

TWO NEW SPECIES OF NEMATODE WORMS OF THE  
GENUS *OSTERTAGIA* FROM THE VIRGINIA DEER,  
WITH A NOTE ON *OSTERTAGIA* *LYRATA*

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Through the courtesy of the Bureau of Biological Survey and of the Pennsylvania Board of Game Commissioners, the writer was afforded an opportunity to examine several abomasums of the Virginia deer (*Odocoileus virginianus*), from Pennsylvania. A total of 16 abomasums were examined, and 11 of these contained nematodes belonging to the genus *Ostertagia* and representing two hitherto undescribed species.

Specimens of the first of these species were referred to the zoological division by Dr. J. D. Jones, of the Pennsylvania Bureau of Animal Industry, Harrisburg, Pa., in March, 1929, and later additional specimens of this species and specimens of the second species were collected by the writer from material sent to the laboratory for examination by representatives of the Pennsylvania Board of Game Commissioners.

*OSTERTAGIA* *ODOCOILEI*, new species

PLATE 1

*Specific diagnosis.*—*Ostertagia*—*Male*: About 7.5 mm. long and  $120\mu$  wide just anterior to the bursa. Esophagus,  $560\mu$  long and  $54\mu$  wide at base. Head,  $23\mu$  wide. The cervical papillae are situated about  $300\mu$  from the head end. The nerve ring is located slightly anterior to these papillae. The spicules are  $165\mu$  long and are light brown in color; they are divided distally into three processes, two of which are ventral in position and one dorsal; the dorsally directed process is deeper in color than the remainder of the spicules and terminates in a broad truncated end; the two other processes are sharp-pointed; the outer ventral branch is the longest. There is no gubernaculum. In the general arrangement of the rays of the bursa, this species does not present any striking difference from other members of the genus. The externo-dorsals are comparatively short

and stout. The dorsal ray is about  $50\mu$  long; about  $30\mu$  from its proximal end it divides into two branches, which in turn are cleft at their tips; in the region of the principal bifurcation there are two lateral branches, one on each side. There is the usual accessory bursal membrane supported by two rays. *Female*: About 8.5 mm. long and  $138\mu$  wide in the region of the vulva. Esophagus,  $550\mu$  to  $570\mu$  long, with the cervical papillae about  $310\mu$  from its anterior end. Combined length of the muscular portions of the ovejectors, including the sphincters,  $212\mu$ . Distance from the anus to the tip of the tail,  $225\mu$ . About  $35\mu$  from the tip of the tail there is a slight bulbar swelling. Eggs,  $70\mu$  to  $78\mu$  long and  $38.5\mu$  to  $42.5\mu$  wide.

*Host*.—Virginia deer (*Odocoileus virginianus*).

*Location*.—Abomasum.

*Locality*.—Pennsylvania.

*Type specimen*.—U.S.N.M. Helm. Coll. No. 29427.

#### OSTERTAGIA MOSSI, new species

#### PLATE 2

*Specific diagnosis*.—*Ostertagia*—*Male*: About 7 mm. long and  $110\mu$  wide just anterior to the bursa. Esophagus,  $740\mu$  to  $775\mu$  long and  $62\mu$  wide at base. Head,  $16\mu$  wide. The cervical papillae are situated  $320\mu$  from the head end. The nerve ring is slightly anterior to the cervical papillae. The spicules are  $175\mu$  to  $190\mu$  in length and are light yellowish brown; in the posterior fourth they are divided into three processes, one dorsal and two ventral; the dorsal process is straight and ends in a blunt tip; the ventral processes are sharp; the outer ventral process is the longest and ends in an acute recurved point. There is a distinct paddle-shaped gubernaculum,  $60\mu$  to  $70\mu$  long. The pattern of the rays of the bursa is similar to that of the other members of the genus, except that the dorsal ray, which is, as usual, bifid with split ends, is without any other accessory processes. *Female*: About 9 mm. long and  $92\mu$  wide in the region of the vulva. Combined length of the muscular portion of the ovejectors, including the sphincters,  $285\mu$  to  $330\mu$ . The vulva is a transverse slit, naked or covered by a backward-projecting flap. Distance from the anus to the tip of the tail,  $170\mu$  to  $175\mu$ . Eggs,  $77\mu$  to  $80\mu$  long and  $38.5\mu$  wide.

*Host*.—Virginia deer (*Odocoileus virginianus*)

*Location*.—Abomasum.

*Locality*.—Pennsylvania.

*Type specimen*.—U.S.N.M. Helm. Coll. No. 29428.

#### A NOTE ON OSTERTAGIA LYRATA

In 1926, Agnes Sjöberg described a new species of *Ostertagia* from cattle in Austria. She gave it the name *Ostertagia lyrata* because

of the lyre-shaped rays of the accessory bursa. (Fig. 1.) What appears to be the same nematode was collected by the writer from the fourth stomach of cattle in Louisiana in 1927. This material, however, differs in some respects from that on which the original description was based. Sjöberg, in describing the spicules of *O. lyrata*, says that the distal end consists of two parts, that is, it is bifurcated, and she suggests the possibility of there being a third process. This has been definitely found to be present, as may be seen from Figure 1. The original description further states that the dorsal ray is double, the two rays touching in their posterior fifths. Examination of the present material shows the dorsal ray to be single, as in the other members of the genus. It is  $90\mu$  to  $95\mu$  in length and bifurcates distally about  $13\mu$  to  $15\mu$  from the end, each bifurcation

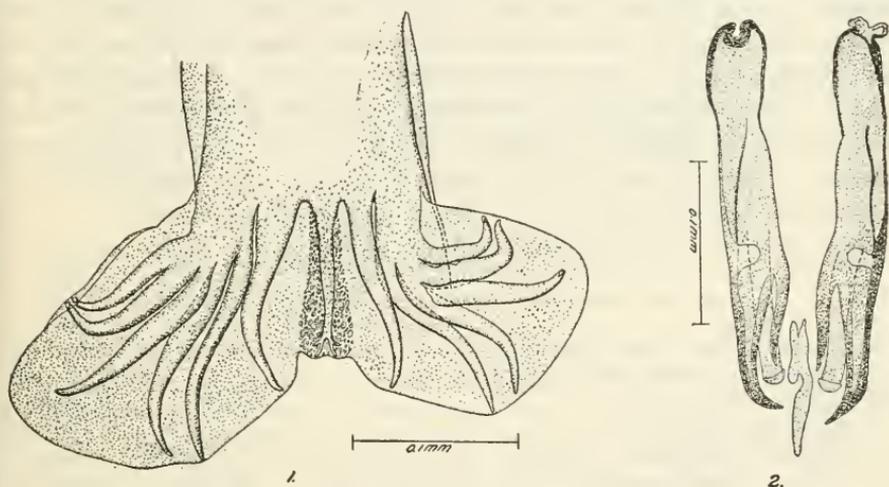


FIGURE 1.—*Ostertagia lyrata*: 1, Bursa; 2, spicules

again dividing near the tip. The dorsal lobe of the bursa is thickened. Sjöberg interprets the structure supported by the lyre-shaped rays as a prolongation of the genital cone. This structure is apparently the accessory bursal membrane common to all species of the genus.

Up to the present, 23 species have been described as belonging to the genus *Ostertagia*. Of these, 18 are reported from ruminants, and 5, all from South America, from animals other than ruminants. Three of the species reported from ruminants differ in some points from the published generic diagnosis, and it is, therefore, desirable to amend the generic diagnosis to include these species, as follows:

#### OSTERTAGIA Ransom, 1907

*Generic diagnosis*.—Trichostrongylidae; Trichostrongylinae: Head, less than  $25\mu$  in diameter, with six indistinct lips or papillae sur-

rounding the mouth. Mouth cavity small. Cervical papillae present or absent. Cuticle marked with 25 to 35 longitudinal ridges appearing as simple lines, except under high magnification when they sometimes show a finely beaded appearance. Cuticle of the head may be slightly dilated, forming a narrow collar, or annulus. Bursa with two lateral lobes united by a smaller median lobe and each lateral lobe supplied with six supporting rays. The two ventral rays usually approach each other near the margin of the bursa. The tips of the medio-lateral, postero-lateral, and externo-dorsal rays are in relation with the posterior border of the bursa. The dorsal ray separates into two main branches, which may divide distally into two short branches or give off one or two short side branches internally or externally. There is an accessory bursal membrane supported by two slender diverging rays. The spicules are short (less than 1 mm. long), similar in size and shape. They may be undivided, bifurcate, or trifurcate in their distal portions. A gubernaculum may be present or absent. Prebursal papillae are present. Vulva is less than one-fifth the length of the body from the posterior end, naked or covered by a thin, backward-projecting, cuticular flap. Ovejectors are well developed. Eggs, oval, with thin shells.

*Type species.*—*Ostertagia ostertagi* (Stiles, 1892), Ransom, 1907.

KEY TO THE SPECIES OF OSTERTAGIA RANSOM, 1907

I. Spicule structure not ascertainable.....	Group D
Spicule structure ascertainable.....	II
II. Spicules undivided.....	Group A
Spicules divided.....	III
III. Spicules bifurcated.....	Group B
Spicules trifurcated.....	Group C

GROUP A.—SPICULES UNDIVIDED

1. Dorsal ray more than 100 $\mu$ long; gubernaculum trihedral in shape.....	<i>bullosa</i>
Dorsal ray less than 100 $\mu$ long.....	2
2. Gubernaculum present.....	<i>asymmetrica</i>
Gubernaculum absent.....	<i>houdemeri</i>

GROUP B.—SPICULES BIFURCATED

1. Spicules 700 $\mu$ long.....	<i>mentulata</i>
Spicules less than 700 $\mu$ long.....	2
2. Spicules more than 400 $\mu$ long.....	<i>turkestanica</i>
Spicules less than 400 $\mu$ long.....	3
3. Dorsal rays originating from a common trunk.....	<i>khalili</i>
Dorsal rays not originating from a common trunk.....	<i>circumcincta</i>

GROUP C.—SPICULES TRIFURCATED

1. Distal portion of spicule divided into two ventral processes and one dorsal process.....	3
Distal portion of spicule not so divided.....	2

2. Distal portion of spicule divided into one ventral, one dorsal, and one median process.....	8
Distal portion of spicule divided into three processes, of which two arise from the inner or median border of the spicule.....	9
3. Outer ventral process obliquely truncated at end.....	4
Outer ventral process not obliquely truncated at end.....	5
4. Dorsal ray 280 $\mu$ to 300 $\mu$ long; bifurcations 80 $\mu$ to 100 $\mu$ long.....	occidentalis
Dorsal ray 244 $\mu$ to 320 $\mu$ long; bifurcations 40 $\mu$ to 80 $\mu$ long.....	skrbjagini
5. Outer ventral process of spicule sharply pointed and recurved medially.....	6
Outer ventral process of spicule divided distally into three processes; dorsal branch barbed.....	7
6. Accessory bursa supported by two lyre-shaped rays.....	lyrata
Accessory bursa supported by two straight rays; bifurcations of dorsal ray without lateral branches.....	mossi
7. Outer ventral process of spicule straight; dorsal process barbed.....	marshalli
Dorsal process of spicule truncated.....	odocollei
8. Bifurcations of dorsal ray without lateral branches.....	ostertagi
Bifurcations of dorsal ray with lateral branches.....	appendiculata
9. Right spicule terminating in a short, corkscrewlike hook; outer process of spicule not truncated; gubernaculum absent.....	bisonis
Right spicule not terminating in a corkscrewlike hook; outer process of spicule truncated; gubernaculum present.....	trifaricata

## GROUP D.—TERMINATION OF SPICULE NOT DETERMINED

1. Stem of dorsal ray five times the length of its branches.....	brigantiaca
Stem of dorsal ray very small.....	2
2. Spicules complex, 163 $\mu$ to 170 $\mu$ long.....	ransomi
Spicules less than 150 $\mu$ long.....	3
3. Spicules hollowed out in the shape of a gutter, 134 $\mu$ long.....	callis
Spicules not hollowed out, 91 $\mu$ long.....	delicata

The spicules of *O. callis* are figured on Plate 17 of Travassos's monograph of the Trichostrongylidae (1921a), but it is impossible to determine the nature of the termination of the spicules from his figures. They are therefore included in Group D.

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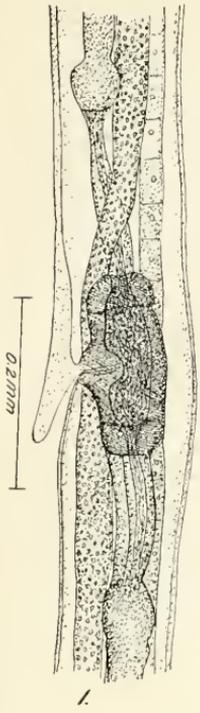
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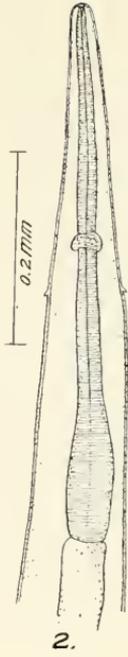
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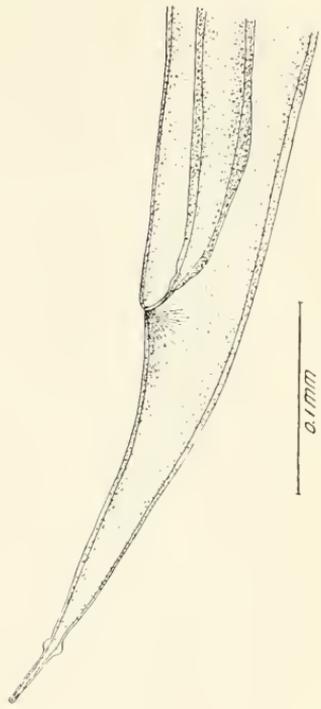


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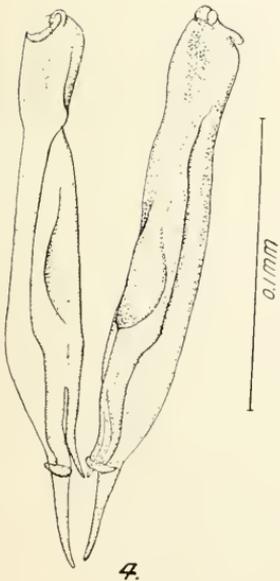
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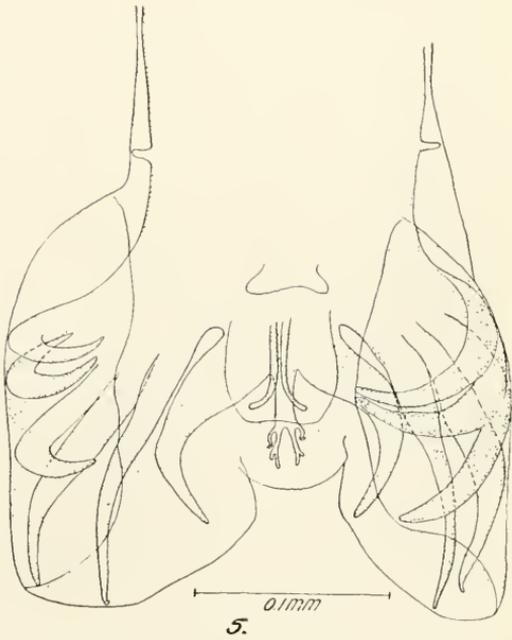
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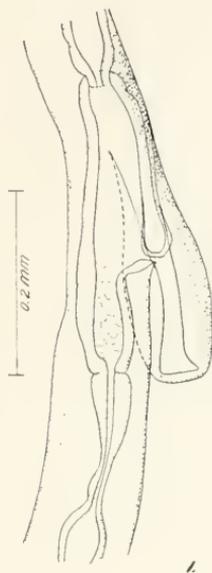


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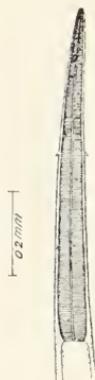
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OSTERTAGIA ODOCOILEI

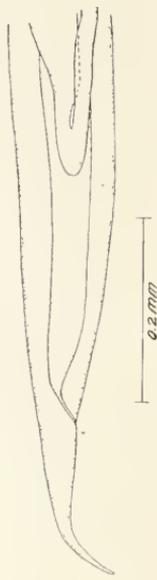
1, Terminal portion of female genitalia; 2, anterior portion of body; 3, tail end of female; 4, spicules of male; 5, bursa of male.



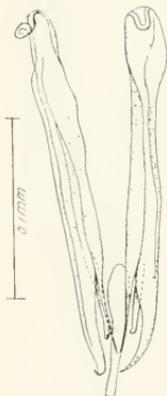
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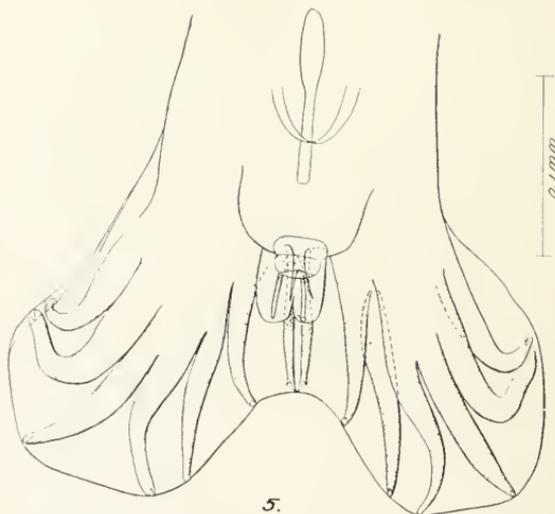
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5

OSTERTAGIA MOSSI

1, Terminal portion of female genitalia; 2, anterior end of body; 3, tail end of female; 4, spicules of male; 5, bursa of male.

