

Semi-Annual Progress Report – FY2004

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Project Title: **Determination of Genetic Diversity and Restoration Potential of the Pitcher Plant (*Sarracenia purpurea*) in the Lake Superior Watershed.**

Summer 2004 Work

Pitcher plant populations were discovered and surveyed in the Apostle Islands National Lakeshore, Isle Royale National Park, and Pictured Rocks National Lakeshore. Populations were also surveyed in three Canadian Provincial Parks – Sleeping Giant, White Lake, and Lake Superior Provincial Park. One population was discovered at Indiana Dunes National Lakeshore this season but the population has not yet been surveyed or sampled – this will happen in the next field season.

These parks were each visited for a period of one week during the 2004 summer season. While in each park, Jennifer used maps, photos, vegetation surveys, and personal communication to locate accessible populations of pitcher plants. All populations, up to 5 per park, were surveyed and sampled. Two transects were established in each population, one transect running North/South through the center of the population and the other running East/West. This tended to encompass the majority of the intended sampling area. All pitcher plants within 1 ft on either side of the transect were tagged and surveyed. Measures were taken of flower number, leaf number, flower height, and basal diameter for each plant. A measure of pH was taken in each location in a spot of standing water along the transect.

Tissue samples were collected from 30 individuals per population, a random subset of the previously surveyed and tagged plants. A small sample was clipped from the tip of a young pitcher, placed in a labeled test tube and put on ice for transport back to the lab. Younger pitchers were selected for the ease of DNA collection and the freshness of the sample. Tissue samples were taken back to the lab and stored at -80° until DNA could be extracted.

2004-2005 Lab Work (to this point)

The first step of lab work is to extract DNA from the pitcher plant tissue samples collected. The tissue is ground in liquid nitrogen and extracted using an established DNeasy extraction kit. Extracted samples are placed in a test tube and stored at -80°. At this time samples from Isle Royale populations and Sleeping Giant Provincial Park have been completely extracted, the other populations are currently in process.

DNA of the populations is being examined using ISSR (Inter-Simple Sequence Repeat) Technology to explore genetic diversity within and between these populations. A primer study has been performed and 8 polymorphic, reproducible ISSR primers have been chosen to quantify collected DNA. Preliminary data, using samples from Isle Royale National Park and Sleeping Giant Provincial Park, suggests moderate genetic diversity within sampled pitcher plant populations and that populations of pitcher plants, even across large distances are relatively similar.

This *Sarracenia purpurea* is a clonal species and further investigation might prove that this species, even though separated by great distances, does not experience enough environmental pressure to drastically alter its genetic diversity. In terms of restoration, this may mean that individuals from any established population can be used to restore an extirpated population. The validity of this assumption will be explored using samples collected from the other parks, United States and Canadian, to get a large scale picture of genetic variability around the western Great Lakes region. Geologic material and its influence on environmental pH may play in role in differentiating populations – this will be further explored through correlation of the collected pH data and genetic diversity measures.

Further work, Lab and 2005

Lab work this winter will concentrate on extracting and analyzing the remaining tissue samples from the remaining US and Canadian park populations. We expect to see any genetic variation between

populations to be linked with patterns of pH and geologic material, this will be explored before the start of the next field season. If these patterns are observed, then the sampling season next summer will focus on the collection of seeds from the various populations. We'll conduct a germination regime and a common garden study to examine the effect of physical location on morphology of the plant. Using data obtained from genetic analysis, a plan will be developed to begin restoration of populations within the Cowles Bog area of Indiana Dunes National Lakeshore.