

8 dec 1976

Indian J. Nematol. 5 (1975) : 1-8

NEMATODES OF LEGUMINOUS CROPS IN INDIA
III. THREE NEW SPECIES OF *HOPLOLAIMUS* DADAY, 1905
(HOPLOLAIMIDAE)

BY

M. MUDDASSIRUL MULK and M. SHAMIM JAIRAJPURI

Section of Nematology, Department of Zoology, Aligarh Muslim University, Aligarh, India

Hoplolaimus seshadrii sp. n., 1.45-1.77 mm long, head continuous or faintly marked off from body bearing 3 annules, spear 42-43 μ m long, spear knobs with two anterior projecting processes, intestine partially overlapping rectum, tail with 14-18 annules. *H. cephalus* sp. n., 0.78-1.18 mm long, head set off smooth, spear 34 μ m long, spear knobs anteriorly directed, and tail with 6 annules of which terminal annules larger than on body. *H. dimorphicus* sp. n., 1.08-1.64 mm, head distinctly set off from body marked with 2-3 annules, spear 34-36 μ m long, spear knobs anteriorly directed, tail irregular with rounded to flat or notched terminus and with 6-10 annules.

The survey of nematodes associated with leguminous crops in India yielded three new species of the genus *Hoplolaimus* Daday, 1905 which are described below. The specimens were fixed in hot 4% formalin and processed to glycerine by slow method. Type specimens are in the Nematode collection of the Department of Zoology, Aligarh Muslim University, India.

*HOPLOLAIMUS SESHADRII** sp. n.

(Fig. I)

14 ♀♀ (*paratypes*): L = 1.45 - 1.77 mm ; a = 28-39 ; b = 8.8 - 11.4 ;
b' = 7.1-8.7 ; c = 41 - 60 ; V = 55-57 ; O = 11-13.

Female (Holotype): L = 1.59 mm ; a = 28 ; b = 10.0 ; b' = 8.2 ; c = 57 ;
V = 56 ; G₁ = 19 ; G₂ = 19 ; O = 11.

Body ventrally arcuate or 'C' shaped upon fixation, tapering anterior to glandular region of oesophagus. Body annules about 2 μ m wide near middle.

*The species has been named after Dr. A. R. Seshadri, Head of the Division of Nematology, I. A. R. I., New Delhi.

Lateral fields and incisures not seen and the transverse striae cross the body without any interruption except in the tail region.

Head continuous, or faintly marked off from the body, slightly conical, bearing 3 annules. *En face* view shows bilobed lip region. Basal annule of lip region marked with 20-22 longitudinal lines; basal plate of labial framework with dorsal and ventral arms tripartite, subdorsal and subventrals bifid (5 *en face* views). Spear robust, 42-43 μm , metenchium 20-22 μm or 47-52% of spear length. Spear knobs 7-8 μm across, each with two anterior projecting processes. Median oesophageal bulb slightly oval, 21-22 μm long and 15-18 μm wide. Oesophageal glands with six distinct nuclei. Orifice of dorsal oesophageal gland 5-6 μm from spear base or 11-13% of spear length. Oesophago-intestinal valve well developed, near middle of the oesophageal gland lobe. Excretory pore above the level of oesophago-intestinal valve, 56-59 μm from anterior extremity. Hemizonid 2-3 annules wide, 0-6 annules below excretory pore. Hemizonion inconspicuous. Cephalids rather indistinct, one pair 10-12 annules posterior to lip region. Anterior phasmid at 34-40% of body length from anterior end, posterior one at 81-88%. Nerve ring 112-126 μm from anterior end. Spermatheca non-functional, without sperms. Epitygma double. Intestine partially overlaps rectum and extends up to the anal level. Tail 0.8-1.1 anal body width long, rounded, with 14-18 annules, terminal annules coarser than other body annules.

Males: not found.

Type habitat and locality: Soil around roots of *Arachis hypogaea* from Bundi, Rajasthan.

Type specimens: Collected in September, 1970; holotype and eight paratypes on slide MSJ/*Hoplolaimus seshadrii* /1; paratypes on slides MSJ/*Hoplolaimus seshadrii*/2-3.

Differential diagnosis: *Hoplolaimus seshadrii* sp. n. comes closest to *H. columbus* Sher, 1963 but differs due to its differently shaped bilobed head, basal annule of lip region marked with 20-22 longitudinal lines (10-15 in *H. columbus*), subdorsal and subventral arms of basal plate of labial framework biforked (simple in *H. columbus*), excretory pore above the level of oesophago-intestinal junction and partially overlapping rectum. The new species is also close to *H. pararobustus* (Sch. Stek. & Teun., 1938) Sher, 1963, but differs in having six nuclei in the oesophageal glands and the absence of spermatheca and males.

HOPLOLAIMUS CEPHALUS sp. n.

(Fig. 2)

2 ♂♂ (*paratypes*): L = 0.78-1.06 mm; a = 31-36; b = 7.2-9.2; b' = 6.0 — 7.6; c = 34-47; T = 47.

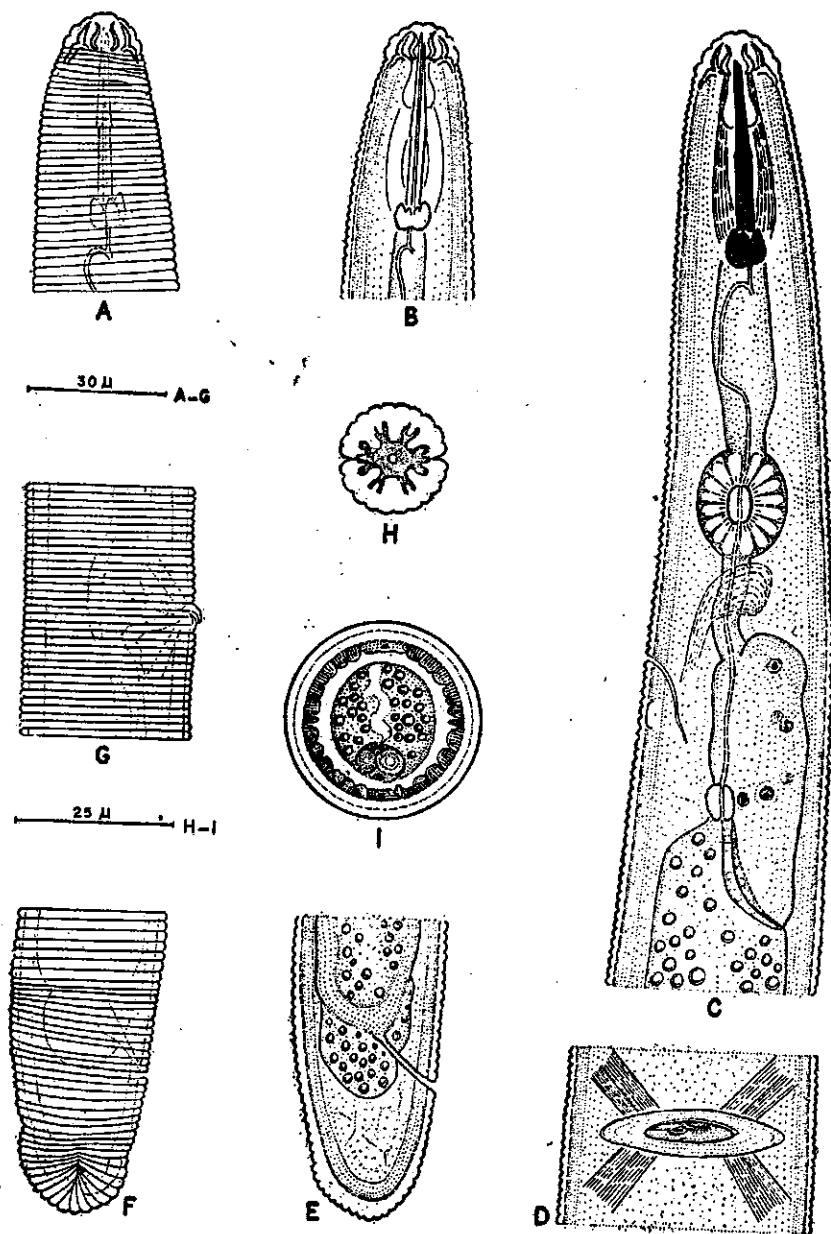


Fig. 1. *Hoplolaimus seshadrii* sp. n. Female: A & B—Head ends; C—Oesophageal region; D—Vulval region, ventral; E & F—Female tails; G—Vulval region, lateral; H—*En face* view; I—Cross-section through midbody, (A, G & F—surface views).

Female (Holotype): $L = 1.18$ mm ; $a = 35$; $b = 9.3$; $b' = 6.9$; $c = 67$;
 $V = 55$; $G_1 = 20$; $G_2 = 19$; $O = 11$.

Body almost straight or slightly ventrally arcuate ; the post-vulval region much narrower as compared to pre-vulval part. Body annules $2-3\mu\text{m}$ wide near middle. Lateral fields not existing, transverse striae cross the body without interruptions.

Head distinctly set off from body with smooth lip region lacking both the transverse and longitudinal striae. Spear robust, $34\mu\text{m}$ long, metenchium 50% of spear length. Spear knobs anteriorly directed, indented, $7\mu\text{m}$ across. Median bulb oval, $18 \times 14\mu\text{m}$, its centre $83\mu\text{m}$ from anterior extremity. Oesophageal glands with 6 nuclei. Dorsal oesophageal gland opening $4\mu\text{m}$ from spear base. Oesophago-intestinal valve well developed. Excretory pore above the oesophago-intestinal junction, opposite anterior portion of oesophageal gland lobe, $108\mu\text{m}$ from anterior extremity. Hemizonid 5 or 6 annules below excretory pore, 2 or 3 annules wide. Hemizonion not distinct. Cephalids not seen. Anterior and posterior phasmids at 50% and 84% of body-length respectively. Nerve ring at $101\mu\text{m}$ from anterior end. Epiptygma single, attached posteriorly. Spermatheca obscured by intestine. Intestine does not overlap rectum. Tail 0.7 anal body width long, rounded, with 6 annules, terminal annules larger than other body annules.

Males: Spicules $33-38\mu\text{m}$ along median axis. Gubernaculum $15-20\mu\text{m}$. Capitulum $9-11\mu\text{m}$ long. Tail less than one anal body-width long, elongate-conoid with smooth terminus.

Type habitat and locality: Soil around roots of *Cymopsis tetragonolobus* L. from Kota, Rajasthan.

Type specimens: Collected in September 1970 ; holotype female on slide MSJ 35/*Hoplolaimus cephalus* sp. n /1 ; two paratype males on slides MSJ 35/*Hoplolaimus cephalus* sp. n. /2-3.

Differential diagnosis: *Hoplolaimus cephalus* sp. n. is unique among all species of *Hoplolaimus* due to its smooth lip region. It is, however, close to *H. indicus* Sher, 1963 but differs because of the absence of intestinal overlap over rectum and also due to the absence of lateral fields.

HOPLOLAIMUS DIMORPHICUS sp. n.

(Fig. 3)

Mirzapur population (type):

5 ♀♀ (*paratypes*): $L = 1.24-1.64$ mm ; $a = 35-47$; $b = 9.8-10.5$; $b = 7.0-8.0$; $c = 57-74$; $V = 54-56$; $O = 16-20$.

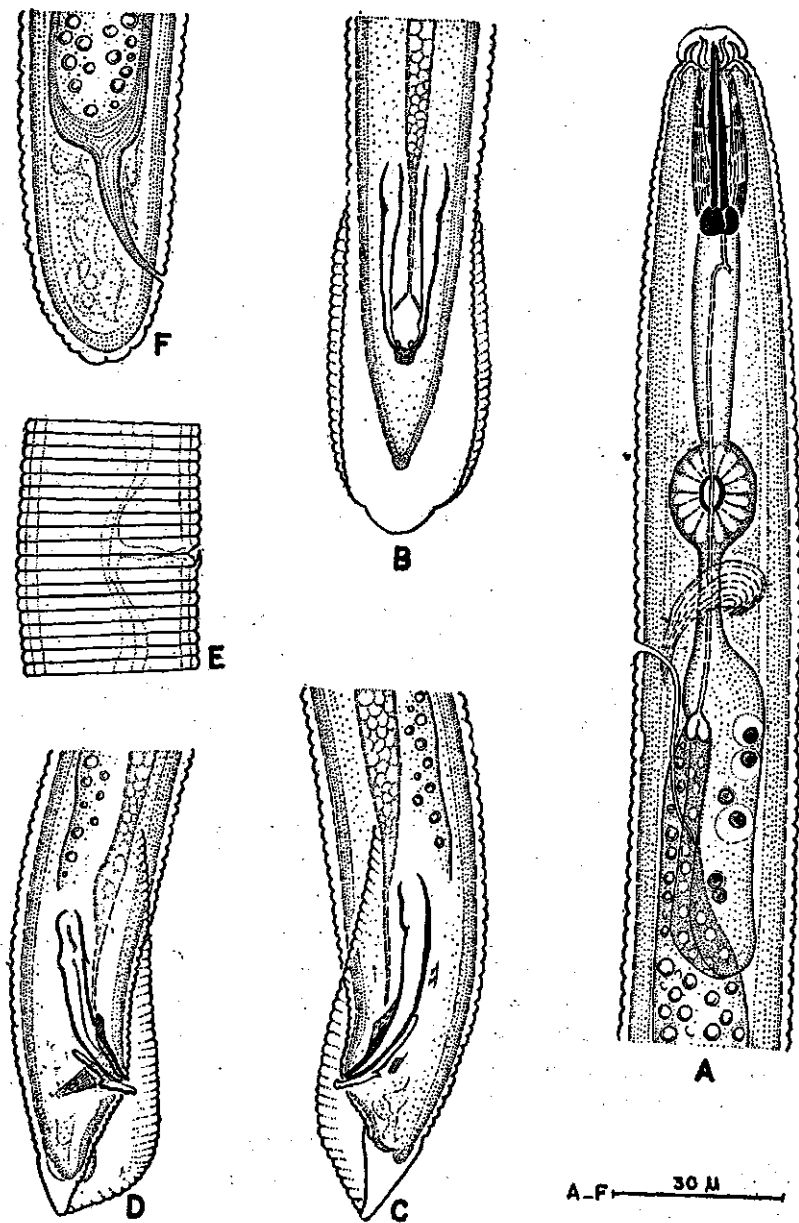


Fig. 2. *Hoplolaimus cephalus* sp. n. A—Female oesophageal region; B—Male tail, ventral; C & D—Male tails, lateral; E—Vulval region, surface view; F—Female tail, lateral.

3 ♂♂ (*paratypes*): L=1.08-1.09 mm; a=31-33; b=8.4-9.1; b'=6.6-7.0; c=39-44; T=41-42; O=16-21.

Female (Holotype): L=1.24 mm; a=35; b=9.6; b'=7.6; c=64; V=55; O=16.

Amer, Rajasthan population:

8 ♀♀: L=1.15-1.31 mm; a=33-35; b=8.6-10.0; b'=6.9-7.8; c=56-76; V=55-57; O=16-17.

4 ♂♂: L=1.09-1.16 mm; a=36-37; b=8.8-9.4; b'=7.0-7.3; c=34-48; T=41-43; O=16-17.

Female: Body ventrally arcuate or 'C' shaped upon fixation. Transverse annules about 2 μ m wide near middle. Lateral fields and incisures not seen, transverse striae cross the body without interruptions except in the tail region where it is marked by breaks in striae.

Head distinctly set off from body, conical but rarely bluntly rounded, marked with two or three annules; 13-14 μ m wide and 6-7 μ m high. *En face* view shows bilobed labial region. Basal annules of lip region marked with 18-21 longitudinal lines (3 ♀♀ *en face* views). Basal plate of labial framework with tripartite dorsal and ventral arms, and simple subdorsals and subventrals. Spear 34-36 μ m; metenchium 17-18 μ m or 48-52% of spear length. Spear knobs anteriorly directed, rarely slightly indented, 6-7 μ m across. Median bulb oval or slightly rectangular, 17-20 μ m long and 12-15 μ m wide. Oesophageal gland lobe with 6 distinct nuclei, over two corresponding body-widths long. Orifice of dorsal oesophageal gland 4-5 μ m from base of spear. Oesophago-intestinal valve well developed, placed at about 1/8th-1/7th of oesophageal lobe anteriorly. Excretory pore generally below the level of oesophago-intestinal valve, 106-129 μ m from anterior end. Hemizonid rather inconspicuous approximately 2-3 annules wide, 2-4 annules below the excretory pore sometimes on the same annule. Hemizonion indistinct. Anterior phasmids at 33-43% of the body length from anterior end, posterior phasmid at 80-83%. Nerve ring 95-105 μ m from anterior end. Spermatheca large, rounded, filled with sperms. Oocytes arranged in single row, sometimes in double rows. Epiptygma single, attached posteriorly. Intestine does not overlap rectum. Tail irregularly-shaped with rounded, flat or notched terminus, 0.8-0.9 anal body-width long, with 6-10 annules.

Males: Body almost straight or slightly ventrally arcuate towards its posterior extremity. *En face* view shows bilobed labial region. Basal annule of lip region marked with 6 longitudinal lines, dividing it into two big subdorsals, two subventrals and two small lateral lobes. Basal plate of labial framework with biforked dorsal and ventral arms, and simple subdorsals and subventrals (4 *en face* views). Spicules 36-41 μ m along median axis, gubernaculum 16-18 μ m, capitulum

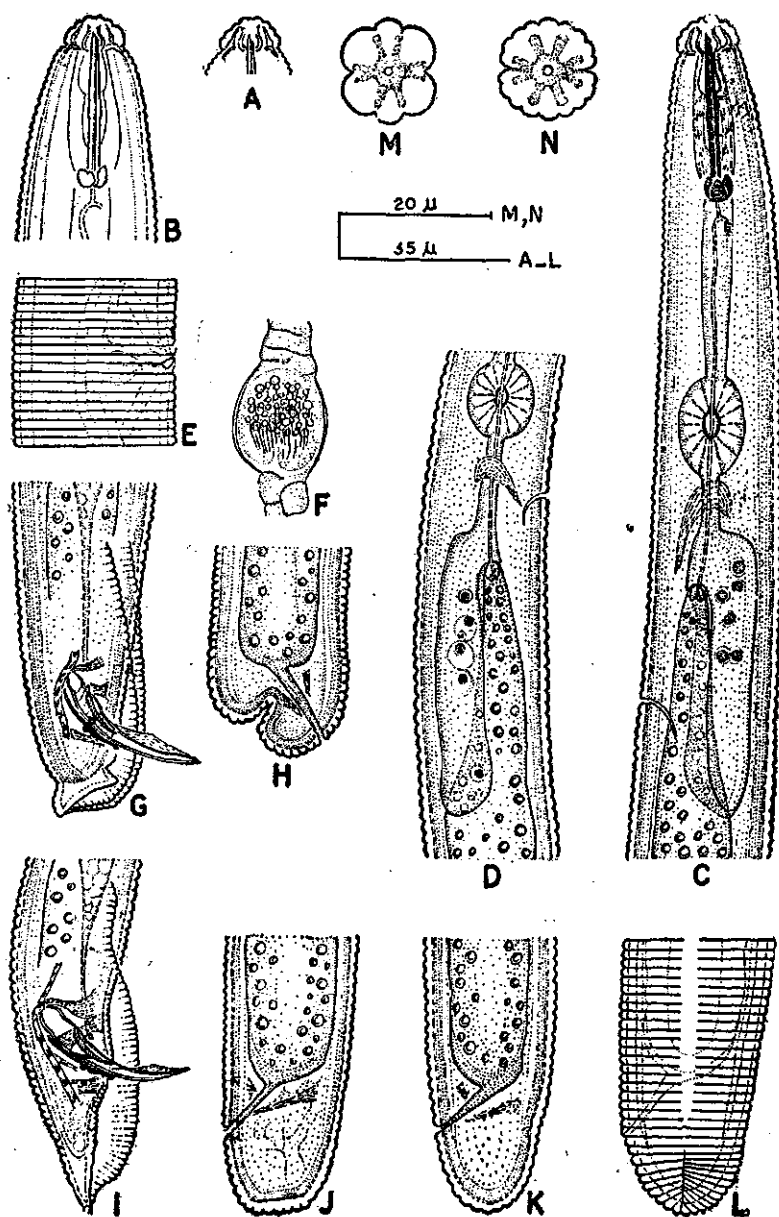


Fig. 3. *Hoplolaimus dimorphicus* sp. n. A—Head, female; B—Head end, female; C—Female oesophageal region; D—Female oesophageal region below procorpus; E—Vulval region, surface view, lateral; F—Spermatheca; G—Aberrant male tail; H—Aberrant female tail; I—Male tail, normal; J & K—Female tails, normal; L—Female tail, normal surface view; M—En face view, male; N—En face view, female.

11-12 μm long. Tail usually more than one anal body-width long, tail terminus smooth.

Type habitat and locality : Soil around roots of *Cicer arietinum* L. from Mirzapur, U. P.

Other locality : Soil around roots of *Phaseolus aconitifolius* Jack. from Amer, Rajasthan.

Type specimens : Collected in March, 1973 and September, 1970 ; holotype and 5 paratype females on slide MSJU/*Hoplolaimus dimorphicus* sp. n./1 ; 8 paratype females and 7 males on slides MSJR 11/*Hoplolaimus dimorphicus* sp. n./2-3.

Differential diagnosis : *Hoplolaimus dimorphicus* sp. n., comes closest to *H. indicus* Sher, 1963 but differs due to sexual dimorphism in manner of striation of the basal annule of the lip region, considerably longer oesophageal lobe with cardia situated at about 1/8th-1/7th of its anterior end, intestine without rectal overlap and irregularly shaped tail.

The authors are thankful to Dr. Mashhood Alam, Head, Department of Zoology, Aligarh Muslim University, Aligarh, for his encouragement and keen interest in the present research work.

REFERENCE

- SHER, S. A. (1963). Revision of the Hoplolaiminae (Nematoda) II. *Hoplolaimus* Daday, 1905 and *Aorolaimus* n. gen. *Nematologica* 9 : 267-295.