



A publication of the VIRGINIA NATIVE PLANT SOCIETY

*Conserving wild flowers and wild places*

<http://www.vnps.org>



*A banana plant in Richmond? Come to the Annual Meeting to see it.*

## ***Annual Meeting will center on the James River***

River, wildlife, history, recreation—all in the middle of Richmond on the James. These features have Richmond on the top 10 list of cities in the nation, according to some surveys. Visit James River Park with naturalist Ralph White as he tells stories and leads you along its nature trails, pointing out native plants, invasives we all want to help remove, plus unusual “adventives” like pumpkins and watermelons brought in by the river. Maymont, with its history, 19th-century gardens, a nature center

*(See Then and Now, page 4)*

## **Shenandoah Mountain Proposal**

### ***A study in environmental collaboration***

Stretching across the western edge of the Shenandoah Valley, Shenandoah Mountain is one of the largest remaining expanses of undisturbed forestland in the Southern Appalachians. Located in the George Washington National Forest, it has five roadless areas, including the 29,000-acre Little River, the largest in the East. Reddish Knob, with a parking lot on its summit, provides the best vantage point for the wild central portion of the 70-mile-long mountain. In fact, President Bill Clinton chose this scenic spot on Reddish Knob to announce his Roadless Area Rule on October 13, 1999, a rule that offers administrative protection of roadless areas in our national forests. This rule has been challenged repeatedly over the past 13 years.

The central portion of Shenandoah Mountain between Route 33 and Route 250 just west of Harrisonburg and Staunton boasts 10 peaks above 4,000 feet, 10 lakes and reservoirs, and some of the best mountain scenery in the commonwealth. It has headwaters of both the Potomac and James Rivers and coldwater native trout streams, and it supplies pure drinking water to Staunton, Harrisonburg and other towns and cities downstream.

Generations of Virginia families

have enjoyed hunting, fishing, camping, hiking, horseback riding, scenic driving, birding and studying nature on Shenandoah Mountain. Its 150 miles of trails offer both challenge and terrific opportunities for solitude. A new generation of mountain bikers claims it offers some of the best mountain biking in the East.

In addition to scenic beauty, outstanding recreation, and clean water, Shenandoah Mountain supports a great variety of plant and animal life. In fact, it sits on the northern edge of a biodiversity hotspot identified by The Nature Conservancy. The Southern Appalachians have the greatest diversity of salamanders of any place on earth, and Shenandoah Mountain is home to two species found nowhere else: Cow Knob salamander and Shenandoah Mountain salamander. It is a haven for black bear who need refuge and freedom from too much human access for sustainable breeding populations. In addition to serving as a migratory corridor, Shenandoah Mountain is home to 250 species of birds, many of which need a mature forest habitat.

With so many special qualities, it's easy to see why groups have been trying  
*(See Shenandoah Mountain, page 6)*

**Inside: Register for the VNPS Annual Meeting**



## From the president . . . . .

### Topsy-turvy thoughts involving nature

*It's 2012, the year of the topsy-turvy spring. We enjoyed most of our wildflowers three weeks ahead of time. It was nearly June*

*before we could turn the heat off, and now we have had unseasonable heat in the middle of June. Do you wonder if the insects and birds are confused? Still, the wildflowers have been wonderful, from the trilliums on the mountain to the "weeds" in the yard.*

*I'd like to send special thanks to Beth Umberger (New River Chapter) for arranging our trip to the Florida Panhandle. We had good weather and great botanical guides. We came home having seen memorable sights, such as a forest of dwarf cypress, the interesting limestone landscape surrounding Florida Caverns, and the Apalachicola River from its bluffs, from a boat and finally where it meets the Gulf of Mexico. The plants were a mixture of some familiar friends, some plants from our southeastern coastal plain, and some species like palms that we don't see.*

*We had some interesting speakers in Winchester this spring at a conference called Tomorrow's Landscapes.*

*The one who stands out for me was organic gardener Jeff Lowenfels, from Alaska, who spoke about the soil food web. Too bad he's so far away, but luckily he is coauthor of Teaming with Microbes: The Organic Gardener's Guide to the Soil Food Web (available at my library!) that has the information. While written for home gardeners, the information about the soil and its inhabitants and processes applies to all soil. Previously I thought of the soil as a fairly uniform and random place. According to Lowenfels and friends, that's not so. In fact, he says that plants are at the center of the soil food web. They use a fair amount of the energy they make by photosynthesis to exude substances into the soils. These exudates attract soil organisms to the root zone. Fascinating interactions ensue, and the photos are amazing. Other authors on soil organisms that I found through Lowenfels include James B. Nardi, an entomologist and artist, and Elaine Ingham, a microbiologist specializing in soil organisms. I have something new to ponder in the garden or on botanical walks this summer.*

*Hope to see you on the trail,*

*Your President, Sally Anderson*

## Wavyleaf basketgrass: Stay alert for this invasive plant

There's a new invasive plant threat to our native plants for which VNPS members should be on the lookout. Wavyleaf basketgrass (*Oplismenus hirtellus* ssp. *undulatifolius*) is an exotic grass taxon native to Southeast Asia. Two small populations of the perennial grass were discovered in 1996 in Patapsco Valley State Park in Maryland. Its identity was confirmed by botanists from the Smithsonian Institution.

Members of the Maryland Department of Natural



Wavyleaf basketgrass  
*Oplismenus hirtellus* ssp. *undulatifolius*  
Illustration by Nicky Staunton

Resources quickly learned how invasive the Asian plant was when it rapidly covered acres of wooded ground. In the summer of 2008 four populations were discovered in Virginia, including Shenandoah National Park.

The plant is similar in many ways to another invasive, Japanese stiltgrass, that has been the target of invasive plant removal efforts for the last 25 years. However, wavyleaf basketgrass stems are fuzzy and hairy, while Japanese stiltgrass stems are smooth. Wavyleaf basketgrass leaves do not have a silvery stripe while Japanese stiltgrass leaves have a reflecting silver stripe down the middle of the leaf, or slightly to one side. Wavyleaf basketgrass leaves have ripples across their width and taper quickly to an elongated sharp point. Japanese stiltgrass leaves end in a blunt point.

Wavyleaf basketgrass is spread by its very sticky, tiny seeds, which sticks to mammals—people, horses, dogs and wildlife. The most important time to avoid entering a wavyleaf basketgrass patch is typically late July through September, when the plant is blooming and producing its sticky seeds.

In Virginia, the Piedmont Environment Council is leading a task force to stop the spread of wavyleaf basketgrass. Go to the PEC website ([www.pecva.org](http://www.pecva.org)) for information on how to identify and eradicate this invasive plant as well as how to report a location.

You have waited years for this opportunity!

## Pre-order your *Flora of Virginia* now!

**About the Book:**

The Foundation of the Flora of Virginia Project Inc. and Botanical Research Institute of Texas Press are collaborating to publish the *Flora of Virginia*. The *Flora of Virginia*, with publication targeted for fall 2012, will describe approximately 3,200 taxa in 200 families and feature 1,400 captioned, scaled, and botanically accurate illustrations. Introductory material will include chapters on the natural history and vegetation of Virginia and a historical account of botanical exploration in the state, as well as a key to the vascular plant families represented in the *Flora*. A glossary, bibliography, and comprehensive index will also be provided. The authors are Alan S. Weakley, curator of the herbarium at the University of North Carolina, J. Christopher Ludwig, chief biologist with the Virginia Natural Heritage Program of the Department of Conservation and Recreation, and John F. Townsend, staff botanist with the Virginia Natural Heritage Program.

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**Specifications:** 7.5"×10.5" (hbk), approx. 1500 pp., 1400 b/w figs.



**\*Pre-orders can be made through e-mail, phone, fax, or mail. For more information or to order, please contact Botanical Research Institute of Texas Press Assistant at 817-332-4441 Ext. 232; FAX 817-332-4112; E-mail: [orders@brit.org](mailto:orders@brit.org); or online [www: http://www.britpress.org](http://www.britpress.org).**

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## Then and Now Along the James VNPS Annual Meeting, Sept. 14-16

*(Continued from page 1)*

landscaped with native plants and its view of the James River is a delight. Contrast that with the Lewis Ginter Botanical Gardens and learn its history as a farm, 19th-century club, private home—see it then and now.

Residents who are trying to convert their own gardens to native plants, either for butterflies, or just on general principles, have opened their yards to us to showcase what can be done in urban and suburban areas. Another adventure with “then and now.”

If wilder areas suit you better, explore trails at the Rice Center with Virginia Commonwealth University staff. This property has been converted from farming to a Boy Scout Camp with a lake for swimming, and now to a research center where the natural vegetation changes are encouraged. The dam has been removed to restore the wetland in place of the lake.

Walking the Dutch Gap Conservation Area trails with leader John Hayden, professor of biology at University of Richmond and VNPS Botany Chair, will present a completely different view of the river. An oxbow lake cut off by the Dutch Gap canal—another source of historical stories—is closing in with vegetation that changes year to year, season to season. Have you seen stands of wild rice in shimmering golden bloom? Follow VNPS member Richard Moss around the trails at Point of Rocks to look for rattlesnake master, ladies tresses, partridge pea, gerardia, and—who knows what else?

Come join members of the Pocahontas Chapter to hear Leonard Adkins tell stories about his hikes along the Blue Ridge photographing the wildflowers as he traveled. His pictures are accompanied by the most entertaining stories reflecting his wonderful sense of humor. Then stay for Saturday night’s celebration of the society’s 30th birthday and recognition of VNPS Charter Members. Ecologist Robert Wright, our keynote speaker, will tie the flora of the Blue Ridge to that of the areas along the James and describe his project to restore Forest Hill Park. He will regale us with tales of his extensive explorations along the banks of the James.

Finally, we’ve planned easy but interesting Sunday trips so that you will leave with great memories and a new appreciation of the landscape history around our state capital, but won’t be too tired to travel home!

*Catharine White Tucker, Pocahontas Chapter President*



*These photos provide a small sneak preview of what is in store for those who sign up for the Virginia Native Plant Society Annual Meeting in September. At the top left, river birch frame the James River and shade its banks; the top right photograph provides a winter view of Dutch Gap Conservation Area. Fall displays at the conservation area will feature white, yellow and pink flowers against the lush greenery. The photograph above shows a flower border at Maymont.*

Partridge berry

# Closely paired flowers produce single fruit

Perhaps one of the most striking features of partridge berry (*Mitchella repens*), the 2012 VNPS Wildflower of the Year, is its closely paired flowers that yield a single berry fruit (figure 1). That these fruits are double structures, formed by pairs of flowers, is

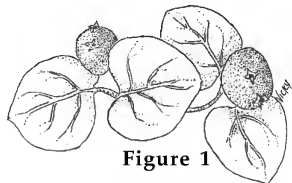


Figure 1

revealed in the presence of two discrete rings of five sepals each on the fruit apex, or in some cases, by a single ring of 10 sepals. Viewed in isolation, without context, the nature of these double fruits may seem perplexing, but as in so many things, a comparative perspective helps to make sense of conundrums such as this one.

First, let's consider the paired occurrence of flowers. While two-by-two is the usual configuration, examination of many partridge berry plants in flower will reveal occasional exceptions. As pointed out by Blaser (1954), instances in which three flowers are produced (figure 2) are significant, as

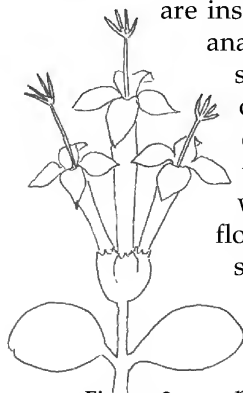


Figure 2

are instances in which anatomical/microscopic remnants of a third flower can be found between the two well-developed flowers. These observations suggest that, fundamentally, partridge berry produces flowers in a pattern known as a cyme, or dichasium. Cymes constitute one of the fundamental inflorescence patterns found in flowering plants; a cyme is characterized by one flower that terminates a stem and a pair of flowers that diverge from opposite sides of the stem at the node directly below the terminal flower; typically, the terminal flower opens first, followed by the two lateral flowers. Potentially, flower

production in cymes can continue by successive repetition of pairs of later flowers forming below earlier flowers. Cymes are widespread in Rubiaceae, the family in which partridge berry is classified. It should be easy, therefore, to interpret the paired flowers of partridge berry (figure 3) as a simple cyme in which the terminal flower is absent and the rare instances of three-flowered clusters (figure 2) as a typical, simple, cyme. Further, the flowers are tightly paired simply because their individual pedicels (flower stalks) are very short.

A parallel situation exists in the honeysuckle family, Caprifoliaceae. Like Rubiaceae, this family has cyme-based inflorescences, and two-flowered cymes with terminal flowers absent are common. Examples include the twin-flower (*Linnaea borealis*, so beloved by Linnaeus that he named the plant for himself), beauty bush (*Kolkwitzia amabilis*), and honeysuckles (*Lonicera* species). The paired flowers of honeysuckles are particularly interesting in that a series of species show progressive degrees of fusion between the ovaries of paired flowers (Wilkinson 1948): the American fly-honeysuckle (*L. canadensis*) has essentially no fusion of paired ovaries, various species shows intermediate degrees of fusion, while the paired ovaries of sweet-breath-of-spring (*L. fragrantissima*) can be fused for nearly their entire length but still retain, as in partridge berry, two distinct remnants of calyx (sepals) at the apex (figure 4). The double fruits of

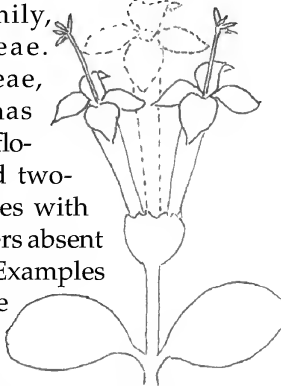


Figure 3

partridge berry and sweet-breath-of-spring appear to be morphologically equivalent structures.

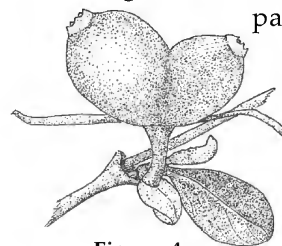


Figure 4

This illustrates, I hope, the power of a comparative perspective to make sense of plant form. All the intermediate stages may not be known in Rubiaceae, but given a simple three-flowered cyme as a hypothetical starting point and tightly paired flowers with fused ovaries and fruits as an endpoint, similar intermediate stages to those seen in Caprifoliaceae may be inferred to have occurred in the ancestry of *Mitchella*.

Viewed from another perspective, partridge berry represents the small end of the scale in terms of floral aggregation in Rubiaceae. Consider, for example, buttonbush (*Cephalanthus occidentalis*), in which hundreds of flowers are tightly gathered into a globose head-like inflorescence, which can be interpreted as the condensation product of an extremely large compound cyme consisting of many flowers. In buttonbush, unlike partridge berry, the flowers are merely close, not really fused together; in fact, each floret is separated from its neighbors by several minute bracts. Other globe-headed Rubiaceae with crowded but separate flowers are known, for example the Asian genus *Adina*, sometimes cultivated as an ornamental.

Finally, we should consider *Morinda*, another globe-headed genus of Rubiaceae, but one in which the densely crowded ovaries do fuse together, à la those of *Mitchella*. There are about 80 species of *Morinda* found throughout the tropics including *M. royoc*, a vine-like shrub or small tree that extends from the Caribbean into southern Florida and *M. citrifolia*, the noni fruit, originally native to tropical Asia but now cultivated throughout warm regions. *M. yucatanensis* (figure 5)—a plant that I know from the forests of Yucatan, Mexico—and for which the general resemblance to partridge berry should be obvious is illustrated on page 8. In the much larger flower clusters of *Morinda*, however, flowering is sequential, rather than simultaneous as in partridge berry. Nevertheless, each component ovary of (See *Similar behavior*, page 8)



Part of what makes Shenandoah Mountain special is the diversity of flora and fauna found there. Shenandoah Mountain is a stronghold for mountain fetterbush (below) (*Pieris floribunda*) and eastern turkeybeard (*Xerophyllum asphodeloides*). Both plants, which are limited in range, are found in abundance in the higher elevations of Shenandoah Mountain. Popular sites for enjoying wildflowers are Reddish Knob, which has easy paved access by car, and Ramseys Draft Wilderness.



## • Shenandoah Mountain: A Special Place

(Continued from page 1)

for decades to gain permanent protection for Shenandoah Mountain. So far, only the 6,800-acre Ramseys Draft Wilderness, designated in 1984, has permanent protection.

A new threat is adding urgency to efforts to protect Shenandoah Mountain: industrial energy development. The entire Shenandoah Mountain is underlain by marcellus shale, a source of natural gas. Although traditional gas wells in marcellus shale were unproductive, a method called "hydrofracking" now makes it possible to extract gas from marcellus shale. This method is being used extensively in West Virginia and Pennsylvania. Contrary to popular belief, National Forest land can be leased for gas development. In fact, the 5,500-acre Shaws Ridge in the GWNF just west of Shenandoah Mountain was leased by a Texas company in December of 2007, although no drilling permit requests have yet been filed. The new forest plan will likely make 1 million acres available for lease.

Shenandoah Mountain is also a potential site for industrial wind turbines. West Virginia now has hundreds of 400-foot turbines on its mountain ridges. High bird and bat kills have been recorded around some of these giant turbines. Private landholders are in the process of developing wind on Cow Knob along the northern part of Shenandoah Mountain. We expect pressure to develop domestic energy to continue increasing.

The Shenandoah Mountain that Virginians have enjoyed for generations is now at a crossroads. Its future depends on how much the public and our policymakers value the benefits we now enjoy from a natural Shenandoah Mountain.

In 2002, the Virginia Wilderness Committee reached out to mountain bike leaders from Harrisonburg to see if we could find common ground and join forces to protect the area. Wilderness advocates and mountain bikers do not always see eye-to-eye since mechanized transport (i.e. mountain bikes) is not allowed in wilderness areas. Yet,

mountain bikers appreciate the natural beauty of Shenandoah Mountain, one of their favorite places to ride, and wanted to see it protected.

After three years of negotiations, wilderness advocates and mountain bikers were able to hammer out an agreement called the Shenandoah Mountain Proposal. The proposal calls for congressional designation of 115,000 acres of central Shenandoah Mountain between Route 33 and Route 250 as a combination of Wilderness and National Scenic Area. Boundaries were carefully drawn to maximize trail access by mountain bikers and keep all roads open. The agreement also supports National Scenic Area designation for Kelley Mountain-Big Levels near Sherando Lake and Wilderness designation for Laurel Fork in the far corner of Highland County.

Friends of Shenandoah Mountain grew out of this collaborative effort. It is a group with the sole purpose of gaining congressional protection of these three areas. Thomas Jenkins, owner of  
(See Agreement page 7)

# • Agreement

(Continued from page 6)

the Shenandoah Bicycle Company in Harrisonburg, and I, a past president of Virginia Wilderness Committee, were asked to serve as co-chairs to strengthen our continuing collaboration. Friends of Shenandoah Mountain has been actively seeking endorsements by organizations, businesses, and faith groups. VNPS was an early endorser of the proposal. The list of endorsers has grown to 55 organizations, 13 faith groups, and 95 businesses. Tourism-related businesses see National Scenic and Wilderness Areas as being good for our local economy by drawing visitors to our area.

During the past five years, the GWNF has been developing a new forest plan, which it is required to do every 15 years or so. In an effort to satisfy its many stakeholders, the GWNF planners proposed several alternatives, but none of these satisfied all the interest groups. Each alternative seemed to have a "poison pill." Mark Miller of the Virginia Wilderness Committee and John Hancock of the Virginia Forestry Association stated in a forest planning meeting that they thought stakeholders could work together and come up with a better alternative on their own. In Sep-

tember 2010, representatives from timber, wildlife management, wilderness, mountain biking, off-road driving, hunting, and fishing came together to see if they could find common ground. Friends of Shenandoah Mountain was among these groups. The University of Virginia Center for Environmental Negotiation led several of the meetings that took place over the course of a year. In addition to these meetings, selected representatives went on field trips to areas of contention. This whole effort of stakeholders, who are ordinarily in opposition to each other, trying to work together involved a great deal of listening and learning, not just explaining one's own point of view. I believe it is fair to say that we all learned to respect each other's perspective. We agreed where we could and agreed to disagree where we could not. The result of the stakeholders' meetings was a joint set of comments that was submitted to the GWNF in October 2011. The stakeholders' agreement was signed by 14 organizations, including groups as diverse as Virginia Wilderness Committee, Virginia Forestry Association, International Mountain Biking Association, and Virginia Wild Turkey Federation. Who would have thought this possible?

The stakeholders' agreement supports a modified Shenandoah Mountain National Scenic Area and the creation of other wilderness areas (now totaling 86,000 acres). It also supports a Beech Lick Knob Wilderness and several Wilderness additions unrelated to the Shenandoah Mountain Proposal. Along with these recommendations, the agreement calls for an increase in early successional habitat by timber management and more trails. In the case of Shenandoah Mountain, core natural areas could be designated as National Scenic or Wilderness areas, and areas around the periphery could be managed for deer, turkey and grouse. When these goals are worked on side by side in just the right balance, the result could be win-win. From our perspective, these compromises have strengthened the Shenandoah Mountain Proposal, enabling broader acceptance and support.

Most importantly, the stakeholders' agreement calls for the Forest Service to institute a process that involves stakeholders in the planning stages of large projects in the GWNF. Each project would include wildlife management by timber and/or prescribed burning, an improvement in the recreation resource, and a recommendation for

(See GWNF plan, page 8)

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## •GWNF plan

(Continued from page 7)

permanent protection of a core area. At 1.1 million acres the GWNF is large enough to meet all these goals.

The GWNF plan will come out in July 2012. It remains to be seen whether the plan will incorporate the recommendations of the stakeholders' agreement. I hope so, because the collaborative effort of this group embodies the power of cooperation. At a time when polarization seems to be the norm, it is inspiring to see such diverse groups able to work together successfully to achieve their goals for our public lands. Purists might find this type of cooperation to be too painful. But for those who want to protect special places, what is the alternative? It takes broad public support for congressional designations, and the Sixth Congressional District is a tough one. But if congressional designations go hand-in-hand with an increase in management for wildlife species and more emphasis on recreation, then it really does seem possible to gain permanent protection for Shenandoah Mountain.

By Lynn Cameron, Co-Chair,  
Friends of Shenandoah Mountain

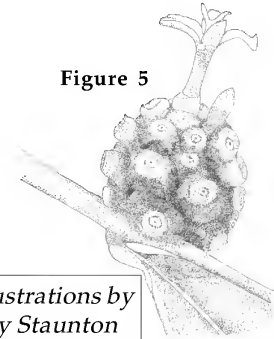
## •Similar behavior

(Continued from page 5)

*Morinda* retains its individual calyx and all the fruits are thoroughly fused together, just like partridge berry, but in *Morinda*, a dozen or more flowers, rather than just two, are fused together. In fact, the fruit of *Morinda*, like mulberries and pineapples, is a good example of what is known botanically as a multiple fruit.

And here is another example of the benefits of a comparative perspective. The double berries of *Mitchella* are seldom described as multiple fruits, but clearly, that is what they are. Fundamentally, it matters not that only two fruits derived from two flowers are fused together; fused fruits from closely spaced flowers define the term. Nevertheless, it may seem a stretch to assert that little partridge berries are in some fashion morphologically equivalent to much larger examples of multiple fruits like mulberries and pineapples. Comparing partridge berry with *Morinda*, however, should remove any doubt; the only real difference between the two is the number of flowers/fruits that are ultimately fused together. So, partridge

Figure 5



All illustrations by  
Nicky Staunton

berries and their paired double fruits are not so odd, not so idiosyncratic, after all—at least they are no stranger than pineapples. The two fused ovaries of partridge berry that form a single common fruit is merely the simplest possible example ( $n=2$ ) of a multiple fruit. A comparative perspective permits one to see perplexing structures for what they really are.

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John Hayden, VNPS Botany Chair