

# NEW HELMINTH PARASITES FROM CENTRAL AMERICAN MAMMALS

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Among some specimens forwarded to the Bureau of Animal Industry by Mr. Harold W. Brown of Johns Hopkins University, Baltimore, Md., were a few specimens of small nematodes which had been collected from the small intestine of a three-toed sloth, *Bradypus* sp., at Penonomé, Panama, July 17, 1926. The specific identity of the host is doubtful, since Miller (1924) lists three species of three-toed sloths, *Bradypus castaniceps*, *B. griseus*, and *B. ignavus*, from Central America. The nematodes belong in the family Trichostrongylidae Leiper, 1912, and subfamily Trichostrongylinae Leiper, 1908, two species being represented. One species appears to belong to a new genus, for which the name *Bradypostrongylus* is proposed; the other species is placed in the genus *Graphidium* Railliet and Henry, 1909.

In this paper there is also described a species of trematode which was collected by the writer from the gall bladder of a gray spider monkey, *Ateles geoffroyi*, which died in the National Zoological Park, Washington, D. C., October 8, 1926. This animal had been received from Nicaragua about two years previously. Since conditions in the monkey house are such as to practically preclude the acquirement of a trematode infestation, it is assumed that the infestation must have been acquired by the monkey before its arrival here, and presumably was acquired in Central America. This trematode belongs in the family Dicrocoeliidae Odhner, 1910, but owing to the peculiar arrangement of the testes, it has not been possible to allocate this species to any existing genus. The new genus *Controrchis* is, therefore, proposed for it.

## NEMATODA

### Family TRICHOSTRONGYLIDAE

#### BRADYPOSTRONGYLUS, new genus

*Generic diagnosis.*—Trichostrongylinae: Cephalic cuticle inflated and coarsely striated. Oral aperture simple; esophagus slender, varying little in diameter. Bursa of male with two large lateral

lobes and an indistinct dorsal lobe. Ventro-ventral and latero-ventral rays slightly thicker than the other rays and with their tips divergent; externo-lateral, medio-lateral, and postero-lateral rays about equal in size, parallel proximally and diverging distally; externo-dorsal ray arises from the base of the dorsal ray and is more slender than the other rays; dorsal ray thick, forming two branches distally and with each branch bifurcate; on each side of the dorsal ray, immediately in front of the two branches, a small lateral projection is present. Spicules similar, short, twisted, and with a relatively long, twisted, median process. Gubernaculum double and heavily chitinized. Telamon present. Tail of female terminates in a slender tip and is also provided with three spike-like processes. Vulva in posterior fourth of body; ojectors and sphincters well developed; uteri divergent. Eggs oval, with thin shells of uniform thickness, and not embryonated within the uterus.

*Type species.*—*Bradypostrongylus panamensis*, new species.

BRADYPOSTRONGYLUS PANAMENSIS, new species

*Specific diagnosis.*—*Bradypostrongylus*: Cuticle of cephalic extremity inflated and coarsely striated transversely. (Fig. 1.) The expanded cuticle is about  $85\mu$  long and  $50\mu$  in diameter. The head, exclusive of the cuticular expansion, measures  $32\mu$  in diameter. The oral aperture is simple. The esophagus is about  $770\mu$  long and  $52\mu$  in diameter at the posterior extremity. The nerve ring is situated about  $270\mu$  from the anterior end. Cervical papillae not apparent.

*Male* 9.5 mm. long with a maximum diameter, in front of the prebursal swellings, of  $156\mu$ . The bursa (fig. 2) is large, elongated dorso-ventrally, and composed of two large lateral lobes and an indistinct dorsal lobe. The rays of the bursa, with the exception of the externo-dorsals, terminate near the edge of the bursa. The ventro-ventral and latero-ventral rays are slightly thicker than the other rays and divergent; the externo-lateral, medio-lateral, and postero-lateral rays are about equal in size and with their tips well separated: the externo-dorsal rays are more slender than the other rays and terminate some distance from the edge of the bursa; the dorsal ray is heavy and bifurcates to form two branches distally; each branch in turn bifurcates to form an incurved median branch and a long, slender, widely divergent, lateral branch. A small, cone-like lateral prominence is present on each side of the dorsal ray, immediately in front of the primary bifurcation. The cuticle in front of the bursa is expanded laterally and supported by strong prebursal papillae. The spicules are equal,  $205\mu$  long, twisted, and with a twisted filamentous process arising from the inner aspect of each spicule. (Fig. 3.) The gubernaculum is double and consists of two slightly curved,

parallel, well chitinized pieces, each measuring  $44\mu$  in length. The telamon is composed of two feebly chitinized parts embedded in the wall of the cloaca; the anterior part appears as a relatively wide band showing a deep notch in the antero-dorsal border and a similar notch in the postero-ventral border; the posterior part is composed of a narrow band extending across the dorsal wall of the cloaca and the two ends of this band appear to unite or fuse with a V-shaped structure embedded in the ventral wall. (Fig. 4.)

*Female* 14 mm. long and  $220\mu$  in diameter. The vulva is a transverse slit located about 3.5 mm. from the end of the tail. The tail (fig. 5) terminates in a slender filamentous tip and is also provided with three spike-like processes. The terminal filament is about  $23\mu$  long and the spines about  $16\mu$  long. The anus is located about  $185\mu$  from the tip of the tail. The ovejectors (fig. 6) are strongly muscular and with a combined length, including sphincters, of 585 to  $600\mu$ . The eggs (fig. 7) are oval, 66 to  $69\mu$  long and 33 to  $40\mu$  wide.

*Host*.—Three-toed sloth, *Bradypus* sp.

*Location*.—Small intestine.

*Locality*.—Central America (Penonomé, Panama).

*Type specimens*.—United States National Museum Helminthological Collections No. 27002.

The female of this species closely resembles that of the genus *Anoplostrongylus*, a genus proposed by Boulenger (1926) for certain trichostrongyles of bats; the male, however, appears to be more closely related to *Ornithostrongylus* Travassos, 1914, and in the key given by Yorke and Maplestone (1926) it would run out at that genus. The dorsal ray, spicules, and gubernaculum appear to be sufficiently different from those of either of the above genera to warrant the creation of a new genus.

#### GRAPHIDIUM BROWNI, new species

*Specific diagnosis*.—*Graphidium*: Cuticle of the anterior extremity slightly inflated and coarsely striated transversely. (Fig. 8.) The cuticular expansion is about  $77\mu$  long and  $38\mu$  in diameter. The body shows numerous fine, wavy striations, and is also finely striated transversely. The oral aperture is surrounded by three small inconspicuous lips. The esophagus is  $650\mu$  long in the male and  $740\mu$  long in the female, slender, slightly enlarged posteriorly, and is  $32\mu$  wide about the middle and  $58\mu$  wide at the enlarged posterior portion. The nerve ring is situated 237 to  $260\mu$  from the anterior end. The excretory pore opens ventrally 340 to  $390\mu$  from the anterior end. Cervical papillae not apparent.

*Male* 8.5 mm. long and with a maximum width of about  $130\mu$  in front of the bursa. The bursa (fig. 9) is composed of two lateral

lobes and a smaller inconspicuous dorsal lobe. The rays are well separated and extend to near the edge of the bursa. The ventro-ventral and latero-ventral rays are divergent and about equal in size; the externo-lateral ray is slightly thicker and longer than the other rays; the medio-lateral and postero-lateral rays are divergent; the externo-dorsal rays arise from the base of the dorsal ray and are curved dorsad near their posterior third; the dorsal ray forms two branches near its tip and each branch is bidigitate. Prebursal papillae present. The spicules are equal in length, slender, modified tubular in shape, and  $532\mu$  long. The tips of the spicules are pointed and incurved, and have a sharp pointed process on the median aspect a short distance from the tip. The shaft of each spicule appears twisted about  $156\mu$  from its anterior end. The gubernaculum is elongated, curved, well chitinized, and is  $128\mu$  long. The telamon is composed of two similar, feebly chitinized, retort-shaped structures, embedded in the ventral and lateral walls of the cloaca. (Fig. 10.) The genital cone is small, rounded, and bears two prominent papillae; these papillae are pedunculated and are situated on each side of the cloacal aperture.

*Female* 14 mm. long and with a maximum width of  $166\mu$ . The vulva is situated about 2.7 mm. from the posterior end of the body. The tail (fig. 11) is slender and pointed. The anus is located about  $160\mu$  from the end of the tail. The ojectors (fig. 12) are strongly muscular and have a combined length, including sphincters, of  $400\mu$ . The eggs are oval,  $64\mu$  to  $70\mu$  long by  $32\mu$  to  $38\mu$  wide, with shells of uniform thickness, and are not embryonated within the uterus.

*Host*.—Three-toed sloth, *Bradypus* sp.

*Location*.—Small intestine.

*Locality*.—Central America (Penonomé, Panama).

*Type specimens*.—United States National Museum Helminthological Collections No. 27003.

This species differs from *Graphidium strigosum* (Dujardin, 1845), the type of the genus, in the following respects: In *G. strigosum* the spicules, according to Hall (1916), are tubular and measure 1.2 to 2.4 mm. in length; in *G. browni* they are modified tubular and their length is only about one-half of the minimum length given for *G. strigosum*. The gubernaculum in *G. browni* is long and well chitinized; in *G. strigosum* it is short and so imperfectly chitinized as to be almost invisible. In *G. strigosum* the diameter of the female diminishes abruptly behind the vulva; in *G. browni* the attenuation is gradual. The cuticular inflation of the cephalic extremity is very distinct and coarsely striated in *G. browni*, but this character is not mentioned for *G. strigosum*. An examination of the specimens of the latter species, donated to the Bureau of Animal Industry by

Professor Railliet, shows that a coarse striation of the anterior end of the body is present but the cuticular inflation is not marked.

## TREMATODA

### Family DICROCOELIIDAE

#### CONTRORCHIS, new genus

*Generic diagnosis.*—Dicrocoeliinae: Body oval in outline and with greatest width at the middle of the body. Oral sucker strongly muscular and directed anteriorly. Pharynx well developed; prepharynx absent. Esophagus short; intestinal ceca slender and extending to the posterior third of the body. Acetabulum large, situated about one-fourth of the body length from the anterior end. Vitellaria compact, extracecal, and not extending anteriorly beyond the posterior border of the posterior testis. Ovary oval in shape and situated immediately posterior to the posterior testis. Uterus with one ascending and one descending limb, each with numerous transverse coils, extending to the posterior end of the body. Testes oval, one lying anterior and the other posterior to the acetabulum. Genital orifice immediately behind the intestinal bifurcation. Excretory pore terminal.

*Type species.*—*Controrchis biliophilus*, new species.

#### CONTRORCHIS BILIOPHILUS, new species

*Specific diagnosis.*—*Controrchis*: Length 2.5 to 3 mm.; width 0.85 to 1.1 mm. In preserved specimens the anterior end is slightly curved ventrally. The anterior third of the body is covered with small scalelike spines. The oral sucker is strongly muscular,  $200\mu$  to  $213\mu$  long by  $148\mu$  to  $184\mu$  wide, and with the oral aperture terminal. The pharynx is situated immediately behind the oral sucker and measures  $84\mu$  to  $99\mu$  long by  $71\mu$  to  $84\mu$  wide. The esophagus is short,  $67\mu$  to  $71\mu$  in length, and bifurcates a short distance in front of the anterior testis to form simple, slender, intestinal ceca which extend to the posterior third of the body. The acetabulum is circular, strongly muscular,  $183\mu$  to  $355\mu$  in diameter, and situated in the median line about  $500\mu$  from the anterior end of the body. The testes are ovoid, elongated transversely; the anterior testis is situated anterior to the acetabulum and measures  $140\mu$  to  $210\mu$  by  $280\mu$  to  $430\mu$ ; the posterior testis is situated posterior to the acetabulum and measures  $140\mu$  to  $210\mu$  by  $350\mu$  to  $430\mu$ . The cirrus pouch is pyriform,  $142\mu$  to  $227\mu$  long and  $65\mu$  to  $100\mu$  wide, and contains a relatively large vesicula seminalis, a small prostate, and a short ejaculatory duct. The genital orifice is situated immediately behind the intestinal

bifurcation. The ovary is oval,  $99\mu$  to  $114\mu$  by  $127\mu$  to  $170\mu$ , and is situated immediately posterior to the posterior testis. The receptaculum seminis and shell gland are located a short distance behind the ovary. The vitellaria are made up of few compact irregular follicles, occupying a space  $350\mu$  to  $400\mu$  long, on each side of the body lateral to the intestinal ceca, and not extending anteriorly beyond the level of the posterior edge of the posterior testis. The uterus consists of an ascending and descending branch and of numerous lateral coils, extending posteriorly to the posterior end of the body and anteriorly to the ovary. The eggs are small, oval, brown in color, and are  $35\mu$  to  $38\mu$  long and  $21\mu$  to  $24\mu$  wide.

*Host.*—*Ateles geoffroyi*.

*Location.*—Gall bladder.

*Locality.*—National Zoological Park, Washington, D. C.

*Type specimens.*—United States National Museum Helminthological Collections No. 27599; paratypes, No. 27369.

#### REFERENCES

BOULENGER, C. L.

1926. Report on a collection of parasitic nematodes, mainly from Egypt. Part IV. Trichostrongylidae and Strongylineae, Parasitology, Cambridge (Eng.), vol. 18 (1), January 22, pp. 86-100.

HALL, MAURICE C.

1916. Nematode parasites of mammals of the orders Rodentia, Lagomorpha, and Hyracoidea. Proc. U. S. Nat. Mus., vol. 50, pp. 1-258, pl. 1, fig. 290.

MILLER, GERIT S.

1924. List of North American recent mammals. U. S. National Museum. Bull. 128, pp. xvi+673.

YORKE, WARRINGTON and MAPLESTONE, P. A.

1926. The nematode parasites of vertebrates. With a foreword by C. W. Stiles. xi+536 pp. 307 figs. London.

## EXPLANATION OF PLATES

## ABBREVIATIONS

*ac.* acetabulum; *c. p.* cirrus pouch; *d.* dorsal ray; *e.* egg; *e. d.* externo-dorsal ray; *e. l.* externo-lateral ray; *e. p.* excretory pore; *gb.* gubernaculum; *gc.* genital cone; *g. p.* genital pore; *int.* intestine; *l. v.* latero-ventral ray; *m. l.* medio-lateral ray; *os.* oral sucker; *ov.* ovary; *ovj. 1, 2, 3.* ovejectors; *pgc.* papillae on the genital cone; *ph.* pharynx; *p. l.* postero-lateral ray; *sp.* spicules; *t.* telamon; *t. a.* anterior testis; *t. p.* posterior testis; *ut.* uterus; *vit.* vitellaria; *vul.* vulva; *v. v.* ventro-ventral ray.

## PLATE 1

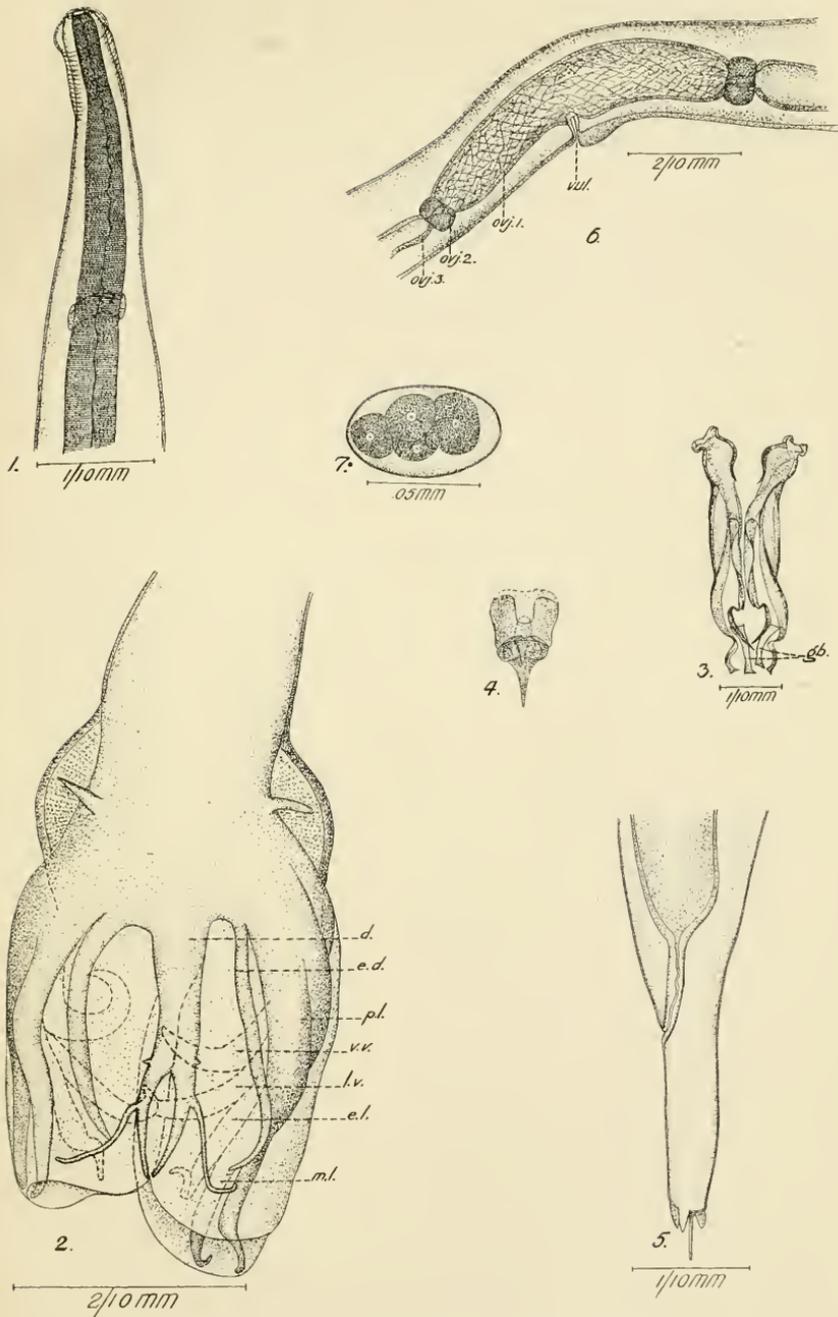
- FIG. 1. *Bradyostrongylus panamensis*. Anterior end of female.  
 2. *Bradyostrongylus panamensis*. Bursa of male; dorsal view.  
 3. *Bradyostrongylus panamensis*. Spicules and gubernaculum; ventral view.  
 4. *Bradyostrongylus panamensis*. Telamon; dorsal view.  
 5. *Bradyostrongylus panamensis*. Posterior end of female.  
 6. *Bradyostrongylus panamensis*. Ovejectors.  
 7. *Bradyostrongylus panamensis*. Egg.

## PLATE 2

8. *Graphidium browni*. Anterior end of female.  
 9. *Graphidium browni*. Posterior end of male.  
 10. *Graphidium browni*. Telamon and genital cone; ventral view.  
 11. *Graphidium browni*. Posterior end of female.  
 12. *Graphidium browni*. Ovejectors.  
 13. *Controrchis bilitophilus*. Ventral view.

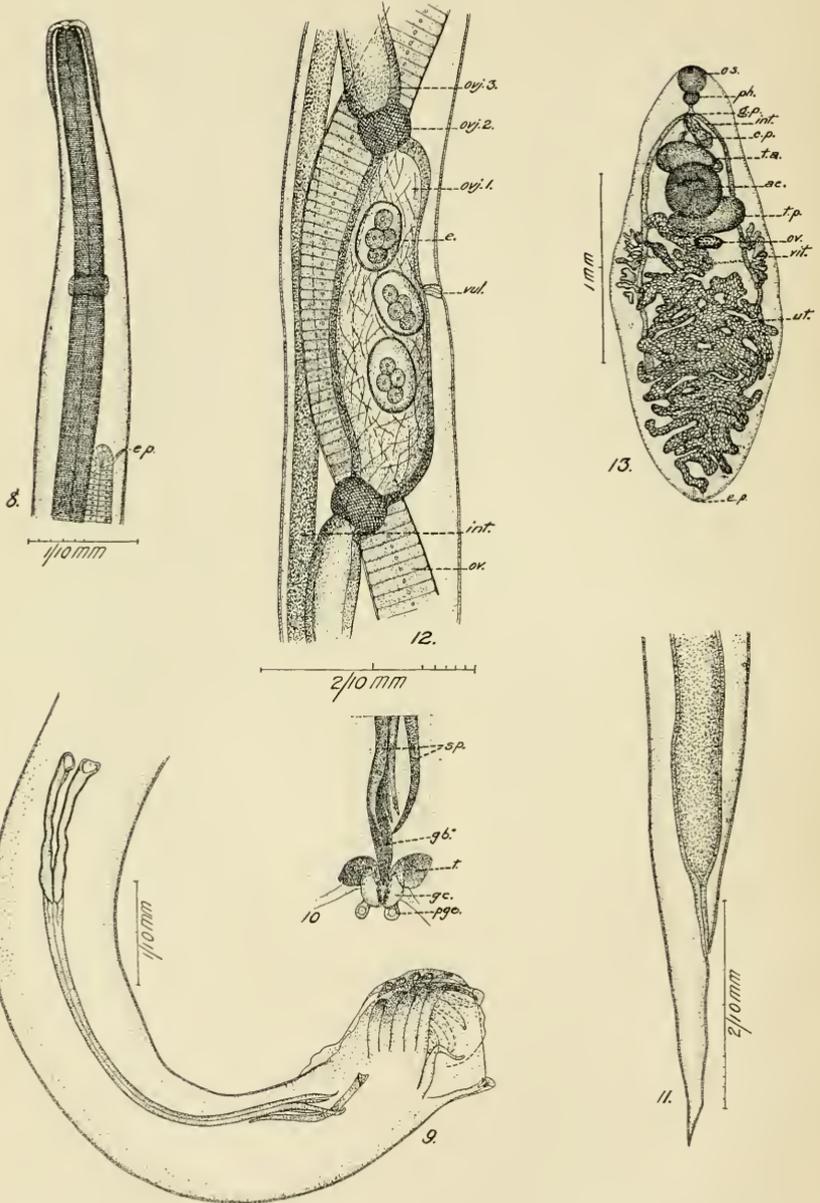
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BRADYPOSTRONGYLUS PANAMENSIS, NEW SPECIES

FOR EXPLANATION OF PLATE SEE PAGE 7



GRAPHIDIUM BROWNI, NEW SPECIES AND CONTRORCHIS BIBLIOPHILUS, NEW SPECIES

FOR EXPLANATION OF PLATE SEE PAGE 7