

CHINQUAPIN

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SOUTHERN APPALACHIAN BOTANICAL SOCIETY

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Conjurer's Nut? Or Not: *Nestronia umbellula*

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

William Bartram encountered *Nestronia umbellula* in his travels and records Native Americans using the fruit as a charm when hunting game, giving this rare, obscure shrub the “common” name of conjurer’s nut—though the fruit is not a nut. I prefer the simpler common name of nestronia.

While a doctoral student at Chapel Hill I asked the late Al Radford what habitat I should search for this parasitic shrub, needed for my anatomical research. His response was “tobacco barns”. The reply of the doyen of southeastern botany reflects how little is known about the habitat and behavior of this relative of sandalwood. (There has been much realignment with the taxa once included in the Santalaceae, but nestronia remains.) However, in part Radford was correct because nestronia will grow in disturbed areas like riverbanks and second growth forests and even around tobacco barns (which today are probably endangered structures).



Branch of nestronia showing opposite leaves.

A moderate sized, much branched clonal shrub, nestronia occurs in eight states in the Piedmont region of the Southeast. Leaves are opposite and unremarkable. The shape of the leaves and the mahogany brown color of the stems (Fig. 1) resemble those of sweet shrub (*Calycanthus floridus*). In fact, nestronia, despite its intriguing livelihood and female-depauperate sex life can rightly be classified as a “blah bush”,

modestly blending into the understory of pine woods.

This species is dioecious but the ratio of staminate to pistillate plants is drastically unequal. Pistillate plants are extremely rare. I have visited most of the populations in the Southeast and have seen only two pistillate plants! How is this explained? The only study on population biology and reproduction was done by F. C. Sowers as a master’s thesis at the University of North Carolina, Charlotte. He suggested that the paucity of fruit was due to pollinators being



Nestronia staminate flowers. In a single umbel, flowers can be either three or four-merous. Along the Banister River, Pittsylvania County, Virginia.

drawn away from nestronia by the introduced honeysuckle (*Lonicera japonica*) which has a very similar scent. But this does not explain the ratio of staminate to pistillate plants, a mystery to be further studied.

Flowers are small, yellowish-green, and borne in umbels. Rafinesque, who erected the genus, thought the flowers (Fig. 2) resembled those of daphne (*Daphne* species, Thymeleaceae). The genus name *Nestronia* is based on the ancient name for daphne. Fruits are produced in mid-summer and are about the size of a cherry, yellowish green in color and with a large single seed surrounded by a thin layer of pulp (Fig 3). How they are dispersed is another mystery. I collected a few fruits and was going to grow them, having had success with other shrub parasites including buffalo nut (*Pyrolaria pubera*) and buckleya (*Buckleya distichophylla*). However, at the time I was preparing the treatment for the Generic Flora of the Southeast and was requested to yield the fruits for dissection and illustration. Alas, the conjurer’s fruit did not guide me and that flora project was discontinued shortly thereafter with the loss of my specimens.

Like the other hemi-parasitic shrubs in the Southeast, nestronia is an opportunist, so it attaches to a diversity of woody hosts. And in common with this guild of parasites, the haustoria of nestronia are large (up to 0.5 inches) and have distinct folds (known as the mantle) that enwrap the host root.



Mature nestronia fruit. Stanly County, North Carolina.

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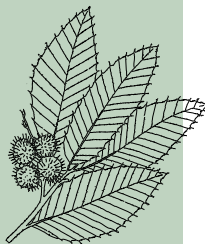
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From The Editor's Desk: Where are the Students?

Joe Pollard, Newsletter Editor

Just before this issue of *Chinquapin* went to press, the SABS council members met for their mid-year working session. We had a very productive full day of meetings at Furman University. Complete reports will be presented to the membership next spring at the annual meeting.

As always, we received reports on the membership numbers. After dwindling for several years, the overall numbers seem to have stabilized recently, which is good news. The current total is 419 members, in various categories. However, as I examined Mike Held's very comprehensive report, two numbers just kept jumping out at me. The society currently has 233 regular members (the biggest category) and 29 student members. Only 29 students?

When I teach population ecology, I tell my classes that a population age-structure diagram that is narrow at the bottom, as in certain European countries today, is predictive of future population shrinkage. Student members of SABS are the future professional botanists of our region, so I find this situation worrying, both for our society and for our discipline.

I know organismal botany isn't the trendiest field of study, but I'm also certain there are a lot more than 29 botany students in the Southeast! I'm guessing at least half of those 233 regular members are faculty at universities and colleges, and each of us probably has one or two students, if not more. So the reality isn't a shortage of students, but simply that they haven't joined SABS. Perhaps they've never been encouraged to do so.

Student members of SABS receive tangible benefits such as the ability to apply for research funds through the Earl Core

fund and the opportunity to compete for student paper and poster awards at the annual meeting, in addition to receiving *Chinquapin* and getting easy access to *Castanea*. The most important benefits may be less tangible – the ability to list a respected professional society on their résumé, and an opportunity to network with other botanical students and professionals throughout the region. The student membership rate of \$20 per year is probably not an insurmountable hurdle. I really think the biggest problem is just getting the word out.

So I would ask all you SABS members who are college faculty to encourage your students to join. Send them a link to the SABS web-page, which now allows online membership registration. Or even better, buy them a gift membership. The Council has agreed to extend last year's promotional offer: if you sign up four new members, you can get a year's membership at the e-Journal rate at no cost. (If you prefer to receive *Castanea* on paper, you would get a \$45 discount.) To claim this benefit, it may be easiest to fill out all five membership forms on paper and mail them together to the treasurer, with a note requesting the free membership promotion on yours.

Finally, for the student members who may be reading this, WE'RE GLAD YOU'RE HERE! If you have any suggestions on how SABS can increase its student membership, we'd love to hear them; feel free to contact me or any member of the SABS council.

SABS Welcomes Our New Members

Daniel Breen
Robert Floyd
Fredrick Rich

“Was it not strange that Charles Darwin, who confessed himself ‘unable to tell a daisy from a dandelion’ (though in this he was rather poking fun at himself), should be the one not to follow the botanists but to lead them?”

Allan, Mea. Darwin and his Flowers.
New York, Taplinger Pub. Co., p. 116.

Sliding Toward Extinction: *Thalictrum debile*

Linda Chafin, Conservation Botanist,
State Botanical Garden of Georgia, Athens

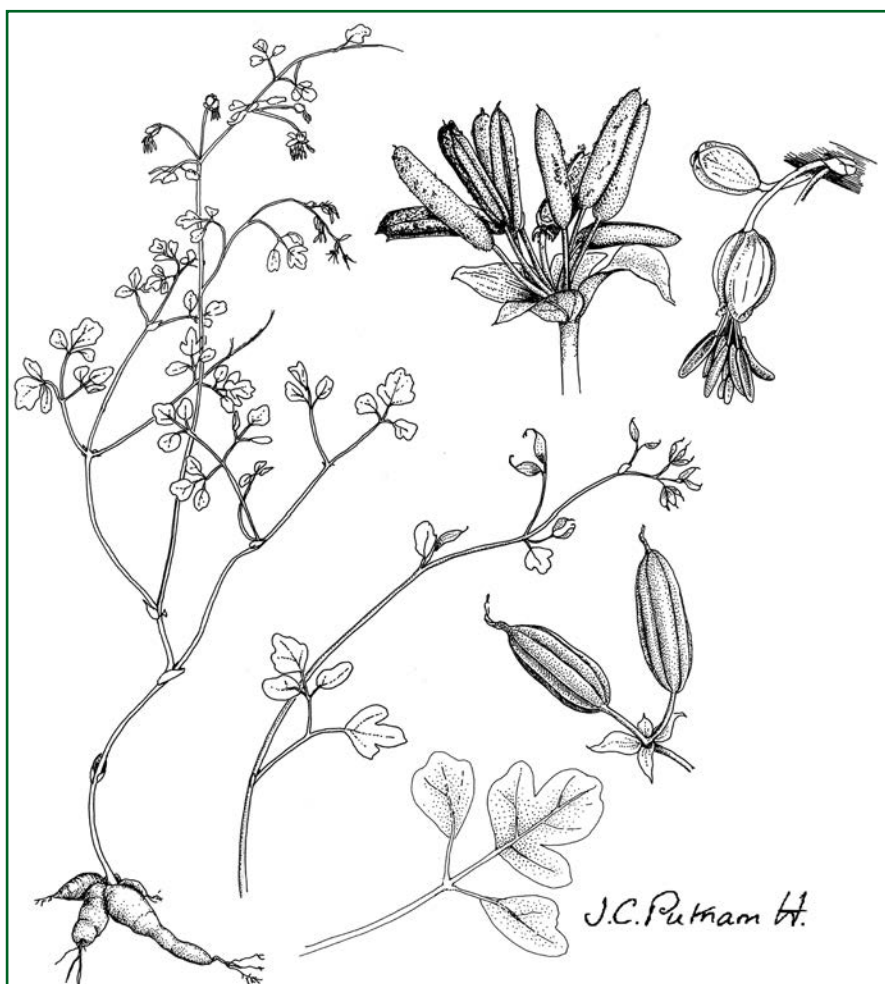
For years, or in some cases decades, dozens of plant species languished in a sort of bureaucratic no-man's land called federal candidate status. No one argued that these species were in trouble – there was enough information on their vulnerability to justify listing them as endangered or threatened. But other species had a higher claim on the budgetary resources needed to actually move the species through the system toward listing. As candidates, these 75 plant species lacked even the limited protection afforded to plants under the Endangered Species Act. Thanks to a legal settlement, finalized in 2011, between the U.S. Fish and Wildlife Service and The Center for Biodiversity, decisions to list these species (or not) must be reached by 2018. The 2011 settlement has been challenged at least four times by industry groups that allege that increased listings under the ESA will hurt property values and limit energy development. So far, the courts have turned back these challenges. (For a list of the species included in the settlement, see http://www.biologicaldiversity.org/programs/biodiversity/species_agreement/taxa.html#plants)

Over the decades, some of the plants on the candidate list have been pulled back from the brink by state natural resource agencies and conservation groups. But in states where plant conservation happens under the political radar, if at all, some of these species are

fast sliding toward extinction. For these, listing under the Endangered Species Act may come too late. *Thalictrum debile*, Southern or Trailing Meadow-Rue, is one example. Found in rich forests over limestone-based floodplains, *Thalictrum debile* is a dioecious perennial with slender, trailing stems. Its leaves are typical of *Thalictrum* leaves, bluish-green with several rounded, lobed leaflets per leaf. Both pistillate and staminate flowers are in small, inconspicuous clusters. The plants are ephemeral, disappearing quickly underground after an early spring flowering and fruiting. They have small taproots but lack rhizomes and do not reproduce vegetatively. They are not strong competitors and their delicate stems would be easily overwhelmed by exotic invaders.

Thalictrum debile has been documented over the last century in a total of six counties in three states—Alabama, Mississippi, and Georgia. But natural populations are extant in only 3 of those counties, with one safeguarded (ex situ) population in an additional county in Georgia. Of the extant natural populations, only two occur on public land, on a single U.S. Army Corps of Engineers site that straddles the Alabama-Mississippi border. However, biologists for the USACE site only recently learned of the presence of *Thalictrum debile* on the site and learned of it only because of the species' inclusion in the legal settlement.

If *Thalictrum debile* were a federally listed species, the USACE populations would have received the highest level of protection that the Endangered Species Act offers plants. Without the recognition and scientific attention that comes with federal listing, these populations have slipped through the cracks. With federal listing, it's likely that more populations of *Thalictrum debile* will turn up because agency biologists and environmental consultants will be looking for them. With federal listing, populations on state and federal lands, and even some private lands, will likely receive the kind of monitoring and management that goes a long way to insuring a species' survival. Without federal listing, *Thalictrum debile* is liable to slip over the brink into extinction.



Endangered and Threatened Wildlife and Plants; Partial 90-Day Finding on a Petition To List 404 Species in the Southeastern United States as Endangered or Threatened With Critical Habitat. Federal Register / Vol. 76, No. 187 / Tuesday, September 27, 2011.

FNA. 1997. Flora of North America, Vol. 3, Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, New York.

Georgia Department of Natural Resources. Rare Plant Species Profiles: *Thalictrum debile*. http://www.georgiawildlife.org/node/2627#Scientific_Name.

Taylor, Phil. April 1, 2014. Court Upholds Massive Listing Settlements Between FWS, Greens. E&E News, Environment & Energy Publishing. <http://www.eenews.net/pm/2014/04/01>.

BOTANICAL EXCURSIONS

Viburnum lantanoides: “Stained Glass” in the High Country

By George Ellison, with artwork by Elizabeth Ellison

October is the month closely associated with fall colors. That's when most of the leaf-lookers from near and far arrive in the southern highlands, as they should. But some trees, shrubs and vines display peak colors at an earlier date. Witch hobble (*Viburnum lantanoides*, formerly *V. alnifolium*) unveils an array of hues—mauves, magentas, greens, purples, yellowish-oranges, maroons, reds, and more—the last two weeks in September that in the right setting can assume the luminous glow of stained glass.

Arthur Stupka, the naturalist (and later the biologist) for Great Smoky Mountains National Park from 1935 into the mid-1970s, was for decades the fall color savant for the Smokies region. Each year he predicted what the coming season might bring.

That was a role assumed in recent decades by Western Carolina University biologist J. Dan Pittillo, now retired. Our current savants are biologists

Kathy Mathews at WCU and Howard S. Neufeld at Appalachian State University, who contribute their insights and predictions on leaf color to the online “2015 Fall Color Forecast” site: <http://blog.exploreasheville.com/2015/09/2015-fall-color-forecast-prepare-for.html>.

In his *Trees, Shrubs and Woody Vines of the Great Smoky Mountains National Park* (1965), Stupka notes that, “In the latter half of September the hobblebush is at the peak of its autumnal leaf color and is then one of the most strikingly-arrayed shrubs in the park.” During a conversation in Bryson City with me prior to his death in 1999, Stupka described the leaf coloration as “truly remarkable.”

Before taking a closer look at witch hobble's fall color phase, it'll be useful to consider what's going on with the plant in other seasons that might shed light, as it were, on the fall phase.

James T. Costa notes in his *Highlands Botanical Garden: A Naturalist's Guide* (2012) that, “The viburnums constitute a group of 150 to 200 species of shrubs and small trees, primarily Northern Hemisphere in distribution.” There are eight in the southern mountains from western Virginia to north Georgia. Of those, two are primarily high-elevation species, being for the most part restricted to locations from 3,000 feet to the highest peaks: witch hobble and witherod or wild raisin (*V. cassinoides*). As might be

anticipated both have northern affinities, with core populations extending from central Pennsylvania into Canada.

Jim Costa also notes that, “The genus name *Viburnum* comes from the Latin name for one of the group's best-known European species: the wide-ranging (and so appropriately named) Wayfaring Tree, *V. lantana*.” The present specific epithet for witch hobble, *lantanoides*, calls attention to its close relationship with *V. lantana*.

Many of us still know witch hobble by its former specific epithet *alnifolia*, which referenced the resemblance of its coarsely-textured leaves to those of shrubs like tag alder, *Alnus serrulata*, and explains yet another of the common names: alder-leaved viburnum.

(It's not really apropos but amidst all of this background regarding taxonomic and common names, I can't help but pass along the pre-Linnaean classification of viburnum that I stumbled upon somewhere in the outer reaches of cyberspace: *Viburnum folliis cordatis serratis venosis subtus tomentosis*. Thank



Witch Hobble in Fall by Elizabeth Ellison.

goodness for Latin binomials.)

Witch hobble is a sprawling deciduous shrub. The slender main stems are ascending or erect with spreading sometimes pendulous branches that can reach 12 feet in height but are more often half that height. The ovate, sometimes heart-shaped, coarsely-textured leaves are four to eight inches long and about as wide, with noticeably-sunken veins.

The flower heads that bloom in May and June consist of a flat-topped terminal cluster about four inches across that is comprised of many small white fertile flowers in the center, surrounded by a ring of large white sterile flowers that attract bees and other pollinators. The berry-like fruits (drupes) turn from green to red to purplish black as they ripen in August and September. They are eaten by various birds and mammals.

The main stems of the shrub will sometimes arch downward until their tips touch the ground, forming roots and new shoots that in time separate from the parent plant. Under heavy snow or ice the branches are pressed to the ground rather than breaking off. In the process they also reproduce asexually, creating dense tangles of intertwined branches that are difficult to penetrate, unless you are a long-legged moose seeking a place of refuge in which to browse.

Viburnum continued on Page 21

Viburnum continued from Page 20



Witch Hobble in Flower, by Elizabeth Ellison.

The tangled growth and its association with foraging moose gave rise to additional common names: moosewood, tangle foot, hobble bush and hobble foot. And the deeply shaded tangles became associated with evil spirits, thereby evoking yet another common name: witch hobble. The Cherokees believed that witch hobble shrubs planted either side of the front door would ward off evil spirits by tripping them up.

Witch hobble leaves emerge several weeks before canopy trees open and shut out the sunlight. Research indicates this strategy – which might be labeled the spring ephemeral solution – increases the shrub's annual amount of photosynthesis.

In his *Wildflowers & Plant Communities of the Southern Appalachian Mountains and Piedmont* (2011), Timothy P. Spira provides an excellent overview of what might be labeled the Spring Ephemeral Solution:

The leaves of witch hobble emerge in early spring, providing several weeks of high light before canopy trees leaf out. During this short period of time, the leaves of witch hobble have an unusually high rate of photosynthesis, contributing almost 40-percent of the plant's net annual photosynthetic gain. With canopy closure, the leaves continue to be photosynthetically active, but at a much lower rate. Witch hobble has an unusual dual strategy, exploiting early season high light, as ephemeral herbs do, as well as maintaining low photosynthetic rates throughout the summer under a dense canopy much the way shade tolerant species do.

While working on this column I emailed Dan Pittillo to see what his thinking might be in regard to witch hobble's uniquely varied leaf color. I attached a copy of Elizabeth's illustration that accompanies this column:

Dan ... here's Elizabeth's rendering of what I think of as a sort of Stained Glass Window effect witch hobble leaves can sometimes display from late Sept into Oct given the right conditions (including being back lit by sunlight) ... any thoughts you have will be much appreciated ... you can see various stages of leaf color in google images ... George

His response was received in short order:

George ... What is likely going on is the level of pigment formation. Most leaves begin to lose chlorophyll as leaf abscission forms, temperatures drop, and sunlight becomes more intense as the air clears of moisture and clouds. This effect likely is more

intense at high elevations where witch-hobble grows. So anthocyanins give the red (purple with pH differences) and mixed with the one or two yellow pigments an orange. Where there is no anthocyanin, you would either see yellow, maybe a bit of orange from carotenoids and xanthophylls. Also purplish color may be where the chlorophyll is breaking down amongst the anthocyanins. Thus you have the painter's pallet for a stained glass display in what spiritually might be more allied with a church than the common name applies ... cheers, Dan

Dan copied our correspondence to Dr. Neufeld at Appalachian State University, who also responded in short order:

Dan and George - I think you're correct about the very strange fall leaf coloration of this Viburnum. I've been photographing it and watching them change for several years now. Not sure why this species is so varied in how it displays its colors ... When the chlorophyll is still present, but anthocyanins have started to be synthesized, I think you get a deeper red/purple color. When the chlorophyll finally degrades, it brings out a brighter reddish color (although anthocyanins can form complexes with metals, sugars, themselves, etc., which results in a plethora of potential colors) ... Howie

By mid-afternoon Tim Spira, recently retired biologist at Clemson University, who now resides in Asheville, had at my request weighed in:

George: I think Howie's and Dan's comments are good. Nothing much to add from this end except to say that the progression in color of the ripening fruits is also noteworthy going from green to red to purplish-black. Perhaps the brightly colored leaves associated with the ripe fruits help attract the birds that consume the pulp and disperse the seeds, much like in Virginia creeper and a number of other species. E's painting of the fall leaves is really great ... Tim

Thereafter the emails were chiefly about the "Foliar Flagging" concept whereby plants show a flush of early color to signal migrating birds that their fruits are ripe. I was initially sort of a proponent of the concept as a possible explanation for the plant's unusual leaf color displays. By the end of the day, however, Howie's doubts in that regard were changing my mind.

Tim's closing observation was cautionary and very much to the point:

Viburnum continued on Page 23



Photo Credit, H. Neufeld

Botanical Brainteasers

By Joe Pollard and Janie Marlow

Our summer Brainteasers [Chinquapin 23(2)] were (1) *Maianthemum racemosum* (formerly *Smilacina racemosa*), (2) *Lunaria annua*, (3) *Nothoscordum bivalve*, (4) *Boehmeria cylindrical* and (5) *Pyrrophappus carolinianus*. Which is the odd one out? We were thinking of the common names. Four of them are “false” – (1) false Solomon’s seal, (3) false garlic, (4) false nettle, and (5) false dandelion. But #2 is not false; in fact, it is honest! (Yes, honesty is one of the common names of *Lunaria annua*, along with money-plant.)

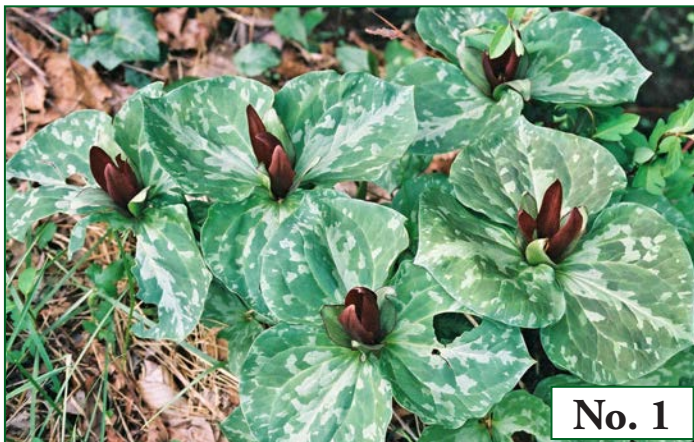
That’s a clever twist in the common names, but maybe too clever. Only two readers sent in responses, regular competitors Sam and Eva Pratt. They correctly spotted the fact that four are “false.” But it turns out that it’s almost impossible to tell *Lunaria annua* from *Hesperis matronialis* without being able to see the fruits or the trichomes, which somewhat spoiled the joke. Anyway, we’ll declare Sam and Eva to be joint winners this time, with equal points in the annual competition. 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, and it’s not about common-names at all. We learn that there are certain basic rules for identifying plants. Unfortunately, some plants just refuse to obey those rules, much to the frustration of beginning students of botany. As usual, you need to identify these five plants, and one of them doesn’t really belong with the other four, so you must figure out which is the “odd one out”. But more importantly, explain why all five of them are “rule-breakers” that could frustrate a novice trying to key them out. 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.



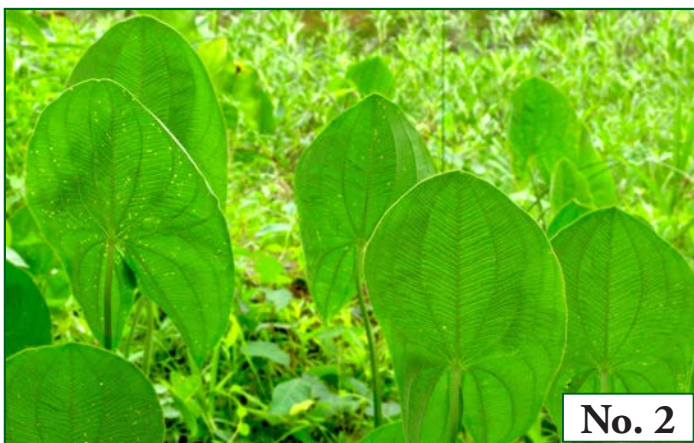
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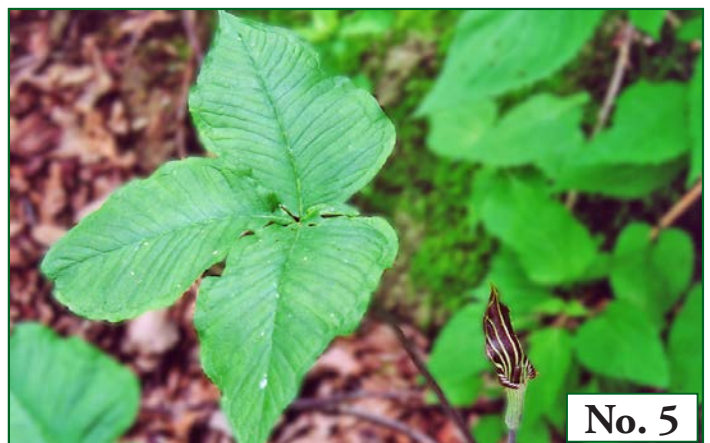
No. 1



No. 4



No. 2



No. 5

Viburnum continued from Page 21

The unusual fall leaf colors of witch hobble may simply reflect metabolic processes within the leaf with no attendant ecological benefit (as we know, not every trait we see in nature is adaptive).

So, where are we? We have a plant whose luminous fall color scheme I have likened, without too much hyperbole, I hope, to “stained glass.” One that other far more competent observers than I will ever be have described as “strikingly-arrayed” and “truly remarkable” and “very strange.”

We don't know why the plant displays these sorts of ethereal colors and patterns; or even, as Tim cautioned, whether they are the result of adaptive behavior. We do know that witch hobble creates its own shadowy low-energy world in “the under-woods”—to use Thoreau's description—but compensates by implementing its own version of the Spring Ephemeral Solution. The luminous early color display could be associated with yet another strategy involving shade adaptation; or maybe, as Dan remarked in the last sentence of his email:

Thus you have the painter's palette for a stained glass display in what spiritually might be more allied with a church than the common name applies.

(A shorter version of this essay was published in the author's Nature Journal column for September 17, 2015 in the Asheville Citizen-Times.)

George and Elizabeth Ellison are based in Bryson City, NC. www.georgeellison.com ; www.elizabethellisonwatercolors.com

Changes in *Castanea* Editorial Board

The Editor-in-Chief of *Castanea*, Chris Randle of Sam Houston State University, is assisted by subject editors who play a vital and much appreciated role in the manuscript review process. There have been several recent changes in the editorial board. Our current subject editors are as follows.

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The SABS Council at our Fall Meeting at Furman University. Left to right: Mike Held, Charlie Horn, Joe Pollard, Lisa Kelly, Jennifer Boyd, Kathy Mathews, Chris Randle. Unable to attend: Susan Farmer, Jay Bolin.

“The red maple forms dense woods by itself in low ground almost anywhere, called maple swamps, and it is also found throughout other woods, both on low and high ground, though it does not attain to perfection on high ground.”

Henry D. Thoreau. 1993.
Faith in a Seed.
Island Press, Washington, DC.
283 pp. (p. 51).

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Society Awards and Grants – APPLY NOW!

The Southern Appalachian Botanical Society presents awards and grants each year at its annual meeting in April. Information on the application process can be found on the SABS web page: <http://www.sabs.appstate.edu/Awards/Index.htm>.

APPLY FOR STUDENT RESEARCH FUNDS

Dr. Earl Core was a major force in the founding of the Southern Appalachian Botanical Club in 1935. The annual Earl Core Student Awards were established by the Society in 1996 to provide financial assistance in support of student research projects in plant taxonomy, systematics, and ecology. The application deadline is February 1st each year. Both students and their professor must be SABS members during the year of award. Find application information at <http://sabs.appstate.edu/about/awards/earl-core-student-award>.

APPLY FOR STUDENT PRESENTATION AWARDS

The newest of the SABS awards recognizes exceptional student presentations at the annual meeting. Each year we present two awards: the SABS Outstanding Student Poster Award and the SABS Outstanding Student Contributed Paper Award. Each award includes an honorarium of \$150, and the winners are announced at the Association of Southeastern Biologists (ASB) banquet. To submit your paper for consideration, make sure to note such as you submit your abstract to the ASB meeting. Students need to be members of SABS to receive an award.

HONOR A DISTINGUISHED BOTANIST

The Society annually presents the Elizabeth Ann Bartholomew award in memory of the namesake's untiring service to the public, to plant systematics, and to SABS. It is presented to individuals who have excelled in professional and public service that advances our knowledge and appreciation of the world of plants and their scientific, cultural, and aesthetic values, and/or rendered exceptional service to the society. If you feel a person deserves recognition, please submit a nomination and request others to write supporting letters. Forms are online at <http://sabs.appstate.edu/about/awards/elizabeth-ann-bartholomew-award>.

PUBLISH THE BEST PAPERS IN CASTANEA

The Richard and Minnie Windler Awards are designated for the best papers published in systematics and ecology during the preceding year in our journal *Castanea*. It was established by Dr. Don Windler as a memorial to his parents. If you published or will publish a paper in one of the 2015 issues, your paper will automatically be considered for the award.