

THE MONONCHIDAE: A FAMILY OF PREDACEOUS NEMATODES

V. GENERA SPORONCHULUS, GRANONCHULUS, AND PRIONCHULOIDES N. GEN. (ENOPLIDA: MONONCHIDAE)

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Abstract

Females of *Sporonchulus minutus* n. sp. are illustrated and described. *S. dentatus*, *S. recessus*, and *S. ibitensis* are redescribed and illustrated. Females of *Granonchulus decurrens* are described and illustrated for the first time. *Brachonchulus brachuroides* is transferred to the genus *Granonchulus* and a new genus, *Prionchuloides*, is set up to accommodate the former *Judonchulus micoletzkyi*.

Brachonchulus sumatrensis and *Judonchulus brakenhoffi* are placed in *species inquirendae*. Taxonomic keys are provided for the three genera and species within each.

Introduction

This paper is the fifth in a series concerning the taxonomy of the Mononchidae, a family of free-living predatory nematodes inhabiting soil and fresh water. Cobb (6) first erected *Sporonchulus* as a subgenus of *Mononchus* Bastian, 1865 to accommodate the species in which the denticles opposite the dorsal tooth were irregular in arrangement but characters otherwise as in the subgenus *Mylonchulus* (Cobb, 1916) (see Mulvey (11)). Pennak (12) was the first to consider *Sporonchulus* at the generic level. Andrassy (2) erected two new genera, *Granonchulus* and *Judonchulus*, to accommodate species in *Sporonchulus* which he considered sufficiently different for the establishment of these two new genera. He also erected another new genus, *Brachonchulus*. The present paper deals with the status of these new genera and establishes one new genus and a new species.

Materials and Methods

Collecting, preparing of slides, measuring, and illustrating were done as previously described by Mulvey (11).

Taxonomy

KEY TO GENERA

1. Denticles in buccal cavity arranged in one group, either irregular or regular in order.....*Sporonchulus* (Cobb)
2. Denticles in buccal cavity arranged in two groups, mostly irregular in order..... 2
2. One group of denticles arranged in two longitudinal rows, the other group irregularly arranged opposite the dorsal tooth.....*Prionchuloides* n. gen.
- One group of denticles arranged in transverse rows at the level of the dorsal tooth, the other group irregularly arranged on the walls of the buccal cavity and posterior to the dorsal tooth.....*Granonchulus* Andrassy

Genus *Sporonchulus* (Cobb, 1917) Pennak, 1953

Diagnosis (emended).—Dorsal tooth midway or anterior in buccal cavity, opposed by numerous denticles on opposite wall, in one group, either regular or irregular in arrangement. Female monodelphic or didelphic. Caudal glands and terminal opening present or absent. Tail conoid, ventrally arcuate. Male unknown.

Type species.—*Sporonchulus dentatus* (Cobb, 1917) Andrásy, 1958.

KEY TO SPECIES OF GENUS *Sporonchulus* Females

- | | |
|----------------------------------------------------------------------------------------------|-----------------------------|
| 1. Denticles irregularly arranged..... | 2 |
| Denticles regularly arranged in longitudinal rows..... | 3 |
| 2. Dorsal tooth situated midway in buccal cavity, tail long and bulky..... | <i>recessus</i> (Cobb) |
| Dorsal tooth situated in anterior third section of buccal cavity, tail short, conoid..... | <i>dentatus</i> (Cobb) |
| 3. Denticles arranged in two longitudinal rows, not along a longitudinal rib..... | <i>minutus</i> n. sp. |
| Denticles arranged in four longitudinal rows, at least two rows along longitudinal ribs..... | 4 |
| 4. Female monodelphic..... | <i>coronatus</i> (Carvalho) |
| Female didelphic..... | <i>ibitensis</i> (Carvalho) |

Sporonchulus dentatus (Cobb, 1917) Andrásy, 1958 (Figs. 1-3)

Venezuelan Specimen

(1 female).— $L = 1.25$ mm; $a = 30.0$; $b = 3.9$; $c = 19.2$; $V = 62\%$; buccal cavity = 34×18 microns; tail length = 0.065 mm.

Cobb (6) based his description and illustrations on a young female. Later (according to his notes) he found specimens of this species from Angola, West Africa. I have identified the female specimen from Venezuela as belonging to this species.

The Venezuelan female conforms very closely with Cobb's description and illustrations (6). Dorsal tooth opposed by numerous irregularly arranged denticles. Esophagointestinal valve non-tuberculate. Female didelphic, tail conoid, ventrally arcuate with rounded terminus. No caudal glands or terminal opening observed.

Williams (15) described and illustrated female specimens which he identified as this species.

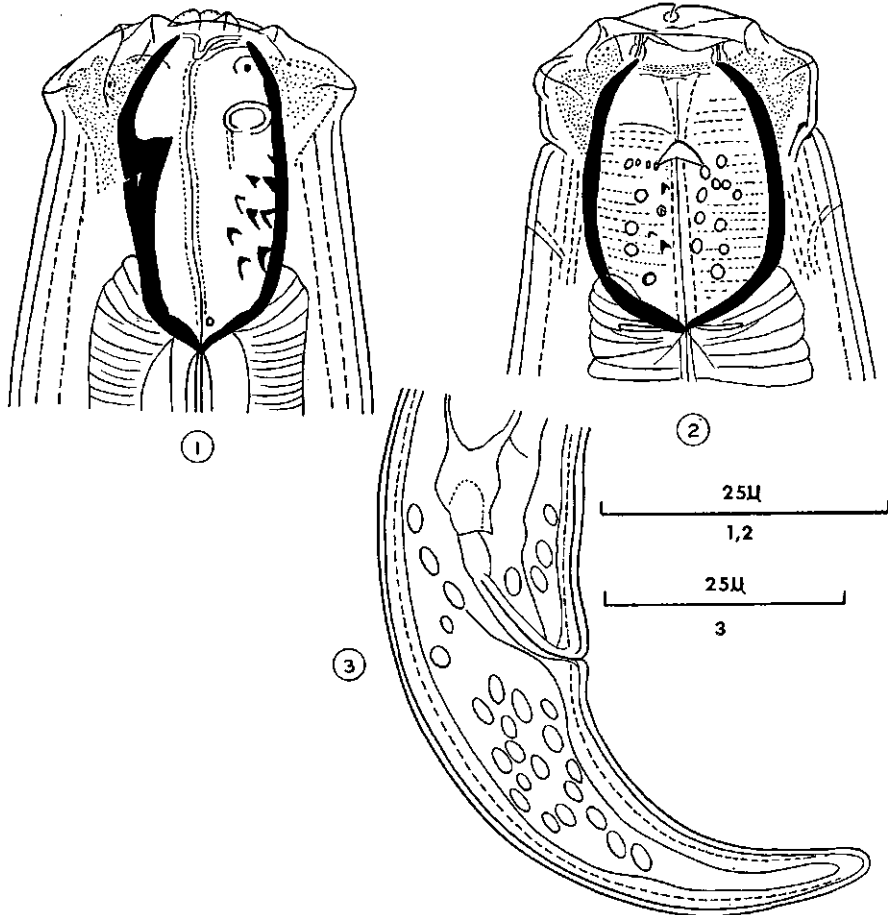
Habitat.—About the roots of orange trees (Brazil), roots of gladioli bulbs (West Africa), and in sugarcane fields (Mauritius).

Geographical distribution.—Bahia, Brazil; Angola, West Africa; Mauritius; San Felipe, Venezuela.

Sporonchulus coronatus (Carvalho, 1956) Andrásy, 1958

(3 females).— $L = 1.06-1.40$ mm; $a = 16.9-22.2$; $b = 3.3-4.0$; $c = 20.5-26.0$; $V = 60-66\%$; buccal cavity = 28×17 microns (after Carvalho (5)).

Carvalho (5) based his description of this species on mature females. He remarked that the labial region was crown-shaped, and the buccal cavity large with a large dorsal tooth situated in the anterior third section. He stated that the denticles were coarse, in four rows of four to five denticles in each. Female monodelphic, ovary short and prodelphic. Caudal glands three, leading to a terminal pore.



FIGS. 1-3. *Sporonchulus dentatus*. 1. Young female head, lateral view. 2. Female head (mature female, somewhat compressed), dorsoventral view. 3. Young female tail. (All from Cobb's original sketches.)

This species is distinguished from others in the genus by being monodelphic and having a crown-shaped labial region.

Habitat.—Around the roots of the ornamental plant, *Rhododendron* sp.

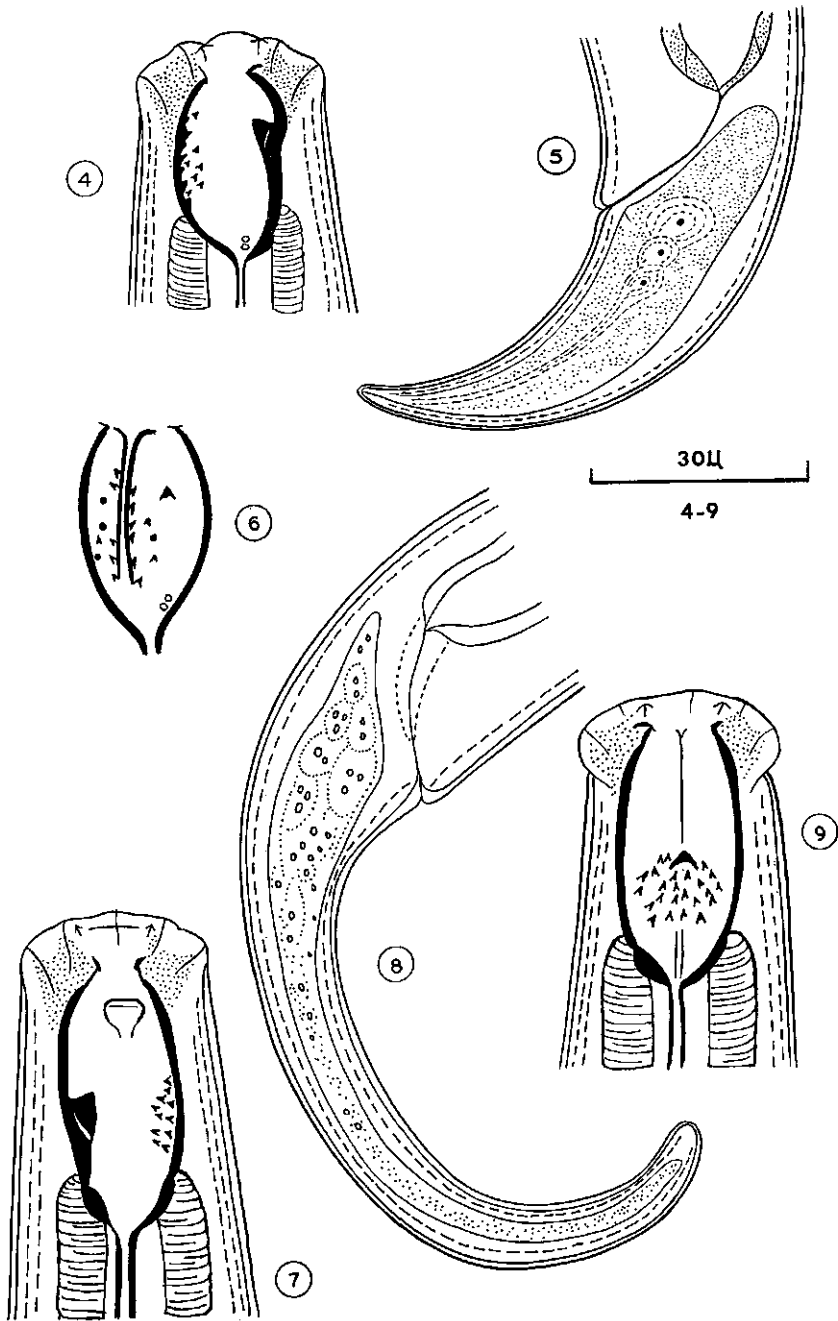
Geographical distribution.—Private garden in Sao Paulo, Brazil.

***Sporonchulus ibitensis* (Carvalho, 1951) Andrásy, 1958**
(Figs. 4-6)

Ceylonese Specimen

(1 female).— $L = 1.2$ mm; $a = 30.0$; $b = 3.9$; $c = 24.0$; $V = 63\%$; buccal cavity = 25×15 microns; tail length = 0.05 mm.

Carvalho (4) based his description of this species on gravid females. He stated that it differed from *Prionchulus muscorum* (Dujardin, 1945) Chitwood



FIGS. 4-6. *Sporonchulus ibitensis*. 4. Female head, lateral view. 5. Female tail. 6. Female buccal cavity, dorsoventral view.

FIGS. 7-9. *Sporonchulus recessus*. 7. Female head, lateral view. 8. Female tail. 9. Female head, dorsoventral view.

and Chitwood, 1937 by its smaller pharynx, smaller dorsal tooth opposed by four ribs, each of which had six denticles, and by the presence of caudal glands leading to a terminal pore which had no valve. I have identified the mature female from Ceylon as this species.

Buccal cavity small, dorsal tooth small, situated in the anterior third section, opposed by four longitudinal rows of rather large denticles ranging from three to six in each. Two rows situated along longitudinal rib. Junction of esophagus and intestine non-tuberculate. Female didelphic, ovaries reflexed nearly to level of vulva. Tail arcuate-conoid, containing three caudal glands arranged in tandem leading to an obscure terminal opening.

The female from Ceylon differs from Carvalho's species in the position of the vulva and tail length (according to Carvalho (4) $V = 70\%$ and $c = 10.0$). However, his illustrations indicate that $V = 60\%$ and the tail is approximately 0.060 mm in length, with a c value of 23.3. Carvalho (4) remarked that there were four longitudinal ribs, each of which had six denticles. From a lateral view this may be interpreted as such, but from a dorsoventral view of the specimen from Ceylon there appears to be only two ribs, with three to six denticles along each, and two rows of denticles which are not arranged along a rib.

Habitat.—Soil (by Carvalho), and about the roots of tea plant (Ceylon).

Geographical distribution.—Experimental Station of Monte Alegre (Ibiti), State of Sao Paulo, Brazil; Ceylon, from potted tea plant intercepted by the Plant Protection Division, Canada Department of Agriculture.

***Sporonchulus recessus* (Cobb, 1917) n. comb.**

Syn. *Mononchus* (*Sporonchulus*) *recessus* Cobb, 1917

Judonchulus recessus Andr assy, 1958

(Figs. 7-9)

Florida Specimens

(10 females).— $L = 1.5$ mm (1.4-1.6); $a = 36.4$ (32.2-39.7); $b = 3.4$ (3.3-3.7); $c = 13.4$ (13.0-14.1); $V = 64\%$ (63-65); buccal cavity = 33-35 \times 18-19 microns; tail length = 0.11 mm (0.10-0.12).

The specimens from Florida correspond closely to Cobb's (6) description and illustrations of this species. I examined Cobb's original sketch of the full length tail of this species. The tails of the females from Florida are very similar in shape and length to that of Cobb's specimen.

Buccal cavity of Florida specimens twice as long as wide, dorsal tooth large, situated midway or lower in the buccal cavity, small subventral denticles irregularly arranged opposite dorsal tooth. Amphid aperture from 5-6 microns wide. Esophagointestinal valve non-tuberculate. Female didelphic, ovaries reflexed, containing no sperm. Tail tapering suddenly immediately posterior to anus, then continuing conoid, ventrally arcuate. No terminal pore or caudal glands observed. Cobb (6) remarked that the caudal glands were small and inconspicuous and that a spinneret was present. His illustration shows an inconspicuous spinneret.

Andr assy (2) considered this as the type species for his new genus, *Judonchulus*. However, the details of the buccal cavity of this species does not

conform to Andrásy's (2) diagnosis of the genus *Judonchulus*. There is no secondary area of denticles (teeth) as stated in the diagnosis. Furthermore, the shape of the buccal cavity of *S. recessus* varies considerably from that of *J. micoletzki*. Therefore, I have returned the former to the genus *Sporonchulus* and set up a new genus to accommodate the latter.

Habitat.—Soil from tomato field (Cobb (6)), about the roots of native grasses in swampy soil (collected by B. E. Hopper in 1956).

Geographical distribution.—Narango, Florida (N. A. Cobb (6)); near Lacrosse, Florida (B. E. Hopper, 1956).

Sporonchulus minutus n. sp.

(Figs. 10–13)

(3 females).— $L = 0.846$ mm (0.83–0.85); $a = 21.5$ (21.0–21.8); $b = 3.3$ (3.1–3.4); $c = 18.5$ (17.6–19.1); $V = 63\%$ (62–65); buccal cavity = $28 \times (14–17)$ microns; tail length = 0.045 mm (0.044–0.047).

Holotype female.— $L = 0.84$ mm; $a = 21.0$; $b = 3.4$; $c = 19.1$; $V = 64\%$; buccal cavity = 28×17 microns; tail length = 0.044 mm.

Description of this new species is based on three mature females and three juveniles.

Buccal cavity about twice as long as wide with walls of medium thickness. Amphid aperture about 4μ wide. Dorsal tooth medium-sized, opposed by two longitudinal rows of denticles, not along a longitudinal rib and relatively large. Posterior two denticles nearly basal and larger than other eight. Esophago-intestinal valve non-tuberculate. Lining of lumen of intestine thick. Female didelphic, ovaries reflexed. Tail conoid, ventrally arcuate containing three glands leading to an obscure terminal opening.

I have also identified a female specimen from Truk as this species.

Differential diagnosis.—*S. minutus* differs from other species in this genus in having only two longitudinal rows of denticles.

Habitat.—About the roots of egg plant.

Geographical distribution.—Saipan and Truk.

Holotype (female).—Collection No. Saipan 1, deposited with the University of California Collection, Davis, California.

Paratypes (females).—Same data as holotype.

Genus *Granonchulus* Andrásy, 1958

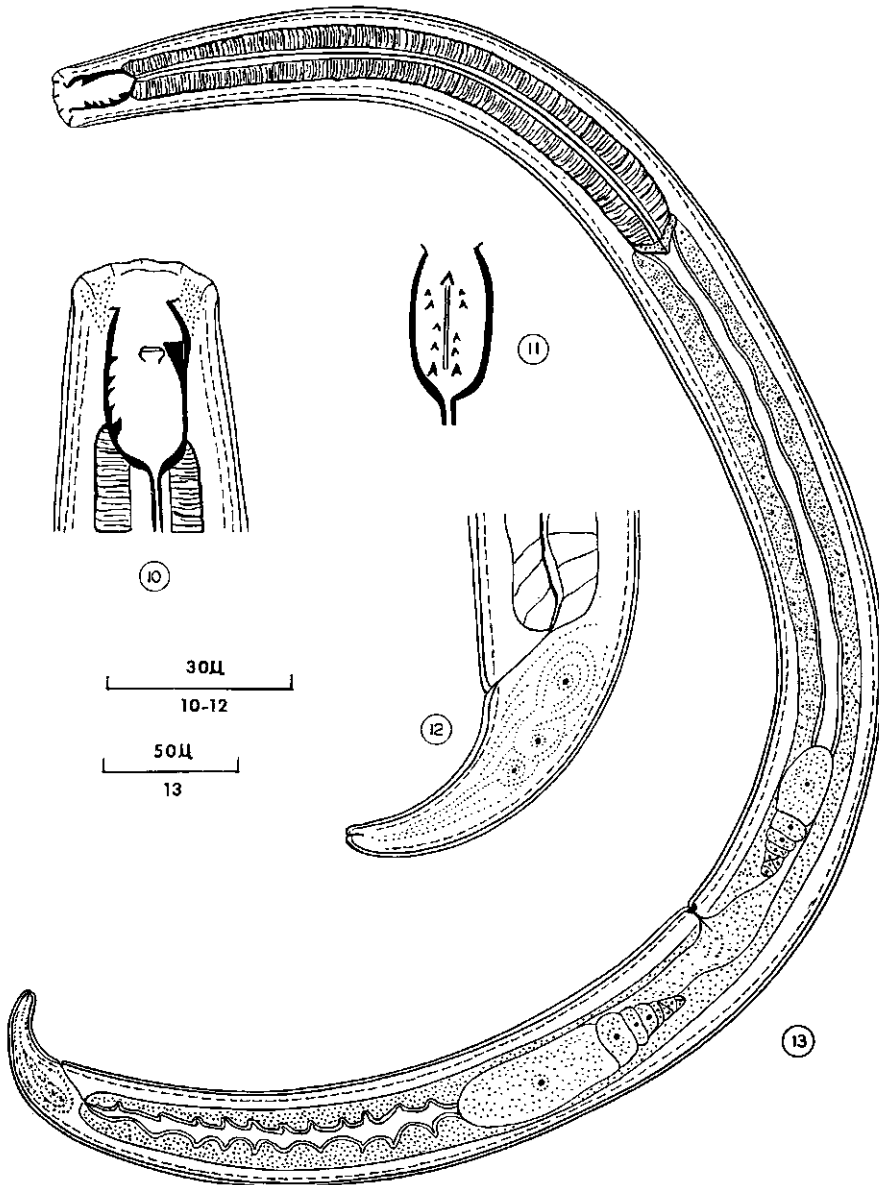
Diagnosis (emended).—Walls of buccal cavity fairly thick, dorsal tooth situated in anterior third section. Denticles arranged in two groups. Anterior group in transverse rows; posterior group irregularly arranged. Female didelphic, ovaries reflexed. Tail short, conoid arcuate or broadly rounded. Tail glands and terminal opening present or absent.

Type species.—*Granonchulus decurrens* (Cobb, 1917) Andrásy, 1958.

KEY TO SPECIES OF GENUS *Granonchulus*

Females

1. Transverse denticles arranged in several rows opposite dorsal tooth.....
.....*brachyuroides* (Micoletzky) 2
2. Transverse denticles arranged in two rows opposite dorsal tooth.....
Tail conoid, ventrally arcuate, terminus acutely rounded.....*decurrens* (Cobb)
Tail bluntly conical to hemispherical.....*schulsi* (Meyl)



FIGS. 10-13. *Sporonchulus minutus* n. sp. 10. Female head, lateral view. 11. Female buccal cavity, dorsoventral view. 12. Female tail. 13. Female.

***Granonchulus brachyuroides* (Micoletzky, 1925) n. comb.**Syn. *Mononchus brachyuroides* Micoletzky, 1925*Brachonchulus brachyuroides* (Micoletzky, 1925) Andrassy, 1958

(2 females).— $L = 0.93, 0.96$ mm; $a = 21.3, 22.6$; $b = 3.0, 3.1$; $c = 20.5, 20.7$; $V = 58, 59\%$ (after Micoletzky (10)).

Micoletzky (10) described this species on the basis of two mature females. His illustration of the female head shows a thick-walled buccal cavity, a large dorsal tooth situated in the anterior third section of the cavity and opposed by at least five transverse rows of small denticles. Posterior to these are a group of 18–20 slightly larger denticles, arranged irregularly. Micoletzky (10) states that this species is distinguished from *Mylonchulus brachyuris* (Bütschli, 1873) Altherr, 1953 only by the structures in the buccal cavity.

Andrassy (2) erected a new genus *Brachonchulus* to accommodate this species and a new species, *B. sumatrensis*. He designated *B. brachyuroides* as the type for the genus. However, I consider the taxonomic differences between *B. brachyuroides* and species in *Granonchulus* are insufficient to justify the setting up of a separate genus to accommodate these species.

G. brachyuroides differs from other species in this genus by the arrangement of the posterior denticles and in the number of transverse rows of anterior denticles.

Habitat.—Leaf axils of palm trees (according to Meyl (7)).

Geographical distribution.—Surinam ?

***Granonchulus decurrens* (Cobb, 1917) Andrassy, 1958**

(Figs. 14–16)

Florida Specimens

(3 females).— $L = 1.05$ mm (1.03–1.10); $a = 25.9$ (25.0–27.1); $b = 3.8$ (3.6–3.9); $c = 22.3$ (20.6–26.2); $V = 59\%$ (57–61); buccal cavity = $23 \times 13 \mu$; tail length = 0.047 mm (0.042–0.050).

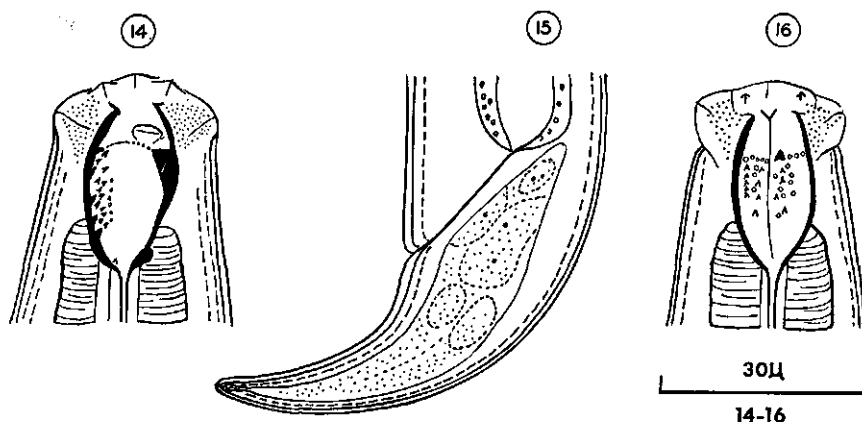
Cobb (6) first described and illustrated this species on two juvenile specimens. The following is a description of females from Florida which I consider belong to this species.

Buccal cavity about twice as long as wide, dorsal tooth situated in the anterior third section, opposed by denticles arranged in two groups. Anterior transverse rows consisting of from five to six very small denticles in each. Amphid aperture about 4μ wide, situated just forward of dorsal tooth apex. Esophagointestinal valve non-tuberculate. Female didelphic, ovaries reflexed. Tail conoid, ventrally arcuate. Caudal glands absent.

Cobb's original sketches of the juvenile of this species show a tail shaped very similarly to that illustrated here. His sketch of the ventral and lateral views of the buccal cavity corresponds closely to my illustrations.

Habitat.—Garden soil (Cobb (6)), about the roots of an evergreen tree, *Averrhoa carambola* L. (collected by Dr. A. C. Tarjan in 1961).

Geographical distribution.—Plant Introduction Gardens, Miami, Florida (by N. A. Cobb in 1917), and Lake Alfred area in Florida (by Dr. A. C. Tarjan in 1960).



FIGS. 14-16. *Granonchulus decurrens*. 14. Female head, lateral view. 15. Female tail. 16. Female head, dorsoventral view.

Granonchulus schulzi (Meyl, 1955) Andr ssy, 1958

(5 females).— $L = 1.9-2.2$ mm; $a = 24-30$; $b = 5.0-5.5$; $c = 52-61$; $V = 54-59\%$; buccal cavity = $(30-33) \times 20$ microns; tail length = 0.04 mm (after Meyl (8)).

(5 males).— $L = 2.0-2.2$ mm; $a = 26-39$; $b = 5.0-5.9$; $c = 53-60$; spicule length = 60μ ; supplements = 17-21 (after Meyl (8)).

Schulz (14) incorrectly identified specimens from coastal ground water as *Mylonchulus rotundicaudatus* (Skwarra, 1921) Andr ssy, 1958. Meyl (8) gave Schulz's specimens a new name, *Mononchus (Sporonchulus) schulzi*, and, at the same time, adequately described and illustrated males and females which he identified as this species. Andr ssy (2) transferred this species to a new genus, *Granonchulus*.

Meyl (8) in his description of the female, remarked that the walls of the buccal cavity were strongly cuticularized, dorsal tooth pointed and situated in the anterior third section. Denticles arranged in manner described by Andr ssy (2) for this genus. Amphid aperture very wide, about 8μ and situated at the level of dorsal tooth apex. Female didelphic, ovaries reflexed. Tail short, evenly bluntly conical to hemispheroid containing three small glands in tufted position and leading to a slightly terminal opening.

Male spicules, according to Meyl (8), relatively slender, tips blunt and indented, proximal part of spicula weakly cuticularized. Gubernaculum about 25μ long, trough-shaped. Guiding pieces strongly cuticularized, and distally forked.

Altherr (1) described and illustrated males and females of this species from Heligoland. His males were 3.1-3.6 mm in length and the females 3.5-3.9 mm in length. I examined males and females from Poland which I identified as this species. These specimens correspond very closely to Meyl's (8) description, measurements, and illustration. The esophagointestinal valve is non-tuberculate in the Polish specimens.

Habitat.—Coastal ground water (Schilksee); dunes (Heligoland).

Geographical distribution.—Schilksee, Heligoland, and Poland (collected by M. Stradonski).

***Prionchuloides* n. gen.**

Diagnosis

Dorsal tooth midway in buccal cavity opposed by two groups of denticles: one arranged in two longitudinal rows, the other irregularly dispersed. Female didelphic. Tail conoid arcuate, caudal glands and terminal opening absent.

Type species.—*Prionchuloides micoletzkyi* (Meyl, 1954) n. comb.

***Prionchuloides micoletzkyi* (Meyl, 1954) n. comb.**

Syn. *Mononchus* (*Sporonchulus*) *micoletzkyi* Meyl, 1954

Judonchulus micoletzkyi (Meyl, 1954) Andr ssy, 1958

(1 female).— $L = 1.7$ mm; $a = 22.1$; $b = 4.0$; $c = 14.0$; $V = 62\%$; buccal cavity = 40×34 microns (after Meyl (7)).

Meyl (7) erected this new species on one female. He illustrated the head area only. Meyl stated that this species occupied an intermediary position between the genera *Prionchulus* and *Sporonchulus*.

Buccal cavity barely longer than wide, strong dorsal tooth situated midway, opposed by two longitudinal rows of small denticles, each row along a rib (his illustration shows 12–13 very small denticles along each rib). At the level of the dorsal tooth are a number of denticles scattered irregularly (his illustration shows 10 of these denticles). Female didelphic. Tail the same as that of *P. muscorum*.

Andr ssy (2) placed this species in the genus *Judonchulus*, but since the type species of this genus has been returned to *Sporonchulus* I have described the new genus *Prionchuloides* to accommodate the remaining species, *J. micoletzkyi*.

Habitat.—In moist humus.

Geographical distribution.—Ischia Island, Italy.

Species Inquirendae

***Brachonchulus sumatrensis* Andr ssy, 1958**

(2 juveniles).— $L = 0.94$ mm; $a = 16.7$ (somewhat injured); $b = 3.1$; $c = 12.5$ (after Schneider (13)).

Schneider (13) described and illustrated two young female specimens which he did not name but placed in the subgenus *Sporonchulus* (Cobb, 1917). Andr ssy (2) designated the name *sumatrensis* to accommodate these specimens and placed this species in the genus *Brachonchulus* Andr ssy, 1958. The illustration by Schneider (13) shows that the buccal cavity is occupied by many denticles which may be undergoing a molting stage and, therefore, it would be questionable as to the number and position of the denticles in the adult of this species. Schneider remarked that the animal he measured was somewhat injured. Because of the paucity of existing information on this species, and the fact that the description is based on juvenile specimens, I feel

it is advisable to regard *B. sumatrensis* as *species inquirenda* pending future discovery of allocable adult specimens.

Habitat.—?

Geographical distribution.—Northern Sumatra.

Judonchulus brakenhoffi Andrassy, 1958

(*Female*).— $L = 3.04$ mm; $a = 30.4$; $b = 4.6$; $c = 18.0$ (after Brakenhoff (3)).

Brakenhoff (3) gave a brief description but no illustration of a female which he did not name. His specimen was apparently a juvenile as he remarked that it belonged to an early stage and was not sexually differentiated. He stated that the buccal cavity was 1/10th as long as the esophagus (the buccal cavity would, therefore, be about 70μ long), with a dorsal tooth situated in the proximal half but relatively smaller than as a rule in the *Mononchus*. He mentioned the presence of several small dispersed teeth located on the wall of the buccal cavity. The tail of his specimen was conical with rather pointed terminus and ventrally incurved.

Micoletzky (9) considered that Brakenhoff's specimen belonged to the subgenus *Iotonchus* (Cobb, 1916). Andrassy (2) named this specimen *Judonchulus brakenhoffi* and assigned it to this new genus. Brakenhoff's specimen possesses certain features in common with species in the genus *Iotonchus* (Cobb, 1916) Pennak, 1953, and, therefore, *Judonchulus brakenhoffi* is designated *species inquirenda* with the hope that future discovery of specimens will shed light on its generic relationships.

Habitat.—Bog soil.

Geographical distribution.—Northwest German lowlands.

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