

Native Plant News

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North Carolina Lichens: A National Treasure of Natives

By **James C. Lendemer**, Guest Contributor

Is that a lichen? How did it get there and what causes it? Those questions have probably gone through your mind while botanizing for natives in North Carolina. As a scientist studying lichens I am often asked these questions by passing hikers when they see me sprawled out looking at a rock with a hand lens, or delicately putting specimens in bags covered with seemingly cryptic notations. My colleagues and students get the same questions, which they dutifully answer.

Lichens are fungi that have adopted a novel lifestyle. While some fungi parasitize crops or decompose wood, lichens are unique collaborations between a species of fungus and one or more algae. Together they form a symbiosis that is more resilient to harsh conditions

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Arthonia kermesina

Endangered Perennial Highlighted in Study

By **A. Renee Fortner**, 2014 Shinn Grant Recipient

On June 15, 1957, the botanist Harry E. Ahles was doing field work in a “boggy savanna-like border of a low woodland” in Onslow County, NC. This particular field foray was part of a collaborative effort by botanists at UNC-Chapel Hill to document the plants of North and South Carolina. It was on this day that Ahles encountered an unfamiliar Meadowrue in flower; he later named this new species *Thalictrum cooleyi* Ahles or Cooley’s Meadowrue.

Had Ahles visited the site earlier in the season, he might have missed this delicate herbaceous perennial. Vegetatively, the plant can be cryptic with a rosette of compound leaves which are often obscured by surrounding vegetation. When flow- (Continued on page 13)

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President's Letter



Jean Woods

I have a trillium just out of the ground. Now it is in a sunny, protected place, but really!? February can be cold and snowy here in the mountains and who knows when the next polar vortex might make a visit southward?

Winter can be a great time in the native plant world, even without the astonishing blooms we all love to

see. Joe, my husband, and I take walks and practice our winter tree ID skills. There's a great little guide called, *Winter Tree Finder* that we use and it has really increased our observational skills and our repertoire of trees we can now ID by their buds alone. A hand lens and a small pocket knife are the only other tools you need, and you don't always need them.

Taking a class is another great winter activity. The Botanical Garden at UNCC has classes as part of their Certificate in Native Plant Studies, which are taught year round. In fact, yours truly will be one of the instructors for "History of Botany in the Carolinas," where I will be sharing some of the research I have done on women botanists in America. The Botanical Garden at Chapel Hill also teaches classes in Native Plant Studies and in Botanical Illustration. Our Southeast Coast Chapter received a grant and are offering a series of classes on native plants. The first will be on Jan. 25, taught by Robert Thornhill. There are opportunities across the state. Check out the links below.

UNCC

<https://gardens.uncc.edu/education-events/certificate-in-native-plant-studies/summer-winter-course-schedule/>

UNC-Chapel Hill

http://reg.abcsignup.com/view/view_month.aspx?as=5&wp=289&aid=NCBG

http://reg.abcsignup.com/view/view_month.aspx?as=5&wp=288&aid=NCBG

Southeast Coastal Chapter

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NC Lichens (cont. from p1)

than either one would be alone. The thallus that we see in the wild, the body of the lichen formed from fungus and algae, is actually a miniature ecosystem that provides food and shelter for an entire unseen world of other fungi, bacteria and tiny invertebrates. Without lichens many of these species would not be able to survive. The importance of lichens extends well beyond providing services for tiny forms of life. In fact lichens are central to many ecosystems and arguably our own lives; they break down rocks and consolidate soil so that plants can grow, they are important players in nutrient cycling, they absorb and release moisture to buffer the environment from extreme temperatures, and they even provide vital nesting materials for hummingbirds and form a major food source for reindeer.

It's hard not to be curious about lichens when the trees and rocks wear a heavy, colorful coat. The lofty spruces and firs of the Smokies and Blacks are covered with them, as are the jagged crests of the Craggies and the grassy tops of the Unicois. Down near the coast they drip from the cypress and black gums in the primeval forests of the Alligator River or Great Dismal Swamp, they paint the *Gordonia* in Angola Bay and Croatan, and sit silently with Live Oaks at Buxton or Sabal Palmettos on Smith Island. In the Piedmont the trees and flat rocks are adorned with mosaics, mixtures of species from the highlands and lowlands. From one end of the state to the other, Tapoco to Swansboro, lichens abound. The motto "first in lichens" could be as apt as "first in flight".



Canoparmelia texana

The abundance and diversity of lichens in North Carolina is why I am writing this article. My colleagues and I have worked in the state for nearly a decade, inventorying hundreds of sites and identifying tens of thousands of specimens. We have climbed peaks and slogged through swamps, faced down bears and rattlesnakes and chiggers. We have also traveled back in time, identifying thousands of specimens collected by others over a period spanning more than a century. As a result of all of our efforts we are finally beginning to understand what North Carolina's lichens looked like in the past, what they look like in the present, and what they may look like in the future.

But how many lichens are there? If you've stopped to ponder this question you may have thought there were a few kinds: the gray leafy one, the green leafy one, rock tripe, old man's beard, reindeer moss. But you might not have guessed that there are places where one or two hundred species grow together in the same amount of space it would take to build a ranch home. North Carolina is home to two of these places, hotspots of lichen diversity unlike anywhere else on earth. In the western mountains there are over 1,000 species, more than 800 of them occurring in the Smokies alone. In the eastern low-lying swamps of the Coastal Plain there are over 500 species. More than 400 of them are found on the Albemarle-Pamlico Peninsula and nearby barrier islands.

When my colleagues and I counted up the number of times we have seen each species we found that most of them are rare. In the mountains, more than one third had been

NC Lichens (cont. from p8)

seen only once and nearly 75% were seen fewer than 10 times. The same was true when we looked at the hundreds of sites along the coast. The trend is the same even in the regenerating forests that we have studied in Pennsylvania. Evidently most lichens are rare, regardless of whether you are looking at an old growth forest or one regenerating from recent logging. In North Carolina that means that hundreds and hundreds of species are rare and potentially merit listing as such by the Natural Heritage Program.



Chrysothrix chamaecyparicola

That there are large numbers of rare species may not surprise most people familiar with native plants. However, what surprised us was the number of lichens we found that occur nowhere else. We have now discovered dozens of species that were previously unknown to science; many occur at only a handful of sites in some of the last tracts of mature forests or wilderness areas. There is tiny "Hot Dots" (*Arthonia kermesina*), a lipstick red lichen that grows only on old growth spruces in the very heart of the Smokies. And there is "Carolina Beach Dots" (*Phaeographis oricola*), a crust that covers trees in the few mature maritime forests left on the barrier islands from Hatteras to Smith Island. There are species that have long been known to be special, like the "Rock Gnome" (*Cetradonia linaeris*) that is found on wet, sheltered rocks in the western mountains. There are also species that may have already been lost, such as Catawba Buttons (*Dermisclum oulocheila*), which was only found twice along the Haw and Catawba Rivers in the 1800's.

Trying to imagine a healthy planet without lichens is difficult. Unfortunately landscapes with fewer and fewer lichens are an increas-

ingly common sight. Although stronger together than the individual fungi and algae would be alone, the lichen symbiosis is not invincible. In fact decline and loss of lichens can be among the first signs of environmental change and degradation. Centuries of habitat loss, pollution, and deforestation have taken their toll on lichens all over the world. If you live in an American city you probably only see a dozen or so species on your way to work, which is an improvement from the days before the Clean Air Act when you would have been hard pressed to see any at all.

In the bigger picture of North America and the world, the importance and uniqueness of the lichens hotspots in North Carolina cannot be understated. These are among a handful of places where you can catch a glimpse, just a glimpse, of what our forests east of the Mississippi once looked like everywhere. My goal is not to wax nostalgic or bemoan progress, but rather to point out the contrast between the lichens you see on a hike in the Smokies and a drive on I-95 to Lumberton or US-64 to Plymouth. If lichens are as important as studies have shown they are, then what are the implications of living in a landscape without them?

Conveying the importance, and beauty, of native species can be difficult when the dozen native orchids with their subtle flowers and scents are replaced by two dozen non-natives that rapidly invade and burst with showiness. Many would ask why it matters that we lose a dozen natives if we gain two dozen non-natives? We know it matters, but conveying that convincingly requires a lot of education. Lichens however, present a unique opportunity. When we lose lichen species they are not

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NC Lichens (cont. from p9)

typically replaced by invasive or non-native species. A common species can simply expand to colonize the vacated space, convincing us that uniformity is truly the plague of sameness. Or the space is left abandoned like an empty lot or boarded-up building to remind us of a something vibrant now lost. As we lose native lichens the loss is readily visible to all as naked bark, branches, rocks and soil.

All of the more than 1,000 lichen species in North Carolina are native and many are in trouble. Where these natives presently occur has often been shaped by centuries of past human activities. Many are now further threatened by factors including loss of habitat, pollution, climate change and sea-level rise. The lichens hotspots in North Carolina are unique, not only because of what they can show us but also because they serve as reservoirs for the future. Like seed banks these hotspots hold the genetic material that will allow species to recolonize their ranges if we let them.

Recognizing the importance of lichens to us, and the importance of North Carolina to lichens, is crucial to safeguarding our rich natural heritage. If you have taken the time to read this article, I invite you stop for a moment the next time you are out in looking at natives and think of the lichens past, present and future.

James C. Lendemer is a Post-Doctoral Researcher at the Institute of Systematic Botany, The New York Botanical Garden, and author of *The Lichens and Allied Fungi of Great Smoky Mountains National Park: An Annotated Check List*

Photo Credits (other than author):

Jason Hollinger and Natassaja Noell
Canoparmelia texana (a foliose lichen)
and
Chrysothrix chamaecyparicola (Moonglow)

Endangered Plant (cont. from p1)

ering (June-August), however, Cooley's Meadowrue rises above surrounding vegetation as a 1-m tall, open panicle with separate male and female flowers occurring on different plants (dioecy). The lax panicles are often supported by shrubs such as Inkberry (*Ilex glabra*) and Wax Myrtle (*Morella cerifera*). Despite a lack of petals, male flowers are showy with a striking contrast between distinctive lavender filaments supporting yellow anthers above. Female flowers also lack petals and are slightly less dramatic, with separate carpels of a greenish-lavender hue topped by white, fuzzy stigmas. A female flower has on average 12 carpels, each with the ability to form a single seed that typically matures from late August-September.

A coastal plain endemic, Cooley's Meadowrue was considered rare when first described and later listed as federally



Renee with the first Cooley's Meadowrue plant she had seen in flower.
(Dale Suiter)



North Carolina Native Plant Society

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**We're
Wild
About
Natives!**



Longtime NCNPS member Emily H. Allen in her famous pose on Mt. LeConte. A memoriam to Emily is on page 3.