Native Plant News

NEWSLETTER OF THE NORTH CAROLINA NATIVE PLANT SOCIETY

Native Plant News
Julie Higgie, editor

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INSIDE:

MISSION STATEMENT:

Our mission is to promote the enjoyment and conservation of North Carolina's native plants and their habitats through education, cultivation and advocacy.

Sandhills Gamelands Beauty

By **Will Stuart**

Sandhills Lily with Hummingbird

I confess to having something of an obsession with Longleaf. To passers-by, the Sandhills of the Carolinas may reveal little beyond pine trees and scrub oaks. Pause to look and listen, and the Sandhills reveal well-kept secrets. A patch of Pixie Moss beneath the pine straw, "drifts" of pitcherplants on a seepage slope, fluttering Palamedes Swallowtails on Butterfly-weed, azure blossoms of Pine Barrens Gentians. You may hear the distinctive call of the handsome Pine Barrens Treefrog or the chatter of Red-cockaded Woodpeckers. You, too, might get hooked on Longleaf.

Longleaf Pine ecosystems once dominated the Southeast, from southeast Virginia into east Texas. Centuries of agriculture, lumbering, development, and fire-suppression reduced Longleaf to a small fraction of its original range and much of what remained was fragmented. Most who study Longleaf Pine ecosystems agree they are fire-dependent; they must be both conserved and managed.

There is, in my opinion, good news. Longleaf Pine awareness, conservation and restoration are on the rise in the Carolinas and across the Southeast. In 2011, Bruce Sorrie published his guide to the *Wildflowers of the Sandhills Region*, the first field guide devoted to the Sandhills region. Bruce is a Carolina treasure. His book introduced me to scores of plant species and also led me to explore

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President's Report

Dr. Larry Mellichamp

This has been a topsy-turvy winter for gardeners. The weather has been weird, almost unprecedented for its atypical behavior (almost every year's weather seems unprecedented lately). First we had a very dry September-October. Then it rained a great deal. And was warm. Then in late November we had several spells of sharp cold. Then it became really, really warm before Christmas, and rained a huge amount (for most of us). Then, after Christmas it became super cold (we had 14 °F around Jan. 13), and then warm again.

What has happened is that many of our non-native plants reacted to the cold and rainy November by being stimulated to flower. The brief cold met their requirement for winter dormancy, and the warm, wet weather then made them think it was spring. These are tree species that flower normally in January-February such as Star Magnolias (*M. stellata*), Japanese Apricot (*Prunus mume*), Autumn-flowering Cherry (*Prunus autumnalis*) and Okame Cherry (*Prunus* 'Okame'). Shrubs like Daphne, Edgeworthia, and winter-flowering camellias also bloomed a month early. We also saw daffodils, dnowdrops (*Galanthus*) and hellebores flowering a month, or more, early.

Many of these plants were then zapped by the 14-degree temperatures. Normally they would have bloomed after the worst of cold weather (our coldest days are *typically* around Jan. 21.) Very few native plants were fooled by these happenings. However, I have a *Trillium maculatum* in full bloom right now and a *Trillium decipiens* in late bud. These normally flower in late March.

All temperate plants have a requirement for a cold period to break dormancy and allow them to grow. This keeps them from blooming on a warm winter day in February and then getting hit by hard freezes. The plants need a certain number of hours, called chilling hours, at or below 40 °F. The farther north you go, the longer the chilling requirement, the farther south, the less. This is why you

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President's Report (cont.)

cannot successfully move many species too far from their region of origin, as they are adapted to a certain requirement for a period of cold winter temperatures.

I recommend moving plants from *no more than* one zone away. For example, here in Zone 8 (down to 10 °F), you can move wild plants from zones 7-8-9.

Trillium decipiens

On the other hand, some years ago I rescued dozens of some beautiful *Trillium grandiflorum* from the same housing site in northern Michigan. I brought them to Charlotte, planted them, and the following spring not a one came up. None ever did! We even have trouble with rescued plants from 4,000 ft. in the mountains. In Greensboro, which is Zone 7 (down to 0 °F), they have a better time with more northern and mountain plants.

Dirca palustris

The lesson here: It is vital to know where your plants and seeds came from, where they were grown, and how long of an adjustment they have had. It may not be your fault if a plant will not grow for you. Watch out for cheap plants (or any kind) on the Internet!

Many species from warmer climates in China and Japan that have milder winters have a lower chilling requirement, and hence they bloom here in our mild winters and make great winter-interest plants. Our native species are much less likely to bloom "out of season", but they may have beautiful evergreen winter foliage (for example, heart-leaf ginger, Allegheny-spurge, alum-roots, Foamflower, sedums, toothworts, Seersucker Sedge, and many more). It's as if they know that winter is not over until March-April. Many species that flower early are able to tolerate cold nights down to 20 degrees or so without damage, if it has been gradual.

Some species may also be under the influence of day length, and will not flower and grow until both a winter chill is reached and the days are long enough to indicate spring (after the spring equinox, March 21). This is why it is difficult to force many natives into blooming in winter for a flower show. You often need extra lighting to simulate longer days.

Dealing with fickle weather is yet another reason to use natives—they are better adapted to our local conditions. And predictable weather is a good reason to grow from local or regional plant sources. So, hold your breath that the rest of winter will be normal, and spring will produce the usual array of wonderful wildflowers and shrubs for our enjoyment.

I can hardly wait!

Trillium maculatum

Sandhills Gamelands (cont.)

the North Carolina Sandhills Gamelands, a patchwork of well-managed tracts centered around Hoffman, N.C. and spanning 65,000 acres across three counties.

The rolling terrain of the Gamelands is criss-crossed with streams. As you walk in a straight line you pass through Longleaf Pine thick with Wiregrass, then a rich, shrubby streamhead, and finally a tall and impenetrable pocosin (good luck with the last!). Sorrie's book does an excellent job discussing these Sandhills plant communities.

White Wicky

A visit to the Gamelands means unmarked gravel roads. A good map, sunscreen, bug spray, and drinking water are essential. Given the size of the Gamelands, its diverse habitats, and seasonal variation, I will not predict what you might encounter but I will share moments from two of my more memorable visits.

In early June of 2014, I hiked through rich Longleaf, admiring late spring wildflowers while serenaded by a Bachman's Sparrow. I followed the margins of a streamhead to the headwaters where I discovered Swamp Azalea (*Rhododenron viscosum*) and glaucous Honey-cups (*Zenobia pulverulenta*), both in full bloom. Just beyond I spotted dozens of White Wicky (*Kalmia cuneate)* shrubs, each bearing clusters of nodding white blossoms with brilliant red markings. White Wicky had been near the top of my "must-see" wish list. Botanical bliss!

Well-managed Gamelands

In July, 2015, I happened upon a tall stem of the uncommon Sandhills Bog Lily (*Lilium pyrophilum*) a Sandhills endemic not described until 2002. I "stalked" the lily for weeks as its three buds matured. The last bud opened through the morning of July 31st. Late that afternoon I watched as a hummingbird visited the newly opened blossoms. Another item on my "botanical bucket list". Another day of discovery in the Carolina Sandhills.

All photos by Will Stuart.

The Green & Growin' Show!

By **Lynda Waldrep**

The 2016 Green & Growin' Show in Greensboro in January was another big success, and NCNPS's participation brought native plant information to visitors who picked up the numerous handouts, bought books on natives, or participated in discussion with members who staffed the booth throughout the two-day show.

More than 1,000 handouts were distributed, along with brochures and ideas for using natives. **John Neal** provided a great variety of books to sell, such as the recently published book, *Native Plants of the Southeast*, by Dr. **Larry Mellichamp**, who was present both days to answer questions and help participants make multiple plant-based decisions. Interest in natives appears to remain high, and many vendors displayed at least some natives, with several almost exclusively natives. Some are working hard to provide information on their natives to potential customers, and Carolina Native Nursery shared their "cheat sheets," which can be downloaded from their website.

Check out these helpful items:
http://www.carolinanativenursery.com/wordpress/wp-content/uploads/2015/12/Native-azalea-cheat-sheet-PDF-2.pdf
http://www.carolinanativenursery.com/wordpress/wp-content/uploads/2015/02/Vol-13-evergreen-rhododendron-cheat-sheet.pdf
http://www.carolinanativenursery.com/wordpress/wp-content/uploads/2014/12/Hydrangea-cheat-sheet.pdf

Hoffman Nursery in Rougemont, NC, a wholesale-only grower of grasses and grass-like plants, sells mostly natives, and their catalog is very helpful to buyers who want to see descriptions and photos of these plants. The company has even created a special section on their website for gardeners, so you can visit this and find what plants you want your local nursery to order:
http://hoffmannursery.com/home-gardeners.com
And they even donated a few of their plants for us to take to an auction. Thanks, Hoffman!

A new vendor that was across from us is Roundstone Native Seed from Kentucky. They sell not only seeds but also plugs. Anyone with a large area to plant may consider contacting them:
http://roundstoneseed.com/

The NC Nursery & Landscape Association organizes and sponsors this show, which has over 450 vendors and almost 5,000 attendees. The group deserves a big "thank-you" for allowing many non-profits to have free access to this show and to talk with participants about their programs.

Eleven NCNPS members volunteered time and energy to help with our booth. They are **Robert** and **Ruth Jones, Cheryl and Jeff Prather, Tom Harville, Joanne Lapple, Lynda Waldrep, Terry Ball**, Dr. **Larry Mellichamp, John Neal**, and **Judy West**, who, as a first-timer, bought the entire booth of Baker Environmental Nursery, another wholesale-only grower of mostly natives.

Society News!

The first-ever museum exhibit featuring

The Art of Native Plants

Exhibition Dates: April 9–July 24, 2016

Plants are not optional on this planet.
With few exceptions, neither we, nor anything else, can live without them.
–Douglas Tallamy

North Carolina is rich with plant species, which provide endless subjects for artistic interpretation. Celebrating our plant diversity, the **North Carolina Native Plant Society** is collaborating with the **Blowing Rock Art & History Museum** (159 Chestnut Street, Blowing Rock NC 28605; www.blowingrockmuseum.org) to showcase works by contemporary artists who are inspired by our native plants. This exhibition has been in the planning stage for two years and is happening this year! There will be 3 months to take advantage of this opportunity to visit and enjoy the exhibit. Encourage your friends and families to see how artists celebrate native plants.

The juror, Professor Lynn Duryea of the Appalachian State University Art Department, who is also a gardener and an award-winning ceramic artist, had her work cut out for her, with 75 artists submitting 97 pieces of art! She was very impressed by the quality of work that came in for this exhibition and the challenge was to narrow down the submissions to allow 45 works of art to fit in the gallery.

The **Blowing Rock Art & History Museum** is located in the beautiful scenic mountain town of Blowing Rock, NC. The Museum caters to the interdisciplinary potential of both art and history, and features artwork and artifacts that educate the public on our rich regional culture. Surrounded by a lush, natural environment consisting of many native plant species, the Museum is an ideal place to celebrate and feature artwork inspired by native plants found all over the state, from the mountains to the coast. We applaud people who create native plant habitats ***and now the artists who are inspired by them.***

NCNPS members, artists, and their friends are invited to be Special Guests at our *Summer Exhibition Celebration* and reception at the Museum on **Thursday, May 5th from 5–7 pm (5:30 p.m. for the public)**. This event will be free and open to the public; food, refreshments, and live music will be provided. Guest juror, Lynn Duryea, will announce a Best in Show during the reception.

Nature like an enthusiastic gardener could not resist the temptation to plant flowers everywhere.
--John Muir

Society News! (cont.)

NCNPS Artists included in the* Art of Native Plants *exhibit:

Betty Lou Chaika of Chapel Hill
Carolina Lara Corona of Winston-Salem
Christine Lisiewski of Huntersville
David McAdoo of Kernersville
Florrie Funk of Asheville
Jim Sams of London, KY
Mark Rose of Boone
Preston Montague of Raleigh
Stan Gilliam of Oak Ridge
Trena McNabb of Winston-Salem
Will Stuart of Matthews

Stan Gilliam

Post Oak

Cullowhee Scholarships

The 33rd annual Cullowhee Native Plant Conference will be held July 20-23. Every year, conference leaders award around 20 scholarships to deserving students, beginning professionals, and K-12 educators so they can attend the conference free or at half the cost. **They are now accepting scholarship applications until April 22.**

Online conference information will be updated later in March when speaker commitments have been finalized. Registration opens around April 1. For applications and conference information, visit http://nativeplantconference.wcu.edu

Amazon Smile!

If you order from Amazon, you can support the NC Native Plant Society! We are now set up with Amazon's Smile program for donations to charities. Below are instructions on how to link your Amazon account to the NCNPS.
Go to
https://smile.amazon.com/
Log into your Amazon account and type in North Carolina Native Plant Society, which will bring up our name. Click on North Carolina Native Plant Society. You are now set up. When you order, just go to
http://smile.amazon.com/ place your order, and we will get .5% of your eligible Amazonsmile purchases. Our checking account is linked to Smile and money is transferred periodically. Consider doing it today!!!

Wilmington Weed Warriers!

By **Lisa Lofland Gould**

We have among us an intrepid group of invasive species eliminators: the Southeast Coast chapter's Wilmington Weed Warriors! Chapter co-chairs **Lara Berkley** and **Cary Paynter** report that their doughty band, under the guidance of Melanie Doyle and often with other local environmental organizations, has been working to tackle some of the worst invasive plant offenders in their area.

In terrestrial habitats, they have been battling Mimosa (*Alibizia julibrissin*), Hybrid Asian Wisteria (*Wisteria x formosa*), Chinese Ligustrum (*Ligustrum sinense*), and Chinese Tallow-tree (*Triadica sebifera*; formerly *Sapium sebiferum*). And plans are under way to begin working on an infestation of Silver Poplar (*Populus alba*) on Zeke's Island/ Masonboro NC Estuarine Research Reserve [NCERR]. Like most invasive plants, these species benefit from habitat disturbance and fragmentation, and like most areas in or near cities, there is plenty of both in New Hanover County.

The Wilmington Weed Warriors (a name that Melanie dubbed them) have concentrated on removing invasives in local public parks. They pick a target area and a target species, and Melanie (who has the herbicide application license) gives an overview of what they will be doing. If there are newcomers, she also gives identification pointers and safety information, and the group makes sure that first-timers work with those who are more experienced.

The Southeast Coast Chapter has observed Mimosa spreading in Longleaf Pine and Turkey Oak forests in its area. Mimosa is a serious pest throughout North Carolina, but unfortunately is still available in the nursery trade. We can thank botanist André Michaux for its introduction in the late 1700s, when he brought it to Charleston, SC. While its pink flowers are pretty, the tree can form dense stands—especially in abandoned farmland and other disturbed habitats—and crowds out native trees and shrubs. Like other members of the Pea Family, it is a nitrogen fixer, so its presence can change local soil chemistry.

Asian Wisteria and Mimosa are also common offenders, found in a variety of habitats, from open areas to inner forests. Introduced as ornamental vines in the first half of the 19th century, Chinese and Japanese wisteria have since hybridized; Alan Weakley's *Flora*

Weed Warrior Melanie Doyle at work.

Chlorofiends! (cont.)

Asian Wisteria

of the Southern and Mid-Atlantic States, Working Draft of 29 May 2015 suggests that most of the invasive Wisteria in the Southeast appears to be a genetic mix of Chinese Wisteria (*Wisteria sinensis*) and Japanese Wisteria (*Wisteria floribunda*). Wisteria can form dense thickets and can climb high into the forest canopy and shade out native plants, or strangle them. The seeds are too large to be dispersed by most animals, but they travel easily in riparian areas.

National Park Service Gyro-Trac tackling a privet thicket.

Privet (along with Mimosa and Asian Wisteria) is widespread in New Hanover County. It appears to be primarily an edge species, where it can form dense thickets, and it also spreads rapidly in wetlands and along stream edges. Birds eat the fruit and help spread it farther. Unfortunately, there are six other *Ligustrum* species also spreading in the NC coastal plain; privets have been being introduced into North America (from Europe and Asia) since the late 1700s.

Chinese Tallow-tree (which is also called "Popcorn Tree" because the waxy, white seeds resemble popcorn) is a more recent invader in the North Carolina coastal plain. Benjamin Franklin learned that oil and wax could be extracted from the fruits, and it was subsequently introduced in Charleston, SC, in 1776. Like the privets, Mimosa, and Wisteria, it thrives on disturbed soils and can be very invasive along waterways, but it can also invade undisturbed forests and drier, upland sites. Texas considers it one of their most invasive trees and has placed it on their Noxious Weed list; however, it is still sold in some places, where it is advertised for its rapid growth and red fall foliage. Like the privets, birds eat the fruit and disperse the seeds, so chances are high that it will become a serious weed here.

Tune in next time for more of what's happening with invasive species in our coastal plain!

**Thanks to Jim Butcher's* The Dresden Files *for the column title.*

Fruit of the Chinese Tallow-tree

Pollinators! Mason Bees

By **Theresa Morr**

The delicious apples, peaches and blueberries we look forward to enjoying each year are made possible in a large part by the Mason Bees, which emerge at the same time as the blossoming of these favorite fruits. Farmers have come to value the Mason Bees as much as honey bees for orchard pollination, because their active adult lifecycle coincides with spring blossoming. The Mason Bees' docile nature also makes them a great pollinator partner for smaller gardens shared by children or those concerned about stinging insects. Mason Bees are named from their habit of building nesting compartments out of mud and chewed plant material for their young. Providing nesting structures and building materials are a great way to attract Mason Bees to the backyard garden.

Blueberry Mason Bee
Wikimedia

About 140 species of Mason Bees are native to North America, out of about 200 species worldwide. Mason Bees comprise the genus *Osmia* in the leafcutter bee family Megachilidae, order Hymenoptera. They originated in forested regions, and are found in most areas of the northern hemisphere. Mason Bees are used for pollination all over the world, and are even raised commercially for just this purpose. Among the North American species, the most popular are the Blue Orchard Bee (*Osmia lignaria*), which has become established as a primary orchard pollinator in North America, especially among apple growers. The Blueberry Bee (*Osmia ribifloris)* is another type of native Mason Bee that is fairly common throughout most of the U.S. and is used as a pollinator for blueberry plants. Studies of the native Mason Bees by the United States Department of Agriculture (USDA) reveal that Mason Bees work even on cool or rainy days when honeybees are more likely to stay in the hive. And they are very efficient—a mature apple tree needs only two or three female Mason Bees for complete pollination!

Most *Osmia* are slightly smaller than honey bees, about 13 mm (0.5 in) long. They have stout bodies, and many species are metallic green or blue-black in color. The males do not have a stinger, and the females will only sting if trapped or squeezed. This makes them an ideal neighbor for the home garden, since they pose little to no threat of stinging. In spring and early summer the females industriously collect pollen and nectar, but by midsummer, having tucked their progeny away for next year, they die out, leaving summer vegetable gardens to other pollinators.

Mason Bees are solitary bees. They do not function as a collective in hives, like honey bees, nor do they produce honey. They build part or all of their nests with mud or plant fiber chewed into a paste. Most species construct mud partitions between brood cell compartments for their larvae in soil, hollow plant stems, or preexisting cavities such as insect tunnels bored in wood. Because they prefer to make nests close to each other in aggregation, and are willing to use man-made structures for nests, they are perfectly suited to

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NCNPS's Spring Outing

By **David McAdoo**

With snow hitting much of the state recently, it makes me happy to start thinking about our Spring Outing this year. In a departure from the past several years' mountain weekends, we are choosing to explore the coast, May 20–22.

This year we have permission to visit Shaken Creek Savanna Preserve http://tinyurl.com/jgnpe5fml.org located in Pender County southwest of Jacksonville on **Saturday, May 21.** To quote from Robert Thornhill's paper on the flora of the preserve (which the NCNPS supported with a Shinn Grant) "the site contains seven savanna or savanna-like plant community types, three of which are globally critically imperiled (G1)." It is habitat for four federally endangered species (Red-cockaded Woodpecker, Cooley's Meadowrue, Golden Sedge, & Rough-leaf Loosestrife), along with several native orchid species that could be blooming during our field trip (three grass-pinks, Spreading Pogonia, and ladies-tresses). On Sunday morning there will be a final field trip to a newly opened Nature Conservancy preserve, McLean Savanna http://tinyurl.com/je7p52d.org

Our headquarters will be the Econo Lodge in Jacksonville http://www.econolodgejacksonville.com which is giving us a great rate of $50 plus tax for rooms with either two double beds or a king-sized bed. Friday night, May 20, we will open the weekend with a talk from Jim Fowler, who recently released a wonderful book on the flora of the Green Swamp, *Orchids, Carnivorous Plants, and Other Wildflowers of the Green Swamp, North Carolina* (James Fowler Photography, 2015). And don't forget, for our traditional plant auction, please bring labeled native plants only!

As we get closer to the date of the weekend we will release further details and a registration form. Stay tuned and "Think Spring!"

Calopogon pulchellus

Pollinators! (cont.)

orchard farms, concentrating enough bees in an area for commercial pollination.

Mason Bees emerge in early spring. Whether you have a large orchard or a small backyard garden, you can invite Mason Bees as good gardening partners by planting early blooming fruit trees. Include fruiting natives such as Highbush Blueberry (*Vaccinium corymbosum*), native Black Cherry (*Prunus serotina*) and wild American plum (*Prunus americana*). Installing a Mason Bee nestbox would help sustain these hard-working native pollinators, and also be a fun and worthwhile garden project!

Theresa Morr is a NCNPS member and an active conservation volunteer. She can be reached at tfmorr9900@att.net

Assessing Highway Effects on Lichens

By **Gary Perlmutter, Gary Blank, Tom Wentworth**, and **Eimy Rivas Plata**

In 2007, I (Gary Perlmutter) conducted a study on urban air pollution effects on lichens in the Raleigh area (*Native Plant News* Vol. 7, Iss. 1, 2009). With the support of the 2015 Tom and Bruce Shinn Grant from the North Carolina Native Plant Society, I and my collaborators—Dr. Gary Blank (North Carolina State University, [NCSU}), Dr. Tom Wentworth (NCSU), Dr. Megan Lowman (NCSU), Dr. Howard Neufeld (Appalachian State University), and Dr. Eimy Rivas Plata (Field Museum of Natural History)—were able to increase the scope of the previous study for my Masters thesis in the College of Natural Resources, at NCSU. Instead of studying lichen communities in open areas of city parks, we shifted the focus to lichens living in forests to see if they, too, are affected by air pollution. We suspected that forests near roads would have fewer species than those away from roads, similar to the patterns found in the Raleigh area study.

Loblolly Pine, nearly devoid of lichens, at forest edge facing I-40.

To test this hypothesis, we decided to implement plots closer and farther away from a busy highway. For this study, highway I-40 was selected, since traffic and air pollution data are available to further explore emission patterns. We designed two plots on opposite sides of highway I-40 (closer to busy highway), each with a series of parallel transects arranged from the forest edge along the highway to 150 m into the forest. The objective was to inventory lichen diversity and presence of bryophytes (mosses and leafy liverworts) in tree trunks. Additionally it was decided to sample soils and ambient air for pollutants. Finally, we sampled a lakeside forest plot in Harris Lake (HL) County Park, far removed from heavily-traveled roads.

The results clearly indicated that more lichen species were found farther from the highway, with the greatest diversity at the HL site. We also found the highway sites to be more polluted than the HL site, especially at the forest edge just 10 m away from the road edge itself. The forest edges facing I-40 had the highest soil metal concentrations (from vehicle wear and tear), soil sodium (from winter brine applications), and soil nitrogen and air nitrogen dioxide (NO_2) concentrations (from vehicle exhaust). The trees at these forest edges had very few lichens, with just four species found, and no bryophytes.

Using a multivariate analysis of lichen diversity together with several environmental variables, we found strong negative relationships of lichen species number with the pollution data, including soil parameters of sodium, pH, nitrogen, metals, and air NO_2 concentrations, and a strong positive relationship of lichen species number with bryophyte occurrence on trees. In other words, the cleaner the environment, the richer the lichen communities on trees (and the mossier the trees, too!).

Even though the results of this study and similar studies performed in other continents are consistent, further observations are needed in forests near lesser-traveled roads, along with repeated measurements over time, to see if the most affected lichen communities improve as newer, cleaner cars use our highways.

As a future effort, Dr. Rivas Plata and I plan to observe the original plots/transects for five consecutive years to determine how the lichen communities are responding to improved traffic emissions.

Gary Perlmutter is a 2015 NCNPS Shinn Grant recipient. gbperlmu@ncsu.edu

Germination Ecology in Southern Appalachia

By **Michelle C. D'Aguillo**

It is common to think that plants, unlike animals, have little or no control over the habitat where they live. We might be inclined to imagine that seeds are produced on a parent plant and are released into the environment, and that is it—they must make do with the conditions they have. In reality, as many gardeners and horticulturalists know, seeds are surprisingly "intelligent." They have an incredible ability to detect changes in the environment, and they can use this information to decide whether to germinate or remain in the soil until more favorable conditions develop. Although seeds can't control *where* they land, they can control *when* they become seedlings. By timing germination appropriately, seeds are able to gain some control of the environmental conditions experienced during the above-ground portion of the life cycle.

Houstonia serpyllifolia *in bloom.*

I am interested in studying the timing of germination partially because I love the idea that plants have much more control over their growth trajectories than we often think they do. In summer 2015, I had the opportunity to study the environmental conditions associated with germination in the native Mountain Bluet, *Houstonia serpyllifolia* (Rubiaceae). Another common name for *H. serpyllifolia* is the Creeping Bluet, because stems are found "creeping" horizontally and low to the ground along stream-banks and the forest floor. The Mountain Bluet is a perennial endemic to the southern Appalachian Mountains and prefers very wet habitats, such as streamsides and seepage areas. Flowering occurs from May until August, and numerous seeds are produced in dry capsules 3 to 4 weeks after flowering.

Houstonia serpyllifolia *seed capsules.*

Mountain Bluets are excellent for studying variation in germination behavior across landscapes because, unlike many Appalachian herbs which are restricted to specific elevations, they occur along a very broad elevational belt. While I studied populations between 2300 and 6250 feet, Mountain Bluets have been found at least as low as 1500 feet, and up near the summit of Mt. Mitchell (6684 feet). One can imagine that seeds at low elevation populations will be exposed to very different temperatures throughout the year (and on the whole, much warmer temperatures), than seeds dispersed near mountain summits. I hypothesized that seeds from high elevation populations would germinate at lower tempera-

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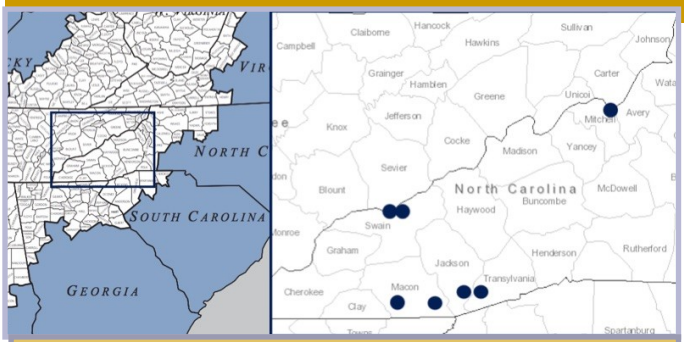
Germination Ecology (cont.)



Population locations from which seeds were gathered.

tures in order to extend the growing season. That is, I predicted high-elevation *H. serpyllifolia* populations would begin above-ground growth around the same time as lower-elevation population simply by germinating when temperatures were still cold in late winter/early spring.

To test my hypothesis, I collected thousands of seeds in June and July 2015 from seven populations in western North Carolina: four populations near Highlands Biological Station in southwest North Carolina, two populations in Great Smoky Mountains National Park, and one population near Roan Mountain. Back in the laboratory, I removed seeds from their capsules and placed them in cold temperatures (40 ^{o}F) for 2.5 to 4 months, in order to mimic winter conditions. Seeds were then arranged in petri dishes and exposed one of six temperatures ranging from 45 ^{o}F to 72 ^{o}F, intended to mimic early and late spring conditions. I monitored the seeds for five weeks and recorded total germination.

Interestingly, there were large differences in the temperatures that caused germination in different populations along the elevational gradient—but these differences were exactly the opposite of what I had predicted! Seeds from low elevation populations germinated to higher percentages overall, and in a broader range of temperatures. I observed 25 to 75% germination at all five of the highest temperature treatments, which spanned 50 ^{o}F and 72 ^{o}F. In contrast, seeds from the 3 high-elevation populations did not germinate above 25% at a single temperature treatment colder than 68 ^{o}F day/50 ^{o}F night, the second warmest treatment. Thus, seeds from high-elevation populations were pickier overall and preferred much warmer temperatures.

My results imply that plants from high elevation populations are unlikely to germinate until much later in the season for two reasons: first, because they don't respond to low temperature cues during late winter/early spring, and second, because an average temperature of 68 ^{o}F day/50 ^{o}F night will occur later in the year at high elevations. From an ecological perspective, this causes high elevation *H. serpyllifolia* populations to have less time to grow before reproduction—their first and subsequent years—in an already shortened growing season. This later germination may have cascading effects on the entire life cycle of *H. serpyllifolia,* including the environmental conditions plants experience during their first year of growth, seedling survival, size of reproduction, and lifetime fitness.

For my dissertation, I am studying how plants can gain control over the environments in which they spend their lives by germinating under very specific conditions, whether by responding to specific temperatures, or other environmental cues (light, moisture, etc.). My research in 2015 with *H. serpyllifolia* not only enabled me to generate original data concerning natural variation in germination, but helped me to advance my ideas about how to quantify differences in germination behavior. I am thus very grateful to the NC Native Plant Society for the opportunity to work with this charming native plant.

Michelle D'Aguillo is a 2015 NCNPS Shinn Grant recipient. mchelle.d.aguillo@duke.edu

Life is Tough for Spring Ephemerals!

By **Rebecca M. Dalton**

Recently, during blizzard Jonas, I watched the snow and ice lay gently outside of my window and thought about how hard life must be for the understory spring plants. You and I can quickly put on our winter jacket when it begins to snow and easily shed layers on days that reach 60 °F, but plants don't have this luxury. In addition to chilly temperatures, the native plants residing in the bottomlands where I work experienced heavy rains in December. The thick, insulating layer of leaf litter was washed away, leaving many plants in the spring ephemeral community exposed to the recent frost. Dealing with irregular weather conditions is not a new challenge to the early bloomers, but with increasing variability in weather patterns due to climate change, should we be worried?

Star Chickweed

Now, remember those unusually warm December temperatures? Scientists know that warming temperatures cause some plants to begin making flowers earlier in the season than in the past, while some species are unaffected. If all of the species in the community respond differently to the same environmental cues, species' flowering periods might begin to overlap, even if they have not in the past. If these plant species share common resources (e.g., nutrients, water, pollinators), they might now have to compete with one another for access to these resources.

How species sharing a limited number of resources are able to live in the same place at the same time is a fundamental question in ecology. If two species share common resources, their ability to coexist is sensitive to environmental conditions, and any change in their interactions with the environment and each other could result in extinction of one of the species. My research examines the relationship between timing of life cycle events and the ability of two plant species, Springbeauty (*Claytonia virginica)* and Star Chickweed (*Stellaria pubera)*, to coexist. From 1978-1982 in Durham, NC, two researchers, Alexander Motten and Diane Campbell, both former graduate students at Duke University, studied the timing of flowering and competition for pollinators between native, understory flowering plants. I can now use their data from 35 years ago to understand if changes in phenology, or timing of life cycle events, influence competitive interactions between two forest herbs.

Last February, I set out to work in the Duke Forest in Durham, NC, to begin answering these questions. What I wanted to know first was, has flowering time shifted significantly in these native flowering communities since 1980? Second, does flowering time affect how reproductively successful a plant is? I spent the first few weeks setting up 50-meter transects, where I would return every few days to observe flowering in *Claytonia virginica.* I recorded first day of flowering, last day of flowering, plant size, and number of fruits and flowers for over 400 plants. Even controlling for the unusually cool weather last spring in my analysis, I found that the length of the bloom period in 2015 was very similar to the 1980s. In addition, I found that *C. virginica* plants with longer bloom periods produce more fruits and flowers, but fruit set (fraction of flowers producing fruits) was unaffected by length of flowering period.

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I Spy.....Spring Flowers!

By **Mark Rose**

Seeking native beauty this spring? Look for *Anemone acutiloba* and *A. americana* (Formerly *Hepatica* but as of 2012 lumped into the genus *Anemone* as per Weakley in the *Flora of the Southern and Mid-Atlantic States-2015* draft). Both species are true harbingers of spring and one of the first of our native wildflowers to show their blooms.

A. acutiloba (Sharp-lobed Hepatica) and *A. americana* (Round-lobed Hepatica) make wonderful garden additions. Immediately after producing their white to pink to blue flowers the plants put forth a beautiful flush of foliage that persist for over a year, making them evergreen. Although the leaves get pretty ratty looking during the winter months there is still a charm about them and a constant reminder of not only their location but the promise of things to come every time you walk by them in the garden or woods. They prefer to grow in shady woodland settings but will tolerate more sunny locations as long as you help them get established with some additional water immediately after planting. In the photo you can pick out the old foliage below and around the flowers.

First in a series on Seasonal Plants.

2016 Annual Meeting & Picnic

Saturday, June 4
Seven Springs
118 Alder Lane
Mocksville, NC 27028

*Please Bring **Native Plants** for Plant Auction!*

Life is Tough on Plants! (cont.)

These data suggest that flowering phenology does influence how reproductively successful a plant is, and phenology hasn't significantly shifted in one of my species of interest. These spring plants are perennials, which means they can live and reproduce multiple years. Because of this life schedule, one year doesn't give me enough information to draw conclusions. So I am returning to these communities this year to dig deeper into my questions.

In 2016 I am setting up a few field experiments and identifying pollinators of *Claytonia virginica* and *Stellaria pubera* in order to elucidate the mechanisms enabling coexistence between these two species. Over the next few years, I will collect data that will help me understand how competition for shared resources is altered in response to climate change. While we can easily adjust our routines in response to atypical weather events, plants have fewer ways to cope. Next time you are enjoying the warm, spring weather or experiencing a freezing cold walk with the dog, think about the forest understory plant community and how they must feel!

Rebecca Dalton is a 2015 NCNPS Shinn Grant recipient. rebecca.m.dalton@duke.edu

New Native Plant Habitat Certifications

NCNPS certified two Native Plant Habitats in December! It is always rewarding to see the ways people use native plants to make unique and beautiful spaces that enrich our environment. These latest certifications are examples of that.

The first was the home garden of **Robin** and **N'Earl Godwin** in Winston-Salem. This garden is noteworthy for the large number of plants listed in every category—over 170 total—particularly in the canopy- and understory-trees categories.

The second certification is the home garden of **Beth** and **Bob Davis** in Charlotte. They have added understory trees and shrubs to the mature canopy trees on their property to make a well-rounded habitat for birds. Beth is becoming proficient at starting native plants from seeds in a greenhouse built from reclaimed windows. She gathers seeds from friends and at NCNPS seed exchanges to add to the many plants in their inventory.

The Society welcomes your submission for Native Plant Habitat certification. Information and applications are available on the website, and you can also contact me at carolyni@ncwildflower.org or 919-967-6796 to ask any questions about the process.

Carolyn Ikenberry

Godwin Habitat

Davis Habitat

Member Spotlight!

Lynda Waldrep

Know a member who's doing something natively? Send their info to:

jchiggie@yahoo.com

Meet **Lynda Waldrep** of Summerfield, an active participant in the Triad Chapter. Lynda is a retired school teacher who, she claims, "hated science as a young person but began to love plants as I spent more time in the mountain areas."

Lynda took Master Gardener classes in the spring of 2000 and stayed active in that program for 10 years. But she finally decided that they didn't focus on native plants as they should, so she decided to spend more time participating in our Native Plant Society!

"I have been secretary for the board and, in 2002, vice president in charge of the spring and fall outings, and membership picnic," Lynda said. "Selecting the site and finding speakers and guides was actually quite fun for me. I had good help from then-President **Tom Harville**, and later from **Robert** and **Ruth Jones**, both of whom traveled to the sites to help find motels and places for our dinner. I think this was probably the most satisfying volunteer job I have ever done."

Right now, Lynda organizes the Society's annual participation in the Green and Growin' Show in Greensboro. "Our work at the booth has provided great information on natives for about 200 people each year," she said. She also participates in the Guilford Horticultural Society's annual symposium and other plant events, helps rescue native plants, and presents programs. She is especially known for leading a popular Winter Sowing Program that has motivated members to grow more natives and share them at fund-raising auctions.

Her favorite native plant? "I used to say my favorite plants were trilliums and gingers, but I am branching out to sun-loving plants, thanks to seeing **Trena McNabb's** meadow," she said. Thank you, Lynda!

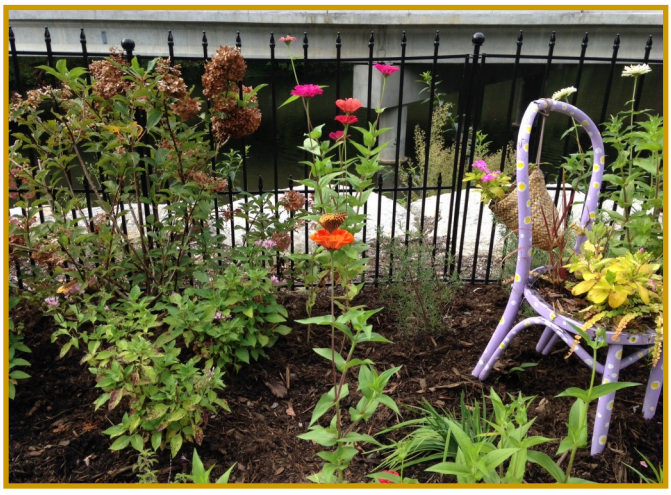
A Friend to Natives:
Alvera Henley Frauenheim

Alvera Henley Frauenheim died on Thursday, Jan. 21, at age 94. She was an accomplished botanist, specializing in wildflowers of North Carolina, and worked closely with both the North Carolina Botanical Garden and NC State University to further understanding of species. She was a former member of our Native Plant Society and a friend to many.

One of her greatest joys was helping with publication of Harry Phillips' and NCBG's landmark book *Growing and Propagating Wild Flowers* (1985). Dr. Larry Mellichamp adds that back in the 1980s, in the early days of the native plant movement, she was a vibrant force, promoting native plants with energy and enthusiasm.

In lieu of flowers, memorials are requested to be made to the North Carolina Botanical Garden, CB#3375, The University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-3375 or to Historic Rural Hill at P.O. Box 1009, Huntersville, NC 28070.

Amazing Lake Lure Flowering Bridge!



What if you saved an old bridge and turned it into an amazing flower garden? That's what a group of gardeners did in Lake Lure, NC, a quaint mountain town full of artists, crafters and nature-lovers. In 2011, the NC Department of Transportation completed a new bridge on US 64/US 74-A/ NC9 between that town and the Village of Chimney Rock, home to Chimney Rock State Park, closing the old 1925 bridge to traffic. The historic bridge was turned over to an enthusiastic group of local volunteers called Friends of LLFB. People of all ages installed themed garden beds with scientific signage along the pedestrian walkway that crosses the Rocky Broad River, as well as the pathways to and from, and added unique artwork. Plants were chosen to benefit pollinators, birds and mammals. The bridge has been declared a Certified Wildlife Habitat! Definitely worth a visit. **Julie Higgie**

Located at:

3068 Memorial Highway

Lake Lure, NC 28746

North Carolina Native Plant Society
C/O Julie Higgie
176 Huntington LN
Mooresville, NC 28117

We're Wild About Natives!