



## One new and three known species of *Paratylenchus* (Nematoda: Tylenchulidae) from Manipur, India

M. Pramodini<sup>1</sup> & N. Mohilal<sup>2</sup>

<sup>1,2</sup> Parasitology section, Department of Life Sciences, Manipur University, Canchipur, Manipur 795003, India  
Email: <sup>1</sup> cd\_paralab@indiatimes.com, <sup>2</sup> mohilaln@yahoo.co.in (corresponding author)

Species of *Paratylenchus* Micoletzky, 1922 commonly known as “pin nematodes” are well-known plant pathogens of various agricultural crops. During a study of the plant parasitic nematodes associated with plant communities in Manipur, three known and one new species of *Paratylenchus* were recovered.

The nematodes were killed in hot water, fixed in 4% formaldehyde solution, dehydrated in Glycerine-Alcohol and were mounted in glycerine (Seinhorst 1959, 1962). Measurements were taken using an ocular micrometer.

*Paratylenchus canchicus* Mohilal & Dhanachand 2004

**Dimensions:** Refer Table 1.

### Description

**Female:** Body an open “C” after fixation. Head not set off, bluntly rounded, almost hemispherical, cephalic framework weakly developed. Stylet well-developed, stylet knobs posteriorly directed. Orifice of dorsal oesophageal gland located at  $4.5 \pm 0.3$  (4-5)  $\mu\text{m}$  from stylet base. Excretory pore distinct. Nerve ring located at  $65.5 \pm 3.5$  (60.8-70.4)  $\mu\text{m}$  from the anterior end. Oesophago-intestinal valve prominent. Ovary outstretched, spermatheca prominent. Tail narrows gradually to a rounded terminus. Lateral field with four incisures, equally distinct. Body annules  $1.4 \pm 0.2$  (1.4-1.6)  $\mu\text{m}$  wide. Vulva-anus distance  $36.5 \pm 0.5$  (36.0-37.6)  $\mu\text{m}$  or more than one tail length long.

**Male:** Not found.

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### Habitat and locality

Soil around the roots of *Alocasia indica* Roxb. from Kakwa, Imphal West district.

### Remarks

The morphological characters and dimension of the present specimens are in agreement with those original descriptions and dimensions provided by Mohilal & Dhanachand (2004).

*Paratylenchus lepidus* Raski 1975

**Dimensions:** Refer Table 1

### Description

**Female:** Body arcuate ventrally to an open ‘C’ after fixation, slightly more curved ventrad posterior to vulva. Body cuticle marked by fine transverse striae, about 1.0  $\mu\text{m}$  wide. Head rounded, without distinct annules. Stylet knobs squared-off or slightly posteriorly directed. Dorsal oesophageal gland orifice opens into lumen of oesophagus, about  $7 \pm 0.8$  (6-8)  $\mu\text{m}$  behind the basal knobs. Oesophagus composed of distinct amalgamated procorpus and corpus with posteriorly located valve plates, narrow isthmus and rather rounded basal bulb. Cardia small, round. Nerve ring surrounds isthmus.

Ovary mono-prodelphic and outstretched. Spermatheca ovoid, prominent, with small spermatozoa. Vulva flaps distinct, large and rounded. Tail tapers gradually to a finely rounded terminus. Lateral field with four incisures, inner two slightly less distinct than outer two.

**Male:** Not found.

### Habitat and locality:

Soil around the roots of *Crotalaria juncea* Linn. from Wakha, Imphal East district, Manipur.

### Remarks

The dimensions and descriptions of the present specimens agree well with those provided by Raski (1975).

*Paratylenchus longicaudatus* Raski 1975

**Dimensions:** Refer Table 1

### Description:

**Female:** Body curved ventrally upon fixation more towards posterior region of vulva. Cuticle with fine transverse annulations. Body gradually narrows at anterior end to head which is conoid and truncate. Lip region rounded with indistinct annules. Lateral fields with four incisures. Stylet slender with slightly posteriorly directed knobs. Orifice of dorsal oesophageal gland located at  $5.4 \pm 0.4$  (5-6)  $\mu\text{m}$  from stylet base. Median oesophageal bulb located at 63-88% of total oesophageal length. Nerve ring at  $77.6 \pm 1.8$  (75-80)  $\mu\text{m}$  from anterior end of body encircling the isthmus region. Cardia round, distinct.

Reproductive system mono-prodelphic and outstretched. Spermatheca oval shaped, with small spermatozoa. Vulval flaps large and rounded. Tail tapering to a finely rounded terminus.

**Male:** Not found.

**Table 1. Measurements of three females of *Paratylenchus* spp. All measurements in  $\mu\text{m}$ , except L in mm.**

Characters	<i>Paratylenchus canchicus</i> Mohilal & Dhanachand, 2004	<i>Paratylenchus longicaudatus</i> Raski, 1975	<i>Paratylenchus lepidus</i> Raski, 1975
n	12	10	15
Length	0.33-0.42 (0.38±0.0)	0.34-0.38 (0.36±0.0)	0.36-0.38 (0.37±0.8)
a	24.0-26.4 (24.8±0.9)	22-26 (24±1.7)	25-30 (27.3±2.0)
b	4.1-4.6 (4.3±0.2)	4.0-4.3 (4.1±0.12)	4.1-4.4 (4.2±0.1)
c	11.5-14.6 (13±1.1)	14-18 (16±1.7)	11-12 (11.6±0.4)
V	81.5-83.5 (82±0.9)	82-83 (82.6±0.4)	81-83 (82±0.8)
Stylet % L	4.9-5.2 (5±0.1)	5.8-6.2 (5.9±0.2)	6-6.1 (6.0±0.0)
Oesophagus. % L	21.7-24.3 (23.2±0.9)	23.2-25 (23.8±0.6)	22.6-23.6 (23.2±0.4)
Stylet	18.4-20.8 (19.4±0.8)	20-24 (22±1.7)	22-24 (23±0.8)
Prorhabdion	10.4-12 (11.4±0.6)	10-14 (12±1.7)	14-16 (15±0.8)
Oesophagus	87-91.7 (89.5±1.7)	83.9-90.2 (87.2±2.4)	83-91 (87.6±3.3)
DGO	4-5 (4.5±0.3)	5-6 (5.4±0.4)	6-8 (7±0.8)
Body width	15.2-15.9 (15.4±0.2)	14.9-15.6 (15.2±0.3)	12.9-14.6 (13.8±0.6)
Tail	28.8-32 (30±1.3)	25-27 (26±0.8)	30-32 (31±0.8)
ABD	8-9.6 (9±0.6)	8-10 (9±0.8)	-
Excretory pore	80.8-86.1 (85.3±3.1)	57-68 (60.2±4.2)	76-80 (78±1.6)
G <sub>1</sub>	36-40 (38.2±1.4)	29-31 (30±0.8)	61-64 (62.3±1.2)

**Habitat and localities**

Soil round roots of *Cynodon dactylon* (L) Urban from Lamka, Churachandpur District.

**Other recorded habitats and localities of Manipur:**

Soil around roots of 1. *Allium hookeri* Thw. from Tronglaobi, Bishnupur District; 2. Banana, *Musa* sp. from Elangbam Leikei, Imphal District, Manipur.

**Remarks**

The dimensions and morphological characters of the present populations correspond well with type specimen described by Raski (1975).

*Paratylenchus thysanolus* sp. nov.  
(Fig. 1)

**Material examined**

Holotype: 28 May 2004, on slide no. PD 295, Parasitology Laboratory, Life Sciences Department, Manipur University, Canchipur, Imphal.

Paratype: Same information as above. on slides PD 288 (1-3), PD 295(1-4)

**Dimensions:** Tables 2 & 3

**Etymology:** The species is named after its host plant.

**Description**

**Female:** Body ventrally curved when relaxed, tapering at both ends but become swollen in pre-vulval region. Lateral field with three lines. Lip continuous with body contour, bluntly rounded, not setoff, almost hemispherical, with a slightly sloping side and a distinct depression at the oral aperture. Body cuticle marked by fine striae, nearly 1 $\mu\text{m}$  apart. Stylet slender with stout prominent knobs, which are backwardly directed. Excretory pore situated in the anterior region of basal bulb of the oesophagus. Oesophagus typical of the genus. Cardia small and rounded, about 4.2 ±0.3 (3.4-5)  $\mu\text{m}$  long.

Reproductive system mono-prodelphic, ovary outstretched with a single row. Spermatheca almost spherical and filled with small spermatozoa. Vulva, a transverse slit with

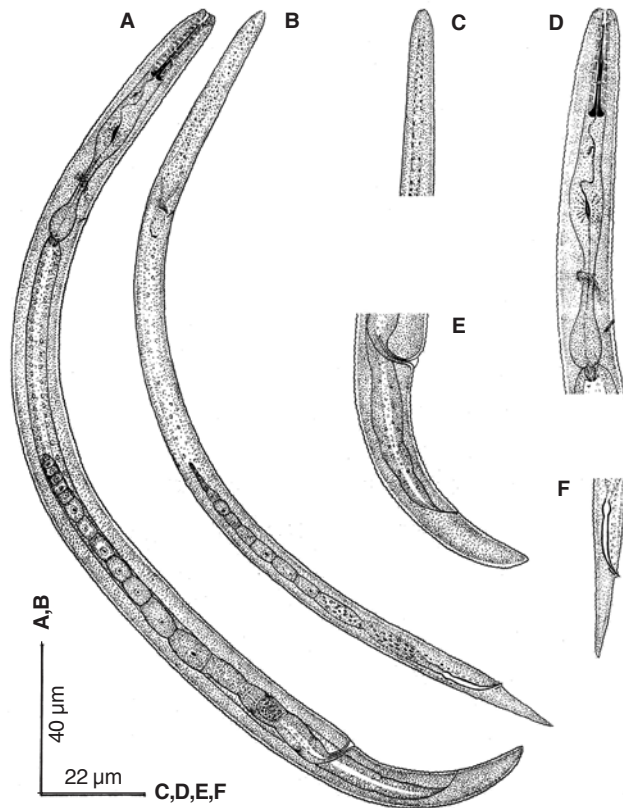
**Table 2. Measurements of the females of *Paratylenchus thysanolus* sp. nov. All measurements in  $\mu\text{m}$ , except L in mm.**

Characters	Holotype	Paratype	Juvenile
n		11	3
Length	0.29	0.16-0.29 (0.22±0.0)	0.16-0.19
a	19.4	13.5-20 (17.8±1.8)	14-16.6
b	4.0	2.5-4.4 (3.3±0.5)	2.9-3.3
c	17.4	8.6-20.6 (14.2±3.3)	-
DGO	6.8	5.1-6.8 (5.9±0.8) (n=4)	-
V	81	79-83 (80.1±2.2)	-
VL/VB	4.1	3.1-4.6 (3.8±0.4)	-
St % L	6.3	6.3-11.3 (7.7±1.4)	9-9.8
Oeso.% L	38	33-40.5 (36.6±2.6)	32-35.3
Lip width	5.1	5.1-6.8 (5.7±0.8)	5.1
Lip height	3.4	3.4	3.4
Stylet length	18.7	17-18.7 (17.4±1)	15.3-17
Stylet knob width	5.1	3.4-6.8 (5.3±1.1)	3.4
Stylet knob height	3.4	1.7-8.5 (4.2±1.9)	3.4
Metenchium length	11.9	8.5-11.9 (10.0±1.5)	6.5-8.5
Telenchium length	6.8	6.8-8.5 (9.7±1.4)	8.5
Oesophagus length	76.5	64.6-78.2 (71±4.3)	54.4-61.2
Procorpus	30.6	23.8-30.6 (26.5±1.9)	20-25.5
Metacarpus	17	15.3-19.5 (16.6±1.2)	15.3-20
Isthmus	13.6	11.9-15.3 (12.1±3.6)	8.5-10.2
Basal bulb	11.9	10-13.6 (11.7±1.3)	8.5-11.9
Excretory pore	61.2	42.5-61.2 (55.7±6.9)	44.2-45.9
Body width	15.3	10.2-13.6 (12.5±1.5)	10.2-11.9
G <sub>1</sub>	38	33-40.5 (36.6±2.6)	-
Vulval length	56.1	37.4-56 (44.9±4.9)	-
Vulval width	13.4	10.2-13.6 (12.0±1.3)	-
Tail	17	13.6-20.4 (16.6±2.4)	17-18.5
Anal body diameter	8.5	6.8-8.5 (7.7±0.8)	8.5

prominently rounded lateral vulvar membrane. Tail tip curved gently ventrad, conoid, narrows gradually to a bluntly rounded terminus.

**Male:** Body gently ventrally arcuate after fixation. Body narrows at anterior end to a rounded head at terminus and posterior from the region of the cloaca to an acute terminus. Head sloping with fine annule and sclerotization very light. Stylet lacking. Oesophagus degenerated.

Excretory pore distinct, near the nerve ring. Lateral field with three lines. Body annules very fine. Testis full of large refractive spermatozoa. Anal sheath prominent and short. Spicule curved slightly. Tail straight, narrows to give a very slender conoid outline with an acute terminus.



**Figure 1.** *Paratylenchus thysanolus* sp. nov.

A - Female, entire body; B - Male, entire body; C - Male, anterior body; D - Female, anterior body; E - Female, tail region; F - Male, tail region.

#### Type habitat and locality

Soil around the rhizosphere of *Thysanolaena maxima* (Roxb.) Kuntz. from Waithou hill, Thoubal district, Manipur.

#### Diagnosis and relationships

*Paratylenchus thysanolus* sp. nov. is distinct in having smaller body, bluntly rounded lip with a distinct depression at the oral aperture and heterogeneous tail shape in between male and female. The new species comes close to *P. variatus* Jairajpuri, 1982 and *P. colbrani* Raski, 1975. From *P. variatus*, it differs in the body length, stylet length, oesophagus length and shape

**Table 3.** Measurements of the male of *Paratylenchus thysanolus* sp. nov. All measurements in  $\mu\text{m}$ , except L in mm.

Characters	Paratype
n	3
Length	0.23-0.24 (0.24 $\pm$ 0.0)
a	24-28 (26.6 $\pm$ 1.8)
b	12.8-14.4 (13.4 $\pm$ 0.7)
c'	1.6-2.2 (2 $\pm$ 0.3)
T	26.9-34.5 (29.4 $\pm$ 3.5)
Spicule	16-17 (16.6 $\pm$ 0.4)
Gubernaculum	5.1
Excretory pore	54.4 (n=1)
Body width	8.5-10.2 (9.0 $\pm$ 0.8)
Tail	17.0-18.7 (18.1 $\pm$ 0.8)
Anal body diameter	6.8-8.5 (7.9 $\pm$ 0.8)

of tail (L = 0.21-0.31mm, b = 3.6-4.3, stylet = 15-16 $\mu\text{m}$ , oesophagus = 55-65 $\mu\text{m}$ , tail conoid with variable shape, often digitate or indented in *P. variatus*). It is distinguished from *P. colbrani* in its smaller body length, value of 'a', 'b', lesser excretory pore length, prorhabdion and lateral fields (L = 0.28-0.33mm, a = 19-26, b = 3.7-5.4, prorhabdion = 8-10 $\mu\text{m}$ , excretory pore = 63-79 $\mu\text{m}$ , lateral fields = 4 lines in *P. colbrani*). The present specimen also differs from *P. canchicus*, *P. longicaudatus* and *P. lepidus* in its smaller body length, lesser value of 'a', smaller length of stylet and oesophagus, much smaller tail length.

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