

THE MONONCHIDAE: A FAMILY OF PREDACEOUS NEMATODES

VII. GENUS PRIONCHULUS (NEMATODA:MONONCHIDAE)

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Males and females of *Prionchulus muscorum* and of *P. longus* collected from various localities in the United States and Canada are considered and compared. Females of *P. punctatus*, including two specimens exhibiting bivulvarity, are described and illustrated. Taxonomic keys are provided for the males and females of this genus.

Introduction

This paper is the seventh in a series dealing with the taxonomy of the family Mononchidae Chitwood and Chitwood, 1937, a family of predaceous nematodes inhabiting soil and fresh water. Cobb (1916) described *Prionchulus* as a subgenus under the genus *Mononchus* Bastian, 1865. Wu and Hoeppli (1929) were the first to consider *Prionchulus* at the generic level. The purpose of this paper is to present new information and to evaluate the status of the nominal species in this genus.

Materials and Methods

Collecting, preparing of slide mounts, and measuring and illustrating of nematodes were done as previously described by Mulvey (1961).

Taxonomy

Genus PRIONCHULUS Wu and Hoeppli, 1929

DIAGNOSIS EMENDED.—Family Mononchidae Chitwood and Chitwood, 1937. Buccal cavity about twice as long as wide, sides almost parallel, dorsal tooth stout, single, directed anteriorly, and situated in the anterior half of the buccal cavity, opposed by few to numerous denticles arranged along two longitudinal ribs. Esophagointestinal valve non-tuberculate. Ovaries two, opposed, reflexed, egg shell smooth, ridged, or punctate. Testes two, outstretched, spicule stout, arcuate. Accessory pieces present or absent. Ejaculatory and rectal glands present or absent. Tails usually short and conoid, with or without caudal glands and terminal opening. Males present or absent.

TYPE SPECIES.—*Prionchulus muscorum* (Dujardin, 1845) Wu and Hoeppli, 1929.

Prionchulus muscorum (Dujardin, 1845) Wu and Hoeppli, 1929 (Figs. 1-7)

Mononchus ctenodentatus Tysowski, 1915

Canadian specimens (Table I) with large denticles, consisting of 10-15 in each of the two longitudinal rows. Amphid aperture width from 5-6 μ wide. Reproductive tract well developed in all the females examined, uteri containing either one or two eggs with smooth or ridged shells. No sperm observed in the reproductive tract. All specimens had fairly long tails with broadly rounded termini. Clark (1960) observed caudal glands in his specimens. These were not found in any of the several hundred Canadian specimens examined.

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KEY TO SPECIES OF THE GENUS *Prionchulus*

Females

1. Caudal glands and terminal opening in the tail present. *thiocrenobius* Pax and Soós 2
Caudal glands and terminal opening in the tail absent. 2
2. Reproductive tract with well-developed spermatheca and valvular apparatus between oviduct and uterus. 3
Reproductive tract without spermatheca and a valvular apparatus between oviduct and uterus. 4
3. Vulva 54–57% of body length, tail relatively short ($c = 24-31$). *spectabilis* (Ditlevsen)
Vulva 61–69% of body length, tail relatively long ($c = 14-25$). *longus* (Thorne)
4. Longitudinal denticles in buccal cavity medium-large, generally evenly spaced, tail bulky, mostly with bluntly rounded terminus, egg shell smooth or rugose. *muscorum* (Dujardin)
Longitudinal denticles small, unevenly spaced, tail relatively slender, with acutely rounded terminus, egg shell punctate (echinulate). *punctatus* (Cobb)

KEY TO SPECIES OF THE GENUS *Prionchulus*

Males

1. Males rare, spicule not provided with a central stiffening rod. *muscorum* (Dujardin)
Males in equal proportion to females, spicule provided with a central stiffening rod. 2
2. Tail pores very prominent, stiffening rod heavily culticularized, about 35% of spicule length. *longus* (Thorne)
Tail pores not prominent, stiffening rod slender, about 50% of spicule length. *spectabilis* (Ditlevsen)

Only one male (Table I) was found amongst the several hundred females examined. Testes two, containing many sperm, spicules bulky without lateral accessory pieces. Tail conoid, terminus broadly rounded. Schneider (1923), who described and illustrated two males which he considered belonged to this species, mentioned an accessory piece with bifurcated ends. His specimens had 16 supplements. Schuurmans Stekhoven and Teunissen (1938) recorded five males which they assigned to this species.

Andrássy (1958) designated *P. punctatus* as a synonym of *P. muscorum*. Clark (1960) considered *P. punctatus*, which has eggs with a punctate (echinulate) shell, a valid species. I agree with Clark's decision.

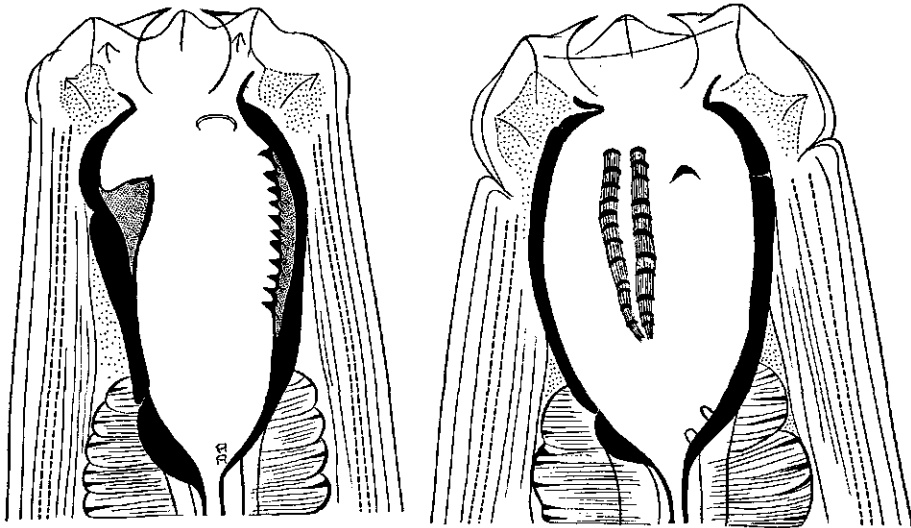
I agree with Andrássy (1958) and Clark (1960), who place *Mononchus* (*P. muscorum macrolaimus* Cobb, 1917 in synonymy of *P. muscorum*, and with Clark (1960), who considered *M. (P.) longicollis* Cobb, 1917 as *species inquirenda*. Description and illustrations of the latter species were based on juvenile forms.

Californian specimens (Table I) from two localities varied in the size of the denticles and tail terminus shape. Those from the Inverness area had large to very large denticles in two rows of 12–15 denticles in each. All were mature females with no sperm in the reproductive tract. Tails were long with acutely rounded termini. Specimens from the Tuolumne River area varied considerably in the size of the denticles, which ranged from small to large. The tail termini were broadly rounded.

Loof (1961) remarked that the body length of *P. muscorum*, according to records given by many workers, was 1.6–2.7 mm. My findings agree with those of Loof.

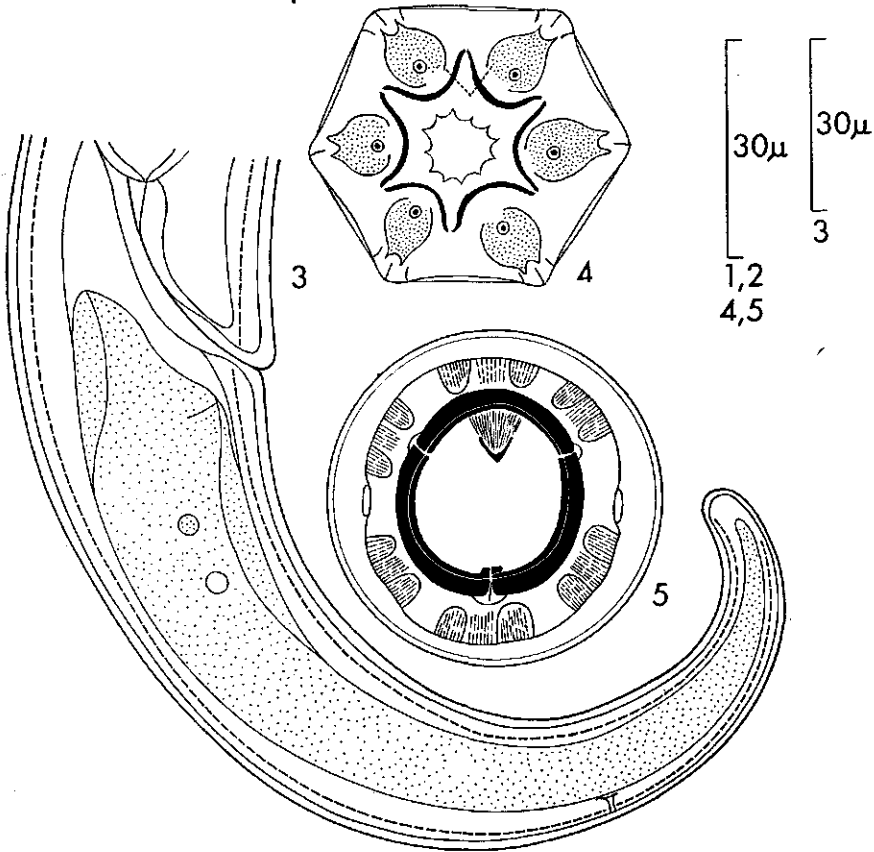
GEOGRAPHICAL DISTRIBUTION.—Cosmopolitan.

FIGS. 1–5. *Prionchulus muscorum*. 1. Female head, lateral view. 2. Female head, dorsoventral view. 3. Female tail. 4. *En face* view of head at level of labia. 5. *En face* view of head at level of dorsal tooth.



1

2



3

4

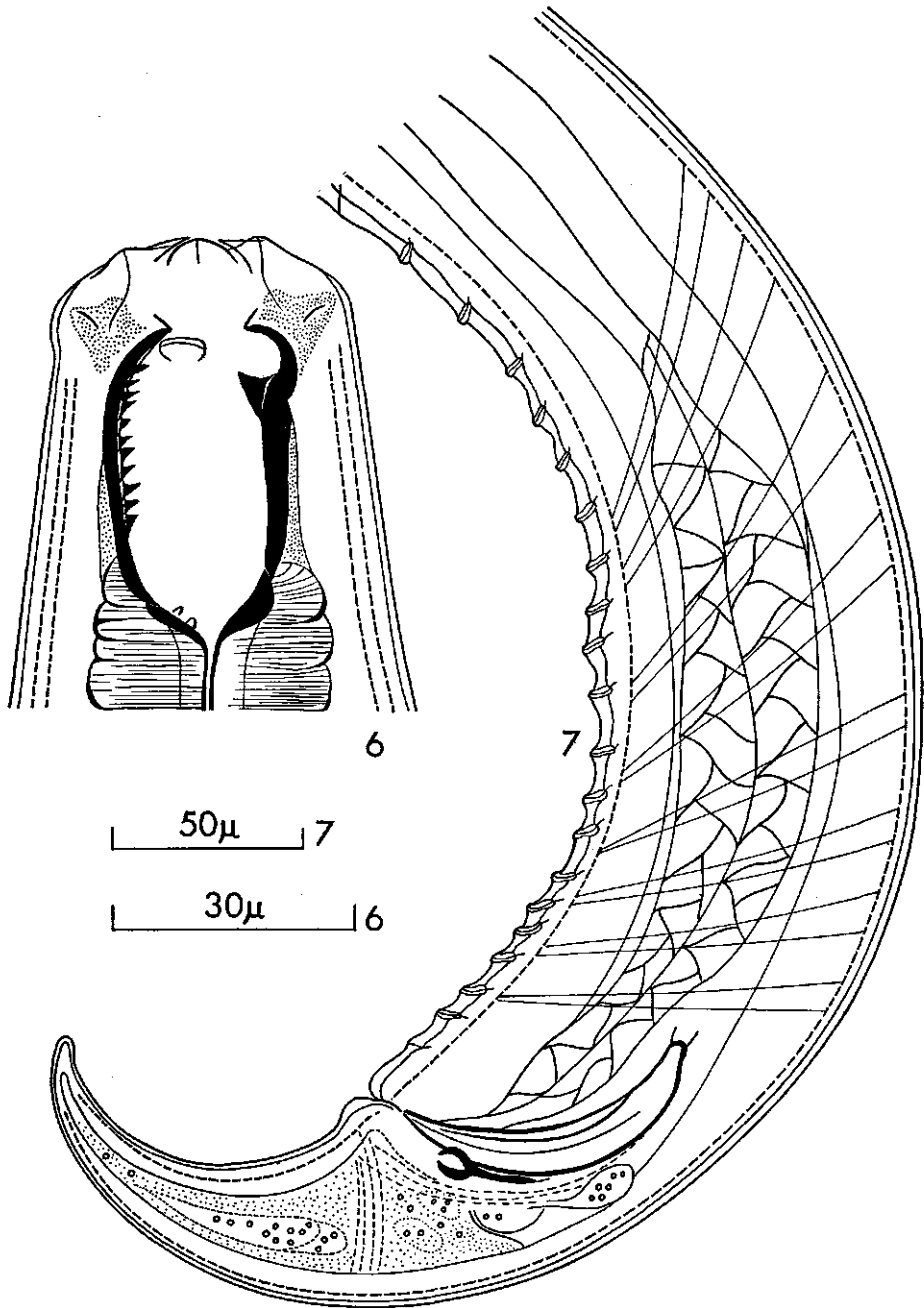
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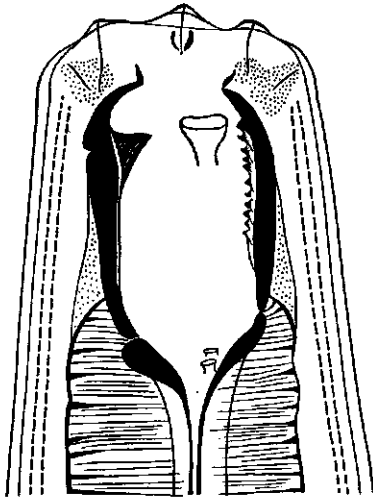
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FIGS. 6, 7. *Prionchulus muscorum*. 6. Male head. 7. Male tail, showing spicule and supplements.

TABLE I
Prionchulus muscorum from various localities in Canada and the United States

Locality	No. specimens	Body length (mm)	Buccal cavity		Tail length (μ)	c value	V% (spicule)	Tail terminus
			Length (μ)	Width (μ)				
CANADA								
Lake Hazen, Ellesmere Is., N.W.T.	15 ♀	1.8-2.2	39-46	22-28	150-200	10-13	60-65	Bluntly rounded
Ottawa area, Ontario	20 ♀	1.9-2.5	47-53	27-33	160-210	10-15	60-66	"
Hope area, British Columbia	1 ♀	1.9	40	21	140	14	63	"
	1 ♂	2.2	43	25	110	20	(90) μ	"
UNITED STATES								
Inverness, Marin County, California	10 ♀	1.8-2.1	39-43	25-28	140-170	11-13	57-61	Acutely rounded
Tuolumne River area, California	10 ♀	2.0-2.4	40-45	22-26	170-170	13-16	61-64	Bluntly rounded
Gainesville, Florida	3 ♀	2.1-2.4	39-43	23-28	120-150	16-18	60-67	"

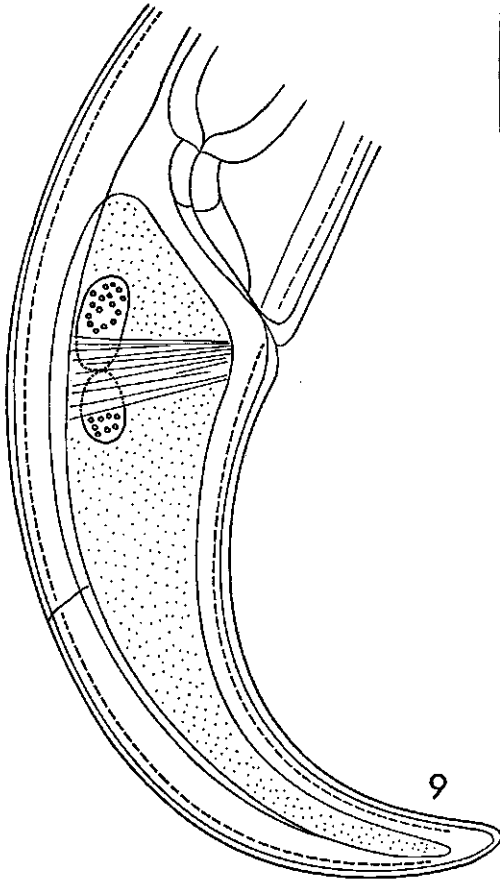


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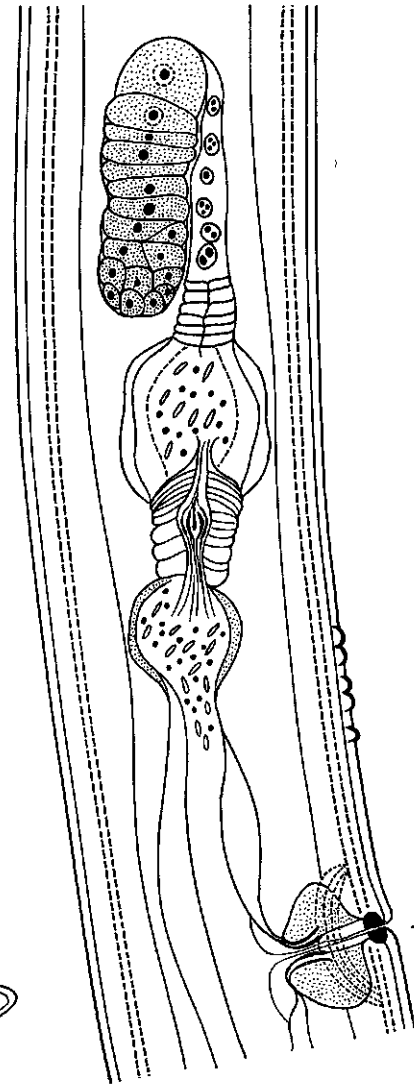
30μ | 9

50μ | 10

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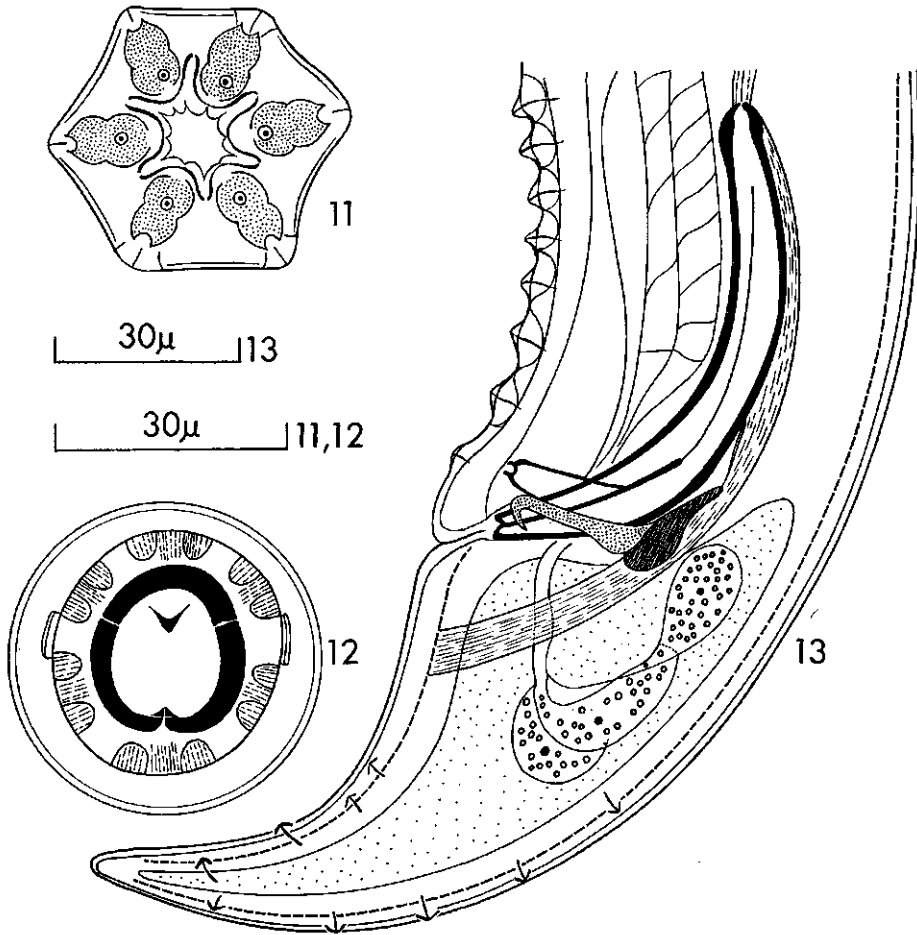
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Prionchulus longus (Thorne, 1929) Andrásy, 1958 (Figs. 8–13)

Prionchulus muscorum in Mulvey, 1963

Thorne (1929) described and illustrated this species. The females in Thorne's collection were too young to show the details of the ovaries. The females which I examined from Colorado and Canada (Table II) were mature specimens.

Buccal cavity about twice as long as wide, amphid aperture width 5–6.5 μ . Denticles medium-sized in two longitudinal rows of 14 in. each. Esophago-intestinal valve non-tuberculate. Female didelphic, ovaries reflexed, with distinct valve between oviduct and uterus, spermatheca filled with sperm.



FIGS. 11–13. *Prionchulus longus*. 11. *En face* view at level of labia. 12. *En face* view at level of dorsal tooth. 13. Male tail showing spicule and several supplements.

FIGS. 8–10. *Prionchulus longus*. 8. Female head. 9. Female tail. 10. Anterior reproductive tract, showing vulval papillae (cuticular thickenings) near vulval labia.

TABLE II
Prionchilus longus from Canada and the United States

Locality	No. specimens	Body length (mm)	Tail length (μ)	<i>c</i> value	Buccal cavity		Spicule length (μ) (Supplis.)	<i>V</i> (%)
					Length (μ)	Width (μ)		
CANADA								
Lake Hazen, Ellesmere Is., N.W.T.	5 ♂♂	2.1-2.5	100-120	20-25	36-39	20-22	75-85 (21-23)	—
	6 ♀♀	2.2-2.4	130-160	14-17	35-39	20-22	—	61-68
Gatineau area, Quebec	15 ♂♂	2.3-2.9	100-125	23-26	40-43	21-23	95-108 (26-30)	—
	15 ♀♀	2.1-3.1	120-160	16-22	39-43	21-23	—	65-69
UNITED STATES								
Trail Ridge, Colorado	1 ♂	2.2	90	24	38	20	90 (22)	—
	1 ♀	2.2	120	18	37	20	—	68
Alaska	1 ♂	2.6	110	24	41	24	105 (22)	—
Long's Peak, Colorado (after Thorne 1924)	2 ♂♂	2.0	75	27	38	20	75 (18-20)	—
	5 ♀♀	2.14	110	20	38	20	—	66

Many females with distinct cuticular thickenings (vulval pores) immediately posterior and anterior to vulval lips. Tail conoid, without caudal glands or terminal opening.

Males numerous, spicula arcuate, with gubernaculum and distinct median thickening rod, accessory pieces with bifurcated ends. Supplements many, 18-24 well-developed and several vestigial anterior supplements.

GEOGRAPHICAL DISTRIBUTION.—Long's Peak, Colorado (Thorne, 1929), and Colorado, U.S.A.; several areas in Canada.

Prionchulus punctatus (Cobb, 1917) Andrásy, 1958 (Figs. 14-20)

All females examined (Table III) contained from one to two eggs which had punctate or echinulate shells and measured 72-95 μ long by 45-60 μ wide.

Denticles small, in two longitudinal rows of 10-13 in. each. Amphid aperture 5-6 μ wide. Female didelphic, amphidelphic, ovaries reflexed. Uterus distinctly vacuolated. Tail conoid, arcuate, with acutely rounded terminus. Male unknown.

This species is fairly common in Ontario. The punctate shell of the egg (Fig. 19) distinguishes it from *P. muscorum*, in which the egg shell is either smooth or ridged. The vacuolated uterus (Fig. 18) is also a good distinguishing character for *P. punctatus*. Females (with punctate egg shells) from The Netherlands, Switzerland, and France were also examined.

The Canadian specimens agree with the original description and illustration of this species by Brakenhoff (1914). I disagree with Andrásy's (1958) placement of *P. punctatus* in synonymy of *P. muscorum* because I feel that the difference in egg shell sculpturing is sufficient for the separation of these two species. Clark (1960) stated that echinulate eggs are never found in specimens of *P. muscorum*. I concur with his findings. He recognized *P. punctatus* as a valid species.

BIVULVARIETY.—Two females, of the several hundred specimens of *P. punctatus* examined, had two vulvas. One of these bivulvar specimens (Fig. 20) was didelphic ($V^1 = 66$, $V^2 = 72$), and the other had three ovaries ($V^1 = 60$, $V^2 = 64$). In the latter the reproductive tract leading to the anterior vulva was single, while that leading to the posterior vulva was didelphic, amphidelphic.

GEOGRAPHICAL DISTRIBUTION.—The Netherlands, France, Switzerland, and Germany; Provinces of Ontario, Quebec, Alberta, and British Columbia, Canada.

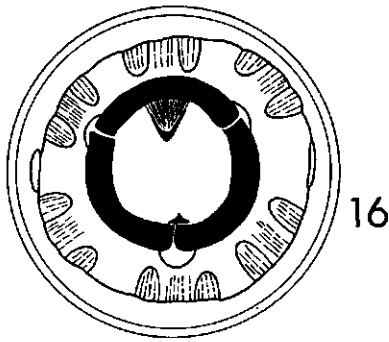
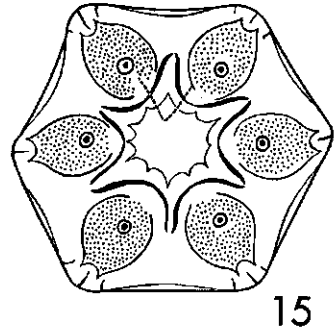
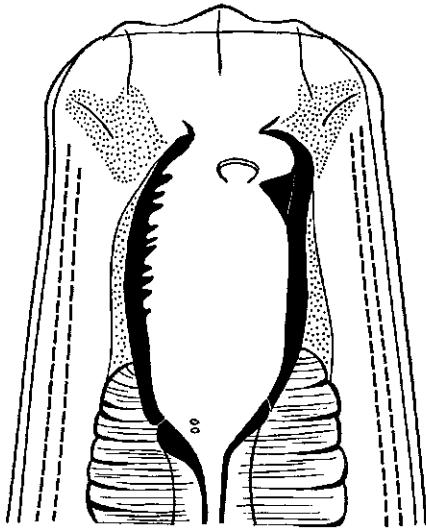
Prionchulus spectabilis (Ditlevsen, 1912) Andrásy, 1958

(FEMALES).—L = 4.0 mm; $a = 31$; $b = 5$; $c = 31$; $V = 54$; buccal cavity = $47 \times 27 \mu$; tail length = 130 μ (after Ditlevsen 1912, p. 226).

(MALES).—L = 3.6 mm; $a = 45$; $b = 4.9$; $c = 45$; supplements = 24-28 (after Ditlevsen 1912, p. 226).

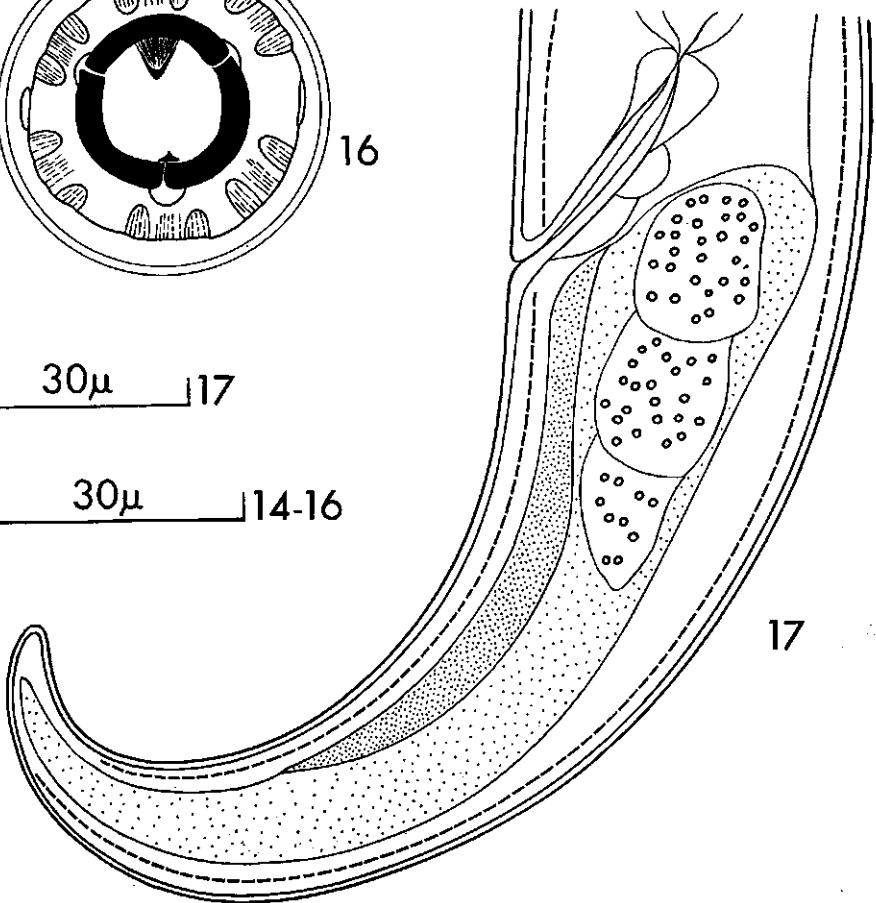
Ditlevsen (1912) described and illustrated the male and female of this species. In 1927 he described and illustrated specimens from Greenland which he considered belonged to this species. The spicules of the males in this collection were 125 μ long and the supplements 26-29 in number.

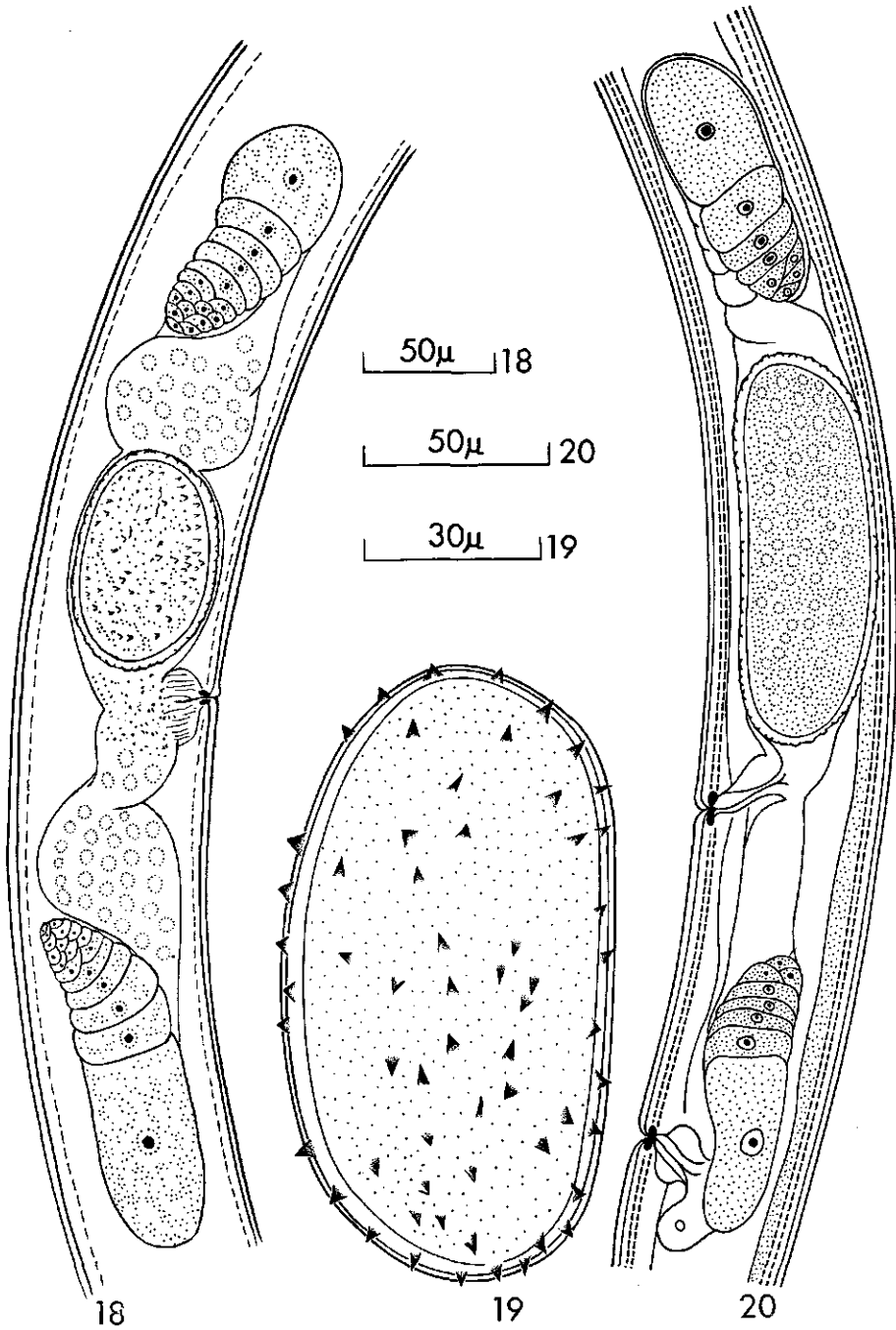
His illustration (1912, Fig. 17) of the head shows two longitudinal rows of large denticles with eight in each row. Buccal cavity about twice as long as



30μ 17

30μ 14-16





FIGS. 18-20. *Prionchulus punctatus*. Fig. 18. Female reproductive tract. Fig. 19. Egg, showing many punctations in shell. 20. Female with two vulvas and two reproductive tracts.

FIGS. 14-17. *Prionchulus punctatus*. 14. Female head. 15. *En face* view at level of labia. 16. *En face* view at level of dorsal tooth. 17. Female tail.

TABLE III
Prionchilus punctatus from various areas in Canada

Locality	No. females*	Body length (mm)	Tail length (μ)	c value	Buccal cavity		V (%)
					Length (μ)	Width (μ)	
Lake Hazen,	10	2.0-2.2	140-165	12-16	38-40	20-22	62-64
Ellesmere Is., N.W.T.	10	1.7-2.2	120-160	12-15	34-40	18-22	61-64
Blackburn area, Ontario	10	1.5-1.7	90-115	14-17	30-33	15-19	62-65

*All females contained one or more eggs with punctate shells.

wide, dorsal tooth anterior. Tail conoid, ventrally arcuate with an acutely rounded terminus.

Male spicules angular, provided with accessory pieces having bifurcated ends.

HABITAT.—Strand meadow, meadow frequently inundated by seawater, supporting typical halophyte vegetation.

GEOGRAPHICAL DISTRIBUTION.—Hellerup near Copenhagen, Denmark, and Greenland (by Ditlevsen and O. Hagerup, respectively); Finland (by Guido Schneider); Barseback in Sweden (by Allgén); Switzerland (by Steiner, which according to Ditlevsen (1927), is questionable).

Prionchulus thiocrenobius (Pax and Soós, 1943) Andrassy, 1958

Pax and Soós (1943) erected this species on an adult female. They stated that the esophagus was cylindrical and the hind end had no bulbous swelling. Their illustration shows a thin-walled buccal cavity with a rather large dorsal tooth opposed by two short, longitudinal rows of very small denticles. Female didelphic, amphidelphic. Tail elongated with cylindrical posterior area and rounded terminus. Caudal glands present, tail gland opening terminal. Male unknown. This species may be separated from others in the genus by the shape and details of the tail, and by the position of the vulva.

(FEMALE).—L = 1.6 mm; $a = 21$; $b = 4.3$; $c = 5.5$; $V = 47$.

HABITAT.—Sulphur springs.

GEOGRAPHICAL DISTRIBUTION.—Wieniec near Leslau (formerly Wloctawek in Warthegau), Germany.

Acknowledgments

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