soil of cucurbitaceous plants from two different localities of the district North 24-Paganas, West Bengal, India have been described and illustrated.

ACKNOWLEDGEMENTS

Authors are thankful to the Director Zoological Survey of India for providing laboratory and other facilities and to Dr. Amalendu Chatterjee, Retired Joint-Director, Zoological Survey of India, Kolkata for his valuable guidance. We are also grateful to Mr. Rati Ram Verma, Publication and Production Officer, Zoological Survey of India, Kolkata for his kind effort to publish the paper quickly.

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