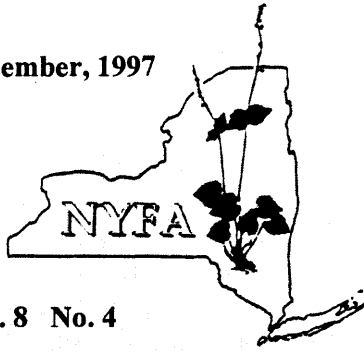


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Richard S. Mitchell, Editor, New York State Museum
Correspondence to NYFA, 3140 CEC, Albany, NY 12230
e-mail: rmitche3@mail.nysed.gov Dues \$10

SPECIAL ISSUE: NORTHERN PLANTS IN THE SOUTH

Yankee Plants in Dixie -

by Bruce A. Sorrie

The title of this article comes from my fascination with botanical disjunctions -- species found well away from their main centers of distribution. Back when I lived and botanized in New England, I became keenly aware of southern species that occurred there, at their northern limits, mostly in the region just south of Boston. Most of those species are also known from Long Island, NY, but several jump directly from the New Jersey Pine Barrens to Massachusetts, and some exhibit even less likely disjunctions north to Nova Scotia or westward to the Great Lakes. I've always marveled at the ability of plant species to disperse into distant habitats that are similar to those from which they came.

Since moving to North Carolina in 1991, I find that several familiar northern plants occur here, south of their normal ranges. I'm not talking about the well-documented occurrences of boreal plants that are sprinkled along the southern Appalachian Mountains, although some of those, such as *Conioselenium chinense*, *Huperzia selago* and *Scirpus cespitosus* are notable disjuncts. Travel to Grandfather Mountain in western North Carolina, and you will quickly realize that such boreal species belong there. Rather than discuss these better known examples, I will treat in this article some selected northern species that occur "out of place" on the steamy, southern Coastal Plain.

Chamaedaphne calyculata (L.) Moench, leatherleaf or Cassandra, is a well-known circumboreal shrub of peat bogs and pond borders. Fernald (1950) gave its range as "south to Georgia," while Gleason & Cronquist (1991) listed it only to North Carolina ("chiefly in the mountains"). It is, in fact, absent from Georgia, occurring generally southward to Maryland. It is disjunct at one site in the mountains of North Carolina, but also at a dozen or more sites on



Chamaedaphne calyculata (L.) Moench

LEATHERLEAF. This plant is no stranger to New York botanists, but it is a curiosity in the Carolinas, where it is found in shrubby, coastal, raised bogs called "pocosins."

the Coastal Plain, barely into South Carolina. Coastal lowland occurrences of leatherleaf are mostly found in "pocosins"-- shrub-dominated, raised peat bogs that sometimes cover areas up to ten square miles. *Chamaedaphne* also grows on peat mats that border lakes within depressions called "Carolina bays" -- shallow, elliptical wetlands of varying sizes that border a variety of habitats, from open water to forests. These Carolina bays are very reminiscent of the boggy, Coastal Plain ponds of Long Island and southern New England, and harbor many of the same species.

Rhynchospora alba (L.) Vahl PALE BEAKRUSH, is a northern sedge that is found in association with leatherleaf in coastal bogs, including some boggy beaver ponds. It also grows in a number of montane bogs as far south as northeastern Georgia, then as a disjunct in extreme southeastern Georgia, on floating peat-sedge islands in the Okefenokee Swamp. But that's not all -- *R. alba* then makes a remarkable jump to a single mountain top in Puerto Rico.

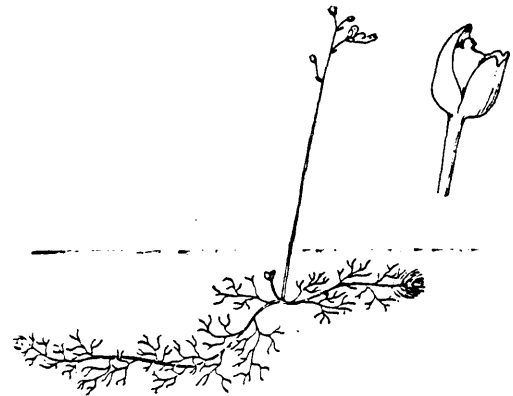
Eriophorum virginicum L., TAWNY COTTON-GRASS, is more widely distributed south of New Jersey than the two previous northern species, especially in the mountains of Virginia, the Carolinas and Tennessee, but not in Georgia. In the fall-line sand hills of North Carolina, on the inland border of the Coastal Plain, it is found in streamhead bogs -- seepage zones that result from the channeling of groundwater to the surface by underlying lenses of clay hardpan.

Ecologically, these features amount to poor fens, but most botanists call them bogs, and local people may refer to them as "bays" as well. Frequent associates of *Eriophorum* in such places include three species of pitcher plants: *Sarracenia purpurea*, *S. flava* and *S. rubra*. Tawny cottongrass also inhabits a few boggy beaver ponds, as well as shrub pocosins on the outer Coastal Plain of NC. It is then disjunct to the Okefenokee Swamp of southern Georgia, where it occurs with *Rhynchospora alba*. Florida reports are apparently erroneous.

Carex exilis Dewey is a boreal sedge, primarily confined to Northeastern North America south of a line from Minnesota to New Jersey. It is extremely rare in Delaware and Maryland and unknown in Virginia. In North Carolina, it was originally collected at a single site in 1948 in the fall-line sandhills, but recent searches have documented half a dozen sites in adjacent counties. Even more disjunct sites are now known for the species in southernmost Alabama and Mississippi, on the Gulf Coastal Plain, where over 20 sites are known from 9 counties. Here, it occupies hillside seepage bogs, ecologically analogous to the streamhead bogs of the Carolinas, but sometime much larger (100+ acres), replete with the most alluring array of showy herbs, graminoids and carnivorous plants imaginable. I have tallied as many as 137 species in a single bog. In these places, *C. exilis* is found on the wettest, most unstable peat.

Scirpus subterminalis Torrey is a clubrush with mostly north-temperate to boreal distribution, south to

Illinois, Pennsylvania and Delaware. It is very rare in Maryland and eastern Virginia, but reappears in the fall-line sandhills region of south-central NC and northern South Carolina, where it is not uncommon in beaver ponds and impounded streams. These acidic, tannin-rich waters also support *Eleocharis robbinsii*, another sedge that is rare, but widely scattered in the southeast to the Gulf of Mexico. *Scirpus subterminalis* has been reported from Georgia, but I have not yet found a specimen; however, it has been recently discovered in the Florida panhandle -- a major disjunction. As if that weren't enough, this species has been found westward in central Tennessee and Missouri.

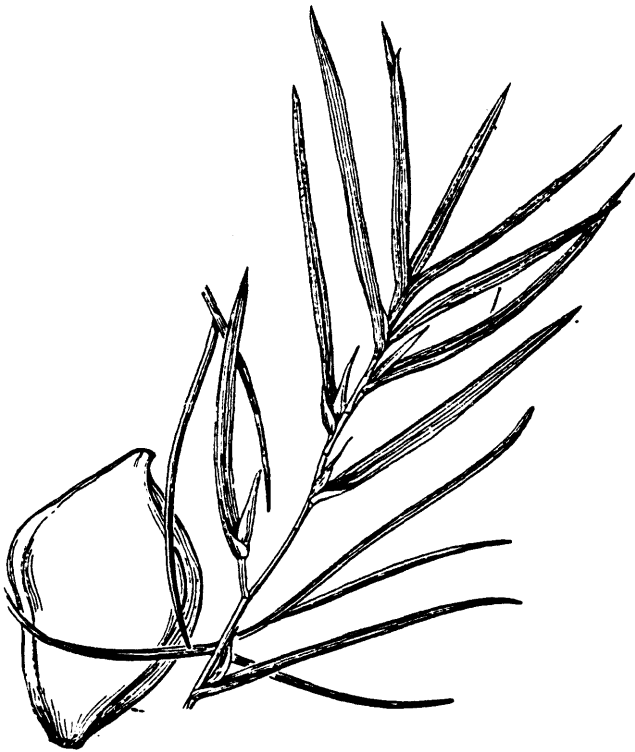


***Utricularia geminiscapa* Benj.** TWINSCAPE BLADDERWORT. This species, primarily known from the northeastern U. S. and eastern Canada, is rare in Virginia, then occurs as a disjunct in the Sand Hills of south-central North Carolina, along with other rarities.

Potamogeton confervoides Reichenb. is a pondweed that ranges from the acidic waters of New England to the Great Lakes, southward to the Adirondacks of New York, Pennsylvania, and onto the Coastal Plain of New Jersey. Without known intervening stations, it occurs again in the Carolina sandhills, a disjunction of 350 miles. There, it inhabits (you guessed it) a handful of beaver ponds and impoundments, most of which support *Eleocharis robbinsii* and *Scirpus subterminalis*.

Potamogeton perfoliatus L. is the familiar wavy-leaved pondweed of tidal rivers, estuaries and salt ponds that extends inland to alkaline lakes and rivers from Newfoundland to Ontario, south to Michigan, Ohio Pennsylvania and the coast of North Carolina.

Remarkably, it skips the southeastern Atlantic Coast from that point to reappear on the Gulf Coast from the Florida panhandle to Louisiana, but only in estuaries.



***Potamogeton robbinsii* Eames. ROBBINS' PONDWEED**, exhibits a broad disjunction, from New Jersey to southern Alabama.

Potamogeton robbinsii Eames, is a well-defined species of pondweed that ranges from New Brunswick to Ontario, south to Minnesota, northern Illinois, Indiana, Ohio, Pennsylvania and New Jersey. It is considered extirpated from Delaware and Maryland, and is completely unknown from other southern states, except in extreme southern Alabama, where two collections (pre-1932 and 1970) were made in the vast Mobile-Tensaw River Delta. To my knowledge, this disjunction of some 900 miles is the most extreme of any northern plant in the southeast.

Ecological Implications -

Four of the plants discussed inhabit peat bogs or at least peat-dominated ecosystems. These are species of *Carex*, *Chamaedaphne*, *Eriophorum* and *Rhynchospora*, the latter three of which often occur together at the disjunct sites.

Three species discussed (*P. confervoides*, *Scirpus*, *Utricularia*) are aquatics, found in impoundments, also together at the disjunct locations. I have come to

believe that beaver ponds and bogs are especially important habitats that serve as outposts for aggregates of northern species. Where beaver populations have been severely reduced, human-impounded streams have then served as alternate, similar habitats into which the northern plants have more recently spread.

Long-distance dispersal by water birds is implicated in the major disjunctions, and perhaps some of the minor ones. Disjunctions may also be explained by expansion of ranges southward during the glacial maxima, when boreal conditions extended southward into the Carolinas (see Delcourt & Delcourt, 1981, *Geobotany II*, Plenum Press). One may consider the southern disjuncts of the above species to be relicts -- survivors of times when their ranges were more extensive southward, during the recent glacial epoch. This is not easily proved, since none of the species considered here has been specifically identified in fossil pollen studies from southern bogs.

The role of water birds and other vertebrates in plant dispersal has been assumed for centuries; however, to my knowledge, biological details on the subject have not been extensively explored in the literature. Please direct any studies of this sort to my attention *via* the newsletter editor, as I find the subject fascinating.

Editors Note:

The Fall-line Sandhills of North Carolina: Botany and Childhood Memories -- by Richard S. Mitchell

It was nostalgic for me to read about the Carolina Sandhills, where I was privileged to live, deep in the piney, from ages 8-11, and then return for visits during my early teenage years.

The examples of botanical carpetbaggers that Bruce Sorrie has so aptly detailed for us are just a few among the many curiosities of this region. The sandhills are situated well inland, along the NC-SC border, where the state line diverges southward. Tens of thousand of acres are maintained by the state as game preserves, covered by longleaf pine (*P. palustris*), live-oaks, bluejack and turkey oak, dotted by blackwater pools, lakes, tupelo swamps, "bays" and ponds. The soil is almost pure white sand, often 15 feet deep or more. Agriculture there is like hydroponics (peaches, tomatoes and a little tobacco).

The longleaf pines don't just whisper -- they can roar loudly enough to wake you at night when a strong wind comes. Heaven forbid that one of the ground-fires intentionally set to clear brush and maintain the pine stands should jump to the crowns of the trees ("crown

out") during a sudden wind storm. This happened once when my father and other game management people were burning to maintain the savanna. I was ten years old, and we fought fire through the night. Because no grown man could be spared, I was asked to learn to drive a truck very quickly on a back road alone. I managed to hang from the steering wheel to work the clutch, bouncing and jerking the old Chevy up the hills to the nearest telephone, on which I cranked one long and four short rings to get an answer at the game warden's house. Eventually reinforcements came, including the first military-type helicopter I had seen up close -- an old Sikorsky, originally from Fort Bragg, that came to drop borate powder on a hot-spot very near to us.

The place is still mystical to me, since I developed a deep love of nature there, fishing, gigging frogs, avoiding the cotton-mouths, raising caterpillars into moths, watching otters play among the drowned logs of upper Lake McKinney by the government fish hatchery -- sneaking out the back window to share late-night adventures with my dog when the moon was full and its reflection on the sand roads was almost blinding. But, mostly I remember that the animals and plants were a wonder to me, as they still are.

Tiny toads, in astronomical numbers, would play on the black muck, unseen, but occasionally venture

over the sharp line onto bright sand. Instinctively, most would leap right back onto the black, but the few that didn't would be picked off by birds -- natural selection!

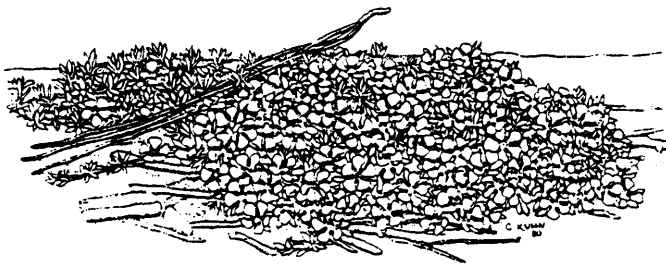
A "bull-bat" (nighthawk) opened his sack-like jaws in a dive, and bellowed just above my head one evening when I was an innocent eight year old who didn't know any such creature existed. This sent me scurrying to the house, as did a spectacular, two-inch, scarlet and black, velvet ant, which is really a wingless wasp.

Once, when I was wrestling with my black dog, Sox in a pit of pine needles, on the abandoned game farm where I lived, I noticed, very close to my face, what seemed to be a moss with minute white flowers and yellow anthers. Later, I asked my father if mosses ever had flowers, and he said, "No, but some flowers, like bluets, are very small, and can grow up through the mosses." That was the end of that, until I saw *Pyxidantha barbulata* on Long Island, 32 years later. *Deja vu*. What I had seen as a child must have been the very rare var. *brevifolia* (Wells) Ahles, that occurs there.

New York Plants in the Florida Panhandle - by Richard S. Mitchell

Because Florida is low-lying, like a limestone sponge riddled with caves, sinkholes and underground rivers, it has been particularly vulnerable to catastrophic flooding and major floristic changes during the ice ages. With the encroachment of the seas during interglacial periods, nearly all of Florida's flora has been extirpated several times, up to an elevation of about 250 feet. With the water that high, what we now call Florida was reduced to a few low bluffs along the Georgia-Alabama border and possibly a few small islands in the Gainesville area along the "Trail Ridge." These areas are of particular phytogeographical interest, because they have served as refugia for both northern and southern species that migrated in and out of the region.

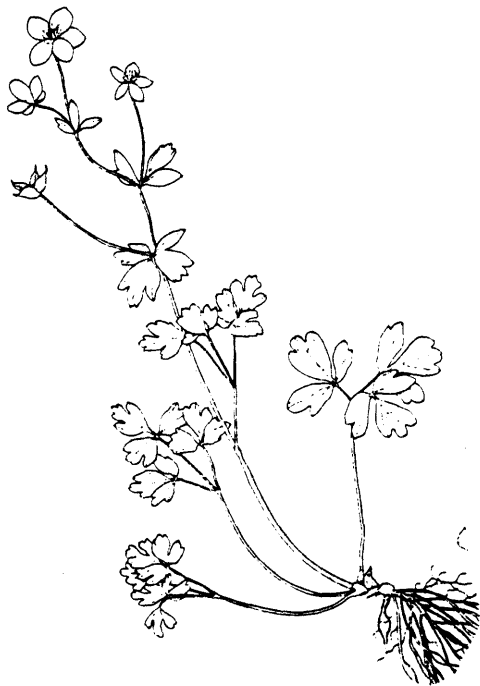
During the pluvial periods, when glaciers were at their maximum, the shore of the Gulf of Mexico apparently had a climate that was cooler, with more winter precipitation -- perhaps similar to that of the Chesapeake Bay region of today. Much erosion of the Appalachians had already occurred during the Pliocene and earlier periods, bringing clay soils southward in abundance along the river valleys toward the Gulf. This created corridors along which northern Appalachian plants could migrate when conditions got cooler. With the coming of glaciers, north-temperate plants, and even some boreal species found their way down the river valleys into the south, where some persist to this day.



***Pyxidantha barbulata* Michx. FLOWERING MOSS or PIXIES.** These plants are very rare, both in New York and North Carolina at the extremes of their distribution range.

In the panhandle of Florida, there are three notable "red-hills" areas that not only support large tracts of southern deciduous forest, but harbor a number of populations of Appalachian and even more boreal, disjunct plant species. These are the Tallahassee Red Hills, the Appalachianicola River Bluffs and the Marianna Lowlands.

I was fortunate to do my first botanical collecting in a place where I had already done some caving, the Marianna Caverns State Park. Three years later, I published my Masters thesis on the phyto geography and flora of the area (Mitchell, 1963; Amer. Midl. Nat.). It is a beautiful place, with rolling hills and clay soils, slumping over limestone boulders and small cliffs. Adjoining the muddy floodplain of the Chipola River, this so-called "karst topography" offers a great diversity of microhabitats. The wide variety of *niches*, combined with the fact that the area has not been submerged by the encroaching Gulf of Mexico during interglacial periods, makes it one of the more interesting floristic areas in the south -- a true refugium for both southern and northern plants.



***Enemion biternatum* Raf.** FALSE RUE ANEMONE. Reported at its northeastern range limit near Buffalo, New York, it is thought to be extirpated from the state, but it should still be sought in calcareous woodlands. It reaches its southernmost distribution limit as a disjunct population in Florida's Marianna Lowlands.

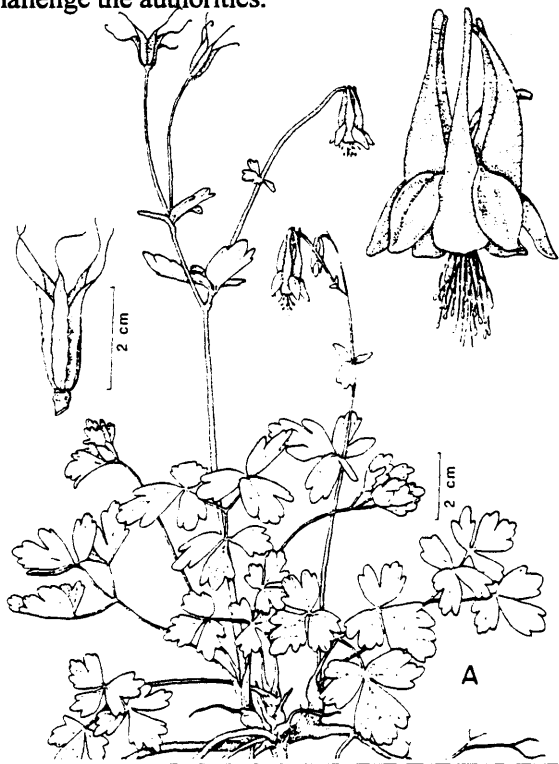
The red hills of western Florida are part of one of the more diverse floristic regions of eastern North America -- a zone extending from North Florida across southern Alabama and Mississippi to Louisiana. Imagine rolling hills covered by a rich, deciduous forest, where a spring walk will lead you among such exotic southern elements as spine-palms (*Rhapidophyllum hystrix*), a subtropical fern (*Pteris cretica*) and showy Atamasco lilies (*Zephyranthes atamasco*), but the surprising spring wildflowers are: columbine, bloodroot, jack-in-the-pulpit, wood nettle, blue phlox, may apple -- even rue anemone or toothwort.

My first botanical collection book starts in Florida with a date of February 28, and specimen #1, *Enemion biternatum* Raf. FALSE RUE ANEMONE (formerly called *Isopyrum*). These delicate, white-flowered herbs are distributed mostly in rich, calcareous woodlands from the Great Lakes down the Appalachians to the western Carolinas, northern Alabama and Arkansas, with a disjunct population at Marianna Caverns park in northern Florida. Oddly enough, this same species has been reported once from New York in a limy woodland near Buffalo, where it is now thought to be extirpated. A plant from a completely different taxonomic group, but which shows a very similar distribution pattern in the south, is *Carex laxiculmis*. That sedge species is, of course, relatively frequent across New York State, extending considerably north of our range in calcareous, woodland habitats.

Rue anemone (*Thalictrum thalictroides*) also called *Anemonella*, is largely missing from the deep south, but occurs at one widely disjunct station on North Florida's Appalachianicola River bluffs, at a ghost town. It may be an escape from the garden of a nearby former house site, but maybe not. This unique area is the home of several notable rarities and endemic species, such as the famous stinking cedar (*Torreya taxifolia* Arn.), and it also has populations of columbine and other northern species, so the possibility of another disjunction of several hundred miles to this place should not be readily dismissed.

The columbines of the Appalachianicola bluffs and Marianna Lowlands are considered to be conspecific with ours, but they look quite different at first glance. They are taller, more slender and sometimes profusely branched than ours, and the flowers are scarlet (to pale orange-red), whereas ours tend to be darker red. John Kunkel Small, who studied with Nathaniel Lord Britton in New York, thought the Florida populations constituted a new species and named them *Aquilegia australis*. Dr. Small gave a large number of southern

species names that are now considered synonyms; however, his *Manual of the Southeastern Flora* (1933) still serves as an excellent source, in which one may find a wide range of variation and polymorphism described, yielding fine problems for biosystematic study. For instance, a variant of the common water parsnip (*Sium suave*), well-known to us in the northeast, was named *S. floridanum* Small, from plants like some I found in the Chipola River; these flower readily from stems that bear only dissected, submerged leaves. I suspected that this was phenotypic variation at the time I saw it, but was not bold enough, as a fledgling graduate student, to challenge the authorities.



***Aquilegia canadensis* L. COLUMBINE OR ROCK-BELLS.** This plant, which is so familiar to us in rocky woodlands, is extremely rare in Florida, where a disjunct race of tall, slender plants with orange-red flowers grows on karst topography and limy river bluffs. It was once considered a distinct species (*A. australis* Small).

A number of northeastern, Appalachian/Ozarkian and midwestern woody plants migrated southward on the clay riverbanks and floodplains of the drainage systems that empty into the Gulf of Mexico in - northwestern Florida and Alabama. A good example



***Symphoricarpos orbiculatus* Moench CORALBERRY.** Like slippery elm and several other woody plants, this species probably migrated southward along rivers, on alluvial clays eroded from the Appalachians during the Pliocene. It persists at a few relict sites south to Florida.

is slippery elm (*Ulmus rubra*), a relatively frequent plant in northern Georgia, but which drops out abruptly on the Coastal Plain, extending to northern Florida only along the river courses. Another typically northern woody plant that shows a disjunction to North Florida is coralberry (*Symphoricarpos orbiculatus*), which ranges from Connecticut to the Great Lakes, southward to central Georgia & Louisiana, with an outlier in the Marianna Lowlands.

Apparently north temperate forest species migrated southward during the glacial advances, surviving in spotty patterns across the southeastern U. S., depending upon subsequent microclimatic conditions. Meanwhile, some of the same species have successfully reinvaded glaciated areas like New York. This means that we share a few species with places as exotic as northern Florida. The reasons for these common occurrences are complex, but, disregarding macroclimate, the habitats are about as different as grits and cream of wheat.

Dues: Be sure to check your envelope to see when you last paid dues. 1998 is upon us. Remember that you can always reinstate for \$20. Some bold people send more, projecting their botanical interests into the next century.

Happy Holidays !