

A taxonomic survey of the family Mylonchulidae (Nematoda)

By
I. ANDRÁSSY*

Abstract. This second paper of a series dealing with the taxonomic view of the superfamily Mononchoidea gives account of the family Mylonchulidae. It presents seven genera all belonging to the same subfamily (Mylonchulinae): *Mylonchulus*, *Margaronchulus*, *Oligonchulus*, *Polygonchulus*, *Megaonchulus*, *Brachonchulus* and *Granonchulus*. 67 valid species are enumerated and characterized in form of keys. Two species, new to science, *Mylonchulus orientalis* and *M. doliolaris* spp. n., as well as the hitherto unknown male of *Mylonchulus lacustris* (COBB in COBB, 1915) are described.

In one of my recent papers (1992) I published a taxonomic view of the family Mononchidae CHITWOOD, 1937, a large group of the predaceous nematode superfamily Mononchoidea. I presented eleven genera and 100 valid species. In this second study the family Mylonchulidae JAIRAJPURI, 1969 is discussed. This is the most homogeneous group of the superfamily, and represents a clearly segregated branch on the phylogenetic tree of that.

The family Mylonchulidae is less rich in genera and species than the family Mononchidae: 67 species have been described so far which can be grouped in seven genera all belonging to one subfamily, Mylonchulinae. For this once they should be enumerated and presented in form of diagnoses as well as in identification keys, respectively.

Family MYLONCHULIDAE JAIRAJPURI, 1969

Mononchina, Mononchoidea. Medium-sized animals. Buccal cavity heavily sclerotized, goblet- or funnel-shaped, strongly tapering at base. Dorsal tooth large, claw-like, located in anterior part of stoma and sharply pointed forward. Opposite to it each subventral wall showing a rasp-like field consisting of transverse rows of minute denticles. Two small subventral teeth behind the rasp-fields may be present. Besides, scattered denticles or dentate longitudinal ridges can occasionally occur in the anterior part of stoma. Oesophago-intestinal junction non-tuberculate.

Mylonchulidae clearly differs from both the other families, Mononchidae CHITWOOD, 1937 and Anatonchidae JAIRAJPURI, 1969 in having a funnel-like, posteriorly strongly tapered buccal cavity, a very large claw-like dorsal tooth with apex

* Dr. István Andrásy, ELTE Állatrendszertani és Ökológiai Tanszék, MTA Talajzoológiai Kutatócsoport (Department of Zoosystematics and Ecology of the Eötvös Loránd University, Section of Soil Zoology of the Hungarian Academy of Sciences), 1088 Budapest, Puskin u. 3, Hungary.

always located close to the anterior end of stoma, and two subventral groups of rasp-like denticles arranged in transverse rows. This latter kind of buccal armature is especially characteristic for Mylonchulidae and never occurs in the two other families.

The mylonchulids represent a well definable branch on the phylogenetic tree of the superfamily Mononchoidea. They had separated most probably earlier from the common trunk and have gone more definitely a separate way than the mononchids and anatonchids. These latter have retained a number of common characteristics and seem to be therefore in a close relation also at present, mainly differing from each other by the presence or absence of tubercle-like structures in the oesophago-intestinal junction. The family Mylonchulidae shows several anatomical features that cannot be found at the other two families, i.e. a permanent fram of stoma, a constance in shape and location of dorsal tooth and subventral teeth, the presence of rasp-like denticulation. Everything points to that this family does have a strict constance in its general morphology and is much more homogeneous than Mononchidae—Anatonchidae.

Because of this homogeneity, the seven genera shall be included to one and the same subfamily, Mylonchulinae.

Subfamily MYLONCHULINAE JAIRAJPURI, 1969

Mylonchulidae; with the characteristics of the family.

Seven genera (with 67 species), in alphabetic order:

Branchonchulus ANDRÁSSY, 1958

Granonchulus ANDRÁSSY, 1958

Margaronchulus ANDRÁSSY, 1972

Megaonchulus JAIRAJPURI & KHAN, 1982

Mylonchulus COBB, 1916

Mononchus (*Mylonchulus* COBB, 1916)

Paramylonchulus JAIRAJPURI & KHAN, 1982

Pakemylonchulus KHAN & SAEED, 1987 (syn. n.)

Oligonchulus ANDRÁSSY, 1976

Polyonchulus MULVEY & JENSEN, 1967

Key to genera

- 1 Beside the transverse rows of file-like denticles in the stoma also dentate longitudinal ridges or groups of scattered denticles present 2
- Small denticles only in transverse rows present..... 5
- 2 Subventral walls of stoma with two serrate longitudinal ridges 3
- Subventral walls of stoma with numerous, posteriorly located denticles not arranged in definite longitudinal rows or on ridges..... 4
- 3 Tail in both sexes long, filiform (8—20 times anal diameter) **Megaonchulus** JAIRAJPURI & KHAN
- Tail in both sexes short (1—2 times anal diameter) **Polyonchulus** MULVEY & JENSEN
- 4 Rasp-like denticles in a single transverse row on each subventral wall; scattered denticles occupying almost the entire length of stoma **Granonchulus** ANDRÁSSY
- Rasp-like denticles in 5—6 transverse rows on each subventral wall; scattered denticles restricting to the posterior half of stoma **Branchonchulus** ANDRÁSSY
- 5 Transverse denticles numerous, forming file-like fields; ovaries predominantly two **Mylonchulus** COBB
- Transverse denticles only in one or two rows present, not forming file-like fields; ovary one..... 6
- 6 Ovary anterior to vulva; caudal glands reduced **Margaronchulus** ANDRÁSSY
- Ovary posterior to vulva; caudal glands well developed **Oligonchulus** ANDRÁSSY

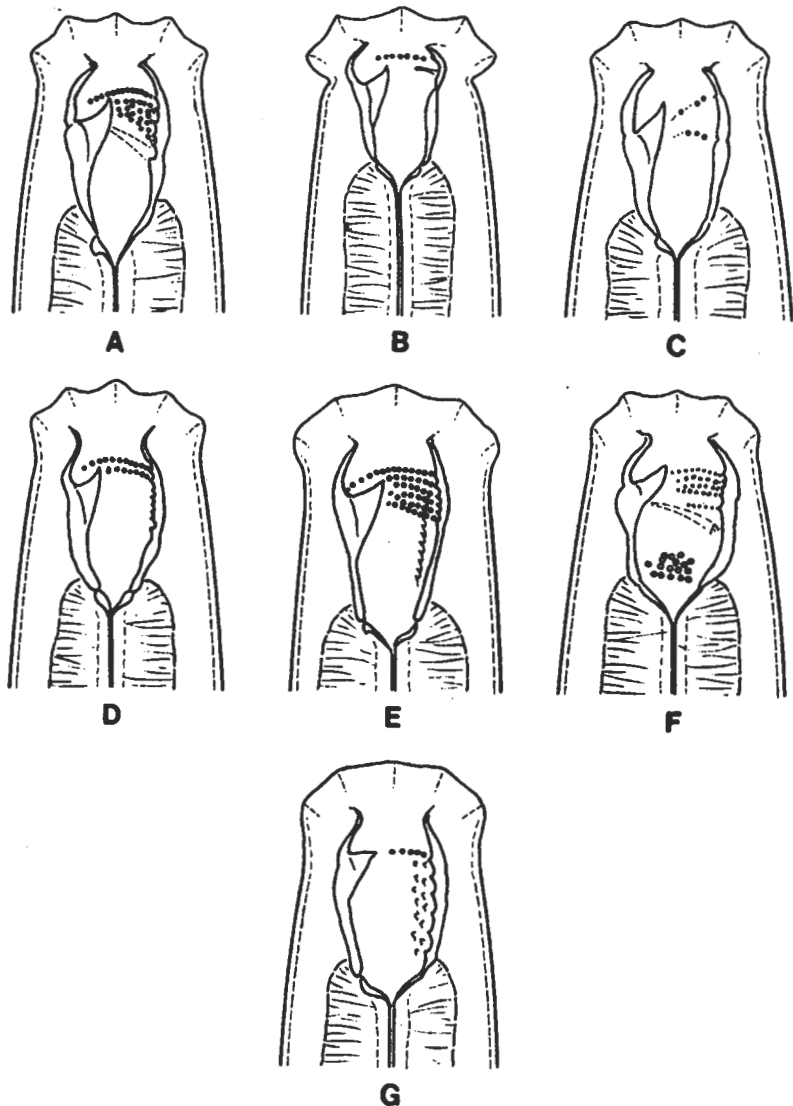


Fig. 1. The types of buccal cavity in the seven genera of the family Mylonchulidae. A: *Mylonchulus*; B: *Margaronchulus*; C: *Oligonchulus*; D: *Polyonchulus*; E: *Megaonchulus*; F: *Brachonchulus*; G: *Granonchulus*

Genus *Mylonchulus* COBB, 1916

Mononchus (*Mylonchulus* COBB, 1916); *Paramylonchulus* JAIRAJ PURI & KHAN, 1982; *Pakmylonchulus* KHAN & SAEED, 1987 (syn. n.).

Mylonchulidae, Mylonchulinae. Body length varying between 0.5 and 2.9 mm. Buccal cavity goblet- or funnel-shaped, dorsal wall thicker than ventral. Dorsal tooth very large, claw-like, obliquely forward directed with sharply pointed apex; located in anterior half of stoma. Each subventral wall armed with several small, rasp-like denticles more or less arranged in regular transverse rows. Anterior and/or posterior

margin of the rasp-fields often provided with sclerotized refractive rings (better: arches). Two small subventral teeth opposite to the base of dorsal tooth generally present. Proximal end of oesophagus simple. Female amphidelphic or — in 18% of species — mono-prodelphic; vulva varying in position from 52 to 72%. Males known in 60% of the species. Spicula slender, arcuate, with or without lateral accessory pieces. Supplements 6 to 16; anterior to the normally developed supplements often some weaker ones present. Tails of both sexes similar, shorter or to four times longer than anal body diameter, varying in form. Caudal glands and spinneret in almost every case conspicuous, the latter terminal or subterminal.

Type species: *Mononchus minor* COBB, 1893 = *Mylonchulus minor* (COBB, 1893) COBB, 1916.

Although *Mylonchulus* may have some variation in certain features (ovaries double or single; subventral teeth present or absent; caudal glands and spinneret well developed or reduced), these characters don't occur in clear relations, that means they show either combinations or various transitions among each others. All these mean that we cannot find any good reason to divide this rich genus into different subgenera, even genera. Therefore I can not accept the validity of the genera *Paramylonchulus* JAIRAJURI & KHAN, 1982 and *Pakmylonchulus* KHAN & SAEED, 1987 just based on the above mentioned characters. The former genus has been established for species showing a monodelphic ovary and lack of subventral teeth, the latter for ones having two ovaries but lacking subventral teeth. Between amphidelphy and prodelphy transitional forms often occur: there are species with a single anterior ovary, others with a posterior branch, too, equal in length with the anterior branch but having no ovary on that, and even ones which can show a rudiment of posterior ovary. As for the subventral teeth, they may represent every kind of developmental stages from unambiguous presence to lack.

From the other genera of the family, *Mylonchulus* can be distinguished by the following characteristics: rasp-like denticles numerous, longitudinal denticulate ridges or scattered denticles never present, subventral teeth predominantly distinct, female amphidelphic or prodelphic (not opisthodelphic), tail very variable in shape but always short, never filiform.

Terrestrial, semi-aquatic or limnic species occurring around the globe except the Antarctic. The continents are represented by the following number of species: Europe 20, Asia 30, Africa 12, North and Central America 25, South America 7, Australia and Oceania 13 species. The majority of species inhabit the northern hemisphere. The most abundant species are *M. brachyuris* (recorded from 39 countries or states) and *M. sigmaturus* (recorded from 30 countries or states).

56 species:

M. agilis DOUCET, 1980

M. amurus KHAN & JAIRAJURI, 1979

Paramylonchulus amurus (KHAN & JAIRAJURI, 1979) KHAN & SAEED, 1987

M. ananasi YEATES, 1992

M. apapillatus KHAN & JAIRAJURI, 1979

M. andrassyi LOOF, 1992

M. arenicolus CLARK, 1961

M. brachyuris (BÜTSCHLI, 1873) COBB, 1917

Mononchus brachyuris BÜTSCHLI, 1873

Mononchus (Mylonchulus) brachyuris BÜTSCHLI, 1873 (COBB, 1917)

Mononchus (Mylonchulus) brachyuris microdenticulatus typicus MICOLETZKY, 1922

Mylonchulus agriculturae COETZEE, 1967 (syn. n.)

- M. brassicus** SONI & NAMA, 1980
- M. brevicaudatus** COBB, 1917
Mononchus (Mylonchulus) brevicaudatus COBB, 1917
Mononchus (Mylonchulus) brachyuris macrodenticulatus brevicaudatus COBB, 1917 (MICOLETZKY, 1922)
- M. bulbiferous** JENSEN & MULVEY, 1968
- M. caespitosus** RAZZHIVIN, 1971
Paramylonchulus caespitosus (RAZZHIVIN, 1971) JAIRAJPURI & KHAN, 1982
- M. californicus** JAIRAJPURI, 1970
Mylonchulus index apud MULVEY, 1961
Paramylonchulus californicus (JAIRAJPURI, 1970) JAIRAJPURI & KHAN, 1982
- M. cavensis** SCHNEIDER, 1940
Mononchus (Mylonchulus) cavensis SCHNEIDER, 1940
- M. cereris** COETZEE, 1967
- M. contractus** JAIRAJPURI, 1970
- M. curvicaudatus** MULVEY & JENSEN, 1967
- M. dentatus** JAIRAJPURI, 1970
- M. doliolarius** sp. n.
- M. exacutus** JENSEN & MULVEY, 1968
- M. hawaiiensis** (CASSIDY, 1931) GOODEY, 1951
Mononchus (Mylonchulus) hawaiiensis CASSIDY, 1931 (GOODEY, 1951)
Mylonchulus bareilliensis SHARMA & SAXENA, 1980 (syn. n.)
Mylonchulus indicus SHARMA & SAXENA, 1980 (syn. n.)
- M. incurvus** COBB, 1917
Mononchus (Mylonchulus) incurvus COBB, 1917
Mononchus (Mylonchulus) brachyuris macrodenticulatus incurvus COBB, 1917 (MICOLETZKY, 1922)
- M. index** (COBB, 1906) COBB, 1917
Mononchus index COBB, 1906
Mononchus (Mylonchulus) index COBB, 1906 (COBB, 1917)
Paramylonchulus index (COBB, 1906) JAIRAJPURI & KHAN, 1982
- M. insolitus** ANDRÁSSY, 1968
- M. kaszabi** ANDRÁSSY, 1967
- M. lacustris** (COBB in COBB, 1915) COBB, 1917
Mononchus lacustris COBB in COBB, 1915
Mononchus (Mylonchulus) lacustris COBB in COBB, 1915 (COBB, 1917)
Mononchus (Mylonchulus) brachyuris macrodenticulatus lacustris COBB in COBB, 1915 (MICOLETZKY, 1922)
- M. longisacculus** (POPOVICI, 1990) LOOF, 1992
Paramylonchulus longisacculus POPOVICI, 1990
- M. longus** ALTHERR, 1972
Mylonchulus macrosoma ALTHERR, 1976 (syn. n.)
- M. mashhoodi** KHAN & JAIRAJPURI, 1979
Paramylonchulus mashoodi (KHAN & JAIRAJPURI, 1979) JAIRAJPURI & KHAN, 1982
Mylonchulus ciradi YEATES, 1992 (syn. n.)
- M. minor** (COBB, 1893) COBB, 1916
Mononchus minor COBB, 1893
Mononchus (Mylonchulus) minor COBB, 1893 (COBB, 1916)
Mononchus (Mylonchulus) brachyuris microdenticulatus minor COBB, 1893 (MICOLETZKY, 1922)

- M. mulveyi** JAIRAJPURI, 1970
Paramylonchulus mulveyi (JAIRAJPURI, 1970) JAIRAJPURI & KHAN, 1982
Paramylonchulus lapidus LAL & KHAN, 1988 (syn. n.)
Mylonchulus lapidus (LAL & KHAN, 1988) LOOF, 1992
- M. nainitalensis** JAIRAJPURI, 1970
- M. neocontractus** PATIL & KHAN, 1982
- M. noreasus** (RAHMAN & JAIRAJPURI, 1984) LOOF, 1992
Paramylonchulus noreasus RAHMAN & JAIRAJPURI, 1984
- M. obliquus** COBB, 1917
Mononchus (Mylonchulus) obliquus COBB, 1917
Mononchus (Mylonchulus) brachyuris macrodenticulatus obliquus COBB, 1917
(MICOLETZKY, 1922)
Mononchus (Mylonchulus) japonicus COBB, 1917
Mononchus (Mylonchulus) brachyuris microdenticulatus japonicus COBB, 1917
(MICOLETZKY, 1922)
Mylonchulus japonicus COBB, 1917
- M. obtusicaudatus** (DADAY, 1899) COBB, 1916
Mononchus obtusicaudatus DADAY, 1899
Mononchus (Mylonchulus) obtusicaudatus DADAY, 1899 (COBB, 1916)
- M. oceanicus** ANDRÁSSY, 1986
- M. orbitus** JENSEN & MULVEY, 1968
Mylonchulus muradi JAIRAJPURI, 1970 (syn. n.)
- M. oregonensis** sp. n.
Mylonchulus striatus apud JENSEN & MULVEY, 1968
- M. orientalis** sp. n.
- M. paitensis** YEATES, 1992
- M. parabrachyurus** (THORNE, 1924) SCHNEIDER, 1939
Mononchus parabrachyurus THORNE, 1924
Mononchus (Mylonchulus) parabrachyurus THORNE, 1924 (SCHNEIDER, 1939)
- M. polonicus** (STEFANSKI, 1915) COBB, 1917
Mononchus polonicus STEFANSKI, 1917
Mononchus (Mylonchulus) polonicus STEFANSKI, 1915 (COBB, 1917)
Mononchus (Mylonchulus) brachyuris microdenticulatus polonicus STEFANSKI, 1915
(MICOLETZKY, 1922)
Mononchus (Mylonchulus) montanus THORNE, 1924 (GOODEY, 1951)
Mylonchulus montanus (THORNE, 1924) GOODEY, 1951
Mylonchulus boveyi ALTHERR in ALTHERR & DELAMARE DEBOUTTEVILLE,
1972 (syn. n.)
- M. prodenticulatus** MULVEY, 1961
- M. psammophilus** YEATES, 1967
- M. rosensis** KHAN, 1975
- M. rotundicaudatus** (SKWARRA, 1921) SCHNEIDER, 1939
Mononchus rotundicaudatus SKWARRA, 1921
Mononchus (Mylonchulus) rotundicaudatus SKWARRA, 1921 (SCHNEIDER, 1939)
- M. signaturellus** MULVEY, 1961
- M. sigmaturus** COBB, 1917
Mononchus (Mylonchulus) sigmaturus COBB, 1917
Mononchus (Mylonchulus) brachyuris sigmaturus COBB, 1917 (MICOLETZKY, 1922)
Mononchus (Mylonchulus) brachyuris sigmaturoides SCHNEIDER, 1939
Mylonchulus sessus JAIRAJPURI, 1982 (syn. n.)

- M. silvaticus** RAZZHIVIN, 1971
Paramylonchulus silvaticus (RAZZHIVIN, 1971) JAIRAJPURI & KHAN, 1982
- M. solus** MULVEY, 1961
- M. striatus** (THORNE, 1924) SCHNEIDER, 1939
Mononchus striatus THORNE, 1924
Mononchus (Myonchulus) striatus THORNE, 1924 (SCHNEIDER, 1939)
- M. subsimilis** COBB, 1917
Mononchus (Myonchulus) subsimilis COBB, 1917
Mononchus (Myonchulus) cobbi MICOLETZKY, 1922
- M. subtenuis** COBB, 1917
Mononchus (Myonchulus) subtenuis COBB, 1917
Mononchus (Myonchulus) tenuis COBB, 1917, nec DADAY, 1908
Mononchus (Myonchulus) brachyuris tenuis COBB, 1917 (MICOLETZKY, 1922)
- M. ubis** CLARK, 1961
- M. vasis** YEATES, 1992
- M. vulvapapillatus** ALTHERR in ALTHERR & DELAMARE DEBOUTTEVILLE, 1972

Remarks

1) *Myonchulus agilis* DOUCET, 1980. — This species is very close to *M. sigmaturus* COBB, 1917; some differences between them can be found only in their measurements. Further observations would be required to settle their specific independence.

2) *Myonchulus agriculturæ* COETZEE, 1967. — COETZEE's species is so close to *M. brachyuris* (BÜTSCHLI, 1873) that it can not be separated with certainty from that. As for the measurements, they also agree perfectly with those of the latter species. I feel it authorized synonymizing *agriculturæ* with *brachyuris*.

3) *Myonchulus bareilliensis* SHARMA & SAXENA, 1980 and *M. indicus* SHARMA & SAXENA, 1980. — They are most probably one and the same species (discovered in localities very close to each other) and in all likelihood identical with *M. hawaiiensis* (CASSIDY, 1931). Since no essential differences can be found in all these three species, I consider them as synonyms.

4) *Myonchulus boveyi* ALTHERR in ALTHERR & DELAMARE DEBOUTTEVILLE, 1972 and *M. montanus* (THORNE, 1924). — They belong to the same species-range with *M. polonicus* (STEFANSKI, 1915), and are not to be distinguished. I regard them as synonyms.

5) *Myonchulus ciradi* YEATES, 1992. — On the basis of the description this species is not to be separated from *M. mashoodi* KHAN & JAIRAJPURI, 1979; the "differences" given by YEATES are insignificant. In my opinion *ciradi* is identical with *mashoodi*.

6) *Myonchulus lapidus* (LAL & KHAN, 1988). — It agrees completely with *M. mulveyi* JAIRAJPURI, 1970, even the tip of tail is the same in both species. *M. lapidus* is a synonym of *mulveyi*.

7) *Myonchulus macrosoma* ALTHERR, 1976. — I synonymize this species with *M. longus* ALTHERR, 1972. They are very similar both in the measurements and in the shape of tail. KHAN and JAIRAJPURI (1979) synonymized both of these species with *M. micrurus* COBB, 1917, I feel however that the cylindroid finger-portion and the broad terminus of the tail distinguish them well from COBB's species.

8) *Myonchulus minor* (COBB, 1893). — COBB described and illustrated this species as having a short (about one anal diameter long) tail with almost rectangular ventral contour and cylindroid posterior half (see COBB's drawing in MULVEY and JENSEN,

1967, Fig. 99—100). On the other hand, several subsequent authors have recorded nematode species under the name „*Mylonchulus minor*” (MULVEY and JENSEN, 1967; JAIRAJPURI, 1970; JAIRAJPURI and KHAN, 1982; CHAVES, 1990; LOOF, BAROOTI and KHEIRI, 1990), or under the name „*Mylonchulus lacustris*” (= *minor* teste MULVEY and JENSEN, 1967 — WILLIAMS, 1958; MULVEY, 1961; LOOF, 1964) but always with longer and more arcuate tail. In my opinion it is rather dubious if these latter species were the same as *minor* in COBB's sense.

9) *Mylonchulus muradi* JAIRAJPURI, 1970. — I suppose this species is identical with *M. orbitus* JENSEN & MULVEY, 1968. The differences mentioned by JAIRAJPURI are negligible.

10) *Mylonchulus nainitalensis* JAIRAJPURI, 1970. — It resembles *M. obliquus* COBB, 1917 very much, only in the shape of tail can be found some small difference (?) and its body is somewhat shorter. The specimens described by COOMANS and KHAN (1981) from Kenya are intermediate in the length of the body. COBB underlined that *obliquus* had a very large egg in the uterus (two and a half times as long as body width), and JAIRAJPURI found in *nainitalensis* a similarly large egg (three times as long as body width). It is therefore possible that *nainitalensis* and *obliquus* are one and the same species.

11) *Mylonchulus oregonensis* sp. n. — MULVEY and JENSEN described in 1968 a species under the name “*Mylonchulus striatus*” from the state of Oregon (United States) which, in my opinion, is not identical with the *striatus* of THORNE. The tail of the Oregon species is very short and quite hemispheroid without spinneret while the tail of the true *striatus* is longer and clearly bent ventrad with a distinct spinneret. I regard the animal of MULVEY and JENSEN as a separate species and suggest the name *M. oregonensis* sp. n. for it. In the genus *Mylonchulus* there are only two other species showing such a broadly rounded, hemispherical tail, *M. rotundicaudatus* (SKWARRA, 1921) and *M. bulbiferous* JENSEN & MULVEY, 1968, but both of them do have conspicuous gland orifices on the tip of tail.

12) *Mylonchulus sessus* JAIRAJPURI, 1982. — This species fits well to the variability range of *M. sigmaturus* COBB, 1917 so that I regard it as a junior synonym of that.

13) *Mylonchulus sparsus* COBB, 1917 and *Mylonchulus micrurus* COBB, 1917. — These species were described on the basis of juvenile specimens; they are species inquirendae.

14) *Mylonchulus denticulatus* COBB, 1917, *M. subterraneus* SCHNEIDER, 1940, *M. sexcristatus* (MERZHEEVSKAJA, 1951) and *M. madrasi* KANNAN, 1961 are species inquirendae as well. Owing to the meagre descriptions they can not be recognized with certainty. Maybe *M. sexcristatus* is equal with *M. arenicolus* CLARK, 1961, if so, MERZHEEVSKAJA's name will be valid.

Key to species of *Mylonchulus*

- | | |
|---|----------------------|
| 1 Female genital organ prodelfic (posterior branch occasionally nearly as long as anterior but not possessing a functional ovary) | 2 |
| — Female genital organ amphidelphic with two functional ovaries..... | 11 |
| 2 Postvulval uterine sac present, one to eight times as long as corresponding body width | 3 |
| — Postvulval uterine sac absent..... | 7 |
| 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 |
| — 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)
- Body 1.5 mm or shorter; postvulval 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.) **andrssyi** LOOF
- Tail not S-shaped, dorsally practically not concave, with shorter posterior cylindrical part..... 6
- 6 Vulval lips sclerotized, posterior uterine branch about 4 body diameters long. — ♀: 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)
- Vulval lips not sclerotized, posterior uterine branch about 2 body diameters long. — ♀: 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
- 7 Caudal glands inconspicuous, spinneret absent; body longer than 1 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
- Caudal glands and spinneret conspicuous; smaller species, 0.6–1 mm..... 8
- 8 Tail short, one anal diameter or so; rasp-like denticles in 5–6 transverse rows 9
- Tail longer, 1.5–2 anal diameters; rasp-like denticles in 2–4 transverse rows..... 10
- 9 Caudal spinneret subdorsal. — ♀: L=0.98 mm; a=32; b=3.1; c=49; V=73%; c'=0.9. ♂ unknown. (Vietnam.) **orientalis** sp. n.
- Caudal spinneret terminal. — ♀: 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
- 10 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
- 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
- 11 Tail broadly rounded, hemispheroid 12
- Tail of other shape, not hemispheroid 14
- 12 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** sp. n.
- Spinneret present 13
- 13 Spinneret subdorsal, tail bulbiferous, distinctly shorter than anal body diameter. — ♀: L=1.2–1.4 mm; a=32–34; b=3.0–3.4; c=61–69; V=69–71%; c'=0.6. ♂ unknown. (United States: Oregon.) **bulbiferous** JENSEN & MULVEY
- 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)
- 14 Caudal glands reduced, terminal opening absent 15
- Caudal glands and terminal opening present 19
- 15 Tail arched, uniformly tapering 16
- Tail nearly straight, subdigitate or digitate 17
- 16 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.) **subsiniilis** COBB
- Female tail distinctly longer than one anal diameter; spicula 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

* JENSEN and MULVEY (1968) described a population from Oregon, United States, which contained males, too. Since however their animals were essentially bigger (1.1–1.3 mm) it is doubtful whether they belonged to *index*.

- 17 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
— Subventral teeth absent; body length near 1 mm 18
- 18 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** ANDRÁSSY
— 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
- 19 Spinneret subdorsal, i.e. situated on the dorsal side of tail tip 20
— Spinneret terminal, at the centre of tail tip 31
- 20 Female tail as long as two anal diameters 21
— Female tail as long as one and a half anal diameters or shorter 22
- 21 Denticles in 4 transverse rows; body about 1 mm. — ♀: 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
— Denticles in 6 transverse rows; 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.) **parabachyurus** (THORNE)
- 22 Advulval papillae — pre- and postvulval — present. — ♀: 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
— Advulval papillae absent 23
- 23 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** ANDRÁSSY
— Tip of tail not bent dorsally; subventral teeth mostly present 24
- 24 Buccal cavity 30 µm or longer; body length about 1.5 mm. — ♀: 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
— Buccal cavity 20 µm or shorter; body length less than 1.5 mm 25
- 25 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** sp. n.
— Body longer, near 1 mm; buccal cavity as usual: strongly tapering toward base 26
- 26 Subventral teeth present, distinct 27
— Subventral teeth absent 30
- 27 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)
— Tail 15–25 µm long 28
- 28 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
— Intestine not narrowed strikingly at the genital region 29
- 29 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
— 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
- 30 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
— 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
- 31 Tail sigmoid: sharply bent ventrad with digitate posterior part inclining slightly dorsad and making the dorsal contour somewhat concave 32
— Tail not so, either more or less arcuate or, if subdigitate, showing no concave dorsal contour, or not sharply bent ventrad 36

- 32 Tail 55–80 μm , 2–2.5 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
- Tail 25–50 μm , 0.8–1.5 times as long as anal body width; labial region not or slightly wider than adjacent body 33
- 33 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
- Body shorter, 1–1.5 mm; spicula — if male known — about 50 μm long 34
- 34 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
- Posterior finger-like portion of tail slightly but perceptibly bent dorsad 35
- 35 Rasp-like denticles numerous (about in 10–15 irregular rows arranged). — ♀: L=1.0–1.5 mm; a=30–37; b=3.0–3.5; c=30–35; V=61–65%; c'=1.5. ♂ unknown. (India.) **dentatus** JAIRAJPURI
- 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, Kolumbia, Hawaii, Australia, New Zealand.) **sigmaturus** COBB
- 36 Tail as long as 2–4 anal diameters 37
- Tail shorter than 2 anal diameters 41
- 37 Small species, 0.8–1.3 mm 38
- Larger species, to 2.5 mm 39
- 38 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)
- 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
- 39 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
- Subventral denticles not so dense, in 5–7 rows; buccal cavity 30–35 μm long 40
- 40 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
- 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)
- 41 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
- Subventral teeth present 42
- 42 Buccal cavity (the sclerotized capsule) 35–55 μm long; body length 2 mm or so 43
- Buccal cavity 15–30 μm long; body length 1.5 mm or less 47
- 43 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
- Subventral teeth more forward, posterior refractive ring weak 44
- 44 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)
- Tail sharply bent ventrally, as long as, or shorter than anal diameter 45
- 45 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
- Posterior digitate part of tail cylindroid, broadly rounded on its terminus 46

- 46 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* ANDRÁSSY
- 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
- 47 Tail longer than anal body diameter (1.5–1.8 times) 48
- Tail about as long as anal body diameter 51
- 48 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)
- Tail sharply (suddenly) bent ventrad, consisting of an anterior wider and a posterior slenderer, digitate-subdigitate part 49
- 49 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
- Rasp-like denticles in 6–7 rows 50
- 50 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
- 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)
- 51 Tail obtuse with bluntly rounded tip 52
- Tail conoid with narrowly rounded tip. (Species very close to each other, therefore not easy to separate.) 53
- 52 Spinneret rather indistinct; supplements 12. — ♀: L=1.1–1.6 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)
- Spinneret well developed; supplements 15. — ♀: L=1.0–1.5 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
- 53 Tail 30 µm 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
- Tail 40–50 µm long 54
- 54 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
- Tip of tail cylindrical 55
- 55 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
- 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; see Remarks.) *minor* (COBB)

Genus *Margaronchulus* ANDRÁSSY, 1972

Mylonchulidae, Mylonchulinae. Body small, 0.7–0.9 mm. Buccal cavity comparatively small and broader proximally than usual in the family. Dorsal tooth not too large, in the anterior half of stoma with apex directed forward. Buccal armature very poor: subventral teeth absent, rasp-like denticles either in a single row present or completely absent. Each subventral wall provided in the former case with a short transverse ridge, in the latter case with two closely arranged refractive rings. Oesophago-intestinal junction non-tuberculate. Female prodelphic, without a posterior uterine sac. Male not known. Tail either long, filiform or short, bluntly conoid. Caudal glands reduced, spinneret lacking.

Type species: *Margaronchulus mulveyi* ANDRÁSSY, 1972

Peculiar representatives of the family characterized particularly by the very meagre armature of the buccal cavity; but the less tapered buccal capsule, the prodelphic gonad and the rudimentary caudal glands are also typical for them.

Terrestrial animals occurring in Central Africa.

Two species:

M. adenticulatus ANDRÁSSY, 1985

M. mulveyi ANDRÁSSY, 1972

Key to species of Margaronchulus

- 1 Rasp-like denticles present in a transverse row; head set off from body by a deep constriction; tail long, filiform. — ♀: L=0.9 mm; a=36; b=4.2; c=4.6; V=57%; c'=12. ♂ unknown. (Congo Republic.) *mulveyi* ANDRÁSSY
- Rasp-like denticles absent; head without constriction; tail much shorter, conoid. — ♀: L=0.7–0.75 mm; a=26–28; b=3.6–3.7; c=22–24; V=68–69%; c'=2.3–2.4. ♂ unknown. (Congo Republic.) *adenticulatus* ANDRÁSSY

Genus *Oligonchulus* ANDRÁSSY, 1976

Mylonchulidae, Mylonchulinae. Body about 1 mm long. Cuticle finely striated, striae resolving into small dots. Buccal cavity goblet-shaped. Dorsal tooth large, oblique with pointed apex located quite close to the beginning of buccal capsule. Subventral teeth absent. Transverse denticles only in two rows and very few (about six in number on each side). Refractive rings absent. Female gonad one, posterior to vulva, without anterior uterine sac; vulva situated before the middle of body. Eggs unusually long. Male not known. Tail arcuate, cylindrical in its posterior half, twice as long as anal diameter. Caudal glands and spinneret present.

Type species: *Mononchus (Mylonchulus) reversus* COBB, 1917 = *Oligonchulus reversus* (COBB, 1917) ANDRÁSSY, 1976.

In having a single ovary posterior to the vulva this genus is unique not only in the family Mylonchulidae but also in the whole superfamily Mononchoidea. The strongly restricted number of the rasp-like denticles is also a typical phenomenon for it.

Oligonchulus is represented by a single species described from South America and having been not refound so far.

O. reversus (COBB, 1917) ANDRÁSSY, 1976

Mononchus (Mylonchulus) reversus COBB, 1917

Mylonchulus reversus COBB, 1917

— ♀: L=1.1 mm; a=29; b=3.8; c=25; V=40%; c'=2. ♂ unknown. (Brazil.) *reversus* (COBB)

Genus *Polygonchulus* MULVEY & JENSEN, 1967

Mylonchulidae, Mylonchulinae. Body length near 1 mm. Buccal cavity about twice as long as wide. Dorsal tooth large, claw-like, situated in anterior half of stoma with forward directed apex. Subventral teeth absent, instead of them two longitudinal serrate ridges present. Rasp-like subventral denticles in 2 to 7 rows; refractive rings lacking. Oesophago-intestinal junction non-tuberculate. Female didelphic or monodelphic without posterior uterine sac. Vulva in 66–70% of body length. Male known in one species; spicula arcuate, without lateral accessory pieces. Supplements small, 6 in number. Tails of both sexes similar, conoid arcuate or subdigitate, one to

two and a half times as long as anal body width. Caudal glands and spinneret either present or reduced.

Type species: *Polyonchulus cobbi* MULVEY & JENSEN, 1967.

The genus is distinctive because of the presence of two longitudinal serrate ridges in stoma and of the short tail. Owing to the longitudinally arranged denticles *Polyonchulus* shows some resemblance to the genera *Granonchulus* ANDRÁSSY, 1958 and *Megaonchulus* JAIRAJPURI & KHAN, 1982. It differs from the former by the nature of those longitudinal denticles which are arranged along ribs, not lying free on the walls of stoma, from the latter by the short tail.

Terrestrial or semi-aquatic forms known from Africa.

Two species:

P. clavicaudatus (SCHUURMANS STEKHOVEN & TEUNISSEN, 1938) JAIRAJPURI, 1970

Mononchus clavicaudatus SCHUURMANS STEKHOVEN & TEUNISSEN, 1938

Mononchus (Mylonchulus) clavicaudatus SCHUURMANS STEKHOVEN & TEUNISSEN, 1938 (GOODEY, 1951)

Mylonchulus clavicaudatus (SCHUURMANS STEKHOVEN & TEUNISSEN, 1938) GOODEY, 1951

P. cobbi MULVEY & JENSEN, 1967

Remarks

Polyonchulus clavicaudatus (SCHUURMANS STEKHOVEN & TEUNISSEN, 1938). — I somewhat hesitate to regard this species as a representative of the genus *Polyonchulus*. In showing denticulate longitudinal ribs in stoma and an African distribution it seems to be congeneric with *P. cobbi*. On the other hand however it differs essentially from that by having a large number of rasp-denticles, paired gonads as well as well developed caudal glands and spinneret.

Key to species of *Polyonchulus*

- 1 Gonad one, anterior to vulva, without posterior branch; transverse denticles in two rows; tail arcuate-conoid with reduced glands. — ♀: L=0.9–1.1 mm; a=25–34; b=3.0–3.7; c=14–19; V=67–70%; c'=2.5. ♂: L=1.2 mm; a=33; b=3.5; c=21; PO: 6. (Nigeria.) **cobbi** MULVEY & JENSEN
— Gonads two, amphidelphic; transverse denticles in seven rows; tail subdigitate, dorsally bent with well developed glands. — ♀: L=0.95 mm; a=27; b=3; c=36; V=66%; c'=1. ♂ unknown. (Zaire.)
..... **clavicaudatus** (SCHUURMANS STEKHOVEN & TEUNISSEN)

Genus *Megaonchulus* JAIRAJPURI & KHAN, 1982

Mylonchulidae, Mylonchulinae. Body 1.4–1.7 mm long, very slender. Buccal cavity goblet-shaped, strongly narrowing to its base. Dorsal tooth large, triangular with forward directed apex. Subventral teeth absent, instead of them two fine serrate longitudinal ribs present. Transverse denticles rasp-like, arranged in about half a dozen rows. No refractive rings. Proximal end of oesophagus not tuberculate. Ovary one, anterior to vulva, postvulval uterine sac present, unusually long. Vulva at the middle of body. Spicula comparatively short, without lateral accessory pieces. Supplements 8 in number. Tails of both sexes similar, filiform, 8–20 times as long as anal body diameter. Caudal glands and spinneret absent.

Type species: *Polyonchulus megadontus* MULVEY & JENSEN, 1967 = *Megaonchulus megadontus* (MULVEY & JENSEN, 1967) JAIRAJPURI & KHAN, 1982.

Megaonchulus mostly resembles *Polyonchulus* MULVEY & JENSEN, 1967: besides the transverse denticles both genera are provided with longitudinal denticles arranged on ribs. *Megaonchulus* differs from *Polyonchulus* in having a very long, filiform tail in both sexes. Since this peculiar shape of the tail is rather uncommon within the family, I agree with JAIRAJPURI and KHAN (1982) that this phenomenon may serve for generic character. Long-tailed forms are to be found in an other genus, *Margaronchulus* ANDRÁSSY, 1972, too. However that genus is unique in having a very poor armature in the buccal cavity.

Soil inhabiting nematodes living in Africa.

One species:

M. megadontus (MULVEY & JENSEN, 1967) JAIRAJPURI & KHAN, 1982

Polyonchulus megadontus MULVEY & JENSEN, 1967

— ♀: L=1.7 mm; a=55; b=4.7; c=4.6; V=50%; c'=20. ♂: L=1.4–1.5 mm; a=45–52; b=4.2–5.0; c=6.3–6.5; PO: 8. (Nigeria) **megadontus** (MULVEY & JENSEN)

Genus *Brachonchulus* ANDRÁSSY, 1958

Mylonchulidae, Mylonchulinae. Body about 1 mm long. Buccal cavity goblet-shaped. Dorsal tooth large, claw-like, in the anterior half of stoma and with anteriorly directed apex. Subventral teeth present. Denticles arranged in two groups: an anterior rasp-like field opposite to the dorsal tooth and composed of 5–6 rows of denticles, and a posterior field consisting of irregularly scattered denticles. Refractive rings apparently absent. Oesophago-intestinal junction simple. Female gonads paired, vulva in 58–59% of body length. Male not known. Tail short and conoid, as long as anal body width. Caudal glands and orifice present.

Type species: *Mononchus brachyuroides* MICOLETZKY, 1925 = *Brachonchulus brachyuroides* (MICOLETZKY, 1925) ANDRÁSSY, 1958.

This genus seems to be close to *Granonchulus* ANDRÁSSY, 1958 by having — besides the rasp-like denticles — several scattered subventral denticles as well. Owing to this armature in the stoma MULVEY (1963) synonymized *Brachonchulus* with *Granonchulus*. I am however of opinion that similarity between these genera does not mention also identity. If MICOLETZKY's description and illustration are correct — we do not have any reason considering them as incorrect — *Brachonchulus* does show a number of essential (generic) differences against the other genus mentioned. These are: 1) the buccal cavity is more of *Mylonchulus*-type, goblet-shaped, strongly tapering at base and armed with a large, claw-like dorsal tooth; 2) the rasp-denticles are much more numerous and arranged in 5–6 transverse rows; 3) a posterior refractive ring is present; 4) subventral teeth are present as well; 5) the scattered denticles show a dissimilar arrangement: they are far back, near the posterior end of buccal cavity and gathered in a dense group.

Terrestrial nematodes, occurring in South America.

One species:

B. brachyuroides (MICOLETZKY, 1925) ANDRÁSSY, 1958

Mononchus brachyuroides MICOLETZKY, 1925

Granonchulus brachyuroides (MICOLETZKY, 1925) MULVEY, 1963

Remarks

Brachonchulus sumatrensis ANDRÁSSY, 1958. — I accept the opinion of MULVEY that this nematode — described by SCHNEIDER (1937) on a juvenile specimen and named by me (1958) — is better to be regarded as a species inquirenda.

— ♀: L=0.9–1.0 mm; a=21–23; b=3.0–3.1; c=20–21; V=58–59%; c'=0.9–1.1. ♂ unknown. (Suriname.) brachyuroides (MICOLETZKY)

Genus *Granonchulus* ANDRÁSSY, 1958

Mylonchulidae, Mylonchulinae. Body 1 to 2.2 mm long. Buccal cavity somewhat different from the *Mylonchulus*-type: more ovoid, not tapering so strongly to the base. Dorsal tooth of moderate size, situated in the anterior half of stoma and pointed forward. Subventral teeth and refractive rings absent. Subventral denticles in two arrangements are present: rasp-like ones in a sole row and restricted in number (5–10 on each side), scattered ones in irregular longitudinal rows, just posterior to the former ones. Proximal end of oesophagus not tuberculate. Female gonads paired, vulva in 54–65% of body length. Males known in two species. Supplements numerous, 15–21. Tails in both sexes similar, hemispheroid or conoid, one to two and a half times as long as anal diameter. Caudal glands predominantly well developed.

Type species: *Mononchus (Sporonchulus) decurrens* COBB, 1917 = *Granonchulus decurrens* (COBB, 1917) ANDRÁSSY, 1958.

The genus can be characterized by the ovoid buccal cavity, the simple row of rasp-like denticles, the presence of scattered denticles, the paired gonads and the short tail.

Terrestrial or semi-aquatic nematodes occurring in four continents: in Europe 1, in Asia 1, in Africa 2 and in North America 2 species. Rare animals.

Four species:

G. decurrens (COBB, 1917) ANDRÁSSY, 1958

Mononchus (Sporonchulus) decurrens COBB, 1917

G. helicus SHARMA & SAXENA, 1981

G. schulzi (MEYL, 1955) ANDRÁSSY, 1958

Mononchus (Sporonchulus) schulzi MEYL, 1955

Sporonchulus schulzi MEYL, 1955

Granonchulus auberti ALTHERR in ALTHERR & DELAMARE DEBOUTTEVILLE, 1972

G. subdecurrens COETZEE, 1966

Remarks

1) *Granonchulus auberti* ALTHERR in ALTHERR & DELAMARE DEBOUTTEVILLE, 1972. — The differences given by ALTHERR between *G. auberti* and *G. schulzi* (MEYL, 1955) — in the length of oesophagus, shape of labial region and amphids — are very minute and negligible. It is scarcely doubtful that *auberti* is equal with *schulzi*.

2) *Granonchulus helicus* SHARMA & SAXENA, 1981. — This species is quite close to *G. subdecurrens* COETZEE, 1966 from which it differs only in the shape of tail. Maybe they are the same species.

3) *Granonchulus indicus* SHUBHA & DAS, 1985. — The original description of this species was unfortunately not obtainable to me, I know only a short character-

rization from the Nematological Abstracts. It would be similar to *G. subdecurrens* COETZEE, 1966 but the subventral denticles are arranged in regular longitudinal rows. But such regular rows of the longitudinal denticles do not occur in the genus *Granonchulus*, thus a) the Indian authors have misobserved the real situation, or b) their species does not belong to our genus.

Key to species of *Granonchulus*

- 1 Tail hemispheroid, about as long as anal diameter; body length nearly 2 mm. — ♀: L=1.7–2.0 mm; a=23–30; b=3.9–5.5; c=36–61; V=54–65%; c'=0.8–1. ♂: L=1.7–2.2 mm; a=23–41; b=4.3–5.2; c=39–60; PO: 17–21. (Holland, Germany, Poland, United States: Massachusetts.) *schulzi* (MEYL)
- Tail conoid, about as long as two anal diameters; body length nearly 1 mm 2
- 2 Caudal glands reduced, spinneret absent; tip of tail almost pointed. — ♀: L=1.0–1.3 mm; a=25–27; b=3.6–4.0; c=20–26; V=57–61%; c'=2–2.5. ♂ unknown. (South Africa, United States: Florida.) *decurrens* (COBB)
- Caudal glands normally developed, spinneret present; tip of tail more rounded 3
- 3 Tail arcuate. — ♀: L=1.0–1.4 mm; a=20–34; b=3.8–5.0; c=16–24; V=53–62%; c'=2. ♂: L=1.1 mm; a=23; b=4; c=17; PO: 15. (Nigeria, South Africa.) *subdecurrens* COETZEE
- Tail almost straight. — ♀: L=1.1–1.2 mm; a=19–22; b=4.0–4.5; c=19; V=57–61%; c'=2. ♂ unknown. (India.) *helicus* SHARMA & SAXENA

Description of two new species

Mylonchulus orientalis sp. n.

(Fig. 2 A–D)

♀: L=0.98 mm; a=32; b=3.1; c=49; V=73%; c'=0.9.

Body arcuate, 30 μ m wide at mid-region. Cuticle smooth, about 1.5 μ m thick, on tail not thicker than elsewhere. Head 17 μ m wide, hardly set off from body, lips conoid; body at posterior end of oesophagus 1.6 times as wide as head. Amphids level with dorsal tooth apex.

Buccal cavity goblet-shaped, thick-walled, uniformly tapering to its base; sclerotized capsule 18–19 μ m long and maximal 11 μ m wide. Dorsal tooth very strong, claw-like, its apex lying in 16% of buccal capsule. Subventral teeth lacking. Rasp-like denticles arranged in 5–6 rows of which the anterior ones are stronger than the posterior ones. Refractive rings present. Proximal half of stoma finely transversely striated.

Oesophagus 310 μ m long, comparatively very long, gradually widened in its posterior half. Distance between oesophagus and vulva 1.3 times as long as oesophagus. Cardia flat, intestine with broad lumen. Rectum somewhat shorter than anal body width.

Vulva transverse, vagina a little oblique. Female gonad one, prodelphic, about thrice as long as body width. Uterus with a small spermatheca. Postvulval sac hardly developed, shorter than half a corresponding diameter of body. Advulval papillae not present.

Distance between vulva and anus 12 times as long as tail. The latter 20 μ m long, somewhat shorter than anal body diameter, in its anterior half wider, rounded, in the posterior half digitiform, ventrally arcuate. Caudal glands globular, well developed, spinneret subterminal.

Male not found.

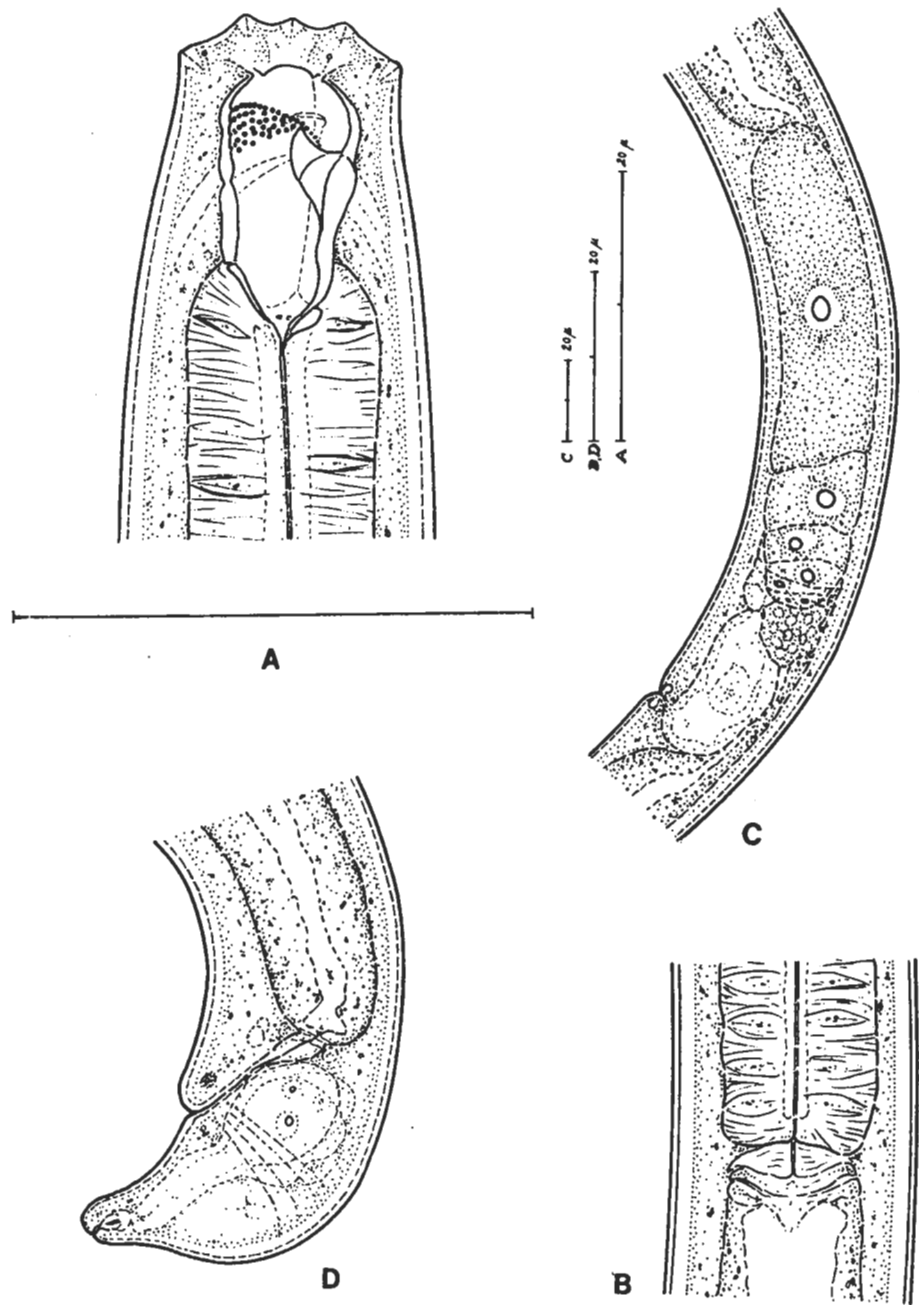


Fig. 2. *Mylonchulus orientalis* sp. n. A: anterior end, and body width at posterior end of oesophagus; B: cardial region; C: female genital organ; D: posterior end of female

Diagnose: A smaller *Mylonchulus* species with large dorsal tooth, several rasp-denticles, lacking subventral teeth, very long oesophagus, prodelphic gonad, hardly expressed postvulval sac, digitate tail, well developed caudal glands and subdorsal spinneret.

Because of the practically lacking posterior uterine sac and the shape of the tail the new species shows a close resemblance to *M. index* (COBB, 1906) COBB, 1917 but it can be distinguished from that by the structure of the tail: this latter is not rectangular in curvature and its digitate part shorter and plumper, and the spinneret lies subdorsal. (Good drawings on the tail of *M. index* are to find in WILLIAMS, 1958, BUANGSUWON & JENSEN, 1966, JAIRAJPURI, 1970).

Holotype: ♀ on the slide No. 12332. Paratype: ♀ (with broken tail tip).

Type locality: Vietnam, Santa Maria, 20 km from Bao Loc, fallen leaves and humus from a secondary forest, October, 1988.

Mylonchulus doliolarius sp. n.

(Fig. 3 A-E)

♀: L=0.60–0.64 mm; a=18–20; b=3.0–3.1; c=35–39; V=61–62%; c'=1.

Body very small and rather plump, showing a C after fixation. Cuticle smooth, 1.2–1.5 μ m thick, not thicker on tail. Head 17 μ m wide, not set off from body, lips somewhat protruding. Body at the posterior end of oesophagus 1.6–1.7 times as wide as head. Amphids about $\frac{1}{3}$ of corresponding body width, located in level of dorsal tooth apex.

Buccal cavity somewhat different from the usual type: more barrel-shaped (hence the name „doliolarius”) and less tapered to its base. Buccal capsule 16–17 μ m long and 10 μ m wide, as long as labial diameter, not too heavily sclerotized. Dorsal tooth claw-like, its apex in 23–24% of stoma. Rasp-denticles arranged in 5 rows; the first row longer and more dense in denticles than the others. Posterior refractive ring present but weak. The subventral teeth in one of the four animals investigated were present but small, in the others however not perceptible.

Oesophagus 195–212 μ m long, about $\frac{1}{3}$ of body length, with thick intima. Distance between the posterior end of oesophagus and vulva shorter than oesophagus. Intestine thick-walled, rectum nearly as long as anal body width.

Vulva transverse, practically not sclerotized, vagina short, a little oblique. Advulval papillae not present. Ovaries two, each gonad 1.7–2.5 times as long as body width.

Distance between vulva and anus 12–14 times as long as tail. Tail 15–19 μ m, about one anal diameter long, ventrally arcuate with subdigitate posterior portion. Anterior lip of anus heavily swollen, body showing therefore a strong narrowing immediately behind the anus. Caudal glands globular, spinneret subdorsal, behind the rounded tip of tail.

Male not found.

Diagnosis: A small *Mylonchulus* species with barrel-like buccal cavity, hardly developed or reduced subventral teeth, paired gonads, short subdigitate tail and subterminal spinneret.

Mylonchulus doliolarius sp. n. belongs to those group of species which are provided with a subterminal-subdorsal spinneret but differs from all of them by its small body and the comparatively wide, barrel-like buccal cavity.

Holotype: ♀ on the slide 12340. Paratypes: 2 ♀ and 1 juvenile.

Type locality: Vietnam, Bao Loc, detritus from a rock, October, 1988.

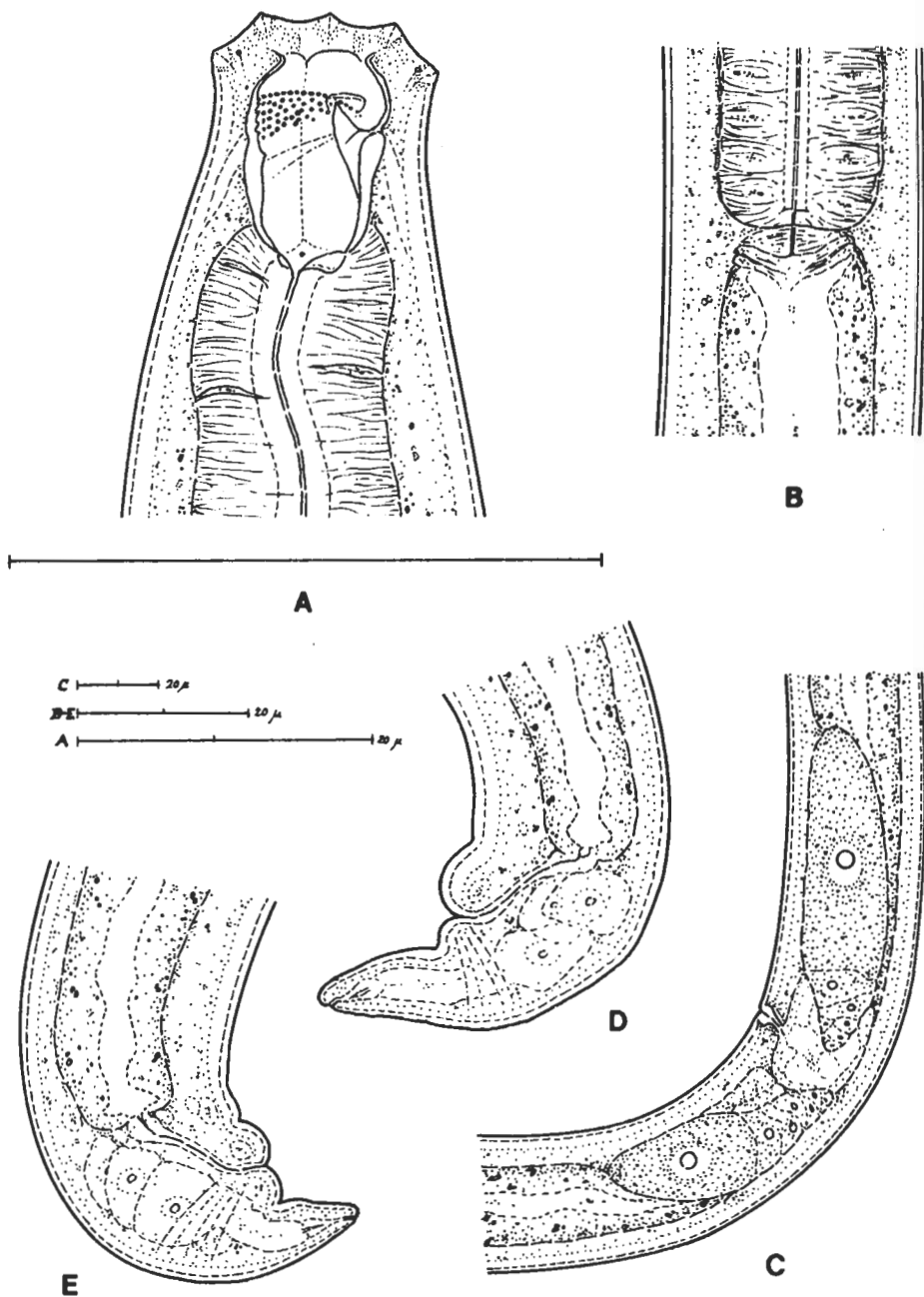


Fig. 3. *Mylonchulus doliolaris* sp. n. A: anterior end, and body width at posterior end of oesophagus; B: cardial region; C: female genital organ; D—E: posterior ends of two females

Mylonchulus lacustris (COBB in COBB, 1915) COBB, 1917

(Fig. 4 A-E)

♀: L=1.16–1.24 mm; a=25–32; b=3.3–3.7; c=22–25; V=55–58%; c'=1.7–2.

♂: L=1.15 mm; a=34; b=3.4; c=27; c'=1.3.

Body C- or 6-shaped after fixation; 36–46 (♀) or 33 (♂) μm wide at the middle region. Cuticle smooth and thin, 1–1.5 μm . Labial region somewhat set off from body, 21–23 μm wide, lips conoid, protruding. Body at the posterior end of oesophagus 1.6–1.9 times (♀) or 1.4 times (♂) as wide as head. Amphids in front of the dorsal tooth apex, about $\frac{1}{6}$ of corresponding body diameter.

Buccal cavity (the sclerotized capsule) 23–24 μm long and 13–14 μm wide, $\frac{1}{13}$ – $\frac{1}{14}$ as long as oesophagus, strongly tapering at base, with moderately thick walls. Dorsal tooth very large, claw-like with finely rounded tip; its apex located in 19–22% of stoma. Subventral teeth present, moderately developed. Rasp-like denticles arranged in 5–6 transverse rows on each subventral wall. Denticles contiguous, pearl-shaped in the first rows. Posterior refractive ring present but weak.

Oesophagus 310–350 μm long, 27–30% of entire length of body, characteristically obliquely striated in its posterior part. Distance between posterior end of oesophagus and vulva nearly equal with length of oesophagus. Rectum somewhat shorter than anal body width.

Vulval lips sclerotized, vulva transverse. Vagina thin and short, about $\frac{1}{4}$ of corresponding body width. Female amphidelphic, each gonad 2–2.3 times as long as body diameter. Distance between vulva and anus 8–10 times as long as tail. The latter 47–53 μm , 1.7–2 times as long as anal body width, or 4–4.5% of body length; arched, almost cylindrical in its greatest length. Tip of tail rounded. Caudal glands and terminal spinneret well developed, the latter terminal in position.

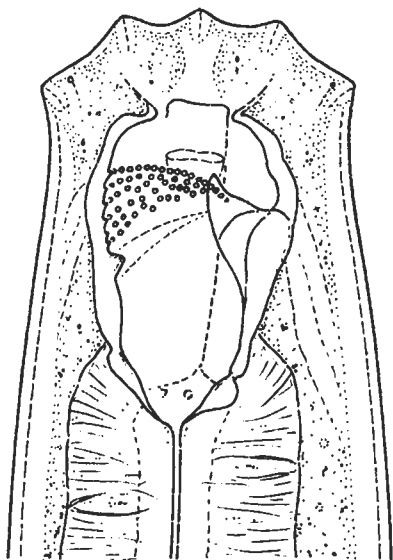
Testes two, each 3 times as long as body width. Spermatozoa slender, spindle-shaped, 4–5 μm long, as long as $\frac{1}{7}$ – $\frac{1}{8}$ body width. Spicula 44 μm long, nearly of equal width in its entire length, arched. Gubernaculum thin, lateral accessory pieces present, with bifurcate distal tips. Apart from the adanal pair there are 9 normally developed + 2 weakly expressed copulatory supplements; the formers arranged at a distance of 10 to 17 μm from each other. Male tail 42 μm , 1.3 times as long as anal body diameter, similar to that of female, provided with a pair of subventral and a pair of subdorsal-subterminal papillae.

This is the first description of the male of *Mylonchulus lacustris*. The species has been recorded from Asia, Africa, both Americas and Australia hitherto.

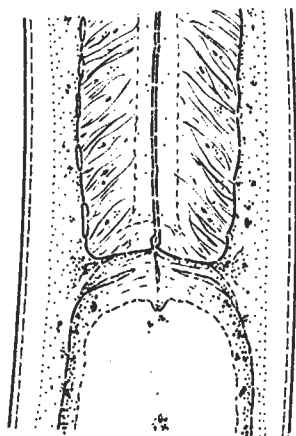
Locality: India, Chandigarh, soil from a garden (4 ♀), and Bombay, Elephanta Island, soil with humus (6 ♀, 1 ♂, 3 juv.), January, 1986.

Addendum

After closing the manuscript some further species came to my knowledge: *Mylonchulus sagarensis* SINHA, BAQRI & CHOUDHURY, 1989; *Mylonchulus hortulanus* KHAN, 1991; *Mylonchulus sarmini* AZMI, 1991.

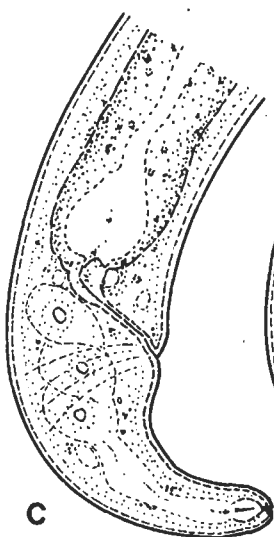


A

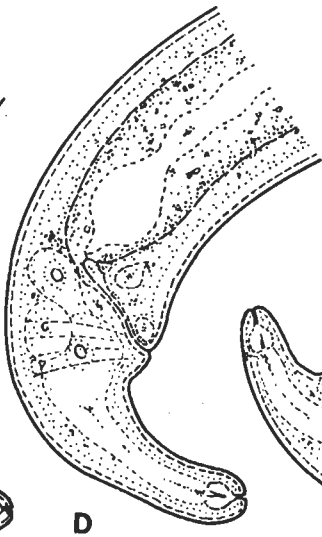


B

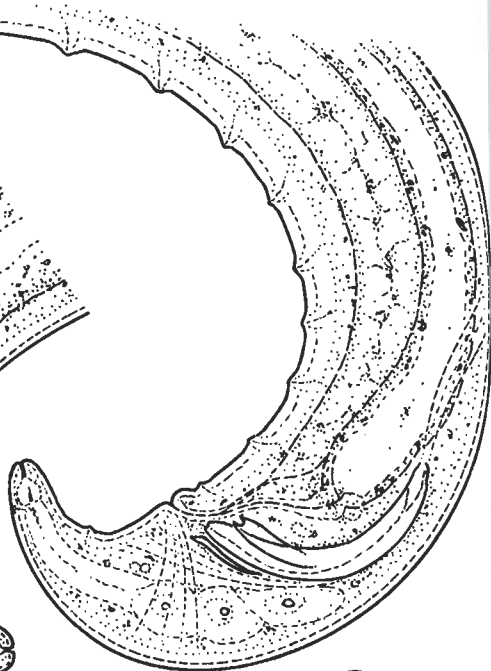
C-E |-----| 20 μ
 B |-----| 20 μ
 A |-----| 20 μ



C



D



E

Fig. 4. *Mylonchulus lacustris* (COBB in COBB, 1915) COBB, 1917. A: anterior end, and body width at posterior end of oesophagus; B: cardial region; C—D: posterior ends of two females; E: posterior body of the hitherto unknown male

REFERENCES

1. ALTHERR, E. (1972): Contribution à la connaissance des Nématodes rithrostygosammiques et rithrostygoséphiques de Suède. — *Rev. Suisse Zool.*, 79: 881—902.
2. ALTHERR, E. (1976): La faune des eaux profondes interstitielles de la région de Wiesbaden. — *Bull. Soc. Vaud. Sci. Nat.*, 73: 97—116.
3. ALTHERR, E. & DELAMARE DEBOUTTEVILLE, C. (1972): Nématodes interstitiels des eaux douces des États-Unis d'Amérique (états de Washington, du Colorado et du Massachusetts) récoltés par C1. Delamare Deboutteville. — *Ann. Spéleol.*, 27: 683—760.
4. ANDRÁSSY, I. (1958): Ergebnisse der zoologischen Aufsammlungen des Ungarischen Naturwissenschaftlichen Museums in Ägypten im Jahre 1957. — *Ann. Hist.-nat. Mus. Nat. Hung.*, 50: 135—150.
5. ANDRÁSSY, I. (1958): Über das System der Mononchiden (Mononchidae Chitwood, 1937; Nematoda). — *Ann. Hist.-nat. Mus. Nat. Hung.*, 50: 151—171.
6. ANDRÁSSY, I. (1967): Ergebnisse der zoologischen Forschungen von Dr. Z. Kaszab in der Mongolei. 92. Weitere Bodennematoden aus den Jahren 1964 und 1965. — *Opusc. Zool. Budapest*, 6: 203—233.
7. ANDRÁSSY, I. (1968): The scientific results of the Hungarian Soil Zoological Expedition to the Brazzaville-Congo. 31. Nematoden aus Grundwasser. — *Ann. Univ. Sci. Budapest*, 9—10: 3—26.
8. ANDRÁSSY, I. (1972): Zwei neue Gattungen von Bodennematoden. — *Ann. Univ. Sci. Budapest*, 14: 187—192.
9. ANDRÁSSY, I. (1976): Evolution as a basis for the systematization of nematodes. — Budapest: 1—288.
10. ANDRÁSSY, I. (1985): Three new species of Mononchoidea (Nematoda) from the Southern Hemisphere. — *Opusc. Zool. Budapest*, 21: 23—30.
11. ANDRÁSSY, I. (1986): Fifteen new nematode species from the Southern Hemisphere. — *Acta Zool. Hung.*, 32: 1—33.
12. ANDRÁSSY, I. (1992): A taxonomic survey of the family Mononchidae (Nematoda). — *Acta Zool. Hung.*, 39. (In print.)
13. BUANGSUWON, D. K. & JENSEN, H. (1966): A taxonomic study of Mononchidae (Enoplida: Nemata) inhabiting cultivated areas of Thailand. — *Nematologica*, 12: 259—274.
14. BUSSAU, C. (1991): Freilebende Nematoden aus Küstendünen und abgrenzenden Biotopen der deutschen und dänischen Küsten. III. Dorylaimida. — *Zool. Anz.*, 226: 33—63.
15. BÜTSCHLI, O. (1873): Beiträge zur Kenntnis der freilebenden Nematoden. — *Nova Acta Acad. Nat. Curios.*, 36: 1—124.
16. CASSIDY, G. H. (1931): Some mononchs of Hawaii. — *Hawaiian Planters' Rec.*, 35: 306—339.
17. CHAVES, E. (1990): Mononchida (Nematoda) from Argentina. — *Nematologica*, 36: 181—193.
18. CLARK, W. C. (1961): The Mononchidae (Enoplida—Nematoda) of New Zealand. IV. The genus *Mylonchulus* (Cobb, 1916) Pennak, 1953. — *Nematologica*, 6: 1—6.
19. CLARK, W. C. (1963): Notes on the Mononchidae (Nematoda) of the New Zealand region with descriptions of new species. — *New Zealand Journ. Sci.*, 6: 612—632.
20. COBB, M. V. (1915): Some freshwater nematodes of the Douglas Lake region of Michigan, U. S. A. — *Trans. Americ. Microsc. Soc.*, 34: 21—47.
21. COBB, N. A. (1893): Nematodes, mostly Australian and Fijian. — *Macleay Mem. Vol. Linn. Soc. N. South Wales*: 252—308.
22. COBB, N. A. (1906): Free living nematodes inhabiting the soil about the roots of cane, and their relation to root diseases. *Bull. Haw. Sugar Planters' Ass. Exper. Stat.*: 163—195.
23. COBB, N. A. (1916): Subdivisions of *Mononchus*. — *Journ. Parasitol.*, 2: 195—196.
24. COBB, N. A. (1917): The mononch (*Mononchus* Bastian, 1866), a genus of predatory nematodes. Contributions to a science of nematology, VI. — *Soil. Sci.*, 3: 431—486.

25. COETZEE, V. (1966): Species of the genera *Granonchulus* and *Cobbonchus* (Mononchidae), occurring in southern Africa. — *Nematologica*, 12: 302–312.
26. COETZEE, V. (1967): Species of the genus *Mylonchulus* (Nematoda: Mononchidae) occurring in southern Africa. — *Nematologica*, 12: 557–567.
27. COOMANS, A. & KHAN, S. H. (1981): Mononchida from Mount Kenya. — *Biol. Jb. Dodonaea*, 49: 64–75.
28. DADAY, J. (1899): Új-guineai szabadon élő nematodok. — *Math. Természettud. Ért. Budapest*, 17: 557–572.
29. DOUCET, M. E. (1980): Description d'une nouvelle espèce du genre *Mylonchulus* (Nematoda: Dorylaimida). — *Nematol. Mediterr.*, 8: 37–42.
30. JAIRAJPURI, M. S. (1969): Studies on Mononchida of India. I. The genera *Hadronchus*, *Iotonchus* and *Miconchus*, and a revised classification of Mononchida, new order. — *Nematologica*, 15: 557–581.
31. JAIRAJPURI, M. S. (1970): Studies on Mononchida of India. III. The genus *Mylonchulus* (family *Mylonchulidae* Jairajpuri, 1969). — *Nematologica*, 16: 434–456.
32. JAIRAJPURI, D. S. (1982): *Mylonchulus sessus* n. sp. (Nematoda: Mononchidae) from Brunei. — *Syst. Parasitol.*, 4: 185–187.
33. JAIRAJPURI, M. S. & KHAN, W. U. (1982): Predatory nematodes (Mononchida), with special reference to India. — *New Delhi*: 1–131.
34. JENSEN, H. J. & MULVEY, R. H. (1968): Predaceous nematodes (Mononchidae) of Oregon. — *Corvallis*: 1–57.
35. KHAN, H. A. (1975): A new species of the genus *Mylonchulus* (Cobb, 1916) Altherr, 1953 (Enoplida: Mononchidae) from Karachi. — *Pakist. Journ. Zool.*, 7: 143–144.
36. KHAN, H. A. & SAEED, M. (1987): *Pakmylonchulus*, new genus (Mononchida: *Mylonchulidae*) with notes on *Mylonchulus nainitalensis* Jairajpuri, 1970 and *M. sigmaturus* (Cobb, 1917) Altherr, 1953 from Pakistan. — *Pakist. Journ. Zool.*, 19: 313–320.
37. KHAN, W. U. & JAIRAJPURI, M. S. (1979): Studies on Mononchida of India. XII. Genus *Mylonchulus* (Cobb, 1916) Altherr, 1953 with descriptions of three new species. — *Nematologica*, 25: 406–418.
38. LAL, A. & KHAN, E. (1988): Taxonomic studies on nematodes associated with the rhizosphere of forest trees in India. I. Two new nematode species of the order Mononchida. — *Nematol. Mediterr.*, 16: 1–3.
39. LOOF, P. A. A. (1992): Status of *Mylonchulus cavensis* W. Schneider, 1940 (Nematoda: Mononchida). — *Nematologica*, 38:
40. LOOF, P. A. A., BAROOTI, S. & KHEYRI, A. (1990): Predatory nematodes (Mononchida) from Iran. — *Appl. Entom. Phytopath.*, 57: 27–52.
41. MERZHEEVSKAJA, O. I. (1950): Nematodes of peaty and mineral soils and their importance to agriculture. (Russian). — *Sborn. Nauchn. Trudov. Akad. Nauk Belorus. SSR*, 1: 155–170.
42. MEYL, A. H. (1955): Über einige an den deutschen Küsten vorkommende Arten der Nematodengattung *Mononchus* Bastian, 1865. — *Kieler Meeresforsch.*, 11: 80–85.
43. MICOLETZKY, H. (1922): Die freilebenden Erd-Nematoden, mit besonderer Berücksichtigung der Steiermark und der Bukowina, zugleich mit einer Revision sämtlicher nicht mariner, freilebender Nematoden in Form von Genus-Beschreibungen und Bestimmungsschlüsseln. — *Arch. Naturg., Abt. A*, 87: 1–650.
44. MICOLETZKY, H. (1925): Zur Kenntnis tropischer, freilebender Nematoden aus Surinam, Trinidad und Ostafrika. — *Zool. Anz.*, 64: 1–28.
45. MULVEY, R. H. (1961): The Mononchidae: a family of predaceous nematodes. I. Genus *Mylonchulus* (Enoplida: Mononchidae). — *Canad. Journ. Zool.*, 39: 665–696.
46. MULVEY, R. H. (1963): The Mononchida: a family of predaceous nematodes. V. Genera *Spronchulus*, *Granonchulus*, and *Prionchuloides* n. gen. (Enoplida: Mononchidae). — *Canad. Journ. Zool.*, 41: 763–774.

47. MULVEY, R. H. & JENSEN, H. J. (1967): The Mononchidae of Nigeria. — *Canad. Journ. Zool.*, 45: 667–737.
48. PATIL, K. J. & KHAN, E. (1982): Taxonomic studies on nematodes of Vidarbha region of Maharashtra, India. III. One new and two known species of Mylonchulus (Nematoda: Mononchoidea). — *Indian Journ. Nematol.*, 12: 158–160.
49. POPOVICI, I. (1990): Studies on Mononchida (Nemata) from Romania. — *Nematologica*, 36: 161–180.
50. RAHMAN, M. F. & JAIRAJPURI, M. S. (1984): Two new species of Mononchida from India. — *Nematologica*, 29: 126–131.
51. RAZZHIVIN, A. A. (1971): New species of nematodes of the family Mononchidae from soils of apple forests in Djungarian Alatau. (Russian.) — *Zool. Zhurn.*
52. SCHNEIDER, W. (1923): Niederrheinische freilebende Nematoden. — *Zool. Anz.*, 56: 264–281.
53. SCHNEIDER, W. (1939): Würmer oder Vermes. II. Fadenwürmer oder Nematoden. 1. Freilebende und pflanzenparasitische Nematoden. — In: *Die Tierwelt Deutschlands*, 36: 1–260.
54. SCHNEIDER, W. (1940): Neue freilebende Nematoden aus Höhlen und Brunnen. 1. Nematoden aus jugoslawischen Höhlen. — *Zool. Anz.*, 132: 84–94.
55. SCHUURMANS STEKHOVEN, J. H. & TEUNISSEN, R. J. H. (1938): Nématodes libres terrestres. — In: *Miss. de Witte, Explor. Parc Nat. Albert*, 22: 1–229.
56. SHARMA, R. K. & SAXENA, V. (1980): Two new species of the genus Mylonchulus (Cobb, 1916) Altherr, 1953 (Mononchida: Nematoda) from North India. — *Rendiconti, Cl. Sci.*, 114: 18–26.
57. SHARMA, R. K. & SAXENA, V. (1981): *Granonchulus helicus* sp. n. (Nematoda: Mononchida) from North India. — *Nematol. Mediterr.*, 9: 159–162.
58. SKWARRA, E. (1921): Diagnosen neuer freilebender Nematoden Ostpreussens. — *Zool. Anz.*, 53: 66–74.
59. SONI, G. R. & NAMA, H. S. (1980): On a new species of Mylonchulus (Cobb, 1916) Altherr, 1956 (Nematoda: Mylonchulidae). — *Curr. Sci.*, 49: 750–751.
60. STEFANSKI, W. (1915): Nouvelles espèces de Nématodes provenant de Pologne. — *Zool. Anz.*, 45: 363–368.
61. TARJAN, A. C. & HOPPER, B. E. (1974): Nomenclatorial compilation of plant and soil nematodes. — *DeLeon Springs*: 1–419.
62. THORNE, G. (1924): Utah nemas of the genus Mononchus. — *Americ. Microsc. Soc.*, 43: 157–171.
63. WILLIAMS, J. R. (1958): Studies on the nematode soil fauna of sugar cane fields in Mauritius. 1. The genus Mononchus (Trilobidae, Enoplida). — *Occ. Pap. Mauritius Sugar Ind. Res. Inst.*, 1: 1–13.
64. WINISZEWSKA, G. (1985): Szesc gatunków Mononchoidea (Nematoda) nowych dla fauny Polski. — *Fragm. Faun.*, 29: 29–38.
65. YEATES, G. W. (1967): Studies on nematodes from dune sands. 3. Oncholaimidae, Ironidae, Alaimidae and Mononchidae. — *New Zealand Journ. Sci.*, 10: 299–321.
66. YEATES, G. W. (1992): Nematodes from New Caledonia. 1. Introduction and Mononchoidea. — *Fundam. Appl. Nematol.*, 15: 101–126.