A NEW SPECIES OF TREMATODE WORMS BELONGING TO THE GENUS HASSTILESIA FROM RABBITS IN TEXAS

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In the upper third of the small intestine of a specimen of *Sylvilagus floridanus alacer*, collected at Houston, Tex., were found a large number of flukes which prove to be a new species of *Hasstilesia*, for which the name *Hasstilesia texensis* is proposed.

HASSTILESIA TEXENSIS, new species

Specific diagnosis.—Hasstilesia; small worms, oval or elliptical in outline, slightly pointed at the ends, 0.55 to 0.86 mm. long, 0.40 to 0.53 mm. broad, and 0.24 to 0.33 mm. thick, varying greatly in the proportions of length, breadth, and thickness according to the degree of contraction. The majority of the specimens are ellipsoid in cross section, the mean maximum measurements of cross sections being 0.44 by 0.29 mm., but some specimens are relatively thicker and others relatively broader. Fresh specimens appear a dirty rusty white in color, and do not show the three distinct shades described by Stiles and Hassall (1894) in *H. tricolor*. The entire cuticle is beset with minute spines, from 4μ to 10μ in length, but the spines are much denser on the anterior than on the posterior part of the body. In many whole mounts the spines drop out in the process of fixation and staining and can not be seen.

The oral sucker is terminal, with the opening anterior or very slightly ventral; it is relatively much larger than in *H. tricolor*, and broader than long. It measures from 115μ to 132μ in transverse diameter. The ventral sucker is slightly smaller, measuring from 105μ to 120μ in diameter; it is further posterior than in *H. tricolor*, its center being from 0.21 to 0.34 mm. from the anterior end. In most specimens the center is very slightly posterior to the junction of the anterior and middle thirds of the body. In one small specimen measuring 540μ in length and 450μ in breadth the center of the acetabulum is 240μ from the anterior end.

The digestive tract consists of the oral sucker, pharynx, and intestinal ceca. The pharynx lies immediately behind the oral

sucker, is nearly spherical, and measures about 50μ to 60μ in diameter. There is no esophagus, since the pharynx opens directly into the anterior portions of the intestinal ceca which form a transverse tube about 200μ long; this tube bends posteriorly at its distal ends to continue as the posterior portions of the intestinal ceca. The latter pursue an irregular wavy course near the lateral margins of the body, but medial to the yolk glands. The transverse portion just behind the pharynx may be slightly curved so that the lateral shoulders are very slightly more anterior than the part of the tube into which the pharynx opens. At the posterior end of the body the ceca curve dorsally and medially and end very close together; in one sectioned specimen the walls of the posterior extremities of the ceca are in contact.

The excretory system opens by a minute pore toward the dorsal side of the posterior extremity. From this a fine tube leads forward, enlarging into a small reservoir, and then branching to right and left.

The testes are on different planes. The right testis lies medially in the posterior part of the body, while the left one is situated well on the left side of the body between the posterior testis and the acetabulum. The position of the left testis varies; in some specimens the anterior border of the testis lies on a level with or even slightly anterior to the posterior border of the acetabulum, while in others it is distinctly posterior to this, but it is always somewhat nearer to the acetabulum than to the right testis. The testes are round or slightly oval, never lobate, and measure 105μ to 140μ or more in diameter. Usually the anterior testis is slightly larger than the posterior one, but this is not invariably the case. The cirrus is an extremely large and powerful organ, and when extruded is very conspicuous in fresh specimens. The extruded cirrus in one of the writer's specimens measures 140μ in length with a diameter of 50μ. In one specimen loaned by Doctor Francis it is still larger. The cirrus pouch into which it is retracted is very long and cylindrical, pursuing a more or less wavy course anteriorly and terminating near the posterior border of the acetabulum. The proximal portion is surrounded by a large mass of prostate glands. The vas deferens leading from the anterior testis to the proximal end of the ejaculatory duct is short and direct; the one leading from the posterior testis could not be followed in either whole mounts or sections. The cirrus and uterus open side by side in the posterior part of the body, the cirrus near the median line, and at the level of the ovary, and the metraterm to the left. The genital openings are nearer to the posterior end of the body than to the posterior border of the acetabulum, and not more than 200μ to 250μ from the posterior end.

The ovary is situated on the right side of the body between the two testes, but somewhat nearer the posterior one. It is round, oval or somewhat triangular in shape, not lobate, and measures about 88μ to 100μ in transverse diameter and somewhat less dorso-ventrally. The shell gland is situated just medial to the ovary, and is connected with the latter by a short oviduct; the shell gland is relatively large, having a diameter of about 60μ to 65μ. Posteriorly it gives off the rather well-developed Laurer's canal which turns and runs straight dorsally. The vitellaria are much less abundant than in *H. tricolor*, and occupy a rather narrow lateral area from just behind the level of the pharynx to about the level of the ovary. The ducts cross the body at about the level of the ovary and shell gland and form a small triangular reservoir where they meet near the latter organ. The ducts can not be followed in whole mounts and their course is very difficult to follow in sections. The uterus is extremely thin-walled, and its convolutions can not be followed in either whole mounts or sections. In sections the eggs appear to be scattered through the body, the thin-walled uterine tubes being indistinguishable from spaces in the parenchyma. The eggs are most numerous in the part of the body between the anterior testis and the oral sucker, on the left side posterior to the posterior testis, and between the testes, but in no specimens are the eggs solidly massed as is the case in specimens of *H. tricolor* which I have examined, and as they have been figured and described by Stiles and Hassall. The terminal part of the uterus, where it opens beside the cirrus, is thick-walled and conspicuous in sections, but this portion, which runs antero-medially from the genital pore, is short and soon loses its distinct wall. The eggs are oval, about 21μ to 22μ long by 13μ to 15μ broad.

Host.—East Texas cotton-tail rabbit, *Sylvilagus floridanus alacer*, and Texas jack rabbit, *Lepus texianus* (collected by Francis); in small intestine.

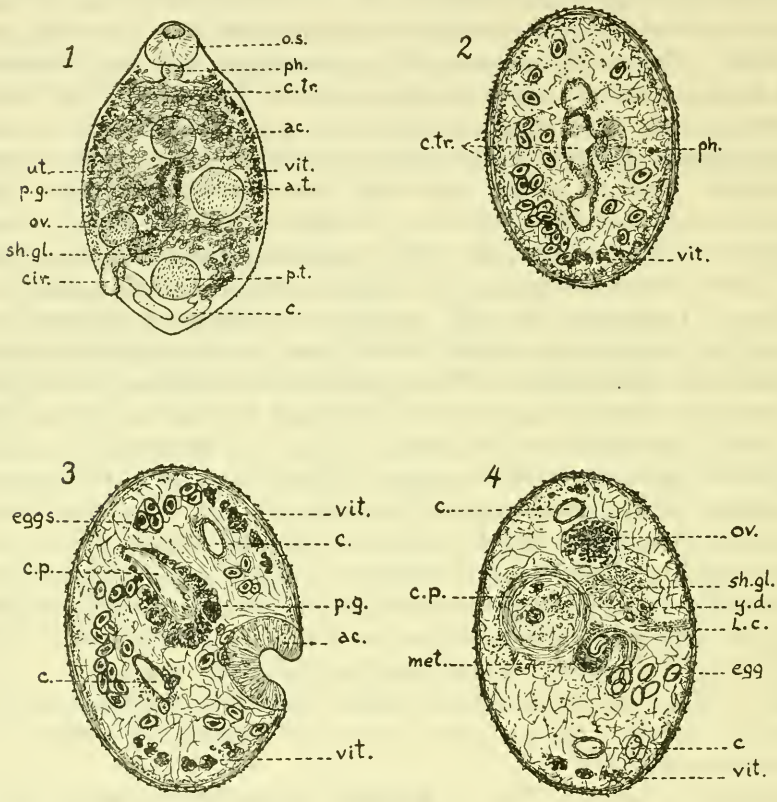
Locality.—Houston, Tex. (Chandler), and College Station, Tex. (Francis).

Type specimens.—Cat. No. 8026, United States National Museum Helminthological Collections; paratypes, Cat. No. 8027.

This fluke is clearly closely related to *Hasstilesia tricolor*, which was first described by Stiles and Hassal (1894) from *Lepus americanus* and *L. sylvaticus* from Maryland to Virginia, and later reported by Hall (1916) as being reported from Long Island, N. Y., and also from jack rabbits at College Station, Tex. (reported by Doctor Francis of the Texas A. and M. College). Doctor Francis very kindly sent me a slide of the specimens collected from jack rabbits for comparison with my specimens and with *H. tricolor*. They conform in every detail, except the size of the testes, which is very variable anyway, with my Houston specimens. The geographic range of *H. tricolor* is

therefore limited to the middle eastern seaboard States so far as is known at present, while *H. texensis* is so far known only from eastern Texas.

Hasstilesia texensis differs in a number of respects from *H. tricolor* and is undoubtedly specifically distinct. The principal and most striking differences are in the size of the suckers and in the formation



FIGURES 1–4.—1, HASSTILESIA TEXENSIS. ×83. 2, CROSS SECTION OF SAME THROUGH TRANSVERSE PORTION OF INTESTINAL CECA. ×166. 3, CROSS SECTION OF SAME THROUGH POSTERIOR PART OF ACETABULUM AND ANTERIOR PORTION OF CIRRUS POUCH. ×166. 4, CROSS SECTION OF SAME JUST ANTERIOR TO GENITAL OPENINGS AT LEVEL OF LAURER'S CANAL. ×166.

ABBREVIATIONS: *ac.*, ACETABULUM; *a. t.*, ANTERIOR TESTIS; *c.*, INTESTINAL CECUM; *cir.*, CIRRUS; *c. p.*, CIRRUS POUCH; *c. tr.*, TRANSVERSE PORTION OF INTESTINAL CECA; *L. c.*, LAURER'S CANAL; *met.*, METRATERM; *o. s.*, ORAL SUCKER; *ov.*, OVARY; *ph.*, PHARYNX; *p. g.*, PROSTATE GLANDS; *p. t.*, POSTERIOR TESTIS; *sh. gl.*, SHELL GLAND; *ut.*, UTERUS; *vit.*, VITELLARIA; *y. d.*, YOLK DUCT.

of the uterus in adult specimens. Stiles and Hassall give the diameter of the oral sucker as 88μ to 112μ; in two specimens kindly loaned from the United States National Museum Helminthological Collections the sucker measures 93μ and 87μ transversely and 69μ and 74μ in length, respectively. The specimens have a total length of 710μ and 745μ and a breadth of 565μ. In specimens of *H. texensis* of

equivalent size the oral sucker measures 120μ to 128μ transversely and 86μ to 115μ in length. The acetabulum is also markedly larger and situated farther posteriorly. The loose arrangement of the uterine coils as compared with the solid massing of eggs in *H. tricolor* is very marked. The sizes of the testes and ovary are also different. In the two specimens of *H. tricolor* mentioned above, which were lent for comparison, the posterior testis measures 236μ by 157μ in one and 248μ by 133μ in the other. In my specimens of *H. texensis* the posterior testis is much more nearly round, with a diameter of from 110μ to 115μ, but in Doctor Francis's specimens the posterior testes are more oval and measure from 170μ to 228μ in the larger, transverse, diameter. This slide was prepared over 30 years ago and the testes may have become considerably compressed, as may also be the case with Stiles and Hassall's specimens. Other differences exhibited by *H. texensis* are the very much larger size of the extruded penis (80μ by 32μ in *H. tricolor* and 140μ to 200μ by 40μ to 60μ in *H. texensis*); the absence of an esophagus between the pharyngeal bulb and the bifurcation of the ceca; the less profuse and more scattered vitellaria; the unusual development of the prostate glands; and the very distinct Laurer's canal.

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