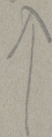


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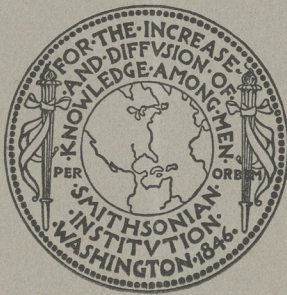
TWO NEW GENERA OF NEMATODES, WITH A NOTE ON A NEGLECTED NEMATODE STRUCTURE

BY

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No. 2386.—From the Proceedings of the United States National Museum,
Vol. 59, pages 541-546

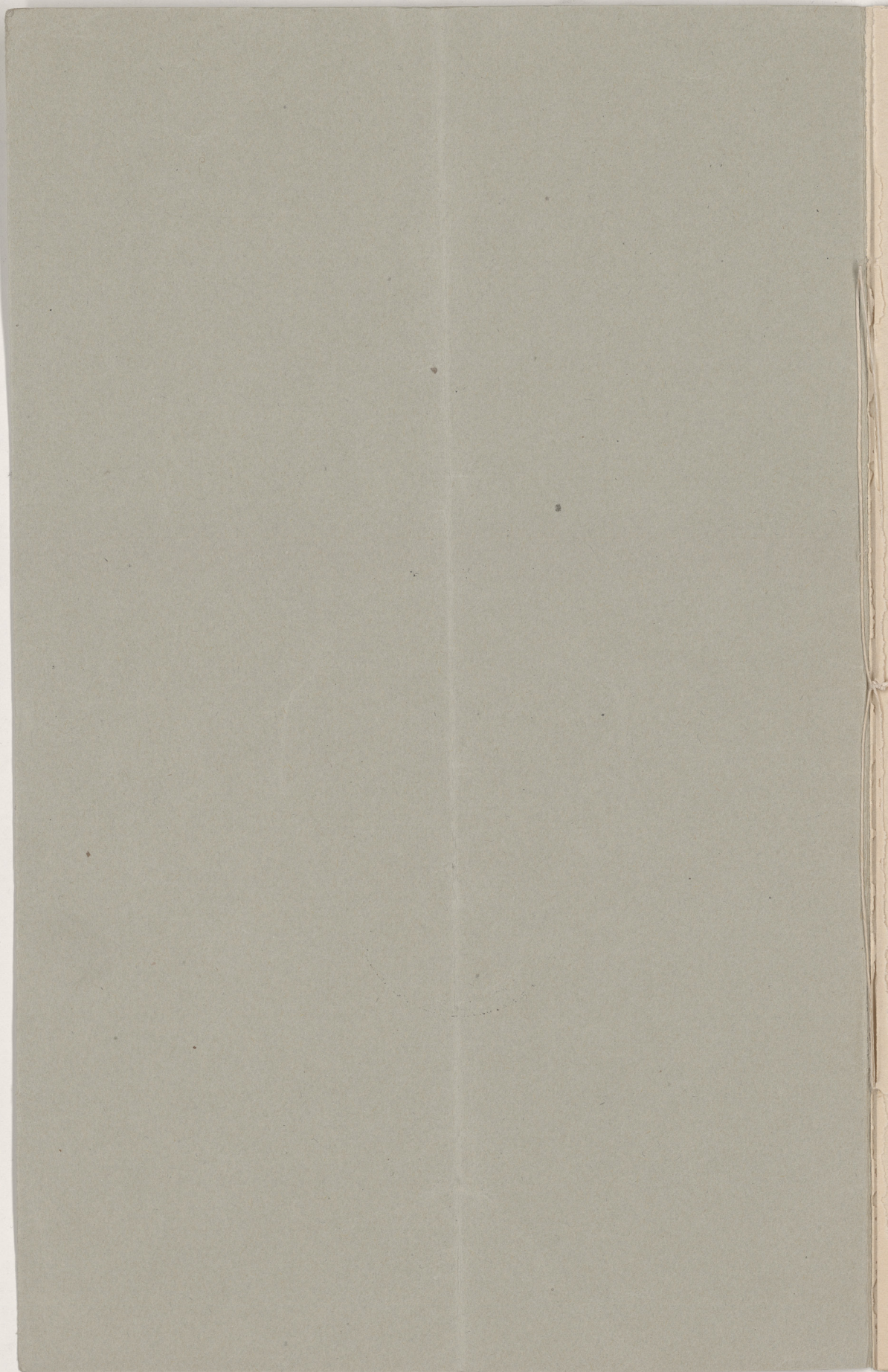


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strongylidae as *Cooperia* Ransom, 1907, *Ostertagia* Ransom, 1907, and *Ornithostrongylus* Travassos, 1914, but it differs from these genera in certain respects which appear to be of generic value. The generic name *Hyoststrongylus* is therefore proposed for it, with the following diagnosis:

HYOSTRONGYLUS, new genus.

Generic diagnosis.—Trichostrongylinae: Male bursa with small but distinct dorsal lobe and well-developed lateral lobes. (There is a distinct bulla just anterior of the bursa in the type species.) The latero-ventral ray is larger than the ventro-ventral ray, and its tip is turned back towards the ventro-ventral. The externo-lateral and medio-lateral rays diverge slightly, the postero-lateral ray diverging more widely from the medio-lateral. The short externo-dorsal ray arises at the base of the dorsal ray and lies about midway between the postero-lateral rays and the short dorsal ray. The dorsal ray bifurcates near its tip, and has also two small branches at about two-thirds of the distance from the base. Two equal spicules (120 μ long by 20 μ wide anteriorly in the type species), tapering to a point, with a wavy ridge running the length of the spicule and supporting a curved membranous portion, which terminates in a second point. Posterior of the position usually occupied by these spicules in the body is a narrow brown gubernaculum (60 μ long in the type species), situated in the dorsal wall of the cloaca and terminating by a colorless connection in a brown, oblong structure. Ventral of this is a structure (fig. 1), readily seen in fresh material, but so transparent as to be difficult to detect in glycerine jelly mounts or alcoholic material. This structure has a central portion shaped like a spur or a wishbone, situated in the ventral wall of the cloaca near its aperture, and with the point of the spur extending anteriorly; the two posterior points of the spur turn dorsally into the lateral walls of the cloaca and then extend anteriorly as flattened curved plates in the lateral walls of the cloaca. This structure I have named the *telamon*, a term of Greek origin used in architecture for an ornamental supporting structure. In the female worm the tail is rounded, not mucronate; the anus is very near the posterior end of the body and the vulva is about one-sixth to one-seventh of the body length from the posterior end;

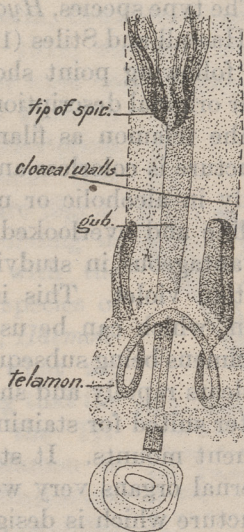


FIG. 1.—HYOSTRONGYLUS RUBIDUS. CLOACAL REGION IN MALE SHOWING TELAMON. HIGHLY MAGNIFIED.

the vulva is a long, narrow transverse slit, sometimes slightly salient. There are a very short vagina and two divergent ovejectors. Eggs are elliptical, comparatively thin-shelled, and segmenting when deposited.

The only known species occurs in the stomach of swine.

Type species.—*Strongylus rubidus* Hassall and Stiles, 1892. This worm is designated as *Hyostromylus rubidus* (Hassall and Stiles, 1892) Hall, 1921. Travassos, in an undated reprint which has just come to hand, puts *S. rubidus* in the genus *Ostertagia*, but this species lacks the accessory bursal membrane characteristic of species of *Ostertagia*.

The type species, *Hyostromylus rubidus*, has already been described by Hassall and Stiles (1892) in their original report on this worm, but the following point should be noted in regard to this species: In their original description, Hassall and Stiles figure the lateral portions of the telamon as filamentous. This is due to the fact that this structure is colorless and highly transparent, very difficult to find or study in alcoholic or mounted material, and they have drawn the outline and overlooked the included structure. It has been found advantageous in studying this structure to resort to staining with gentian violet. This is a very rapid, penetrating, and amenable stain, which can be used in water or any strength of alcohol, the specimens being subsequently mounted in glycerine jelly or in balsam. It clears rapidly and shows a tendency to decolorize, so it is perhaps better suited for staining material for immediate study than for permanent mounts. It stains the rays of the bursa and many of the internal organs very well, and also stains the accessory supporting structure which is designated as the telamon in such forms as *Hyostromylus rubidus*. The so-called chitinous structures, such as the spicules, which are brown, do not take the stain, as a rule. Staining develops the fact that there is a transparent structure which connects the posterior end of the gubernaculum proper to the irregularly oval or quadrangular structure, which Hassall and Stiles regarded as the cloacal aperture, showing that these are parts of one structure. The quadrangular structure is too small to permit the passage of the spicules, even if it represented a true aperture. It is situated on the conical tip of the body, inside of the bursal cavity, and gives the tip of the body an appearance of being bifid or bicornate in profile when seen in some views. The cloacal aperture is ventral of this conical body termination and is very vague in outline, even in stained preparations.

The gubernaculum and telamon appear to be modifications of the cloacal wall, either by local thickening and condensation or by the deposition of material of suitable hardness for the protection of the cloacal walls from the passage of the sharp, pointed spicules, and for

the direction of the spicules; they also support the cloacal wall and aperture, the spicules when these are extruded, and the genital cone in some cases; a platelike gubernaculum projecting from the dorsal wall of the cloaca may also aid in separating the spicules to form a suitable channel for the passage of the spermatozoa. Apparently the term *gubernaculum* should be restricted to the more or less longitudinal structure in the dorsal wall of the cloaca toward the anterior end, and the term *telamon* used for the supporting structure of variable form near the cloacal aperture.

The study of the telamon in the genus *Hyostrongylus* naturally led to an examination of other nematodes to ascertain if this structure was commonly present. A closely related worm, *Ornithostrongylus quadriradiatus* (Stevenson, 1904), Travassos, 1914, was first considered, since *H. rubidus* and *O. quadriradiatus* were both originally described from this laboratory, the Zoological Division of the Bureau of Animal Industry, with a description and figure of a peculiar structure in the cloaca. Examination showed that the star-shaped structure (fig. 2) figured by Stevenson is a telamon corresponding in its general location and evident function with the telamon in *H. rubidus*. An examination of species of the trichostrongyle genera *Cooperia*, *Ostertagia*, *Haemonchus*, *Graphidium*, and *Citellinema* shows what are apparently telamons in these genera, indicating that the telamon will be found generally present in the Trichostrongylidae. What appears to be a telamon is present among the Strongylidae in the genera *Bustomum* and *Oesophagostomum*. Among the Metastrongylidae it appears likely that what has been called the unpaired accessory structure in *Synthetocaulus pulmonalis* (= *Synthetocaulus commutatus*) must be regarded as a gubernaculum, and what have been called the paired accessory structures must be regarded as the elements of a telamon. The chitinous arc in which the body terminates in the genus *Synthetocaulus* may also prove to be an element of the telamon. An examination of a number of published figures of male nematodes indicates that what is apparently a telamon has been figured by various authors, sometimes without explanatory labeling and sometimes as a gubernaculum or part of the spicules. Outside of the Strongyloidea this structure appears to be present in some form in the Oxyuroidea and perhaps in the Spiruroidea and Filarioidea. It appears to be best developed in forms having comparatively short spicules and poorly developed in forms having long linear spicules, so far as I have examined them. In its simplest form the telamon seems to be a ring-shaped structure, complete or incomplete, surrounding the cloacal aperture. This elementary form is modified by the



FIG. 2.—ORNITHO-
STRONGYLUS
QUADRIRADIA-
TUS. TELAMON,
X 470. FROM
STEVENSON,
1904.

development of processes anteriorly along the walls of the cloaca and along the sides of the genital cone. It seems probable that this relatively hard and distinct structure with its wide variation in shape will prove of value as a generic and specific character. The material of which it is composed gives the impression of being very similar to that forming the wall of the sucker in such genera as *Heterakis*, where the sucker is strongly developed. What is apparently the same material appears to be present in the region of the vulva in the female, apparently serving the same purpose as a supporting structure. This seems to be a quite distinct structure in *Trichostrongylus*, and for the time being this may be referred to as the vulvar support.

was commonly present. A closely related worm, *Oxyurostrongylus* (Stevenson, 1901), Traverso, 1914 was first considered since *A. rubrus* and *O. quadrivittatus* were both originally described from the laboratory, the Zoological Division of the Bureau of Animal Industry, with a description and figure of a peculiar structure in the cloaca. Examination showed that the star-shaped structure (fig. 2) figured by Stevenson is a telamon corresponding in its general location and evident function with the telamon in *A. rubrus*. An examination of species of the trichostrongyle genera *Cooperia*, *Osphradion*, *Hannon-*



FIG. 2.—DRAWING OF THE TELAMON OF *TRICHOSTRONGYLUS*. X 100. STEVENSON, 1901.

the trichostrongyle genera *Cooperia*, *Osphradion*, *Hannon-* class *trichobdella*, and *Citellus* shows what are apparently telamons in these genera, indicating that the telamon will be found generally present in the Trichostrongylidae. What appears to be a telamon is present among the Strongylidae in the genera *Dactynotus* and *Oesophagostomum*. Among the Metastrongylidae it appears likely that what has been called the rapaid necessary structure in *Synsphylococcus pubescens* (= *Synsphylococcus* *complanatus*) must be regarded as a gubernaculum, and what have been called the paired necessary structures must be regarded as the elements of a telamon. The spinous are in which the body tentacles in the genus *Synsphylococcus* may also prove to be an element of the telamon. An examination of a number of published figures of male nematodes indicates that what is apparently a telamon has been figured by various authors, sometimes without explanatory labeling and sometimes as a gubernaculum or part of the spinules. Outside of the Strongylidae this structure appears to be present in some form in the Oxyuroidea and perhaps in the Spiruridae and Filarioidea. It appears to be best developed in forms having comparatively short spinules and poorly developed in forms having long linear spinules, so far as I have examined them. In its simplest form the telamon seems to be a ring-shaped structure, complete or incomplete, surrounding the cloacal aperture. This elementary form is modified by the

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