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The monogenean *Haploclidus furcatus* Mueller, 1937 (phylum Platyhelminthes) on *Lepomis cyanellus* Rafinesque, 1819 from Utah: a range extension

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The green sunfish, *Lepomis cyanellus* Rafinesque, 1819, is native to the central eastern United States but has been widely introduced throughout the United States (Sigler and Miller 1963, Sigler and Sigler 1987). In 1890 the species was introduced into Utah, where many self-sustaining populations occur. Utah populations of *L. cyanellus* are generally stunted, and few individuals exceed 150 mm in length (Sigler and Miller 1963). This species of sunfish is host to many ecto- and endoparasites (Hoffman 1999).

We collected green sunfish from Red Lake, Utah County, Utah, during September 1997 using angling equipment. Seven fish were weighed (g), measured (mm; Table 1), and then examined for the presence of ectoparasites. We found a total of 162 monogeneans. These flatworms were collected, fixed, and stained by standard methods (Stoskopf 1993) and identified as *Haplocleidus furcatus* Mueller, 1937. Stained specimens were sent to Delane Kritsky, Idaho State University, for generic confirmation. Slides deposited in the Manter Collection at the University of Nebraska were given the accession number HWML 39822. The prevalence of *H. furcatus* was 100% for the examined fish, with a mean intensity of 23.1 worms per fish (range = 6 to 43 worms per fish; Table 1).

*Haplocleidus furcatus* is a parasitic fluke on the gills of many species of fish including *Lepomis cyanellus* (Hoffman 1999). The genus *Haplocleidus* is characterized by a large set and a small set of anchoring hooks located on the opisthaptor (attachment organ; Fig. 1) and the type II copulatory complex (Beverly-Burton and Suriano 1980, Beverly-Burton 1984).

Adults of this genus and other monogeneans lay eggs while on the gills, which can remain on the same host or be flushed out via gill ventilation. Eggs then incubate in the substrate before developing into free-swimming oncomiracidia (Cope and Burt 1981, 1982, 1985, Stoskopf 1993, Woo 1995).

Green sunfish are a documented host of *H. furcatus* in other regions of North America (Hoffman, 1999); however, this is the first published record of *H. furcatus* in Utah. Therefore, the range of *Haplocleidus furcatus* has been extended to Red Lake, Utah County, Utah. We suspect that this monogenean was introduced to Red Lake with stocking of infested green sunfish in the late 1907s. According to the Utah Division of Wildlife Resources (C. Thompson personal communication), this was done by a group of local Boy Scouts.

*Haplocleidus furcatus* in Red Lake infests the green sunfish, which is the dominant fish species in that body of water. Other resident fish species may also be infested with this parasite, suggesting the need for further research at Red Lake and nearby lakes and streams to learn more about host preference for *H. furcatus*. This is the first known record for *H. furcatus* in Utah and the Rocky Mountain region.

**Taxonomic Summary**

Parasite: *Haplocleidus furcatus* Mueller 1937

Utah host: Green sunfish, *Lepomis cyanellus* Rafinesque, 1819

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Table 1. Length (mm) and weight (g) of green sunfish (*Lepomis cyanellus*) and number of Monogenea found on each fish.

<table>
<thead>
<tr>
<th>Fish number</th>
<th>Standard length (mm)</th>
<th>Total length (mm)</th>
<th>Weight (g)</th>
<th>Number of Monogenea</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>115</td>
<td>140</td>
<td>48.3</td>
<td>31</td>
</tr>
<tr>
<td>2</td>
<td>128</td>
<td>158</td>
<td>76.8</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>110</td>
<td>128</td>
<td>52.0</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>138</td>
<td>168</td>
<td>89.5</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>121</td>
<td>149</td>
<td>66.4</td>
<td>21</td>
</tr>
<tr>
<td>6</td>
<td>90</td>
<td>114</td>
<td>34.2</td>
<td>43</td>
</tr>
<tr>
<td>7</td>
<td>105</td>
<td>130</td>
<td>42.1</td>
<td>34</td>
</tr>
</tbody>
</table>

Fig. 1. Photomicrograph of *Haplocleidus furcatus* (magnification 100X). Identifying structures are marked as follows: A = anchor, H = hooks, O = opisthaptor.

Type host: Largemouth bass, *Micropterus salmoides* Lacepede, 1802
Site of infection: Gills
Type locality: Florida
Other localities: Alabama, Arkansas, California, Kansas, Louisiana, North Carolina, Ohio, Tennessee, Texas, Virginia, Washington, Wisconsin, West Virginia, Ontario (Canada)
Specimens deposited: HWML 39822, University of Nebraska (Manter Collection)
Comments: First record for *H. furcatus* in Utah and Rocky Mountain area

We thank Delane Kritsky of Idaho State University for confirming the genus identification and for providing protocols regarding collecting and fixing specimens. We also thank Dennis Shiozawa of Brigham Young University for the use of his laboratory during this study.
LITERATURE CITED


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