Semper virens

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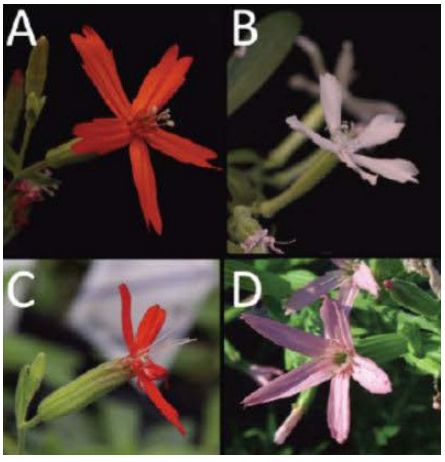
Two stellar proposals draw VNPS grant funding

After careful review of eight wonderful proposals requesting over $77,869 for 2026 VNPS research grant funding, two proposals stood above the rest. An award for $14,670 was given jointly to Dr. Rachel Reid of Virginia Tech and to Dr. Ryan Klopf from the Virginia Natural Heritage Program for the project "**Investigating the Vegetation and Fire History of Buffalo Mountain, VA.**"

A second award for $13,118 was given to Dr. Andrea Bernardi of James Madison University for the project "**Investigating Species Boundaries Between Fire Pink (*Silene virginica*) and Wild Pink (*Silene caroliniana*).**"

All proposals were carefully read and scored by five knowledgeable reviewers. Each proposal was scored on its merits of research focus, financial considerations, inclusion of undergraduate and graduate students, and projected contribution to the understanding of Virginia's native plants. Although every project was worthwhile and worthy of funding, the VNPS grant budget is limited so we were only able to support two of the proposals. This year we raised the funding level to $30,000 from $20,000. At its inception in 2015, a funding limit of $10,000 was established but raised to $15,000, then $20,000, now up to $30,000.



A. *S. virginica*; B. *S. caroliniana*; C. *S. regia*; D. Rare *S. regia*

The eight proposals came from a mix of institutions, agencies and non-profits throughout the state. Dr. Rachel Reid is a Research Assistant Professor in the Geosciences Department at Virginia Tech. Dr. Ryan Klopf is the Mountain Region Supervisor and Natural Area Science Manager for the Virginia Natural Heritage Program. Their research will focus on Floyd County's Buffalo Mountain Natural Area Preserve, one of the 69 Preserves in Virginia. Like all our Natural Area Preserves, it is a crucial protected area with 19 rare plants and 10 different ecological community types. One of the ecological types is a grassland community known as a Southern Blue Ridge Low-elevation Mafic Barren Community. This community type exists nowhere else except on Buffalo Mountain. The summit at 3,971 feet is treeless with upper southwest slopes containing prairie-like openings while lower slopes are mostly forested. The preserve was recently expanded from 1,150 acres to 2,121 acres.

Grasslands are certainly on any ecologist's endangered list given that it's estimated we have lost over 90% of this habitat since European settlement. Reid and Klopf point out that conversion to agriculture and suppression of fire has significantly

Dr. Ryan Klopf at Buffalo Mountain NAP

reduced the Commonwealth's grassland habitat. This loss spreads across the spectrum of flora and fauna, for example 14 of 19 species of grassland birds are suffering from significant decline over the past 60 years of census data and about 50% of all state and federal listed endangered and threatened species are prairie, savanna and/or open woodland species. Buffalo Mountain's open grasslands (balds/glades) are home to 9 of the 19 rare plants found in the preserve.

The grasslands on the summit of Buffalo Mountain have been declining since at least the 1940s as trees invade these grassy habitats. The goal of Virginia's Natural Area Preserve System is to "conserve and manage sites identified as having exceptional natural heritage value, focusing on threatened or rare plants, animals, and natural communities." Reid and Klopf note that the age of these unique grassland habitats and their history need to be explored in order to make future management decisions regarding thinning and prescribed fire. Toward that goal, they will take a series of soil core samples

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VNPS Grants

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Dr. Rachel Reid with soil core

and use carbon isotope analysis to date the samples focusing on organic matter and microfossils in the cores. This will show the structure of vegetation in relation to fire over the past 2,000 or so years. Further, fungal spores from herbivore dung have been found in soil cores and used as a proxy for the abundance of large herbivores by other researchers and this will be further studied by Reid and Klopf. This grant will help support two Virginia Tech students who will be intimately involved with this project from start to finish.

This research by Reid and Klopf will provide a historical picture of the unique grassland communities on this exceptional Virginia Natural Area Preserve and VNPS is proud to help support this work that will enlighten all–researchers and the public–to the conservation and protection of Buffalo Mountain NAP.

The second grant project is led by Dr. Andrea Bernardi, an assistant professor in the Department of Biology at James Madison University. Her research focuses on speciation in flowering plants delving into the inherent evolutionary, genetic and ecological processes that may be involved. This research incorporates field studies along with lab work in biochemistry, genetics, and phylogenetics in an attempt to understand how the role of floral color may influence speciation.

Dr. Andrea Bernardi

This VNPS grant will help support a research focus on two Virginia native wildflowers in the genus *Silene* in an attempt to determine the boundaries between the two species. These two species differ in flower color–one red (*S. virginica*) and one pink (*S. caroliniana*)–and other morphological characteristics but have been found to hybridize. These two species may provide a unique opportunity to understand if and how pollinator behavior may facilitate or influence the breakdown of species boundaries. A basic and fundamental pursuit in biology is to understand the evolutionary, genetic and ecological processes that may be involved or trigger the diversification and speciation in the natural world.

Traits, such as flower color, scent, and flower shape, are important in attracting and rewarding pollinators. Interestingly, the red flowered *S. virginiana* has abundant nectar and a long floral tube that appears to favor hummingbirds while the pink flowered *S. caroliniana* has wide petals and small amounts of concentrated nectar and attracts bees. Dr. Bernardi has observed butterflies on both species, suggesting butterfly behavior that may enable hybridization. Hybrids have been found in both nature and in a greenhouse, though the greenhouse specimens have a low survival rate (11%). While only a few populations of hybrids are found in nature, one of these hybrid populations has been documented for over 60 years. These existing populations suggest to Dr. Bernardi that the reproductive barriers between the two species occasionally do fail and the why and how of this is what her research is focused upon.

Dr. Bernardi will be using field, molecular and bioinformatic methods to determine the mechanisms (genetic and otherwise) involved in the speciation of these two species. This will be accomplished in several ways. Two JMU students supported by this grant will conduct pollinator observations in the field as well as observations of and experiments with greenhouse specimens in the JMU Edith Carrier Arboretum. Further field studies will also be conducted in Ohio of a non-Virginia Silene (*S. regia*), which has both red and pink-flowering morphs. Study of *S. regia* may provide insight into the role of pollinator selection among *Silene* species. Dr. Bernardi has begun cross pollination of the two Virginia species to investigate the genetics of the hybrids through gene sequencing and VNPS funds will help with this work as well.

Dr. Bernardi's varied and integrated approach should yield some enlightenment into how hybridization, floral traits and genomic variation are linked in these two Virginia Pinks. We look forward to Dr. Bernardi's results.

VNPS is proud to help fund the research of these dedicated botanists in their goal of increasing the knowledge of our Commonwealth's flora. VNPS has awarded well over $130,000 to principal investigators and students from a variety of academic institutions and non-profit organizations. Information about the research grant program can be found under Resources on the VNPS website at **https://vnps.org/research-grant-program/** or by emailing grantmanager@vnps.org.

Kevin Howe, First Vice President and Acting Grants Manager

A practical ecological health guide for suburban yards

By Aaron Kershaw, inspired by the 2023 PWC Native Plant Symposium presentation by VNPS President Nancy Vehrs

Suburban landscapes often begin as blank slates. Expanses of turfgrass bordered by a few foundation shrubs. While tidy, these spaces rarely support the ecological richness that once defined Virginia's natural habitats. Herbaceous perennials, especially native species, offer homeowners a powerful way to transform their yards into vibrant, resilient ecological communities.

This guide introduces the fundamentals of herbaceous perennials, highlights seasonal planting opportunities, and shares practical strategies for creating wildlife-friendly suburban gardens.

What Are Herbaceous Perennials and Why Do They Matter?

Herbaceous perennials are plants that die back to the ground each winter and return reliably each spring. Unlike annuals, which require replanting every year, perennials establish long-term root systems that stabilize soil, conserve water, and support local wildlife. **Three core principles guide successful perennial gardening in suburban spaces: 1)** choose native species that evolved in Virginia's climate and soils, **2)** match plants to the natural conditions of your site, such as sun, shade, moisture, and soil type, and **3)** think ecologically, not just aesthetically. Native perennials are more than ornamental choices; they are building blocks of functioning ecosystems.

A Year-Round Palette: Seasonal Interest with Native Perennials

Spring

One of the greatest strengths of herbaceous perennials is their ability to provide beauty and ecological value year-round. In spring, plants such as **Virginia Bluebells** (*Mertensia virginica,* VNPS's first wildflower of the year), **Wild Geranium** (*Geranium maculatum*, VNPS's 2020 wildflower of the year), and **Golden Groundsel** (*Packera aurea*) emerge as early bloomers offering nectar when few other plants are flowering.

Summer

In summer, native perennials such as **Black-eyed Susan** (*Rudbeckia hirta*), **Bee Balm** (*Monarda didyma*), and **Milkweeds** (*Asclepias* spp.) come into bloom, supporting pollinators at their peak activity.

Autumn & Winter

As the seasons shift to autumn and winter, **Aromatic Aster** (*Symphyotrichum oblongifolium*), **Blue Mistflower** (*Conoclinium coelestinum*), and **Goldenrods** (*Solidago* spp.) provide vibrant late-season color.

Throughout the colder months, seedheads and standing stems from these and other perennials offer vital winter habitat for birds and overwintering insects.

Planting and Maintenance: Working With Your Yard, Not Against It

Suburban yards come with constraints such as compacted soil, shade from neighboring trees, and drainage issues, but these can become opportunities with the right approach. Test and prepare your soil to understand its pH and nutrient levels. Layer plantings beneath existing canopy trees to mimic natural forest structure, and observe micro-conditions such as wet spots, sunny strips, or areas with afternoon shade. Native perennials are adaptable, but they thrive best when placed where nature intended.

Creating Habitat: Welcoming Pollinators and Wildlife

A perennial garden is more than a collection of plants; it's a living habitat. Pollinators benefit from continuous bloom cycles and nectar-rich native species, while birds and small mammals rely on seedheads, berries, and sheltering vegetation. Beneficial insects overwinter in leaf litter, hollow stems, and undisturbed soil. Small changes in how you maintain your yard can dramatically increase biodiversity, such as leaving leaves in a corner of the yard or delaying spring cleanup.

Local Resources and Small-Space Solutions

Even the smallest suburban yard can support native plants. Container gardens allow perennials to thrive on patios and porches, making it easy to add biodiversity to limited spaces. Plant societies offer valuable guidance, foster a sense of community, and provide access to regionally appropriate species. At VNPS, our chapters support gardeners through educational programs, curated plant lists, and volunteer opportunities. Here, we believe that native gardening is as much about building community as it is about nurturing plants.

Every Yard Counts: Creating Change One Plant at a Time

Restoring ecological health doesn't require a full yard makeover. Even small actions can have a significant impact; a single perennial bed, a patch of milkweed, or a cluster of shade-loving natives can begin to shift the balance toward biodiversity. Every suburban gardener can support pollinators, improve soil health, reduce water use, and reconnect fragmented habitats. By choosing herbaceous perennials, you're not just planting a garden; you're participating in a larger movement to restore Virginia's natural heritage. ❖

Ghost Pipes and the 'Wood Wide Web'

Article and images by W. John Hayden, Botany Chair

As a scientist, I readily acknowledge that science is an amazingly effective way to understand the natural world. Repeated observations and replicated experiments, coupled with thorough, thoughtful, discussion by multiple investigators, have produced profound insights into the nature of our world and, for that matter, the whole universe, in which we live. Nevertheless, at its frontiers, science can be downright messy. Before widespread consensus on a question is reached, science often grapples with multiple competing hypotheses, and conflicting interpretations. At times, science can be stymied over diametrically opposed schools of thought. It can take time for the process of science to produce widespread consensus. Such seems to be the case with the concept popularly known as "the wood wide web," the network of forest trees connected to each other via mycorrhizal fungi. Because of their nutritional dependence on mycorrhizal fungi (Hayden 2026), Ghost Pipes, *Monotropa uniflora*, the 2026 VNPS Wildflower of the Year, must be considered components of the wood wide web. However, Ghost Pipes (Figure 1) and similar mycotrophic plants, in my view, might challenge how some natural history buffs assess the nature of the wood wide web (Figure 2).

Setting mycotrophic plants aside for the moment, proponents of the wood wide web emphasize that mycorrhizal connections between multiple forest trees provide a mechanism by which trees communicate with each other and share resources. Stated more generally, instead of being in competition with each other, forest trees help each other via their connections to the wood wide web. Indeed, careful study has documented that food transferred from one tree to its mycorrhizal fungus is not consumed entirely by that fungus—some food makes its way to other trees that are connected to the same mycorrhizal fungus. Moreover, some studies have found evidence that nutrient transfer can move between trees in either direction; a given donor tree may, at some later time, become a recipient of shared resources. For example, in forests of the Pacific Northwest, evergreen spruce trees perform photosynthesis on mild winter days while deciduous alders are unable to do so, and nutrients have been documented to flow from spruces to alders in winter; however, in summer, photosynthesis in alders is more highly efficient than in nearby spruces and nutrients have been documented to flow in the opposite direction, from alders to spruces. Another widely discussed aspect of the wood wide web is the concept of "mother trees," well-established mature trees that share mycorrhizal connections with multiple nearby offspring saplings—and nutrient flow from mother trees to their sapling offspring has been demonstrated. Cooperative aspects of the wood wide web such as these have emerged largely from the work of Suzanne Simard (2021), a forest ecologist at the University of British Columbia.

The concept of a wood wide web that makes it possible for mother trees to assist their saplings has been very well received in the popular press, blog posts, and social media outlets. Part of the popularity of these and related ideas is, I think, that they make plant biology understandable and relatable in terms of human social norms. For people, it is eminently acceptable, socially and morally, for people to be cooperative, to help others in need, and for parents to care for their offspring. Despite the many ways in which plant and human biology are radically different, it is reassuring to perceive plants and people sharing similar, positive, social ideals. It is, I think, this reinforcement of humanistic values that prompts some to characterize the concept of the wood wide web as a charming idea.

Figure 1. Ghost Pipes, *Monotropa uniflora*, the 2026 VNPS Wildflower of the Year. Photograph by W. John Hayden.

How, then, should we view the role of Ghost Pipes in the wood wide web? *Monotropa uniflora* was an extremely popular choice for this year's Wildflower of the Year. Finding a Ghost Pipe in the woods is always a thrill. I have heard VNPS members proclaim how much they adore this little plant. Nevertheless, our beloved Wildflower of the Year is, fundamentally, a parasite that

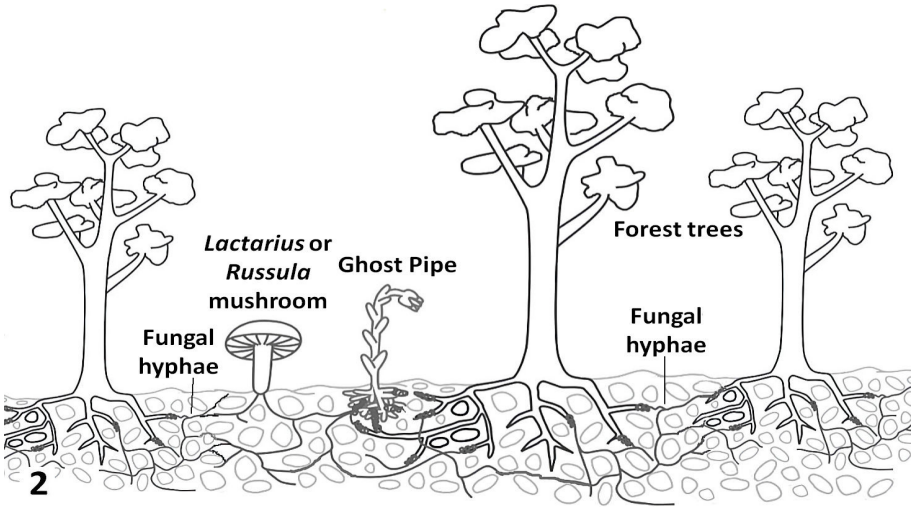

Figure 2. Diagram of the wood wide web showing hyphal connections between mushrooms, Ghost Pipes, and multiple forest trees. Modified by W. John Hayden from fair use original by M. Piepenbring posted on Wikipedia.

steals nutrients not just from the *Lactarius* and *Russula* fungi in their roots, but also from the forest trees with mycorrhizal connections to the very same mushrooms. Decades of teaching biology has shown me that most people have an innate antipathy towards parasites. It seems to me that learning about the biology of Ghost Pipes could lead to a measure of cognitive dissonance: are these uniquely cute, ephemeral, plants really parasites? Do Ghost Pipes truly freeload off the wonderfully charming function of mother trees caring for their saplings? (Yuck!)

Cognitive dissonance can be uncomfortable. How do we find resolution? Must we recalibrate our affection for Ghost Pipes? No, I don't think so. Adopting a dispassionate, scientific perspective may help. For me, science suggests other perspectives that may help resolve the apparent paradox of an adorable parasite.

First, from a scientific perspective, I think we should be extremely careful about how we use words that originated in the context of human-to-human interactions as we attempt to describe the biology of non-human organisms. Given that plant biology is so radically different from human biology, word choice becomes critically important. The problem is that our words easily project assumptions and values that may not be appropriate to non-human organisms. Words like "cooperation" and "nurturing" certainly convey humanistic social values, but are these values automatically appropriate when applied to mycorrhizal networks? There is undeniable evidence for nutrient transfer from tree to tree via mycorrhizal networks, but must this dynamic interaction be characterized as cooperation? Might there be a simpler, less hyperbolic, description? Might it suffice to characterize the interaction as nothing more complicated than movement from source to sink, from abundance to scarcity, with the fungal hyphae functioning as the conduit?

There are other problems with the idea of mother trees supporting her offspring via mycorrhizal connections. One problem is that it is difficult to imagine how a molecule of sugar or some other sugar-derived substance, once given over to the fungus, could possibly be targeted to the roots of her offspring and not the roots of any other plant that happens to be connected to the same mycorrhizal fungus. A source-to-sink model for the interaction requires no complicated hypothetical targeting mechanism. From this perspective, mycotrophic plants, like Ghost Pipes or Coral Root Orchids (*Corallorhiza* spp.), nutritionally, are scarcely different from the offspring saplings being fed by their mother. The mycotrophs, of course, are not genetically related to the mother tree(s).

At this point, I must confess that I cringe at the very concept of mother trees as highlighted in charming wood wide web scenarios. Seed production involves genetic contributions from eggs produced in ovules and from sperm derived from pollen. In genetic terms, every forest tree sapling has two parents, one maternal and the other paternal. And for many tree species, each individual tree produces both pollen and ovules. The concept of a mature "mother tree" preferentially supporting her offspring omits entirely the likelihood that the same mature tree might have mycorrhizal connections with saplings that are patrilineal descendants. Fundamentally, this is another example of the problems that arise when words that originated in human language to characterize human biology are applied to completely different organisms. Any given oak tree in the forest will produce both pollen and ovules and is, therefore, both a "father tree" and a "mother tree." Ditto any Sweet Gum. Ditto any magnolia. The list goes on and on.

The concept of wood wide web is relatively new and, despite much success in the popular press, the underlying science has not yet reached a point of widespread consensus. This is very much a frontier of science, and, from a scientific point

(See Ghost Pipes, page 12)

Our Rarest Plants and the Endangered Species Gap

From Your Natural Heritage Program

By John Townsend
Senior Botanist

In the world of conservation, rarity is not everything. But when it comes to prioritizing which species we protect with scant funding, favorites are chosen. All of us have heard of the Endangered Species Act, a landmark federal law that helps protect endangered species and their habitats. But how many species actually get this designation? What about our ability and inclination to protect others?

The Endangered Species Act passed in 1973 with overwhelming bipartisan support. Wow, isn't that a sentence to behold! The act has done immeasurable good by protecting at-risk species and the habitats that support them, but it is by nature a tool susceptible to politics, opinion, and the reality of limited resources. For each scientific name recognized under the act, there are scads of species that deserve the same treatment. Advocacy is the name of the game, and for those without any federal protection, the calls for action need to be louder.

Obviously, you can't advocate for and protect what you can't name, and it is tough to get support for conserving species lacking a certain charisma. Nearly 70 Virginia plant species are among the most imperiled in the world (ranked G1 or G2 by Natureserve and the Natural Heritage network). And of these, 15 were named within the last 30 years, a few more have been recently resurrected from taxonomic obscurity, and even more are in genera only a botanist could love (see sedges). At Natural Heritage, we "track" and prioritize species that are at risk based on criteria of abundance and threat. The species on this rare list become targets for conservation action, which can include land protection. Just think of these species as endangered with a lower case "e", though no less deserving of attention.

The list of species worthy of greater recognition and funding is long, but we only have space for a few here. Some might be familiar, some surprising.

Piedmont Fameflower (*Phemeranthus piedmontanus*) is a great name for a showy succulent found on our rocky Piedmont barrens. This plant has gained notoriety for its coordinated flowering displays—including its daily patterns of emerging and fading—and the "moonscape" habitats it occupies. It also is inspiring in a backwards way due to the imbalance between its incredible scarcity and the lack of legal protection. With only a handful of tiny sites straddling the VA-NC line, it epitomizes the gap between federal effort and conservation need. The species benefited greatly from the sharp eyes of botanists Alan Weakley and Chris Ludwig (who recognized it as a poor fit for our known *Phemeranthus*) and William and Mary professor Stewart Ware (who described the species as new to science), so it's a dear one to Virginia botanists. Its discovery also highlighted the Southern Piedmont as an underappreciated area for botanical discovery and rarity. Thankfully, protection of some populations has resulted through the actions of DCR's Division of Natural Heritage and the North Carolina Plant Conservation Program.

Harper's Fimbry (*Fimbristylis perpusilla* – G2/S1)

Did someone say sedges? Well, I did! For most botanists the Cyperaceae is a fascinating family of plants and fertile ground for the description of new taxa. Even long-recognized species have suffered from the nerd factor inherent to appreciating plants that don't produce showy flowers. The well-known tendency for glitz to outweigh need applies to species like Harper's Fimbry (*Fimbristylis perpusilla*), a sedge small enough that photographs of the plant sometimes include pennies and paperclips for scale. The isolated ponds this species occupies are in dire need of protection, particularly since wetland regulations have left them a bit high and dry. It is also a classic case where multiple plant and animal species would benefit from the protection that federal listing of the species would provide. Luckily, this species and others find some protection on property owned by the city of Newport News and dedicated as DCR's Grafton Ponds Natural Area Preserve.

What species could have an even lower profile? How about a sedge that is known to be rare but not named yet? One species that fits the bill is found in The Glades region of Virginia, a set of open, lowland habitats with unusual geology. This species has been under study for decades as "Carex

Running Glade Clover (*Trifolium calcaricum* – G1/S1)

species 3" but hasn't made it to prime time. As it turns out, close investigation of this plant led to the realization that other, related species also may need description. This complication has slowed the classification and naming process, but the end result of careful study will be worth it. Luckily, one population of this obscure species is among those protected at Grayson Glades Natural Area Preserve.

An unusual case that blurs the boundary of what protection means comes with Fraser's Fir (*Abies fraseri*). When we buy a Christmas tree it can be difficult to picture why such a widely propagated species might be "in trouble." The fir story gets at the core of what we value in a species, and to most of us that means not just the tree but also its habitat. Fraser's Fir is a southern analog of the widespread northern Balsam Fir that was discovered by Scottish botanist-explorer John Fraser and was later named for him. It is restricted to isolated high elevation peaks in the Southern Appalachians, and in Virginia it is wholly confined to the top of Mount Rogers. Always restricted in range, it is further threatened by logging, exotic pathogens, pollution, and climate change. The latter problem is the hardest one to contemplate since losing Fraser's Fir implies losing a host of high elevation Appalachian species from delicate liverworts to Grays Lily to Red Squirrels. Looking south from Grayson Highlands, Christmas tree farms sit stitched together in big blocks. These are large plantings of the fir, but is this conservation? Protecting John Fraser's favorite fir has meant taking bold steps in land protection on our highest peaks and means we need to take even bigger steps on behalf of a functioning planet. One website actually describes this tree as "an endangered species" (lower case "e"). This mixed message neatly sums up the legal protection versus rarity divide that exists with some of our rarest plants.

My favorite rare but under-loved species must be Running Glade Clover (*Trifolium calcaricum*). It has everything going for it, but it still isn't winning hearts in the federal protection sense. It occupies several scattered sites in the Nashville Basin of Tennessee, where it was first spied by Leo Collins of TVA Natural Heritage in 1979. And in Virginia, it is still only known from the same football-shaped landform in Lee County (The Cedars) where Tom Wieboldt found it in 1984. Leo and Tom share authorship of this striking look-alike for our weedy white lawn clover. Luckily, The Cedars has been a major land protection target for multiple agencies and private organizations for many reasons. The varied animal and plant life, including endemic subterranean creatures, are hard to ignore.

The list of Virginia's recently discovered, globally rare species includes showy species too, such as orchids, mints, violets, and species in the Aster family. And in the long-known but underappreciated category, we have several rare and showy Clematis, one of which (the Millboro Leatherflower, *Clematis viticaulis*) only occupies a small portion of one Virginia county. Mosses and liverworts are even in the mix.

It is no coincidence that I used the word "luckily" and "thankfully" so much in this article when it comes to protecting these species. Conservation actions have been taken on behalf of these plants, but in each case, this has been done despite the lack of federal recognition and funds. The plight of these and other rare flora would be improved by greater commitment to them and to the habitats they occupy. For a hot-off-the-presses list of species that deserve more attention, please visit https://www.dcr.virginia.gov/natural-heritage/document/plantlist-current.pdf. ❖

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Next submission deadline:

June 15, 2026

Can the American Beech be saved?

If you walk through forests across eastern North America, you will likely see American Beech. With its smooth silver bark and dense canopy, it is one of the most recognizable trees in our forests, and the only beech species (member of the genus *Fagus*) native to North America.

"Beech is dead in my eyes," is one anecdotal answer I have received when asking about the status of American Beech in forests where both Beech Bark Disease and Beech Leaf Disease are present. I knew this was the case in Connecticut, in the center of both disease ranges and where I live now, but it was devastating going to the Bull Run Mountain Natural Area Preserve in my hometown of Broad Run, Virginia, and seeing Beech Leaf Disease take hold.

Today, American Beech is under threat from multiple pressures, and together they could outpace the species' ability to adapt on its own. Across its range, beech faces three major challenges:

Beech Bark Disease (BBD): An insect/fungal complex that has been spreading for over a century.

Beech Leaf Disease (BLD): A recently introduced nematode that has spread across the eastern U.S. in just over a decade.

Climate change is expected to reduce suitable habitat, particularly at the southern edge of the species' range where drought and temperatures are increasing.

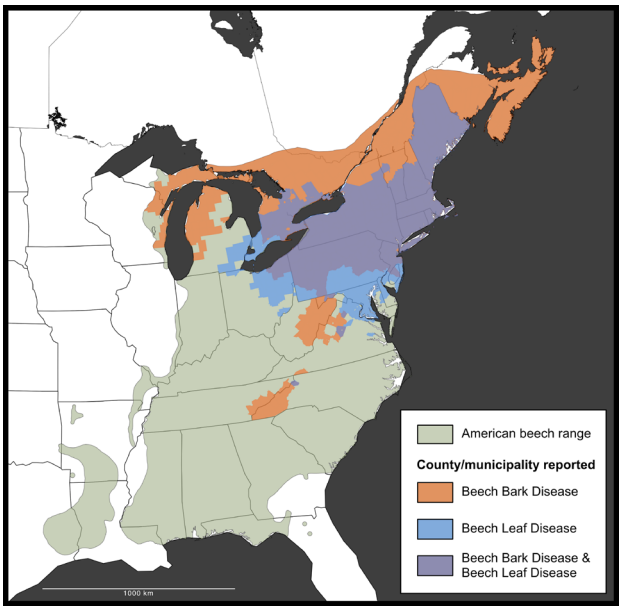
Despite this grim picture, there is also reason for hope, as research suggests that *some beech trees are naturally resistant.*

Lessons from one of the three threats, Beech Bark Disease

Beech Bark Disease first appeared in North America in the late 1800s when an invasive scale insect was introduced from Europe. The disease consists of an insect-fungal complex of Beech Scale, non-native *Cryptococcus fagisuga* introduced to Nova Scotia in the 1890s and native *Xylococculus betulae*, and *Neonectria* fungi species. The scale insects create holes in the bark that allow the *Neonectria* fungus to enter, and consume inner bark tissue, leading to cankers and sometimes death.

Yet members of the U.S. Forest Service observed that a fraction of trees remained scale-free, even as disease swept through forests. Researchers, led by U.S. Forest Service Research Biologist Dr. Jennifer Koch, confirmed that this resistance is genetic. By breeding resistant trees and studying their DNA, genetic markers linked to resistance were also discovered, much like variants in genes associated with the absence of human diseases.

Michelle Neitzey and Preserve Manager Joe Villari collecting American Beech leaf samples at Bull Run Mountains Natural Area Preserve in September 2025.



Map of American Beech range and diseases in the continental U.S. and Canada. American Beech range (Little 1977). U.S. counties and Canadian municipalities reporting Beech Bark Disease (Cale 2017) and Beech Leaf Disease (USFS).

A new threat: Beech Leaf Disease

Unfortunately, a new and rapidly spreading threat emerged in 2012: Beech Leaf Disease. BLD is caused by a microscopic nematode, *Litylenchus crenatae*, which was identified in 2019, and reclassified to subspecies *mccannii* in 2020. The nematode infects beech buds, where it overwinters and damages leaf tissue, leading to the distinctive dark banding on leaves of infected trees. Unlike Beech Bark Disease, which took decades to spread, BLD has moved across the eastern United States and into Canada in just over 10 years. The primary concern with BLD is that it disproportionately affects young trees, threatening the next generation of beech forests. Several groups are working together to address this challenge, including scientists from the U.S. Forest Service, The Nature Conservancy, and arboreta such as the Holden Arboretum, in collaboration with university research teams working to understand the genetics

(See Beech Trees, page 10)

Help find the lost Butternut Trees

It is a common story: move diseases to new continents and the disease finds new hosts and destroys them. Think Chestnut Blight and Dutch Elm Disease, and now Beech Leaf Disease. In the eastern U.S., a prominent but little-known example is Butternut Canker, a fungal disease that devastates wild Butternut Trees (a.k.a., White Walnut, *Juglans cinerea*). It has wiped out 50-90% of Butternut Trees across its range since the 1960s. When you find the tree, you usually find symptoms of the disease – longitudinal dark fissures in the bark that eventually girdle and kill the tree. When you find several trees together, all diseased and dying with no seedlings coming up, it feels like you're walking through a time-lapse of extinction.

Despite its decline, the tree is still regularly encountered the entire length of Virginia, from the Piedmont to the western border. It is most commonly found along rivers, but can be found in fields, roadsides, or ridgetops, wherever light is plentiful. **We are on a hunt for Butternut trees, especially ones that are large and look healthy.** Propagating trees that will survive in a landscape full of disease requires finding trees that are resistant to the disease. There is no cure for Butternut Canker, but there still may be resistant trees out there to find. For several decades, research programs at Purdue University, USDA, The Morton Arboretum and the Canadian Forestry Service have been studying Butternuts and Butternut Canker, trying to find resistant trees for a future breeding program. No trees have been found to be completely resistant, but some lineages appear to have moderate levels of resistance that could contribute to breeding programs. Virginia has been ignored in most studies, despite having a large geographic area where the trees naturally occur. That is why we are undertaking a large search for trees across the state. If you know where to find them, please help!

How can you help? If you know where to find Butternuts, please contact me or my graduate student Mia Murray. We are looking for exact tree locations, photos of trees to confirm tree identification and disease status, and leaf samples for genetic analysis. The genetic analysis is to confirm that the tree is not a Butternut x Japanese Walnut hybrid, which sometimes grows wild. There are three ways to help: 1) If the tree is on your land, take photos and a leaf sample and send them to us (we'll tell you how and provide packaging); 2) If the tree is on your land but you can't reach any leaves, send us the photos and we'll come to collect the leaf by slingshotting a line over the lowest branch and shaking off a leaf; or 3) If the leaf is on public land, take a photo and we'll get a permit for collecting the leaf sample and then come to collect it. After we get genetic samples back, we will choose the largest, healthiest looking trees to visit in the fall for collecting fruit samples to propagate. We'll be propagating the seeds at the State Arboretum of Virginia in Boyce, Virginia, and assess resistance over many years. While we are mainly collecting seeds from healthy trees, we want to know where any trees are in the state to assess the extent of disease spread and tree survival over time.

Everything starts with simply

(See Butternut Trees, page 10)

From top to bottom: The Butternut fruit, leaves, and bark. The bark is flat and often makes diamond patterns. The dark colored wounds in this photo indicate the presence of the canker.

Beech Trees

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underlying this threat. Scientists are now racing to determine whether any natural resistance to BLD exists within American Beech populations.

How genetics can help

Traditional tree breeding can take a very long time; some trees, including beech, don't reach reproductive maturity for decades. Modern genetic tools allow us to identify genetic resistance quickly. By sequencing the genomes of resistant and susceptible trees, researchers can identify genes linked to disease resistance and climate adaptation.

But to do this effectively, we need to understand how genetic variation is distributed across the landscape. I am currently leading a landscape genetics study of American Beech, with a goal of collecting and sequencing at least 400 trees across the species' range.

By comparing genomes from trees across North America, we can answer important questions:

Are some populations better adapted to certain climates?

Are there genetic clues to disease resistance?

Why Virginia matters

Virginia sits at a critical crossroads for American Beech. Both Beech Bark Disease and Beech Leaf Disease have been documented (especially in Northern Virginia), and climate models predict significant habitat shifts in the region. Collecting samples across the state will help us understand the genetic diversity of beech populations in this important part of the species' range.

How you can help

For the 2026 field season, I am seeking volunteers to help collect leaf samples from wild American beech trees across Virginia, Maryland, and other parts of the range. Participation is simple:

Distinctive dark banding in early signs of Beech Leaf Disease, most visible through sunlight.

Curling, browning, and leathering of later stage Beech Leaf Disease leaves.

1. Volunteers receive a collection kit and instructions.
2. Locate a wild beech tree (not planted or in a heavily landscaped region)
3. Collect three leaves and place them in the provided desiccant.
4. Record tree observations using the TreeSnap mobile app.
5. Mail the samples back to scientists in the lab.

Ideally, samples will be at least five miles apart (approximately one per hike) so we can capture genetic diversity across the region. These samples will be sequenced and analyzed to help us understand how American Beech populations are connected, how they may respond to climate change, and whether genetic resistance to disease exists

Join us!

If you or your local chapter would like to help collect samples during the **2026 field season**, please sign up here: https://forms.gle/egGbcGAytZ3veBg26. You can also contact Michelle Neitzey at michelle.neitzey@uconn.edu with questions.

With enough participation, we can build the genetic resources needed to give American Beech a fighting chance.

Michelle Neitzey, University is a Connecticut Postdoc Fellow studying American Beech genetics at the University of Connecticut.

Butternut Trees

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reaching out to us at uvabutternuts@virginia.edu. We'll provide all the details about getting involved, how to take the photographs and leaf samples, and anything else you want to know about the project. Thank you for helping preserve Butternut Trees for future generations.

For recognizing the tree, only the fruit is totally diagnostic on its own, but take a look at the photos in the article to learn more about the main characteristics for recognizing the species.

T'ai Roulston is the Curator of the State Arboretum of Virginia and a Research Associate Professor in the Department of Environmental Science at the University of Virginia.

Johnson's winning art captures Ghost Pipe aura

From the President
Nancy Vehrs

Another smashing success! Thanks to the diligent work of our publicity chair Ashley Moulton, with assistance of our web administrator David Gorsline, we conducted another very popular Wildflower of the Year T-shirt design contest for Ghost Pipes (*Monotropa uniflora*) resulting in lucrative T-shirt sales. Fifteen artists submitted beautiful designs, and the choices for first, second, and third places were difficult ones for our voting membership. In second place was a design by Caroline Newbit of Staunton, and third place was awarded to Katrina Pelikan of Richmond for her entry.

Maggie Johnson of Broadway, Virginia, produced the winning design that now adorns T-shirts across the Commonwealth.

The 15 contest entries in the 2026 Virginia Native Plant Society T-shirt Design Competition.

Maggie is a recent alumna of the College of William & Mary with a B.A. in art and art history. She submitted the following about her design: "Last summer, while on a walk through the woods, I wandered off the path and stumbled on a cluster of what I initially thought to be white mushrooms. I soon discovered they were actually Ghost Pipes, a wonderful native flower that only grows on forest floors, as they require fungal networks to obtain their nutrients. Upon seeing them, I remember being struck by how they almost seemed to glow against the dark decaying leaves. This, along with their ragged translucent petals, really did make me feel like I was looking at specters of flowers. When VNPS announced the contest for designs featuring Ghost Pipes, I immediately recalled that luminous glow and knew that was the impression I wanted my drawing to evoke. Referencing photos, I took from that day in the woods, I attempted to make a design in which I hope others can appreciate the delicate detail and otherworldly beauty that I saw in this enchanting plant."

Maggie Johnston sitting in her garden to sketch. (Photo copyright StevenDavidJohnson.com)

View more of Maggie Johnson's art on her website https://maggshjohnsonart.wixsite.com/jelly-fish-draws. The VNPS awarded Maggie, Caroline, and Katrina cash prizes and a year's membership in the VNPS. We are proud to support botanical art and artists.

Looking ahead, the VNPS Executive Committee is working on plans for our annual meeting. This year it will be held October 2-4 at the Airfield 4-H Center in the southeastern part of the state near Wakefield. The conference center has a lake and some trails onsite. Several natural area preserves are in the general area, so there should be plenty of botanically rich field trip choices.

Maggie Johnson's winning artwork is displayed on the 2026 VNPS T-shirt. Order yours today.

Ghost Pipes

(Continued from page 5)

of view, things are still somewhat messy. For example, Justine Karst, a forest ecologist from the University of Alberta and her colleagues have raised objections to how Suzanne Simard has characterized aspects of mycorrhizal networks (Karst et al. 2023). In Karst's opinion, much remains unknown about the workings of mycorrhizal networks, and the current state of the science is such that some experimental findings contradict the results of other experiments. Further, while Karst does not deny that mycorrhizal fungi can transfer nutrients from tree to tree, she has questioned whether the *scale* of nutrient transfer is significant to the lives of the plants involved. Bringing the focus back to our Wildflower of the Year, it is difficult to imagine that a few ounces (dry weight) of Ghost Pipes can have much impact on what likely is multiple tons of tree biomass to which it is connected by mycorrhizal fungi. Scale is an important consideration! From Justine Karst's perspective, at this early point in our understanding the nature of forest mycorrhizal networks, more rigorous science is required. Perhaps, in time, consensus will be achieved, but that is not yet the case.

In conclusion, mycorrhizal networks connecting multiple forest trees do exist and nutrients do transfer from tree to tree. Ghost Pipes do obtain nutrients from these networks, and, unlike the photosynthetic forest trees, these small herbs have not been shown to contribute resources to the network—and in that sense they are, undeniably, parasites. But Ghost Pipes are not alone in acquiring nutrients from mycorrhizal networks. Bottom line, Ghost Pipes are fascinating little plants. And from an esthetic, but not necessarily scientific, perspective, I might even describe them, without cringing, as charming! ❖

LITERATURE CITED

Hayden, W. J. 2026. Do not even think about transplanting Ghost Pipes! Sempervirens 2026 Issue 1: 1-2, 12.

Simard, S. 2021. Finding the mother tree: Discovering the wisdom of the forest. Alfred A. Knopf, New York.

Karst, J., M. D. Jones, and J. D. Hoeksema. 2023. Positive citation bias and overinterpreted results lead to misinformation on common mycorrhizal networks in forests. Nature Ecology & Evolution 7: 501-511.

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