Lissorchis heterorchis sp. n. (Trematoda: Lissorchiidae) from Catostomus macrocheilus Girard in Oregon

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The only previous record of a species of Lissorchis in the Pacific Northwest appears to be that of L. attenuatum which was found by Bangham and Adams (1954) in Catostomus catostomus and C. macrocheilus in British Columbia. Magath (1917) established the genus Lissorchis which, with the new species described herein, at present includes eleven species.

Materials and Methods
Specimens were removed from the small intestine of the host, fixed in Gilson’s fluid at room temperature, under slight cover glass pressure, stained in Ehrlich’s acid hematoxylin, and counterstained with 0.02% fast green in 95% alcohol. Drawings were made with the aid of a microprojector and camera lucida. The description is based upon the six largest specimens. Measurements are in microns unless otherwise stated and the average of each is followed by the minimum and maximum in parentheses.

Lissorchis heterorchis sp. n.
(Figs. 1–3)

Diagnosis
Body elongate, anterior and posterior ends rounded, 3.1 (2.4–4.0) mm long by 0.87 (0.65–1.10) mm wide; cuticular spines extending along body margins from anterior end to a short distance posterior to posterior testis, with few spines on ventral surface. Oral sucker subterminal, aspinose, 322 (283–389) long by 365 (313–454) wide, acetabulum in anterior third of body, 374 (307–460) long by 401 (319–513) wide. No prepharynx, esophagus short, ceca of moderate width, extending to near posterior end of body. Testes tandem, lobed, posterior to midbody. Anterior testis smaller, 408 (342–472) long by 330 (260–413) wide; posterior testis 605 (460–779) long by 314 (248–389) wide. Cirrus sac oblique, proximal end just posterior to acetaebulum and distal end at midlevel of acetaebulum and reaching left body margin, 547 (354–708) long by 121 (83–165) wide; seminal vesicle bipartite with anterior part smaller; prostate gland cells present. Genital pore marginal at midlevel of acetaebulum; cirrus protrusible, spined (Fig. 2). Ovary multilobed with variable number of lobes immediately anterior to anterior testis, 269 (212–342) long by 324 (290–401) wide. Vitelline follicles broadly interconnected, fields overlapping ceca and uterine arms, extending from midlevel of acetaebulum to midlevel of posterior testis. Transverse vitelline ducts meeting at posterior margin of ovary at vitelline reservoir; common duct then proceeds anteriorly over ovarian surface where it is joined by short oviduct leading to ootype and beginning of uterus. Laurer’s canal and seminal receptacle not seen. Uterus proceeds posteriorly along right side almost to end of body then returns on same side to the level of ovary, then crosses to the left side where it duplicates the same course on the left side of the body, terminating in the metraterm which lies under the cirrus sac, and reaching the common genital pore. Mature uterine eggs, brownish yellow, averaging 26 long by 16 wide.

Type host: Catostomus macrocheilus Girard. Habitat: Small intestine.
Type locality: Multnomah Creek, Multnomah County, Oregon.
Incidence: Seven specimens found in one sucker.

Key to the species of Lissorchis Magath, 1917
1. Vitelline follicles 7–12 on each side ... 2
   Vitelline follicles 16 or more on each side ........................................ 3
2. Ovary deeply trilobed, lobes completely separated; length of body posterior to hind testis approximately equal to combined length of...
Figures 1–3. *Lisorchis heterorchis* sp. n. 1. Holotype, dorsal view. 2. Detail of genital region. 3. a, b. Outline of testes of two paratypes to show variation.
the three gonads .......... *L. simeri* (Van Cleave and Mueller, 1932)

Ovary compact, moderately lobed but not appearing as three separate structures; length of body posterior to hind testis less than length of the three gonads

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3. Cuticular spines extending to posterior end of body; postacetabular region much narrowed and triangular

Cuticular spines extending no farther than the middle of the posterior testis; postacetabular region not narrowed, posterior end more broadly rounded

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4. Cirrus armed .................

---------- .......... *L. gullaris* Self and Campbell, 1956

Cirrus not armed

---------- .......... *L. fairporti* Magath, 1917

5. Ovary overlapping both testes, testes wider than long, body flask-shaped

----------- .......... *L. garricki* (Simer, 1929)

Ovary not overlapping both testes, testes longer than wide, body more elongate

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6. Anterior limits of vitelline fields much posterior to acetabulum

----------- .......... *L. hypentelii* (Fishthal, 1942)

Vitelline fields reaching level of acetabulum

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7. Acetabulum about twice the size of the oral sucker

----------- .......... *L. transluscens* (Simer, 1929)

Acetabulum less than twice the size of the oral sucker

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8. Cuticular spines only on the ventral body surface and not on body margins; combined width of ceca equal to one-third of body width

----------- .......... *L. crassicurum* (Haderlie, 1953)

Cuticular spines on body margins, not confined to ventral surface; ceca narrower

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9. Testes distinctly lobed; posterior testis about one-third longer than anterior testes

----------- .......... *L. heterorchis* n. sp.

Testes entire; posterior testis not one-third longer than anterior testis

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10. Vitelline fields largely confined to anterior half of body; testes not confined to posterior half of body

----------- .......... *L. attenuatum* (Van Cleave and Mueller, 1932)

Vitelline fields reaching posterior third of body; testes in posterior half of body

---------- .......... *L. polylobatum* (Haderlie, 1950)

### Results and Discussion

The new species is relatively large with a broad posterior region. It is the only species of the genus with lobed testes. The posterior testis is much longer than the anterior one and the ovary is deeply lobed. The cirrus sac is relatively short and its proximal end does not extend much posterior to the acetabulum. The cirrus is spined.

Following Smith (1968), we consider *Tri-ganodistomum* to be synonymous with *Lissorchis*. Simer (1929) erected a new genus *Alloplagiorchis* for *A. garricki* but this genus also is a synonym of *Lissorchis*.

An examination of paratypes of *Lissorchis crassicurum* Haderlie and *L. polylobatum* Haderlie revealed that the vitelline follicles are more numerous than shown in the author’s drawings; in the former species the vitelline fields extend nearly to the inner margins of the ceca, in the latter species the vitelline follicles are overlapping and closely packed.

Magath (1917) found that the first and second intermediate hosts of *Lissorchis fairporti* were the snail *Helisoma trivolvis* and chironomid larvae, respectively. The cercaria possessed both stylet and tail in contrast to the cercaria of *L. mutabile* which, according to Wallace (1941), lacked both stylet and tail. Cercariae of the latter encyst in the commensal annelid *Chaetogaster limnaei* in the respiratory chambers of *Helisoma trivolvis* and *H. campanulata*. The tailless cercariae of *L. mutabile* encyst after being eaten by the annelid. Thus, there is a correlation between the habitat of the second intermediate host and presence or absence of a tail on the cercariae. Smith (1968) found that *L. mutabile* also utilizes freshwater limpets and planarians as intermediate hosts.

No *Helisoma* snails are known to occur in the area inhabited by the sucker host of *Lissorchis heterorchis*. More probable snail hosts are *Flumenicola* or *Oxytrema*, common stream snails of the region.
Summary

Seven specimens of a trematode found in the intestine of a sucker, *Catostomus macrocheilus* Girard, collected in Multnomah Creek below Multnomah Falls, Multnomah County, Oregon, were determined to be an undescribed species of *Lissorchis* Magath (1917). The new species herein described is characterized especially by lobed testes unequal in size, a spined cirrus, and numerous, broadly joined vitelline follicles. The genus *Triganodistomum* is considered to be a synonym of *Lissorchis*. A key to the species of *Lissorchis* is presented.

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Grover C. Smart, Jr., and H. R. Thomas

In Virginia, fields infested with the soybean cyst nematode, *Heterodera glycines* Ichinohe, 1952, are planted to peanut, *Arachis hypogaea*, in the rotation system. Although peanut is not a host of the nematode, cysts do adhere to the pods and hay when this crop is grown in infested soil (Miller, 1960; Smart and Wright, 1962). After peanuts are harvested, swine are often allowed to roam the fenced fields to eat the waste and cull peanuts and peanut vine hay. On infested land, they undoubtedly ingest nematode cysts. Swine then may be moved to noninfested fields, and the possibility exists of spreading the nematode to new locations through the fecal droppings.

Triffit (1929) reported that eggs and larvae in cysts and larvae not in cysts of *H. rostochiensis* Wollenweber, 1923 did not survive passage through the digestive tract of the 6-week-old pig. Goffart (~1934) fed 3,000 cysts of *H. rostochiensis* to a rabbit and mixed the excrement in sterilized soil planted to potato. Upon examining the potato roots, he found one larva. Ellenby (1944, 1946) reported that eggs in cysts of *H. rostochiensis* survived passage through the gut of earthworms, and yielded a greater number of larvae in larval emergence tests than cysts which did not pass through earthworms.

Girard (1887) reported that cysts of *H. schachtii* Schmidt, 1871, which were not damaged by the teeth of sheep eating infected sugarbeets, survived passage through the digestive tract of the sheep. He observed larvae emerging from such cysts and was able to obtain reproduction by adding infested sheep excrement to sand taken from a quarry and seeding sugarbeet. Chatin (1890) was unable to recover viable *H. schachtii* from sheep fed infected sugarbeet, some of which were arti-

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1 Respectively, Associate Professor of Nematology, Department of Entomology and Nematology, University of Florida, Gainesville, and Associate Professor of Animal Science, Virginia Polytechnic Institute Division of Research, Holland, Virginia. The research was conducted in 1963 while the senior author was located at Holland, Va. Florida Agricultural Experiment Stations Journal Series No. 3086.

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Literature Cited


