

# Battlefield Harbors a Rare Tennessee Plant

by Kimberlie McCue and  
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**Pyne's ground-plum**  
Photo by Kim McCue

**Opposite page (from upper left):  
Seedlings in Missouri Botanical  
Garden greenhouse**

Photo by Vera Alexander

**National Park Service employees and  
volunteers transplant Pyne's ground-  
plum to glade habitat in Stones River  
National Battlefield.**

Photo by Kim McCue

**Newly transplanted seedlings are  
tagged and covered with wire mesh  
to protect them from herbivores.**

Photo by Kim McCue

*P*yne's ground-plum (*Astragalus bibullatus*) is a rare wildflower endemic to limestone cedar glades in the Central Basin of Tennessee. Last year, this species took a step toward recovery with the establishment of a new population at Stones River National Battlefield in Murfreesboro, Tennessee. Seedlings were transplanted into suitable habitat within the Civil War battlefield in the spring and fall of 2001. The project was made possible by a partnership among the Tennessee Department of Environment and Conservation, Missouri Botanical Garden, U.S. Fish and Wildlife Service, and National Park Service.

Although the first collections of the ground-plum likely took place in the late nineteenth century, nearly 100 years passed before the plant regained attention. Milo (Guthrie) Pyne, a local botanist, rediscovered the unusual plant in 1980 in a cedar glade in Rutherford, Tennessee. In 1984, Edwin Bridges of the Tennessee Heritage Program went to the site and collected specimens, which he sent to Dr. Rupert Barneby at the New York Botanical Garden in 1985. Dr. Barneby accompanied Bridges and Pyne to the site in 1986 to confirm his suspicions that this plant was an undescribed species. The unusual fruit type, a "double bubble" or "bilocular bubble," gave rise to the name *A. bibullatus*. The ground-plum produces showy purplish flowers in early spring, followed by small, plum-shaped, reddish fruits in summer.

Since 1987 when it was scientifically classified, two populations of *A. bibullatus* have been extirpated, one by urban development and the other by a reservoir project. Just four years after its description as a species, *A. bibullatus* was listed as endangered. Today, there is

a grand total of three known wild populations. One is permanently protected by the state and The Nature Conservancy. The other two populations are on privately owned land; one is threatened by development, while the other is being protected by the landowner. For a number of years, the Tennessee Department of Environment and Conservation had hoped to establish a new population of *A. bibullatus* in protected habitat, but the project was delayed because of a lack of plant material. Although seeds of the ground-plum were available, protocols for consistently growing the plants had not been developed.

Coincidentally, the Missouri Botanical Garden (MBG) had begun working on the problem of *A. bibullatus* propagation in the spring of 1999. As a Participating Institution of the Center for Plant Conservation, the Garden not only builds *ex situ* germplasm collections of rare Midwestern plants but also conducts research relevant to the conservation and restoration of these species.

Work with the ground-plum proved challenging. Multiple trials yielded the same results, good seed germination followed by rapid mortality of all seedlings. Perseverance, however, paid off when attempts to mimic the ground-plum's native soil conditions resulted in a 60 percent survival rate for seedlings. The key to propagation appeared to be providing "poor" soil conditions by mixing three parts filter sand with only one part organic material, along with a minimal watering regime. Young *A. bibullatus* do not like to get their feet wet!

With a reliable propagation protocol in hand, MBG entered into a contract with the Tennessee Department of



Environment and Conservation to grow *A. bibullatus* for the purpose of establishing a new population. The Fish and Wildlife Service provided funding for the project. Suitable and secure habitat was found at the Stones River National Battlefield, and the National Park Service agreed to allow the project on the site.

Seeds were collected from all of the remaining populations in June 2000, and propagation of the plants began the following month. Because the environmental conditions on cedar glades, the habitat of *A. bibullatus*, can be harsh and unpredictable, we decided that propagated seedlings would be introduced into the national battlefield at two times during the year, early spring and fall.

The first transplant of ground-plum seedlings took place at the battlefield in March 2001. Two-thirds of the available seedlings were transplanted at that time. Each seedling received a unique number and tag to facilitate monitoring. Seedlings were placed into five glade areas within the battlefield. The remaining one-third of the original seedling cohort was transplanted into the same five glade areas in September 2001.

Members of the Stones River National Battlefield staff began informal monitoring of the seedlings the day after the first transplanting in March. This was fortunate since many of the transplants fell victim to herbivory, presumably by rabbits. In one of the five plots, all of the seedlings were lost. Staff immediately constructed chicken wire exclosures to protect the remaining plants. Formal monitoring of the spring planted seed-



lings began in June 2001. At that time, each individual (or the remaining tag) was observed and recorded as alive or dead. Thirty-three percent of the original transplants had survived. When the sites were again visited in September 2001, only three plants had perished since the June observations. The exclusion of herbivores seemed to play an important role in the survival of the transplants. All seedlings transplanted in September 2001 were immediately enclosed in chicken wire.

The sites will continue to be monitored periodically. We hope that some of the plants will flower in their second season of growth, bringing Pyne's ground-plum that much closer to recovery.

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