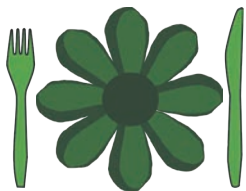


# CHINQUAPIN

THE NEWSLETTER OF THE  
SOUTHERN APPALACHIAN BOTANICAL SOCIETY

VOLUME 24 (1)  
SPRING 2016



## Edible Wild Plants: The Wonderful Walnut

By Lytton John Musselman,  
Old Dominion University

[Editor's Note: This is the inaugural installment in Lytton Musselman's new series on edible wild plants, which was described in our previous issue. Bon appétit!]

Of all the commonly-eaten nuts that are native to the eastern United States, black walnut (*Juglans nigra*) is the most widespread. The related pecan (*Carya illinoensis*) is more restricted and southern in its native distribution but widely planted throughout the south. Our native chestnut (*Castanea dentata*) has gone the way of rational political discourse and typewriters. Black walnut is a well-known resource for wood, nuts, and stain, and lesser-known products including syrup, cordials—even a dentifrice.

### Nuts and Fruits

Tryma. More than botany babble, tryma is the technical term for the specialized fruit of the walnut—so technical that I have never heard a botanist actually use it for the round, green fruits borne in late fall. The unique term—when used—signifies the origin of the “husk” of the fruit because the husk is not derived from the flower; it is from bracts and associated structures at the base of the female flower.

It is easy to collect bushels of the fruits. However, removing the husk is tedious and staining. As a boy in southern Wisconsin, I collected nuts with my family. Unlike many trees, most walnuts seem to produce a suitable crop each year. After drying and turning jet black we put them in a gunny sack, placed the sack on our driveway, and my dad would drive over them several times with his Studebaker. The hard nuts were then easily separated from the chaff of the husk. Long Wisconsin winter nights were a good time to retrieve the delicious meat from the ironclad nuts.

Black walnut is my favorite nut because of its rich taste, the reason it is valued in cooking and snacking. One way I enjoy them is by making black walnut chips. This involves coating a leaf with walnut paste. Utilizing wild plants, I use young basswood leaves when they are less than two inches long. Take one cup of walnut meats, water, salt to taste. Blend until the consistency of hummus. Coat leaves with paste. Dry in a food dehydrator for 12 or more hours. I have also used sour dock (*Rumex acetosella*) leaves—they add a nice tang.



### A Syrian Treat

I worked as a botanist in Aleppo, Syria in happier days. It was a gourmand's paradise. One of the Aleppo delicacies is candied green walnuts made from the Persian walnut (which we call English walnut), *Juglans regia*. In the middle of the summer, before the stony wall of the nut hardens, the young green fruits are harvested and boiled in sugar syrup with cloves. These are traditionally served as a dessert or with coffee. To my knowledge, black walnut has not been used for this purpose but preparation should be similar.

### Waffles and Walnut Syrup?

An acquaintance in Syracuse, New York (known as the salt city because of the once dominant industry of salt mining) produces syrup from several native trees including black walnut. In general appearance and taste, I would have a hard time distinguishing the black walnut syrup from maple syrup though I think I detect a hint of black walnut in the finish. You can contact Salt City Syrup at [fierce@hotmail.com](mailto:fierce@hotmail.com)

### A Walnut Toast

That's right, a walnut toast-- not toasted walnuts. Peter Schafran and I are making aperitifs and cordials from as many of the native plants of the Eastern United States as possible. Fortunately, we tried black walnut. The cordial is made from the immature fruits, not from the seeds. This unusual drink is easy to prepare.

Edible Plants continued on Page 3

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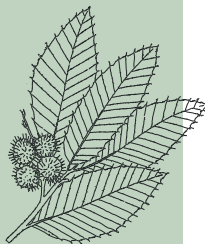
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**From The Editor's Desk:****Joe Pollard, Newsletter Editor**

Here's the belated spring issue. Ideally it would have reached you before the SABS/ASB Annual Meeting, but I was delayed for several reasons, and the meeting has come and gone. SABS news items from the meeting are listed below. Financial reports and minutes will be included with the summer issue, as usual. Hopefully you won't have too long to wait for it. Enjoy the spring weather!

**NEWS FROM THE ANNUAL MEETING****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.

Outstanding Student Oral Paper Award

**Peter Schafraan** (Old Dominion University), Towards a Phylogeny of *Isoetes* in the South-eastern United States

Outstanding Student Poster Award

**Nikolai Hay** (Appalachian State University), Preliminary Analysis of Genetic Diversity in *Geum radiatum* Suggests Inter-Population Diversity

**Core Student Research Award**

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

**Eranga Wettewa** (Mississippi State University) for her proposal "EPIC markers for understanding evolutionary diversification in *Platanthera* (Orchidaceae)." Her advisor is Dr. Lisa Wallace.

**M. Taylor Perkins** (University of Tennessee - Chattanooga) for his proposal "Phylogeographic examination of *Castanea* Mill. (Fagaceae) morphotypes in the eastern United States." His advisor is Dr. Hill Craddock.

**Student Conference Support Awards**

In a new program this year, students were invited to apply for funds to offset the cost of attending the annual meeting. Awardees were: **Sean Binninger, Cameron Byrd, Thom Green, Ashley Hawk, Cassandra Karlsson, and Adam Ramsey**

**Richard and Minnie Windler Award**

Two awards are presented annually; first to the author or authors of 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.

Systematics – **Jessica Allen and James Lendemer**. "*Japewiella dollypartoniana*, a New Widespread Lichen in the Appalachian Mountains of Eastern North America" *Castanea* 80(1): 59-65.

Ecology – **Lauren Howard**. "A Quarter-Century of Change Without Fire: The High-Elevation Pitch Pine Community on Panther Knob, Pendleton County, West Virginia" *Castanea* 80(3) 193-210.

**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 also 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 recipient of the 2016 Elizabeth Ann Bartholomew Award is **Dr. Lytton John Musselman** of Old Dominion University.

**Election Results**

The SABS Council will be joined by the following newly-elected officers and members:

Treasurer: **Kunsiri "Pum" Grubbs**

Recording Secretary: **Jay Bolin**

Members-at-large to Council:

**Lisa Wallace and Steph Jeffries**

*"The comparison of a grass and a tree, of a meadow and a forest, is a sterile exercise until it is remembered that a tree, as a seedling, is also a small plant. Then the herbaceous plant is perceived as the incipient stage of a larger and woody plant induced to flower precociously."*

E.J.H Corner, 1964, *The Life of Plants*, University of Chicago Press, p. 269.

## “*Caroliniana*”? – not so fast...

By Alan Weakley, University of North Carolina Herbarium (NCU), North Carolina Botanical Garden

Some years ago I was leading a field trip in North Carolina for a dozen plant ecologists from other parts of North America, and we happened upon Atamasco Lily (*Zephyranthes atamasco*; Amaryllidaceae) in flower. Initially, everyone exclaimed excitedly about the striking white flower, until a (dis)quiet set in, and then the question – “wait a minute, is this NATIVE?” Once reassured that it was, the delight and acclaim started over with new enthusiasm.

As botanists, conservationists, land managers, and gardeners, one of the things we want to know about a plant species is whether it is native – its context. For most plants in the flora, nativity is an easy and obvious thing to know. We deduce it in various ways. In general, native species occur in “natural” habitats, they often have rather specialized habitats, they were recorded as occurring in our area “early” (but see below!), they do not occur elsewhere, and they are related to other native species that are North American or West Indian. By contrast, alien species occur in “disturbed” and often unspecialized habitats, they were not recorded in our area until more recently, they are known to occur elsewhere (such as on other continents), and they are often unrelated to other native species.

So, Common Dandelion (*Taraxacum officinale*; Asteraceae) in the southeastern United States is clearly alien: generally found in human-dominated habitats, abundant in Europe, with no native members of the genus in eastern North America (south of Canada). Trailing Wolfsbane (*Aconitum reclinatum*; Ranunculaceae) is clearly native: morphologically distinct from all other species of its genus, with a narrow distribution in the Central and Southern Appalachians, with a distinctive habitat (bouldery and/or seepy areas over calcareous or mafic rocks at middle to high elevations), and discovered and named in 1841.

Scientific names (the specific epithet the plant bears) provide additional hints. The North American exotic status of *Taraxacum officinale* is telegraphed by the epithet ‘*officinale*’, indicating that it had an established medicinal or culinary use (in Europe) when named in 1753. Epithets such as ‘*chinensis*’, ‘*europaea*’, ‘*anglicum*’, ‘*italicum*’, and ‘*japonicum*’ also suggest that the plant was originally found in that country or continent and is therefore likely alien in North America. Conversely, ‘*caroliniana*’, ‘*virginianus*’, or ‘*canadense*’ suggest North American nativity.

But all of these kinds of evidence sometimes fail. Epithets can be misnomers, because of confusion by the naming scientist. Eastern North American natives Hemlock-parsley (*Conioselinum chinense*; Apiaceae) and Common Milkweed (*Asclepias syriaca*; Apocynaceae) are not natives of China or Syria; *Conioselinum chinense* missed being placed on North Carolina’s Rare Plant List for decades because none of the southern botanists in the state recognized that its single population in the state was native and a notable disjunction from its northeastern North American distribution! Allegheny Barberry (*Berberis canadensis*) is native to eastern North America, but never ranged north to Canada.

A sampling of ‘Carolina’ epithets will illustrate the potentially misleading aspects of judging plants by their epithets. Among the 82 currently recognized plants in the Southeast with ‘Carolina’ epithets are some that are common in Carolina and always have been, some that are common there now but may not have been a few hundred years ago, some that are rare there in rare habitats, and some that are not even native. Among those that are common and characteristic are Carolina Willow (*Salix caroliniana*; Salicaceae), Carolina Wild-petunia (*Ruellia caroliniana*; Acanthaceae), and Muscle-tree or American Hornbeam (*Carpinus caroliniana*; Betulaceae). Carolina Bull-nettle (*Solanum carolinense*) and Carolina Pony-foot (*Dichondra caroliniensis*) are both common ‘native weeds’ usually seen in human-dominated habitats; their native distribution and abundance in the past is uncertain. Carolina Grass-of-Parnassus (*Parnassia caroliniana*; Parnassiaceae), Carolina Thistle (*Cirsium carolinianum*; Asteraceae) and Carolina Thimbleflower (*Anemone caroliniana*; Ranunculaceae) are rare plants in the Carolinas; the latter two might better be called ‘*arkansana*’ if scientific names were less based on happenstance and history (and perhaps their common names should be changed to reflect that they are primarily midwestern taxa). And, Carolina Dayflower (*Commelina caroliniana*; Commelinaceae) has now been quite convincingly shown (by Robert B. Faden) to be a native of southern Asia, having been early introduced into the southeastern United States, probably as a contaminant in rice seed.

In Part 2, let’s ponder “what do we really know about the ‘native’ distributions of plants in the United States in, say, 1491?”...

[The second part of this series will be featured in our summer issue – Ed.]

### Edible Plants continued from Page 1

Collect the fruits as late in the season as possible but before the “husk” becomes discolored or, as often happens, infested with insect larvae. Mid-September is the best time in southeastern Virginia. Put ten fruits in a two-quart glass jar and add five cups of vodka. (To standardize our productions, we always use Smirnoff). Leave in a cool dark place for at least one year. To make the cordial, decant the black liquid so that any residue is left behind and add one cup simple syrup (1:1 sugar/water). I recommend storing in the refrigerator as some cordials develop an unsightly precipitate when left at room

temperature. The taste is definitely walnutty but with a mild bitter finish. This pairs well with Stilton cheese.

Some time after preparing our black walnut cordial, I was in Martina Franca, Italy and found an Italian liqueur called Nocino. It is prepared from the Persian walnut but has a similar taste to our cordial.

Read Lytton Musselman’s Edible Wild Plant blog at <http://fs.wp.odu.edu/lmusselm/2015/11/24/wonderful-walnut-4/>



## BOTANICAL EXCURSIONS

## North American Bamboo: River, Switch &amp; Hill Cane

By George Ellison (www.georgeellison.com)

Artwork by Elizabeth Ellison (www.elizabethellisongallery.com)

River Cane, by Elizabeth Ellison.



*In wind, fair weather, rain or dew, bamboos behave in a characteristic manner. Whether they are bending over or standing upright, hidden or exposed, each aspect has a particular form and integration. Each movement . . . must be felt through the heart for full understanding of the expressiveness of bamboo.*

--Mai-mai Sze, The Way of Chinese Painting

For years Elizabeth and I have been admirers of the little woodland cane local people and most botanical manuals referred to as switch cane. It adds an Oriental touch that seems appropriate to our Appalachian landscapes, especially in winter. Many plants, after all, occur in eastern Asia and the Southern Appalachians, but no other place in the world.

For more than 200 years after the plant explorer Andre Michaux named the genus *Arundinaria* in 1803 there has been taxonomic turmoil in its regard. By the late 1980's many (but not all) observers recognized the presence of two native bamboos in the southeastern United States: "river cane" (*Arundinaria gigantea*) and "switch cane" (*Arundinaria tecta*). But lo and behold, in the 1990s a third candidate emerged that—after due diligence by the powers that be—was in 2006 granted species status as *Arundinaria appalachiana*, aka "hill cane."

Western North Carolina is situated at the epicenter of the apparent range for hill cane, but it is also found in the mountains and upper piedmont regions of east Tennessee, northeast Alabama, north Georgia, and northwest South Carolina. There's every chance if you live within those parameters you have either river cane or hill cane or both growing in your vicinity. It's not likely that you have switch cane as its apparent range is now considered to be restricted to the coastal plain. Here's what to look for:

River cane is a perennial grass or bamboo with a rounded hollow stem that can be almost three inches in diameter and grow to a height of over 30 feet in brown-water flood plains or a moist forest understory up to perhaps 2000 feet. It occurs throughout the southeast, where it once thrived in immense cane brakes mostly decimated by human development. The plant is still of economic and cultural significance for the Cherokees as it is one of the primary items used in making baskets.

As indicated above, switch cane is now thought to be pretty much restricted to the coastal plain. Like hill cane it is low-growing (up to several feet in height) but is restricted to swamps and very wet areas, whereas hill cane grows along the crests and slopes of hills and ridges, especially in oak-hickory forests.

In *Trees, Shrubs and Woody Vines of Great Smoky Mountains National Park* (1963), naturalist Arthur Stupka reported stands of switch cane occurring in the national park at elevations approaching 3500 feet. We now know that Arthur was in fact observing hill cane.

The primary morphological difference between hill cane and switch cane is that the former species is mostly deciduous. A few leaves may remain attached through winter but most will be found spread out on the ground like a brown coverlet that turns gray with age.

Herewith are some additional observations about or pertaining to hill cane culled from an article by Jimmy Triplett et al., titled "Phylogenetic Relationships and Natural Hybridization Among the North American Woody Bamboos" (Poaceae: Bambusoideae: *Arundinaria*), published in 2010 by the *American Journal of Botany* (39, 471-492), or online at <http://www.amjbot.org/content/97/3/471.full.pdf>.

Bamboo continued from Page 4



River Cane, by Elizabeth Ellison.

*The temperate bamboos exhibit extensive morphological variation . . . and intergradation is common. Published treatments vary widely in character interpretation, leading to confusion and disagreement regarding the number and rank of taxa.*

*The flowering behavior of Arundinaria species is not well documented, but they appear to be either sporadic or cyclical flowerers. Arundinaria gigantea apparently flowers every 20–25 years, while A. tecta may flower as frequently as every 4–7 years. No information on flowering is available for A. appalachiana.*

*All three species are presumed to be wind-pollinated and probably have mechanisms to facilitate outcrossing, including*

*stigmas that develop after pollen is shed . . . Typically in woody bamboos, the flowering period extends over several months, providing ample opportunity for wind pollination.*

*Like other bamboos, Arundinaria reproduces extensively by rhizomes . . . but it is unknown how frequently new clones arise or are established in natural populations.*

A brief account of the relatively recent discovery of hill cane, provided in an Iowa State University news release ‘Botanists Identify New Species of North American Bamboo’ (March 12, 2007), reads, in part:

*Iowa State University botanists Lynn Clark and Jimmy Triplett . . . discovered a new species of North American bamboo in the hills of Appalachia . . . They first heard about "hill cane" from University of North Carolina botanist Alan Weakley. As soon as they saw it, they knew it was different. Lynn Clark, Iowa State professor of ecology . . . and Ph.D. student Jimmy Triplett study bamboo diversity and evolution . . . Although the plant was known to the people in the area, its distinctiveness was not recognized. Hill cane differs from the other two native North American bamboo species . . . in an important way: It drops its leaves in the fall.*

*"That's why it was recognized locally as being different," Clark said. "It's pretty uncommon for bamboos to drop their leaves."*

*Clark should know. She's an internationally recognized bamboo expert. She had previously discovered 74 new species of bamboo.*

*"All of the other new ones came from Central and South America," she said. "It's so exciting to find a new species in our own backyard!"*

(Note—This column originally appeared in January 2016 in an abridged format in my weekly Nature Journal column published by the Asheville Citizen-Times. It will be one of the 50 essays included in a collection titled *Literary Excursions in the Southern Highlands: Essays on Natural History* to be published with Elizabeth Ellison's artwork by The History Press in Charleston SC later this year.)

## SABS Welcomes Our New Members

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# Botanical Brainteasers

By Joe Pollard and Janie Marlow

Our winter Brainteasers [Chinquapin 23(4)] were (1) *Lonicera japonica*, (2) *Microstegium vimineum*, (3) *Clematis ternifolia*, (4) *Phytolacca americana* and (5) *Murdannia keiskei*. All these plants are “weeds” - at least in the sense of being easily dispersed successional pioneers that are common in sites of anthropogenic disturbance. All of them are to some extent “noxious,” though all that really means is that some people don’t like them!

But which is the odd one out? Numbers 1, 2, 3, and 5 are all invasive exotic species, originally from Asia. *Phytolacca americana*, pokeweed, may be a weed, but it’s OUR weed. As the specific epithet suggests, it’s indigenous to America, especially the southeastern United States. But be sure to read Alan Weakley’s article in this issue for information about the pitfalls of judging the native range of a species based on its scientific name. Anyway, whether you hate it or love it, pokeweed belongs here, so it’s the odd one out.

Five readers submitted responses, and all of them got the identifications and the puzzle exactly correct! I guess that shows how familiar we are with invasive plants and weeds, unfortunately. So we have to break the tie based on how the speed of response, and the first one submitted was from Sam Pratt of Inman, SC, so he is the winner of the fall Brainteaser. Sam submits excellent entries for every challenge, and his persistence pays off: he’s also the grand winner for volume 23 - Congratulations, Sam!

We’ve been saying all year that the player with the most total points over the course of volume 23 will receive a copy of Linda Chafin’s new book on Wildflowers of Georgia. It is scheduled for publication on June 1, and as soon as we can get hold of a copy, we’ll be sending it to Sam.

Now we’ll start a new series. As usual there are five pictures: you need to identify them by scientific name, and then explain which is the odd one out and why it doesn’t belong. At the end of volume 24 we’ll award the player with the best record a copy of “Literary Excursions in the Southern Highlands” – currently in press – by our regular columnist George Ellison.

Please address all correspondence regarding Botanical Brainteasers to [joe\\_pollard@att.net](mailto: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. Color photos will be posted online at <http://sabs.appstate.edu/chinquapin-issues>. Images are ©JK Marlow unless otherwise marked.



No. 3



No. 1



No. 4



No. 2



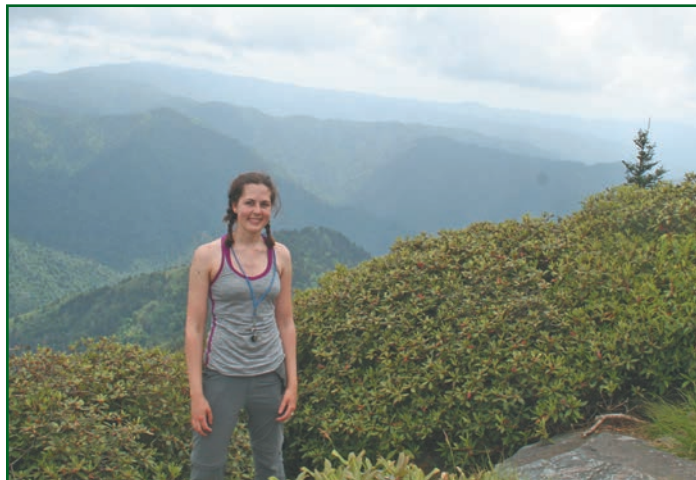
No. 5



# Earl Core Student Report

## Systematics and Biogeography of *Carex* section *Laxiflorae* (Cyperaceae)

Jenna E. Dorey, The New York Botanical Garden



The author at Mount LeConte

When I first reveal that I am working on the systematics of *Carex*, a frequent first reaction is to commend me for my bravery. I enjoy receiving this reaction because it gives me an opportunity to explain that sedges are exciting and fascinating. With over 2100 species, *Carex* is one of the most species-rich genera in the world, and the most species-rich genus in the temperate Northern Hemisphere. Many species of *Carex* are ecological specialists, and one can often infer a vast amount about the biology and geology of an area just by observing the sedge flora. In eastern North America, one of the botanically best explored regions in the world, taxonomic problems persist in sedges because the diversity, biology and ecology of this incredibly important group are understudied. For me, reconstructing the evolutionary history of *Carex* is an exciting challenge and one of North America's most interesting remaining taxonomic puzzles.

The goal of my PhD research is to produce a systematic revision of *Carex* section *Laxiflorae*, a North American clade of forest understory sedges composed of sixteen species, with diversity centered in the Southeast United States. The section is plagued by difficult species complexes, especially *Carex laxiflora* and *C. blanda*, where identification is confounded by high phenotypic plasticity, overlapping measurements for diagnostic characters, and conflicting historical circumscriptions. Section *Laxiflorae* is disjunct between eastern North America and the Pacific Northwest; the origin of this disjunction is not fully understood, as higher relationships of section *Laxiflorae* remain unclear. Alternative hypotheses posit that 1) the sister clade is composed of North American members of sections *Panicaceae* and *Bicolores*, and 2) the sister taxa are East Asian species frequently circumscribed to section *Panicaceae*. My research aims to infer the geographic origins of section *Laxiflorae* by examining phylogenetic relationships of the section, estimate the timing of historical biogeographic events leading to the present-day disjunct distribution, and revise the taxonomy of the section through an integration of morphometrics and molecular phylogenetics.

During the past two field seasons I have travelled to 13 states across the US Midwest, Northeast, Pacific Northwest, and Southeast widely sampling sedges in section *Laxiflorae* and close relatives in sections *Panicaceae*, *Bicolores*, *Griseae*, *Careyanae*, and *Granulares*. Though the species of sect. *Laxiflorae* are widespread throughout eastern North America, the Southeast has been the most important region for field work, as it is the center of diversity of the section. Thirteen species are found in the Southeast, eight are in the Southern Appalachians, and two — *C. radfordii* and *C. manhartii* — are Southern Appalachian endemics. Thanks to support from the Southern Appalachian Botanical Society, my field research included a week at Highlands Biological Station, near the crest of the Blue Ridge Mountains, collecting tissue samples and voucher specimens of sedges in the Nantahala National Forest.

Observing and collecting specimens in the field is an indispensable part of any revisionary project, but existing herbarium specimens can be an equally useful source of data for both molecular phylogenetics and morphometrics. In my preliminary morphometric work on the *Carex laxiflora* species complex I have measured 16 characters on 42 specimens from my personal collections and herbarium specimens, and I have identified several potential phylogenetically informative morphological characters. I am continuing to measure additional specimens and search for new and useful micromorphological characters, and I am beginning work to evaluate the morphological diversity in the *C. blanda* species complex.

My preliminary molecular work has generated 150 sequences from 50 DNA samples of silica-dried material and herbarium speci-

*Carex radfordii*

Earl Core Report continued on Page 8



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#### Earl Core Report continued from Page 7

mens representing 37 different taxa in section *Laxiflorae* and five closely related sections. I performed PCR amplifications for three gene regions — two nuclear and one chloroplast — sequenced the DNA, and aligned the sequences with the program MUSCLE. The separate and concatenated aligned data were analyzed in RAxML, a program for maximum likelihood inference of phylogenetic trees. The resulting trees from the different genes were topologically incongruent, and many shallow nodes below section-level had low bootstrap support. Interestingly, all of the trees failed to recover a monophyletic section *Laxiflorae*. Several *Laxiflorae* species were recovered in a clade with members of sections *Paniceae* and *Bicolores*, which are distributed across both North America and Eurasia. Moving forward, I am expanding my sampling to include taxa from

Europe and eastern Asia and also working to include new molecular markers. This summer I will be conducting field work to sample members of sections *Paniceae* and *Limosae* in Japan, which holds the highest diversity for these sections in eastern Asia. These data will hopefully provide additional characters to delimit sectional relationships and enable me to perform ancestral area reconstruction to estimate the spatial and temporal evolutionary history of this interesting distribution.

I would like to thank the Southern Appalachian Botanical Society again for selecting me for the Earl Core Student Research Award, which allowed me to sample *Carex* in the Southern Appalachians of Western North Carolina. I would also like to thank the US National Forest Service for permission to conduct research in the Nantahala National Forest.

*“There should be no schism between the pure and applied aspects of biology. Moreover, it is to be hoped that ... professional scientists will concentrate more and more on examining the living plant in its outdoor environment, for we believe that increased food production, enlightened nature conservation and a proper use of biological resources can only come if people appreciate and understand the patterns of plant and animal variation found all around us.”*

David Briggs and S. Max Walters, 1984, *Plant Variation and Evolution*, p. xiii.