The Effect of Blue-Green Algae on Fatty Acids in the Yellow Perch (Perca flavescens) of Shelburne Pond

Danielle Perry, Mitch Vaillancourt, Natalee Deaette, Victoria Deatherage
Johnson State College
Upward Bound

Introduction

Lake Champlain, divided among Vermont, New York, and Canada, encompasses a total of four-hundred thirty five square miles - over fifty percent of which are set in Vermont. The lake is home to many living species including fish, plants, and waterfowl. One species in particular, Blue-Green Algae, can have both direct and indirect effects on the lake as well as organisms that live in or come in contact with the lake. Blue-Green Algae is a low nutrition food for the phytoplankton in the pond, which means that all fish that eat the phytoplankton will not get their nutrients either.

Hypothesis:

The amount of fatty acids found in the muscle tissue of yellow perch will decrease as the presence of algae bloom increases.

Background

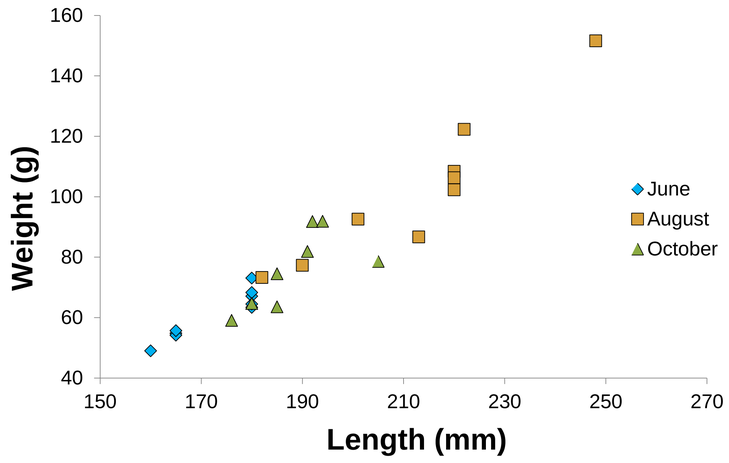
Cyanobacteria are common and naturally occurring photosynthetic organisms found in many lakes and rivers worldwide (Vermont Department of Health, 2013). They can be found in fresh, salt, and brackish water (Centers for Disease Control and Prevention, 2012). Typically, they are in such small concentration that they are not visible to the human eye. Blue-green algae are almost always present, but thrive in warm, somewhat stagnant water that is rich in nutrients. With these conditions, the algae can rapidly multiply causing what is classified as an “algal bloom”. Depending on the characteristics of the bloom and the type of cyanobacteria, they can be found at different levels of the water. Blue-green algae blooms normally occur in late summer or early fall. It’s possible for a thick mat or foam to form if the bloom washes onto shore. Despite the name, blue-green algae can be blue, green, brown, or red.

Methods

The region used for testing was Shelburne Pond because of it’s marsh-like conditions which allow considerable plant growth. The fish being tested are yellow perch, in part because they are low on the food chain, and also because of their abundance in the pond. Fish were collected and analyzed in June, August and October. They were each weighed and measured, livers and stomachs were removed, and they were filleted. The meat was put through a gas chromatograph to separate the fatty acids in the fish from the other material.

Data

Figure 1. Length(mm) to weight(g) regression of yellow perch (Perca flavescens) from Shelburne Pond, over three seasons



Results

June:

During the month of June, the lengths and weights were lowest. The average weight for the month of June was 172.2g. The average length for the month of June was 61.1mm.

August:

During the month of August, the lengths and weights were highest. The average weight for the month of August was 212.9g. The average length for the month of August was 102.3mm.

October:

The lengths and weights of the fish collected in October were somewhere in the middle in relation to June and August. The average weight for the month of October was 188.5g. The average length for the month of October was 75.8mm.

Data Analysis

Our group ran into some problems getting algal counts ready in time; we were unable to use the equipment we had planned on using to provide automated counts of algae and so are trying to find people to perform manual counts for us. Because of this, our results are temporarily invalid and we cannot come to a conclusion regarding our hypothesis.

This is an ongoing research project; it requires further studies to come to any sort of conclusion, regardless of the problems we had with data collection.

Acknowledgements

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