

PARASITES OF THE AMERICAN MUSKRAT
(*FIBER ZIBETHICUS*) *

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In previous papers¹ the finding of a varied and abundant parasitic fauna in muskrats in Nebraska was announced, and attention was called to the fact that with the exception of a brief note by Leidy² there are no references to or descriptions of the parasites of the muskrat. Those papers reported the finding of seven new species of trematodes, one new species of cestode, and two new species of nematodes. In more recent investigations, two additional species of trematodes, one species of cestode and one species of nematode have been found.

A recent appeal to American helminthologists in the JOURNAL OF PARASITOLOGY by Prof. Al. Mrazek further emphasizes the lack of information concerning the parasites of the muskrat and the desirability of more extensive data. For these reasons it has seemed advisable to publish at once this preliminary description of the parasites which we have found in American muskrats and later the more detailed descriptions.

The forms recorded by others are the following:

Leidy² mentions finding a number of trematodes in the small intestine of the muskrat which he placed in *Echinostomum echinatum* Zeder. He also found in the muskrat two specimens of a trematode which he says "appear to belong to *Amphistomum subtriquetrum* Rud." We question the correctness of the diagnosis of this trematode and suspect that they were specimens belonging to the new genus and species *Wardius zibethicus*.

Dr. B. H. Ransom reports an unidentified species of *Filaria* from the muskrat in the collection of the Bureau of Animal Industry, Washington, D. C.

* Contributions from the Zoological Laboratory of the University of Nebraska, No. 113.

1. Barker, F. D., and Laughlin, J. W.: A new species of trematode from the muskrat, Tr. Am. Micr. Soc., 1911, 30, 261-274. Barker, F. D.: The Parasites of the Muskrat, Science, 1913, n. s., 37, 1268.

2. Leidy, Joseph: On the Trematodes of the Muskrat, Proc. Acad. Nat. Sci., Phila., 1888, 40, 126-127.

The forms which we have discovered are as follows:

TREMATODES

Echinostomum coalitum Barker and Beaver, *sp. nov.*³ (Plate 1, Fig. 1).

Twenty-two specimens of an unusually large trematode were found among several hundred specimens of different species of trematodes in the intestines of forty-six muskrats. The condensed description of this species based on the specimens obtained is as follows:

Body much elongated, flattened dorso-ventrally, tapering posteriorly, slightly tapering anteriorly. When alive, color reddish or creamy, body very flabby. Length 22 to 30 mm., width at level of ovary 1.5 to 2.3 mm., at level of acetabulum 1 to 1.4 mm. Anterior part of body covered with minute spines. Well-defined reniform collar surrounds oral sucker. Collar has wide shallow or deep narrow indentation in posterior edge of ventral surface and bears 35 spines arranged in single or slightly alternate rows, 25 large spines on rim and 5 smaller spines on each lappet. Oral sucker circular, terminal, 0.37 to 0.46 mm. in diameter. Acetabulum at level of second anterior sixth of body, pouch like, strongly muscular, 1.37 to 1.60 mm. long by 1.12 to 1.32 mm. wide. Opening of sucker circular, very large, 0.72 mm. in diameter. Mouth and pharynx separated by tubular non-muscular prepharynx, 0.2 to 0.3 mm. long. Esophagus 1.03 to 3.2 mm. long. Intestinal ceca tubular, slightly undulating, increasing in caliber toward posterior end of body where they end blindly. Testes close together in median plane, at third fourth of body, one testis directly behind other; elliptical; anterior testis entire to four-lobed, posterior with smooth or undulating margin. Cirrus pouch large, gourd-shaped, with base to right or left at level of anterior third of acetabulum. Cirrus pouch encloses tubular, U-shaped seminal vesicle, voluminous granular prostate gland and large muscular-walled cirrus. Genital pore a little anterior to anterior margin of acetabulum.

Ovary ovoid, margin smooth or undulating, transverse, median, in anterior part of posterior half of body. Shell gland well defined, posterior to ovary and slightly larger than it. Seminal receptacle and Laurer's canal not evident. Yolk glands voluminous, of small spherical follicles, masses continuous, in lateral areas, extending from slightly caudad to acetabulum to extreme posterior end of body where they coalesce in the median plane, completely filling body posterior to testes. Transverse vitelline ducts and reservoir present at level

3. Abstract of unpublished research by Franklin D. Barker and Chester A. Beaver.

EXPLANATION OF PLATES

All drawings were made with a camera lucida from original specimens. The degree of magnification is indicated by a vertical line 1 mm. in length at the side of each figure.

ABBREVIATIONS

<i>A D</i> , Adhesive disc	<i>P S</i> , Posterior sucker
<i>Ac</i> , Acetabulum	<i>S</i> , Sucker
<i>B C</i> , Bursa copulatrix	<i>S G</i> , Shell gland
<i>C P</i> , Cirrus pouch	<i>S R</i> , Seminal receptacle
<i>Cr</i> , Cirrus	<i>S V</i> , Seminal vesicle
<i>Es</i> , Esophagus	<i>T</i> , Testis
<i>Ex</i> , Excretory reservoir	<i>Ut</i> , Uterus
<i>G P</i> , Genital pore	<i>Va</i> , Vagina
<i>G Pa</i> , Genital papilla	<i>V D</i> , Vas deferens
<i>L C</i> , Laurer's Canal	<i>V G</i> , Vitelline glands
<i>Ov</i> , Ovary	<i>V R</i> , Vitelline reservoir

PLATE 1

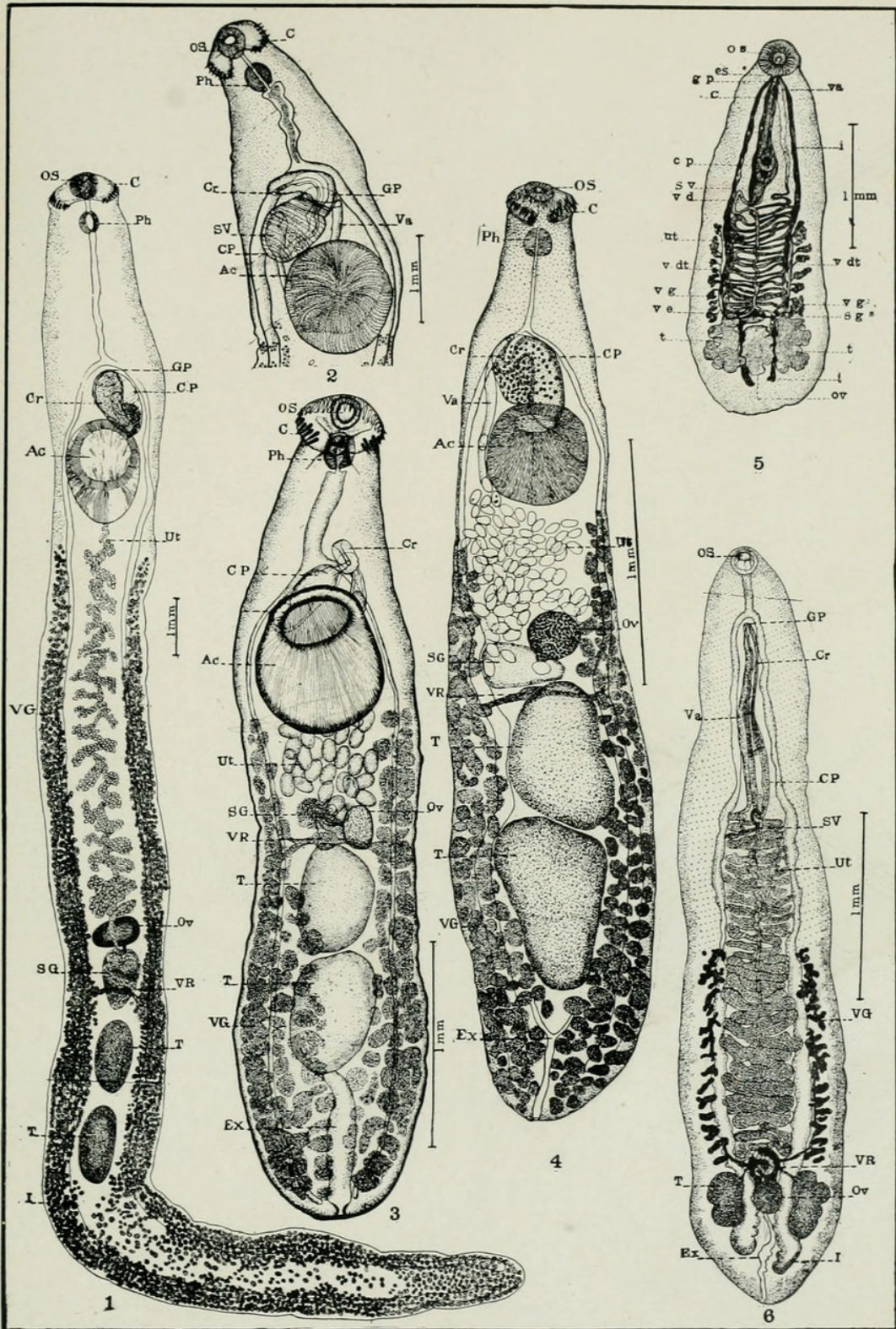


Fig. 1.—*Echinostomum coalitum* Barker and Beaver, ventral view, specimen slightly compressed.

Fig. 2.—*Echinostomum coalitum*, anterior end enlarged to show cirrus pouch and contents.

Fig. 3.—*Echinoparyphium contiguum* Barker and Bastron, ventral view, specimen compressed.

Fig. 4.—*Echinostomum callawayensis* Barker and Noll, ventral view, specimen compressed.

Fig. 5.—*Notocotyle quinqueseriale* Barker and Laughlin, ventral view.

Fig. 6.—*Catatropis filamentis* Barker, ventral view.

PLATE 2

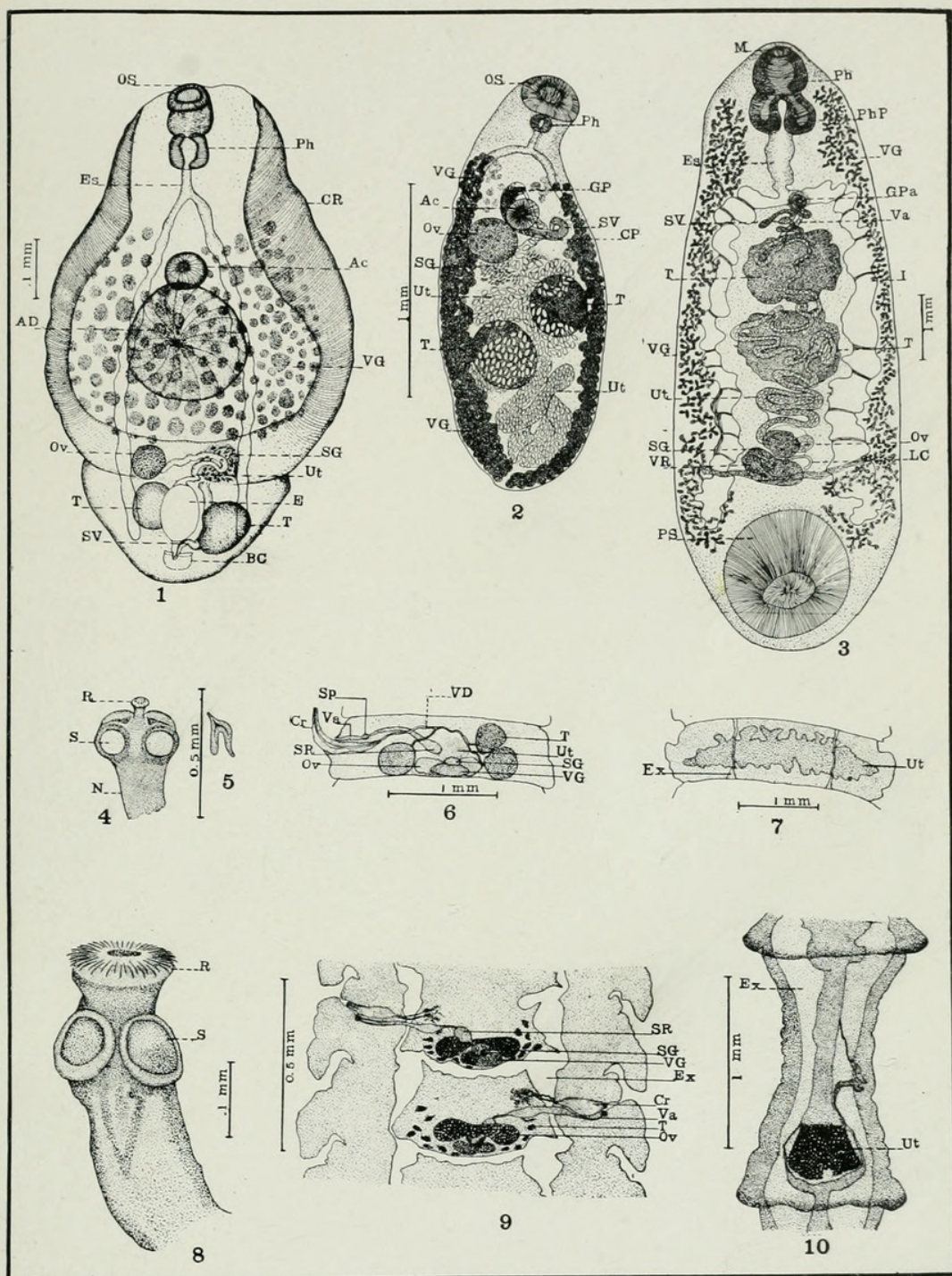


Fig. 1.—*Hemistomum craterum* Barker and Noll, ventral view.

Fig. 2.—*Plagiorchis proximus* Barker, ventral view.

Fig. 3.—*Wardius zibethicus* Barker and East, ventral view, specimen compressed.

Fig. 4.—Scolex of *Hymenolepis evaginata* Barker and Andrews.

Fig. 5.—Hook of *Hymenolepis evaginata*.

Fig. 6.—Mature proglottid of *Hymenolepis evaginata*.

Fig. 7.—Gravid proglottid of *Hymenolepis evaginata*.

Fig. 8.—Scolex of *Anomotaenia telescopica* Barker and Andrews.

Fig. 9.—Mature proglottid of *Anomotaenia telescopica*, reconstruction from frontal sections.

Fig. 10.—Gravid proglottid of *Anomotaenia telescopica*.

of shell gland. Uterus median with densely coiled transverse tubes extending from anterior testis to genital pore.

Eggs numerous, oval, light brownish color, 0.104 to 0.108 mm. by 0.067 to 0.070 mm. Lids small, opercular rim absent. Excretory reservoir tubular, in median plane of posterior part of body, forming a large bulb-like reservoir at extremity of body; excretory pore terminal, median.

Found in duodenum of host.

Echinoparyphium contiguum Barker and Bastron, *sp. nov.*⁴ (Plate 1, Fig. 3).

Body spindle- or boat-shaped, flattened dorso-ventrally, anterior end tapering, posterior end bluntly rounded. Length 3.3 to 4.3 mm.; width 0.57 to 0.70 mm. at level of acetabulum. Oral sucker almost surrounded by well-defined collar with ventral median incision. Collar has 37 spines arranged in alternate rows of 14 oral and 15 aboral spines on rim and one set of 4 on each ventral flap or lappet. Cuticula smooth, without spines. Oral sucker subterminal, 0.12 to 0.16 mm. by 0.09 to 0.14 mm.

Large circular muscular acetabulum, 0.45 to 0.57 mm. in diameter at middle of anterior half of body. Oval muscular pharynx separated from mouth by short prepharyngeal tube. Wide, thin-walled esophagus extending from pharynx to level of acetabulum where it bifurcates; intestinal ceca extend straight to posterior end of body and end blindly.

Ovary small, ovoid, 0.16 to 0.19 mm. by 0.14 to 0.15 mm. in middle of body, slightly to left of median line. Shell gland diffuse, without definite outline, at level of ovary and to right of median line. Laurer's canal present. Seminal receptacle not evident. Testes very large, in anterior part of posterior half of body, median, one directly behind the other. Uterine coils loose, occupying intercecal zone between shell gland and acetabulum. Vagina opens with cirrus at genital pore just posterior to bifurcation of esophagus. Cirrus pouch club-shaped, extending from genital pore obliquely caudad, dextral and dorsal to acetabulum. Its base at level of middle of acetabulum. Large tubular seminal vesicle, granular prostate gland, and muscular cirrus lie within cirrus pouch.

Vitelline glands coarsely acinous, extending in continuous lateral masses from acetabulum to extreme posterior end of body. Masses more voluminous caudad to posterior testis. Transverse vitelline ducts and median vitelline reservoir at level of anterior margin of anterior testis. Eggs limited in number, from 30 to 100; oval, 0.096 to 0.109 mm. in length by 0.068 to 0.070 mm. in width. Lid present.

4. Extract of unpublished research by Franklin D. Barker and Carl Bastron.

Excretory system Y-shaped, lateral arms unite just caudad to posterior testis, forming large tubular median reservoir; excretory pore median and slightly ventral, at posterior end of body.

Found in duodenum of host. ,

Echinostomum callawayensis Barker and Noll, *sp. nov.*⁵ (Plate 1, Fig. 1).

Body spatulate; anterior end tapering, posterior end bluntly rounded. Length 4.28 to 6.91 mm.; width 1.04 to 1.49 mm. Anterior end almost entirely surrounded by oval collar-like expansion, 0.34 to 0.51 mm. wide, having a definite ventral incision. Collar armed with double row of alternately arranged spines varying in number from 37 to 41, 31 to 33 on rim and 2 to 5 on each flap. Length of collar spines 0.0385 to 0.056 mm., mid-dorsal spine being smallest. Cuticula smooth, without spines. Acetabulum circular, cavity sac-like, musculature well developed, lying between first and second anterior fourths of body.

Oral sucker 0.08 to 0.16 mm. long by 0.12 to 0.17 mm. wide, separated from pharynx by short narrow prepharyngeal tube. Weakly developed but wide esophagus bifurcates into narrow ceca which broaden posterior to acetabulum and end blindly between posterior testis and posterior end of worm. Testes more or less elliptical, lying tandem in anterior three-fourths of posterior half of body. Cirrus pouch, pear-shaped, containing thick, muscular-walled cirrus, tubular somewhat coiled seminal vesicle, and granular prostate gland; pouch right or left and anterior to middle of acetabulum. Genital pore right or left of median line and anterior to acetabulum.

Ovary nearly globular, in middle of body right or left of median line; large, compact, well-defined, pear-shaped shell gland between ovary and anterior testis. Uterine coils compact, almost entirely anterior to ovary, filling region between intestinal ceca. Laurer's canal present; seminal receptacle not found. Eggs numerous, straw colored, oval, lid small, without opercular rim; length 0.0805 to 0.1015 mm., width 0.042 to 0.063 mm. Vitelline glands coarsely acinous, extending from posterior border of acetabulum in continuous lateral masses to posterior end of worm; posterior to testis vitelline glands extend toward median line but do not coalesce. Transverse vitelline duct and reservoir at level of anterior margin of anterior testis.

Excretory system Y-shaped, with slender median reservoir; excretory pore in median line at posterior end of worm.

Found in duodenum of host.

5. Extract of unpublished research by Franklin D. Barker and William C. Noll.

Echinostomum armigerum Barker and Irvine, *sp. nov.*⁶ (Text Fig. A).

Body elliptical, somewhat flattened dorsoventrally, anterior end slightly tapering, posterior end wider and more rounding. Length 9.4 to 12.4 mm.; width 1.2 to 1.8 mm. When alive pinkish gray color. Oral sucker almost completely surrounded by well-developed collar bearing 37 chitinous spines arranged in three sets, 27 around rim and 5 on each ventral point of collar. Collar spines vary in length from 0.061 to 0.094 mm., those on points of collar being smallest. Well marked median ventral break in collar. Anterior third of body covered by small spines 0.030 mm. long. Acetabulum prominent, pouch-like at juncture of anterior and middle thirds of body.

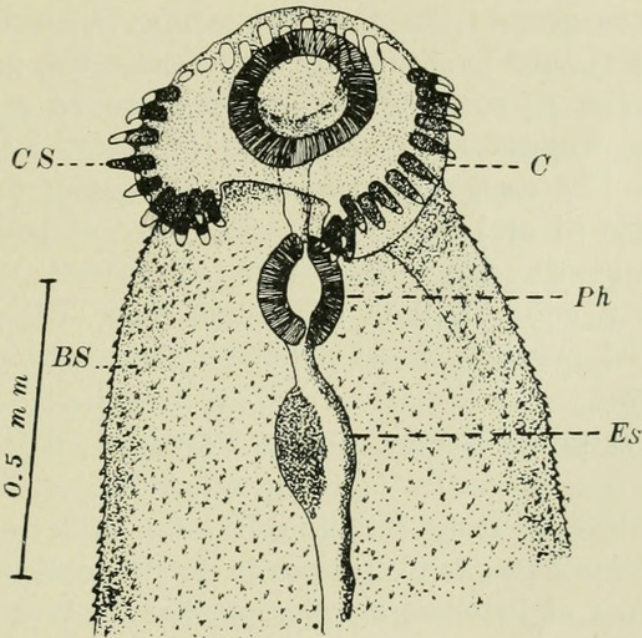


Fig. A.—Anterior end of *Echinostomum armigerum*: Bs, body spinelets; C, collar; Cs, collar spines; Es, esophagus; Ph, pharynx.

Digestive tract well developed; intestinal ceca somewhat undulating and rather narrow, ending blindly in extreme posterior end of worm. Testes quadrate to triangular, irregularly lobed, lying tandem and close together between middle and posterior thirds of body. Cirrus pouch pear shaped, surrounding large thick walled cirrus, and tubular somewhat coiled seminal vesicle, at level of anterior margin of acetabulum. Genital pore median between anterior margin of acetabulum and transverse arms of ceca.

Ovary pear-shaped, anterior to testes, median, transverse. Well-defined shell gland, slightly larger than the ovary, between anterior

6. Extract of unpublished research by Franklin D. Barker and Robert S. Irvine.

testis and ovary, slightly to one side. Laurer's canal and seminal receptacle not found. Uterine coils fairly compact, in transverse coils for most part anterior to ovary in median field. Eggs numerous, straw-colored, ovoid, operculum small and without opercular rim; size 0.084 to 0.105 mm. by 0.057 to 0.066 mm.

Vitelline glands coarsely acinous, extending in continuous masses, from acetabulum, in lateral fields, to posterior end of worm. Transverse vitelline ducts and reservoir at level of shell gland. Excretory system two lateral vessels which unite in region of posterior third of body and form slender median excretory reservoir; excretory pore in median line at posterior end of worm.

Found in duodenum of host.

Notocotyle quinqueseriale Barker and Laughlin, (Plate 1, Fig. 5).

Characters in general like those of genus. Ventral surface provided with five distinct longitudinal rows of wart-like papillae extending from anterior to posterior end, with 16 to 18 papillae in each row. Cuticula without spines. Length of body, 2.5 to 4.0 mm.; width 0.66 to 1.33 mm. Cirrus pouch elongated, extending from posterior margin of oral sucker to middle third of body. Vagina as long as cirrus pouch. Eggs light straw color, oval, with long polar filament at each end; 0.019 to 0.021 mm. long, 0.01 to 0.013 mm. wide. Polar lid present. Most abundant parasite found; generally occurs in cecum.

Catatropis fimbriata Barker, *sp. nov.*⁷ (Plate 1, Fig. 6).

Body thin, flat, gradually tapering anteriorly. Length 2.2 to 3.3 mm., width at level of testes 0.56 to 0.70 mm. Anterior half of body covered with minute needle-like spines in definite oblique rows. Three longitudinal rows of flattened circular papillae on ventral surface; 12 to 13 papillae in each row. Oral sucker, sub-terminal, oval 0.079 to 0.099 mm. wide, 0.066 to 0.092 mm. long. Pharynx absent; esophagus 0.105 to 0.132 mm. long; intestinal ceca undulating, external to uterine coils, internal to testes, end blindly in posterior end of worm. Testes opposite, at same level in posterior fifth or sixth of body, weakly two- to four-lobed; 0.198 to 0.257 mm. long, 0.132 to 0.151 mm. wide; vas deferens prominent, median, extends from shell gland to base of cirrus pouch; cirrus pouch tubular, greatly elongated, extends from level of intestinal bifurcation caudad to level of middle third of body. Seminal vesicle coiled at base of and almost entirely outside of cirrus pouch. Prostate gland and muscular cirrus covered with papillae within pouch. Ovary between testes, globular or oval, margin undulating 0.132 mm. long by 0.105 to 0.112 mm. wide. Uterine coils transverse, numerous compact, in intercecal zone. Vagina straight, walls

7. Abstract of unpublished research by Franklin D. Barker.

quite muscular, as long as cirrus pouch. Genital pore ventral, median, just caudad to intestinal bifurcation. Shell gland, compact, definite, ovoid, immediately anterior to and a little larger than ovary.

Vitelline glands, lateral in extracecal zone in posterior half of body, extending from middle of body caudad to level of testes, 12 to 15 rather definite, irregular acini on each side. Excretory canal tubular, undulating, extends in median line from ovary to posterior end of body. Eggs elongated, oval, 0.020 to 0.022 mm. long, 0.011 mm. wide; shell thick, with lid and long polar filament at each end, 0.084 to 0.098 mm. long.

Found in duodenum of host.

Hemistomum craterum Barker and Noll, *sp. nov.*⁸ (Plate II, Fig. 1).

Body divided into cephalic and caudal regions; cephalic region thin, flat, wide, anterior portion tapering, lateral margins turn ventrad and mesad one fifth width of region; caudal region thick, rounding, conical. Length of entire worm 0.75 to 1.89 mm. Length of cephalic region 0.62 to 0.79 mm., width 0.41 to 0.49 mm.; length of caudal region 0.28 to 0.47 mm., width 0.20 to 0.36 mm.

Body spines not evident. Oral sucker muscular subterminal, nearly circular, 0.075 to 0.094 mm. in diameter. Acetabulum at posterior margin of anterior half of cephalic region, circular, 0.075 mm. in diameter. Adhesive disk large, flattened cone with crater-like top, muscular without papillae; median in anterior portion of posterior half of cephalic region. Frequently overlaps acetabulum. Size 0.19 to 0.22 mm. in diameter.

Pharynx oval, 0.07 mm. long by 0.073 mm. wide. Esophagus narrow, straight, 0.06 mm. long. Intestinal ceca narrow, tubular, undulating, terminating blindly in posterior end of caudal region. Ovary at junction of body regions to right of median line. Globular, margins smooth 0.07 mm. in diameter. Shell gland diffuse, in same plane but on opposite side from ovary.

Uterus, winding turns to left then caudad to bursa copulatrix, which is dorsal and subterminal in posterior end of worm. Vitelline glands voluminous globular acini, filling posterior two thirds of cephalic region. Testes two, globular or oval, entire or slightly lobed at about middle level of caudal region on either side of median line, slightly oblique. Twice as large as ovary. Seminal vesicle, large, winding tube slightly to left of median line between testes; opens into bursa. Genital pore slit-like, dorsal, median, subterminal, at posterior end of worm. Eggs, large, oval, few, one to three; thin shell, small operculum, size 0.11 by 0.07 mm.

8. Abstract of unpublished research by Franklin D. Barker and William C. Noll.

Found in duodenum and cecum of host; only in one out of forty-six muskrats examined.

Plagiorchis proximus Barker, *sp. nov.*⁹ (Plate II, Fig. 2).

Body plump, oval, tapering anteriorly, bluntly rounding posteriorly. Color creamy, opaque. Minute spinelets cover anterior two thirds of body. Length 1.32 to 1.98 mm., width at level of anterior testis 0.49 to 0.66 mm. Oral sucker muscular, terminal, 0.085 to 0.125 mm. long by 0.105 to 0.115 mm. wide. Pharynx immediately posterior to oral sucker, 0.035 to 0.05 mm. long by 0.045 to 0.055 mm. wide. Esophagus as long as pharynx. Intestinal ceca, simple, straight, extend almost to posterior end of body. Acetabulum, between first and second fourths of body; muscular, circular, 0.065 to 0.11 mm. long by 0.075 to 0.105 mm. wide. Ovary, globular to oval, margins smooth, immediately posterior to acetabulum and to right of median line. Margin separated by width of cirrus pouch, or touches posterior margin of acetabulum. Size 0.095 to 0.145 mm. long by 0.10 to 0.11 mm. wide. Uterine coils winding, descending limb passes caudad from ovary between testes filling posterior end of body, ascending limb passes between testes cephalad to genital pore; coils overlap testes but do not overlap intestinal ceca. Eggs very numerous. Vitelline glands voluminous, coarse globular acini lateral and partly dorsal and ventral, extend uninterrupted from slightly anterior to acetabulum to extreme posterior end where they tend to fuse; glands overlap and obscure intestinal ceca; shell gland, diffuse, posterior and to left of ovary. Seminal receptacle and Laurer's canal not evident. Testes, globular, margins smooth, in anterior portion of posterior half of body, one obliquely behind the other, slightly separated. Testes measure 0.125 to 0.160 mm. long by 0.120 to 0.150 mm. wide. Cirrus pouch, narrow, elongated, tubular; base just posterior to acetabulum and to left of median line; pouch turns transversely to right then cephalad dorsal and to right of acetabulum to the genital pore. Genital pore in median plane just anterior to acetabulum. Eggs numerous, straw color, operculum, with rim present, opercular end broad, opposite end tapering. Size 0.032 to 0.0378 mm. long by 0.020 to 0.024 mm. wide.

Found in duodenum of host.

Wardius zibethicus Barker and East, *Gen. et sp. nov.*¹⁰ (Plate II, Fig. 3).

Large thick worms, 4 to 13 mm. long by 1 to 4.5 mm. wide; body broadly ob lanceolate; anterior end tapering and bluntly conical, posterior end broader and rounded. Cuticula smooth without spines or

9. Abstract of unpublished research by Franklin D. Barker.

10. Abstract from unpublished research by Franklin D. Barker and Anna M. East.

wart-like projections. Oral sucker absent; large muscular, cup-shaped sucker, posterior, ventral and subterminal; antero-posterior diameter 1.116 to 2.79 mm., transverse diameter 1.116 to 2.294 mm.; opening of sucker 0.3 to 1.55 mm. in diameter. Small, terminal mouth leads directly into muscular, elongated, cup-shaped pharynx (or oral sucker), size 0.434 to 0.992 mm. by 0.434 to 0.992 mm. pharynx with two dorsal, postero-lateral pockets often as large as pharynx; 0.45 to 1.08 mm. in length by 0.45 to 0.99 mm. in breadth. Pharynx leads into well-developed simple esophagus, without muscular thickenings; 0.62 to 2.17 mm. long and 0.186 to 0.30 mm. wide, bifurcating at level of first and second fourths of body; intestinal ceca sinuous, with numerous short lateral pockets, terminating blindly at level of anterior margin of posterior sucker.

Two testes weakly, but not regularly lobed, close together in tandem position in middle third of body. Testes vary from orbicular to transversely elliptical, 0.496 to 1.736 mm. in length by 0.496 to 2.294 mm. in width.

Male genital tract terminates in much convoluted and distended vesicula seminalis followed by slightly convoluted pars muscosa and pars prostatica surrounded by prostate gland. Short ductus ejaculatorius opens at base of genital papilla, ventral, right or left of median plane just posterior to intestinal bifurcation and slightly anterior to anterior margin of anterior testis; hermaphroditic duct and genital sucker absent. Ovary median, at level of posterior third of body, orbicular or transversely oval with smooth or undulating margin. Shell gland somewhat diffuse, right or left of, and posterior to ovary. Laurer's canal right or left and posterior to ovary; opening dorsal, median, slightly anterior to posterior sucker. Vitelline glands small globular acini, continuous, extending from level of pharynx to middle of posterior sucker, almost entirely outside of intestinal ceca. Two transverse vitelline ducts and prominent yolk reservoir at level of shell gland. Uterus in median plane, anterior to the ovary. Coils transverse, loose to compact. Metraterm opens at base of genital papilla through common genital pore.

Eggs, elongated, oval, numerous; opercular end tapering, 0.016 to 0.019 mm. by 0.009 to 0.014 mm. Operculum small, opercular rim absent. Excretory system complex consisting of two longitudinal canals, mesal of intestinal ceca, with numerous anastomizing laterals, extending from anterior end to posterior sucker where they empty into large vesicular reservoir dorsal and in part posterior to anterior margin of posterior sucker. Excretory pore dorsal, median at level of anterior margin of posterior sucker.

Generally found in cecum of host.

CESTODES

Hymenolepis evaginata Barker and Andrews, *sp. nov.*¹¹ (Plate II, Figs. 4, 5, 6, 7).

Worms 20 to 40 cm. long, 300 to 900 proglottids. In living worm posterior three centimeters greatly contracted, thick, rigid, opaque, anterior portion of body abruptly becomes thin, flabby, transparent. Proglottids four to eight times wider than long. Gravid posterior proglottids 2 to 3 mm. by 0.36 mm., anterior proglottids 0.15 to 0.30 mm. by 0.045 mm. Lateral edges project slightly. Genital pores unilateral in middle of proglottid. Scolex well developed, inverted pear-shaped, 0.33 mm. wide; four muscular circular suckers present, 0.09 to 0.11 mm. in diameter. Rostellum elongated, retractile, pestle-shaped, armed with single row of ten comparatively large hammer-shaped hooks, 0.007 mm. long by 0.004 mm. wide. Three testes, large, globular; one on one side and two, one obliquely anterior to other, on opposite side. Cirrus elongated, muscular, posterior to vagina. Ovary transversely elongated, bilobed, median, posterior; vitelline gland, transversely elongated, median, behind ovary. Shell gland oval, median, anterior to vitelline gland. Mesal end of vagina swollen to form seminal receptacle anterior to ovary. Vagina opens anterior to cirrus. Gravid uterus transversely elongated, sac-like, anterior and posterior margins lobulated, partitions absent. Eggs oval, thin shell, 0.0206 by 0.0162 mm.

Found in duodenum of host.

Anomotaenia telescopica Barker and Andrews, *sp. nov.*¹² (Plate II, Figs. 8, 9, 10).

Preserved specimens 115 to 130 mm. long, with 600 to 700 proglottids. Body heavy, rugged, opaque, proglottids markedly telescoped, edges serrated, mature proglottids four to five times wider than long, gravid proglottids three to four times longer than wide. Mature proglottids 1.1 mm. wide; 0.5 mm. long, 0.17 mm. thick. Gravid proglottids 1.5 mm. long by 0.5 mm. wide. Genital pores irregularly alternate. Scolex well developed 0.17 mm. wide with four muscular, circular, cup-shaped suckers. Rostellum strongly developed, wide, armed with double row of forty-eight alternately arranged, elongated hooks. Inner row of twenty-four hooks, 0.057 mm. long; outer row of twenty-four hooks 0.047 mm. long.

Testes limited in number, in lateral and posterior regions of mature proglottids. Cirrus pouch short, muscular, anterior to vagina. Ovary transversely elongated, weakly bilobed, median, posterior. Vitelline gland compact elongated, median, posterior to ovary. Shell gland

11. Abstract of unpublished research by Franklin D. Barker and Mitchell Andrews.

12. Abstract of unpublished research by Franklin D. Barker and Mitchell Andrews.

oval, median, anterior to vitelline gland. Seminal receptacle prominent, sac-like, anterior to ovary. Vagina elongated, muscular. Uterus, sac- or pouch-like in posterior portion of gravid proglottids, without median stem or lateral branches. Eggs spherical, 0.013 mm. in diameter, shell thick.

Found in duodenum of host.

NEMATODA

Trichuris opaca Barker and Noyes, *sp. nov.*¹³ (Text Fig. B).

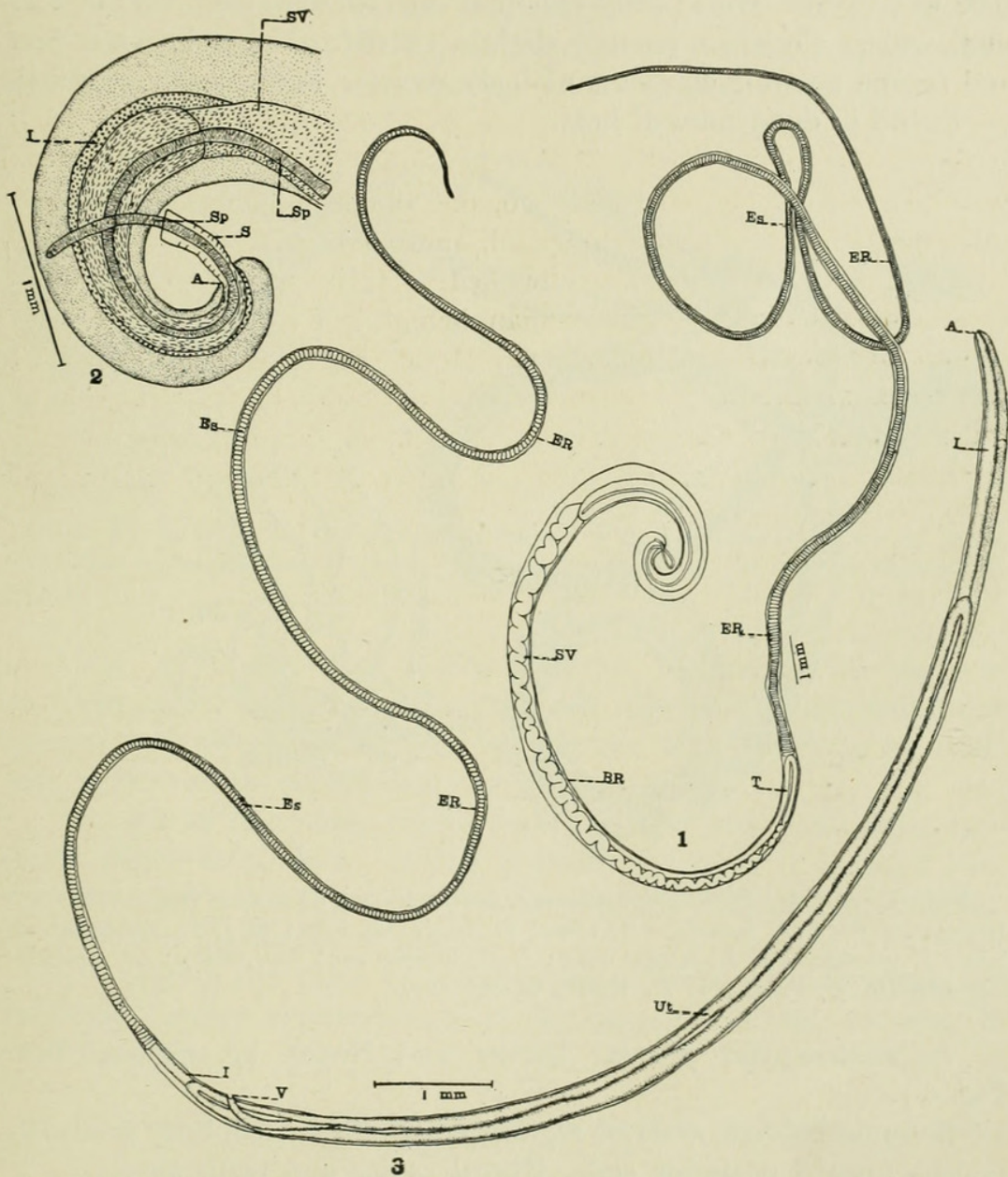


Fig. B, 1.—*Trichuris opaca*, male. Fig. 2.—*Trichuris opaca*, posterior end of male. Fig. 3.—*Trichuris opaca*, female. A, anus; B R, body region; E R, esophageal region; Es, esophagus; I, intestine; S, Spicule sheath; Sp, spicule; S V, seminal vesicle; T, testis; Ut, uterus; V, vulva.

13. Abstract from unpublished research by Franklin D. Barker and Bessie Noyes.

Body cylindrical, stiff, opaque, divided into long slender esophageal region and shorter, thicker body region. Anterior portion attenuated, tapering, rounded; posterior blunt, rounded; anus a little subterminal.

Male: 22 to 28 mm. long; esophageal region 13 to 19 mm. long, 0.06 to 0.08 mm. wide; body region 7 to 9 mm. long, 0.14 to 0.16 mm. wide. Posterior end rolled into spiral. Spicule 2 mm. long by 0.017 mm. broad surrounded by sheath covered by minute blunt spinelets; sheath when evaginated 0.18 mm. long by 0.07 mm. broad.

Female: 28 to 30 mm. long; esophageal region 18 to 19 mm. long, 0.06 to 0.07 mm. wide; body region 10 to 11.1 mm. long, 0.23 to 0.25 mm. wide. Posterior portion slightly curved. Vulva between first and second anterior elevenths of body region. Anus nearly terminal.

Found in duodenum of host.

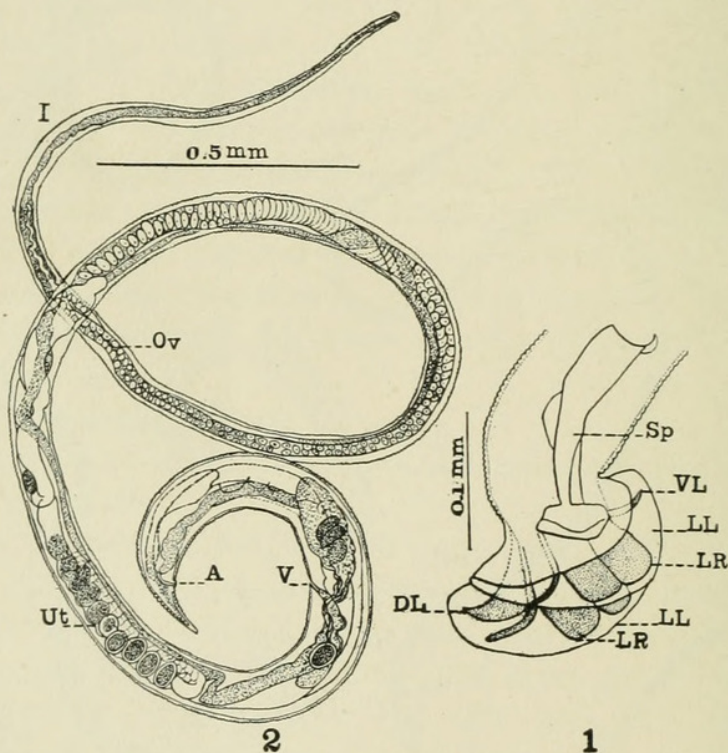


Fig. C, 1.—*Trichostrongylus fiberius*, posterior end of male. Fig. 2.—*Trichostrongylus fiberius*, female. A, anus; D L, dorsal lobe; D L R, dorso-lateral lobe; I, intestine; L L, lateral lobe; L R, lateral ray; Ov, ovary; Sp, spicule; Ut, uterus; V, vulva; V L, ventro-lateral ray.

Trichostrongylus fiberius Barker and Noyes, *sp. nov.*¹⁴ (Text Fig. C).

Body thread-like, anterior region greatly attenuated, body gradually widens toward posterior end. Buccal cavity and teeth absent.

Male: 2.8 mm. long; width just posterior to mouth 0.013 mm., anterior to bursa 0.09 mm. Bursa with two wide lateral lobes and

14. Abstract from unpublished research by Franklin D. Barker and Bessie Noyes.

narrow dorsal median lobe. Lateral lobes with two wide, blunt, lateral rays and one narrow, pointed dorso-lateral and one ventro-lateral ray. Spicules short and heavy.

Female: 4.7 mm. long; width posterior to mouth 0.03 mm., at level of vulva, 0.135 mm. Vulva in posterior ninth of body 0.52 mm. from end. Anus 0.08 mm. from posterior end. Posterior end slightly curved and pointed. Eggs oval, segmented, 0.059 by 0.036 mm., shell, thick.

Found in duodenum and cecum of host.

Capillaria ransomia Barker and Noyes, *sp. nov.*¹⁵ (Text Fig. D).

Body capillary, not divided externally into two regions, gradually increasing in width in body region. Anal opening subterminal.

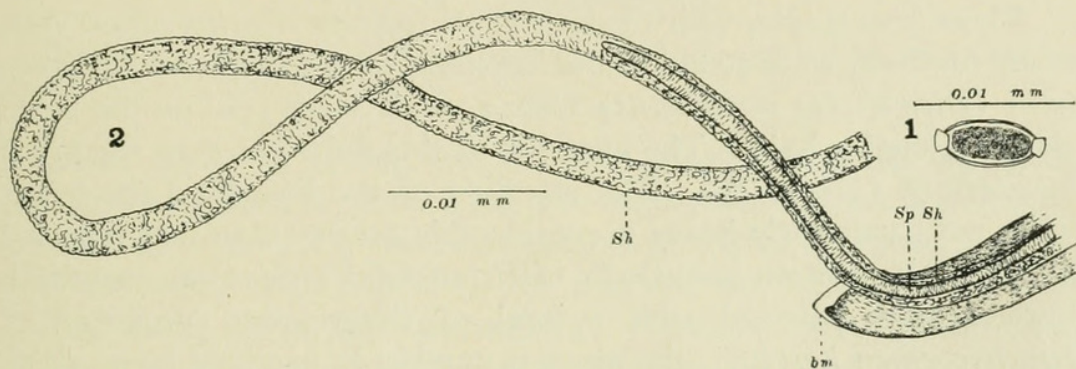


Fig. D, 1.—Egg of *Capillaria ransomia*. Fig. 2.—Caudal region of male, *Capillaria ransomia*, lateral view; *bm*, bursal membrane; *sh*, spicule sheath; *sp*, spicule.

Male: 19.6 mm. long, width posterior to mouth 0.01 mm., in posterior region 0.032 mm. Posterior end slightly curved; small bursa present with two lateral lobes; one spicule, 1.36 mm. long by 0.007 mm. wide; spicule sheath 0.01 mm. wide.

Female: 19 mm. long; width posterior to mouth 0.022 mm., posterior region 0.065 mm. Vulva in anterior fourth of body, 5 mm. from anterior end. Eggs with prominent plugs, 0.05 mm. by 0.02 mm.

Found in duodenum of host.

It is hoped that these preliminary descriptions will stimulate and facilitate further investigations of the parasites of the muskrat in other localities.

15. Abstract from unpublished research by Franklin D. Barker and Bessie Noyes.



Barker, Franklin Davis. 1915. "Parasites of the American muskrat (*Fiber zibethicus*).*" The Journal of parasitology* 1(4), 184–197.

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