

NORTH CAROLINA *wild flower* PRESERVATION SOCIETY, INC.



Gayfeather
Liatris scariosa

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**NORTH CAROLINA WILD FLOWER
PRESERVATION SOCIETY, INCORPORATED**

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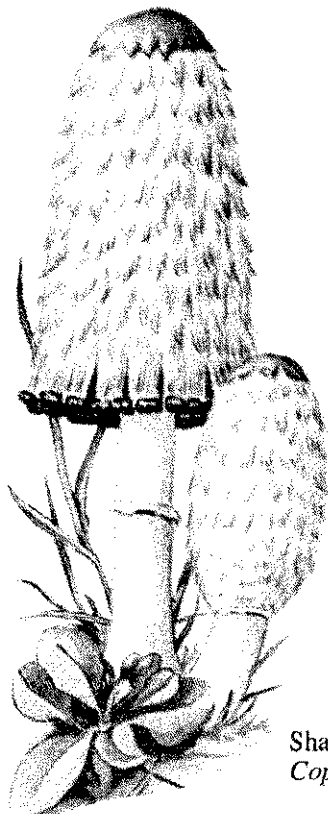
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NEWSLETTER
of
North Carolina Wild Flower Preservation Society

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Shaggy Ink Cap
Coprinus comatus

PRESIDENT'S MESSAGE

1. Help Wanted! Please!

The Society needs someone to assume primary responsibility for our mailings. Our bulk mailing permit and our permanent address are in Chapel Hill. The Post Office requires a "local" telephone number to call if needed. Thus, our priority is on finding someone in or near Chapel Hill. (If you do not have a local phone number, we will try to accommodate that with another number for the Post Office to call.)

We have four bulk mailings a year on a normal basis, two *Newsletters* and two meeting announcements. The major responsibilities of the job are to keep up with our bulk mailing account at the Post Office, affix the mailing labels, sort/bundle as required by the Post Office, and deliver to the bulk mail room. Tom Howard keeps our mailing list on his computer and provides an already sorted list.

Jean Stewart has offered to continue as a helper, but would like to give up the primary responsibility. We have found several volunteers/helpers through our "member information sheets," and Jean has had many helpers over the years.

We can promise our new "bulk mail coordinator" several cheerful helpers (including Jean), a special fall "treat" courtesy of Julie Moore and Benson Kirkman, and quite possibly a special treat from Jean and membership on board.

To ask questions or volunteer, call Jean Stewart (942-2902) or Benson Kirkman (859-1187). Become involved in your Society!

2. Coming Attraction: A new edition of our best seller, *The North Carolina Native Plant Propagation Handbook*.

That's right! Our best seller is nearly sold out! As of this writing, we are down to about 50 copies on hand. Therefore, we will be reprinting this fall. We hope that the new edition will be available in November.

Jane Welshmer, our *Newsletter* Editor and authority on ferns, is contributing a chapter on ferns for the new edition.

We ask all members who use the *Handbook* to send corrections or additions to Ray Noggle or Benson Kirkman (addresses inside front cover). We need this material right away so that we can get the new edition ready to go to press.

Benson

Benson



DATES OF INTEREST

**NCWFPS Fall 1990 Meeting—
October 20-21, Chimney Rock Park and Bat Cave**

October 6, 8:00 A.M.—

“Early Bird Hike” or Birds and Trees with Harry LeGrand.

Harry is an accomplished naturalist employed by the N.C. Natural Heritage Program and has led many hikes at White Pines and for the Wild Flower Society. Early October is a good time for migrating birds and the start of the outstanding fall color at White Pines.

October 27, 2:00-5:00 P.M.—

Penny’s Bend Nature Preserve Field Party.

This is an 84 acre tract of land bounded on three sides by the Eno River, located in Northern Durham and managed by the Botanical Garden Foundation. Informal hikes will be conducted by naturalists. An old fashioned cider press will be in operation. Bring your family and enjoy the Nature Treasure Hunt. Call 919-962-0522 week days between 8 and 5 for information.

**NCWFPS Spring 1991 Meeting—April 20-21, Greensboro area
Special Hikes at White Pines Natural Area**

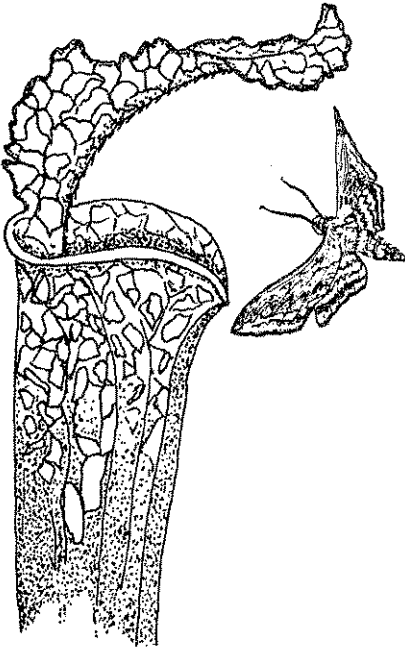
Meet in the parking lot behind the Pittsboro Town Hall. The Town Hall is immediately south of the old courthouse in the central traffic circle. For more information, call the Triangle Land Conservancy Office (833-3662) or Benson Kirkman (859-1187).

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Past presidents are permanent advisors and members of the board of directors.

SARRACENIA LEUCOPHYLLA IN THE CROATAN?



White-topped Pitcher Plant
Sarracenia leucophylla

Two years ago, I was thrilled to see what I thought was an extension of the fairly small population of sweet pitcher plants (*Sarracenia rubra*) in the Croatan National Forest. I knew of only two other populations in this local area, and was happy to have a third possibility. However, something looked very strange about these pitcher plants. Although it is the size of *S. rubra*, the hood has a whitish coloration with red veins rather than an overall reddish coloration. The margins of the hood are undulate (wavy), as described for the white-topped pitcher plants (*S. leucophylla*). The problem with it being *S. leucophylla* is that it only grows natively along the Gulf Coast, and nowhere near coastal North Carolina.

Well, could it be just a natural variation in the population of *S. rubra* (yellow—*S. flava* and purple pitcher plants—*S. purpurea* are also nearby)...or could it have been introduced by an avid pitcher plant lover? Jesse Perry, curator at the N.C. State

Museum of Natural Sciences shed some light on this recently when he said he had "heard" of someone spreading seeds around in suitable habitats. In addition, all the plants appeared to be about the same age and size as if they had been planted at the same time. All plants are immature with no signs of flowers.

Did our avid pitcher plant lover do a good deed for *Sarracenias*? They were evidently planted near a roadside, where they are easily visible and some were probably removed by the same folks that usually dig up Venus fly traps. Nonetheless, new seedlings appeared this spring. It could be detrimental to the native populations to introduce a new species (we have seen these cases many times with animals). The introduced plants often out-compete the native plants, thus reducing the native populations. They may even hybridize with native species, changing the entire gene pool. *Sarracenias* are known to readily hybridize and produce fertile hybrids, so the ramifications of this could prove to be quite harmful. While this person was perhaps well-intentioned to assist declining populations, introducing a non-local species is not the method of preserving native populations!

Jeannie Kraus
N.C. Maritime Museum
(note—*S. leucophylla* is on the cover of Spring 1989 issue)

Illustration by Dot Wilbur

PINE STRAW

by Dot Wilbur

Now is the time many of us are gloating over the incredible beauty around us that we have helped create. We want to beautify our surroundings and it's natural to want to do so with plants—we call this landscaping.

Few of us will dispute the value to the home landscape of mulch, and few will argue that pine needles make attractive, colorful, long-lasting and tidy mulch.

Last week I had dinner with a colleague of mine, Julie Moore, who works for the North Carolina Natural Heritage Program. She had just come from a meeting concerning the unknown effects of the pine straw industry in North Carolina.

In the Sandhills area of North Carolina where the long leaf pine grows, there is a burgeoning pine straw industry—from large operators who take tractors with big rakes into a forest, rake the straw into rows and bale it right on the spot—to individuals with pitch forks and a pickup who can moonlight for a few hours raking and sell to another person who bales the pine needles and sells to our garden supply stores.

It never occurred to me that there was anything wrong with this practice. We rake leaves from our lawns and use them for mulch—what's the matter with buying pine straw for mulch?

Several things can be. After we rake leaves from under deciduous trees and uncover our beautiful green grass, we are careful to fertilize both the lawn and the trees.

Some unscrupulous pine straw wholesalers are scalping the long leaf pine forests. Those large rakes and even the pitch forks are not only removing the natural fertilizer for the pine trees, they are taking the tree's natural mulch away, thus increasing water loss from the already sandy, porous soil; they are destroying the plant diversity of the region, and very importantly, the raking eliminates the fuel for the controlled fires needed for good forest management.

Julie has some suggestions for alternatives to buying pine straw mulch. To reduce the tremendous percentage of yard waste that ends up in our landfills, let's use the wood chips from yard pruning. Many of our towns let us have leaves now; perhaps we can get them to begin chipping brush so that we can use that for mulch. It may even be worth your while to purchase a shredder, by yourself if you have a sizable property, or with neighbors for a community project.

If we want healthy pine trees, and beautiful yards, high quality lumber, enough paper, and wonderful vegetable gardens, we're just going to have to be more resourceful and less destructive!

Dot Wilbur coordinates activities for the North Carolina Botanical Garden. She also edits and illustrates the NEWSLETTER and writes and delivers a weekly radio spot on WUNC radio. This article is from one of her scripts. Dot may be heard in two rather flexible time slots: some time shortly after 8 A.M. and shortly before 4 P.M. on Mondays.

ECOLOGICAL CONCERNS ABOUT PINE STRAW RAKING IN SOUTHEASTERN LONGLEAF PINE ECOSYSTEMS

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Raking of longleaf pine (*Pinus palustris*) leaf litter, or "pine straw," has become a large and profitable business in North Carolina. Baled pine straw brings high prices as mulch for gardens and landscaping. Raking is regarded as an immediate and ongoing source of revenue for landowners, with little investment. It can provide significantly greater (and more regular) income for a landowner than harvesting the pine on the land. Consequently, pine straw raking is now almost ubiquitous in longleaf pine stands, being practiced on state forests, state game lands, U.S. military bases, national forests, private estates, and large and small private holdings. The stands best suited to pine straw raking are level, even-aged longleaf pine stands with little understory or shrub layer. Raking has concentrated on these stands, but as the price of pine straw has risen, raking has been extended to natural longleaf pine communities, and even to sites set aside for natural area or wildlife protection.

Although pine straw raking is a relatively new activity and little research has yet been completed on it, existing evidence supports a number of concerns about its immediate and long term effects on longleaf pine ecosystems. It is not surprising that pine straw mulch should have beneficial effects in the natural stands from which it comes, as well as in landscaped sites for which it is sought.

The primary concern among foresters has been the potential for impact on tree productivity. McLeod, *et al.* (1979) found growth reduction in longleaf pine for 1 to 2 years after a single episode of pine straw removal in a young plantation. Ginton, *et al.* (1979) found increased water stress in the raked stands and suggested this was the cause of the immediate reduction in growth. This experimental raking was done with pitchforks rather than the normal tractor-mounted rake; only "red straw," the most recent year's litter, was removed; and the stands were raked only once. This was a mild treatment compared to most operations in North Carolina in that it did not remove all the litter and apparently did not disturb the soil.

Another likely cause of loss of tree productivity is nutrient removal. Over a century ago, a German forester found that removal of leaf litter from Bavarian forests for agricultural purposes was removing sufficient nitrogen to limit tree growth, and recommended the practice be halted (Ebermayer 1876). Both of the above papers on pine straw raking raised concerns about nutrient removal. In longleaf pine systems, phosphorus rather than nitrogen is usually the most critical, or limiting, nutrient. Dr. Larry Morris of the University of Georgia (pers. comm. to Julie Moore 1989) estimated that raking over a 25 year period would remove 325 lbs./acre of nitrogen and 25 lbs./acre of phosphorus. This is more than double the amount that would be removed by harvesting all the trees, and would significantly decrease productivity. He recommended fertilizing stands that were continuously raked.

An additional concern for raked areas is erosion of the exposed soil. The loose, sandy soils in sandhill areas are particularly susceptible to erosion.

One almost universal raking impact in natural communities is damage to the herb layer. Many raking operations use a tractor-mounted rake to pull the pine straw into rows, where a mechanical baler loads it. The rakes tear and uproot grasses and herbs, and sometimes dig into the soil. Because so many herbs in these communities are typically slow to regenerate, the damage is cumulative, with progressive loss of ground cover and species richness (i.e., number of species) at each raking. While pitch fork-based operations are less destructive, they too involve some damage. Vegetation samples by the ongoing North Carolina Vegetation Survey found 13 to 40 species of vascular plants/tenth-hectare plot in raked areas, while similar, unraked areas had 65 to 140 species/tenth/hectare.

Longleaf pine communities, particularly on moist sites, are known for their high species diversity. At a scale of 1 square meter, species richness in mesic coastal plain savannas exceeds all other North American plant communities studied (Walker and Peet 1983). At scales of 100 and 1000 square meters, species richness in moist, frequently burned sites in the Sandhills region can be as high as 100 and 130 species respectively, values which exceed any previous reports for temperate North America (cf., Peet 1978). Many of these species are rare or endangered, and many more have become uncommon with the decline of their habitat. In addition, the seeds of legumes, grasses, and other herbs are important food sources for wildlife in these habitats. In North Carolina, many areas raked for pine straw for the past decade are nearly devoid of herbaceous plants, especially legumes and grasses; elimination of these components is certain to have negative effects on wildlife species, including important game species such as quail.

Another serious effect on pine straw raking is the disruption of controlled burning programs. Numerous studies and observations have shown that longleaf pine communities are dependent on periodic fire to retain their natural nutrient cycling, their high diversity, and to allow reproduction of many of the component species. After raking, most strands have too little fuel to carry a prescribed fire. While some sites may initially have sufficient grass to carry fires, the mechanical destruction by the rakes eventually removes native grasses.

The long-term removal of nutrients by pine straw raking is a concern in natural communities as well as plantations. The effects of such removal on particular species or on the community are not known. It should be noted, however, that the effects of fertilization are also likely to be detrimental. A five-year study in North Carolina and Mississippi by a team of researchers headed by Dr. Robert Peet of the University of North Carolina (pers. comm. 1990) has shown that fertilization results in the gradual elimination of species and a loss of small-scale and large-scale diversity in coastal plain savannas. This result is consistent with a general trend in grasslands worldwide, where fertilization leads to a decline in species richness (Peet, *et al.* 1983). Fertilization should not be undertaken in areas designated to preserve natural conditions.

Another concern about pine straw raking in natural communities is the damage done by some of the practices used to develop stands for raking. Such preparation may involve building roads and removing hardwood trees, principally scrub oaks, by herbicide use. While removal of an unnaturally dense hardwood layer may be desirable in some longleaf pine communities, the use of herbicides or

heavy equipment is likely to be destructive. The most commonly used herbicide, Velpar, is reported to kill a number of hardwood species. Its effects on the herb species in these communities have not been studied; however, aerial application has been observed in two instances to kill not only all hardwoods, including huckleberries (*Gaylussacia* spp.) and blueberries (*Vaccinium* spp.), but also wiregrass (*Aristida stricta*).

Once the dominant vegetation over much of the Southeast, longleaf pine-dominated natural communities and many of their components are becoming endangered elements of natural diversity. Lack of fire, replacement by plantations, and conversion of land to other uses have destroyed or severely degraded most of this once-vast resource. Pine straw raking represents an additional threat to the remaining natural community sites. While it does not destroy the trees, it appears that continued raking degrades and impoverishes the community. It is a particular threat to the dominant wiregrass or other grasses. Clewell (1989) described the current plight of wiregrass:

“Until a few decades ago, wiregrass was probably the most abundant species in longleaf pinelands and associated herb bogs and prairies within its broad range of geographic distribution. Its shallow root system makes it especially susceptible to modest soil disturbances. Its negligible reproductive capacity makes regeneration particularly difficult.... With it may be doomed an undetermined but rather large number of associated species that rarely occur except with wiregrass. Wiregrass is the keystone species for determining the natural fire regime.... The continuing demise of wiregrass threatens the ecological integrity of all longleaf pine-wiregrass lands and other wiregrass communities.”

While many factors are involved in the decline of these ecosystems, pine straw raking represents an additional important but as yet little-known threat. It may be appropriate for dense old-field and plantation stands in which most components of the community have already been lost, but should be avoided in areas which retain natural characteristics. Pine straw raking should not be regarded as a harmless cure for financial problems; extraction of “brown gold” is accompanied by a long-term degradation of ecological systems. On public lands in particular, this degradation should be unacceptable to foresters, wildlife biologists, conservationists, and the public.



“The earth’s vegetation is part of a chain of life in which there are intimate and essential relations between plants and the earth, between plants and other plants, between plants and animals. Sometimes we have no choice but to disturb these relationships, but we should do so thoughtfully, with full awareness that what we do may have consequences remote in time and place.”

—Rachel Carson, from *SILENT SPRING*

THE NOMENCLATRURAL AND TAXONOMIC STATUS
OF THE SANDHILLS BLAZING-STAR:
A PREVIOUSLY MISUNDERSTOOD ENDEMIC WILDFLOWER

by Milo Pyne



The native North American genus *Liatris* (of the family Asteraceae) is a group of common, showy, roadside fall wildflowers. The genus is commonly known as blazing star or gayfeather. It contains approximately 35 perennial species, and has been used in herbal folk-medicine and planted in wildflower gardens. It was noted by Rickett (1967) that its taxonomy has been a source of vexation and confusion for the amateur and specialist alike: "The genus is easily recognized, but the species have been—and may be—badly confused. The reason for this is their propensity for crossing in nature, with the formation of plants with intermediate combinations of characters." This confusion has led to a failure to appreciate properly the significance of a well-known endemic wildflower of the Carolinas, the sandhills blazing-star. This plant has either passed as part of another taxonomic entity, or has masqueraded under another scientific name. Several noted botanists either recognized it and never published a name for it, or knew it as a separate plant but didn't realize that it lacked its own scientific name. Herein lies an interesting story of the history of southeastern Botany. The moral of the tale is that our region's flora is not as well known as we would like to believe.

The common blazing-star of the counties of the fall-line sandhills is treated as an endemic in the Vascular Flora of the Carolinas, and it passes under the name of *Liatris regimontis* (Small) K. Schumann. When Dr. Jon Stucky and I were beginning some investigations in the genus, this apparent contradiction caught our eye: why would a plant endemic to the sandhills be named after King's Mountain, of Cleveland County, N.C., a mountainous geological feature of the western Piedmont? The solution to a question of this kind involves several lines of

research; literary, historical, and phytomorphological. A quick survey of the literature revealed that the type collection of *Liatris regimontis* was in fact made on King's Mountain, but that plants identified by this name had only rarely been collected since then from the area of the Piedmont-Blue Ridge interface. The plants bearing this name at the UNC Herbarium (on which the data in the Vascular Flora of the Carolinas is based) were all from the sandhills counties. To further compound the mystery, all of the specimens of the sandhills blazing-star in the NC State University Herbarium were found to bear the name *Liatris carinata* (Small) Coker. These NC State collections were made or annotated by Dr. Robert Godfrey, presently of Florida State University, during his tenure as Herbarium curator at NC State.

The name *Liatris carinata* bears its own interesting history. Appearing first as *Laciniaria carinata* (a now-rejected generic name) in Small's 1903 Flora of

the Southeast, it was transferred to *Liatris* in 1912 by Dr. W.C. Coker in his Flora of Hartsville S.C. When it appeared in Small's Flora, it was apparently inadvertently left out of a list of new species printed in the back of the volume. We were able to see Dr. Coker's collection of the plant he collected at Lake Hartsville, which is in the UNC Herbarium. It is of the sandhills plant, but whether Coker's use of the epithet *carinata* is valid depends on what was originally intended by Small when the epithet was first used (in 1903).

The first modern survey of the genus *Liatris* in its entirety was published by Dr. L.O. Gaiser in 1946. This Canadian investigator began her systematic work as a necessary prologue to an effort to determine the chromosome numbers of the genus (which proved to be disappointingly uniform). Apparently most of her work was conducted with the benefit of seeding the plants of the southeastern United States in the field, and without any understanding of their ecology or the nature of southeastern plant communities. Despite these shortcomings, her work has justifiably affected all subsequent treatments and investigations. She noted that *Laciniaria carinata* was described by Small in his 1903 and 1913 Flora, and has been included in synonymy under *L. secunda* in his 1933 Manual. She justifiably felt that the material bearing the name *L. carinata* was generally more closely related to *L. regimontis* than it was to *L. secunda*, and therefore placed *L. carinata* in synonymy under *L. regimontis*. She did not consider that the plants were worthy of specific, or even varietal, distinction. Her publication is apparently the last place that the name *L. carinata* appeared in print, and it is not included in current lists of nomenclatural synonymy.

The regional taxonomic literature on the Asteraceae treats *Liatris regimontis* as did Dr. Gaiser: as a wide-ranging plant, with locations in both the western Piedmont and the Coastal Plain. The Southeastern treatment by Arthur Cronquist (1980) lists the name *Liatris graminifolia* var. *smallii* in synonymy with it, although Cronquist's *L. regimontis* is a very different plant from *L. regimontis* as treated by Ahles in the Vascular Flora of the Carolinas. This uncertain and confusingly varied application of the name *L. regimontis* led to our thorough taxonomic and nomenclatural investigations of the sandhills blazing-star, and to an appreciation of its proper place in the flora of the Carolinas.

In the absence of consensus regarding the proper application of scientific names of a plant, the nomenclatural type specimen must be sought and compared with current material of the plant under investigation. This is necessary because the correct use of any plant name is dependent on its being linked to a particular individual specimen of the plant, which is the type specimen. As the current concept of nomenclatural types was codified after Small's Flora and Manual were published, he did not follow this convention. It is accordingly incumbent on current workers to examine what may be several possible type specimens and choose one to retroactively designate as the type. This is known as "lectotypification": the chosen specimen is known as a lectotype.

The holotype and one isotype of *L. regimontis* were also obtained from the Herbarium of the NY Botanical Garden, as well as the holotype of *L. graminifolia* var. *smallii* (Britton) Fernald & Griscom. This latter name is included in synonymy under *L. regimontis* by Cronquist (1980). In order to understand Small's concept of his species *L. carinata*, its type was also requested on loan from NY. In response to this latter request, five specimens were sent from NY which are relevant to

the application of the name *L. carinata*. Four of these were inscribed by Small '*L. carinata*,' and represent possible lectotypes for this name. The other sheet was an M.A. Curtis collection of the sandhills plant from South Carolina combined with an A.P. Garber collection of *Liatris pauciflora* from Florida.

It immediately became apparent that the *Liatris* of the sandhills was very different from the type material of *L. regimontis*. In particular, there are differences in the number of flowers per head, the width of the head, and the shape of the phyllaries, or bracts, of the inflorescence. The sandhills plant has 8-9 flowers per head, which measures 3-4 mm across. In contrast, *L. regimontis* has 10-12 flowers per head, and the head measures 4-5 mm across. The most telling character is phyllary shape; the sandhills plant has ones which are sharp-pointed at their tips, and are in fact rolled-up at the edges, causing a tapering effect. The phyllaries of *L. regimontis*, in contrast, are generally blunt, and eroded-looking at the tip. Both of these morphologies are distinct from that of the phyllaries of typical *L. graminifolia*. This plant's phyllaries are rounded at the tip, with a pale hyaline margin which goes all the way around it. It was also apparent that the type material of *L. graminifolia* var. *smallii* was very similar to that of the original *L. regimontis* from King's Mountain. The fact that the sandhills material was not compatible with the types of *L. regimontis* meant that this name could not be correctly applied to the sandhills plant.

So the next part of the problem was what is the correct name of the Sandhills plant, if it is not *L. regimontis*? This would require resolving the lectotypification problem mentioned earlier. Since Small had not cited a particular specimen when he published the name *L. carinata*, any one of the four specimens could be designated by subsequent workers in the genus as a lectotype. Of the four specimens received from New York which were inscribed by Small as *L. carinata*, two were of the Sandhills plant; these were both collections made by Moses Ashley Curtis, a famous early botanist of the Carolinas. He had resided in the area of the sandhills of South Carolina, near Society Hill, from 1847 until February 1857 (Berkeley & Berkeley 1986). One of his sheets was inscribed '*L. oxylepis*, ined.' The meaning of this inscription was that Curtis had recognized these plants as distinct, and had labeled the sheet as such, but had apparently not published the name. He did make collections of the plant in North Carolina as well, but for some reason did not recognize them as the same plant, because the North Carolina material is not labeled with this name, and the name did not appear in his 1867 list of the Flora of North Carolina. Curtis' interests shifted to fungi in his later years, and apparently he never got back to the Sandhills' blazing-star, and neither did he alert Asa Gray, or other northern botanists with whom he corresponded, about the plant's distinctiveness. (I also became curious about Curtis' travels, because one of his *Liatris* collections from Society Hill was made in September, 1857. How did he collect this Fall wildflower there since he had moved back to Hillsborough the previous February? Apparently he made the collection while traveling from Hillsborough to Montgomery, Alabama, to attend a meeting to discuss the founding of The University of the South at Sewanee [Berkeley & Berkeley 1986].)

So, since Curtis' name was never published, we must return to Small's resolution of the problem. Upon what plant or plants did Small base his 1903 description. The confusion over the application of the name *L. carinata* arose in part

from the similarity of our sandhills plants to another *Liatris* of an overlapping sandhills distribution, *Liatris secunda* Elliott. Descriptions of *L. carinata* and *L. secunda* never appeared together in the same work by Small. Apparently Small and E.J. Alexander, who treated the genus in the 1933 Manual were both unaware that they were dealing with two different Sandhills plants. Apparently in 1903 (and 1913) Small was unaware of the name *L. secunda*, or uncertain of its application. In 1933, Alexander apparently decided that this name better applied to the plants in question, and so placed *L. carinata* in synonymy, as *L. secunda* had priority. However, as Gaiser (1946) realized, *L. secunda* (with a pubescent stem and large corollas [10-12 mm] and heads (1.5-2 cm)) is not the same plant as the Sandhills element, which has smaller corollas (7-8 mm) and heads (1 cm) and a smooth stem. The phyllaries of both are sharp-pointed (acuminate), and they share the same habitat and range (pinelands, North and South Carolina) as well as the spicate and secund (one-sided) inflorescence, the latter aspect of which is a result of a phototropic response when the stems are reclining. This generally similar appearance necessitates careful observation, but to anyone who has seen both of these plants in the field, they are undoubtedly distinct.

So, returning to our four possible type specimens for *L. carinata*, on what basis does one choose a lectotype? It must be a plant which the describing author used as a basis for the description. As all four are inscribed by Small, these all qualify. Even though any one could be chosen, the best choice is the one which best fits the original written description. Two of the four sheets were collections of the sandhills plant; to choose one of these would validate the name *L. carinata* as applying to the sandhills plants. One of the sheets was apparently an immature collection of *L. regimontis*; this choice would not be acceptable. The other sheet was actually *Liatris secunda*; to choose this one would make *L. carinata* a synonym for *L. secunda*, and necessitate publishing a new name for the sandhills plants. Even though my first impulse was to choose the easier course of simply validating the use of *L. carinata*, advice from other more experienced botanists and an article on the subject by Rollins (1972) led to the conclusion that the right thing to do was choose the sheet of *L. secunda* as the lectotype of *L. carinata*.

Before we complete our analysis of the possible type material of *L. carinata*, let us look at how this name was applied to the Sandhills plants by Dr. R.K. Godfrey. Dr. Godfrey, a former curator of the NC State Herbarium is a well-recognized authority on the genus in the Southeast, and his studies regarding the North Carolina species of *Liatris* spanned at least eleven years. Specimens of the Sandhills plants collected by him in 1939 and determined as *Liatris carinata* (Small) Coker have been seen, and annotation labels with this same determination dated 1950 are also frequently encountered in regional herbaria. In all these cases, his concept of this entity is compatible with Ahles' concept of *L. regimontis*. A publication on *Liatris* in the Journal of the Elisha Mitchell Scientific Society (Godfrey 1948) treated the North Carolina members of the genus in accordance with Gaiser's work published two years previously. Godfrey's disposition of the Sandhills plants was the same in 1939 as in 1950; he regarded them as *L. carinata* (Small) Coker, and labeled or annotated them as such. However, in 1948, he followed Gaiser and included them with the plants of the western Piedmont as *L. regimontis* (Small) K. Schum.

From the table below, it can be seen that in regard to several characters, in-

cluding stem pubescence (the first character cited by Small), the Chapman specimen (D) best fits the description. Regrettably, neither Small nor Alexander apparently understood that the type material for *L. carinata* Small represented more than one taxon; because Small's annotation of the Chapman sheet ("=*L. secunda*") is undated, we may never know at what point he realized the identity of this specimen, or whether he realized the other sheets were not the same plant. In any case, it is apparent that the 1933 placement of the name *Laciniaria carinata* in synonymy under *L. secunda* was based upon the correct identification of this sheet, along with the failure to realize that certainly the two Curtis collections (if not the Gibbes specimen) were another, yet undescribed species.

Table 1—comparison of Small's description of *Laciniaria carinata* Small with the four specimens which could serve as a lectotype for this name.¹

Character states:	Specimens: ²			
	A.)	B.)	C.)	D.)
Small's characters:				
stem finely pubescent	-	-	-	+
(leaf) blades glabrous	-	-	-	+
heads 3-5 flowered ³	-	-	-	+
involucres 8-10 mm high	-	-	-	+
bracts ovate-lanceolate to oblong and linear	-	-	-	+
pappus-bristles plumose ⁴	-	-	-	+

¹Phrases given are from Small (1903). A "+" indicates that the plant in accord with the description, a "-" that it is not.

²Specimens: A) M.A. Curtis, North Carolina, the sandhills blazing-star; B) M.A. Curtis, South Carolina, also the sandhills blazing-star; C) L.R. Gibbes, South Carolina (?), *L. regimontis* (?)¹ D) A.W. Chapman, North Carolina, *L.*

³A, B, & C all have 8-9 flowers per head, in contrast to the description.

⁴The pappus-bristles in A, B, & C are shorter and less feathery than in D.

Based on this evidence, the Chapman sheet was selected as the lectotype for *Laciniaria carinata* Small. The other sheets to which Small applied this name cannot be paralectotypes, as they are not the same plant. This decision makes *Laciniaria carinata* Small and *Liatrix carinata* (Small) Coker synonyms of *Liatrix secunda* Elliott. This is true despite Coker's application of the name to the plants of the Sandhills under consideration. The other effect of this decision is to essentially invalidate the identifications and annotations of Godfrey; because he never published his conclusions about the name for these plants, this should not cause any confusion.

Dr. Stuckey and I decided to give the name *Liatrix cokeri* to the sandhills blazing-star. This is because Dr. Coker was a native of Hartsville, S.C. and recognized the distinctiveness of the plants. Even though, unfortunately, our resolution of the lectotypification problem makes his combination inapplicable to the plants in question, Dr. Coker deserves recognition for his contributions to the botany of the Carolinas. The only other vascular plant bearing the epithet *cokeri* is a *Lycopus*

species named by Ahles. In addition, there is a species of the Fungal genus *Amanita* bearing this appellation.

The resolution of this problem was a memorable experience for me, and provided an opportunity to work with some of the intricacies of nomenclature, and gain an appreciation for the history of the continuing botanical exploration of the Carolinas. Professional papers describing the new species, and detailing the resolution of the lectotypification problem will appear in the botanical journal *Sida* this fall.

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Coreopsis tinctoria

THE RALEIGH-DURHAM PRESERVATION GARDEN

by Carole Cameron (edited by Benson Kirkman)

The Raleigh-Durham Preservation Garden is located adjacent to the office of a granite mining operation owned by Martin Marietta Aggregates in Raleigh, NC. The garden began nine years ago when Margaret Reid, a local preservationist and "plant rescuer," asked permission to rescue some plants from the site prior to initiation of mining. Mrs. Reid completed her initial rescue and continued to collect plants from the site for many years. Through the process, she became friends with Carole Cameron, landscape designer with Martin Marietta, and Ricky Lee, plant manager at the quarry. In 1989, their efforts led to permission from management to permanently establish the Martin Marietta Preservation Garden.

The mine site is approximately 300 acres, consisting of very steep rolling topography and many north-facing slopes and plentiful drainage ways. There is an abundance of Pinxter Flower Azaleas (*Rhododendron periclymenoides*) and occasional Mountain Laurel (*Kalmia latifolia*). One of the hills is affectionately known as "Hepatica Hill." Another is a solid carpet of Dogtooth Violet (*Erythronium americanum*) and Dwarf Crested Iris (*Iris cristata*).

All plant material in the garden occurs on the site, which is dominated by a mature Beech-Hickory climax forest, with some slopes being uncut for at least 150 years. The garden itself is in an area near the office which probably was cut about 80-100 years ago. Beech trees are just beginning to re-establish in this area.

The soils in the garden are typically Piedmont red clay overlaid with various depths of decomposed leaf mold. These soils were carefully prepared for the transplanting according to Margaret Reid's instructions. Scrub and roots were removed, and composted horse manure was added (but no other fertilizer). Transplants were dug with as much soil as possible, and losses have been minimal.

Each bed in the garden tries to include a succession of species to provide seasonal interest and mimic the "natural landscape." Winter interest is provided by the evergreen foliage of Christmas Fern (*Polystichum acrostichoides*), Mountain Laurel, Rattlesnake Plantain (*Goodyera pubescens*), and Wild Ginger (*Asarum arifolium*). Early spring is evidenced by Liverleaf (*Hepatica americana*) and Dogtooth Violet, with a succession of Pinxter Flower, Maple Leaf Viburnum (*Viburnum acerifolium*), and Atamasco Lily (*Zephyranthes atamasco*). Summer is highlighted by the bloom of Doll's Eyes (*Actaea pachypoda*) and Crane-fly Orchid (*Tipularia discolor*). Fall color is provided by the changing leaves of the Beech forest and species such as Hearts-a-Busting (*Euonymus americanus*). To date, there are 75 species in the garden.

The Martin Marietta Preservation Garden is unique, being located at an operating mine. The positive impact on visitors is surpassed by the pride and enthusiasm exhibited by the Martin Marietta employees. Since it located at an operating quarry, the garden is currently open for visits by special arrangement. For more information on visits, call 782-0002.

In July of this year, the Martin Marietta Preservation Garden was presented the American Native Plants Award for exemplifying the creative use of native plants. The award is sponsored by the Landscaping with Native Plants Conference at Western Carolina University. The judges and those in attendance were im-

mensely impressed with the overall efforts of Martin Marietta's employees and Margaret Reid. Those who have visited the garden are even more excited.



Smartweed
Polygonum pensylvanicum

NEW RECREATION AND NATURAL HERITAGE TRUST FUND

by Charles E. Roe, Coordinator, N.C. Natural Heritage Program

Go ahead and humor yourself. Make a public statement and display a little vanity. Buy a personalized license plate for your automobile. It's for a good cause.

Whatever might motivate you, the time is right to add \$20 to your annual automobile license plate fee and order a personalized plate. Display that set of words, letters, or numbers unique to you on your next license plate, and gain the satisfaction that the proceeds will contribute to roadside wild flower plantings and natural areas preservation.

For several years, \$10 from each annual purchase of a "personalized license plate" have supplemented the budgets of the state's Division of Travel and Tourism and the N.C. Department of Transportation (DOT) to plant and maintain roadside wild flower displays and to landscape and provide access for handicapped persons at highway welcome centers. The annual revenue for those programs was about \$1.5 million. Most of us generally appreciate DOT's efforts for highway beautification.

The North Carolina General Assembly in the fall of 1989 added another \$10 to the annual fee for personalized plates and directed DOT to transfer those additional revenues to the state's new Recreation and Natural Heritage Trust Fund. The legislature expected that the increased fees would provide another \$1.5 for use by state agencies in identifying, acquiring, and protecting important natural areas.

The Natural Heritage Trust Fund was first established on a pilot basis in 1987. The enabling legislation was extended in 1989 to continue the fund. Personalized license plate fee receipts after the first nine months of collection are on target to produce at least \$1.5 million for the fund in the first year. Grants from the fund are awarded by a nine-member board of trustees appointed by the Governor, Lt. Governor, and Speaker of the House. The current chairman is Hamilton C. Horton, Jr., from Winston-Salem. The board is composed of distinguished and conscientious conservationists from across the state.

The primary authors of the Natural Heritage Trust Fund legislation were Senators Marc Basnight and Lura Talley. The program was enacted with the active support of virtually every conservation group in North Carolina.

State agencies are invited to apply for grants from the fund. Already the trustees have awarded grants for a variety of important projects. In most cases, the grants have been used to match other sources of federal and state funding and to create much larger dollar totals. Early grants have been given to enable the N.C. Division of Coastal Management to buy tracts for its new Buxton Woods reserve in Dare County, which is the largest remnant of maritime forest on our state's barrier islands. The N.C. Division of Parks and Recreation has received two grants to buy land along the New River, a state and nationally-designated scenic river in Ashe and Alleghany counties. Grants to the N.C. Wildlife Resources Commission have enabled the acquisition of the Wolcott lands on the Cove Creek tributary to the Green River in Polk County and an additional tract for the new Roanoke River wildlife conservation area in Martin County. The trustees will soon be reviewing another set of grant applications.

The Natural Heritage Program, a unit of the State Parks division, is also a reci-

ipient of grants for use in inventories and planning for protection of important natural areas. It has been awarded grants to sponsor regional surveys to locate the best remaining examples of longleaf pine forests and mountain wetlands. Both are threatened ecosystems and harbor nearly 150 rare and endangered species of native plants and animals. Preliminary results from both studies have demonstrated the grave jeopardy to both ecosystems, but have focused efforts to protect the few surviving prime examples.

Most recently, the trustees for the Natural Heritage Trust Fund awarded \$30,000 in cost-share grants for the state Natural Heritage Program to supplement other funds available from private sources and local governments. The small grants will be used to help conduct inventories of important natural areas in the Lumber River and Yadkin River corridors, in Polk, Jackson, and Macon counties, and to initiate surveys elsewhere in the southern Blue Ridge region. The average cost to conduct a general survey of natural areas in a single county is \$20,000. We hope the success of these cost-share grants will serve to generate more local interests and will be extended with more grants in the near future.

While the Natural Heritage Trust Fund is off to an excellent start, it could become even more prosperous with greater publicity and promotion. Initial opposition to the program from the Department of Transportation resulted in its reluctance to promote the sales of personalized license plates. Revenues for the program will likely increase when DOT places fliers in the annual billings for license renewals to explain and promote the purchase of personalized plates.

Many more North Carolinians may be willing to purchase their personalized license plates if they know that the fee is going to protect natural lands and plant flowers on roadsides. If you like the results of this program, you can support it by helping to spread the publicity and with your own display of a "little vanity" on your personal vehicle.



Doll's Eye
(*Actaea sp.*)

SUMMARY OF SPRING FIELD TRIP

(April 7-8, 1990)

by Eric Hawkins

After meeting in Sanford, our drive to Broadway was made enjoyable by a hint of green in the leafing trees and an occasional cloud of white from flowering dogwoods. Our destination was Juniper Springs Natural Area, known for its stand of large Atlantic white cedar (*Chamaecyparis thyoides*) and several other botanical treasures.

After descending into a boggy area we were in the shady niche of evergreens such as white cedar, tangles of smilax and a ground cover of sphagnum moss. Julie Moore explained that this stand of white cedar is significant due to its location on the western edge of its range, and the age of the trees with some over 200 years old. Some of the other water loving wildflowers seen were green adder's mouth (*Malaxis unifolia*), the endangered bog spicebush (*Lindera subcoriacea*, Collins' sedge (*Carex collinsii*) and pitcher plants (*Sarracenia purpurea*) in flower despite the low light conditions. Draped over a shrub, a green snake was seen basking in a shaft of sunlight and was not about to leave the warmth, even with peering photographers.

As we rose from the wetland to the upland we began to see longleaf pines again, many of which were scarred from a history of turpentine. A Carolina anole went almost unnoticed due to this lizard's ability to camouflage itself by changing from green to brown.

After an enjoyable picnic at Juniper Springs Church we departed for White Pines Natural Area, located at the confluence of the Deep and Rocky Rivers. We were informed that this preserve, protected through the efforts of the Triangle Land Conservancy, contains the southeasternmost disjunct population of eastern white pine (*Pinus strobus*).

A mild winter's end seemed to have prompted an early flowering season for many wildflowers; however, there were still plenty to see on the scenic bluffs and flood plains. Among the many wildflowers enjoyed were: spring-beauty (*Claytonia virginica*), windflower (*Thalictrum thalictroides*), jack-in-the-pulpit (*Arisaema triphyllum*), crested dwarf iris (*Iris cristata*), wild ginger (*Asarum canadense*), giant chickweed (*Stellaria pubera*), saxifrage (*Saxifraga virginien-sis*) wild geranium (*Geranium maculatum*) and buckeye (*Aesculus sylvatica*). Ed Swab led us to the preserve's two species of trout lily (*Erythronium americanum* and *E. umbilicatum*) to show us the differences between the two.

There was excitement over the discovery of a species of phlox never seen here before. Benson and Ed discussed the identity of the single plant found. The conclusion was blue phlox (*Phlox divaricata*), which is interesting because its range in North Carolina is primarily in the mountain region.

At the business meeting Saturday night, Ed gave an enjoyable slide presentation on the flora of the White Pines Natural Area, showing much time spent there with flowers from spring to autumn. Ed is a recipient of the Tom and Bruce Shinn Scholarship Fund.

Sunday morning we were greeted with chilly air and frosty windshields as we prepared to leave for Raven Rock State Park. Upon arrival we began our hike, soon finding a sluggish zebra swallowtail warming in the morning sun. Tom

Howard explained the swallowtail's dependence on the pawpaw tree, it being the only food for the larvae.

As we proceeded down the trail there were two species of wild ginger (*Hexastylis*) with shy flowers hiding under the leaf litter. Nearing a small stream, ferns with their fresh green foliage grew in abundance. Scattered pinxter-flower (*Rhododendron nudiflorum*) added to the scene a pale pink color. It seemed strange seeing the atamasco lily (*Zephyranthes atamasco*) flowering on a slope instead of its normal food plain habitat. Closer to the Cape Fear River were blue star (*Amsonia tabernaemontana*), buckeye (*Aesculus sylvatica*) and a rare annual phacelia (*Phacelia ranunculacea*).

Tom then led us off the trail to a very rich and densely flowered bluff. Here we saw a most impressive show of foam flower (*Tiarella cordifolia*) appearing to cover a large section of the bluff with a sea of white flowers. More widely scattered were mayapple (*Podophyllum peltatum*), spiderwort (*Tradescantia* sp.) and maidenhair fern (*Adiantum pedatum*). With a closer look we saw the unusual cancer-root (*Orobanche uniflora*), a parasitic plant containing no chlorophyll.

Descending the steps down the massive rock cliff we were soon at the Cape Fear River. A large rock by the river made a nice place to take a break, as well as a great place to view an osprey on its perch on the other side of the river. With lunch time nearing we began taking the many steps back to our cars.

Thanks to the beauty of our natural world, and to the field trip planners and leaders for getting us all together, this was a great and memorable meeting.

PURCHASING NATIVE WILD FLOWERS AND PLANTS— GOOD NEWS FROM TENNESSEE

by Benson Kirkman

The following is an excerpt from a resolution passed at the February 1990 Tennessee Nurseryman's Short Course:

BE IT RESOLVED, That the Tennessee Nurseryman's Association goes on record as supporting and recommending that "native" wild flowers and plants be sold as nursery propagated and produced and discourages the collecting of such from the wild.

FURTHERMORE, That the Tennessee Nurseryman's Association encourages further education for:

- 1) The collectors of these plants should be informed and educated on propagating rather than collecting;
- 2) Sellers (mail order plant sellers) should be encouraged to pay a premium for these wild flowers and plants.

The Eastern Native Plant Alliance and the N.C. Wild Flower Preservation Society applaud the Tennessee Nurseryman's Association for this resolution. A list of nurseries selling only nursery propagated and produced plants is available from the N.C. Botanical Garden (please enclosed a stamped self-addressed envelope with your request).

BOARD MEETING MINUTES
(February 25, 1990)

The Board of the North Carolina Wild Flower Preservation Society was held at the home of Nancy Stronach in Wilson, Benson Kirkman presiding.

Gretchen Cozart, treasurer, reported a balance of \$120.26 in the regular account and a balance of \$8,817.04 in the Tom and Bruce Shinn Scholarship fund.

Dr. Ray Noggle reported a balance of \$4,319.07 in the Plant Propagation Handbook account. There are only 140 copies left from the last printing. Revisions must be made and a chapter on propagation written before it is reprinted. June first is the deadline for revisions.

Benson is to write to colleges and universities informing them of our scholarship fund. There is still a problem finding students who wish to use the money.

The spring meeting will be April 7 and 8 at Juniper Springs Natural Area. Harry LeGrand, Ed Swab, and Benson Kirkman will be group leaders. The membership meeting will include a program on the White Pines Natural Area by Ed Swab.

Julie Moore and the Board discussed ways to influence the Department of Transportation's mowing procedures. DOT cuts down native wild flowers and plants flowers from other areas, she says, using our tax money. It was suggested members write their local newspaper editors to ask DOT to protect native plants. This method would be beneficial and would save money.

Larry Early, editor of THE NC WILDLIFE MAGAZINE will help edit NATURAL GARDENS OF NC. The Society will pay for the reprinting of the book and sell it through local book dealers.

Linda Lamm and Nancy Stronach have selected covers for note cards to be printed by the Society. It will cost approximately \$300 to print 500 sets. Each package will contain 10 note cards.

Elvira Howard

Elvira Howard
Recording Secretary



Clematis virginiana

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Ellers, Ms. Kathi W.
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Rinker, Dr. George E.
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Burlington, NC 27215

Tri-County Horticulture Club
c/o N. Wall
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Burnsville, NC 28714

NORTH CAROLINA WILD FLOWER PRESERVATION SOCIETY, INC. Aims & Objectives

The North Carolina Wild Flower Preservation Society was formed on April 29, 1951 by a group of individuals appreciative of native plants throughout the state and region. The purpose of the Society is to promote enjoyment and conservation of native plants and their habitats through education, protection, and propagation.

Spring and fall meetings are held at "natural gardens" across the state. They feature field trips led by knowledgeable plantmen and visits to native plant gardens and nurseries. Members also exchange seeds and propagated plants at these meetings. Other excursions are organized on a local basis throughout the year.

The Society Newsletter, first published in November 1952, is issued twice a year with articles and illustrations by professional and amateur contributors. The Newsletter includes articles on propagation and cultivation of native plants as well as Society activities.

The Society publishes the *N.C. Native Plant Propagation Handbook* that is available for sale at the Botanical Garden or by mail (\$5.00, postpaid).

The Society Scholarship/Grant Fund sponsors research on native plants by undergraduate and graduate students. The fund is supported by member contributions and by gifts and memorials. Applications are made to the Scholarship/Grant Fund Committee for awards in May of each year.

The Society operates through elected officers and trustees and through appointed committees. Members are urged to participate in the workings of the Society. Office space is provided by the North Carolina Botanical Garden in Chapel Hill.

The Society is a nonprofit organization under North Carolina and Internal Revenue Service regulations. Donations are tax deductible.

Correspondence concerning the Society and its programs should be addressed to: North Carolina Wild Flower Preservation Society, Inc., c/o North Carolina Botanical Garden, Totten Center 3375, UNC-CH, Chapel Hill, NC 27599-3375.

MEMBERSHIP APPLICATION

Individual Annual Dues: \$ 7.50
 Family Annual Dues: 10.00
 Sustaining Annual Dues: 25.00
 Lifetime Membership: \$150.00

*Please send this and all address
 corrections to:
 North Carolina Wild Flower
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 Mrs. S.M. Cozart, Treasurer
 900 West Nash Street
 Wilson, NC 27893*

Scholarship Fund Donation: _____

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New Renewal



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