

Return of the Ericads

Students Dig and Reestablish A Prehistoric Species

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A student plants box huckleberry at the test site. Photos by the author.



Cuttings of box huckleberry overwintered in greenhouse.



Potted box huckleberry.



Box huckleberry, *Gaylussacia brachycera*.



Pipsissewa, *Chimaphila umbellata*.

Picture a project with the allure of “Jurassic Park,” the rigor of scientific research, and the hands-on appeal of Arbor Day. Sound intriguing? Well, this is the kind of project that tribal students at the Lac Courte Oreilles Ojibwe High School in northern Wisconsin became involved with courtesy of yours truly, their enthusiastic science teacher. Of course it would have been fun working with California condors, but since that would be difficult and messy we opted instead for reestablishing an endangered plant, one that hasn’t been seen in these parts since before the last ice age.

The plant is the box huckleberry, *Gaylussacia brachycera*, a slow-growing groundcover 10-46 cm (4-18 inches) tall, similar to blueberries, with shiny evergreen leaves and red new growth which really sets it apart. Its name refers to the small glossy leaves which somewhat resemble those of boxwood. Although we’ll probably never know for sure, it seems likely that it grew in the upper Midwest during the Tertiary Period, in the time preceding the last ice age. The foliage of a plant from Virginia is virtually identical to that of the beautiful evergreen blueberry, *Vaccinium ovatum*, of the Pacific coast. Although in slightly different genera, this may be another example of eastern and western North American disjunct species pairs with ancient preglacial roots. Others are *Rhododendron catawbiense*/*R. macrophyllum*, *Pachistima canbyi*/*P. myrsinites*, *Oxalis montana*/*O. oregana*, *Eriogonum allenii*/*E. jamesii*, *Polystichum acrostichoides*/*P. munitum*, and *Thuja occidentalis*/*T. plicata*. They were likely connected through the upper Midwest in the distant past. Biochemical analysis of the two species would prove an interesting study. In its present-day native range it grows on sandstone, a widespread

rock here in Wisconsin, together with wintergreen, trailing arbutus, pipsissewa, lowbush blueberry, and sweetfern, all of which are also abundant here in our area. Although published hardiness limits for this species vary widely from USDA Zones 4 to 6, a plant which I purchased from a mail-order nursery years ago withstood exposure to -34° C (-30° F) without the slightest harm to its foliage.

Box huckleberry occurs today in the unglaciated eastern states from Pennsylvania south to North Carolina and west to Kentucky and Tennessee, usually in widely scattered isolated colonies up to around 915 m (3000 feet) in elevation. It is listed as globally rare with only about 100 native sites in existence and is imperiled to critically imperiled in most states. However, it is a long-lived plant and may be locally abundant, covering many acres. For instance, one ancient colony in Pennsylvania extends one and a quarter miles up a ravine from the bank of a brook. It continues to spread about 15 cm (six inches) annually by means of underground runners. Seedlings of box huckleberry are extremely rare. The species is typically found in sandy acidic woods, usually with a northern or western exposure. On south slopes the soil tends to dry out too much for the slow-growing seedlings to get established. The plant prefers at least some shade and grows wild beneath white pines, oaks, red maples, and rhododendrons.

The disruption of the ice age which ended here around 13,500 years ago was a serious blow to biodiversity across northern America. Plants, insects, fish, and amphibians which were narrowly endemic, being found only in one particular stream or on one range of hills, were driven to extinction. More widespread species and those which could disperse rapidly enough

ahead of the advancing wall of ice were spared. Those and only those are the ones which returned many thousands of years later, some slower than others, to reclaim their former territory and create the mosaic of natural beauty which we today call the northwoods. It may come as a surprise that this mosaic is incomplete and simplified, with many of its most beautiful and valuable components missing. Mountain-laurel, *Kalmia latifolia*, along with the rhododendrons *R. maximum*, *R. catawbiense*, and *R. minus* for instance are found today in the Appalachians where the forest vegetation and sometimes even the temperature minima are almost identical to that of upland northern Wisconsin. Some may perhaps never return, but other species such as the American chestnut simply haven’t had enough time to return on their own. It had only reached southeastern Michigan by the time the blight struck in the early 20th century, but understandably thrives when planted in its ancient preglacial home of Wisconsin. There it creates a positive ecological effect, providing food for wildlife and people. Box huckleberry finds itself in a similar situation. Its slow dispersal rate and need for specific soil conditions has hindered recolonization of its former haunts. Intervening limestone soils of vast extent around most of the upper Midwest create a formidable barrier for ericaceous plants, as the well-aerated acidic soils preferred by these species are lacking. Therefore, the only ericads to date to colonize Wisconsin are those from the north such as *Rhododendron groenlandicum* and *R. lapponicum*, and a few like *Vaccinium membranaceum* with their main range far to the northwest in the northern Rockies. That’s where my students come in, as advocates for full biodiversity, rewilding a plant which hasn’t been seen in these parts

for over a million years.

Research geneticist Dr. Margaret Pooler of the U.S. National Arboretum was instrumental in helping us accomplish this project. Through a plant testing agreement we were able to obtain offsets of six vigorous box huckleberry clones or genetically identical individuals from the states of Tennessee, Kentucky, Virginia, West Virginia, and two clones from Delaware, which together represent a good cross-section of the species' genetic diversity. The arboretum has the most extensive collection of living box huckleberry plants in the world. They were collected under permit across its native range for the purposes of evaluation, breeding, conservation, and reintroduction.

The shipment of box huckleberries arrived in autumn and my students' first step was to obtain a suitable growing medium for the plants. We did this by simply bringing a supply of 1.9 l (half gallon) pots into the pine forest next to the school and filling them with the sandy acidic soil, being careful not to destroy too many tree roots while digging in any one spot. We brought these into the greenhouse and then potted up the box huckleberry offsets, making sure that the individual plants were correctly labeled as to origin so that our test results would be accurate. We grew them in the greenhouse over winter and in May they were planted out at the test site. We had also received hardwood cuttings of each of the clones. These were treated with a rooting hormone, grown in siliceous glacial sand over winter, and planted out soon after the larger offshoots. Generally, cuttings of the six different box huckleberry accessions rooted strongly by the end of the school year, particularly the ones from West Virginia, the exceptions being one clone from Delaware and those from Virginia where only one cutting of each barely rooted. Perhaps they just needed more time. We planted them out anyway, hoping that they would root in place.

Each clone was planted out in a

group a couple of metres (yards) away from the other clones. Hopefully when the light pink to white blossoms open, the bees will do their duty and cross-pollinate the clones, as each is self-sterile. Planting several clones within a half metre (a few feet) of one another should help ensure this. The fruit color ranges from white to blue to black and the delicious tart berries are favored by turkeys, ruffed grouse, bears and other critters. Perhaps they will oblige us by dispersing viable seeds. Clones are known to vary wildly in fruit set; some bearing reliable heavy crops while others hardly ever fruit at all.

The test site is located in a mixed pine and hardwood forest behind our school. Notable companion plants there are a large colony of the acid soil-loving pipsissewa and attractive rattlesnake orchids. We try to keep our access routes to the site as inconspicuous as possible to prevent disturbance by others (we are a K-12 school after all!). Basically my students will be evaluating the adaptability of the box huckleberries to our regional environmental conditions. The plants will not be coddled in any way, so no animal fencing, mulching, or watering.

We were happy to see, two weeks after planting, that all of the plants were in good shape. Even though there was a drought, the soil there remained moist. One concern was that a bear would smell where we had dug and uproot the plants, but much to our relief that didn't happen. Deer are a bigger concern. In Wisconsin, they would usually be a serious limiting factor to any tasty evergreen shrublets such as these. In my experience, unfenced dormant plants located off-reservation were almost always killed by heavy browsing from an unnaturally high deer population. Fortunately, tribal lands have historically had much lower deer numbers than surrounding areas and provide a refuge for otherwise rare plants such as Canadian yew (*Taxus canadensis*, also known as ground hemlock). So it seems there is little chance of this species eagerly engulfing the northwoods and making

a nuisance of itself as *Rhododendron ponticum* did in Britain by reasserting claim to its ancestral realm.

In the years to come, my students and I look forward to providing Dr. Pooler and the staff at the National Arboretum with data on our plants' cold-hardiness, disease resistance, vigor, drought tolerance, fruit set, palatability, and (hopefully) self-sowing. Perhaps this rare species will find Wisconsin much to its liking and be better able to reproduce itself in our cooler, moister northern climate. Who knows, it would certainly be exciting to one day find a box huckleberry seedling established here in the wild! Our results with this species could be a significant first step towards understanding the preglacial ecology and distribution of other eastern American ericads like rhododendrons. Thus we can dream of a primeval landscape returning in the future when drifts of beautiful ericaceous shrubs will make springtime in the Lake Superior region look like that of the present day Appalachian highlands.

Michael Heim is a member of the Midwest ARS Chapter.

Michael Heim also authored the article "Evergreen Eden in the Northwoods" which appeared in the fall 2007 issue of JARS, page 195, and which features many of the species of Ericaceae growing in Wisconsin.