

Oxyspirura lumsdeni n. sp. (Nematoda:Thelaziidae)
from Tetraonidae in North America

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Oxyspirura lumsdeni n. sp. from the orbit of *Pedioecetes phasianellus* (type host), *Tympanuchus pallidicinctus*, *Centrocercus urophasianus*, *Bonasa umbellus*, and hybrids of *P. phasianellus* and *Tympanuchus cupido* in Canada and the United States is distinguished from other members of the subgenus *Oxyspirura* by the absence of a gubernaculum, the presence and arrangement of three preanal pairs and three postanal pairs of caudal papillae, the presence of deirids, and the length and morphology of the spicules.

Introduction

Species of *Oxyspirura* have not previously been described from Canadian birds and only three (*O. mansonii*, *O. petrowi*, and *O. pusillae*) have been recorded from North America. It is usual to follow Cram (1937) and assign *Oxyspirura* from grouse in North America to *O. petrowi* Skrjabin, 1929. In the present study large collections of *Oxyspirura* from sharp-tailed grouse, sage grouse, lesser prairie chicken, ruffed grouse, and hybrids of greater prairie chicken and sharp-tailed grouse in North America were studied. These worms are apparently conspecific and represent a new species which is described herein and named in honor of Mr. Harry G. Lumsden of the Ontario Department of Lands and Forests.

Materials and Methods

A maximum of 10 adult males and 10 adult females were studied from each of nine groups of worms as follows: (1) sharp-tailed grouse (*Pedioecetes phasianellus*) Manitoulin Island, Ontario (10 males, 10 females); Rainy River, Ontario (one male); Prelate, Saskatchewan (10 males, 10 females); South Dakota (nine males, seven females); Montana (10 males, 10 females); (2) hybrids of sharp-tailed grouse (*P. phasianellus*) and greater prairie chicken (*Tympanuchus cupido*) Manitoulin Island, Ontario (10 males, 10 females); (3) sage grouse (*Centrocercus urophasianus*) Val Marie, Saskatchewan (10 males, 10 females); (4) lesser prairie chicken (*Tympanuchus pallidicinctus*) Oklahoma (two males, two females); (5) ruffed grouse (*Bonasa umbellus*) Kenora, Ontario (one male, one female).

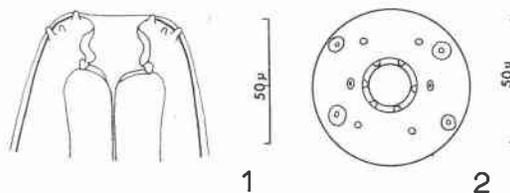
The 63 male and 60 female nematodes selected had been fixed in glycerine-alcohol. They were cleared and examined in glycerine by allowing the alcohol to evaporate. The gross morphology of spicules was studied after they were removed and cleared in lactophenol. Studies of spicules were also made from serial sections stained

with hematoxylin and eosin. Uteri were dissected from adults and cleared in lactophenol. The number and arrangement of caudal papillae in the male were determined from studies of the ventral view obtained by rolling males under cover slips. The length and width of 10 eggs from each of the 60 female specimens were measured. Measurements were made of first-stage larvae cleared in lactophenol.

Oxyspirura (Oxyspirura) lumsdeni n. sp. (Figs. 1-8)

General

Spiruroidea, Thelaziidae, Thelaziinae, *Oxyspirura* Drasche in Stossich, 1897, subgenus *Oxyspirura* Skrjabin, 1931. Slender worms bluntly rounded anteriorly and sharply attenuated posteriorly. Undivided buccal capsule heavily cuticularized. Four submedian pairs and three circumoral pairs of cephalic papillae present. Amphids situated laterally on cephalic extremity. Irregularly shaped dorsoventral cervical alae or swellings usually present. Division of oesophagus into muscular and glandular portions not discernible. Body often with transverse cuticular striations, most prominent at the extremities. Deirids present. Vulva in posterior quarter of worm. Gubernaculum and caudal



FIGS. 1-2. *Oxyspirura lumsdeni* n. sp. FIG. 1. Anterior end female, lateral view (paratype from *Pedioecetes phasianellus*). FIG. 2. Anterior end female, en face view (paratype from *P. phasianellus*).

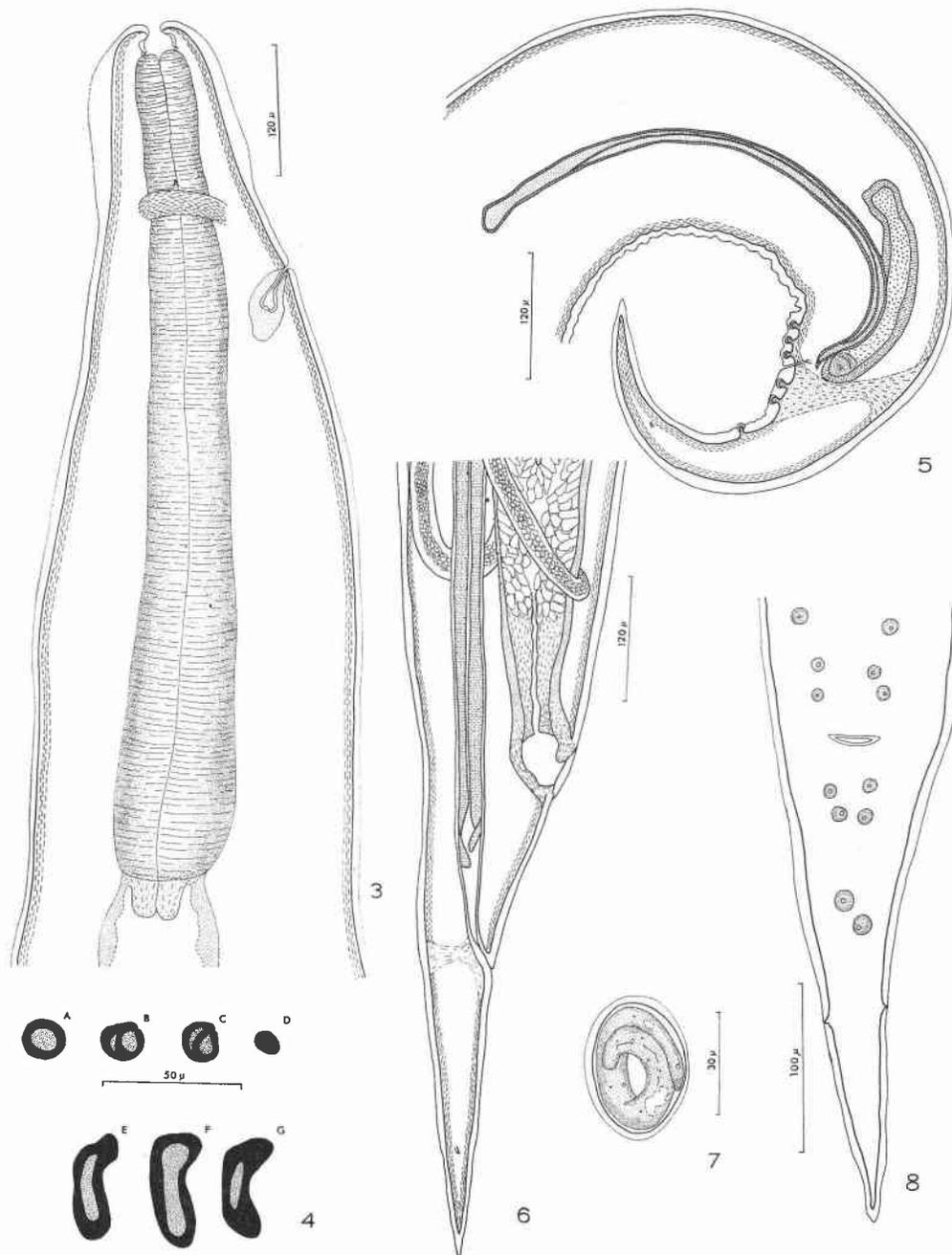


FIG. 3. Anterior end female, lateral view (allotype). FIG. 4. Cross sections of spicules (paratype from *P. phasianellus*). A-D, left spicule: A, proximal end; B, near proximal end of right spicule; C, near middle of right spicule; D, distal end. E-G, right spicule; E, proximal end; F, middle region; G, distal end. FIG. 5. Caudal end male, lateral view (holotype). FIG. 6. Caudal end female, lateral view (allotype). FIG. 7. Egg with fully differentiated larva (from allotype). FIG. 8. Caudal end male, ventral view (paratype from *P. phasianellus*).

alae absent. Asymmetrically placed phasmids present in both sexes.

Male (Holotype)

Length 11.7 mm. Body width: maximum 0.26 mm near middle of body; at anus 0.12 mm. Buccal capsule: length 15 μ ; width 22 μ . Oesophagus 0.84 mm in length. Nerve ring and excretory pore 0.19 mm and 0.33 mm respectively from anterior extremity. Maximum length of cervical alae 0.25 mm. Deirids 0.13 mm and 0.17 mm from anterior extremity. Spicules unequal in length and morphologically dissimilar. Left spicule 0.51 mm in length, acicular in shape. Right spicule 0.22 mm in length, navicular in shape. Spicule ratio 1:2.3. Tail pointed, 0.29 mm in length. Caudal extremity with three pairs of preanal papillae and three pairs of postanal papillae arranged asymmetrically as illustrated (Figs. 5, 8). Phasmids lateral, 0.10 mm and 0.14 mm from caudal extremity.

Female (Allotype)

Length 15.3 mm. Body width: maximum 0.35 mm near middle of body; at anus 0.08 mm. Buccal capsule: length 25 μ ; width 28 μ . Oesophagus 0.86 mm in length. Nerve ring and excretory pore 0.19 mm and 0.34 mm respectively from anterior extremity. Maximum length of cervical alae 0.21 mm. Deirids 0.16 mm and 0.19 mm from anterior extremity. Vulva 0.55 mm from posterior extremity. Muscular vagina 0.36 mm in length. Eggs 37 (29–44) μ in length, 27 (23–30) μ in width. Egg shell smooth, 6–7 μ in

thickness. Tail attenuated, 0.33 mm in length. Phasmids lateral, 0.10 mm and 0.09 mm from caudal extremity.

First-stage Larva (10)

Length 103 (96–110) μ . Maximum width 10 (9–11) μ . Excretory pore 44 (40–50) μ from rounded anterior extremity. Genital primordium 37 (30–40) μ from posterior extremity and 7 (5–10) μ in length. A pointed protuberance ("egg tooth") present slightly posterior to anterior extremity. Twelve to 15 rows of delicate spines surround larva immediately posterior to "egg tooth," becoming progressively more obscure posteriorly. Transverse cuticular striations present.

Eggs (600)

Eggs embryonated, oval, 38 (29–48) μ in length, 27 (22–36) μ in maximum width. Egg shell smooth, 6–7 μ in thickness.

Paratypes

The combined dimensions of all specimens studied are presented in Table I. There are three preanal pairs and three postanal pairs of caudal papillae in all male specimens.

Hosts

Pedioecetes phasianellus (Linné) (TYPE HOST), *Tympanuchus pallidicinctus* (Ridgway), *Centrocercus urophasianus* (Bonaparte) (new host record for *Oxyspirura*), *Bonasa umbellus* (Linné), hybrids of *P. phasianellus* and *Tympanuchus cupido* (Linné).

TABLE I
Dimensions* of adult *O. lumsdeni* n. sp. from Tetraonidae in North America

	Male				Female			
	Range	Mean	S.D.	No.	Range	Mean	S.D.	No.
Length, mm	6.9–16.4	11.8	2.4	63	11.4–22.5	16.4	2.9	60
Maximum width	190–385	285	47.5	63	265–600	410	0.08	60
Length buccal capsule	10–24	18.3	2.6	63	13–26	19.5	2.8	60
Width buccal capsule	19–30	22.8	2.2	63	20–31	25.5	2.4	60
Nerve ring	160–225	185	11.8	63	155–235	185	16.5	60
Excretory pore	245–435	330	34.0	61	265–455	330	36.3	60
Length oesophagus	610–1015	810	74.2	63	550–1095	855	81.7	60
Deirids	140–260	167	31.2	10	130–245	168	29.9	12
Length tail	190–440	280	41.4	63	170–490	325	47.2	60
Length right spicule	200–260	220	33.7	62				
Length left spicule	440–595	515	38.5	62				
Vulva					475–825	620	70.3	60
Length vagina					240–700	410	91.0	52

*In microns except where stated otherwise. S.D. = standard deviation. No. = sample size. The nerve ring, excretory pore, and deirids were measured from the cephalic extremity. The vulva was measured from the caudal extremity.

Site

Orbit.

Locality

Manitoulin Island, Ontario (TYPE LOCALITY); Rainy River, Ontario; Kenora, Ontario; Saskatchewan; South Dakota; Montana; Oklahoma.

Type Specimens

United States National Museum Helminthological Collection, Nos. 70522 (holotype), 70523 (allotype), 70524–9 (paratypes).

Discussion

All specimens are evidently conspecific. Caudal papillae are similar in size, number, and arrangement. There is overlap in the positions of the nerve ring, excretory pore, vulva, and anus and in the sizes of the body, buccal capsule, oesophagus, spicules, and eggs in all the groups of worms studied (Addison 1969).

O. lumsdeni n. sp. belongs with those members of the subgenus *Oxyspirura* (see Addison 1969) lacking a gubernaculum, and possessing three preanal pairs and three postanal pairs of caudal papillae namely, *O. schulzi* Skrjabin, 1929; *O. otocompsa* Rasheed, 1960; *O. cochlearispiculata* Caballero, 1951; *O. matogrosensis* Rodrigues, 1963; *O. laharpurensis* Jairapuri and Siddiqi, 1967; *O. lerouxi* Ali, 1960; *O. peipingensis* Hsü, 1933; *O. streperae* Johnston and Mawson, 1941; *O. petrowi* Skrjabin, 1929; *O. yehi* Ali, 1960; *O. kaitingensis* Hsü, 1933; *O. lalagea* Ali, 1960; *O. indica* Singh, 1948; *O. dicuricola* Jairapuri and Siddiqi, 1967; *O. malabarica* Jairapuri and Siddiqi, 1967; and *O. rysavyi* Barus, 1963. *O. indica*, *O. kaitingensis*, *O. otocompsa*, and *O. petrowi* are described as having four pairs of postanal papillae, but the most posterior pair in each species appear to be phasmids.

O. lumsdeni n. sp. differs from *O. dicuricola*, *O. indica*, *O. laharpurensis*, *O. lerouxi*, *O. malabarica*, *O. otocompsa*, *O. rysavyi*, and *O. yehi* in having a right spicule 48–194 μ and a left spicule 147–224 μ longer.

The left spicule of *O. lumsdeni* n. sp. is 150–305 μ shorter than the left spicule of *O. schulzi*.

O. lumsdeni n. sp. differs from *O. streperae* in having deirids and the most posterior pair of caudal papillae situated much closer to the anus.

O. lumsdeni n. sp. differs from *O. kaitingensis* in having longer spicules, deirids, and an internal circular groove surrounding the base of the buccal capsule.

O. lalagea, known from a single male specimen from a passeriform in India, lacks deirids and has a nerve ring 140–170 μ more anterior than that in *O. lumsdeni* n. sp.

O. lumsdeni n. sp. differs from *O. petrowi* in having deirids and longer spicules. Cram (1937) and Ybarra (1948) incorrectly identified specimens from tetraonids in the United States and Mexico as *O. petrowi*. The specimens of Cram and Ybarra had right spicules 67–91 μ and 73–81 μ respectively longer than those in *O. petrowi* as described by Skrjabin (1929). The specimens of Cram and Ybarra also had deirids which are unreported in *O. petrowi* (Skrjabin, 1929). Erickson *et al.* (1949) probably followed Cram (1937) in reporting *O. petrowi* from *Bonasa umbellus* in Minnesota. The descriptions of Cram (1937) and Ybarra (1948) agree with *O. lumsdeni* n. sp.

The buccal capsule of *O. cochlearispiculata* has neither an internal circular groove at its base nor as much curvature of the internal walls as does *O. lumsdeni* n. sp. *O. cochlearispiculata* also differs from *O. lumsdeni* n. sp. in having one pair of postanal papillae near the anus and two pairs fairly remote from the anus.

O. peipingensis is known from two male and two female specimens from a muscicapid host in China. Unlike *O. lumsdeni* n. sp., deirids were not reported in *O. peipingensis*.

O. matogrosensis, from a corvid in Brazil, is similar to *O. lumsdeni* n. sp., but the left spicule of the latter species is generally longer and the eggs are larger. *O. matogrosensis* has a clearly divided oesophagus, unlike *O. lumsdeni* n. sp., which may also be a larger species with a longer tail.

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