

Biodiversity Assessment of Champion Creek Utilizing DNA Barcoding

Biodiversity, the variety and number of species in a particular habitat, can be an important indicator of the overall health and functioning of an ecosystem. In this regard, to determine the diversity of an environment requires the ability to accurately identify what species are present and determine their relative abundance in the habitat. The accurate identification of species based on morphology can be problematic as it often overlooks cryptic species, relies on taxonomic expertise and often leads to incorrect identifications. An alternative that overcomes these limitations is DNA barcoding. DNA barcoding is a system of species identification that utilizes an ~650 bp fragment of the mitochondrial cytochrome oxidase one gene (COI) to identify and delineate species. In this project, students in Molecular Ecology (BIOL 4951) set out to assess the freshwater diversity of Champion Creek at Georgia College's East Campus. To do this, ~60 fish were collected from Champion Creek through seining and were brought back to the laboratory for biological identification via DNA barcoding. In the laboratory, high molecular weight DNA was extracted from 40 specimens and the COI gene was amplified via the polymerase chain reaction (PCR). Successfully amplified products were then sent off to Eurofins Genomics for sequencing. Analysis of DNA sequences identified 16 unique species of fish. The high number of species recovered, along with the high diversity and richness indices calculated, suggest that Lake Laurel is an overall healthy ecosystem. Information regarding the biodiversity of Lake Laurel from this project could be valuable to subsequent field studies regarding the ecology of this area.