

barbed wire was strung diagonally across that corner to fence the cattle out. The cattle did not mind, but I think the pitcher plants did.

Decline began rapidly. Figure 2 shows a typical part of the area close up and you can see the abundant grass and weed growth and smaller clumps of plants a couple of years after the diagonal. To be fair, the adjacent deciduous trees on the lower and north fence line also grew and their branches spread over the bog causing more shading of part of it, but the open part began to recede more and more towards the lower shaded part.

Then the farm was purchased by a reputable private conservation organization. The only change was a few stakes driven into the ground to act as baseline survey markers for counting the fewer and fewer plants. It was suggested that old farming practices of applying fertilizers and other chemicals to the higher ground had tainted the lower bog corner and this was depressing pitcher plants, but the same practices had been in place for years when I first saw the bog and all through the time I knew it until the cattle were excluded.

Some well trained botanists and ecologists with the conservation organization and the US Fish and Wildlife Service are looking into it. They say they "have not quite got a handle on the continual decline" of this once magnificent stand. When they said that it suddenly occurred to me how old I was and how young these well trained people were. In several areas of this one State alone, they were "saving and managing" areas that excited them but that in actuality were mere faint shadows of the former glory of pitcher plant bogs in years past. Perspective is important.

There, then, is a tale of two bogs. One persisting in spite of mighty efforts by an owner to destroy it, another withering in spite of thoughts to save it. Do I advocate letting the cattle back into that mountain farm bog? Hardly. This bog survived for probable millions of years before farms and herded cattle, but the forces molding the bogs then were probably in parallel to what the cattle did to help them in these more recent times. Maybe the bored, placid cattle are trying to tell us something.

Literature Review

Gardner, Rob. 1994. Growing carnivorous plants at home. Newsl. NC Wild Flower Preservation Soc. 6:1 1-13.

Rob Gardner is a highly skilled grower of plants and is a curator at the North Carolina Botanical Garden. In this brief article he introduces sarracenias, and then describes his experience and suggestions for growing these plants outdoors. Since this is a State Society directed bulletin, the instructions aim mainly toward that state's milder climate. (Outdoor artificial bogs ranging from sunken wading pools to holes lined by plastic sheeting, along with soil light and water recommendations are described.

Sheridan, Phil. 1991. Noteworthy collections: Maryland. *Castanea* 56: 71-72.

Phil (along with Bill Scholl) has made some unusual plant discoveries in Maryland, among them the following CP: *Sarracenia purpurea* (first collection from Charles County and western shore), *Drosera rotundifolia* (declining populations) and *Drosera capillaris* (one of more northern extensions of this species).

Sheridan, Philip M. 1993. 1) A unique habitat for *Drosera rotundifolia* L. (Droseraceae) on the Blackwater River, Virginia. 2) The Virginia pitcher plant bogs, part one: Poo Run. *Virginia Journal of Science* 44: 122. (Abstracts).

In abstract 1) above, the author describes *Drosera rotundifolia* on two vertical clay seepage's on the Blackwater River. Bends in the river result in erosion with water seeps flowing from between the upper sandy layer over wet, impermeable clay. This seep provides excellent habitat for the sunned. In abstract 2), the author recounts the history of Poo Run, a floristically significant wetland located near Petersburg, VA. It

contained the largest stand of *Sarracenia flava* recorded in Virginia, near the species' northern limit. Burning by Native Americans and early settlers helped maintain the bog. The Battle of Petersburg (American Civil War) and clearance of right of way by early railroads (steam with accidental fires!) also maintained the bog. A shift away from Steam and to fire prevention caused significant woody encroachment. The site met its demise with construction of I-95.

Strong, Mark T. and Phillip M. Sheridan. 1991. *Juncus caesariensis* Coville (Juncaceae) in Virginia peat bogs. *Castanea* 56:65-69.

In widely scattered boggy seeps in eastern Virginia kept open because they occur in power line right of ways, the rare rush mentioned above can be found. Among CP that may occur with it are *Sarracenia purpurea*, *Drosera capillaris*, *D. rotundifolia* and *D. brevifolia*.

Teo, Chris KH. 1994. In vitro germination and pitcher formation in *Nepenthes*. *Nature Malaysiana* 19:24-29.

In this article, the Malaysian author describes his experiences growing *Nepenthes* seeds from his area in various flask culture situations. He has had very good success. Using unopened but nearly mature seed pods, he felt at first that surface seed sterilization was not necessary. Most flask growers use a dilute chlorine bleach solution to sterilize seed surfaces so that various fungi and bacteria will not contaminate the agar surface. While he had no contamination, most seeds turned brown or black and failed to germinate, the discoloration being due to accumulation of phenol compounds. After treating the seed with bleach, darkening no longer occurred and he achieved germination, so the bleach served another purpose besides sterilization. In the article, he describes stages of embryo and plant growth in the media and this is liberally illustrated by color photos.

U.S. Fish and Wildlife Service. 1994. Draft revision green pitcher plant recovery plan. U.S. Fish and Wildlife Service, Jackson, Mississippi. 35 pp. (For information on purchasing copies, call 1/800/582-3421 (Maryland)).

The USFWS is required to put out and periodically update recovery plans for listed endangered species, and this is the third, March, 1994 update for *Sarracenia oreophila*. Currently, there are 35 known locations for this species, ten having been "discovered" through discussion with local peoples since 1980. There is one site in northeastern Georgia, two in southwestern North Carolina, and the rest are in northeastern Alabama. Regarding preservation of sites, only three are owned by The Nature Conservancy, three are on Alabama State Park property, and twelve are on private lands and are part of a conservation agreement with the current owners, but are far from secure, as the remainder are not.

Numbers of plants vary from 1 to 500 "clumps" (growth points) per site, but since growth is rhizomatous and one rhizome may have more than one growth point, genets are not known.

This new revision makes interesting reading since it is a fair summary of the history and biology of the species as well as intended plans for recovery. It is felt that if eighteen of the sites can become biologically secure with healthy, growing, reproducing populations, then recovery can be claimed and the species delisted. However, the timetable for this is uncertain, perhaps a minimum of ten to fifteen years if all goes well.

All is not going entirely well. While it is of the opinion of some observers that overall the species seems to be holding its own or the situation getting no worse, it has been fifteen years since listing and little forward progress has been made aside from location of additional sites. Attempts at plant reestablishment by transplant of adult or seedling plants at several sites have failed miserably, probably due to poor planning and preparation as well as choice of site. The general level of seedling activity at all

sites is very poor, and pollination does not seem as effective as other species of *Sarracenia*. Insect destruction of flowers and seedpods is felt to be no worse than with other species elsewhere.

After all this time, efforts at hydrologic studies and recovery are finally being considered seriously for the first time, which is an acknowledged new primary emphasis! Further studies on pollination, seedling establishment and closer census of sites with mapping of each plant will be undertaken.

The report is generally good reading. There are several typos that presumably will be corrected. Unfortunately, some questionable opinions and little more than old rumors are repeated as though solid science. Glancing through the references, the list is far from complete for useful material, and contains reference to at least ten 1-10 page privately commissioned reports to which the public does not have access. Unfortunately, many of these seem to be key bases from which specific "tasks" are derived and yet contents are not available to other serious students to offer support or useful counter-comment.

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