

Propagation and Reintroduction of Two Rare Plant Species in the South-Eastern United States of America[©]

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The habitats of *Sarracenia rubra* subsp. *wherryi* (Wherry's pitcher plant) and *Symphyotrichum georgianum* (Georgia aster) have been declining as a result of human population growth, poor land management, invasive exotic species, and fire prevention. Through a partnership with the U.S. Forest Service and the Beattie Foundation measures have been taken to protect these species through a propagation and re-introduction program.

INTRODUCTION

Many plants native to the United States of America have become rare as a result of land development, poor land management, invasive exotic species, and prevention of fire. Fire is necessary for the maintenance of many ecosystems in the South-eastern United States and removing it from such ecosystems results in a dense understory that limits penetration of sunlight to the forest floor (Gilliam and Platt, 1999). Propagation and reintroduction can help to combat the loss of plant populations. This project was divided into two parts, to determine propagation and reintroduction methods appropriate to each species.

GEORGIA ASTER

Symphyotrichum georgianum (Alexander) G. L. Nesom (syn. *Aster georgianus*) is a perennial plant with a native distribution from central Alabama to central North Carolina (Lynch et al., 2013; Anon, 2010). It blooms from October to November with large dark purple ray florets and lavender disk florets. It is native to dry oak and pine ecosystems and tolerates soils from sand to heavy clay (Fig. 1).



Fig. 1. *Symphyotrichum georgianum* flowers.

To date, 127 populations have been recorded, though many of these have not been observed in the past 10 years. Most of the remaining populations are next to roads, railroads and utility right-of-ways where vegetation management mimics natural disturbance (Anon, 2010). The species is classified as having a moderate, imminent threat of extinction.

Seed Propagation

The objective of this part of the project was to determine whether population numbers could be increased through seed propagation.

Seed was collected from a small population in a utility right-of-way located in Talladega National Forest. This population was able to survive because of mowing that mimicked fire by removing woody species that would compete for light.

The seeds were taken to Auburn University to test viability. They were sown into a commercially available germination substrate (Fafard[®] Super Fine Germination Mix, Sun Gro[®] Horticulture Agawam, Massachusetts, USA) in February 2010. There appeared to be no problem with germination and stratification was not necessary. The seedlings were potted into 18-cell flats using a pinebark, peat and, perlite (5:3:1, by vol.) substrate containing controlled released fertilizer (Polyon[®] with micros 17:5:11 (N:P:K), Harrel's LLC, Lakeland, Florida) at 4.5 kg·m⁻³ and dolomitic limestone at 1.8 kg·m⁻³. The plants were grown under natural photoperiod on raised benches in a greenhouse at Paterson Horticulture Greenhouse Complex at Auburn University.

Later in 2010, 30 plants were reintroduced to the parent population. The process was repeated in 2011 and 2012, each year with more seed available from the introduction of more plants to the population. So far, more than 1,300 plants have been reintroduced to Talladega National Forest.

WHERRY'S PITCHER PLANT

Sarracenia rubra Walter subsp. *wherryi* (F.W. Case & R.B. Case) Schnell (syn. *Sarracenia alabamensis* F.W. Case & R.B. Case ssp. *wherryi*) is a carnivorous plant native to bogs in longleaf pine savannas and sandy seeps. It has a historical distribution of southern Mississippi, northwestern Florida, and southern Alabama (Schnell, 2002). In 2000, it was listed as endangered by the International Union for Conservation of Nature and Natural Resources' Red List of Threatened Species (Schnell et al., 2000). This classification means the population has decreased by more than 50% in past 10 years, the species occupies an area less than 500 km², has a total population of less than 2500 individuals (with no subpopulation of more than 250 individuals) and populations are expected to decrease by a further 20% within the next two generations.

Reintroduction Trial

The objective of this part of the project was to determine whether growth stage at planting (dormant or actively growing) affected survival rates at reintroduction sites.

Three large clumps were collected in May 2012 from a bog in Conecuh National Forest in southern Alabama. The population was in decline because the land had become heavily shaded as a result of economic conditions delaying a timber harvest. The clumps were taken to Auburn University where soil and leaves were removed from the rhizomes. Rhizome cuttings were taken so that each cutting contained 2 to 4 nodes and cut surfaces were dusted with powdered sulfur to prevent pests and disease. Rhizomes were potted just below the soil surface in 2.5-L containers in a peat and perlite (1:1, v/v) substrate. Plants were grown under natural photoperiod on raised benches in a greenhouse at Paterson Horticulture Greenhouse Complex at Auburn University (Fig. 2).



Fig. 2. *Sarracenia rubra* subsp. *wherryi* growing at Paterson Horticulture Greenhouse Complex at Auburn University.

Ten actively growing plants, from terminal cuttings, were planted in August 2012 at Donald E. Davis Arboretum and 10 more into a managed natural bog in Conecuh National Forest. Twenty more plants from terminal cuttings were placed in a walk-in cooler (4°C) in January 2013, for 6 weeks to induce dormancy. In February, the 20 dormant plants were then planted at the same locations: 10 at Donald E. Davis Arboretum and 10 at Conecuh National Forest. Survival was assessed in September 2013.

All of the dormant and actively growing plants had survived. One plant from the dormant treatment attempted to flower, but the bud was killed in a late season frost. Stage of growth at planting therefore appears to have no effect on the ability of Wherry's pitcher plant to establish after reintroduction. It would be useful to undertake future

research to determine whether induced dormancy can advance flowering of plants grown from rhizome cuttings.

DISCUSSION

Future projects related to this research are planned. Currently there are more than 100 *S. rubra* subsp. *wherryi* plants to be reintroduced into Conecuh National Forest and seed propagation is being explored on other species of *Sarracenia* in Alabama. Seed propagation and reintroduction of *S. georgianum* continues. The success of these projects has led the United States Forest Service to initiate other projects with Auburn University to protect other rare plant species found in National Forests of Alabama.

As consumer interest in native plants continues to increase it brings opportunities for commercial propagators and growers in the southern USA. Native plants have the potential to be an untapped market while carnivorous plants continue to be of high interest to collectors. By having these plants available from environmentally sustainable propagation there is the potential to reduce poaching of native populations.

Native plant propagation, proper land management, and increased research is important to safeguard decreasing populations of rare plants.

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