Sempervirens

Issue 4 2025

The Quarterly of the Virginia Native Plant Society

Checking in with the VNPS Research Grant recipients

As most readers of Sempervirens know, VNPS has had a grant program for the past 10 years and it has been a great success. The Society has funded 28 research projects focused on advancing our understanding of the biology of Virginia native plants and their relationship to their ecosystems. While our funds are limited, we are able to support two or three projects every year. A full list of all projects supported is on our website at "Research Grant Program - Virginia Native Plant Society" or https://vnps.org/research-grant-program.

Our grants are awarded once each year to principal investigators through their academic institution or non-profit organization. Individuals are not eligible. We encourage undergrad or graduate students to apply in concert with their advisors. Two awards were made in 2025, and one helped support a grad student's research.

The website above contains all information about the grant program but be aware that our average grant amount is $5,000 to $10,000, and grant proposals are accepted from December 1, 2025, to February 1, 2026. Questions can be submitted via email to grantsmanager@vnps.org. Please apply if you qualify!

This year VNPS funded two projects that were outlined in a previous issue of *Sempervirens*. Recently I checked in with our grantees to see how their research was progressing.

One grant went to Dr. Harvey Ballard of Ohio University who is an eastern North American violet (*Viola* sp.) authority, having studied them for decades. He has discovered over 20 new violet species. We have over 30 described violets in Virginia and this summer Harvey discovered what he believes (and he should know) are four new species in the Commonwealth!

Sam Dutilly identifes a plant sample.

Harvey Ballard and Colin Thacker search the forest for violets.

Beginning in May and ending in August, Harvey and one undergrad assistant, Collin Thacker, traveled throughout much of Virginia searching for violet populations. They explored over 150 sites from the mountains to the coast and, aside from the four new species they discovered (wow), they found some historical populations absent (sad), a few new localities for specific violets (good) and discovered new hybrids (violets have a tendency to hybridize). Harvey is determined to continue his search for new and rare violet populations

(See Grant recipients, page 2)

Grant Recipients

(Continued from page 1)

in the Southeast. VNPS is proud to have helped support this diligent and focused botanist in his studies of Virginia flora. As an aside, Dr. Ballard's fascination with violets began when he was 14 and accidentally ate a poisonous plant. But he says that experience led him down a botanical path that got straighter when as an undergrad he discovered that many herbaria violet specimens were misidentified. Wow, poisoning led to his botanical fascination and career!

Harvey Ballard and Colin Thacker check on violets that they have raised from seed.

Our second VNPS grant of 2025 went to Dr. Doug DeBerry and his graduate student, Sam Dutilly, researchers from The College of William & Mary. Their focus was to document the plant diversity and ecological communities in an area of the coastal plain known as Fones Cliffs. These cliffs are high bluffs with deep steep ravines that sit on the east side of the lower Rappahannock River and are recognized by the National Audubon Society as an Important Bird Area. A large portion of this Fones Cliff region was recently acquired by the Rappahannock Indian Tribe, and Doug and Sam's research is focusing on field studies of the flora and their communities. They are also compiling strategies for the restoration and conservation of these sacred indigenous lands. In addition to tribal lands, they have secured permission from two other adjacent private property owners to survey their lands.

This region has populations of Sensitive Joint-vetch, *Aeschynomene virginica*, a federally threatened species, which occurs in freshwater tidal marshes. Their research also focuses on the protection and potential enhancement of these populations. Doug and Sam have been very busy this spring, summer, and fall collecting, identifying and documenting the plants and communities in the area. They have also undertaken field trials of the Sensitive Joint-vetch with various management techniques to enhance, sustain, and protect the populations on these lands. Preliminary results of their field trials have suggested methods for enhancing/protecting these populations – quite exciting! The Tribe holds conservation easements on their Fones Cliff lands and is co-steward with the Rappahannock River Valley National Wildlife Refuge, which also has land in the region. By December, most of their field research will be completed and by April or May, their final reports will be completed. We look forward to their results.

(l-r)Sensitive Joint-vetch (*Aeschynomene virginica*); *Sam Dutilly botanizes by boat near Fones Cliffs.*

VNPS Grant Program is a wonderful program for researchers of Virginia Flora. If you qualify, please consider checking into the program.

--Kevin Howe, 1st Vice President and Acting Grants Manager

Melody Starya Mobley
Trailblazer, Educator, and Advocate for all

Melody Starya Mobley

As Melody Starya Mobley concludes her tenure as Chair of the Virginia Native Plant Society's Diversity, Equity, Inclusion, and Justice (DEIJ) Committee, we pause to honor her remarkable legacy that has made a lasting, transformative impact on our organization and the wider community.

Melody is a trailblazer in every sense of the word. As the first Black woman to serve as a U.S. Forester, she shattered barriers that had long stood unchallenged, paving the way for countless others. Her life's work is defined by an unwavering commitment to protecting nature, inspiring environmental stewardship, and championing equality and inclusion within the environmental movement.

Over the past year, I've had the privilege of serving alongside Melody as Vice Chair of the DEIJ Committee. To me, Melody is more than a colleague; she is a sister, a friend, and a vital figure in American history. She represents the strength it takes to overcome adversity and stereotypes while embodying humility, love, and a quiet self-confidence that radiates sincerity and hope.

Melody's leadership within VNPS has been distinguished by genuine warmth, deep empathy, and inspiring vision. She has continually reminded us that true conservation extends beyond protecting ecosystems; it is equally about nurturing a sense of belonging and making certain that everyone feels genuinely welcome in the spaces we cherish.

Many of our colleagues have shared words of admiration and gratitude for Melody's impact:

"I am grateful to Melody for sharing her story so that we can all continue to grow."

— Linda Murphy

"It has been my pleasure and privilege to get to know Melody Starya Mobley over the past couple of years through regular VNPS Zoom meetings. Her positivity and compassion always stood out to me, even while discussing issues that could be seen as intractable challenges. She has been a hopeful and warm presence on our board, and I am thankful for her willingness to serve our community."

— Anna Maria Johnson, President, Shenandoah Chapter of VNPS

"She's brave for breaking barriers
and for persevering with pain
She's wonderfully wise
and a joy to befriend
She dearly loves animals—
both wild and tame
And we are lucky to know her
by her melodious name."

— Catherine Flanagan

"I met Melody at the VNPS State Board of Directors meeting when I was Recording Secretary. I was instantly drawn to her for her unique perspectives and honest approach to asking deep and enriching questions about accessibility and diversity at our events. She is funny and kind, and because of her unforgettable personality, I wanted to join the DEIJ Committee and try my best to be more inclusive and welcoming to others through volunteering and my own job as a park ranger. Thank you, Melody, for everything! You are an inspiration."

— Anna Finch

Melody's profound influence will continue to illuminate our path as we move forward, reminding us that the pursuit of inclusion and justice is sustained by love, community, and a deep reverence for all living things. We are deeply grateful for her unwavering service, her wisdom, and the example she has set. As she embarks on new journeys, we extend our heartfelt best wishes for every success and fulfillment in the adventures ahead.

--Aaron Kershaw, VNPS Diversity, Equity, Inclusion, and Justice Chair| Contributors: Linda Murphy, Anna Maria Johnson, Catherine Flanagan, and Anna Finch

Presidential highlights from Society in 2025

From the President Nancy Vehrs

As we wind down 2025, I decided to provide an updated version of the annual report I presented at our annual meeting at Smith Mountain Lake.

We have nearly 3,000 statewide members and 13 chapters. We've been flirting with the magical number of 3,000 members and hope to attain it soon and build from there.

Last year our members raised more than **$50,000** for the Virginia Botanical Associates' Digital Atlas of the Virginia Flora as part of our 2024 fundraiser led by Fundraising Chair Emilia Godwin. This year we hope to raise the same sum for the Flora of Virginia, and I send my thanks to all who have donated.

The VNPS highlighted Mayapple (*Podophyllum peltatum*) as the 2025 Wildflower of the Year. Botany Chair John Hayden wrote another excellent brochure and contributed scientific articles for *Sempervirens*.

Publicity Chair Ashley Moulton oversaw our fourth art contest for the design of a Wildflower of the Year T-shirt for Mayapple, and we had many entries. The winning artwork was by Nick Garnhart of Front Royal who was also the winner for last year's Turtlehead design. Orders for T-shirts are sold directly through the Richmond-based vendor Bonfire and accessed through our website store. We have generated thousands of dollars for these sales without having to hold inventory or fulfill orders.

For the fifth year in a row, we held our annual workshop virtually through Zoom. This year's topic, "Advancements in our understanding of Virginia flora," was presented over two Wednesday evenings, March 19 and 26. Many thanks to Education Chair Maeve Coker for finding speakers and coordinating the event. The speakers were all recipients of previous VNPS research grants:

•Dr. Mary Jane Epps, an associate professor at Mary Baldwin University at the time.

•Hannah Machiorlete**,** an ecology research assistant at Archbold Biological Station in South-Central Florida who conducted her research at the College of William & Mary.

•Dr. Harvey Ballard, a Professor of Plant Biology at Ohio University.

•Dr. Carrie Wu, Associate Professor of Biology at the University of Richmond.

These sessions were recorded and are available for viewing on Vimeo through our website.

First Vice President/Acting Grants Manager Kevin Howe and his team of reviewers selected the two recipients of our 2025 Research Grants:

•$11,805 was awarded to Dr. Harvey Ballard, Professor of Plant Systematics and Evolution and Director of the Floyd Bartley Herbarium at Ohio University. His proposal, "A Taxonomic Treatment of the Violets (Violaceae) of Virginia and North Carolina," continues a multiyear study of the violet species complex found throughout Va. and N.C.

•$8,482 was awarded to Dr. Doug DeBerry and Sam Dutilly of The College of William & Mary. Dr. DeBerry is a research assistant professor in the Environment and Sustainability Program and Sam is his graduate student. This grant will fund a study of the "Vascular Flora of Fones Cliffs, Virginia, and Novel Habitat Enhancement Method for the Preservation of Sensitive Joint-vetch."

REMEMBERING HARRY GLASGOW

It is with great sadness that we announce the passing of the Society's "First Dude," Harry Glasgow (1940-2025). Harry was VNPS President Nancy Vehrs's loving partner not only in life, but in their shared conservation work. A lifelong advocate for the outdoors, he devoted his retirement years to protecting the natural world. Harry never missed an opportunity to take a walk in a park. RIP Harry. Happy Trails.

Legislation: a small VNPS team follows actions of the General Assembly and works with the Virginia Conservation Network to stay informed in the GA's fast-moving environment. Though we did not play as active a role in this year's invasive plant signage legislation, the governor signed a bill requiring signage at nurseries that identifies invasive plants that are offered for sale. The bill had directed an effective date of January 2026, but the governor amended the bill to push back the requirement until January 2027. Last year he vetoed a more stringent bill. We are grateful to our volunteer registered lobbyist Tom Smith and Conservation Chair Barbara Ryan who followed legislation and interacted with legislators on our behalf. Since that time, Barbara's term as Conservation Chair expired and she chose not to be reelected. We owe her a great deal of gratitude for her service during a trying time in her personal life.

We held only one statewide field trip this year: a kayak trip on Dragon Run on the Middle Peninsula organized by Kevin Howe. We hope to offer more next year.

This Annual Meeting is only our third multi-day event held in person since the pandemic. I am grateful to Sally Anderson, Kevin Howe, and Karen York for their diligent work in pulling together this annual meeting. I am also grateful to Secretary Jen

(See Highlights, page 5)

Annual Meeting field trips fun and wide-ranging

This year's field trips at the VNPS Annual Meeting, Sept. 20-21, were, as always, fun, educational and a great way to see and meet other native plant lovers. Plus, we had spectacular leaders. Our trips varied in length and difficulty as we had a wide variety of ages (16-90), interests, and abilities. Every year we try to visit as many of the 66 Virginia Natural Area Preserves as we can because these protected natural areas contain some of the state's rarest plants and unique ecosystems. We were able to visit two this year and these walks did not disappoint! It just doesn't get any better when you are a native plant lover. We strive to limit our walks to 15 participants so everyone can hear, see and enjoy.

Our meeting was held at the Skelton 4-H Camp at Smith Mountain Lake and from there our trips branched out near and far. Hats off and thanks to all our extraordinary trip leaders listed below and a two hat thank you to Bradley Simpson and Jimmy Francis for leading a trip each day. On Saturday we had five field trips leaving the center at 10 a.m. ranging from 20-80 minutes away.

•**Explore Park in Roanoke -** led by Heather Butler, a biology professor at Western Virginia Community College. This was an easy hike though a forested area.

•**Grassy Hill Natural Area Preserve in Rocky Mount -** led by Jimmy Francis with Virginia's Division of Natural Heritage. This uphill hike visited one of the state's 66 protected Preserve sites and we were treated to several rare plants and rare plant communities. An added bonus on this walk was botanist Dr. Alan Weakley of the University of North Carolina who joined us and shared his vast knowledge. We all were wowed by many spectacular and rare plants such as Canada Burnet, *Sanguisorba canadensis*, a northern plant growing only in four western Virginia counties.

•**Fairy Stone State Park near Stuart -** led by Jessica Seaver, a ranger at the park. Jess took a group on a wonderful park trail where she has led bioblitzes that yielded 800 species of fauna and flora! Jess continued the hike then to the fairy stones site where some of the fairy stones were found!

•**Dragon Tooth Trailhead near Catawba –** led by Bradley Simpson, a biologist with Nature Forward in Chevy Chase, MD. This hike on Cove Mountain in the Jefferson National Forest was through a U.S. Forest Service Special Biological Area, and

(See Field trips, page 12)

Highlights

(Continued from page 4)

Crawford, Treasurer Melissa Korzuch, and Blue Ridge Wildflower Society president Jennifer McCarthy for their support and volunteer efforts.

Website and Social Media Outreach:

•Many thanks go to Publicity Chair Ashley Moulton who maintains our Instagram presence. We now have 8,234 followers, up from 7,306 last year.

•Our VNPS Facebook Group has grown from 95,000 members a year ago to more than 109,000 members now, nearly a 15% increase. We have a very active administration group that includes Laurie Dodd, Scott O'Brien, Lauren Taylor, Brian Magurn, Sam Kirby, and me. Many thanks to this great group of dedicated volunteers. This Facebook group can average hundreds of member requests per week, and the administrators are VERY busy. We are constantly on the lookout for spammers and trolls. Identification requests are the most frequent posts.

•We increased Facebook page followers to 32,000, about 2,000 over this time last year. We have added two more contributors, Education Chair Maeve Coker and Piedmont Chapter Board Member Laurie MacNaughton, and have recently increased our posting output. Ashley Moulton and I had been the only admins for a while, and our posts had become sporadic. I am hoping to engage someone from the southwestern part of our state to increase our geographic diversity.

•We maintained an active and current website thanks to David Gorsline. He maintains our events calendar, posts statewide content, and assists chapters with posting content such as newsletters, and so much more!

Sempervirens editor Nancy Sorrells continues to produce an award-winning quarterly 12-page newsletter with a broad mix of content. This is the fourth and final issue of the year. We send it to *all* members electronically through the Leaf Letter email. Those who still receive paper copies receive it in the U.S. mail a little later.

The capstone achievement for VNPS this past year was September's revival of the former Fredericksburg Chapter as the Central Rappahannock Chapter. The chapter held its first official meeting in October and elected officers. I am so grateful to president Stacey Churchill for her work in coordinating this effort. She had a solid steering committee, and the chapter is off to a rousing start with an excellent board. Let's hear it for lucky chapter number 13! ❖

Invasive Species Team hits the ground running

From Your Natural Heritage Program

By Kevin Heffernan & the Invasive Species Team

Over 30 years ago, VNPS and the Virginia Natural Heritage Program (NHP) began collaborating to increase awareness and action on invasive plants in Virginia. This partnership has produced the Virginia Department of Conservation's (DCR) Invasive Plant List, 30 invasive plant fact sheets, regional native plant lists for landscaping and conservation plantings, and—with other partners—the Invasive Species Working Group.

Most recently, the 2024 state budget appropriated funding for multiple invasive species positions across three state agencies: Forestry, Agriculture and Consumer Services, and Conservation and Recreation. In early 2025, DCR's Natural Heritage Program filled two new Invasive Species Specialist positions. AG Sweany and Lindsay Caplan form the team led by the author (Kevin Heffernan) and NHP Invasive Species Coordinator to implement the Virginia Invasive Species Management Plan in cooperation with state, federal, and private partners. They will collaborate with the Natural Heritage Stewardship section on priority invasive species projects and restoration efforts, conduct invasive plant surveys and risk assessments, maintain and expand the Virginia Native Plant Finder, and bring creative energy to education and outreach.

With great joy, I introduce to you our new Invasive Species Specialists: AG Sweany and Lindsay Caplan.

AG Sweany

Lindsay Caplan

AG Sweany steps into this position well-prepared from three plus years in the Invasive Species Technician role, a "part-time" position, and became quickly immersed in *Trapa*-infested waters, *Phragmites* patches, invasive plant risk assessment spreadsheets, GIS tasks, FAA protocols, and drone flight missions. In 2024, AG served a vital role in updating the DCR Invasive Plant Species List and expanding the Virginia Native Plant Finder. AG's work has included the development of our Two-horned Trapa Story Map Dashboard, Wavyleaf Grass StoryMap and Dashboard, and collecting and interpreting drone imagery. Beginning in August 2023, AG also worked as an Environmental Data Specialist at the Virginia Department of Transportation and further honed important GIS skills. AG is a graduate of Virginia Commonwealth University, where, after deciding a theater major might not lead to income, earned a B.S. in biology, minoring in chemistry. AG has since obtained a post-baccalaureate certificate in GIS.

Although AG's family moved around during childhood, they call Spotsylvania County home. Nevertheless, it was eating snap peas in a Kansas grandmother's veggie patch while listening to the call of a Bobwhite Quail where AG first experienced a deep connection to the wild world. Working at the Avian Ecology Lab under Dr. Lesley Bulluck, AG learned conservation was a realistic vocation. A favorite native plant is mountain laurel (*Kalmia latifolia*). To AG, the most delicious invasive species is wineberry (*Rubus phoenicolasius*). I agree! Fresh off the barbed cane or baked in a strudel, so tasty!

Lindsay Caplan returns to Natural Heritage after doing great things with the Virginia Department of Forestry (DOF) as its first Invasive Species Specialist. A graduate of Oregon State University with a B.S. in wildlife biology and a specialization in conservation biology, Lindsay has worked in several local, state, and federal organizations. Her wide-ranging experience will sound familiar to many of us plying our way in the conservation space. Lindsay has been a technician in an ecotoxicology lab, a forest tech for the U.S. Forest Service, and a natural resources tech for the

(See Invasives team, page 11)

Peruvian plants in the Andes different, yet familiar

After more than three decades as the editor of the Society's state newsletter, I have discovered that I have a problem. Well, not a problem exactly, but an unquenchable curiosity about the plants that I bump into during my travels to far flung parts of the world.


Cantuta, the national flower

Recently I went on a hiking and cultural immersion trip to the Sacred Valley of the Incas in the Peruvian Andes. Needless to say, when one leaves not only the country, but the hemisphere, the plants one encounters are fascinatingly different, and sometimes eerily similar.

On one particularly hard trek up and along the Andean ridges at close to 13,000 feet, the plants actually became my allies. There were just four of us following this ancient Inca trail through the fog-shrouded mountains – our guide Dalmiro, my hiking buddy Sue, me, and a 60-year-old Indigenous woman named Isadora whose hiking ability put the rest of us to shame.

Isadora possessed an encyclopedic knowledge of the different plants covered in droplets from the fog that lined the path at these high elevations. From time to time as we slowly made our way along the trail, I queried Isadora, through our guide, about the uses for particular plants. She always knew – this one for indigestion, this one for headaches, this one made a pretty dye. I found her answers fascinating, but I will admit that I also used the short botanical explanations for a moment of rest before continuing the arduous trek.


Colorful yarns and their associated dye plants.

One plant that we encountered often on our visit to Peru was a small spindly shrub with a beautiful tube-like red flower. The Cantuta (*Cantua buxifolia*) is the country's national flower and represents unity and hope. When several of us participated in a religious blessing of the animals ceremony, we were given a necklace of Cantuta flowers to wear.

Everyone who visits Peru comments on the brilliant colors in the clothing of the local people. Many of those colors come from natural dyes made from plants. We visited a textile workshop where the women took us through the process of making natural dyes and the resulting colors were brilliant.

While having lunch with a family in a small village high in the Andes, I noticed a familiar lupine-looking plant in a garden area. When I inquired, I was told it was "Tarwi o Chocho" or *Lupinus mutabilis*. Although lupines are not normally considered edible, the Andean people have developed this species known for its edible bean that is high in protein.

The one plant that stands out more than any other in the Andes is the potato. The word "potato" is actually a Quechua word meaning "tuber." Sometime between 8,000 and 10,000 years ago, the Andean people began domesticating a wild tuber, probably from the wild ancestor, *Solanum bukasovii*. Nearly 500 years ago, Spanish sailors recognized the food value in potatoes and loaded them on a ship, thus introducing them to the world.

Depending on what source you rely on, there are 3,000 to 5,000 varieties of potatoes in the Andes Mountains of Peru and Boliva. Several hundred of those tubers, of every color and shape imaginable, are cultivated and sold at markets everywhere today.


Potatoes, anyone?

Above 10,000 feet, the potato is the only reliable crop that is grown for food. After harvesting the potatoes by hand, the people spread the tubers on the ground, wet them, allow them to freeze and then stomp and squish the water out of them until they are shriveled, dehydrated nuggets. Dehydrated potatoes take up far less storage space and stay edible for several years. When it comes time to cook them, they are boiled at which point they plump back up and become potatoes again.

By the way, one of the most important fertilizers for the potato plants comes from cuy – guinea pigs. Everyone keeps these furry squeaky rodents in their houses under their beds, not as pets but as poopers. The people buy bundles of greens at the local markets to feed the cuy and then use the manure to fertilize their potato crop. And, yes, every once in a while, they have cuy for dinner.

--Nancy Sorrells, Editor

How monopodial Mayapple seedlings become sympodial

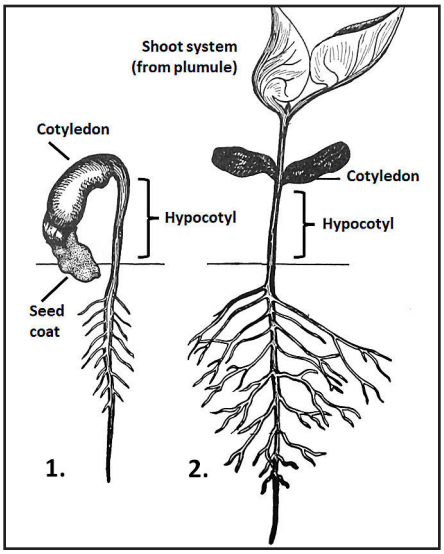
Article and images by W. John Hayden, Botany Chair

Theo Holm was an immigrant from Denmark who at various times in the late 19th and early 20th centuries worked for the U.S. Department of Agriculture and the U.S. National Museum (Smithsonian Institution). He is, perhaps, best known for his work on medicinal plants and sedges (Cyperaceae). My familiarity with Holm's work, however, stems from his meticulous publications on the anatomy and morphology of familiar plants from eastern North America. For my fourth and final article on Mayapple, the VNPS Wildflower of the Year for 2025, I will summarize highlights from Theo Holm's study of *Podophyllum peltatum* (Holm 1899).

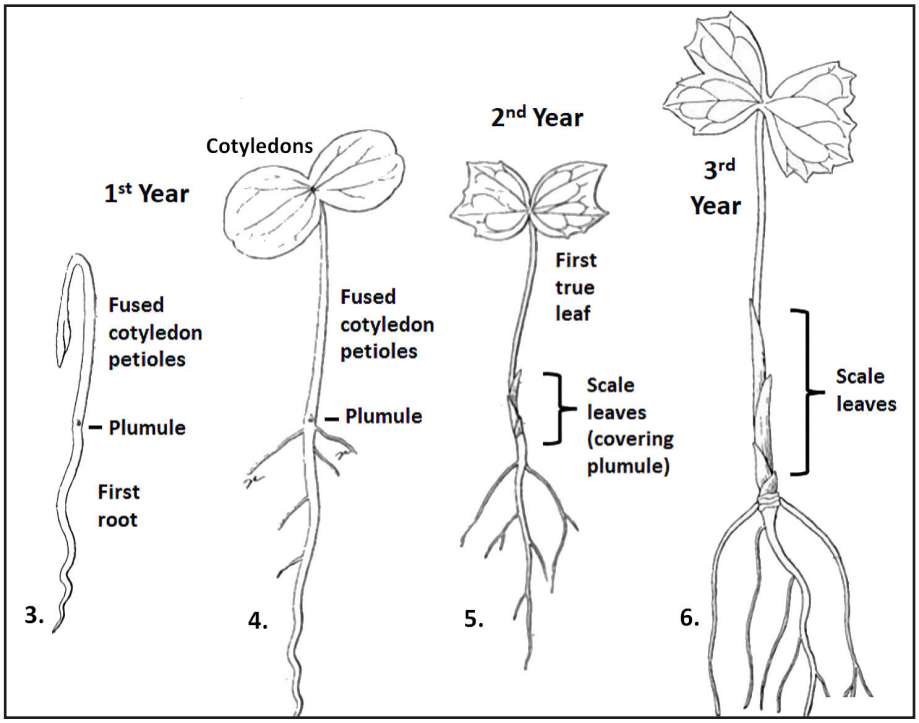
Holm opens his paper on Mayapple, logically enough, with seedlings. Mayapple fruits mature in late summer, and the seeds contained therein are often dispersed by box turtles and small mammals. Seed germination occurs in spring, around the end of April for populations in the mid-Atlantic States. As is common for most plants, the seedling root emerges first, followed soon thereafter by the cotyledons. Holm points out, however, that the details of these earliest stages of Mayapple seedling growth are truly peculiar. But before we explore what's odd about Mayapples, let's summarize a more typical case.

For most dicot seedlings, two cotyledons are raised above soil level by growth of the hypocotyl, a portion of the plant root-shoot axis that serves as a transition zone between the root, below, and the shoot system, which arises immediately above the cotyledons (Figures 1, 2). Further, hypocotyls of emerging dicot seedlings are usually bent into a hook-shape (Figure 1); most growth of the hypocotyl occurs below the hypocotyl hook. Consequently, cotyledons are *dragged* upward through the soil or leaf litter, an adaptation that must be gentler to the delicate cotyledons than being simply *pushed* upwards from below. Further, for dicots with cotyledons that emerge from the soil at germination, the plumule (epicotyl), located between the cotyledons, is dragged upwards with the cotyledons and from that position atop the cotyledons, the plumule grows, establishing the plant's shoot system (Figure 2).

First year seedlings of Mayapple differ from the usual case described above in several respects



Figures 1 and 2. Stages in the germination of Common Bean, *Phaseolus vulgaris*, typical of many dicots. Figure 1. Elongation of the hook-shaped hypocotyl drags cotyledons from below ground. Figure 2. Plumule located just above the cotyledons establishes the shoot system; altogether, the single shoot attached to one root system defines the growth habit of Common Beans as monopodial. Images lightly edited from Fuller & Tippo (1949).



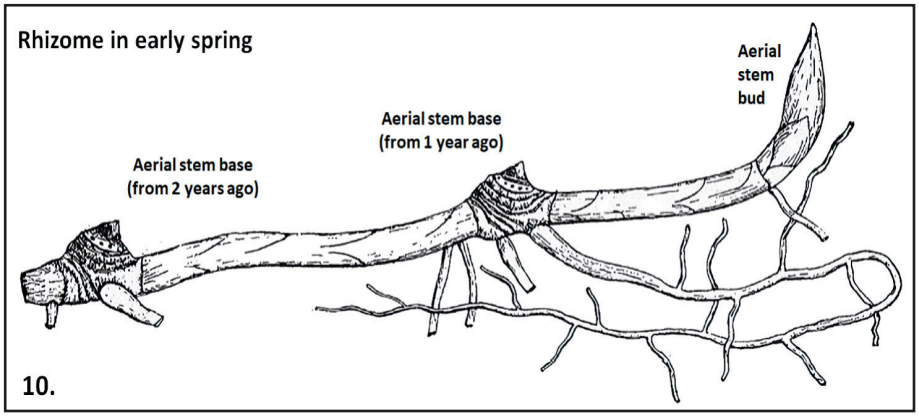
Figures 3-6. Early stages of seedling growth of Mayapple, *Podophyllum peltatum*. Figure 3. Fused petioles of the cotyledons with an apical hook; elongation of cells below the hook drag the folded cotyledon leaf blades upward through leaf litter. Figure 4. First year seedling with expanded cotyledon leaf blades; plumule remains at soil level. Figure 5. Seedling in the second year of growth; the single emergent leaf has two lobes; plumule remains near soil level, covered by scale leaves. Figure 6. Seedling in third year of growth, structurally similar to that of the second year, but all organs are incrementally larger. Images lightly edited from Holm (1899).

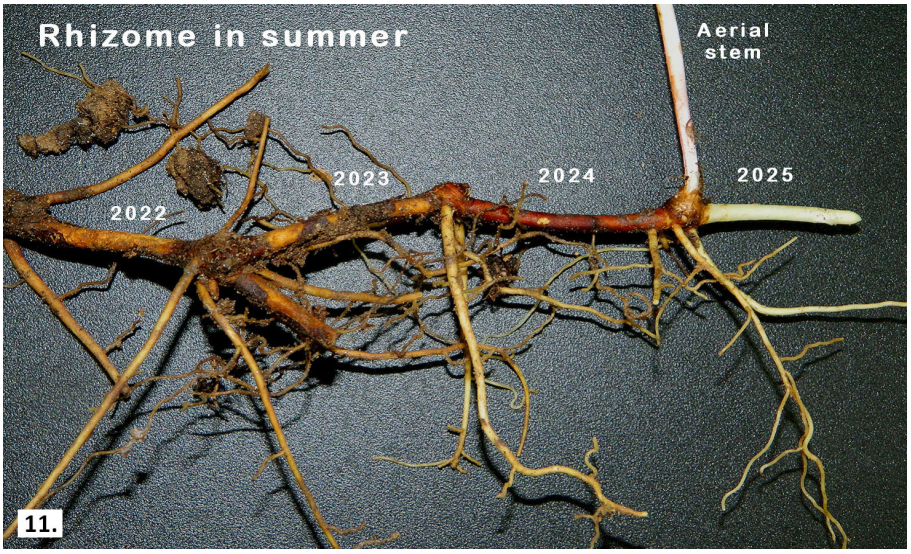
Figures 7-9. Changes in Mayapple leaf shape reflect age of plant. Figure 7. A seedling's only leaf in its second year of growth. Figure 8. A seedling's only leaf from a plant just a few years older than that in Figure 7. Figure 9. Typical multi-lobed leaf blade of a mature Mayapple. Photographs by W. John Hayden.

(Figures 3, 4). First, the hypocotyl region remains small and scarcely elongates at all. Further, the plumule, which usually establishes the shoot system of seedlings during the first year of growth, undergoes only a rudimentary level of growth and remains approximately at ground level for several years. In Mayapple seedlings, it is the cotyledons alone that emerge upon germination. Further, petioles of the two cotyledons are fused together, forming a cylindrical, hollow, tube. It is this hollow petiole tube that elongates, with a subterminal hook (Figure 3), that drags the cotyledon leaf blades through the ever-present leaf litter. During their brief transit through leaf litter, the cotyledons are folded together (Figure 3), but once they emerge into the open air, the cotyledon leaf blades unfold and expand (Figure 4). And not much else happens during the first year of a Mayapple seedling's life! The expanded cotyledons perform photosynthesis, and the plumule (epicotyl), still held at ground level, does little else until year two.

Holm does not address *why* Mayapple seedling development differs so radically from the usual case among dicots, but I will go out on a limb and speculate that it all has to do with the challenges of seedling establishment. Because they are relatively small, Mayapple seeds have a limited amount of stored food with which to fuel early growth of seedlings. But it is also imperative that the cotyledons rise above the woodland leaf litter to reach sunlight and begin the work of building reserves for later growth. Yet, at the same time, given that seed-born resources are few, it

(See Mayapple seedlings, page 10)





Figures 10, 11. Rhizome structure of mature, sympodial, Mayapple plants. Figure 10. Rhizome in early spring; the terminal bud (far right) will form that year's aerial stem and a new rhizome segment will emerge from a lateral bud present on one of the scale leaves below the terminal bud; each previous segment of rhizome growth is terminated with a slightly upturned region bearing scars from former aerial stems and associated scale leaves. Image lightly edited from Holm 1899). Figure 11. Rhizome in summer of 2025; aerial stem and new rhizome segment have emerged; earlier rhizome segments are labelled according to the year in which they developed. Photograph by W. John Hayden.

Mayapple seedlings

(Continued from page 9)

may well be advantageous to keep the growing tip (apical meristem/plumule/epicotyl) near soil-level for improved survival during its first winter. Given limited resources in the woodland environment, a solution that has only cotyledons poking above the leaf litter and keeping the rest of the seedling near soil level may thus be advantageous. Further, two fused cotyledon petioles pushing as one through the leafy overburden is probably more effective than each petiole acting independently. So, for its first year of growth, having pushed into the dappled dim light of the forest floor, Mayapple cotyledons function like little solar panels, sending resources to the rest of the seedling that consists of little more than a few roots and a rudimentary plumule (epicotyl) bud near the soil surface. Tenuous as it may be, a successful first year Mayapple seedling will have gained a small foothold in its forest home.

In its second year, seedling growth is subtly different. The apical meristem of the plumule produces just a single leaf which, unlike the cotyledons, is slightly lobed with short teeth at the tips of the lobes (Figure 5). Much less conspicuous than the single emergent leaf, the plumule apical meristem also produces a few scale leaves, the bases of which clasp the slowly growing, short, vertical stem down near the soil surface and, usually, hidden somewhat by leaf litter. For a few more years, this pattern of limited growth repeats, yielding one green photosynthetic leaf, and several scale leaves on an incrementally elongating, still vertical, stem. The root system, of course, continues to grow year after year and ramify through the soil. Through these first years of growth, Mayapple seedlings possess what is known as a monopodial growth habit, simply put, this means that there is a single axis of growth, with roots below, supporting a small shoot above.

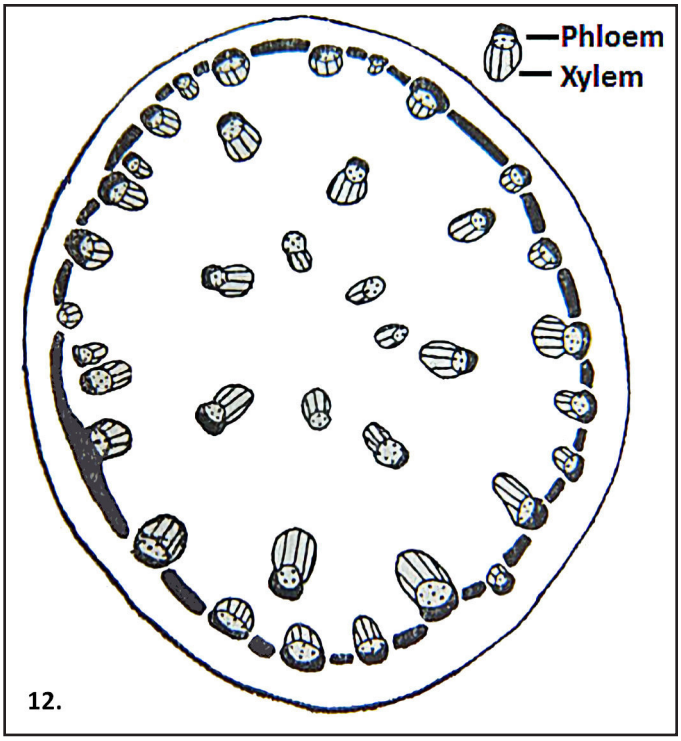


Figure 12. Diagram of the microscopic structure of an aerial stem of Mayapple; note the presence of multiple vascular bundles scattered across the cross-sectional surface. Image lightly edited from Metcalfe and Chalk (1950).

While strolling through a large colony of Mayapple in the spring, it is possible to spot some of the early growth stages described by Holm. I have not been lucky enough to notice newly emerged cotyledons, but I believe my photograph in Figure 7 represents the leaf of a second year plant, and Figure 8 is a seedling perhaps just a few years older. For comparison, Figure 9 illustrates a single, multi-lobed, leaf from a fully mature Mayapple.

According to Holm, it is not until the fourth or fifth year of seedling growth, when the monopodial seedling initiates the sympodial growth habit that is typical of adult Mayapples. At the beginning of this transitional year, another single leaf is formed on the short vertical stem along with a few scale leaves. Whereas Holm failed to find lateral buds in the axils of earlier scale leaves, by year four or five, he found that the largest scale leaf does have a lateral bud. Moreover, that lateral bud soon grows horizontally, thus forming the first increment of Mayapple's rhizome system. From this point on, Mayapple shoot systems have two distinct components: 1) rhizomes that grow horizontally under leaf litter, more or less at the soil surface, elongating in increments each year; and 2) vertically growing aerial shoots that arise from the terminal bud of the previous year's rhizome segment (Figures 10, 11). Once the rhizome has formed, the apical meristem of the original vertical seedling stem remains dormant; Holm asserts, however, that it could resume growth if the new rhizome were to be severed.

Rhizome initiation establishes the sympodial growth habit of mature Mayapple plants (Figures 10, 11).

(See Mayapples, page 11)

Invasives team brings experience, enthusiasm to work

(Continued from page 6)

Virginia Department of Wildlife Resources. In 2022, Lindsay was a Botany Technician with the NHP. At DOF, she collaborated with federal, state, local, and nonprofit partners as well as private landowners to coordinate invasive species removal on state forests, state owned lands, and adjacent properties of concern; conducted surveys and mapping efforts for priority invasive species; oversaw contractor work from scope development to final assessment; and completed management activities such as manual removal and herbicide application of target species. Lindsay also provided educational outreach through social media campaigns, YouTube videos, signage, lectures, and training.

Growing up in Baltimore, Maryland, Lindsay's parents connected her to the wild world through visits to the zoo and adventures in local parks catching frogs, turtles, and fish. With her family, she made annual trips to Shenandoah National Park. Lindsay's interest in photography led her to the work of Nick Brandt, whose nonprofit conservation organization awoke a vision of a life in wildlife biology. Lindsay's favorite Virginia native plant is Eastern Indian Paintbrush (*Castilleja coccinea*). She is fascinated by the American Chestnut blight and its devastating impact on our natural heritage. So true! Can you name another species that could turn a towering giant into an underground zombie?

Together, the Natural Heritage Invasive Species Team looks forward to working with VNPS on our many shared goals. ❖

Mayapples

(Continued from page 10)

Each annual increment of rhizome growth terminates in an upturned tip bearing several scale leaves and a terminal bud (Figure 10). Each year the terminal bud forms a new leaf or, in healthy mature plants, a short stem bearing two leaves and a flower. Each year, a new rhizome segment emerges from the scale leaves below the previous year's upturned tip (Figure 11). Further, healthy, mature, plants may initiate two rhizome segments from two different scale leaves, consequently, producing a branch in the rhizome. Also, adventitious roots develop at the end of each rhizome segment where aerial stems and new rhizome segments form (Figures 10, 11).

A brief etymological note: the "-podial" portion of the words monopodial and sympodial translates directly as "foot," an archaic reference to the root portion of a plant. Plants with monopodial growth habits have just one foot-like root system below a single shoot, e.g., the Common Bean seedling illustrated in Figure 2 and the early stages of Mayapple seedling growth (Figures 3-6). In contrast, the multiple shoots of mature Mayapple plants have multiple root systems; each aerial shoot is associated with its own foot-like cluster of roots. In this case, "sym-" implies the togetherness of multiple "feet" supporting the multiple shoot systems.

Holm's study documented one additional, intriguing, aspect of the sympodial growth habit of mature Mayapples. Mayapples have two distinct kinds of stem, the subterranean rhizome segments and the aerial stems that, in fully mature plants, bear two leaves and a flower. Remarkably, the internal microscopic anatomy of the aerial stem is radically different from that of the rhizome. In simple terms, rhizome anatomical structure is typical for a dicot; there is a ring-like arrangement of vascular bundles surrounding a large central pith. Vascular bundles constitute the plant's "plumbing system;" xylem cells conduct water and dissolved mineral nutrients while phloem cells conduct mostly sugars and other small organic molecules. Mayapple aerial stem anatomy is stunningly peculiar for a dicot, consisting of multiple vascular bundles scattered across the stem as seen in cross-section (Figure 12). Scattered vascular bundles are typical of monocot plants, but Mayapple is a dicot! Holm offers no compelling explanation for this perplexing anomaly, and I am not inclined to do so either, . . . well, at least not right now! I've been thinking about this conundrum for quite a while this year, and I have a few ideas about what might be going on but, in this case, I am reluctant to speculate in the absence of data that might be easy enough to gather next spring when our beloved Mayapples emerge once again from dormancy. Hmm . . . maybe this *isn't* my last article on *Podophyllum*! ❖

REFERENCES CITED

Fuller, H. J., and O. Tippo. 1949. College Botany. Henry Holt and Company, New York.

Holm, T. 1899. *Podophyllum peltatum*: a morphological study. Botanical Gazette 27: 419-433.

Metcalfe, C. R., and L. Chalk. 1950. Anatomy of the Dicotyledons. Clarendon Press, Oxford.

Field trips

(Continued from page 5)

it was indeed special with many uncommon montane plants observed.

•Wood Thrush Native Nursery in Floyd – led by the nursery owner and renowned native plantsman, Ian Caton. Members were treated to a personal nursery tour and tips on native plant propagation.

Sunday's trips began after breakfast and went in all directions so that attendees could head home afterward.

•Compton Peak Trail in Shenandoah National Park – led by Bradley Simpson, this walk yielded a botanically diverse forest with amazing geologic features called columnar jointing.

•Apple Orchard Falls in Jefferson National Forest (Bedford) – led by Dr. Mary Jane Epps, the Va. Natural Area Preserve Biologist. This spectacular walk through lush forest, rocky outcrops with picturesque streams featured astounding plant diversity.

•Grassy Hill Natural Area Preserve - led by Nate Miller, a botanist, landscape designer and instructor at Piedmont Community College. Like Saturday's trip the group saw a number of rare plants including the Canada Burnet, *Sanguisorba canadensis*.

•Buffalo Mountain Natural Area Preserve - led by Jimmy Francis, this preserve is host to six rare and significant natural communities in Virginia with such plants as Plains Frostweed (*Helianthemum bicknellii*) and Virginia's largest population of Large-leaved Grass-of Parnassus (*Parnassia grandifolia*).

The Society thanks all who supported and participated in the walks from the fabulous leaders to those who walked and sweated but learned and viewed some of Virginia's best flora. Join us next year on more dazzling field trips to Virginia's most treasured landscapes. ❖

Sempervirens (ISSN 1085-9632) is the quarterly newsletter of the Virginia Native Plant Society, Blandy Experimental Farm, 400 Blandy Farm Lane, Unit 2, Boyce, Va. 22620, 540-837-1600, info@vnps.org. Nancy Vehrs, President; Nancy Sorrells, Editor; Karen York, Office Manager. Original material in *Sempervirens* may be reprinted if credit is given to the Virginia Native Plant Society, to *Sempervirens*, and to the author of the material, if named. Readers are invited to send letters, news items, and queries for consideration. E-mail items to Nancy Sorrells at lotswife1959@gmail.com. Next submission deadline:

January 31, 2026