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TWO NEW PREDATORY SPECIES (MONONCHIDA : NEMATODA) UNDER THE GENUS *MYLONCHULUS* FROM WEST BENGAL, INDIA WITH A REVISED KEY TO THE SPECIES UNDER THE GENUS *MYLONCHULUS*

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INTRODUCTION

During a survey in district South 24-Parganas (22°22.64' N, 88°25.7' E), West Bengal, India, during May through July, 2005, several populations of nematode were collected. Two new species under the family Mylonchulidae Jairajpuri, 1969, subfamily Mylonchulinae Jairajpuri (1969) and genus *Mylonchulus* Cobb (1916) have been described here. This genus is widely distributed throughout the world but only seven species have been reported so far from Eastern India. Six females of *Mylonchulus goutami* sp. n. were collected from the rhizospheric soil of mango (*Mangifera indica* L.) and four females of *M. istvani* sp. n. were collected from rhizospheric soil of guava (*Psidium guajava* L.).

Key-words : Taxonomy, *Mylonchulus goutami* sp. n., *Mylonchulus istvani* sp. n., key, description, illustration.

MATERIALS AND METHODS

Nematodes were extracted from soil samples by using 'Baermann's Funnel Method' (Christie and Perry, 1951), fixed in hot diluted 4% FA (formalin-acetic acid mixture) (Seinhorst, 1966), mounted in anhydrous glycerin and sealed properly. Preserved specimens were observed under different magnifications with an Olympus BX-51 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.

DESCRIPTIONS OF SPECIES

1. *Mylonchulus goutami* sp. n.

(Fig. 1, 2; Table-1)

Measurements : Table-I.

Description : Female (6) : Body medium in size, ventrally curved upon fixation. Cuticle smooth, moderately thick. Lateral chord about 1/4th of the total body width. Width of the lip region more than four times the lip height. Amphid small with oval aperture. Length of the buccal cavity less than twice of its width. A large dorsal tooth is housed in the buccal cavity, opposed by 7-8 regular transverse rows of denticles arranged in parallel. Apex of dorsal tooth directed forward and is at 3/4th of the buccal cavity length from the base; small sub-median or sub-ventral tooth absent, geusids prominent. Oesophagus slender and muscular with prominent glands; oesophago-intestinal junction nontuberculate. Excretory pore situated behind the nerve ring. Gonad didelphic-amphidelphic; ovaries reflexed, slightly smaller than the length of oviduct in most specimen; anterior ovary longer than posterior; sphincter absent at oviduct-uterus junction; *pars proximalis vaginae*, *pars refringens vaginae* prominent but *pars distalis vaginae* very small. Two advulval papillae present on either side of the vulval pore at very close proximity. Rectum length less than one anal

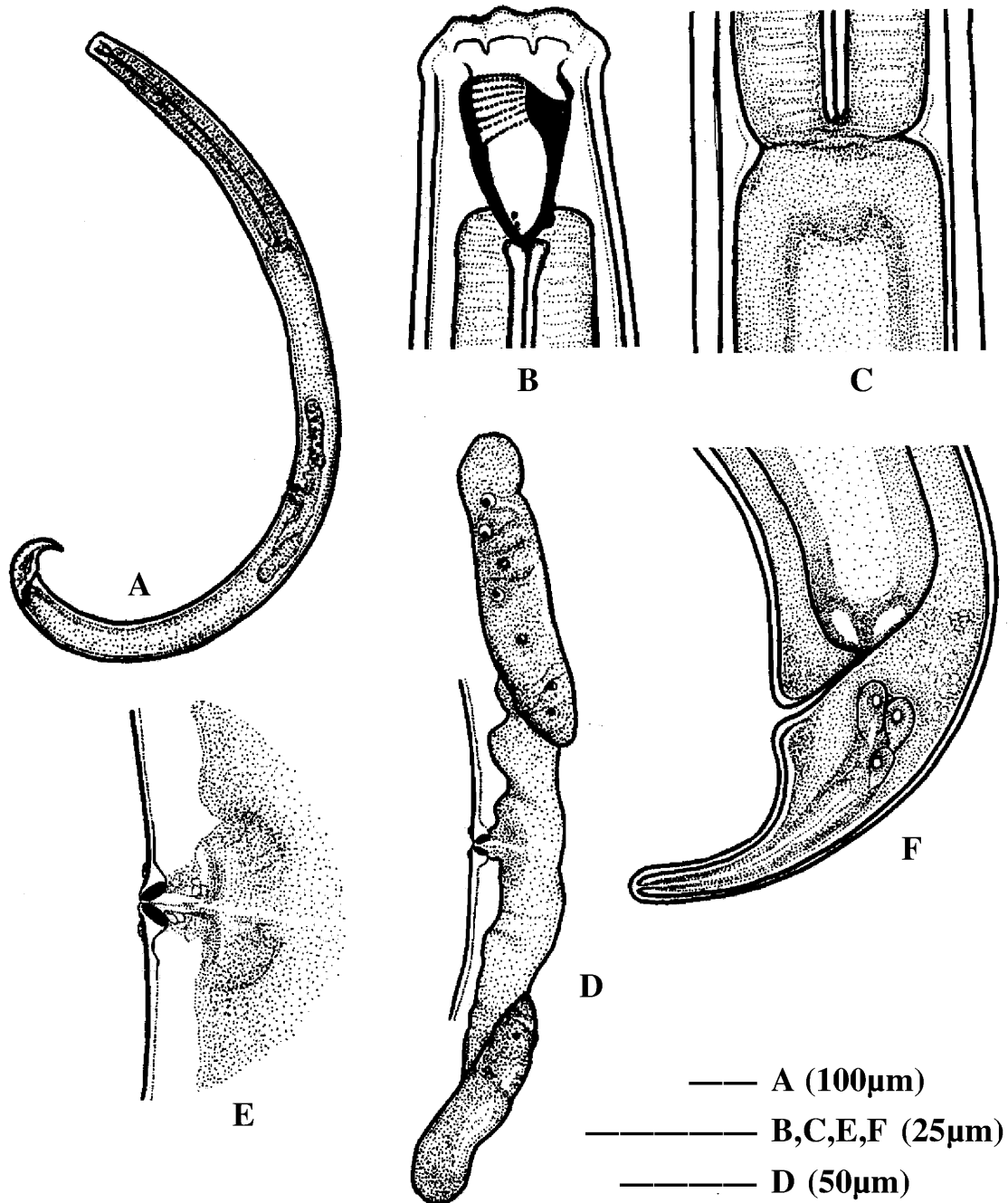


Figure 1 : Camera lucida drawing of female *Mylonchulus goutami* sp. n. A. Whole body; B. Head; C. Oesophago-intestine junction; D. Gonad; E. Vulval region; F. Tail.

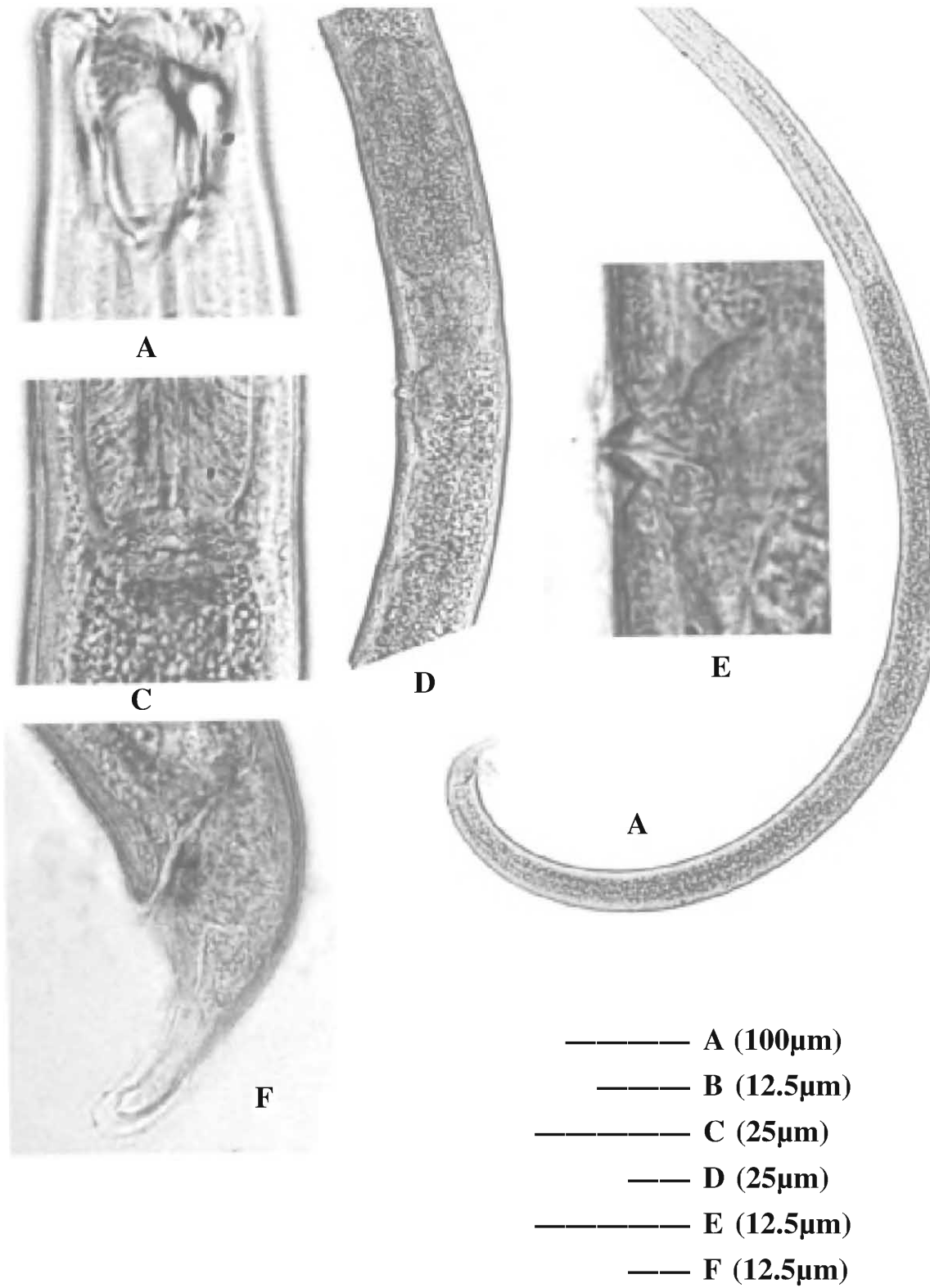


Figure 2 : Photomicrographs of female *Mylonchulus goutami* sp. n. A. Whole body; B. Head; C. Oesophago-intestine junction; D. Gonad; E. Vulval region; F. Tail.

diameter. Tail short, nearly one anal diameter in length, gradually tapering, digitate part sharply bent ventrad. Three caudal glands with terminal spinneret, tail terminus rounded.

Male : Not found.

Type habitat and locality : Specimens were collected during a survey at South 24-Parganas in May, 2005 from the rhizospheric soil of mango *Mangifera indica* L.

Type specimens : Slides containing holotype and paratypes have been deposited at National Zoological Collection of Zoological Survey of India, Kolkata, India, with following registration numbers: Holotype female-WN 982, paratype females-WN 983, WN 984 and WN 985.

Etymology : The name of the proposed new species is chosen after the name of a friend (Goutam Ghosh) of the first author.

Differential diagnosis and relationships : Body medium in length; buccal cavity heavily sclerotized, goblet- or funnel-shaped, strongly tapering at base; dorsal tooth large, claw- or dagger-shaped, located at the anterior part of the stoma and sharply pointed forward; each sub-ventral wall bears transverse rows of minute denticles opposite to the dorsal tooth; oesophago-intestinal junction nontuberculate.

This species closely resembles with *M. amurus* Khan and Jairajpuri, 1979, but bears significant differences in some important taxonomic characters. Lip region slightly set off from body in *M. goutami* sp. n., it bears 7-8 regular transverse rows of denticles (*vs* 5) at the front of large dorsal tooth. Paravulval papillae (one pre- and one post-) present at close apposition to either side of vulval pore. Anterior ovary is larger than the posterior one. Tail shape markedly different from that of *M. amurus*: in *M. goutami* sp. n., tail gradually tapering, sharply bent ventrad with digitate posterior part; tail terminus rounded.

It also differs from *M. hawaiiensis* (Cassidy, 1931) Goodey, 1951 in the higher value of 'c' (38.4-55.8 *vs* 17-30) and possessing 7-8 (*vs* 5-6) transverse rows of denticles.

2. *Mylonchulus istvani* sp. n.

(Fig. 3, 4; Table-2)

Measurements : Table-II.

Description : *Female* (4) : Body medium in length, almost arcuate, posterior end slightly curved, cuticle

thin; lip region set off from body; with a prominent constriction at head region. Buccal cavity mylonchuloid type, upper region wider than the lower and strongly tapering at the bottom; bears a large dorsal tooth, apex of which is at 3/4th of buccal cavity length from its base and directed forward; opposed by four transverse rows of denticles arranged parallelly. A small prominent indentation at the sub-ventral wall opposite to the dorsal tooth. Amphid aperture oval, situated at the base of the lip region. Oesophagus long, muscular; prominent oesophageal glands; oesophago-intestinal junction nontuberculate; distinct cone-shaped cardia. Excretory pore situated behind the nerve ring. Gonad monoprodelfic; ovary reflexed with oocytes arranged in a single row; sphincter absent in oviduct-uterus junction, *pars dilatata* distinct, uterus straight; *pars proximalis vaginae*, *pars refringens vaginae* and *pars distalis vaginae* prominent; distinct invagination at vulval pore. Tail measures about one anal diameter. Rectum length is less than one anal diameter. Tail tip blunt, not regularly rounded, rather, the terminal portion slightly projected or inclined ventrally. Caudal glands and terminal spinneret present.

Male : Not found.

Type Locality and Plant Association : The specimens were collected from soil samples associated with guava (*Psidium guajava* L.) tree, during July, 2005 from district South 24-Parganas (22°22.64' N, 88°25.7' E), West Bengal, India.

Type specimens : Slides containing holotype and paratypes have been deposited at the National Zoological Collection of Zoological Survey of India, Kolkata, India, with following registration numbers: Holotype female-WN954, paratype females-WN955, WN960.

Etymology : The name *Mylonchulus istvani* sp. n. has been chosen after the name of doyen nematologist, Professor István Andrásy, Institutum Zoosystematicum Universitatis, Budapest of Hungary.

Differential diagnosis and relationships : The present species is medium in length; buccal cavity heavily sclerotised, goblet- or funnel-shaped, strongly tapering at base; dorsal tooth large, claw- or dagger-shaped, located at the anterior part of stoma and

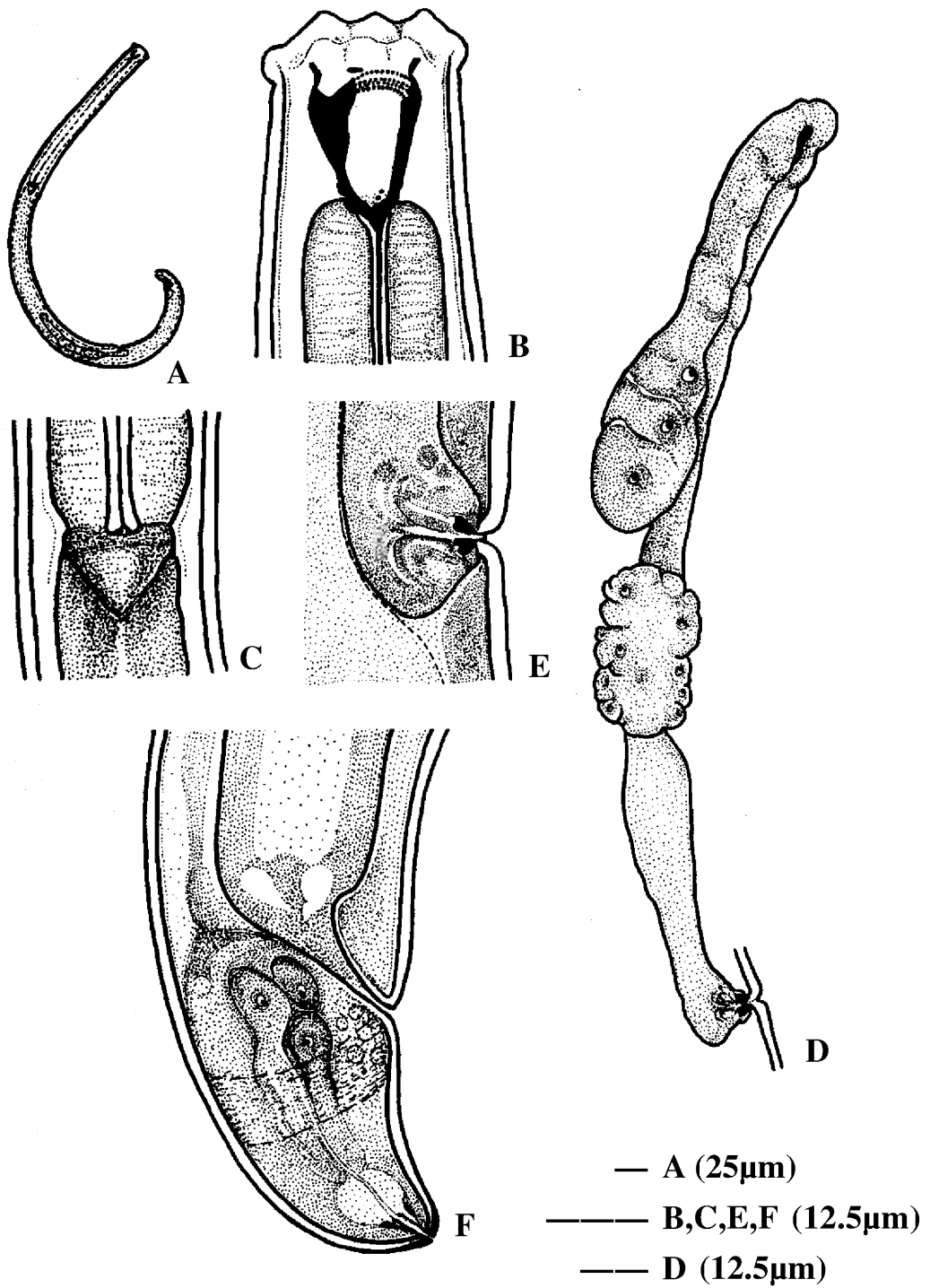


Figure 3 : Camera lucida drawing of female *Mylonchulus goutami* sp. n. A. Whole body; B. Head; C. Oesophago-intestine junction; D. Gonad; E. Vulval region; F. Tail.

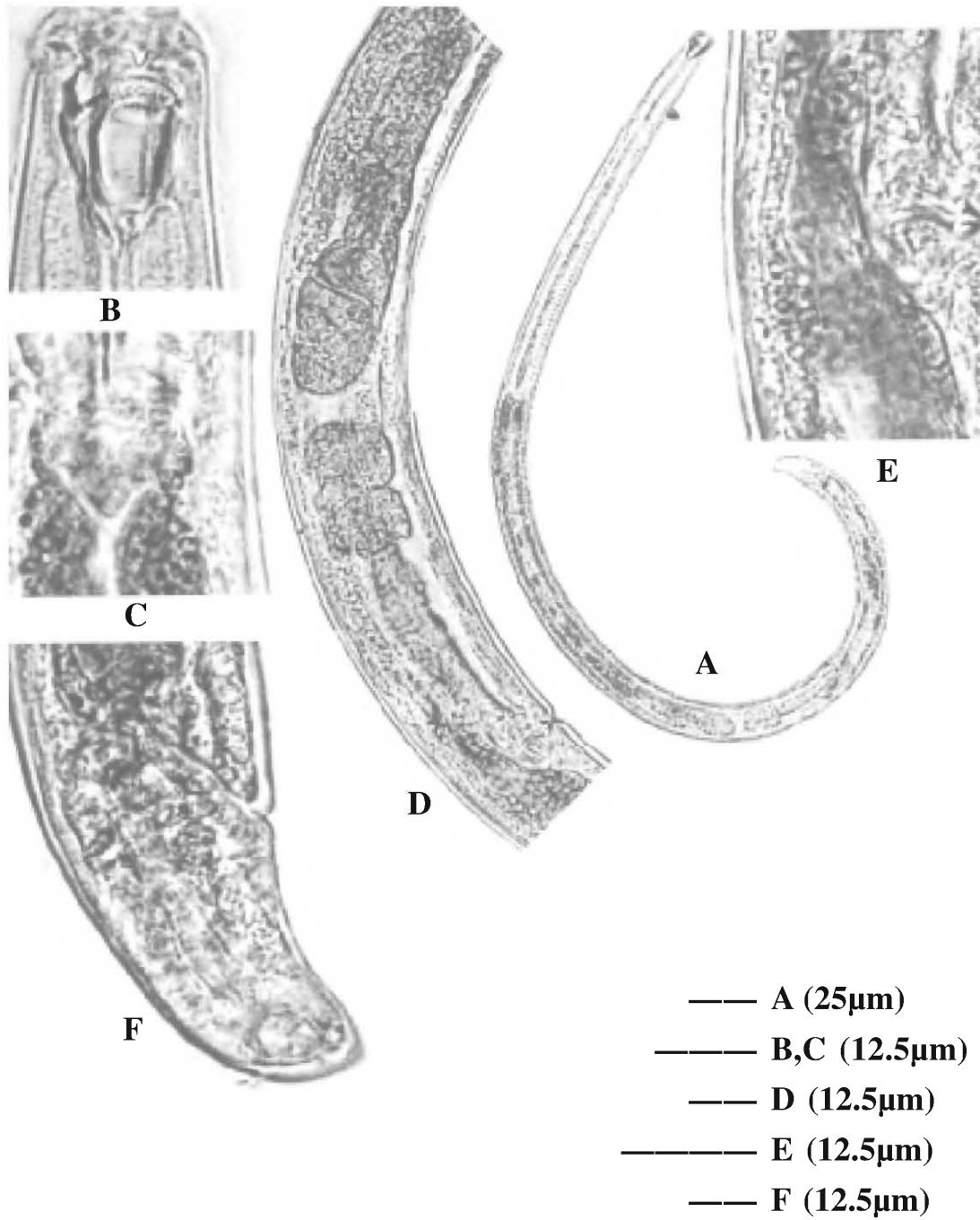


Figure 4 : Photomicrographs of female *Mylonchulus istvani* sp. n. A. Whole body; B. Head; C. Oesophago-intestine junction; D. Gonad; E. Vulval region; F. Tail.

sharply pointed forward; each sub-ventral wall bears transverse rows of minute denticles opposite to the dorsal tooth; oesophago-intestinal junction nontuberculate.

M. istvani sp. n. is comparable to those species of *Mylonchulus* that have single gonad. Among them, *M. silvaticus*, *M. longisacculus*, *M. californicus*, *M. noreasus* and *M. caespitosus* are much longer than the present one. Though, it closely resembles *M. andrassyi* Loof, 1992, *M. japonicus* Dhanachand, Romabati & Anandi, 1995, *M. paraindex* Ahmad, Baniyamuddin & Jairajpuri, 2005, *M. cassicus* Dhanachand, Romabati & Anandi, 1995, *M. orientalis* Andrassy, 1992, *M. Index* (Cobb, 1906) Cobb, 1917, *M. mulveyi* Jairajpuri, 1970 and *M. mashoodi* Khan & Jairajpuri, 1979 but possess some notable differences.

This species differs from *M. andrassyi* in shorter body length (0.7-0.84 mm vs 1.0-1.3 mm), tail shape (blunt tail tip vs 'S'-shaped) and a higher 'c' value (35.6-41.0 vs 19-29).

It also differs from *M. japonicus* in lower value of 'a' (29.7-32.4 vs 37-41), higher value of 'c' (vs 24-27) and smaller value of 'c'' (0.88-1.11 vs 1.6-1.7).

It differs also from *M. cassicus* and *M. paraindex* in shorter tail length (18.8-23.5 µm vs 61-66µm and 35-36 µm), higher value of 'c' (vs 15-16 and 20-28) and smaller value of 'c'' (vs 2.4-2.9 and 1.3-1.6).

M. istvani sp. n. shows significant difference with *M. orientalis* as the former bears much posteriorly located vulva (thus, 'V%'=79.6-81.2 vs 73) and terminal (vs subdorsal) caudal spinneret.

In addition this species differs from *M. index* in having lesser number of rows of rasp-like denticles (4 vs 5-6) and the higher value of 'c' (vs 21-26).

It also differs from *M. mulveyi* in different tail shapes (blunt tail tip vs tip of the tail strongly pointed) and from *M. mashoodi* in the higher values of 'c' (vs 20-33) and lower values of 'c'' (vs 1.5-2.1).

Key to the species of the genus *Mylonchulus*

1. Female genital organ prodelphic (posterior branch nearly as long as anterior but not possessing a functional ovary)..... 2

- Female genital organ amphidelphic with two functional ovaries 15
- 2. Postvulval uterine sac present, one to eight times as long as corresponding body width 3
- Postvulval uterine sac absent 10
- 3. Caudal glands reduced, spinneret absent; tail conoid, ventrally bent. ♀ : L = 1.5-1.6 mm; a = 28-30; b = 3.6-3.9; c = 41-47; V = 67-68%; c' = 1. ♂ : L = 1.3-1.4 mm; a = 28-30; b = 3.4-3.8; c = 45-49; PO = 12. (Kazakhstan) ...*silvaticus* Razzhivin, 1971
- Caudal glands well developed, spinneret present; tail digitate, somewhat dorsally bent 4
- 4. Body 2 mm long; postvulval uterine sac very long, about 8 body diameters. ♀ : L = 2.0 mm; a = 40-45; b = 3.5-3.7; c = 25; V = 72-74%; c' = 2.1-2.4. ♂ : L = 1.9-2.2 mm; a = 35-36; b = 3.4-3.8; c = 22-27; PO = 13. (Romania).....*longisacculus* (Popovici, 1990) Loof, 1992
- Body 1.5 mm or shorter; post-vulval uterine sac shorter, 1-4 body diameters 5
- 5. Tail S-shaped, dorsally concave with long posterior cylindrical part (this latter about one anal diameter long). ♀ : L = 1.0-1.3 mm; a = 26-39; b = 3.1-4.0; c = 19-29; V = 72-78%; c' = 1.8-2.2. ♂ : L = 1.0-1.3 mm; a = 27-36; b = 3.2-5.0; c = 20-27; PO = 7-10. (Austria, Hungary, Italy) *andrassyi* Loof, 1992
- Tail not S-shaped, never concave dorsally, shorter posterior portion cylindrical or digit shaped 6
- 6. Vulval lips sclerotized 7
- Vulval lips not sclerotized. ♀ : L = 1.1-1.5 mm; a = 30-47; b = 3.1-3.8; c = 32-47; V = 75-80%; c' = 1.4. ♂ : L = 1.1 mm; a = 35; b = 3.4; c = 26; PO = 9 (United States : California).....*californicus* Jairajpuri, 1970
- 7. Posterior uterine branch about 4 vulval body diameter long 8
- Posterior uterine branch very short, less than 1 vulval body diameter long 9
- 8. Buccal cavity larger (♀ : 23 x 12; ♂ : 23 x 11); male supplements 8. ♀ : L = 1.4 mm; a = 37; b = 3.4; c = 30; V = 79%; c' = 1.6. ♂ : L = 1.5 mm; a = 39; b = 3.5; c = 31; PO = 8. (India)*noreasus* (Rahman & Jairajpuri, 1988) Loof, 1992

- Buccal cavity smaller (♀ : 16-19 x 7-9; ♂ : 17 x 9).
♀ : L = 0.99-1.24 mm; a = 37-41; b = 3.1-3.5; c = 24-27; V = 76-78%; c' = 1.6-1.7. ♂ : L = 1.23 mm; a = 57; b = 3.5; c = 28; PO = 10. (India)
japanicus Dhanachand, Romabati & Anandi, 1995
- 9. Tail shorter (35-36 µm), anterior portion of tail bluntly conoid and the posterior portion digitate. ♀ : L = 0.71-1.01 mm; a = 29-31; b = 2.9-3.4; c = 20-28; V = 70-71%; c' = 1.3-1.6. ♂ : unknown. (Singapore)
paraindex Ahmad, Baniyamuddin & Jairajpuri, 2005
- Tail longer (♀ : 61-66 µm; ♂ : 74-80 µm), elongate conoid shaped and about half of the tail tapers towards tail tip. ♀ : L = 0.92-1.03 mm; a = 30-36; b = 3.1-3.4; c = 15-16; V = 69-85%; c' = 2.4-2.9. ♂ : L = 1.21-1.29 mm; a = 33-39; b = 3.2-3.6; c = 15.2-17.5; PO = 9. (India)
caasicus Dhanachand, Romabati & Anandi, 1995
- 10. Caudal glands inconspicuous, spinneret absent; body longer than 1.0 mm. ♀ : L = 1.2-1.4 mm; a = 27-36; b = 3.7-5.0; c = 31-33; V = 66-70%; c' = 2. ♂ : unknown. (Kazakhstan)
caespitosus Razzhivin, 1971
- Caudal glands and spinneret conspicuous; smaller species, 0.6-1.0 mm 11
- 11. Tail short, about one anal diameter long 12
- Tail always longer than one anal diameter 14
- 12. Caudal spinneret subdorsal. ♀ : L = 0.98 mm; a = 32; b = 3.1; c = 49; V = 73%; c' = 0.9. ♂ : unknown. (Vietnam)
orientalis Andrásy, 1992
- Caudal spinneret terminal. 13
- 13. Rasp-like denticles in 4 rows. ♀ : L = 0.7-0.84 mm; a = 29.65-32.36; b = 2.93-3.21; c = 35.6-41; V = 79.63-81.2%; c' = 0.88-1.11. ♂ : unknown. (India)
istvani n.sp.
- Rasp-like denticles in 5-6 rows. ♀ : L = 0.6-0.9 mm; a = 23-28; b = 2.9-3.4; c = 21-26; V = 70-77%; c' = 1-1.2. ♂ : unknown. (Austria, Czechoslovakia, Poland, Georgia, India, Thailand, Mauritius, El Salvador, Hawaii)
index (Cobb, 1906) Cobb, 1917
- 14. Sclerotized pieces in vulva elongate; tip of tail strongly narrowing, almost pointed. ♀ : L = 0.7-1.0 mm; a = 21-37; b = 3.0-3.4; c = 17-24; V = 74-78%; c' = 2-2.2. ♂ : L = 0.9 mm; a = 26; b = 2.9; c = 22; PO = 8. (India, El Salvador, St. Lucia)
mulveyi Jairajpuri, 1970
- Sclerotized pieces in vulva dot-like; tip of tail rounded. ♀ : L = 0.8-1.1 mm; a = 24-39; b = 2.8-4.0; c = 20-33; V = 68-76%; c' = 1.5-2.1. ♂ : unknown. (India, New Caledonia)
mashoodi Khan & Jairajpuri, 1979
- 15. Tail broadly rounded, hemispheroid 16
- Tail of other shape, not hemispheroid 18
- 16. Spinneret absent. ♀ : L = 1.4 mm; a = 27-34; b = 3.4; c = 41-62; V = 61-69%; c' = 0.7. ♂ : L = 1.4 mm; a = 38; b = 3.3; c = 36; PO = 11. (United States: Oregon)
oregonensis (Jensen & Mulvey, 1968) Andrásy, 1992
- Spinneret present 17
- 17. Spinneret subdorsal, tail bulbiferous, distinctly shorter than anal body diameter. ♀ : L = 1.2-1.4 m; a = 32-34; b = 3.0-3.4; c = 61-69; V=69-71%; c' = 0.6. ♂ : unknown. (United States : Oregon)
bulbiferous Jensen & Mulvey, 1968
- Spinneret subventral, tail not bulbiferous, as long as or longer than anal body diameter. ♀ : L = 1.4-1.5 mm; a = 24-34; b = 3.4-4.2; c = 34-55; V = 62-68%; c' = 1.1-1.5. ♂ : L = 1.4-1.9 mm; a = 30-34; b = 3.6-4.2; c = 45-50; PO = 14-16. (Holland, Germany, Sweden, Italy, Estonia, Canada)
rotundicaudatus (Skwarra, 1921) Schneider, 1939
- 18. Caudal glands reduced, terminal opening absent 19
- Caudal glands and terminal opening present 23
- 19. Tail arched, uniformly tapering 20
- Tail nearly straight, subdigitate or digitate 21
- 20. Female tail short, as long as anal diameter; spicula hardly bent. ♀ : L = 0.9-1.3 mm; a = 27-35; b = 3-4; c = 30-46; V = 63-70%; c' = 0.8-1.0. ♂ : L = 0.9-1.3 mm; a = 36-40; b = 4.0-4.4; c = 37-42; PO = 10-11. (France, India, United States : Oregon, Brazil)
subsimilis Cobb, 1917
- Female tail distinctly longer than one anal diameter; spicules arched. ♀ : L = 1.0-1.3 mm; a = 19-30; b = 3.3-4.6; c = 21-29; V = 54-69%; c' = 1.3-1.7. ♂ : L = 1.0-1.3 mm; a = 22-30; b = 3.3-4.0; c = 20-27; PO = 10-11. (New Zealand) ..
psammophilus Yeates, 1967

- 21. Subventral teeth present; body length near 1.5 mm.
 - ♀ : L = 1.4 mm; a = 25; b = 3.8; c = 35; V = 68%; c' = 1.3. ♂ : unknown. (Poland, Uzbekistan, Canada) *solus* Mulvey, 1961
- Subventral teeth absent; body length near 1 mm 22
- 22. Transverse denticles in 4 rows; tail as long as 2-3 anal diameters, its tip fine, almost pointed; supplements 7. ♀ : L = 0.8 mm (juv.); a = 31; b = 4.0; c = 11; c' = 3. ♂ : L = 0.8 mm; a = 32; b = 3.9; c = 19 : PO = 7. (Congo Republic) *insolitus* Andrásy, 1968
- Transverse denticles in 6 rows; tail about as long as one anal diameter; supplements 10. ♀ : L = 1.1 mm; a = 25; b = 3.0; c = 37; V = 74%; c' = 1-1.2. ♂ : L = 1.1 mm; a = 28; b = 3.2; c = 32; PO = 10. (United States : Oregon) *exacutus* Jensen & Mulvey, 1968
- 23. Spinneret subdorsal, i.e. situated on the dorsal side of tail tip 24
- Spinneret terminal, at the centre of tail tip 39
- 24. Female tail as long as two anal diameters 25
- Female tail as long as one and a half anal diameters or shorter 26
- 25. Denticles arranged in 4 transverse rows; ♀ : L = 0.8-1.0 mm; a = 27-40; b = 3.0-4.4; c = 25-30; V = 52-57%; c' = 2. ♂ : unknown. (India) *neocontractus* Patil & Khan, 1982
- Denticles arranged in 5 transverse rows or more 65
- 26. Advulval papillae present 27
- Advulval papillae absent 29
- 27. Body comparatively wider, a = 23. ♀ : L = 1.4 mm; a = 23; b = 3.6; c = 30; V = 62%; c' = 1.1. ♂ : unknown. (United States : Massachusetts) .. *vulvapapillatus* Altherr in Altherr & Delamare Deboutteville, 1972
- Body comparatively thinner, a = 26-37 28
- 28. Buccal cavity with 9 transverse rows of denticles; anterior anal-lip never swollen. ♀ : L = 1.5-1.85 mm; a = 26.94-36.5; b = 3.53-3.79; c = 35.23-46.07; V = 60.95-67.32%; c' = 0.72-1.38. ♂ : unknown. (India) *wasimi* Jana, Chatterjee & Manna, 2008
- Buccal cavity with 5-6 transverse rows of denticles; anterior anal-lip strongly swollen in many cases. ♀ : L = 1.25-1.9 mm; a = 28-33; b = 3.5-4.0; c = 37-49; V = 61-66%; c' = 0.9-1.2. ♂ : L = 1.71-1.83 mm; a = 37-40; b = 3.7-4.2; c = 28-30; PO = 10-11 (Netherlands) *inflatus* Loof, 1993
- 29. Tip of tail dorsally bent; subventral teeth absent. ♀ : L = 1.1-1.2 mm; a = 24-26; b = 3.0-3.2; c = 34-35; V = 63-64%; c' = 1-1.2. ♂ : unknown (Hawaii) *oceanicus* Andrásy, 1986
- Tip of tail not bent dorsally; subventral teeth mostly present 30
- 30. Buccal cavity more or less 30 µm long; body length about 1.5 mm 31
- Buccal cavity more or less 20 µm long, body length less than 1.5 mm 32
- 31. Tail shorter, thus, c = 40-58 & c' = 0.8-1.0. ♀ : L = 1.4-1.7 mm; a = 24-30; b = 2.9-3.2; c = 41-58; V = 63-69%; c' = 0.8-1. ♂ : L = 1.4-1.7 mm; a = 26-32; b = 2.9-3.2; c = 40-42; PO : 14-15. (Great Britain, Poland, Switzerland, Hungary, Italy, Russia, Georgia, India, Korea, Egypt, Nigeria, Canada, United States, St. Lucia) *brevicaudatus* Cobb, 1917
- Tail longer, thus, c = 25.2-27.8 & c' = 1.7-1.84. ♀ : L = 1.24-1.48 mm; a = 30-33; b = 3.5-4.0; c = 25.2-27.8; V = 59-60%; c' = 1.7-1.84. (Cameroon) *vulvalatus* Ahmad, 2000
- 32. Body very small, 0.6 mm; buccal cavity unusually broad, barrel-shaped. ♀ : L = 0.60-0.64 mm; a = 18-20; b = 3.0-3.1; c = 35-39; V = 61-62%; c' = 1. ♂ : unknown. (Vietnam) *doliolarius* Andrásy, 1992
- Body longer, near 1 mm; buccal cavity never so broad, strongly tapering toward base 33
- 33. Subventral teeth present, distinct 34
- Subventral teeth absent 38
- 34. Tail shorter, less than 50 µm 35
- Tail longer, 56 µm. ♀ : L = 1.88 mm; a = 49; b = 3.8; c = 40; V = 62.5%; c' = 2. (India) *sagarensis* Sinha, Baqri & Choudhury, 1989
- 35. Tail 35-45 µm long. ♀ : L = 0.9-1.4 mm; a = 20-35; b = 3.1-4.0; c = 25-40; V = 55-64%; c' = 1.2-1.5. ♂ : L = 1.0-1.4 mm; a = 27-32; b = 3.3-3.5; c = 27-36; PO : 8-12. (Holland, Belgium, Germany, Denmark,

- Great Britain, Sweden, Norway, Faeroer Islands, Greenland, Poland, Switzerland, Austria, Czechoslovakia, Hungary, Romania, Yugoslavia, Bulgaria, Spain, France, Italy, Moldavia, Estonia, Lithuania, Russia, Georgia, Iran, India, Korea, Krakatau Island, Egypt, Nigeria, Uganda, South Africa, Mauritius, United States, Mexico, Surinam, Venezuela, Argentina)
 *brachyuris* (Bütschli, 1873) Cobb, 1917
- Tail 15-25 μm long 36
- 36 Intestine characteristically narrowed at the genital region. ♀ : L = 0.5-1.1 mm; a = 19-35; b = 2.4-3.5; c = 30-45; V = 52-65%; c' = 1-1.2. ♂ : L = 1.0 mm; a = 33; b = 3.3; c = 28; PO : 9. (India, Dominika) ...
 *contractus* Jairajpuri, 1970
- Intestine not narrowed strikingly at the genital region 37
37. Tip of tail oblique; body 1.2-1.4 mm. ♀ : L = 1.2-1.4 mm; a = 24-34; b = 3.2-3.5; c = 50; V = 63-67%; c' = 0.8-1. ♂ : unknown. (Germany, Japan)
 *obliquus* Cobb, 1917
- Tip of tail rounded, not oblique; body 0.8-1.2 mm. ♀ : L = 0.8-1.2 mm; a = 24-30; b = 3.2-3.5; c = 40-46; V = 62-64%; c' = 1. ♂ : L = 0.9 mm; a = 25; b = 3.4; c = 40; PO : 12. (India, Pakistan, Kenya)
 *nainitalensis* Jairajpuri, 1970
38. Intestine lying dorsal to female gonads; buccal cavity 15 μm long. ♀ : L = 1.0-1.1 mm; a = 30-31; b = 3.3-3.4; c = 24-27; V = 56-58%; c' = 1.4-1.7. ♂ : unknown. (New Caledonia) ... *ananasi* Yeates, 1992
- Intestine overlapping the female gonads; buccal cavity 20 μm long. ♀ : L = 1.1-1.3 mm; a = 25-32; b = 3.3-3.8; c = 22-26; V = 59-63%; c' = 1.5. ♂ : unknown. (New Zealand) *ubis* Clark, 1961
39. Tail sigmoid: sharply bent ventrad with digitate posterior part inclining slightly dorsad and making the dorsal contour somewhat concave 40
- Tail not so, either more or less arcuate or, if subdigitate, showing no concave dorsal contour, or not sharply bent ventrad 44
40. Tail 55-80 μm , 2.0-2.5 times as long as anal body width; labial region distinctly wider than adjacent body. ♀ : L = 1.6-2.6 mm; a = 28-50; b = 3.7-4.4; c = 22-38; V = 62-66%; c' = 2-2.5. ♂ : L = 1.9-2.9 mm; a = 45-57; b = 3.9-4.6; c = 20-38; PO : 12-14. (Belgium, Romania, United States [California, Oregon], Mexico)
 *signaturellus* Mulvey, 1961
- Tail 25-50 μm , 0.8-1.5 times as long as anal body width; labial region not or slightly wider than adjacent body 41
41. Body longer than 1.5 mm (1.6-2 mm); spicula about 60 μm long. ♀ : L = 1.6-2.0 mm; a = 30-37; b = 3.2-3.6; c = 38-69; V = 61-71%; c' = 1. ♂ : L = 1.6-2.0 mm; a = 31-45; b = 3.4-3.8; c = 30-42; PO : 10-12. (France) *agilis* Doucet, 1980
- Body shorter, 1.0-1.5 mm; spicula-if male known-about 50 μm long 42
42. Posterior finger-like portion of tail straight. ♀ : L = 1.3-1.4 mm; a = 28-33; b = 3.3-3.6; c = 32-41; V = 63-67%; c' = 1.2-1.4. ♂ : unknown. (New Caledonia) ..
 *paitensis* Yeates, 1992
- Posterior finger-like portion of tail slightly but perceptibly bent dorsad 43
43. Rasp-like denticles numerous (about in 10-15 irregular rows arranged). ♀ : L = 1.0-1.5 mm; a = 36-37; b = 3.0-3.5; c = 30-35; V = 61-65%; c' = 1.5. ♂ : unknown. (India) *dentatus* Jairajpuri, 1970
- Rasp-like denticles less numerous (in 7-8 rows arranged). ♀ : L = 1.0-1.6 mm; a = 23-35; b = 3.3-3.6; c = 35-50; V = 62-68%; c' = 0.8-1. ♂ : L = 1.1-1.7 mm; a = 30-50; b = 3.4-3.9; c = 30-40; PO : 11. (Holland, Germany, Poland, Czechoslovakia, Hungary, Spain, France, Italy, Switzerland, Lithuania, Russia, Uzbekistan, Iran, India, Pakistan, Korea, Egypt, Nigeria, Mauritius, South Africa, Canada, United States, Mexico, Venezuela, Argentina, Brazil, Columbia, Hawaii, Australia, New Zealand)
 *sigmaturus* Cobb, 1917
44. Tail as long as 2-4 anal diameters 45
- Tail shorter than 2 anal diameters 49
45. Small species, 0.8-1.3 mm 46
- Larger species, to 2.5 mm 47
46. Tail thrice as long as anal diameter, more or less right-angled. ♀ : L = 1.3 mm; a = 30; b = 3.5; c = 26; V = 66%; c' = 3. ♂ : L = 0.8 mm; a = 32; b = 3.4; c = 21; PO : 10. (Yugoslavia, Czechoslovakia?, El Salvador) *cavensis* Schneider, 1940

- Tail about twice as long as anal diameter, arcuate.
♀ : L = 1.0-1.1 mm; a = 35-38; b = 5.5; c = 23; V = 53-55%; c' = 2.1-2.3. ♂ : unknown. (Pakistan).....
..... *rosensis* Khan, 1975
- 47. Subventral denticles densely arranged, about in 10 irregular rows; buccal cavity 20-23 µm long. ♀ : L = 1.3-1.6 mm; a = 34-33; b = 3.5-4.0; c = 25-34; V = 59-65%; c' = 2.5. ♂ : unknown. (India, Korea)
..... *apapillatus* Khan & Jairajpuri, 1979
- Subventral denticles not so dense, in 5-7 rows; buccal cavity 30-35 µm long 48
- 48. Tail 60 µm long, anterior anal lip massive, overhanging. ♀ : L = 1.9 mm; a = 43; b = 3.8; c = 33; V = 72%; c' = 2.5. ♂ : L = 1.8 mm; a = 45; b = 4.0; c = 33; PO : 14. (Holland, United States: Virginia) .
..... *subtenuis* Cobb, 1917
- Tail 80-120 µm long, anterior anal lip normal, not overhanging. ♀ : L = 1.6-2.5 mm; a = 28-38; b = 3.2-3.7; c = 16-32; V = 56-67%; c' = 2-4. ♂ : L = 1.5-1.8 mm; a = 27-32; b = 3.1-3.3; c = 18-21; PO : 13—14. (Poland, Hungary, Thailand, Egypt, South Africa, Canada, United States [Utah, Washington])
..... *polonicus* (Stefanski, 1915) Cobb, 1917
- 49. Subventral teeth absent. ♀ : L = 0.8-1.2 mm; a = 20-34; b = 2.8-3.4; c = 25-42; V = 58-66%; c' = 1—1.5. ♂ : L = 0.8 mm; a = 25; b = 3.0; c = 42; PO : 13. (India, Pakistan) ... *amurus* Khan & Jairajpuri, 1979
- Subventral teeth present 50
- 50. Buccal cavity (the sclerotized capsule) 35-55 µm long; body length 2 mm or so 51
- Buccal cavity 15-30 µm long; body length 1.5 mm or less 55
- 51. Subventral teeth nearly basal, posterior refractive ring unusually strong. ♀ : unknown. ♂ : L = 2.2 mm; a = 44; b = 3.9; c = 42; PO : 10. (Australia)
..... *prodenticulatus* Mulvey, 1961
- Subventral teeth more forward, posterior refractive ring weak 52
- 52. Tail slightly bent ventrally, conspicuously longer than anal diameter. ♀ : L = 1.8-1.9 mm; a = 21-30; b = 3.6; c = 21-34; V = 66-67%; c' = 1.3-1.5. ♂ : unknown. (Paraguay, New Guinea)
..... *obtusicaudatus* (Daday, 1899) Cobb, 1916
- Tail sharply bent ventrally, as long as, or shorter than anal diameter 53
- 53. Posterior digitate part of tail conoid, distinctly narrowing to its terminus. ♀ : L = 1.4-2.3 mm; a = 25-31; b = 2.8-3.8; c = 37-47; V = 63-68%; c' = 0.8-1.1. ♂ : L = 1.9-2.5 mm; a = 37-44; b = 3.1-3.7; c = 35-44; PO : 14-15. (Poland, France, Russia, India, Korea, Thailand, Mauritius, South Africa, Canada, United States, El Salvador, Jamaica, Brazil)
..... *incurvus* Cobb, 1917
- Posterior digitate part of tail cylindroid, broadly rounded on its terminus 54
- 54. Advulval papillae present; body nearly 2 mm long. ♀ : L = 1.8 mm; a = 29; b = 3.3; c = 50; V = 63%; c' = 1. ♂ : L = 1.7-1.9 mm; a = 32-34; b = 3.4-3.7; c = 45-51; PO : 14-15. (Mongolia)
..... *kaszabi* Andrassy, 1967
- Advulval papillae absent; body 2.5-3 mm long. ♀ : L = 2.4-2.8 mm; a = 22-35; b = 3.5-3.6; c = 30-36; V = 64-69%; c' = 0.8-1.2. ♂ : unknown. (Germany, Sweden) *longus* Altherr, 1972
- 55. Tail always longer than anal body diameter 56
- Tail as long as anal body diameter or shorter 60
- 56. Tail arcuate, cylindrical in almost entire length. ♀ : L = 1.1-1.6 mm; a = 25-40; b = 3.3-4.3; c = 20-32; V = 55-66%; c' = 1.5-2. ♂ : L = 1.1 mm; a = 34; b = 3.4; c = 27; PO : 9 + 2. (Georgia, India, Japan, Thailand, Java, Sumatra, Niger, Mauritius, Zaire, South Africa, Canada, United States, Mexico, Panama, Venezuela, Australia)
..... *lacustris* (Cobb in Cobb, 1915) Cobb, 1917
- Tail sharply (suddenly) bent ventrad, consisting of an anterior wider and a posterior slenderer, digitate-subdigitate part 57
- 57. Rasp-like denticles in 4 rows. ♀ : L = 0.9-1.3 mm; a = 25-31; b = 3.2-3.6; c = 24-29; V = 56-58%; c' = 1.3-1.8. ♂ : unknown. (New Caledonia)
..... *vasis* Yeates, 1992
- Rasp-like denticles in 6-8 rows 58
- 58. Advulval papillae present. ♀ : L = 0.97-1.24 mm; a = 29.91-36.29; b = 3.39-4.62; c = 38.36-55.76; V = 42.91-69.67%; c' = 1.35-1.56. (India) *goutami* n.sp.
- Advulval papillae absent 59

59. Sphincter present at oviduct-uterus junction; male supplements 6. ♀ : L = 0.7-1.0 mm; a = 21-26; b = 3.2-4.0; c = 22-26; V = 54-57%; c' = 1.5. ♂ : L = 0.9 mm; a = 25; b = 3.4; c = 23; PO : 6. (India)
..... *brassicus* Soni & Nama, 1980
- Sphincter present at oviduct-uterus junction; male supplements 10-12. ♀ : L = 0.7-1.3 mm; a = 20-30; b = 2.9-4.0; c = 17-30; V = 55-70%; c' = 1.5-1.8. ♂ : L = 0.9-1.0 mm; a = 25-39; b = 2.3-3.1; c = 35-44; PO : 10-12. (India, Egypt, Niger, Kenya, South Africa, El Salvador, Argentina, Hawaii)
..... *hawaiiensis* (Cassidy, 1931) Andrásy, 1958
60. Tail obtuse with bluntly rounded tip 61
- Tail conoid with narrowly rounded tip. 62
61. Spinneret rather indistinct; supplements 12. ♀ : L : 1-1.6 mm; a = 22-36; b = 3.4-4.0; c = 40-71; V = 63-66%; c' = 0.8-1. ♂ : L = 1.1 mm; a = 34; b = 3.5; c = 34; PO : 12. (Holland, Russia, Canada, United States [Oregon, Utah], New Zealand)
..... *striatus* (Thorne, 1924) Schneider, 1939
- Spinneret well developed; supplements 15. ♀ : L = .0-1.5 mm; a = 24-30; b = 3.1-3.5; c = 39-46; V = 60-65%; c' = 1. ♂ : L = 1.1-1.6 mm; a = 33-42; b = 3.5-3.9; c = 44; PO : 15. (Hungary, India, United States : Oregon) *orbitus* Jensen & Mulvey, 1968
62. Tail 30 mm or shorter. ♀ : L = 1.0-1.2 mm; a = 22-26; b = 3.1-3.2; c = 36-41; V = 58-62; c' = 0.8-1. ♂ : unknown. (Nigeria, Singapore)
..... *curvicaudatus* Mulvey & Jensen 1967
- Tail 40-50 mm long 63
63. Tip of tail conoid-pointed. ♀ : L = 1.2-1.4 mm; a = 30-34; b = 3.3-4.1; c = 39-44; V = 62-67%; c' = 1. ♂ : L = 1.3-1.5 mm; a = 35-40; b = 3.4-4.0; c = 30-43; PO : 13. (South Africa) *cereris* Coetzee, 1967
- Tip of tail cylindroid 64
64. Buccal cavity nearly parallel-walled, hardly tapering to its base. ♀ : L = 1.4-1.5 mm; a = 29-31; b = 3.4-3.6; c = 30-32; V = 63-64%; c' = 1. ♂ : L = 1.9 mm; a = 49; b = 4.0; c = 41; PO : 12. (Russia [Far East], Uzbekistan, New Zealand) ... *arenicola* Clark, 1961
- Buccal cavity funnel-shaped, strongly tapering to its base. ♀ : L = 1.0-1.1 mm; a = 29-30; b = 3.5-3.8; c = 30-40; V = 60%; c' = 1. ♂ : unknown. (Fiji, Java, Panama) *minor* (Cobb, 1893) Cobb, 1916
65. Body less than 1mm long. ♀ : L = 0.88-0.99 mm; a = 28-31; b = 3.2-3.4; c = 24-29; V = 55-58%; c' = 2 (Western Malaysia) *williamsi* Loof, 2006
- Body about 1.5 mm. ♀ : L = 1.3-1.5 mm; a = 29-30; b = 3.7-3.8; c = 24-25; V = 61-62%; c' = 2. ♂ : L = 1.6 mm; a = 33; b = 3.8; c = 25; PO = 10-14 + 10. (Poland, Uzbekistan, United States : Utah)
... *parabrachyurus* (Thorne, 1924) Schneider, 1939
- Note :** Due to lack of literature *M. politus* (Susulovsky, 2000) and *M. sarmimi* (Azmi, 1990) are not included in the present species key to the genus *Mylonchulus*.

SUMMARY

Mylonchulus goutami sp. n., and *Mylonchulus istvani* sp. n., the two new mononchid species have been described from West Bengal, India. *M. goutami* sp. n. is characterized by medium-lengthed curved body (L = 0.97-1.24 mm); a large dorsal tooth and 7-8 regular transverse rows of denticles at the front of dorsal tooth in buccal cavity but no sub-ventral tooth; non-tuberculate oesophago-intestinal junction with simple cardia; didelphic-amphidelphic genital system with longer anterior ovary; vagina with three distinct parts. Tail short, blunt, about one anal diameter long, gradually tapering, digitate and ventrally curved; caudal glands three in number and spinneret opening terminal. It is characterized by small curved body (L = 0.7-0.84 mm); a large dorsal tooth and four regular transverse rows of denticles present at the front of dorsal tooth in buccal cavity but no sub-ventral tooth; non-tuberculate oesophago-intestinal junction with a distinct cone shaped cardia; monoprodelphic genital system without any posterior branch; vagina with three distinct parts. Tail short, blunt, about one anal diameter long; caudal glands three in number and spinneret opening terminal. *Mylonchulus istvani* sp. n. is distinguishable from its closely related species by the following combinations of characters: body length, number of transverse rows of denticles, shape of cardia, monoprodelphic genital system and the tail shape.

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Table-I : Morphometric data of female *Mylonchulus goutami* sp. n. (all measurements are in μm , except L, in mm)

	Holotype (♀)	Paratype (5) ranges		Mean	SD (±)	SE (±)
		Min.	Min.			
L	0.97	0.97	1.24	1.05	0.10	0.04
a	31.67	29.91	36.29	31.97	2.21	0.90
b	3.76	3.39	4.62	3.90	0.41	0.17
c	39.5	38.36	55.76	43.23	7.13	2.91
c'	1.45	1.35	1.56	1.49	0.084	0.033
V	64.13	42.91	69.67	62.15	9.91	4.05
G ₁	11.9	11.80	15.38	13.03	1.82	0.74
G ₂	8.61	8.61	13.46	11.06	2.00	0.81
Cuticle thickness at head region	1.23	1.00	1.23	1.15	0.10	0.04
Cuticle thickness at mid-body	1.3	1.10	1.30	1.23	0.07	0.03
Cuticle thickness at tail region	1.3	1.23	1.30	1.28	0.04	0.01
Lip height	4.9	2.45	4.90	3.68	1.10	0.45
Lip diameter	20.19	19.60	20.36	20.05	0.36	0.15
Mid-body diameter	30.56	30.56	35.30	32.85	1.94	0.79
Anal diameter	24.02	21.56	25.66	24.02	1.56	0.64
Length of buccal cavity	20.15	19.60	22.05	20.81	1.04	0.42
Diameter of buccal cavity	11.13	11.13	12.25	11.85	0.56	0.23
Position of dorsal tooth from the base of buccal cavity	15.93	14.70	15.93	15.73	0.50	0.20
% of dorsal tooth of total buccal cavity length	79.06	72.24	79.06	75.68	3.09	1.26
Position of amphid from the anterior end	6.3	6.13	7.37	6.47	0.47	0.19
Diameter of amphidial aperture	2.2	2.10	2.40	2.22	0.12	0.05
Position of excretory pore from anterior end	93.1	93.10	102.90	98.60	4.89	2.00
Length of oesophagus	289.1	262.15	311.15	280.52	19.40	7.92
Length of cardia	12.14	12.13	12.25	12.17	0.06	0.02
Diameter of cardia	22.3	17.15	22.32	21.20	2.02	0.82
Position of nerve ring from anterior end	85.75	83.30	85.75	85.34	1.00	0.41
D	30.76	26.05	30.76	28.29	2.21	0.90
AS1	15.33	12.82	16.73	15.20	1.50	0.61
AS2	17.33	17.33	21.03	19.50	1.74	0.71
PS1	31.56	31.56	43.59	34.88	4.72	1.93
PS2	36.38	36.38	44.87	40.58	3.46	1.41
Glandularium	187.65	177.66	191.10	183.90	5.71	2.33
Anterior gonad	115.15	115.15	159.00	136.71	20.82	8.50
Uterus	31.85	17.15	31.85	25.32	5.73	2.34
Oviduct	41.65	41.65	73.50	61.25	15.42	6.29
Ovary	41.65	41.65	61.25	50.22	9.77	3.99
Posterior gonad	83.3	83.30	149.45	117.19	28.34	11.57
Uterus	24.5	9.80	26.95	22.46	6.28	2.56
Oviduct	29.4	29.40	73.50	50.63	19.76	8.07
Ovary	29.4	29.40	58.80	44.10	12.00	4.90
Vulval Length	620.6	534.10	720.30	645.83	70.74	28.88
Total length of vagina	15.79	15.79	16.20	15.93	0.17	0.07
<i>Pars proximalis vagina</i>	12.51	12.51	13.35	12.80	0.31	0.13
<i>Pars refringens vagina</i>	2.88	2.55	2.88	2.71	0.14	0.06
<i>Pars distalis vagina</i>	0.4	0.30	0.50	0.42	0.08	0.03
cw	4.6	4.20	4.60	4.46	0.20	0.08
Rectum length	16.78	16.33	16.78	16.54	0.21	0.08
Tail length	24.5	22.05	26.95	24.55	2.13	0.87
% of tail of total body length	2.5	1.80	2.60	2.33	0.34	0.14

Table-II : Morphometric data of female *Mylonchulus istvani* sp. n. (all measurements are in μm , except L, in mm)

	Holotype (♀)	Paratype (3) ranges		Mean	SD (±)	SE (±)
		Min.	Min.			
L	0.8	0.70	0.84	0.8	0.06	0.03
a	32.4	29.65	32.36	30.6	1.24	0.62
b	3.2	2.93	3.21	3.1	0.12	0.06
c	35.6	35.60	41.00	38.2	2.27	1.13
c'	1.1	0.88	1.11	0.9	0.11	0.06
V	80.3	79.63	81.20	80.5	0.67	0.34
G ₁	35.2	30.69	36.54	33.7	2.62	1.31
Cuticle thickness at lip region	2.4	2.33	2.44	2.4	0.05	0.02
Cuticle thickness at mid-body	2.4	2.23	2.40	2.3	0.07	0.04
Cuticle thickness at tail region	2.2	2.00	2.22	2.1	0.10	0.05
Lip height	4.3	3.50	4.30	3.9	0.40	0.20
Lip diameter	16.5	15.50	16.45	16.1	0.45	0.23
Mid-body diameter	25.9	24.75	25.85	25.4	0.55	0.27
Anal diameter	21.2	21.15	22.35	21.7	0.68	0.34
Length of buccal cavity	18.9	18.80	19.45	19.0	0.31	0.16
Diameter of buccal cavity	9.5	9.40	10.40	9.9	0.53	0.26
Position of dorsal tooth from the base of buccal cavity	14.0	13.89	14.10	14.0	0.10	0.05
% of dorsal tooth of total buccal cavity length	75.0	75.00	77.40	76.0	1.19	0.60
Position of amphid from the anterior end	7.7	7.12	7.74	7.5	0.30	0.15
Diameter of amphidial aperture	2.0	1.94	2.10	2.0	0.09	0.05
Position of excretory pore from anterior end	87.0	85.32	88.70	87.0	1.38	0.69
Length of oesophagus	265.6	260.2	270.3	264.8	4.27	2.13
Length of cardia	13.5	12.55	13.80	13.1	0.64	0.32
Diameter of cardia	15.4	15.12	16.30	15.7	0.54	0.27
Position of nerve ring from anterior end	82.3	80.35	82.25	81.7	0.91	0.46
D	28.2	25.00	29.63	27.5	1.95	0.97
AS1	19.4	19.42	22.68	21.5	1.48	0.74
AS2	22.0	22.04	23.76	22.9	0.80	0.40
PS1	39.4	37.69	41.04	39.6	1.42	0.71
PS2	41.0	40.40	42.98	41.5	1.12	0.56
Glandularium	190.6	185.2	190.6	187.9	2.21	1.10
Anterior gonad	295.3	236.3	295.3	272.0	25.12	12.56
Uterus	88.5	72.63	88.46	81.8	6.92	3.46
Oviduct	120.3	96.69	120.3	111.0	10.21	5.10
Ovary	86.6	67.00	87.14	79.2	9.58	4.79
Vulval Length	672.1	622.8	672.1	650.7	20.56	10.28
Total length of vagina	7.7	7.68	8.31	7.9	0.28	0.14
<i>Pars proximalis vagina</i>	2.9	2.58	3.21	2.9	0.26	0.13
<i>Pars refringens vagina</i>	1.9	1.90	2.20	2.0	0.13	0.06
<i>Pars distalis vagina</i>	2.9	2.89	3.10	3.0	0.10	0.05
cw	3.9	3.85	3.90	3.9	0.02	0.01
Rectum length	18.8	18.75	19.25	19.0	0.25	0.13
Tail length	23.5	18.80	23.50	21.7	2.07	1.03
% of tail of total body length	2.8	2.44	3.20	2.9	0.35	0.17