2019 Report: Utilizing Citizen Science to Restore Orchid Biodiversity at The Ridges Sanctuary in Baileys Harbor, Wisconsin

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Introduction

The ultimate goal of this project is to coordinate research initiatives in an effort to create a native orchid recovery plan for each species at The Ridges and throughout the Door Peninsula. The Ridges is responsible for improving germination techniques and out-planting requirements for all of our native orchid species. These techniques will be institutionalized within The Ridges organization and the knowledge will be shared widely with all interested parties. To complete this objective, we will utilize our volunteer base as well as our partnerships with local school districts to collect biotic and abiotic data in the field through population surveys and plot monitoring and to carry out the asymbiotic germination techniques that are developed in-house.

We were awarded $3,218.55 from the San Diego County Orchid Society for the equipment, materials and training necessary for the staff and volunteers to successfully complete our 2019 goals and to help our ongoing restoration process. More specifically, these funds were to be used for capital items necessary for the process to proceed. These items include an autoclave, scale, and glassware to be used to mix orchid germination media and refine the asymbiotic protocols. Additionally, the purchase of six Photosynthetic Light sensors, which will be added to our existing automatic data loggers, is necessary to gain a better understanding of the environmental conditions in our most successful Ram's Head orchid experimental monitoring plots.

Activities Carried out in 2019

The lab equipment that was purchased was put to quick use as we began to increase our asymbiotic germination efforts. This lab equipment, especially the autoclave, will be crucial to initiating a larger-scale orchid germination initiative. Furthermore, the light sensors were purchased and deployed with the existing data loggers.

Results

Our initial batch of germinated orchids has yielded a higher success rate than we have experienced in the past (Figures 1 and 2). Rather than utilizing primitive sterilization methods we are now able to ensure conditions with the use of glassware and autoclave (Figures 3 and 4). Future plans include large-scale Ram's Head orchid germination utilizing this new equipment. The germinated orchid seedlings will be used for future restoration efforts on Ridges' property.

The six light sensors were purchased and deployed with the existing data loggers at our six most successful Ram's Head orchid experimental monitoring plots (Figures 4 and 5). Data from the

automatic data loggers from the 2019 field season has been collected and analyzed. Attached is the analysis from the light sensor data.

Figure 1. Germinated Cypripedium seedlings

Figure 2. Germinated Cypripedium seedlings

Figure 3. Autoclave

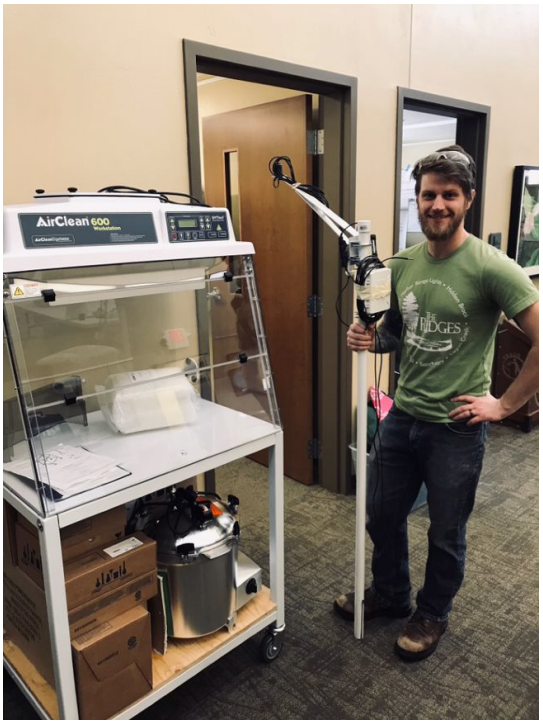

Figure 4. Lab equipment and data logger

Figure 5. Deployment of data logger

Figure 6. Volunteer using lab equipment for orchid germination

Light data – Photosynthetic Active Radiation (PAR)

Below is a plot of cumulative PAR over the 2019 measurement period for the six plots. Cumulative PAR values are calculated by adding each PAR measurement to the sum of all previous PAR values, thereby providing an indication of the total photosynthetically active radiation that has fallen on each plot. In summary:

- Highest cumulative PAR: Plot 7
- Lowest cumulative PAR: Plots 12, 13, and 14