

TWO KNOWN AND ONE NEW SPECIES OF NEMATA FROM MANIPUR

N. MOHILAL, Y. ANANDI AND CH. DHANACHAND
PARASITOLOGY LABORATORY, DEPARTMENT OF LIFE SCIENCES,
MANIPUR UNIVERSITY, CANCHIPUR-795 003, INDIA.

Survey of parasitic nematodes in different areas of Manipur revealed the occurrence of one known species of *Paratylenchus*, another known and one new species of *Hemicriconemoides*. *Paratylenchus longicaudatus* Raski, 1975 is a new record in India.

INTRODUCTION

The genus *Paratylenchus* was proposed by Micoletzky (1922) with *P. bukowinensis* as the type species. The genus *Hemicriconemoides* was established by Chitwood & Birchfield (1957). In a survey of plant parasitic nematodes in Manipur three species i.e. *Paratylenchus longicaudatus* Raski, 1975, *Hemicriconemoides dipterocarpes* n.sp. and *H. mangiferae* Siddiqi, 1961 were recorded. The first species is a new record in India. Their descriptions supported with illustrations are provided.

MATERIALS AND METHODS

Soil samples collected were processed for the extraction of nematodes by Cobb's (1918) sieving and decanting method followed by modified Baermann's funnel technique. Extracted nematodes were fixed in warm F.A. (4 : 1) and dehydrated under the slow glycerine method. Measurements were done using an ocular micrometer and diagrams were drawn by Camera lucida.

RESULTS AND DISCUSSION

Paratylenchus longicaudatus Raski, 1975 (Fig. 1)

Dimensions : Females (12) : L=0.34-0.38 mm (0.36 mm), a=22-26 (24), b=4.1-4.3 (4.2), c=14-18 (16), c'=2.6-3.1 (2.9), V=82-83 (82), G₁=29-31 (30), stylet=20-24 µm (22 µm), tail=25-27 µm (26 µm), ABD= 8-10 µm (9 µm).

Description : Female : Body open 'C' shaped upon fixation, more curved ventrally towards posterior region of vulva. Cuticle with fine transverse annulations. Lateral field with four incisures. Lip region rounded with indistinct annules. Excretory pore located at 75-101 µm from anterior end of body. Stylet 20-24 µm long with slightly posteriorly directed knobs. Orifice of dorsal oesophageal gland located at 5-6 µm from stylet base. Median oesophageal bulb located at 63-68% of total oesophageal length. Nerve ring at 75-80 µm from anterior end of body encircling the isthmus region. Basal bulb of oesophagus 13-15 µm long. Cardia distinct, round.

Reproductive system monoprodelphic and outstretched. Spermatheca oval shaped with small spermatozoa. Vulval flaps large and rounded. Vulva-anus distance 32-48 µm or more than one tail length. Tail 26-31 µm long, tapering gradually to a finely rounded terminus or about 2-3 anal body width in length.

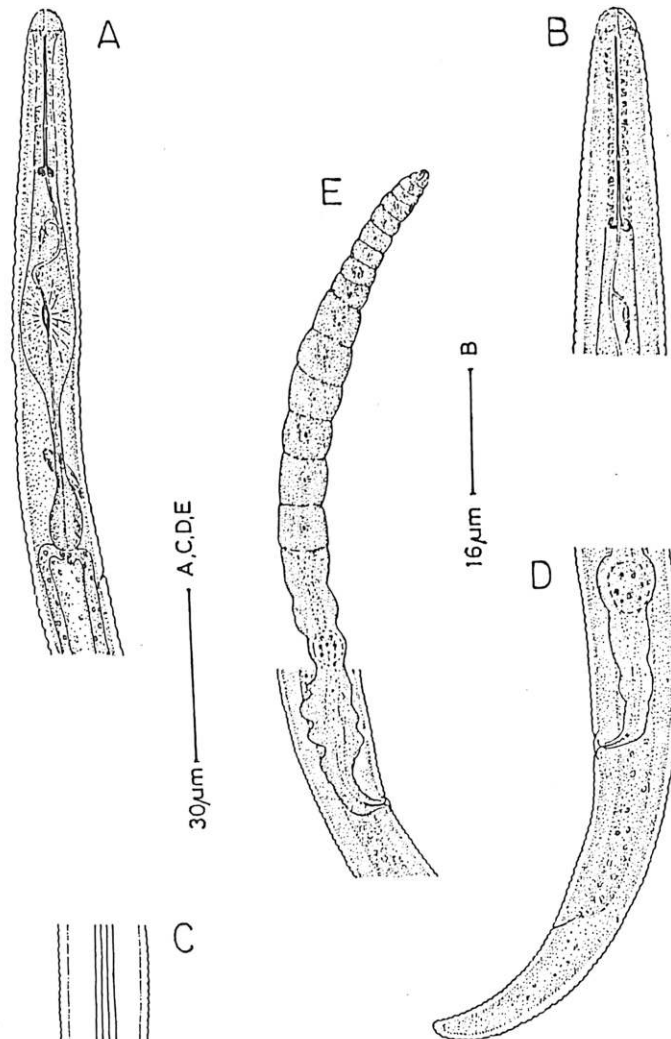


Fig. 1 : *Paratylenchus longicaudatus*. A. Anterior end; B. Head region; C. Mid body showing lateral line; D. Tail; E. Female reproductive system.

Male : Unknown

Habitat & Locality : Detected from soil around the roots of banana, *Musa* sp. from Elangbam leikai, Imphal district, Manipur.

Collected in January, 1993. Female individuals mounted on slides AN₈₄/*Paratylenchus longicaudatus*/1-12 and deposited in the Parasitology Laboratory, Life Sciences Department, Manipur University, Canchipur, Imphal.

Remarks : The morphological characters and dimensions of the present specimens conform well with those described by Raski (1975). It is reported for the first time from India.

Hemicriconemoides dipterocarpes n.sp. (Fig. 2)

Dimensions : Holotype Female : L=0.53 mm, a=18.5, b=5.1, c=15.1, c'=1.8, V=93.1, G₁=48.1, lip width= 8 µm, lip height=4.8 µm, stylet=57.6 µm, prorhabdion=48.0 µm, oesophagus=105.6 µm, R=148, R_{st}=20, R_{oes}=32, R_v=16, R_{van}=3, R_{an}=13, Tail=35.2 µm, ABD=19.2 µm.

Paratype Female (10) : L=0.51-0.53 mm (0.52 mm), a=16.4-18.5 (17.2), b=4.6-5.1 (4.9), c=14.4-15.1 (14.7), c'=1.5-1.8 (1.7), V=91.3-93.1 (92.3), G₁=38.8-48.1 (42.0), lip width=8 µm, lip height=4.8-6.4 µm (6.0 µm), stylet=56.0-59.2 µm (57.6 µm), prorhabdion=48.0-49.6 µm (48.8 µm), Oesophagus=105.6-107.2 µm (106.1 µm), R=147-152 (148), R_{st}=19-20 (20), R_{oes}=30-33 (32), R_v=12-17 (16), R_{van}=2-3 (3), R_{an}=10-13 (12), Tail=30.4-35.2 µm (33.6 µm), ABD=19.2-20.8 µm (19.8 µm).

Male : Not found

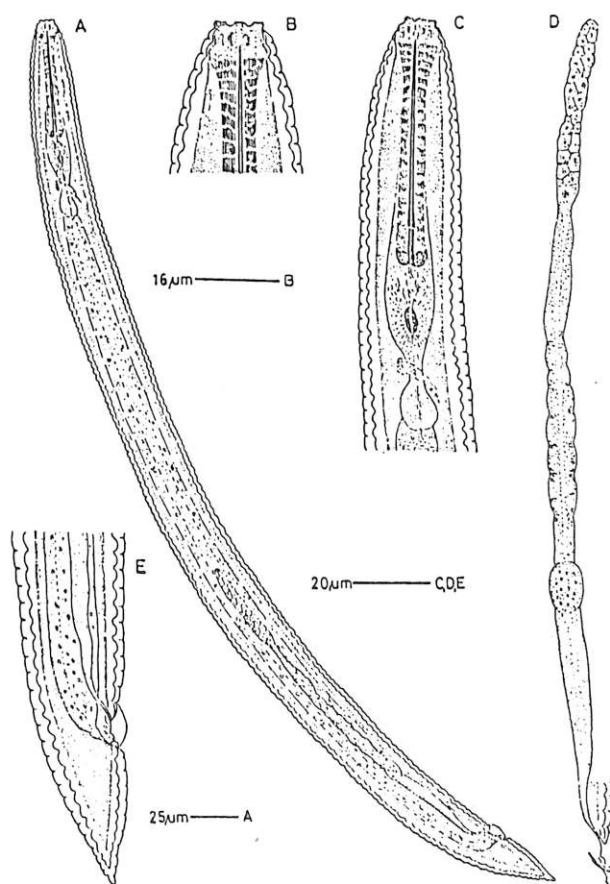


Fig. 2 : *Hemicriconemoides dipterocarpes* n.sp. A. Female, entire body; B. Head region; C. Anterior end; D. Female reproductive system; E. Tail region.

Description : Body cylindroid, slightly ventrally curved, tapering anteriorly to a truncate head, posteriorly behind vulva rather abruptly to a conoid, pointed tail. Longitudinal striation in the anterior part only. Body annules 147-152, annules 3-4 μm wide in the middle of body. Lip region slightly set off, with 3 rounded annules. First annule disc-like, slightly constricted, 11.2 μm wide, second annule 12.8 μm wide. Amphidial apertures situated laterally on the labial disc. Cephalic framework much pronounced, mostly in the second annule. Spear 56-59.2 μm long, spear knobs directed forward, 10-11 μm across, situated on 19-20 body annules from the anterior end. Dorsal oesophageal gland opening 4.8 μm behind the spear base. Oesophagus 105.6-107.2 μm . Nerve ring at 89.6-94.4 μm from anterior end of body.

Female reproductive system mono-prodelphic. Vulva open, situated on 12-17 annules from tail terminus in a deep depression and is provided with a broad vulval sheath which is 3 annules wide. Vagina slightly inclined, directed forward. Ovary outstretched, spermatheca oval, oocytes arranged in two rows. Anus situated on 10-13 annules from tail terminus. Tail conoid, tapering abruptly behind anus, 30.4-35.2 μm long or a little more than one half anal body diameter, tail terminus pointed.

Type Habitat and Locality : Soil around the roots of *Dipterocarpus tuberculatus* Roxb. from Lairouching, Moreh, Chandel district, Manipur.

Type specimen : Collected in August, 1990. Holotype female on slide MN₁₀/Hemicriconemoides dipterocarpes n.sp. /1. Paratype on slide MN₁₀/Hemicriconemoides dipterocarpes n.sp./2-11 deposited in the Parasitology Laboratory, Life Sciences Department, Manipur University, Canchipur, Manipur.

Differential Diagnosis : *Hemicriconemoides dipterocarpes* n.sp. comes close to *Hemicriconemoides cocophillus* (Loos, 1949) Chitwood & Birchfield, 1957 and *H. neobrachyurus* Dhanachand & Jairajpuri, 1979. From *H. cocophillus* it differs in its longer spear, shorter tail, more number of body annules, more annules in the tail, more annules in between vulva and anus, much pronounced cephalic framework and its deeply present vulval opening (Spear=50-57 μm , c=16-17, R=108-113, R_{an}=8-9, R_{van}=1 in *H. cocophillus*). It is also distinctive from *H. neobrachyurus* in its shorter spear, shape and length of tail, more anterior position of vulval opening, more number of annules in between tail tip and vulval opening and in between vulva and anus, and in the presence of conoid tail with pointed terminus, (spear=63-69 μm , c=18-23, V=93-95, R_v=11-13, R_{van}=1-2, tail conoid tapering abruptly behind anus in *H. neobrachyurus*).

Hemicriconemoides mangiferae Siddiqi, 1961 (Fig. 3)

- *Vanguireus spinosa* Choithar, Ukhrul population.

Dimensions : Females (8) : L=0.41-0.44 mm (0.43 mm), a=13.8-14.9 (14.4), b=3.9-4.2 (4.1), c=21.2-28.2 (24.7), c'=0.9-1.4 (1.2), V=90.9-93.3 (92.1), G₁=43.1-44.0 (43.6), lip width=9.6 μm , with sublateral lobes in one specimen, lip height=3.2 μm , stylet=64.0-65.6 μm (64.8 μm), basal knob 8 μm x 3.2-4.3 μm (3.8 μm) across, dorsal oesophageal gland opening 4.2 μm from base of spear, oesophagus=101.5-104.0 μm (102.8 μm), Cardia=2.5-3.2 μm (2.9 μm), first annule=11.2 μm , second annule=12.8 μm , R=127, R_{st}=21, R_{oes}=30-32 (31), R_v=10-12 (11), R_{van}=5-6 (6), R_{an}=5-6 (6). Female reproductive system monoprodelphic, ovary outstretched, VL/VB=14.4-16 μm (15.2 μm)/1.6 μm , tail=14.4-20.8 μm (17.6 μm), ABD=14.4-16.0 μm (15.2 μm).

Male : Not found.

- *Bambusa balcooa* Roxb., Chandel population

Females (24) : L=0.41-0.45 mm (0.43 mm), a=12.2-18.1 (16.02), b=4.0-4.8 (4.3), c=22.3-41.1 (31.0), c'=0.9-1.5 (1.4), V=92.3-93.8 (93.1), G₁=24.2-43.2 (34.0), lip width=8.0-9.6 μ m (8.4 μ m), lip height= 1.6 μ m, stylet=57.6-64.0 μ m (61.4 μ m), dorsal oesophageal gland opening= 9.6 μ m from spear base, oesophagus=96.0-102.4 μ m (99.2 μ m), R=119-132 (127), R_B=2.2 R_{st}=19-21 (20), R_{ocs}=29-32 (31), R_v=10-11 (11), R_{van}=4-7 (5). Nerve ring 80.0-83.2 μ m (81.6 μ m) from anterior end of body, female reproductive system monoprodelfic, ovary outstretched. Tail=11.2-19.2 μ m (14.4 μ m), ABD=11.2-14.4 μ m (12.6 μ m).

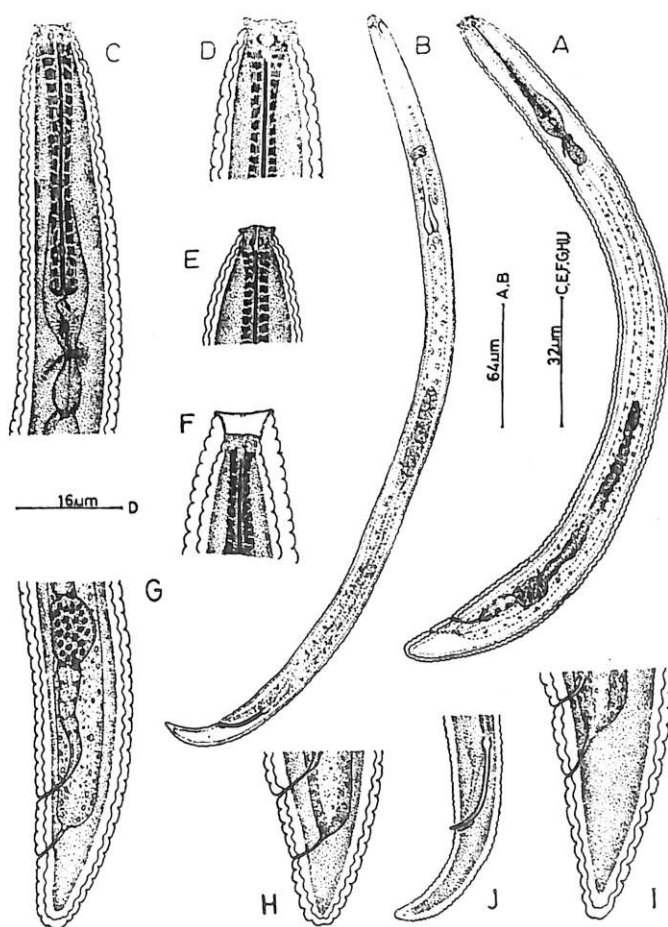


Fig. 3 : *Hemicriconemoides mangiferae*. A. Female, entire body; B. Male, entire body; C. Anterior end; D. Head region, female (magnified); E. Head Region, female; F. Head region, male; G. Female tail; H. & I. Variation in tail; J. Male tail.

Male (8) : L=0.45 mm, a=31.4-35.0 (33.2), c=14.2-15.6 (14.9), c'=3.0-3.3 (3.2), T=28.3-35.7 (32), lip width=4.0-4.8 μ m (4.4 μ m), lip height=1.6-2.0 μ m (1.8 μ m), spicule=24.0-25.6 μ m (24.8 μ m), Gubernaculum=4.8 μ m, Tail=28.8-32.0 μ m (30.4 μ m), ABD=9.6 μ m.

Habitat & Locality : Soil around the roots of *Bambusa balcooa* Roxb. From Chandel, Chandel district, Manipur.

Remarks : *Hemicriconemoides mangiferae* is a very common and widely distributed species. On comparison with the dimensions and descriptions of Siddiqi (1961) variations in the length of body, spear, tail and number of body annules exists. But since the measurements fall within the intraspecific variations and the body structures are similar with those given by Siddiqi (1961), the present specimens have been regarded as *Hemicriconemoides mangiferae*. The males of this species are rare. In this work males have been recovered from Chandel district.

ACKNOWLEDGEMENTS

The authors are grateful to the CSIR, New Delhi for financial assistance in the form of direct research associateship to the first author and Dr. Vishwanath, Head of the Department of Life Sciences, Manipur University for laboratory facilities.

REFERENCES

- CHITWOOD, B.G. & BIRCHFIELD, W. 1957. A new genus, *Hemicriconemoides* (Criconematidae : Tylenchina). *Proc. Helminth. Soc. Wash.* **24** : 80-86.
- COBB, N.A. 1918. Estimating the nema population of the soil. *Agric. Tech. Cic. Bur. Pl. Ind. US. Dep. Agric. No. 1* : 48 pp.
- DHANACHAND, CH. & JAIRAJPURI, M.S. 1979. *Hemicriconemoides neobrachyurus* sp.n. (Nematoda : Criconematoidea) from Manipur, India. *Indian J. Nematol.* **9** : 111-116.
- LOOS, C.A. 1949. Notes on free living and plant parasitic nematodes of Ceylone No. 6. *J. Zool. Soc., India.* **2** : 30-36.
- MICOLETZKY, H. 1922. Die freilebenden Erd Nematoden. *Arch. Naturq. Berlin. Abt. A.* **87** (1921). pp. 1-650.
- RASKI, D.J. 1975. Revision of the genus *Paratylenchus* Micoletzky, 1922 and descriptions of new species Part-I of 3 parts. *J. Nematol.* **7** : 15-34.
- SIDDIQI, M.R. 1961. Studies on species of Criconematidae (Nematoda : Tylenchida) from India. *Proc. Helminth. Soc. Wash.* **28** : 19-34.