The number of freshwater brown algae is significantly smaller than its marine counterpart. Although freshwater brown algae has been known for more than 100 years, the taxonomy of them is unclear because of the lack of research. *Pleurocladia lacustris* can be found in fast moving bodies of water. Its color ranges from olive brown to dark brown. It forms a crust about 1 mm in its natural habitat. Distribution were found in North America, Europe, Australia and the Arctic Ocean. The filaments are lose branched under the microscope.

*Heribaudiella fluviatilis* also form dark brown crusts. It usually lives in fast moving bodies of water. It’s found all over the world, but mainly in North America, Europe and Asia. Its filaments and branches are tightly appressed together.

Four different media were created with a variety of salinities. 0 ppt (Desmidiacean) , 5 ppt, 10 ppt and 15 ppt concentrations. Samples from North America and Europe were used in 2 replicates for each treatment.

**Hypothesis**

*Pleurocladia lacustris* populations from different localities are phylogenetically different because of diverse environmental factors and geological isolation: populations from North America and Europe are hypothesized to be phylogenetically different. *Heribaudiella fluviatilis* will grow Plurilocular sporangia under salt simulation condition in its media.

**Phylogeny Study (**Pleurocladia lacustris**)**: DNA was extracted from both the fresh samples and the herbarium samples with the GE DNA Extraction Kit Phytopure. NANOdrop and gel electrophoresis were used to examine concentration. Specific primers were designed for different molecular markers and used for PCR. Nested PCR was performed for each sample and the products were examined through gel electrophoresis. The lyses process was extended to try to break down the samples even farther for herbarium samples. DNA was diluted before PCR to avoid inhibitors. PCR products were sent out for sequencing. The sequences were edited with Sequencher 4.9., then aligned with ClustalW. Maximum likelihood, Maximum parsimony, and Baysian analysis were used to generate phylogenetic tree.

**Sporangia Observation (**Heribaudiella fluviatilis**)**: Four different media were created with a variety of salinities. 0 ppt (Desmidiacean) , 5 ppt, 10 ppt and 15 ppt concentrations. Samples from North America and Europe were used in 2 replicates for each treatment.

**Methods**

**Phylogeny** study: phylogeny relationship between different population of *P. lacustris* were generated and suggested that despite geological distance and isolation of each location, *P. lacustris* population from North America and Europe are phylogenetically the same.

**Sporangia Observation:** *H. fluviatilis* on the other hand is quite the opposite. Populations from different locations have been confirmed to be genetically different by previous study. But they are morphologically similar. This study seeks to look for potential morphology differences between North America and Europe population, so far no apparent differences have been observed by this study and further study is needed to continue the investigation.

**Goals**

To gather more information on these species and answer some taxonomic questions. To investigate new morphological differences between *Heribaudiella* species from different locations in new environments.

**References**

