

CHINQUAPIN

THE NEWSLETTER OF THE
SOUTHERN APPALACHIAN BOTANICAL SOCIETY

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EARL CORE STUDENT REPORT

High-Elevation Lichen Species Endemic to the Southern Appalachians Threatened by Climate Change

By Jessica L. Allen

After trekking about 170 miles on and off trails looking for rare lichens I have a deep appreciation for what the mountains of western North Carolina have to offer in both scenic beauty and lichen diversity. Lichens, symbioses between fungi and algae or cyanobacteria, flourish in the southern Appalachians, with over 800 species documented from the Great Smoky Mountains National Park. High-elevation ecosystems host a particularly unique community of species, including many rare members that are known from no other place on the planet. Though these species are thought to be rare, little else is known about them. For instance, before I began this work, something as simple as their distribution throughout the



southern Appalachians remained to be documented. Certainly no one had estimated their future distributions in the face of climate change, essential information as high-elevation endemics worldwide are severely threatened by mountain top extinction. During the summer and fall of 2014 I aimed to address both of these knowledge gaps by documenting the distribution of rare lichens endemic to the high-elevations of the southern Appalachians, and using these data to predict how their suitable habitat will be impacted by climate change in the coming years.

The target species I chose formed a diverse assemblage, including one foliose species, *Hypotrachyna virginica*, one fruticose species, *Cladonia appalachensis*, and six crustose species, *Arthonia kermesina*, *Arthopyrenia betulicola*, *Buellia sharpiana*, *Graphis sterlingiana*, *Lecanora masana*, and *Lepararia lanata*. I spent six weeks in the field to search for the target species, visiting the Black Mountains,



Balsam Mountains, Great Smoky Mountains National Park, Unicoi Mountains, Roan Mountain and scattered peaks throughout the southern Nantahalas, and documented at least one previously unknown population for every species. I then used the resulting distributional data and the ecological niche modeling

program Maxent to predict how suitable habitat will shift for each species by 2050 and 2070 under a number of different climate change models and carbon dioxide concentrations.

The results were even more dire than expected; the average predicted suitable habitat loss for each species by both 2050 and 2070 was 90%, and at least one model predicted 100% suitable habitat loss for every species.

Many more questions than resolutions emerged from this projects. Can these species adapt? Can they migrate? What are the implications for other members of high-elevation ecosystems in the southern Appalachians? Hope emerges in the midst of a potentially disastrous situation as many people are asking these same questions for other groups of organisms and taking action. These questions direct the next steps in my doctoral research, examining adaptability and migration through a better understanding of population genetics, and will likely shape my research throughout much of my career.

This study is the first chapter of my doctoral research at The New York Botanical Garden and The City University of New York Graduate Center, and the Earl Core Student Award helped fund a significant portion of my field work, for which I am very grateful. I

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SABS Officers and Executive Council

For full addresses, see <http://sabs.appstate.edu/about/officers>

Kathy Gould Mathews
President (2014-2016)
Western Carolina University
(828) 227-3659
kmathews@email.wcu.edu

Charles N. Horn
President-Elect (2015-2016)
Newberry College
(803) 321-5257, fax (803) 321-5636
charles.horn@newberry.edu

Charles N. Horn
Treasurer (2014-2018)
Newberry College
(803) 321-5257, fax (803) 321-5636
charles.horn@newberry.edu

Michael E. Held
Membership Secretary (2015-2018)
Saint Peter's University
(201) 761-6432
mhheld@saintpeters.edu

Susan Farmer
Recording Secretary (2013-2016)
Abraham Baldwin Agricultural College
(229) 391-5126
sfarmer@abac.edu

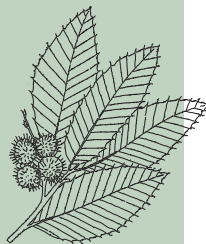
Lisa Kelly
Member at Large (2014-2016)
University of North Carolina at Pembroke
(910) 325-1470
lisa.kelly@uncp.edu

Jay Bolin
Member at Large (2014-2016)
Catawba College
(704) 637-4450
jfbolin@catawba.edu

Jennifer Boyd
Member at Large (2015-2017)
University of Tennessee at Chattanooga
(423) 425-5638
jennifer-boyd@utc.edu

Christopher P. Randle
Editor-in-Chief of *Castanea* (2014-2017)
Sam Houston State University
(936) 294-1401
cpr003@shsu.edu

Joe Pollard
Editor of *Chinquapin*
(2012-2015)
Furman University
(864) 294-3244
joe.pollard@furman.edu

**From The Editor's Desk:****Joe Pollard, Newsletter Editor**

April in Chattanooga produced another enjoyable annual meeting of the Southern Appalachian Botanical Society, along with the Association of Southeastern Biologists and other affiliated societies. Reports on news and society business are included elsewhere in this issue of *Chinquapin*. Next spring's meeting is scheduled to be held in Concord, NC.

The election of new SABS officers produced an interesting twist. Charles Horn will be stepping down from the post of Treasurer, or it would be more accurate to say stepping up. As most *Chinquapin* readers probably know, Dr. Horn has served SABS with great energy, enthusiasm, and integrity for many years as Secretary-Treasurer, and then as Treasurer when the positions became separate. Just a year ago he was elected to another term as Treasurer, but this year he was nominated as a candidate for President and won the election, so he will serve a year as President-Elect and then a two-year term as President. I'd like to publicly congratulate Charlie, and thank him for his willingness to serve SABS in yet another important role.

For the moment Charles is serving as both President-Elect and Treasurer, but we will need to elect a new Treasurer during the coming year. If you would like to suggest someone (including yourself) please contact any member of the SABS Council (addresses shown at left) and we will pass the name along to our nominating committee for consideration. Suggestions must be received by September 18, 2015.

SABS Welcomes Our New Members

Kelly Anderson
Claude Bailey, Jr.
Stacy Bennetts
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Rebecca Dellinger-Johnston
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Jenna Dorey
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Kurt M. Neubig
Jessica P. O'Grady
Donald O'Shields
Jennifer Ogle
Raymond Prater
Adam J. Ramsey
Devin Rodgers
Emily B. Sessa
Cecil Slaughter
J. P. Smith
Bruce A. Sorrie
Kevin Trostel
Kayla Witeck

In Memoriam . . .

In the previous issue of *Chinquapin* we reported the sad news of the death of two influential southeastern botanists. Drs. John Fairey and Wade T. Batson both passed away during February, 2015.

Unfortunately, it had somehow slipped our attention that another giant in our field has now left us. Dr. Elsie Quarterman died on June 9, 2014, at the age of 103 years. Dr. Quarterman received her M.A. and Ph.D. from Duke University and served on the faculty of Vanderbilt University for 33 years, from 1943 to 1966.

Full tributes to all three of these important plant scientists are in preparation for publication in upcoming issues of *Castanea*, the journal of the Southeastern Appalachian Botanical Society.

Seaside Gerardia, *Agalinis maritima*

By Lytton John Musselman,
Old Dominion University, Norfolk, VA

Few parasitic angiosperms in the Southeast inhabit salt marshes, much less hyper saline salt flats. Bigseed dodder, *Cuscuta indecora*, is native in the Southeast and parasitizes marsh alder (*Iva frutescens*) and also grows inland and can be a pest on crops in the Western United States. But the only root parasite in saline and hyper saline habitats on the Atlantic Coast is *Agalinis maritima*, appropriately called seaside gerardia (Fig. 1). *Gerardia* is an older name of the genus and has persisted in the common names after species were recognized as better placed in the genus *Agalinis*.



Figure 1. *Agalinis maritima* in a salt grass meadow, Fisherman Island National Wildlife Refuge, Virginia, in September. At the lower left is a blurred image of salt grass, *Distichlis spicata*, a frequent host.

This group of about 35 pink or purple-flowered plants reaches its greatest diversity in the American South. Most species are annuals. *Agalinis* is the largest genus of parasites in the Orobanchaceae in our flora.

Most species of gerardia grow in open sunny areas, with numerous species in longleaf pine savannahs. *Agalinis maritima*, on the other hand, is unique in growing in salt marshes. Like its pudgy neighbors, seaside gerardia is succulent so fits in well with the three species of *Salicornia* (glassworts) with which it grows.

Agalinis maritima is much branched, as tall as 2 ft. and has



Figure 2. Flower of *Agalinis maritima* showing the short calyx lobes and bilabiate corolla. The flower is about two inches long.

large, showy flowers with short calyx lobes in the late summer or early autumn (Figs. 2 & 3). Many-seeded capsules form in the late fall. I have not germinated the seeds but assume they are easy to germinate, perhaps after cold treatment. Seeds do not need a host stimulant to germinate.

This species, like other gerardias, likely has a broad host range though that term can be confusing because in nature relatively few hosts are parasitized. I have documented salt grass, *Distichlis spicata*, as a host but it also attacks other plants including dicots.



Figure 3. The upper corolla lobes are ciliate. Like its congeners, seaside gerardia has nectar guides for pollinators, generally bees.

“To such an extent does nature delight and abound in variety that among her trees there is not one plant to be found which is exactly like another; and not only among the plants, but among the boughs, the leaves and the fruits, you will not find one which is exactly similar to another.”

Leonardo da Vinci, Thoughts on Art and Life
(Translated by Maurice Baring, 1906).

BOTANICAL EXCURSIONS

The Geography of Place: Inner and Outer Landscapes

By George Ellison; Artwork by Elizabeth Ellison

(This essay was written at the request of Brent Martin, regional director for the Southern Appalachian office of The Wilderness Society, for a symposium of writers from Western North Carolina held at the Handmade in America facility in Asheville, North Carolina, on November 7, 2014, to commemorate the 50th anniversary of the Wilderness Act. That 1964 legislation established the National Wilderness Preservation System and created the process by which Wilderness Areas are designated, and some of our nation's most beautiful and vital wild places are protected. Other writers taking part included Charles Fraser, Katherine Stripling Byer, Thomas Rain Crowe, Wayne Caldwell, John Lane, and Catherine Reid. I was unable to attend but Brent suggested that if I wrote something appropriate he would read it in my absence.)

Let's open with a quote from Barry Lopez's essay "A Literature of Place," first published in the *Portland Magazine* in 1997:

"Over time I have come to think of these three qualities--paying intimate attention; a storied relationship to a place rather than a



Artwork by Elizabeth Ellison.

George and Elizabeth Ellison are based in Bryson City, NC.

www.georgeellison.com ; www.elizabethellisonwatercolors.com

solely sensory awareness of it; and living in some sort of ethical unity with a place--as a fundamental human defense against loneliness. If you're intimate with a place, a place with whose history you're familiar, and you establish an ethical conversation with it, the implication that follows is this: the place knows you're there. It feels you. You will not be forgotten, cut off, abandoned."

Right away Lopez has unapologetically anthropomorphized the landscape. It is immediately placed on equal if not superior footing with human observers. There was a time not so long ago when the powers that be in the Behaviorist School would have had you executed for that sort of thinking.

Lopez's language is Whitmanesque: "The place knows you're there ... it feels you," he exclaims. It is you who might "be forgotten, cut off, abandoned." Landscape is not a commodity for either Whitman or Lopez ... it was and is a living entity.

Lopez stresses the importance of geography as a gateway to this sort of intimacy. He is a traveler to faraway places. I am a traveler within nearby horizons. While I have been exploring my front yard for going on forty years now, he has been venturing into the Antarctic or the Tanami Desert in Australia and similar places. But our methods and objectives are not totally dissimilar.

Lopez believes, as do I, that two landscapes engage each other in our imaginations, "one outside the self, the other within." I am a would-be dweller in both of those landscapes. And I am absolutely confident that a firm sense of *where you are* enhances your understanding of *who you are*.

The natural history essays I write for various publications depict the origins, landscapes, plants, and animals of the Southern Blue Ridge from Mount Rogers in southwest Virginia to Mount Oglethorpe in north Georgia. But the focus is almost always narrowed to western North Carolina, especially the southwestern tip from Asheville to Murphy, the North Carolina side of the Smokies, and my aforementioned front yard, which is, in case you're wondering, situated at the center of the universe.

It gives me pleasure to recall that the creek which flows through the center of the universe heads up in the Smokies below Clingmans Dome, flows into what is placid Lake Fontana in summer and the howling wilderness of the lower Tuckasegee in winter on its way to the Gulf of Mexico via the Little Tennessee, the Tennessee, the Ohio, and the Mississippi.

At night I don't count sheep. I name the mountain ranges east to west: Bald ... Black ... New Found ... Balsam ... Smoky ... Cowee ... Nantahala ... Fish Hawk ... Snowbird ... Tusquitee ... Unaka ... Unicoi ... Iron ... Cohutta.

I dream of special places Elizabeth and I have discovered and return to with regularity. Along the Blue Ridge Parkway at the Wolf Mountain Overlook there are vertical seepage walls where emerald green sphagnum mats have accumulated in which thousands of carnivorous round-leaved sundews reappear each year. At the same spot there are plants such as Blue Ridge St.-Johns Wort, Mountain

Landscapes continued on Page 13

Landscape continued from Page 12

Krigia, Showy St.-John's Wort, Pink-Shell Azalea, Skunk Goldenrod and others classified as Blue Ridge endemics; that is, they are found here or in this general area and no place else in the world. Add other plants like Michaux's Saxifrage, Little Green Orchis, Grass of Parnasus, False Asphodel, Hay Scented and Lady ferns, and American Bugbane and you have a setting that is not far from being Edenic. I'm not sure that the hanging gardens at Wolf Mountain or other settings like the Alarka Laurel (situated where Jackson, Macon, and Swain counties corner in the Cowee range) or High Rocks (situated on the crest of Welch Ridge overlooking the North Carolina flank of the Smokies) are sacred places, but I do know they have become touchstones of spiritual consequence in our lives.

Several years ago Katherine Stripling Byer interviewed me for the North Carolina Literary Review. She observed that, "The landscapes in your essays and those in your poems are sometimes like two different worlds," and then asked: "How do these landscapes intersect?" After due deliberation I replied:

"There is a continuum. The nature essays tend to be informational. Many are, in fact, written-up versions of field-trip topics. The landscapes and specific natural areas visited during a field trip are tangible, and they remain that way in prose descriptions. But something happens when the descriptions begin to resemble sections of narrative verse. The reader of my book of poems titled *Permanent Camp: Poems, Narratives and Renderings from the Smokies* (2012) is put on alert in the preface that thoughts, fantasies, and events (real and imagined) are intermingled. Internal dreamscapes are as frequent as external landscapes and sometimes neither you nor I will know which is which."

Let's close with a poem. One of the pieces in *Permanent Camp* is titled "When I Was A Boy." The opening stanzas describe two visions William Blake had when he was a boy. In the first he saw God "put his head to the window" of the family home in London. In the second, after "walking in green fields all awash in sunny beams," he saw "a tree filled with angels ... bright angelic wings bespangling every bough like stars." The closing stanzas read:

When I was a boy I never saw
God looking through a window
or even one angel in a tree.
But as I walked forth all alone ...
an animal trail descended into a hollow
where I'd never been before.
Though there was no wind
ferns swayed ever so slightly ...
From a springhead in a clay bank
water flowed over yellow sand
into a pool of reflected shadows.

No bright wings or sunny beams
just another boy transfixed in
a place not far from home
sensing for the first time
the abiding mystery at
the heart of things.

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presented the results of this research at the Association of Southeast Biologists conference in Chattanooga and will be presenting it at the International Convention on Conservation Biology this coming summer.

Jessica Allen is a Ph.D. candidate at the New York Botanical Garden and the City University of New York. At the 2015 ASB meetings she won the award for the best student presentation from the Southeastern Section of the Botanical Society of America.



Botanical Brainteasers

By Joe Pollard and Janie Marlow

Our spring Brainteasers [Chinquapin 23(1)] were (1) *Leucothoe fontanesiana*, (2) *Eubotrys recurva*, (3) *Oxydendrum arboreum*, (4) *Rhododendron calendulaceum* and (5) *Clethra acuminata*. Which is the odd one out? Okay, it's true that only #4 is orange, but we didn't think that really deserved much credit. It's just about as obvious that only #1 is evergreen. But there's something more fundamental. Despite the superficial similarity, #5 is in a different family, the Clethraceae. All the others are in the Ericaceae.

The nomenclature and identification present a few traps here. *Leucothoe fontanesiana* used to be called *L. axillaris* var. *editorum*. *Eubotrys* used to be included within *Leucothoe*, and it's tough to tell *E. recurva* from *E. racemosa*. Species of *Rhododendron* can be challenging too. Janie (the modest one) says there's always a chance that we could be wrong, but I think the editor is always right!

We had a lively response to this puzzle, with ten readers sending answers. The very first one we received was from a brand-new SABS member, Kelder Monar, and he gave us exactly the answers we were looking for, so Kelder gets the bragging rights for the spring issue! The other entries will get partial credit because they missed a few details or arrived later. At the end of the year we'll add up all the points to see who gets the prize - a copy of Linda Chafin's new book on the Wildflowers of Georgia.

So here's the next Brainteaser. As usual, identify all the plants and work out which is the odd one out. All these species can be found in the Southern Appalachian region. We know they aren't all native, but this puzzle is not about native vs. exotic. Color photos are online at <http://sabs.appstate.edu/chinquapin-issues>.

Please address all correspondence regarding Botanical Brainteasers to joe_pollard@att.net. (That's an underscore character between first and last names.) If you prefer, send snail-mail to Joe Pollard, Biology Department, Furman University, 3300 Poinsett Highway, Greenville, SC 29605. Images are ©JK Marlow.



News from the Annual Meeting

By Charles Horn

Student Presentation Awards

For 2015, awards were presented for the best student poster presentation and for best oral presentation. The award includes an honorarium of \$500.

Oral presentation – Scott Cory (Appalachian State University) – “Ecophysiological responses of Fraser Fir (*Abies fraseri*) Christmas trees along an elevational gradient.”

Poster presentation – Catherine Cole (Appalachian State University) – “An unusual succulent in the Appalachian understory: leaf morphology and light capture in *Sedum ternatum*.”

Earl Core Student Research Award

This year two proposals were funded, each for \$500.

Jenna Dorey (The New York Botanical Garden) for her proposal “Systematics and biogeography of *Carex* section *Laxiflorae* (Cyperaceae): reconstructing the evolutionary history of an unusual disjunction in a clade of temperate sedges.” Her advisor is Dr. Robert Naczi.

Jerald Pinson (University of Florida) for his proposal “Comparative transcriptomics of independent, sporophyteless gametophytes of the Appalachian Mountains.” His advisor is Dr. Emily Sessa.

Richard and Minnie Windler Award

Two awards are presented annually; first for the best systematic botany paper and second for the best ecology or floristic paper, both published in *Castanea* during the previous year. Each award comes with a check for \$500.

The 2015 Windler Award winners for the best papers published in *Castanea* during 2014 were:

Systematics – Katherine E. Culatta and Jonathan L. Horton “Physiological response of southern Appalachian high-elevation rock outcrop herbs to reduced cloud immersion.” Their article was published in the September 2014 issue.

Ecology – Sabrina Y. S. Sewell and Wendy B. Zomlefer “Floristics of piedmont Gabbro Upland depression forests in Jasper County, Georgia.” Their article was published in the September 2014 issue.

Elizabeth Ann Bartholomew Award

The society annually presents the award in memory of Elizabeth Ann Bartholomew’s untiring service to the public, to plant systematics, and to the organization. The award is presented to individuals who have distinguished themselves in professional and public service that advances our knowledge and appreciation of the world of plants and their scientific, cultural, and aesthetic values, or exceptional service to the society.

The 2015 recipient of the Elizabeth Ann Bartholomew award is **Dr. Patricia Cox**. Pat has been dedicated to a wide variety of education and botanical activities including University of Tennessee Botany Program, Tennessee Rare Plant Council, The Great Smoky Mountains Wildflower Pilgrimage, Discover Life in America, and Tennessee Valley Authority. She has served in many leadership roles in both SABS and ASB.

Election results

Member-at-large to Council – Jennifer Boyd

Membership Secretary – Michael Held

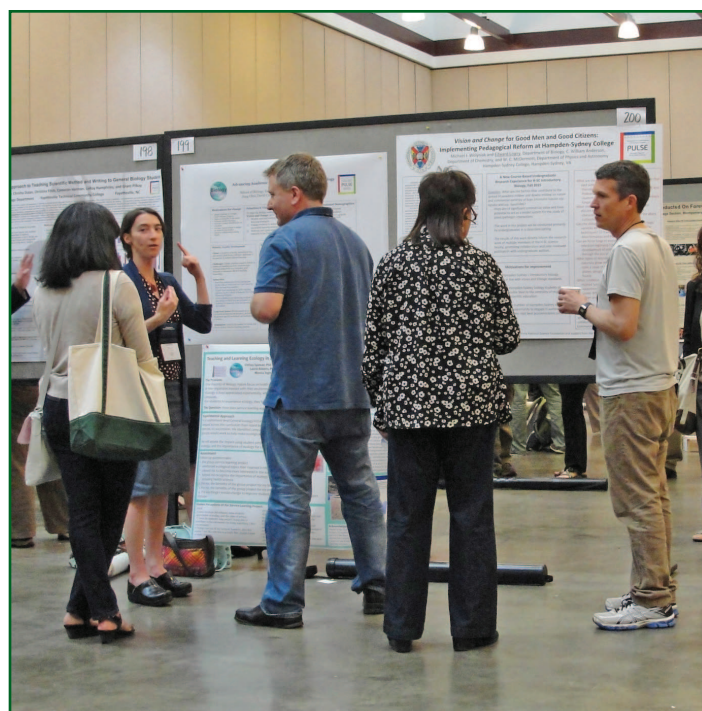
President-elect – Charles Horn

Approved for Emeritus Status

Steven Hill

Larry Mellichamp

Joe Winstead



News Flash: EKU Herbarium Named for Ron Jones

Eastern Kentucky University has announced that its herbarium will henceforth be named in honor of Dr. Ronald L. Jones, who has served as its curator since 1981. Dr. Jones is a long-time member of the Southern Appalachian Botanical Society and serves as the Book Review Editor for *Castanea*.

Ron Jones is well known as the author of *Plant Life of Kentucky. An Illustrated Guide to the Vascular Flora* (2005) and co-author (with Eugene Wofford) of *Woody Plants of Kentucky and Tennessee: The Complete Winter Guide to Their Identification and Use* (2013), both published by the University Press of Kentucky. Under his direction, the EKU herbarium has grown to over 80,000 specimens, the largest in the state.

The Southern Appalachian Botanical Society offers hearty congratulations to Ron on this well-deserved honor.

CHARLES N. HORN, PHD, TREASURER
SOUTHERN APPALACHIAN BOTANICAL SOCIETY
NEWBERRY COLLEGE
2100 COLLEGE STREET
NEWBERRY, SC 29108

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A NEW APPROACH TO KEY CONSTRUCTION: PARTICIPANTS WANTED!

By Rebecca Dellinger-Johnston

I am a graduate student at UNC Greensboro working with Dr. Bruce Kirchoff on a new method of creating visual identification keys. You can learn about Dr. Kirchoff's previous work on this subject at <http://aobpla.oxfordjournals.org/content/2011/plr005>. I am extending this work by developing a way of automating key creation by incorporating information on visual similarity garnered from an on-line survey that I have developed.

I need your help in order to investigate how individuals with a strong botanical background assess visual similarity in plant characteristics. My work uses a survey to assess the visual similarities between the acorns of different species of oak. The survey contains 75 questions, each consisting of two standardized pictures of acorns displayed side by side. You are asked to rate the visual similarity of the acorns with a rating scale that will appear below the images. I will use the results of these aggregated similarity assessments to create a dendrogram, which will be used as the basis for creating the visual key. The survey will take approximately 20 minutes to complete. Your responses will be

stored under an anonymous ID. Neither Dr. Kirchoff nor I will have access to your real name or any information about you. If you choose to participate, please go to https://uncg.qualtrics.com/SE/?SID=SV_1UggIKNWdPLSYSN.

Or, for easier access, go to <http://quercusrus.blogspot.com/> and click on the link provided. The survey site will ask you to confirm your consent to participate before beginning the survey.

Thank you for helping with my work. With your help I plan to create and test a visual key to the oaks of the southeastern US. I expect this key to be more accurate and easier to use for both botanical novices and experts alike. If you have any further questions or want to be updated on the work, you may contact me at the email address below.

Rebecca Dellinger-Johnston
radellin@uncg.edu

Dr. Bruce Kirchoff
Professor of Biology at UNCG
kirchoff@uncg.edu