Telorchis gutturosi sp. n. (Trematoda: Telorchiidae) from Graptemys pseudogeographica Gray in Nebraska, with Reports of Additional Species of Trematodes from Nebraska Turtles

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TELORCHIS GUTTUROSI SP. N. (TREMATODA: TELORCHIIDAE) FROM GRAPTEMYS PSEUDOGEOGRAPHICA GRAY IN NEBRASKA, WITH REPORTS OF ADDITIONAL SPECIES OF TREMATODES FROM NEBRASKA TURTLES

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ABSTRACT: One species of digenean is described and 8 others reported from turtles in Nebraska. Telorchis gutturosi, described from Graptemys pseudogeographica, resembles T. stossichi, T. pseudo-aculeatus, and T. pleroticus in having an acetabulum significantly smaller than the oral sucker, but differs by possessing a pharynx which is as large as the acetabulum and having the ovary only \( \frac{1}{2} \) the body length from the acetabulum. Telorchis necturi is considered the senior synonym of T. cryptobranchi; Graptemys pseudogeographica is a new host. Hapalorhynchus stunkardi is reported for the first time since its description. Based on new morphological evidence, the generic diagnosis of Hapalorhynchus is emended and a key to the species provided. Spirorchis scripta, S. parvus, Protenes angustus, and Eustomos chelydrae are reported for the first time from Nebraska. Graptemys pseudogeographica is a new host for Heronimus mollis; Kinosternon flavescens is a new host for Telorchis corti.

Twenty-one species of platyhelminth parasites have been reported from Nebraska turtles (Brooks and Mayes, 1975). The present study reports seven additional species, one of which is described as new, and new hosts for two previously reported species.

Worms were removed from the host, flattened with slight coverslip pressure or not flattened (spirorchiids), fixed with AFA, stored in 70% ethanol, stained with Mayer’s hematoxylin or Mayer’s carmalum, and mounted in Canada balsam for study as whole mounts. Measurements are in micrometers unless otherwise stated; figures were drawn with the aid of a drawing tube.

TELORCHIIDAE Stunkard 1924

Telorchis gutturosi sp. n. (Figs. 1-3)

Description (based on 9 complete and 1 partial specimens): Body elongate, 3.72 to 4.27 mm long by 0.42 to 0.68 mm wide. Tegument with spines extending to level of acetabulum. Oral sucker subterminal, rounded, without lappets; 248 to 300 long by 240 to 324 wide. Prepharynx short; pharynx 120 to 132 long by 144 to 200 wide; cerebral ganglia conspicuous; esophagus 50 to 70 long; bifurcation 11 to 13% body length from anterior end, ceca extending to near posterior end of body.

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FIGURES 1-5. Trematodes from Nebraska turtles. 1-3. Telorchis gutturosi. 1. Holotype, ventral view. 2. Terminal genitalia, ventral view. 3. Ootype region, dorsal view. 4. Telorchis corti, ventral view. 5. Telorchis necturi, ventral view. Legend: L = Laurer's canal; M = Mehlis' gland; Me = Metraterm; O = Ovary; Pr = Prostatic complex; Sr = Seminal receptacle; Sv = Seminal vesicle; Vr = Vitelline reservoir.

State Mus., H. W. Manter Lab No. 20231, and in collections of authors.

Etymology: The specific name is Latin for "enlarged throat" used as a noun in the genitive singular and refers to the relative size of the pharynx.

Three previously described species of Telorchis have an acetabulum significantly smaller than the oral sucker: T. plerothicus (Braun 1899) Wharton 1940; T. pseudoaculeatus Dollfus 1929; and T. stossichi Coldberger 1911. In all those species the pharynx is approximately half the size of the acetabulum, while the pharynx and acetabulum of T. gutturosi are subequal. The ovary of T. gutturosi is 1/6 body length from the acetabulum; that of T. plerothicus is 1/3 body length, and for T. stossichi and T. pseudoaculeatus 3/4 body length. T. plerothicus further has a long prepharynx, no measurable esophagus, and a cirrus sac which does not reach the level of the ovary; T. pseudo-
aculeatus has slightly larger eggs and a cirrus sac which does not reach the level of the ovary. The most similar species, T. stossichi, occurs in Europe, North Africa and Asia Minor in Emys orbicularia, a member of the same family (Emydidae) as Graptemys pseudogeographica.

_Telorchis necturi_ (Perkins 1928) Wharton 1940

(Fig. 5)

_Synonym: Telorchis cryptobranchi_ McMullen and Roudabush 1935 new synonymy.

_Host: Graptemys pseudogeographica_ (4 in 1 host), new host.

_Site: _Small intestine._


The four specimens identified as _T. necturi_ agree very closely with the original description by Perkins (1928). _Telorchis necturi_ and _T. cryptobranchi_ are distinguishable on the basis of a single attribute; _T. necturi_ has a cirrus sac which terminates at the level of the posterior margin of the ovary, while the cirrus sac of _T. cryptobranchi_ terminates immediately anterior to the ovary. Watertor (1967) clearly demonstrated that the posterior extent of the cirrus sac among members of _Telorchis_ may be a plastic character and that minor differences in the extent of the cirrus sac are not sufficient grounds for recognizing a new species. The four specimens collected in this study have cirrus sac which terminate at varying points from immediately anterior to the ovary to the level of the posterior margin of the ovary, otherwise, they are indistinguishable. Therefore, _T. necturi_ and _T. cryptobranchi_ are considered synonymous.

_Telorchis corti_ Stunkard 1915

(Fig. 4)

_Host: Kinosternon flavescens_ Agassiz (7 in 1 host, new host).

_Site: _Small intestine._

_Specimens: 2, Univ. Neb. State Mus., H. W. Manter Lab No. 20212._

Over 100 specimens of _T. corti_ have now been collected from _Chelydra serpentina_, _Chrysemys picta_, and _Trionyx spiniferus_ (Brooks and Mayes, 1975), _Kinosternon flavescens_ (present report), and _Thamnophis sirtalis_ (Brooks and Mayes, unpublished) in Nebraska. All specimens agree very closely with the original description; in no case does the cirrus sac terminate closer than one ovarian diameter anterior to the ovary.

_**Protenes angustus** (Stafford 1900) Ward 1918_

_Host: Chrysemys picta_ (1 in 1 host).

_Site: _Small intestine._

_Specimen: 1, Univ. Neb. State Mus., H. W. Manter Lab. No. 20230._

This is the first report of _P. angustus_ from Nebraska. Brooks and Mayes (1975) erroneously cited Barker and Covey (1911) as reporting _P. angustus_ from Nebraska; their specimens were in fact from _Chrysemys picta_ in Minnesota.

**SPIRORCHIIDAE** Stunkard 1921

_Hapalorhynchus stunkardi_ Byrd 1939

_Host: Chelydra serpentina_ L. (4 worms in 1 host).

_Site: _Blood vessels of lungs._


Byrd (1939) described _H. stunkardi_ from the blood vessels of the lungs of _Kinosternon (= Sernothaerus) carinatum_ (Gray) in Tennessee. Since this is the first report of the species since its description, both the host and locality are new.

Stunkard (1923) erected the genus _Hapalorhynchus_ for _H. gracilis_ from _Chelydra serpentina_, stating that there was no cirrus sac or cirrus present. Mehra (1933) erected the genus _Coeuritrema_ for _C. lyssemus_ and _C. odhnerensis_, stating that they were generically different from _H. gracilis_ because they possessed well-developed cirri. Thapar (1933) erected the genus _Tremarhynchus_ for _T. indicus_, but Mehra (1934) pointed out that _T. indicus_ possesses a rudimentary cirrus and thus belongs in _Coeuritrema_. Price (1934) considered _Tremarhynchus_ a synonym of _Hapalorhynchus_, and Byrd (1939) considered both _Tremarhynchus_ and _Coeuritrema_ synonyms of _Hapalorhynchus_. Skrjabin (1951) and Yamaguti (1958, 1971) both considered _Coeuritrema_ and _Hapalorhynchus_ separate genera. Our specimens and the original description of _Hapalorhynchus stunkardi_ both show a well-developed cirrus. Additionally, Brooks and Mayes (1975) described _Hapalorhynchus foliorchis_ and reported a weakly muscular ductus ejaculatorius leading from the seminal vesicle to the genital pore; examination of the holotype...
of *H. gracilis* revealed a similar morphology as did Thapar’s description of *Tremarhynchus indicus*. Since a weakly-muscular ductus ejaculatorius may be termed a rudimentary or poorly-develop cirrus, the synonymy of Coeuritrema and Tremarhynchus with Hapalorhynchus is justified, and the generic diagnosis is hereby emended for the first time to include species with either a well-developed or poorly-developed cirrus.

Byrd (1939) compiled a key to the species of Hapalorhynchus, and based his first couplet on the presence or absence of a body constriction at the level of the acetabulum. He described *H. stunkardi* as lacking such a constriction, but our specimens of *H. stunkardi* (which were fixed without pressure) have the constriction. The diagnosis of *H. stunkardi* is hereby emended to include such a constriction and the use of the presence or absence of such a constriction for distinguishing species eliminated. We have prepared the following new key to the species of Hapalorhynchus in light of the new morphological information.

**Key to Species of Hapalorhynchus Stunkard 1923**

<table>
<thead>
<tr>
<th>Synonyms: Coeuritrema Mehra 1933; Tremarhynchus Thapar 1933</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a. Cirrus well-developed</td>
</tr>
<tr>
<td>1b. Cirrus poorly developed</td>
</tr>
<tr>
<td>2a. Testes smooth</td>
</tr>
<tr>
<td>2b. Testes lobed</td>
</tr>
<tr>
<td>3a. Esophageal diverticula present</td>
</tr>
<tr>
<td>3b. Esophageal diverticula absent</td>
</tr>
<tr>
<td>4a. Ovary lobed</td>
</tr>
<tr>
<td>4b. Ovary smooth</td>
</tr>
<tr>
<td>5a. Vitelline follicles extending into forebody</td>
</tr>
<tr>
<td>5b. Vitelline follicles not extending into forebody</td>
</tr>
<tr>
<td>6a. Oral sucker smaller than acetabulum</td>
</tr>
<tr>
<td>6b. Oral sucker larger than acetabulum</td>
</tr>
<tr>
<td>7a. Testes lobed, vitelline follicles extending to bifurcation</td>
</tr>
<tr>
<td>7b. Testes smooth, vitelline follicles not extending to bifurcation</td>
</tr>
</tbody>
</table>

8a. Ovary a narrow transverse band
8b. Ovary ovoid

**Euchromadora scripta** Stunkard 1923

**Host:** Chrysemys picta Schneider (5 in 1 host).
**Site:** Cranial cavity, blood vessels of heart.
**Specimens:** 3, Univ. Neb. State Mus., H. W. Manter Lab. No. 20214.

The specimens collected in Nebraska are uniformly larger than any previously reported. The body is 1.9 to 2.37 mm long by 0.34 to 0.47 mm wide; the oral sucker is 89 to 113 long by 57 to 65 wide; and the eggs are 41 to 65 long by 34 to 57 wide. The anterior testis in all specimens is immediately postbifurcal, a configuration unique to *S. scripta*. Nebraska is a new locality for the species.

**Euchromadora parvus** Stunkard 1923

**Host:** Chrysemys picta (1 in 1 host).
**Site:** Mesenteric blood vessels.
**Specimen:** 1, Univ. Neb. State Mus., H. W. Manter Lab. No. 20223.

This is the only known species of *Euchromadora* with five testes, and the single specimen was easily identified on that basis. Nebraska is a new locality.

**PLAGIORCHIIDAE** Luhe 1901

**Eustomos chelydrae** MacCallum 1921

**Host:** Chrysemys picta (12 in 1 host).
**Site:** Small intestine.
**Specimens:** 8, Univ. Neb. State Mus., H. W. Manter Lab. No. 20224.

MacCallum (1921) described *E. chelydrae* from Chelydra serpentina from an undisclosed locality. McMullen (1935) redescribed *E. chelydrae* and reported its life cycle from material collected from Chrysemys picta and Chelydra serpentina from Michigan. Guilford (1959) reported *E. chelydrae* from the same hosts in Wisconsin. Esch and Gibbons (1967) reported it from Chrysemys picta and Chelydra serpentina from Michigan; Gibbons and Esch (1971) reported it from Sternothaerus m. minor from Florida. Nebraska is a new locality.

**HERONIMIDAE** Ward 1917

**Heronimus mollis** (Leidy 1856) Stunkard 1964

**Host:** Graptemys pseudogeographica (10 in 1 host), new host.
**Site:** Lungs.

This is the first report of *H. mollis* from *G. pseudogeographica*. Brooks and Mayes (1975) reported *H. mollis* from *Chrysemys picta*, *Chelydra serpentina*, and *Emydoidea blandingi*. Our statement that the first report of the species from Nebraska was by Barker and Parsons (1914) was in error, since Barker and Parson’s report was from *Chelydra serpentina* in Iowa.

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