Infection Rate of Dactylogyrus Parasites on Etheostoma duryi and Etheostoma zonale

Kara Million and Dr. Bruce Stallsmith
Department of Biological Sciences, University of Alabama in Huntsville.

Abstract
This project was an analysis of the infection rate of monogenean trematode parasites of the genus Dactylogyrus on the Black Darter (Etheostoma duryi) and the Banded Darter (Etheostoma zonale). Samples of each species of fish were collected from the Flint River during June and July, and their gill arches were removed and examined under a dissecting microscope. The number of parasites found on each fish was recorded, and slides of the found parasites were prepared for species identification and archiving. The parasite load observed on both of these species was relatively low compared to that of other less common species of darter in the Flint River.

Introduction
Darters are fish in the family Percidae and are known to be especially diverse in the North Alabama region due to geographic stability, habitat diversity, and climatic stability. Some darter populations reside in highly specialized locations. The Flint River system in North Alabama is home to darters within the genus Etheostoma, including the black darter and the banded darter. These two species are among the more plentiful darters found in the Flint River.

Dactylogyrus
Darters are hosts for a monogenean class of parasitic trematodes of the genus Dactylogyrus (family Dactylogyridae). Dactylogyrus are flukes that have elongated bodies equipped with four eyes on the head and a pair of dorsal anchors, as well as 14 marginal hooks which they use to latch onto their host. They are typically found on the gill arches of the darters and complete their entire life cycle on a single host.

Methods
Collection of Fish
Samples of E. duryi and E. zonale were collected from a Flint River site in Madison County, AL. A seine net was used to capture the fish, which were immediately euthanized using MS-222 and then stored in a formalin solution in individual tubes. Samples collected in June were immediately stored in a 10% formalin solution, while samples collected in July were first stored in a 1% solution, then after examination were transferred to a 10% solution for permanent storage. The change in procedure was made to prevent any negative impact on the parasites from the formalin.

Examination of Fish and Parasites
The length, mass, and gender of each fish were recorded following collection. The gill arches of each fish were removed using fine forceps and stained in a 0.5% acetic acid solution in individual tubes for 24-48 hours. After the gills were stained, each set of arches was examined under a dissecting microscope at x60 magnification for the presence of Dactylogyrus. The parasites were identified and counted, and the number of parasites found on each arch was recorded.

Preservation of Parasites
Parasites found on the fish were fixed in a 10% solution of alcohol-formalin-acetic acid (FAA) for one hour, then stored in 70% ethanol until ready to be mounted onto slides. The parasites were mounted onto slides using double coverslips and Klermount solution. The slides were allowed to air dry for at least 24 hours before they were examined under a microscope.

Results
Based on the samples collected, both the black darters and the banded darters were found to have little to no Dactylogyrus infections, although microscopic slides of a few found parasites were prepared. No correlation was found between the infection rate and the length, mass, or gender of the fish.

<table>
<thead>
<tr>
<th>Etheostoma duryi (Black Darter) June 2011</th>
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</thead>
<tbody>
<tr>
<td># Total Fish collected: 27</td>
</tr>
<tr>
<td># Total parasites found: 3</td>
</tr>
<tr>
<td>Average parasite load per fish: 0.11</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Etheostoma zonale (Banded Darter) June 2011</th>
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</thead>
<tbody>
<tr>
<td># Total Fish collected: 51</td>
</tr>
<tr>
<td># Total parasites found: 9</td>
</tr>
<tr>
<td>Average parasite load per fish: 0.18</td>
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</tbody>
</table>

The results for these two species of darter differ markedly from those previously obtained for other darter species in the Flint River that are less plentiful, such as Etheostoma kennicotti (Black Darter). Other species of darter have been found to have a significantly greater parasite load than that found for black and banded darters. Further research is required to account for this difference.

It should be noted that data previously gathered for the Tennessee snubnose darter (Etheostoma alabamense, a species similar to black and banded darters) indicates a higher parasite infection rate during spring months, at the peak of the darters’ breeding season. The data from this project was limited to the post-spawning months, which may partially account for a decline in the infection rate.

Acknowledgements
This project was supported by the UAHuntsville Confocal Microscope. Images of the found parasites were obtained using the UAHuntsville confocal microscope. This powerful microscope is capable of obtaining high-resolution images, which are useful for capturing details for species identification and description.

References