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PRELIMINARY NOTES ON PARASITES FOUND IN RUMINANTS AT MUNICIPAL ABATTOIR, BATON ROUGE, LOUISIANA

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Some nematodes found in the abomasum of cattle at the Municipal Abattoir in Baton Rouge, La., were examined by the writer, at the Zoological Laboratory of the Bureau of Animal Industry, Washington, D. C. Among these specimens were some stomach worms which did not correspond to the description of *Hæmonchus contortus* and which are evidently identical with the stomach worm described from cattle in Brazil, by Travassos, as *Hæmonchus similis*, (Brazil Medico, May 15, 1914).

A comparison of the Louisiana material with specimens of *Hæmonchus similis* in the collection of the Zoological Division, (B. A. I. collection, No. 1702 B) confirms the identification.

Dr. Travassos' description of the *Hæmonchus similis* is as follows:

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"Length—
  Male, 8.5mm; female, 12-14mm.

  Thickness—
  Male, 0.224-0.255mm; female, 0.284mm.

  'Body with fine transverse and longitudinal striations; oesophagus enlarged near the posterior end, about 1.072-1.200mm in length; excretory pore situated more or less at the level of the nerve ring, about 0.234mm from the anterior extremity; cervical papillae about 0.319mm to 0.340mm from the anterior end. The vulva of the female is located about 2.5mm to 3mm from the caudal extremity on the tip of a conical projection about 0.300mm in length; eggs ellipsoidal, in the first stages of segmentation in the uterus, about 0.070-0.078mm long and 0.035-0.038mm wide. There are two small papillae near the caudal extremity, about 0.063-0.071mm from the end; the anus is 0.213-0.248mm from the posterior end.
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"Male with a large trilobed bursa, median lobe asymmetrically placed; postero-lateral rays thickened towards the extremity; spicules long, 0.319-0.333mm ending in blunt, button-like knobs, with recurving points like the barb on a harpoon; the point on the left spicule about 0.049-0.056mm from the end and that on the right about 0.063-0.071mm from the distal extremity.

Gubernaculum indistinct, about 0.156mm long;
Habitat, 4th Stomach of Bos Taurus.
This species is similar to *H. contortus*, (Rudolphi), from which it differs in the following characters:

**Similis.**
Male 8.5m.
Female, 12-14mm.
Vulva on the apex of a conical projection.

Spicules.
0.319-0.333mm.
Hooks, 0.049-0.056mm and 0.063-0.071mm from the distal extremity.

**Contortus.**
Male, 19-21mm
Female, 23-24mm.
Vulva at the base of a triangular attenuated expansion.

Spicules.
0.400-0.430mm.
Hooks, 0.014-0.017 and 0.028-0.032mm. from the distal extremity.

Gubernaculum
Not easily visible, Plainly visible, about about 0.156mm long.
0.276 mm.
Postero-lateral rays.
Enlarged near their extremity. Slender in their entire length.

While the females in our collection compare very favorably with those of *H. similis* in the collection at Washington, as may be seen from the accompanying figures (Plate 1.) the male shows some differences—notably the decided and clear-cut appearance of the gubernaculum, (Plate 2). The dimensions of these spicules are as follows:

Length: 0.323-0.326mm, ending in button-like knobs;
Hooks: 0.0532-0.606 and 0.0644-0.0728mm from the tips of the spicules.
Gubernaculum plainly visible, 0.128.8-0.1428mm in length, elliptical in shape 0.025mm at its widest point. When seen in profile it appears somewhat crescentic. Other males do not show the gubernaculum as plainly as is shown in the accompanying illustration.

In a recent paper by Travassos on the Trichostrongylidae, published in the Memorias do Instituto do Oswaldo Cruz, vol. 12, 1921, he has extended the description of this species and figured it. His figures agree with our material. He reports this species from Brazil and Europe. Our record is therefore new for North America and we are publishing figures of this species for the benefit of the American veterinarians and zoologists who do not have access to Travassos' paper.

While studying various specimens of *H. contortus*, considerable variation was observed in the linguiform process covering the vulva of the female. This variation has been noted by Dr. Frank Veglia in his "The Anatomy and Life History of the Hæmonchus contortus, (Rud.)" published in the 3d. and 4th Rep. Director of Vet. Research, Union of South Africa, Pretoria, pp. 349-471. Nov. 1915. Dr. Veglia's report is as follows:

**"Apparent Anomalies of the Vulva Linguiform Process:"**

In general I found that the anatomy of *Hæmonchus contortus* was fairly constant in regard to appearance and size of the different organs, but at the time of marked reproductive activity I met with a very large number of rather old female worms, showing peculiar differences in the linguiform process. In some sheep about twenty-five per cent female worms showed the following peculiarities: The linguiform process was unusually short, measuring 0.250mm in length and about 0.170mm at the base. It was conical in shape, adhering to the body and slanting towards the tip, with contents granular in appearance. In other specimens it was represented by a pimple-like body, protruding for a distance of about 0.025mm sometimes placed anteriorly and at other times situated laterally to the vulva. In some specimens the linguiform process was quite absent and the opening of the vulva was only indicated by a rudiment of the above-mentioned vulval lips. There were no other remarkable changes in the remainder of the genital organs except that the vagina was sometimes situated in a direction perpendicular to the ventral side of the body,
instead of occupying the oblique position already described. 'The laying of eggs was performed quite normally. I might also add that the anomalies mentioned were found in different seasons of the year.'

All the anomalies mentioned by Dr. Veglia were observed in our specimens. In a number of specimens the short, conical process referred to by Dr. Veglia was situated laterad to the vulval opening, at other times apparently dorsad. These variations are shown in the figures published here (Plate 3).

A third interesting subject investigated during the work at Washington was the unusual variation in size of some specimens of what appear to be *Bunostomum phlebotomum* in our collection. The females in this material are 25mm long and the males 18mm long, which is from 5 to 6mm longer than the maximum length reported by Ransom, in B. A. I. Bull. 127, for the same species. These specimens were found in the 4th stomach of calves.

Vial No. 13 of our collection contains specimens collected from the abomasum of four cows, under date of April 7, 1921. In this vial are eight males and eighteen females of *Arduenna strongylina* and three females of *Physoccephalus sexalatus*. These have been frequently reported from swine and are reported from this host in the United States by Foster, in B. A. I. Bull. 158. They are found to be of frequent occurrence in swine slaughtered at the Municipal Abattoir at Baton Rouge. These worms have never been reported as parasites of cattle, but Ransom and Raffensperger have reported the development of *Arduenna strongylina* in the guinea pig after feeding larvae of this species from coprophagous beetles. Since cattle and swine are ungulates and more closely related than swine and rodents, the occasional and accidental occurrence of swine nematodes in cattle appears to be within the bounds of possibility. The collection of the writer's material was made under circumstances which appear to preclude the possibility of confusion of any sort. No swine were being killed at the time these worms were collected and when collected it was noted that these worms differed from the other worms found in the stomachs of the cattle examined.
I wish to express to Drs. Ransom and Hall and to Mr. Chapin, my sincere appreciation for their invaluable aid generously rendered during the work; to Dr. Hall for his assistance in the preparation of this paper; to Dr. Martin, manager and veterinary inspector at the abattoir, for his unfailing assistance in the collection of the material; and to Mr. Haines, Artist for the Bureau, for the drawings reproduced here.

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PLATE NO. 1

Fig. 1. *Hæmonchus similis* (female). Drawn from Travassos' original in the collection of the Zoological Division B. A. I., Washington, D. C.

Fig. 2, 3 and 4. *Hæmonchus similis* (female). Original material collected at Baton Rouge Municipal Abattoir, Baton Rouge, La.
PLATE NO. 2

Fig. 1. Spicules of Hæmonchus similis. A lateral view of Gubernaculum.

Fig. 2, 3 and 4. Tail of Hæmonchus similis.
PLATE NO. 3

ANOMALIES OF LINGUIFORM PROCESS IN H. CONTORTUS.

Fig. 1. Female showing vesicular excrescence.

Fig. 2. Female showing entire absence of linguiform process.

Fig. 3. Modified linguiform process situated laterad to vulval opening.

Fig. 4. Modified linguiform process.