Obinnaya ALCZIE

OZOLAIMUS MEGATYPHLOM RUD., 1819, AN OXYURID PARASITE OF LACHESIS MUTUS (BUSHMASTER SNAKE FROM TRINIDAD, BRITISH WEST INDIES.

ABSTRACT

In a supporting paper, Ozelaimus megatyphlon of South American lizards is recorded for the first time from a snake, the Bushmaster, from Trinidad.
ACKNOWLEDGMENTS

The author wishes to express his thanks to Professor T. W. M. Cameron for making this work possible, and to Dr. Basir Khan, Research Associate, Associate-Professor M. J. Miller, and Miss J. L. Smith, Librarian, at the Institute of Parasitology, for their assistance with the literature.
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INTRODUCTION

Many writers, including Cameron (1938), and Linton (1897) have shown the necessity of studying the parasites of freshwater fishes. Cameron (1938) pointed out, that Canada, with its one-eighth million square miles of freshwater, has an extremely valuable population of commercial and game fish which harbour parasites of both medical and veterinary importance.

Linton (1897), also stressed the economic importance of fish parasites, and showed that heavy infections tend to reduce the fish population.

The work of these two scientists, borne out by others, indicates the need of surveying the parasites of fish in Canada in order to obtain data on their distribution and degree of infection. Only when such a survey has been completed and the life cycles of the parasites worked out can effective control measure be implemented.

HISTORICAL

Helminth parasites of Catostomus commersonii have not been studied extensively in certain areas.
Van Cleave and Mueller (1932, 1934), in their study of the parasites of Oneida Lake fishes in New York, described a number of new species of trematodes, acanthocephala, and nematodes from the *Catostomus commersonnii* and reviewed the literature on the subject.

Hunter and Bangham (1933) investigated parasites of *Catostomus commersonnii* of Lake Erie.

Cameron (1938), in working on fish-carried trematodes in Canada, recorded the trematode *Apophallus venustus* as parasitizing numerous birds and mammals (including man) and showed that *Catostomus commersonnii* was one of the fish harbouring the metacercaria of this parasite.

Miller (1940), described *Phyllodistomum lysteri* from the urinary tubules of *Catostomus commersonnii*.

Lyster (1940), describing the parasites of freshwater fish from Lake Commandant in Quebec, described the helminths of speckled trout, yellow perch, lake trout, and the common sucker (*C. commersonnii*). From the last host, he described two new species, *Glaridacris intermedius* and *Rhabdochona laurentiana*. 
Venard (1941), in his studies on parasites of Reelfoot Lake fish, created a new genus and a new species of trematode from this host.

In Wisconsin, a large scale survey of fish parasites was undertaken by Bangham (1944) and Fischthal (1945) who surveyed the parasites of _C. commersonnii_.

In Ontario, a similar large scale survey has been conducted by Bangham and Venard (1946) on freshwater parasites including those of _C. commersonnii_.

Lincicome and Van Cleave (1949), studied the distribution of _Leptorhynchoïdes thecatus_, a common acanthocephalan parasite in fishes (including _C. commersonnii_).

Choquette (1951), described a new species of nematode, _Rhabdorchon milleri_, from the intestine of _Catostomus commersonnii_.

## Checklist of Helminth Parasites Found in Suckers

<table>
<thead>
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<th>Parasite</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trematoda</strong></td>
<td></td>
</tr>
<tr>
<td>2. <em>Clinostomum marginatum</em></td>
<td>Rudolphi, 1819.</td>
</tr>
<tr>
<td>4. <em>Apophallus venustus</em> <em>(Metacercaria)</em></td>
<td>Cameron, 1938.</td>
</tr>
<tr>
<td>5. <em>Allocercadium commune</em></td>
<td>Cooper, 1915.</td>
</tr>
<tr>
<td>12. <em>Anallocreadium sp.</em></td>
<td>This paper.</td>
</tr>
</tbody>
</table>
Acanthocephala

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Pompohronchus bulbocolli</td>
<td>Linkins, 1919.</td>
</tr>
<tr>
<td>5. N. crassus</td>
<td>Van Cleave, 1936.</td>
</tr>
<tr>
<td>7. Leptorhynchoides thecatus</td>
<td>Linton, 1891.</td>
</tr>
</tbody>
</table>

Cestoda

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Monobothrium ingens</td>
<td>Hunter, 1927.</td>
</tr>
<tr>
<td>2. Biacetabulum infrequens</td>
<td>Hunter, 1927.</td>
</tr>
<tr>
<td>4. G. confusus</td>
<td>Hunter, 1929.</td>
</tr>
<tr>
<td>5. G. lauri</td>
<td>Lamont, 1921.</td>
</tr>
<tr>
<td>6. G. intermedius</td>
<td>Lyster, 1940.</td>
</tr>
<tr>
<td>8. Glaridacris sp.</td>
<td>This paper.</td>
</tr>
<tr>
<td>10. Proteocephalus choquettei</td>
<td>This paper.</td>
</tr>
<tr>
<td>11. Lingula intestinalis</td>
<td>Linnaeus, 1758.</td>
</tr>
<tr>
<td>12. Triaenophorus nodulosus</td>
<td>Pallas, 1781.</td>
</tr>
<tr>
<td>Parasite</td>
<td>Author</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>2. Rhabdochona laurentiana</td>
<td>Lyster, 1940.</td>
</tr>
<tr>
<td>4. Eustrongyloides sp.</td>
<td>Bangham, 1940.</td>
</tr>
<tr>
<td>5. Philometra nodulosa</td>
<td>Thomas, 1929.</td>
</tr>
<tr>
<td>6. Rhabdochona cascadilla</td>
<td>Wodder, 1918.</td>
</tr>
<tr>
<td>7. R. milleri</td>
<td>Choquette, 1951.</td>
</tr>
<tr>
<td>8. Philometra sp. (larva)</td>
<td>Thomas, 1929.</td>
</tr>
</tbody>
</table>
METHODS AND PROCEDURE

Collection:-

The common suckers were collected from different regions from early July to August and the parasites removed and fixed.

Nematodes were killed and fixed in 70% hot alcohol, cestodes and trematodes in hot Bouin's fluid. Unfortunately, the acanthocephalans were not well fixed by either of these techniques.

Trematodes and cestodes were stained with Gower's alum carmine and Ehrlich's haematoxylin. However, it was found that the former was more efficient and gave better results. The acanthocephalans were treated in a similar manner, although they had to be punctured in many places, as suggested by Van Cleave and Müller (1934), to avoid the development of "vacuum opacity". They were allowed to stain for approximately 36 hours.

Nematodes were not stained, but cleared in glycerine or lacto-phenol.
TABLE I.

TABLE SHOWING THE NUMBERS OF HELMINTH PARASITES FOUND IN CATOSTOMUS COMMERSONI FROM THE FOUR DIFFERENT REGIONS STUDIED.

<table>
<thead>
<tr>
<th>Locality</th>
<th>No. of fish examined</th>
<th>No. of fish infected</th>
<th>No. of acanthocephala</th>
<th>No. of trematodes</th>
<th>No. of nematodes</th>
<th>No. of cestodes</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Monroe</td>
<td>163</td>
<td>88</td>
<td>472</td>
<td>52</td>
<td>25</td>
<td>18</td>
<td>--</td>
</tr>
<tr>
<td>Lake Lauzon</td>
<td>9</td>
<td>7</td>
<td>82</td>
<td>18</td>
<td>15</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Lake Edward</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>10</td>
<td>3</td>
<td>2</td>
<td>--</td>
</tr>
<tr>
<td>Chateauguay Basin</td>
<td>20</td>
<td>13</td>
<td>26</td>
<td>1</td>
<td>16</td>
<td>2</td>
<td>--</td>
</tr>
</tbody>
</table>
TREMATODA

The classification according to Van Cleave and Müller (1934), and Dawes (1946) of the species of trematodes found in this survey is as follows:

Sub-order Prosostomata Odhner, 1905.

Family Allocreadiidae Stossich, 1904.

Sub-family Allocreadiinae Looss, 1902.

Genus 1 Triganodistomum Simer, 1929.

Triganodistomum attenuatum Van Cleave and Müller (1932).

Genus 2 Plagioporus Stafford, 1904.

Plagioporus serotinus Stafford, 1904.

Plagioporus cooperi Hunter and Bangham, 1932.

Plagioporus sp.

Genus 3 Allocreadium Looss, 1900.

Allocreadium lobatum Wallin, 1909.

Genus 4 Anaallocreadium MacCallum, 1895.

Anallocreadium sp.

TRIGANODISTOMUM ATTENUATUM Van Cleave and Müller, 1932

Host: Catostomus commersonnii.

Habitat: Intestine.


3 specimens from 1 fish July 3, 1949.
10 specimens from 1 fish July 21, 1949.
4 specimens from 1 fish July 27, 1949.
Lake Lauzon: 15 specimens from 1 fish July 8, 1949.
1 specimen from 1 fish July 18, 1949.
2 specimens from 1 fish July 9, 1949.

Description: Body length: 1.72 mm. - 4.3 mm.
Body width: 0.4 mm. - 0.75 mm.
Oral sucker: 0.23 mm. - 0.4 mm. by 0.2 mm. - 0.4 mm.
Ventral sucker: 0.27 mm. - 0.5 mm. by 0.23 mm. - 0.5 mm.
Anterior testis: 0.16 mm. - 0.52 mm. by 0.1 mm. - 0.53 mm.
Posterior testis: 0.28 mm. - 0.57 mm. by 0.2 mm. - 0.7 mm.
Ovary: three lobed.
Eggs: 0.015 mm. - 0.033 mm. by 0.009 mm. - 0.013 mm.

Discussion: This was by far the most abundant species of trematode encountered, occurring in large numbers in the parasitized host specimens. There is a variation in the sizes of the different specimens collected from the different fish. From Table 2, which compares the measurements of three specimens collected during the
present investigation, it would appear that there is a
genral overlapping of characteristics and that all the
specimens belong to the highly variable species,
*T. attenuatum*. 
<table>
<thead>
<tr>
<th>Size</th>
<th>Type Specimen A</th>
<th>Total length</th>
<th>Type Specimen B</th>
<th>Total length</th>
<th>Type Specimen C</th>
<th>Total length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1.72 mm.</td>
<td></td>
<td>3.5 mm.</td>
<td></td>
<td>4.3 mm.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.4 mm.</td>
<td></td>
<td>0.75 mm.</td>
<td></td>
<td>0.75 mm.</td>
</tr>
<tr>
<td>Ovary</td>
<td>slightly lobed</td>
<td></td>
<td>deeply lobed</td>
<td></td>
<td>deeply lobed</td>
<td></td>
</tr>
<tr>
<td>Testis</td>
<td>slightly irregular</td>
<td></td>
<td>highly irregular</td>
<td></td>
<td>regular</td>
<td></td>
</tr>
<tr>
<td>Vitellaria</td>
<td>extends from anterior portion of ventral sucker to posterior half of the ventral sucker to posterior half of the anterior testis</td>
<td></td>
<td>extends from posterior margin of ventral sucker to posterior half of the anterior testis</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
It is of interest to note that all of the small-sized specimens came from one fish.

Many more specimens were collected from Lake Monroe than from Lake Lauzon.

*Triganodistomum* was created by Simer in 1929 for a single species which he called *T. translucens* and placed in the family *Plagiochiidae*.

Van Cleave and Müller (1934) amended the generic diagnosis on the basis of the fact that in their two new species *T. attenuatum* and *T. simeri*, a seminal receptacle was present which Simer did not find in *T. translucens*. Van Cleave and Müller (1934), nevertheless, remarked that the seminal receptacle which is present is vestigial and apparently non-functional. Thus, they transferred this genus *Triganodistomum* Simer, 1929 to the family *Allocreadiidae* Stossich, 1904.

Wallace (1941), compared the genus *Triganodistomum* with *Lissorchis* Magath (1917) and pointed out that they were very similar morphologically and in the forms of their excretory system in their cercariae. Following this line of argument, Wallace suggested that the genus *Triganodistomum* be placed together with the genus *Lissorchis* in the family *Lissorchiidae* which had
been already formed by Poche in 1925.

Following this suggestion of Wallace's (1941), Fischthal (1941) described a new species of the genus Triganodistomum hypentelli under the family Lissorchiidae Poche, 1925. But he gave no reasons for the pursuit of such a policy.

Haderlie (1950) also described a new species T. polylobatum from the Sacramento Sucker, Catostomus occidentalis Ayres under the family Lissorchiidae. He points out that it differs from T. attenuatum, T. mutabile and T. hypentelli in the shape of the ovary. But he remarks "It resembles Lissorhis fairporti in possessing a lateral genital pore but there are no spines on the dorsal surface, and the testes are fairly rounded not oblong".

The genus Triganodistomum satisfies the characteristics of the family Allocreadiidae Stossich, 1904, and, as amended by Van Cleave and Müller, as such should not be taken away from the family Allocreadiidae. Since the genus Lissorhis Magath, 1917 is closely related to the genus Triganodistomum Simer, 1929, (as visualized by previous authors) the genus Lissorhis should be placed in the same family Allocreadiidae Stossich, 1904 as
previously suggested by Van Cleave and Müller.

Following this suggestion, I, too, have placed this species *T. attenuatum* under the family *Allocreadiidae* Stossich, 1904.

**GENUS PLAGIOPORUS** Stafford, 1904

**Synonym** *Lebouria* Nicoll, 1909  
*Caudotestis* Yamaguti, 1934

Stafford (1904) established this genus to include a type species which he called *P. serotinus*. Müller (1934) amended the genus to take in another species which he designated *P. sinitsini*, and redefined the genus as "the freshwater *Allocreadiinae* in which the genital pore lies on the level and to the left of the caecal bifurcation, with the cirrus sac lying either entirely, or for most of its length, anterior to the acetabulum. Vitellaria lateral, reaching to the posterior end. Parts of the cirrus sac in linear arrangement with little or no coiling. Uterus limited to space between ovary and acetabulum".

Dobrovolsky (1938), transferred *Allocreadium* augsiticolle Hausmann, 1896 to the genus *Plagioporus* Stafford 1904, in that the cirrus sac extends towards the posterior marginal section of the acetabulum, but
otherwise has the characteristics of the genus *Plagioporus* Stafford 1904. It seems then that according to Dobrovolny (1938) the matter of the position of the cirrus sac, whether anterior or posterior to the acetabulum, should be considered insignificant as long as it satisfies other characteristics of the genus.

**Plagioporus sp.**

Host: *Catostomus commersonii*.

Habitat: Intestine.


Discussion: The two specimens collected could be identified as *Plagioporus* but were too distorted to establish a specific identification.

**Plagioporus serotinus** Stafford, 1904

Host: *Catostomus commersonii*.

Habitat: Intestine.


Description: Very small worms broadest in the centre and tapering very slightly to the posterior and anterior regions.

Body size: 1.14 mm. by 0.41 mm.

Oral sucker: 0.13 mm. by 0.13 mm.

Ventral sucker: 0.27 mm. by 0.28 mm.
Anterior testis: 0.14 mm. by 0.12 mm.
Posterior testis: 0.15 mm. by 0.13 mm.
Eggs: 0.072 mm. by 0.05 mm.

Discussion: This specimen resembles closely those described by Stafford (1904) and Miller (1940). Stafford (1904) originally recovered this species from the intestine of *Moxostomata macrolepidotum* (red horse sucker). Miller (1940) also recorded the same species from *Moxostomata aureolum* and *Catostomus commersonii*.

**Plagioporus cooperi** Hunter and Bangham, 1932

Synonym *Lebouria cooperi* Hunter and Bangham, 1932

Host: *Catostomus commersonii*.

Habitat: Intestine.

Abundance: Lake Edward: 1 specimen from 1 fish May 28, 1938.

Description: Oval and flattened worms, widest at its posterior portion.

Body size: 0.87 mm. by 0.48 mm.

Oral sucker: 0.16 mm. by 0.15 mm.

Pharynx: 0.09 mm. by 0.07 mm.

Ventral sucker: 0.3 mm. by 0.25 mm.

Ovary: 0.13 mm. by 0.07 mm.

Anterior testis: 0.08 mm. by 0.12 mm.

Posterior testis: 0.09 mm. by 0.15 mm.
Discussion:— Hunter and Bangham (1932) described this worm previously in the intestines of seven species of minnows; the lake shiner, *Notropis atherinoides*; the spot-tailed minnow, *N. hudsonius*; the straw-coloured minnow, *N. whipplii whipplii*; the long-nosed dace, *Rhinichthys cataractae*; and Storer's chub, *Erineus storerianus*. All of these came from Lake Erie, U. S. A.

Hunter and Bangham (1932) placed this species in the genus *Lebouria* Nicoll, 1904.

Price (1934), after reviewing the work of Nicoll and Stafford 1904 reduced this genus to synonymity with *Plagioporus* Stafford, 1904.

Yamaguti (1934), raised the sub-genus *Caudotestis* Issaitschikow, 1928 to include those *Plagioporus* which have their intestinal caeca ending just at the level of the testis and having their vitellaria not extending into the post-testicular body region. Miller (1940) comments "However, these two characteristics are not sufficiently well defined in the species of the two genera which show all the intergradations. Thus *P. cooperi* has the caeca terminating at the level of the testis, but the post-testicular vitellaria are numerous and meet medially". "It is
apparent, therefore," he concludes, "that Caudotestis, as it is now defined, cannot be retained as a separate genus and must be considered as a synonym of Plagioporus."

ALLOCREADIUM LOBATUM Wallin, 1909

Host: Catostomus commersonii.

Habitat: Intestine.

Abundance: Lake Edward: 3 immature specimens from 1 fish May 28, 1938.

6 mature specimens from 1 fish May 28, 1938.

Description: Body flat and smooth.

Body size: 2.64 mm. by 1.1 mm.

Oral sucker: 0.34 mm. by 0.33 mm.

Ventral sucker: 0.36 mm. by 0.33 mm.

Genital pore: Anterior ventral sucker.

Ovary: 0.25 mm. by 0.13 mm.

Anterior testis: 0.6 mm. by 0.52 mm.

Posterior testis: 0.56 mm. by 0.54 mm.

Eggs: 0.09 mm. by 0.06 mm.

Discussion: Wallin (1909) first described this species from the stomach of Semotilus bullaris from Sebago Lake in Maine.

Van Cleave and Mueller (1934) recovered the same parasite in the intestine of Leucosmosmus corporalis and Semotilus atromaculatus and described it.
The specimen found in the common sucker agrees completely in morphology with the description of Van Cleave and Müller (1934), and differs from Wallin's description. Wallin (1909) states that the intestinal caeca bifurcates anterior to the acetabulum whereas Van Cleave and Müller's specimens, as well as mine, show the bifurcation of the caeca at the dorsal aspect of the acetabulum.

Bangham and Venard (1946) also recorded this species in the intestine of *Leucosmosmus corporalis* and *Notropis cornatusfrontalis*.

**ANALLOCREADIIUM sp.**

**Host:** *Catostomus commersonnii*.

**Habitat:** Intestine.

**Abundance:** Lake Monroe: 2 specimens from 1 fish July 19, 1949.

**Discussion:** The parasites show the characteristics of *Anallocreadium* but could not be identified to species as they were distorted.

Pearse (1924), recovered from the host *Ameiurus nebulosus* (bullhead) and from *Eupomatis gibbosus* several specimens which he called *Anallocreadium armatum*.

Hunter and Bangham (1932) created the species *A. pearsei* for a trematode found in the intestine of *Aplodinotus grunniens*. Hunter and Bangham (1932)
considered *A. armatum* Pearse, 1924, as synonymous with *A. pearsei* Hunter and Bangham, 1932.

Miller (1940) recovered several specimens which he found had the same characteristics as *A. pearsei* and *A. armatum* and states "It appears, therefore, that there is but one valid species of *Anallocreadium*, and that *A. pearsei* must be considered a synonym of *A. armatum*."

CESTODA

The classification of the cestodes found in this survey, according to Southwell (1930), and Van Cleave and Müller (1932), is as follows:

ORDER I CESTODARIA Monticelli, 1892.

Family Caryophyllaeidae Mueller, 1787.

Sub-family Caryophyllaeinae Nybelin, 1922.

Genus Glaridacris Cooper, 1920.

Glaridacris confusus Hunter, 1929.
Glaridacris laruei Lamont, 1921.
Glaridacris sp. (larva) This paper.
Glaridacris catostomi Cooper, 1920.

ORDER II EUCESTODA Southwell, 1930.

Family Proteocephaliidae La Rue, 1911.

Genus Proteocephalus Weinland, 1858.

Proteocephalus choquettei Nov. sp.

GENUS GLARIDACRIS Cooper, 1920.

Cooper (1920) defined this genus as "Caryophyllaeinae with three pairs of loculi or bothria on well defined scolex, which may or may not form a definite terminal disc. Cirrus H-shaped, coils of the uterus never extend anteriorly to cirrus sac. Terminal
excretory bladder and external seminal vesicle present.
Post-ovarian vitellaria present. Parasitic in digestive tract of the Catostomidae.

Glaridacris confusus Hunter, 1929

Synonym Glaridacris intermedius Lyster, 1940

Host: Catostomus commersonii.

Habitat: Intestine.


Description: The size of the body is 4.35 mm. by 0.54 mm. The scolex is much broader at the base measuring 0.45 mm. by 0.65 mm. The vitellaria originate at 0.45 mm. from the scolex. The largest measurement of one testis is 0.07 mm. by 0.045 mm. The cirrus sac is small and measures 0.09 mm. in diameter. The ovary is H-shaped and each wing measures 0.56 mm. No genital atrium is present.

The uterus is very long and passes down through the ovary to the posterior portion and then finally proceeds further to the cirrus sac.
Discussion: Lyster (1940) described this species in *Catostomus commersonnii* from Lake Commandant, Quebec. Nevertheless, he was doubtful as to whether this was actually a new species or a synonym of *G. confusus* Hunter, 1929 and *G. laruei* Lamont, 1921. To quote him, "The significance of these similarities and differences is obscure at this time and may indicate synonymities".

This specimen resembles that of Lyster (1940), the only point of difference lies in the fact that my specimen is much broader at the base of the scolex than at the level of the cirrus sac.

If, as seems to be the case, this specimen is actually *G. intermedius* Lyster, 1940, then the main point of difference between *G. intermedius* and *G. confusus* lies in the fact that the former has its scolex wider than the latter.

This would seem to be too minor a point on which to establish a new species, and I am of the opinion that they should be regarded as synonyms.

*Glaridacris laruei* Lamont, 1921.

Host: *Catostomus commersonnii*.

Habitat: Intestine.
Abundance: Lake Monroe: 4 specimens from 1 fish
July 19, 1949.

Lake Edward: 1 specimen from 1 fish
May 28, 1938.

Lake Monroe: 3 specimens from 1 fish

Description: Body size: 3.9 mm. by 0.45 mm.
 Scolex: 0.57 mm. by 0.6 mm.
 Testis: 0.15 mm. by 0.145 mm.
 Ovary: 0.6 mm. long.
 Eggs: 0.041 mm. by 0.03 mm.

Discussion: The specimens examined in this survey were typical Glaridacris laruei Lamont, 1921. Hunter (1927) amended the previous diagnosis of Lamont (1921). Bangham and Venard (1946) recorded 32 specimens from the same host in Algonquin Park Lakes, Ontario.

Glaridacris catostomi Cooper, 1920.

Host: Catostomus commersonii.

Habitat: Intestine.

Abundance: Lake Monroe: 2 specimens from 1 fish
July 15, 1949.

5 specimens from 1 fish
July 12, 1949.

Description: Body size: 10.95 mm. by 0.95 mm.
 Scolex: 0.45 mm. in length.
 Neck: 0.69 mm. in length.
Vitellaria extends to post-ovarian region and starts at about 0.75 mm. from neck.

Testes: over 400 in number.

Wings of ovary: 0.52 mm. in length.

Eggs: 0.045 mm. by 0.034 mm.

Discussion:- Cooper (1920) and Hunter (1927) reported *Glaridacris catostomi* in the intestine of *Catostomus commersonnii*. The present material seems to agree with their description and is therefore referred to this species.

Van Cleave and Mueller (1934) recovered 22 specimens in their collections from six fish taken from a mill pond at Cleveland.

Bangham (1941) recorded several specimens in the same host from Algonquin Park Lakes in Ontario. Bangham and Venard (1946) reported several specimens from Wisconsin lakes in the same host *Catostomus commersonnii*.

Evidently, *G. catostomi* is a common parasite of *Catostomus commersonnii*.

*Glaridacris* sp. (larva)

Host: *Catostomus commersonnii*.

Habitat: Intestine.
Abundance: Lake Edward: 1 specimen from 1 fish
May 28, 1938.

Description: The body is small and measures 2.1 mm.
by 0.45 mm. The scolex is not well developed and the neck region is broad.
The vitellaria start before the testes and extend to within the anterior portion of the wings of the ovary. The testes are large and each measures 0.17 mm. by 0.09 mm. and is very close to the ovary. The uterus extends right behind the ovary to the posterior portion of the body.

The wings of the ovary are poorly matured. Most parts of the organs of the body are either in their rudimentary stages or not found at all.

Discussion: This specimen is a larva of the genus Glaridacris Cooper, 1920. As the vitellaria precede the testes, I believe it is the larva of *G. catostomi*, as this is a peculiar distinguishing characteristic of the adult as described by Van Cleave and Mueller (1934).

**GENUS PROTEOCEPHALUS** Weinland, 1858

Southwell (1930), defined this genus as
"Proteocephalidae with scolex void of a rostellum; all reproductive organs situated either in the medullary region of the parenchyma (where this is distinguishable from the cortex) or in the undivided parenchyma. Vitellaria lateral, follicular".

Habitat: Intestine of freshwater fishes.

**Proteocephalus choquettei** sp. nov.

Host: *Catostomus commersonii*.

Habitat: Intestine.

Abundance: Lake Monroe: 3 specimens from 1 fish July, 19, 1949.

Description: The body size is about 30 mm. by 0.83 mm. The scolex appears global measuring 0.53 mm. by 0.48 mm. There is a fifth apical sucker which measures 0.048 mm. by 0.065 mm. Four other suckers are present each measuring 0.09 mm. by 0.084 mm. The neck is unsegmented and is 0.38 mm. broad.

The first anterior proglottids are much broader than they are long, measuring 0.11 mm. by 0.43 mm. The middle proglottids are longer than wide, measuring 0.6 mm. by 0.3 mm. The posterior proglottid is degenerate and measures
0.3 mm. by 0.8 mm. The vitellaria, found on both sides of the margin of the body, are very close to the testes. The excretory system consists of two longitudinal trunks running along both sides of the body. The testes are large and usually not above 50 in number. The vas deferens is seen extending from the median line to the middle of the lateral half of the proglottid and is somewhat convoluted. The cirrus sac extends to the marginal line. The ovary is bi-lobed with a thin isthmus. One lobe of ovary measures 0.3 mm. by 1.2 mm. The ovary lies on the posterior region of each mature proglottid. The length of the isthmus is 0.8 mm. The shell glands are well developed and lie posterior to the isthmus. The number of proglottids is at least 75; a complete worm was not recovered.

Discussion:— This species differs from *P. embloplitis* Leidy, 1887, and *P. perplexus* La Rue, 1911, by the possession of a fifth sucker at the tip of the scolex, and from *P. pearsei* La Rue, 1919 in having a larger number
of proglottids and the scolex being larger with a marked
distinction between the scolex and the neck. \textit{P. pearsei} has not over 50 proglottids.

It is readily distinguishable from the related
\textit{P. parasiluri} Yamaguti, 1933, by the size of the scolex
and the testes not exceeding 50 in number. \textit{P. parasiluri} has 180 testes or more.

Bangham (1948), reported a \textit{Proteocephalus}
from the \textit{Catostomus commersonii} in Algonquin Park
Lakes, but did not identify it as to species.
ACANTHOCERATIFERA

The classification according to Van Cleave (1936) and Pearse (1942) of the species found in this survey is as follows:

ORDER PALAEACANTHOCERATIFERA Van Cleave, 1948.

Family Echinorhynchidae

Genus Pomphorhynchus Monticelli, 1905.

Pomphorhynchus bulbocollis Linkins, 1919.

Family 2 Neoechinorhynchidae Ward, 1918.

Genus 1 Octospinifer Van Cleave, 1919.

Octospinifer macilentus Van Cleave, 1919.

Genus 2 Neoechinorhynchus Hamann, 1905.

Neoechinorhynchus crassus Van Cleave, 1919.

GENUS POMPHORHYNCHUS Monticelli, 1905.

Hunter (1927) characterized this genus by the "Presence of long cylindrical neck connecting the proboscis at the anterior portion with 24 to 28 circles of hooks. A circular or spherical enlargement present just before the proboscis at the anterior region with body elongate tapering to the posterior portion.

Pomphorhynchus bulbocollis Linkins, 1919.

Host: Catostomus commersonii.

Habitat: Intestine.
Abundance: Of the 163 fish examined from Lake Monroe, 103 were infected with acanthocephala and of these 100 were infected with P. bulbocollis. Lake Monroe: 98 specimens from 2 fish, July 21, 1949.


160 specimens from 20 fish, July 18, 1949.

12 specimens from 2 fish, August 3, 1949.

30 specimens from 12 fish, July 23, 1949.


Lake Lauzon: 80 specimens from 2 fish, July 8, 1949.

Lake Edward: 5 specimens from 1 fish, May 28, 1938.


Description: Body elongate, tapering towards the posterior extremity.

Neck measures: 3 mm. by 0.13 mm.

Spherical enlargement: 0.6 mm. by 0.6 mm.

Proboscis: 0.7 mm. by 0.18 mm.

Hooks: 28 circles in number.

Male: Size from posterior neck region to tip of body: 7 mm. by 0.9 mm.
Anterior testes: 0.53 mm. by 0.26 mm.
Posterior testes: 0.56 mm. by 0.3 mm.
Female: Size from posterior neck region to posterior tip of body: 7.5 mm. by 1.4 mm.
Embryos in body cavity: 0.045 mm. by 0.009 mm.

Discussion: This specimen agrees with the description by Van Cleave and Mueller (1934) for the same species found in the Oneida Lake, New York. The only point of difference lies in the variation of sizes, which is actually very slight.

The heaviest parasitic infection in the host _Catostomus commersonnii_ was caused by this species. Van Cleave and Mueller (1934) recorded this species as the most common parasite of _Catostomus commersonnii_. Bangham (1944), and Bangham and Venard (1946) also recorded very heavy infections in _C. commersonnii_ with this parasite.

It is evident, therefore, that _Pomphorhynchus bulbocolli_ is the commonest parasite of _Catostomus commersonnii_.

**GENUS OCTOSPINIFER** Van Cleave, 1919.

This genus was created by Van Cleave in 1919 to take in a type species he designated _Octospinifer_.
macilentus. This genus is definitely different from all others in the family Neoechinorhynchidae Ward, 1918 and differs particularly from the genus Neoechinorhynchus Hamann, 1905 by the possession of eight hooks in each of three circles around the proboscis.

Only one species of this genus was recovered in my survey.

Octospinifer macilentus Van Cleave, 1919

Host: Catostomus commersonii.

Habitat: Intestine.


1 specimen from 1 fish, July 17, 1949.

Lake Lauzon: 1 specimen from 1 fish, July 7, 1949.

Description: Males: Size of body: 4 mm. by 0.25 mm.

Proboscis: 0.12 mm. by .12 mm.

Eight hooks of terminal circles are equal.

Terminal hooks: 0.043 mm. long.

Middle circle hooks: 0.034 mm. long.

Basal circle hooks: 0.025 mm. long.
Female: Body size: 9.5 mm. by 0.35 mm.
Genital opening: 0.1 mm. from posterior tip.
Embryos in body cavity: 0.035 mm. by 0.016 mm.

Discussion:- Van Cleave and Mueller (1934) described similar specimens from C. commersonii from Oneida Lake. As my specimen agrees fundamentally with their description, this specimen is referred to C. macilentus.

Van Cleave and Mueller (1934) remarked "Octospinifer macilentus is one of the commonest parasites of young suckers in the lake, it was also found in about 25 per cent of the suckers from Cleveland mill pond. Large suckers from the Oneida Lakes never had it."

Bangham (1941), and Bangham and Venard (1946) recorded several species in the host C. commersonii from Algonquin Park in Ontario.

Fischthal (1945) recorded 14 specimens from Lake Douglas in Michigan.

Van Cleave (1949) remarked "Along with the high incidence of speciation which has been attained by the Catostomidae on this continent several equally distinctive species of Neoechinorhynchidae are found, maintaining
either characteristic or exclusive host relations with these fishes. *N. strigosus* and *N. distractus*, *Octospinifer macilentus* Van Cleave, *Neoechinorhynchus crassus* Van Cleave, *N. australis* Van Cleave, *N. venustus* Lynch and *N. cristatus* Lynch, bring to seven the species of *Neoechinorhynchidae* characteristic of North American *Catostomidae*.

Van Cleave (1949) also remarked that *Octospinifer macilentus* is distinctly eastern and northern in distribution with records from Connecticut and New York westward into Michigan, Wisconsin, Illinois and Ontario.

This is the first known instance of the occurrence of *Octospinifer* in Quebec Province of Canada.

**GENUS NEOECHINORHYNCHUS** Hamann, 1905

This genus, according to Hamann (1905), is characterized by the possession of three circles of six hooks in its rounded proboscis instead of eight as already mentioned in the case of the genus *Octospinifer* Van Cleave, 1919.

The hook arrangements are very much varied, those at the terminal or sub-terminal circles being much stronger and bigger than those in the remaining circle.
Eight distinct species of this genus have been recorded and described from the North American continent. In the European Countries, Van Cleave and Lynch (1950) remarked "The genus Neoechinorhynchus has attained a very high degree of stability which finds expression in the development of only two species for the entire continent".

Only one species, *N. crassus*, was found in the present survey.

**Neoechinorhynchus crassus** Van Cleave, 1919

**Host:** *Catostomus commersonii*.

**Habitat:** Intestine.

**Abundance:**
- Lake Lauzon: 2 female specimens from 1 fish July 18, 1949.
- 1 male specimen from 1 fish July 16, 1949.

**Discussion:** The male specimen was distorted so that measurements are based on the female specimens. Van Cleave (1919) described this species from the same host.

*N. crassus* is a common parasite of the *Catostomus commersonii*, but apparently new in the Quebec region.
In Wisconsin, Bangham (1944) recorded 6 specimens in *C. commersonii* from Brule River; while Fischthal (1945) confirmed Bangham's finding by recording 12 specimens in the same host from the same river.

Van Cleave (1949), remarked that *N. crassus* has attained a very wide dispersal in the Great Lakes area extending from Ohio and Michigan westwards to Washington State.
NEMATODA

The classification, according to York and Maplestone (1926) and Baylis and Daubney (1928), of the species of nematodes found in this survey is as follows:

ORDER FILARICIDAE

Family Spiruridae

Sub-family Thelaziinae Railliet, 1916.

Genus Rhabdochona Railliet 1916.

Rhabdochona cascadilla Wigdor, 1918.

Rhabdochona sp. (larva).

Genus Philometra Thomas, 1929.

Philometra sp. (larva).

Rhabdochona cascadilla Wigdor, 1918.

Host: Catostomus commersonii.

Habitat: Intestine.

Abundance: Lake Lauzon: 15 specimens from 1 fish, July 9, 1949.

Lake Edward: 3 specimens from 1 fish, May 28, 1938.


Description: Female: Body size: 8.5 mm. by 0.15 mm.

Oesophagus length: 2.3 mm.
Anterior oesophagus: 0.25 mm. long.
Posterior oesophagus: 1.7 mm. long.
Buccal cavity: 0.02 mm. long.
Nerve ring from anterior end of body: 0.2 mm. long.
Tail: 0.3 mm. long.
Vulva from anterior portion of body: 4.8 mm. long.

Male: Body size: 4.68 mm. by 0.13 mm.
Oesophagus length: 1.41 mm. long.
Anterior oesophagus: 0.2 mm. long.
Buccal cavity: 0.2 mm. long.
Nerve ring from anterior end of body: 0.14 mm. long.
Tail: 0.28 mm. long.
Short spicule: 0.15 mm. long.
Long spicule: 0.45 mm. long.

Discussion:—The material at hand is similar in all respects to the description by Wigdor (1918) and Choquette (1951). Accordingly, my specimen is referred to the species Rhabdochona cascadilla.

The literature on the genus Rhabdochona Railliet, 1916 has been recently reviewed by Choquette (1951). In it he points out the synonymity between R. cascadilla and
R. laurentiana Lyster, 1940.

R. cascadilla has also been recorded in Semotilus a.atromaculatus, Notropis heterolepis, Notropis bifrenatus, and Notropis cayuaga.

Rhabdochona sp. (larva)

Host: Catostomus commersonnii.

Habitat: Intestine.

Abundance: Chateauguay Basin: 6 specimens from 3 fish.

Lake Monroe: 3 specimens from 1 fish, July 21, 1949.

Discussion: All the larval forms with an intestinal caecum and a mouth with two lips were determined as belonging to the genus Rhabdochona.

Van Cleave and Mueller (1934), in reviewing the adult genus of this worm, remarked that on the basis of head characters viewed en face, Chitwood regarded it as a doubtful member of the Thelaziidae. "On the general anatomical characters available from the work of previous authors," concludes Van Cleave and Mueller (1934), "we are inclined to treat this genus in the same fashion as Spinitectus and Cystidicola and remove it from the Thelaziidae to the Spiruridae, sub-family Spirurinae.

It appears to agree with Spinitectus and
Cystidicola in the spicules, arrangement of papillae on the tail of the male, relation of vagina and uteri, and other features."

**PHILOMETRA** sp. (larva)

**Host:** Catostomus commersonnii.

**Habitat:** Body cavity.

**Abundance:** Lake Edward: 2 specimens from 1 fish, July 19, 1949.

**Discussion:** Thomas (1929) found this larva on the upper lip of a common sucker, Catostomus commersonnii. As this specimen has all characteristics of the described worm recovered by Thomas, it is therefore referred to it as such.

Thomas (1929) remarked, "The larvae themselves, however, resemble more closely those of Philometra globiceps described by Zur Strassen in 1907".
SUMMARY AND CONCLUSIONS

Six species of trematodes, four species of cestodes, including one new species, three species of acanthocephala, and three species of nematodes were found in the intestines and body cavities of *Catostomus commersonnii* from the four regions studied.

Some larval arthropods were also encountered in the intestines of the host. They were evidently non-parasitic and may have been taken into the stomach as food. These larval arthropods were identified as belonging to the order Coleoptra.

The Acanthocephalans were the most numerous and the most common parasites of *Catostomus commersonnii* in all the regions studied. In Lake Monroe, *Pomphorhynchus bulbocollis* Linkins, 1919 was found to be more numerous than any other Acanthocephalan parasite.

The trematodes were next to the Acanthocephalans in abundance with *Triganodistomum attenuatum* Van Cleave and Mueller, 1934 most frequently seen.

The cestodes were relatively few in number and none was found in Lake Lauzon. The Cestodarias were more common than the true cestodes.

The nematode infections were most frequently
seen in common suckers from Lake Monroe. *Rhabdochona cascadilla* Wigdor, 1918 was the most common nematode parasite recovered from all the regions studied.
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Fig. 1. *Triganodistomum attenuatum* : Type specimen 1: dorsal aspect of entire worm.

Fig. 2. *Triganodistomum attenuatum* : Type specimen 2: ventral aspect of entire worm.

Fig. 3. *Triganodistomum attenuatum* : Type specimen 3: dorsal aspect of entire worm.
Fig. 4. *Plagioporus cooperi*: dorsal aspect of entire worm.
Fig. 5. *Glaridacris* sp.: dorsal aspect of entire worm.
Fig. 6. *Proteocephalus choquettei*: mature proglottid.
OZOLAIMUS MEGATYPHON Rud., 1819,
AN OXYURID PARASITE OF LACHESIS MUTUS
(BUSHMASTER SNAKE) FROM
TRINIDAD, BRITISH WEST INDIES.

by

Obinnaya Alozie.
According to Yorke and Maplestone (1926), and Baylis and Daubney (1926), the species of nematode found in this collection from Trinidad, British West Indies, is as follows:

Family Oxyuridae Cobbald, 1864.

Sub-family Oxyurinae Hall, 1916.

Genus Ozolaimus megatyphlon Rud., 1819.

GENUS OZOLAIMUS Duj., 1845.

According to Yorke and Maplestone, (1926), the genus Ozolaimus Duj., 1845 is characterized by "mouth dorso-ventral with two lateral lips; oesophagus very long and composed of two sections in tandem of which the first is shorter and thicker and dilates into a fusiform swelling before entering the second, which is thin and almost filiform and is followed by a bulb; the intestine is dilated at its origin. Male: posterior extremity obliquely truncate, with a short blunt tail; spicule long and straight. Female: tail straight and gradually attenuating; anus near the extremity; vulva salient and situated in the posterior fourth of the body. Parasites of reptiles".

Baylis and Daubney (1926) remarked that the tail is short, finger-shaped, and bluntly rounded.
Apparently, little is known of this genus. It closely resembles its neighbour genus *Macracis* Gedoelst, 1916. Thapar (1926) pointed out the synonymity between *Macracis monhystera* Linstow, 1902 and Gedoelst, 1916, and *Ozolaimus megatyphlon* Rud., 1819 from the fact that they agreed in measurements. However, this became invalid, according to Ortlepp (1933), as Thapar seemed to ignore Yorke and Maplestone's remark that "the point of difference between the two genera *Macracis* and *Ozolaimus* was based only on the structure of the oesophagus".

Ortlepp (1933), suggested the transfer of this genus from the sub-family Oxyurinae Hall, 1916 to a new sub-family, Ozolaiminae, on the grounds that it differed from the former by the presence of two large lateral lips and the peculiar structure of the oesophagus.

However, for the present time, I have followed the suggestion of Yorke and Maplestone by placing this genus under the sub-family Oxyurinae, Hall, 1916.

*Ozolaimus megatyphlon* Rud., 1819

Host: *Lachesis mutus* (Bushmaster snake).

Habitat: Labelled 'under the skin' -- probably in the intestine.
Distribution: Trinidad, British West Indies.

Type: Helminthological collection of the Institute of Parasitology, Macdonald College, Quebec.

Description: The head is broad with a mouth having a vertical slit running down to the oesophagus. There are two raised borders on the lateral surface of the mouth. There are also two lips.

Female: A very stumpy worm with most of its organs situated at the posterior third of the body. The body size is 5.6 mm. to 7.1 mm. long by 0.67 mm. to 1.2 mm. wide at the middle. The female is broadest in the region of the uterus.

The oesophagus is long and slender, 2.12 mm. in length and is divided into a precorpus, corpus, and a long slender isthmus joining the corpus to the spherical bulb. The precorpus measures 0.6 mm. to 0.72 mm. in length whereas the corpus measures 0.33 mm. to 0.2 mm. and the isthmus 1.15 mm. in length by 0.06 mm. in width. The nerve ring is 0.23 mm. from the anterior end of the body.
The spherical bulb is 0.19 mm. long by 0.23 mm. wide. The vulva lies at the posterior fourth of the body, 4.7 mm. to 5.1 mm. from the anterior end. The vagina is long and muscular. The tail is 0.18 mm. to 0.3 mm. long. The eggs are large and measure 0.085 mm. to 0.098 mm. in length by 0.045 mm. to 0.056 mm. in width.

Male: The male is 4.95 mm. to 5.8 mm. long by 0.26 mm. to 0.33 mm. wide. The oesophagus is 1.5 mm. long and consists of a pre-corpus 0.45 mm. in length, a corpus 0.3 mm. long, an isthmus 0.85 mm. long and a posterior almost spherical bulb 0.14 mm. long by 0.15 mm. wide. The nerve ring is 0.13 mm. from the anterior end of the body. There is a single, long spicule which measures 1.05 mm. to 1.32 mm. in length. There is one pair of pre-anal papillae and one pair of post-anal papillae situated at the posterior tip of the dorso-ventral appendage. A caudal ala is present. The tail measures from 0.11 mm. to 0.12 mm. in length.
Discussion:- The present specimens from *Lachesis mutus* (bushmaster snake) seem to be fully in agreement with Ortlepp's description of *O. megatyphlon* Rud., 1819, from the intestine of *Iguana tuberculata*.

Caballero (1938), described *Ozolaimus ctenosaurus* from an iguana in Mexico, which Dosse (1939) transferred to *Macracis ctenosaurus* Caballero, 1938, on the basis of the structure of the oesophagus. This genus *Ozolaimus* contains only two species -- *O. cirratus* Linstow, 1906 and *O. megatyphlon* Rud., 1819.

Apparently, the bushmaster snake is a new host of *O. megatyphlon*. 
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Fig. 1. *Ozolaimus megatyphlon* -- anterior extremity of female.
Fig. 2. *Ozolaimus megatyphlon* -- details of the uterus.
Fig. 3. Ozolaimus megatyphlon -- tail of male.
Fig. 4. *Ozolaimus megatyphlon* -- tail of female.