

# *Semprevirens*

Fall 2015 The Quarterly of the Virginia Native Plant Society

## Mountain Lake: Another Spectacular Adventure

By Richard Stromberg, Board Member, Piedmont Chapter

A group of native plant enthusiasts traveled recently to the heart of the southwest Virginia Appalachians for a three-day field trip at the University of Virginia's Mountain Lake Biological Station west of Blacksburg. The adventure began July 30 when Sally Anderson, Carrie Blair, Chris Bowlen, Margaret Chatham, Ruth Douglas, Mary Jane Epps, Mary Lee Epps, Clifford and Shirley Gay, Tana Herndon, Betty and Butch Kelly, Kim Strader, Nancy Vehrs, Kristin Zimet, and I joined Virginia Natural Heritage Program botanist Johnny Townsend, who led most of the excursion.

Mountain Lake, established in 1930 by UVA's biology department as a summer facility for teaching and research, sits atop Salt Pond Mountain along a forested ridge with an elevation of about 3,800 feet. The 640-acre station adjoins the Jefferson National Forest and the private Mountain Lake Wilderness Conservancy.

On day two we drove to the Cascades National Recreation Area for a two-mile hike to the waterfall. The trail was rocky and climbed 900 feet

but was not difficult. As is typical of VNPS walks, we took four hours for the 2 miles. My GPS indicated that I walked 5.5 miles instead of 4 because of all the zigzags we made to look at things. It said we were on our way for seven hours but were only moving 1 hour and 36 minutes. Johnny constantly pointed out plants and answered our questions as we moseyed along. At the falls, Nancy and Kim sat on a rock and dangled their feet in the water while Sally, Chris, and Kristen swam in the pool at the base of the falls. Mary Jane and Johnny took off their shoes and rolled up their pants to cross the stream to examine mosses and liver-

worts on the wall on the other side.

After dinner, Henry Wilbur, a UVA professor emeritus and former Mountain Lake director, and his wife, Becky, took us into the woods to show us deer exclosures they set up nine years ago. They marked off twelve 10-meter-square plots and enclosed half of them with 8-foot-high fences. Inside the fence was lush, with much taller plants, dominated by Southern Mountain Cranberry (*Vaccinium erythrocarpum*). Outside, plants were sparse and stunted. For example, inside the fence Indian Cucumber-root (*Medeola virginiana*) was in fruit, while outside we found only small, four-leaved plants.

The following day took us to several more places. First we stopped at the north end of Mountain Lake, which mysteriously drained a few years ago, leaving only a small pond at this end. The lake is one of only two natural lakes in Virginia, the other being Lake Drummond, in the Great Dismal Swamp. Then we drove to the south end to Mountain Lake Lodge. We walked onto the dry lake bed to see plants that have appeared, including Foxtail



Johnny Townsend examines a sedge growing in a now dry area of Mountain Lake. Field trip participants Carrie Blair and Mary Lee Epps listen attentively. (Photo by Richard Stromberg)

*For more on Mountain Lake, see page 8*



*From the President*

## Growing Natives Means Loving Natives

**C**onservation: it's the guiding principle in all we do in the VNPS. Preserving habitat for native plant communities is our No. 1 goal. Though seemingly unrelated, horticulture can serve as a gateway to appreciating natives in the wild. When we grow natives, we become intimately involved with them. We may watch them grow from seeds, learn to recognize them as they emerge from the ground each spring, and carefully observe them as they develop buds, flower, and attract pollinators.

I was fortunate to attend the Cullowhee Native Plant Conference at Western Carolina University in July. In its 32nd year, this is the granddaddy of horticultural native plant gatherings. Lectures, workshops, field trips, and a plant sale nearly overwhelmed me on my first-time experience. My two field trips on the Blue Ridge Parkway allowed me to explore floral wonderlands. Magnificent Turk's-cap Lilies (*Lilium superbum*) were in full bloom, and the combinations of phlox (*Phlox paniculata* and *P. carolina*), monardas (*Monarda* spp.), Fire Pinks (*Silene virginica*), Black-eyed Susans (*Rudbeckia* spp.), and Tickseed (*Coreopsis* spp.) on the roadsides were stunning. Rhododendrons still bloomed in the woods, and I found Pink Turtleheads (*Chelone lyonii*) in the wild for the first time. Nearly 300 native plant enthusiasts participated, but only 6 hailed from Virginia. One was John Magee, our horticulture chair, who was one of the speakers. With many horticultural workshops available elsewhere, our Society has chosen to offer a full-day science workshop instead. As a magnet for native-plant nerds from the Mid-Atlantic and Southeast, Cullowhee is an outstanding event, and I urge you to consider attending next year, July 20–23.

As many of you may know, the VNPS is involved with the Virginia Native Plant Marketing Partnership, led by Virginia Witmer of the Coastal Zone Management Program in the Virginia Department of Environmental Quality, Carol Heiser with the Virginia Department of Game and Inland Fisheries, and Dot Field with the Department of Conservation and Recreation's Division of Natural Heritage. Composed of nursery professionals as well as typical native plant devotees, the group strives to increase the use and availability of natives in the landscape. Lovely native plant guides have been developed for the Eastern

Shore, Northern Neck, Northern Virginia, and the Piedmont (focused on the Charlottesville area), and Hampton Roads is now on board. Perhaps as home gardeners learn about and use natives, they will come to appreciate them in the wild as well. It can even encourage the preservation of rare species not suitable for home cultivation.

A more direct application of our conservation focus is the subject of our 2015 fund raiser. We are asking for your support in acquiring more land for The Cedars Natural Area Preserve, in far southwestern Virginia. We have set the ambitious goal of \$20,000, but that sum will open up opportunities for grants and other funding sources for Natural Heritage to purchase a full 70 acres for \$140,000. The area has a canopy of Eastern Redcedar (*Juniperus virginiana*), Chinquapin Oak (*Quercus muehlenbergii*), White Ash (*Fraxinus americana*), Post Oak (*Quercus stellata*), hickories (*Carya* spp.), and the usual limestone rockland–sinkhole terrain. Heritage staff members Chris Ludwig and Johnny Townsend visited the site in late June and documented two globally rare species: Running Glade Clover (*Trifolium calcaricum*) and Yarrow-leaved Rag-



Nancy Vehrs takes a break on her Mount Hardy Loop hike at the Cullowhee Native Plant Conference in North Carolina.

wort (*Packera millefolium*). State rarities included Canada Bluets (*Houstonia canadensis*), Rattlesnake-master (*Manfreda virginica*), White Blue-eyed-grass (*Sisyrinchium albidum*), Pitcher's Stitchwort (*Minuartia patula*), and Ringed Panic Grass (*Dichanthelium annulum*). Chris and Johnny will report their findings as they continue to explore the property. Please consider contributing to this important endeavor, and watch for updates on our website and Facebook page. —Your President, Nancy Vehrs



# Goldenrod: The Singles Bar of the Insect World

Article and photographs by Frank Deckert

Did the title of this article get your attention? I hope so, but we'll talk more about that later. First, though, let me introduce the goldenrods, though they probably need no introduction to Virginia Native Plant Society members. Goldenrods (*Solidago* spp.) are some of the most common wildflowers in North America, with more than 100 species. They are plants of old fields and roadsides, disturbed areas and transition zones between plant communities. (I look at the edge of my pond and easily see the transition from cattails to goldenrod to field grasses and thistles.) More than 380 species of animals, such as insects, spiders, and birds, visit goldenrods!

But what do insects see when they view a patch of goldenrod? They see a huge buffet, be they vegetarian or carnivore. They see a place to get a drink. They see a place to get together with the opposite sex. "A loaf of bread, a jug of wine and thou." (Are we so different from insects, after all?) For several years I have watched the birds and other wildlife on our five acres of fields, forests, and pond. Some of my most enjoyable excursions have included observing insects on our two patches of goldenrod.

Goldenrod flowers teem with a diversity of animals interacting with one another in many ways. I have seen insects visiting for nectar and pollen, such as bees, wasps, butterflies, and moths; insects visiting to eat other insects, such as wasps and praying mantises; and gall flies and other insects that lay their eggs on the plant, causing it to form a protective gall around the egg and, eventually, the larva, providing both food and

shelter. I have not observed these, but there are even parasitic wasps that lay their eggs in the gall fly's larvae by penetrating the gall with their ovipositor, enabling their offspring to feed on the first occupant. Gall-attacking birds, such as woodpeckers and even tiny chickadees, can get a nice packaged meal during the winter, when food can be scarce.

Bumblebees, which are excellent pollinators, are the most common insects I have seen on goldenrods. Their hairy bodies collect pollen, and they can carry large pollen loads in their "baskets." Their large tongues reach farther into flowers than honeybees' can, and they can forage in colder temperatures than other insects. (I have often found them covered with dew on my sedum flowers in the early morning.) One other amazing ability of bumblebees (which I have not observed) is their unique ability to vibrate their body

Bumblebees, below, feed on a goldenrod. At right, the yellow flowers serve as a lover's lane for a pair of potter wasps.

at a particular frequency that causes some flowers to dispense pollen.

Like all aspects of our natural world, goldenrods become even more fascinating as we learn more about them. We can get some of this knowledge through books and other media, but the most pleasurable learning takes place when we can learn about natural history up close and personal. I believe a patch of goldenrod is an excellent microcosm of the natural world in which to spend a sunny fall afternoon. ❖

*Frank Deckert is a retired superintendent with the National Park Service and a Virginia Master Naturalist. The pond he mentions is in the Shenandoah Valley.*



# There's much left to learn *Clethra's Chromosomes*

By W. John Hayden, Botany Chair

Many would argue that chromosomes, genes, and DNA form the ineluctable essence of modern biology. Not only do these fundamental components of living cells provide moment-to-moment instructions by which cells carry out basic life processes, they also control inheritance of characteristics from one generation to the next. These essential functions of DNA stem from its repetitive structure. Hugely long DNA molecules are built from just four components, referenced by their single-letter abbreviations, A, C, G, and T. It is the specific sequence of these As, Cs, Gs, and Ts that constitutes the coded information of DNA. Moreover, molecular biologists have determined that this genetic code is universal, i.e., petunias, earthworms, chimpanzees, and everything else spell out their genetic instructions using the same three-letters-at-a-time code words. We are now well into the genome era, in which biologists seek meaning by reading, for many organisms, the codes contained in the long strings of As, Cs, Gs, and Ts that encompass the totality of their DNA.

Chromosomes were of interest to biologists, however, long before anyone ever dreamed of DNA sequencing or reading entire genomes. Chromosomes have been an object of intense scrutiny since the details of cell division—mitosis and meiosis—were elucidated in the late 19th century. An early insight connecting chromosomes with the mechanism of heredity derived from the observation that gametes (sperm, eggs) of plants and animals contain half the number of chromosomes present in other, nonreproductive cells of the same species. Although the actual number of chromosomes present varies from species to species, the general terms haploid and diploid refer, respectively, to this distinction between reproductive and vegetative cells; haploid gametes have only a single set of chromosomes, whereas diploid cells have two.

An early publication (Winge 1917) established that chromosome numbers in closely related plants often follow predictable patterns. For example, the chromosome number in species of the genus *Chrysanthemum* has been shown to vary widely;

some species have 18 chromosomes per cell, others 36, still others 54, or 72, or 90. (These are all nongamete-related counts from diploid cells.) The realization that counts from these related species were all multiples of the number nine led to the concept of polyploidy, the occurrence of multiple full sets of chromosomes in series of related species.

Chromosome counts are made from cells caught in the act of cell division. A commonly used source is the actively growing root tip, with cells caught in late prophase or metaphase of mitosis (ordinary cell division). Root cells have two sets of chromosomes, one full set received from each parent; a count made from a root tip thus yields what is called a diploid (2n) count. Alternatively, chromosomes can also be counted from anther cells undergoing meiosis before pollen formation. (Meiosis reduces the chromosome number by half, a process that precedes gamete formation. In most plants, including *Clethra*, sperm cells do not form until after pollination, when the pollen grain has formed a pollen tube inside the style.) If observed at the

right stage (late prophase I or metaphase I of meiosis), all the chromosomes are tightly paired, so close together, in fact, that each pair appears through the microscope as a single body. A count made at this stage is called a haploid (n) count because the number of chromosomes observed will match the reduced number that will be found in the gametes that soon form.

Available information indicates that the genus *Clethra*, in which Sweet Pepperbush, the 2015 VNPS Wildflower of the Year, is classified, contains a polyploid series (see summary box). So far, four species, *C. alexandri*, *C. arborea*, *C. lanata*, and *C. pringlei*, are reported to have a diploid chromosome number of 16. Virginia's two species, *C. acuminata* and *C. alnifolia*, have a diploid count of 32. And *Clethra barbinervis*, from Japan and sometimes cultivated in botanical gardens, is reported to have a diploid count of 80.

Clearly, for the genus *Clethra*, the base chromosome number (often designated as x) is eight, and each species in the series has some

multiple of eight for its total chromosome count in vegetative cells.

At this point the terminology gets a little tricky, because the word diploid can be used in two contexts, with different meanings. As mentioned above, a diploid cell, in a life-cycle frame of reference, denotes a nonreproductive cell containing twice as many chromosomes as found in pollen and eggs. But the concept of diploid can be extended to apply to species at the base of a polyploidy series.

A diploid species refers to a species that has just two sets of chromosomes in vegetative cells; similarly, a triploid species would have three sets, and a tetraploid species would have four, etc. *Clethra arborea*, for example, is considered to be a diploid species because cells of its roots, stems, and leaves contain 16 chromosomes (two sets of eight). (These would also be diploid cells in the life-cycle context, and its eggs and sperm would be haploid, with one set, eight chromosomes, each.) Moving up the polyploid series, *C. alnifolia* is a tetraploid species; its nonreproductive cells (diploid in the life-cycle context) contain 32 chromosomes (four multiples of the base chromosome set of eight), while sperm and eggs

### Known Chromosome Counts in *Clethra*: A Summary

DIPLOID (2x) SPECIES,  $n = 8$ ,  $2n = 16$   
*C. arborea*, from Madeira (Hagerup 1928)  
*C. alexandri*, from Jamaica (Judd 2008)  
*C. lanata*, from Mexico (Kyhos 1965)  
*C. pringlei*, from Mexico (Reed 2005)

TETRAPLOID (4x) SPECIES,  $n = 16$ ,  $2n = 32$   
*C. acuminata*, from eastern North America (Tanaka & Oginuma 1980)  
*C. alnifolia*, from eastern North America (Tanaka & Oginuma 1980)

DECAPLOID (10x) SPECIES,  $n = 40$ ,  $2n = 80$   
*C. barbinervis*, from Japan (Tanaka & Oginuma 1980)

Illustration of *Clethra alnifolia* by Lara Call Gastinger  
from *Flora of Virginia*. © Flora of Virginia Project



have 16 chromosomes.

*Clethra acuminata* is also considered a tetraploid species. But *C. barbinervis* is a decaploid species, with 10 sets of chromosomes ( $= 80$ ) in nonreproductive cells and 5 sets of chromosomes ( $= 40$ ) in gametes.

Generally speaking, polyploid series start at the diploid level, and, by various mechanisms, higher chromosome counts arise over time. Almost certainly, then, ancestral *Clethra*, like modern *C. arborea*, was diploid,  $2n = 2x = 16$ . It should also be certain that the ancestry of *C. alnifolia* and *C. acuminata* includes at least one jump, from the diploid to the tetraploid level. And who knows what complex path may have occurred in the ancestry of decaploid *C. barbinervis*. But whatever the details, the trend was from fewer to more whole sets of chromosomes.

Little more can be inferred from the data at hand because, of the 65 or so known species of *Clethra*, chromosome counts have been published only for the seven mentioned in the summary box. In other words, nearly 90 percent of the species of *Clethra* are unknown in terms of this fundamental aspect of their biology. We don't know how many of the 58 species without published chromosome counts will prove to be diploid species. We don't know if tetraploid species are common or whether *C. alnifolia* and *C. acuminata* are the only two. And we don't know if there are any species of *Clethra* alive today that bridge the gap between tetraploids ( $2n = 4x = 32$ ) and the decaploid ( $2n = 10x = 80$ ) status of *C. barbinervis*. Nor do we know whether any living *Clethra* species has a chromosome count greater than 80. Clearly,

we know only a little, and we don't know a lot. But the little that we do know about chromosome numbers in *Clethra* hints at a rich story waiting to be uncovered. ♦

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## Retires Sept. 1 after 25 years with Natural Heritage Larry Smith Has Protected Key Va. Habitats

Seven hundred and sixty exemplary natural communities and rare plant and animal species, 159 individual parcels, 55,600 acres, 62 state natural area preserves, August 1990 to September 2015. These biodiversity facts have in common Larry Smith.

### From Your Natural Heritage Program

By Tom Smith



From the first dedicated natural area preserve tract, Blackwater Farms, 1,246 acres on the North Landing River in Virginia Beach, to tract No. 159 Collins at The Pinnacle Natural Area Preserve in Russell County in May 2015, Larry has guided them all to permanent protection for the citizens of Virginia.

Larry earned his bachelor of science degree at Baldwin Wallace College in Berea, Ohio, and his master's degree in plant ecology at the University of Tennessee. He worked as the plant ecologist for the Tennessee Natural Heritage Program from 1977 to 1986 and as director of science and stewardship for The Nature Conservancy of Ohio from 1986 to 1990, and he joined the Virginia Natural Heritage Program in August 1990. Larry retired Sept. 1.

If you love plants, you love the work Larry has dedicated himself to for the past 38 years. Thirteen of the 62 natural area preserves are featured in the *Flora of Virginia* as great places to study and enjoy the Virginia flora. If you love birds, 29 of the preserves are eBird hot spots. If you love wetlands, there are 22,200 acres in Virginia's Natural Area Preserve System. If you love huge trees you know Cypress

Bridge Swamp Natural Area Preserve. If you love scenic views, you'll love Buffalo Mountain; if you love karst, you'll love Unthanks Cave. And if you just love biodiversity conservation you'll love every single state natural area preserve. Thanks to Larry.

Working with the rest of the Natural Heritage staff, Larry spearheaded our efforts to protect more than 100 significant blocks and 100,000 acres of crucial natural community and rare species habitat in the George Washington and Jefferson National Forests as special biological areas and special-interest areas. He has been the staff lead for the Virginia Cave Board since 1990 and has helped guide the private and public landowners of our 4,100 caves to information on how to best protect the 110 globally rare species, spectacular geological formations, and drinking water they provide.

Whether it's Running Glade Clover at The Cedars in Lee County, Shenandoah Valley sinkhole ponds at Deep Run Ponds in Rockingham County, a beach and dune system at Hughlett Point in Northumberland



Larry Smith discusses protection strategies at The Cedars in Lee County.

County, or maritime forests and migratory songbirds on the Eastern Shore, all are thriving at a place that Larry Smith worked hard and collaboratively to protect for present and future generations. ♦

Tom Smith is director of the Virginia Natural Heritage Program. Learn more about our natural area preserves at [www.dcr.virginia.gov/natural\\_heritage/index.shtml](http://www.dcr.virginia.gov/natural_heritage/index.shtml)



### VIRGINIA NATIVE PLANT SOCIETY

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Next submission deadline: Oct. 1, 2015

## Remembering Hal Horwitz

Hal Horwitz, who died July 6, was a long-time member of the Pocahontas Chapter of the Virginia Native Plant Society. Generous with his time, expertise, and humor, Hal was a much valued and appreciated companion in field and classroom.

He delighted in trying out his new technology in programs for our chapter, adding music, visual effects, and his own commentary. These were delightful, informal, and often humorous explorations of his attempts to find and photograph wildflowers. We were privileged to share the first of his photographs, which illustrate his book *Orchids of Israel*. With his quiet, dry, self-deprecating wit, he shared both triumphs and failures in his photography and travel experiences, much to our delight. In gentle ways, he encouraged each of us to hone our skills.

At first, he sought through his photography to capture flowers in Virginia. Later, he concentrated on orchids, endeavoring to photograph

all the native orchids in North America. His gorgeous orchid portraits were exhibited not only in the education wing of Lewis Ginter Botanical Garden in Richmond, but also in a special invitational exhibit at the National Botanical Garden.

“Hal was an early champion of the NAOCC and supported our efforts in many meaningful ways,” wrote Jay O’Neill in his tribute for the North American Orchid Conservation Center. “He was instrumental in creating opportunities for us to tell the NAOCC story and established many of the contacts that continue to support our conservation efforts on the web. Our initial gallery featured his photography, and his images form the banner on the opening page of the NAOCC website.”

Hal’s personal impact in our community was acknowledged in a lead editorial in the *Richmond Times-Dispatch*. “Hal Horwitz personified the universal uncle. He treated every human being as



Hal Horwitz

a niece or nephew to be nurtured and cherished. Community service defined his creed. A pediatric dentist, he pursued professional and personal passions. He put patients at ease.... He devoted himself to Jewish institutions. He served on boards, raised money, and rose to leadership positions. Israel and the United States held his heart. He shared with [this newspaper] articles of interest and insight about the Middle East. He proved a keen observer.”

Attending Hal’s funeral, I learned of his achievements in both professional and cultural areas as well as his botanical ones. From his daughter’s loving eulogy, I also gathered that he could be wickedly profane and enjoyed telling risqué stories. Rarely have I seen such an outpouring of affection and appreciation as I saw shared among the standing-room-only attendees in the largest auditorium available at Bliley’s funeral home!

We will all miss his intelligent good nature, his humor, and his support and appreciation for all our efforts in conserving wildflowers.

—Catharine Tucker, President,  
Pocahontas Chapter



With the camera, Horwitz’s favorite subjects were orchids. This stunning picture of the Large Yellow Lady’s-slipper, *Cypripedium parviflorum* var. *pubescens*, illustrates both his devotion to the plants and his photography acumen.

## Field Trip Spotlights Mountain Lake Flora *(Continued from page 1)*

Clubmoss (*Lycopodium alopecuroides*), disjunct from the Coastal Plain, Bushy St. John's-wort (*Hypericum densiflorum*), and a 4-meter circle densely filled with Field Horsetail (*Equisetum arvense*).

From there we drove to the Appalachian Trail and walked to Wind Rock to have lunch, surrounded by Appalachian Gooseberry (*Ribes rotundifolium*), Ninebark (*Physocarpus opulifolius*), Minniebush (*Menziesia pilosa*), and Black Chokeberry (*Aronia melanocarpa*).

We drove on to the Potts Rail Trail to walk along the old railroad bed and found six orchid species, all in flower or fruit: Pink Lady's-slipper (*Cypripedium acaule*); Large Round-leaved Orchid (*Platanthera orbiculata*); Small Green Wood Orchid (*Platanthera clavellata*); Spotted


Coralroot (*Corallorhiza maculata*); Bentley's Coralroot (*Corallorhiza bentleyi*), endemic to this area of Virginia and West Virginia; and Bog Twayblade (*Liparis loeselii*), which is rare in Virginia.

Then we stopped at a bog and squished through peat moss (*Sphagnum*) admiring Tawny Cotton-grass (*Eriophorum virginicum*), Kidney-leaved Grass-of-Parnassus (*Parnassia asarifolia*), and Roundleaf Sundew (*Drosera rotundifolia*), until many full-flowering Yellow Fringed Orchids (*Platanthera ciliaris*) exploded into view.

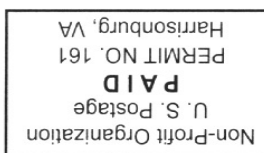
Johnny had to leave Sunday morning, but Mary Jane, who had worked on projects at Mountain Lake in previous years, volunteered to lead us to War Spur Overlook. Before driving there, we went into the

woods to see Sweet Pinesap (*Monotropsis odorata*) that Becky Wilbur had found. We spied the red shoots popping up, and every time we moved the leaf litter, more appeared. On the walk to War Spur, Mary Jane stopped periodically to show us different moss and fungus species. After an hour we had covered only one-third of a mile, so we trotted off at a faster pace so we could enjoy the view and the Red Spruce (*Picea rubens*) at the overlook and get back to the station for lunch. We interrupted the fast pace on the way back when we spotted a Pinesap (*Hypopitys monotropa*) beside the trail.

Thanks to Shirley for making arrangements and keeping us on schedule and to Johnny and Mary Jane for informing us about all the plants and fungi we saw. ❖

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