

REINTRODUCTION AND CONSERVATION OF RAM'S-HEAD-LADY-SLIPPER ORCHIDS IN DOOR COUNTY, WISCONSIN

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BACKGROUND

Orchids thrive in undisturbed ecosystems across the world, but their environmental preferences are largely unknown. Many have highly complex life cycles dependent on specific fungal associations, or produce highly specific flowers designed to attract desired pollinators. Despite their wide range and diversity, a global trend indicates that orchid populations have been decreasing at a rapid rate [1]. Because they are dependent on a balance of many complex aspects of their environment, orchids may die out even before climate change and environmental degradation are apparent in an ecosystem. Some say they are our ecological “canary in the coal mine” [2]. Understanding how to conserve such complex organisms is a new and challenging conservation effort [5].

The Ridges Sanctuary in Door County, Wisconsin contains a unique ecosystem characterized by coniferous forests, open beaches, and wetland swales. It is historically home to 25 native orchid species, including the widely endangered study species *Cypripedium arietinum* [3]. Traditionally, *C. arietinum* thrived in the damp, sandy soil of The Ridges’ lowland conifer forests. In recent years, however, the native population of *C. arietinum* has decreased [4]. Some proposed causes of this decrease include habitat alteration, overcrowding in the forest canopy, and collection by orchid enthusiasts [4]. Like many endangered orchids, *C. arietinum* has an ill-defined regenerative niche with relatively unknown requirements for propagation and growth. Therefore, this project has been designed to increase understanding of effective native orchid reintroduction practices.

METHODS

Plot establishment: 19 2m² plots with varying environmental conditions and surface preparation were established within The Ridges Sanctuary. 11 plots were planted in May of 2015 by an inexperienced volunteer group; 8 were planted in May of 2016 by the Project Leader and a small group of experienced volunteers at varying depths and 2 soil prep methods.

Health Scoring:

2015- seedlings were given a health score (1-3) by volunteers

2016- seedlings were given a health score (1-3) by the project leader

Mapping: Seedlings were mapped on an (x,y) coordinate system for ease in relocation for future monitoring

Monitoring (July 2015 and July 2016): Presence/absence was noted for all originally planted seedlings. Attributes including size of those present were measured.

RESULTS

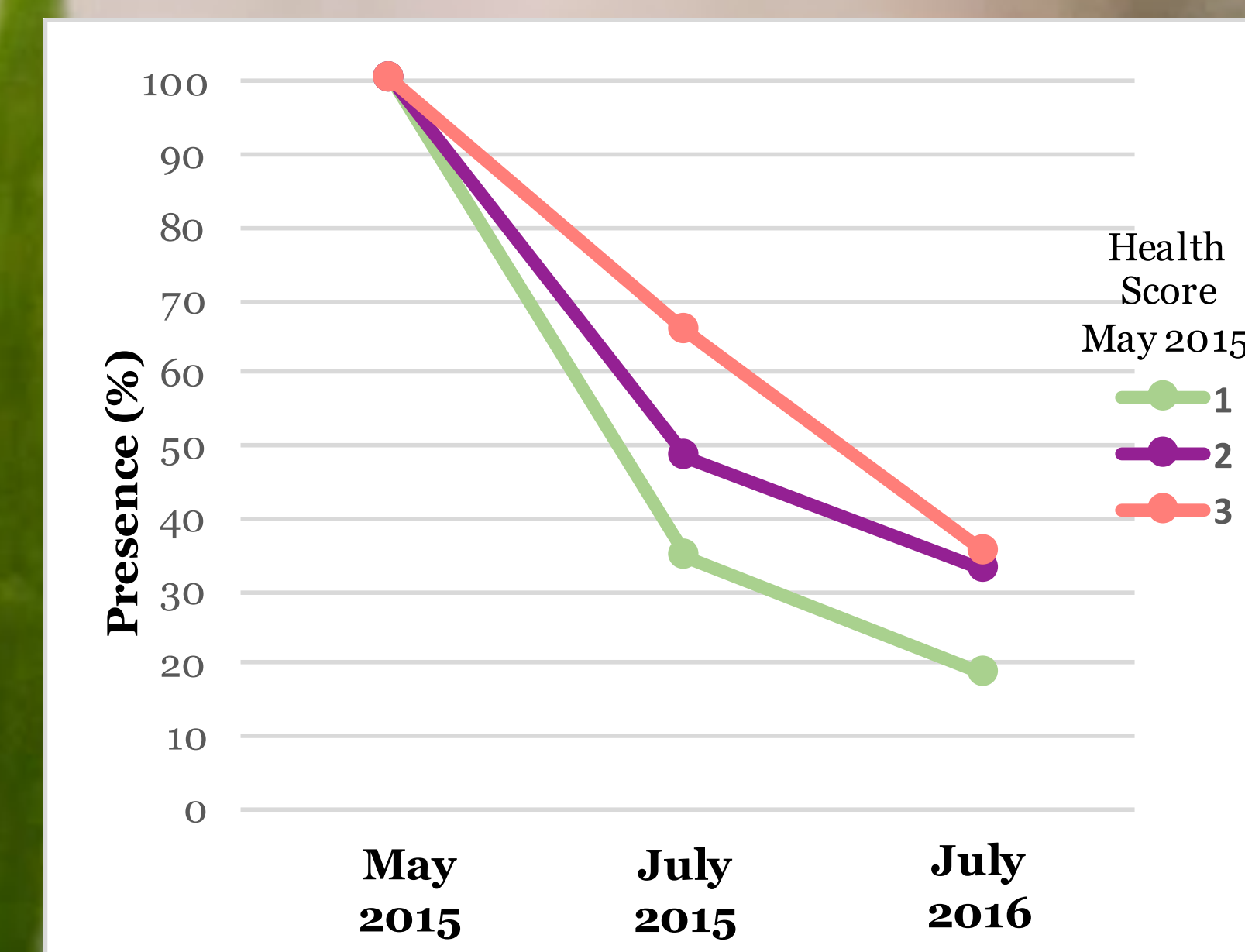


Figure 1 Percent survivorship of *C. arietinum* seedlings with original health scores of 1-3 monitored over the course of three seasons. Seedlings planted with health score 1 significantly underperformed other seedlings. $\chi^2=34.4$. $P < 0.0001$.

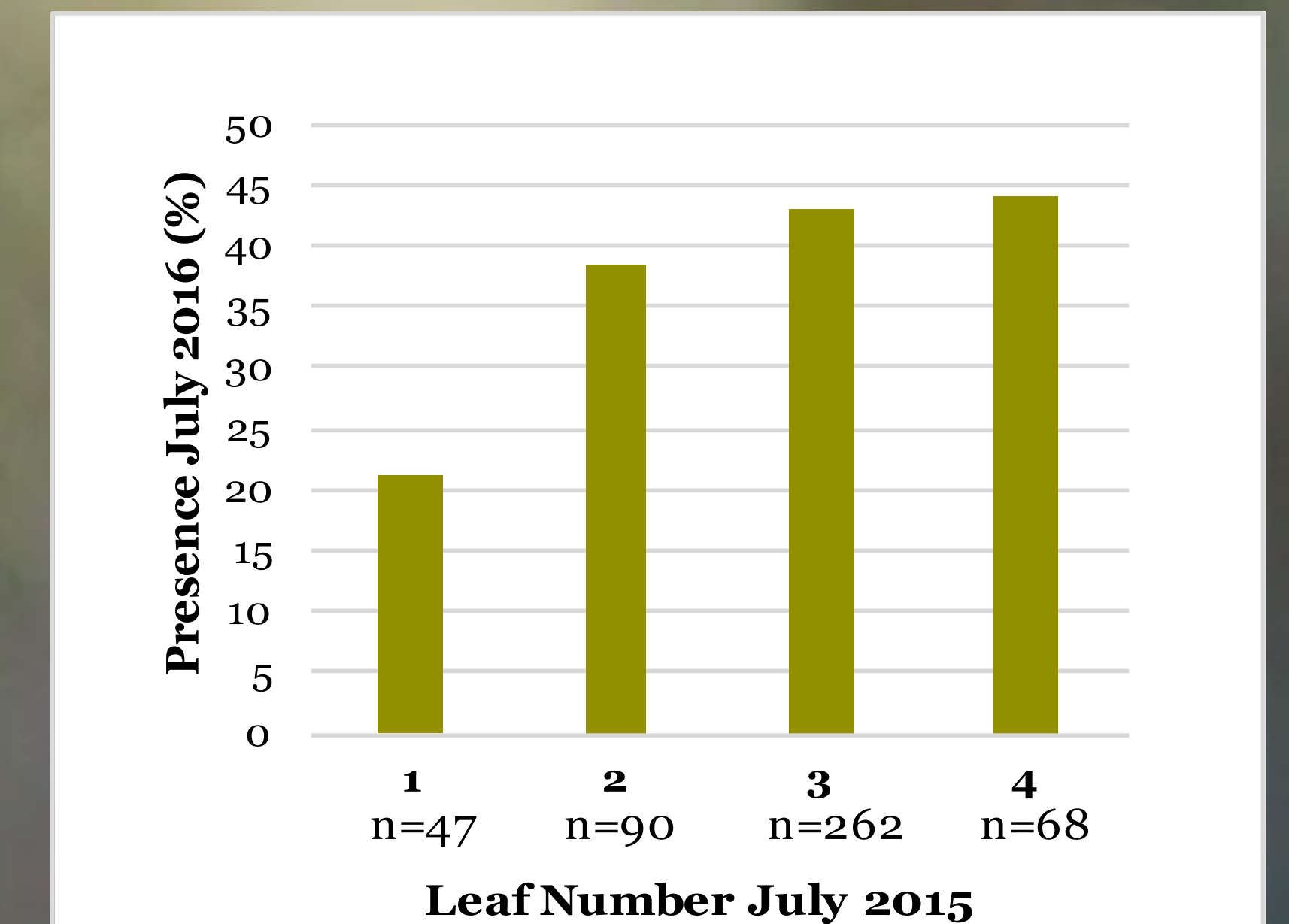


Figure 2 Leaf number in July 2015 significantly affected over-winter survivorship of *C. arietinum* seedlings. Seedlings with more leaves had a higher percentage of survivorship when measured in July 2016. $\chi^2=8.6$. $P < 0.05$.

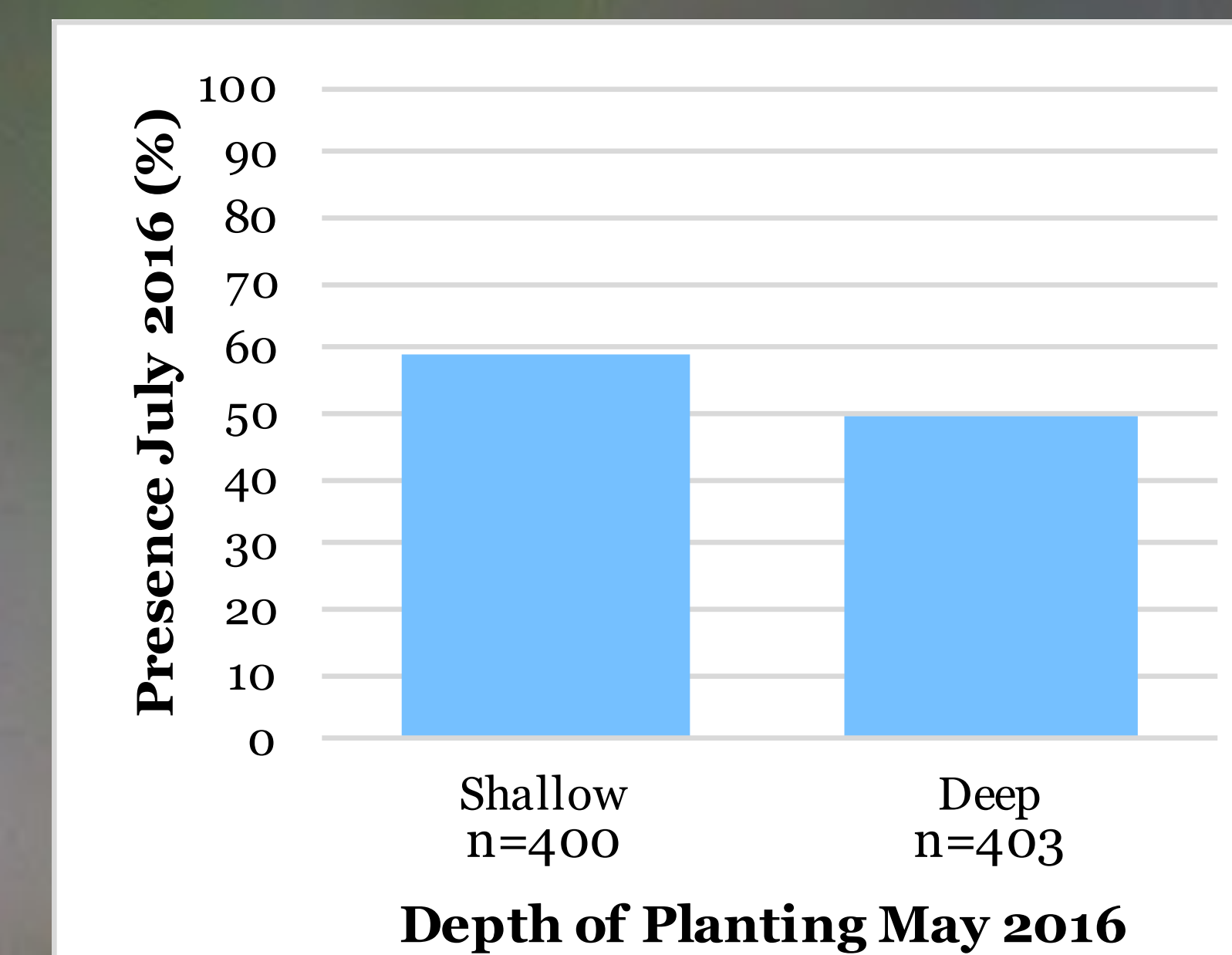


Figure 3 Planting depth significantly affected within-year survivorship of *C. arietinum* seedlings, with shallowly planted seedlings performing better. $\chi^2=7.8$. $P < 0.05$

CONCLUSIONS

These results indicate that there is a correlation between seedling health at planting and both within and between-season survivorship. Seedlings planted in May 2015 with a health score of 3 had significantly greater within-season survivorship than those scored as 1 or 2. Those scored as 2 had greater survivorship than 1. Between seasons, seedlings scored as 2 or 3 survived at a significantly higher rate than those scored as 1. Seedlings with greater leaf numbers exhibited greater survivorship between years, indicating plant size is also important. Only seedlings with health scores of 2 and above should be planted in the future. Seedlings planted in shallow soil exhibited significantly greater survivorship in-season, but future analysis is needed to determine if this is true for over-wintering survivorship as well.



REFERENCES: Swarts, Nigel D., and Kingsley W. Dixon. “Terrestrial Orchid Conservation in the Age of Extinction.” *Annals of Botany* 104.3 (2009): 543–556. *PMC*. Web. 15 Aug. 2016. **2.** Smithsonian SERC. “North American Orchid Conservation Center.” *YouTube*. YouTube, 28 June 2012. Web. 15 Aug. 2016. **3.** “Special Issue: Orchid Restoration Project.” *Sanctuary: A Newsletter of the Ridges*. Fall 2016. **4.** Marjory Brzeskiewicz. “Conservation Assessment for Ram’s Head Lady Slipper (*Cypripedium arietinum*).” *USDA Forest Service Eastern Region*, 25 Sep. 2000. **5.** “Orchid Science.” *North American Orchid Conservation Center*, Smithsonian Institute, 2016. Photo © Stephanie Hachkowski 2016



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