

# Sempervirens

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The Quarterly of the Virginia Native Plant Society

## Don't even think about transplanting Ghost Pipes!

Article and images by W. John Hayden, Botany Chair

**G**host Pipes (*Monotropa uniflora*), the 2026 VNPS Wildflower of the Year, are just plain weird. These ghostly pale woodland herbs are completely devoid of chlorophyll and, therefore, unable to perform photosynthesis. Further, their roots are very short, and the plants themselves spend most of their existence hidden in shallow soil, covered with leaf litter, only to emerge, sometimes gregariously, to make flowers, fruits, and seeds, after which the above-ground portions wither away, leaving once again scant trace of their ghostly presence. The fact that Ghost Pipes (Figure 1) do possess roots, stems, scale-like leaves, flowers, fruits, and seeds is proof that they are, indeed, plants, but the absence of photosynthesis clearly sets them apart from most of the green plant world. In a word, these plants are weird! And their weirdness is at the heart of their undeniable charm. But do not allow the irresistible allure of Ghost Pipes to tempt you to transplant them into your wildflower garden because any such attempt will fail. This article explains why.

How do Ghost Pipes stay alive? Long ago, it was thought that Ghost

Pipes and similar non-photosynthetic plants obtained their nutrition directly from decaying organic matter in the soil, obtaining not just simple mineral nutrients (nitrogen, phosphorus, potassium, etc.), but also the small organic molecules necessary to fuel their metabolism and to build new cells and tissues. In essence, it was thought that, nutritionally, Ghost Pipes were pretty much like mushrooms; consequently, in times past, the word “saprophyte” was applied to mushrooms and Ghost Pipes alike. Science knows better now, and the truth is arguably stranger, still. Rather than obtain nutrition the way mushrooms do, Ghost Pipes obtain their nutrients directly *from* mushrooms! Consequently, the currently accepted term to describe Ghost Pipe nutrition is mycoheterotrophy—“myco-” refers to fungi (mushrooms) and “-heterotrophy” refers to feeding on other organisms. (Since humans cannot do photosynthesis, we, too, are heterotrophs!)

Before proceeding further, we should note that Ghost Pipes are classified in the Heath family



Figure 1. *Monotropa uniflora*, Ghost Pipes, a non-photosynthetic mycoheterotrophic plant.

(Ericaceae), subfamily Monotropoideae, a taxonomic assemblage that includes 14 genera and ca 50 species of mycoheterotrophs, along with other photosynthetic (autotrophic) relatives. In Virginia, we have Pinesap (*Hypopitys monotropa*) and Sweet Pinesap (*Monotropis odorata*) as close relatives of Ghost Pipes. Evidently, mycoheterotrophy has been a moderately successful evolutionary strategy . . . so, how does it work?

A good way to understand mycoheterotrophy is to acknowledge that this mode of nutrition is a modification of mycorrhizal symbiosis—a mutually beneficial interaction between the roots of plants and various kinds of fungi. While there is some variation in detail, the gist of mycorrhizal symbiosis is (See *Ghost Pipes*, page 2)

**Insert inside!**

2026 VNPS WOY brochure

**Ghost Pipes (*Monotropa uniflora*)**



# Ghost Pipes are just plain weird

(Continued from page 1)

as follows: 1) Plant roots are intimately associated with thread-like fungal cells (hyphae), either as a layer of hyphae on the root surface, or via hyphae that penetrate between root cells, or by hyphae that enter the cytoplasm of root cells. 2) As photosynthetic plants send sugars (mostly) to their root systems in order to keep root cells alive and functioning, the mycorrhizal fungi absorb a portion of these sugars; in essence, the plant provides the fungus a portion of the food the fungus needs to survive. 3) In return, the fungal hyphae, which extend well beyond the plant's roots, liberate mineral ions from their decomposition of organic matter in the soil; the mycorrhizal fungus then shares some of these minerals with cells of the plant's roots. There is evidence that mycorrhizal fungi also have the capacity to share water with their host plants' roots. Both plant and fungus receive benefit from the interaction which is, therefore, characterized as mutualism.

Mycoheterotrophy is likely to have arisen from mycorrhizal mutualism when a plant gained the ability to extract small organic molecules like sugars from their

fungal partners. Plants that acquired food from mycorrhizal fungi, as opposed to feeding the fungus, converted the mycorrhizal interaction from mutualism to, at least initially, partial parasitism. And once plants had gained the ability to get their food from fungi, photosynthesis could be totally lost, as has been the case for Ghost Pipes and Pinesaps. Hence, mycoheterotrophs are no longer green. Further, mycoheterotrophy means that these plants need to produce aerial stems only for reproduction, i.e., making flowers, fruits, and seeds. Because the fungi that are parasitized by mycoheterotrophs obtain a portion of their food from mutualistic mycorrhizal interactions with nearby photosynthetic forest trees, the mycoheterotrophic plants *indirectly* parasitize those trees. In fact, mycoheterotrophic plants are sometimes described as epiparasitic.

So what fungi are victims of Ghost Pipe mycoheterotrophy? The details likely vary across the broad geographic range of *Monotropa uniflora*; nevertheless, multiple species of mushrooms classified in *Lactarius* (Figure 2)

and *Russula* (Figure 3) have been implicated. *Russula* and *Lactarius* are closely related fungi classified together in the family Russulaceae and multiple species of each exist in North America. Perhaps the ability to parasitize a variety of mushroom species explains the presence of Ghost Pipes in North America, Central America, northern South America, and Asia!

A decade ago, I discussed the mycorrhizae of *Clethra alnifolia*, the 2015 VNPS Wildflower of the Year (Hayden 2015). In that article, I included a diagram of the close association of mushroom hyphae and root epidermis cells of *Monotropa uniflora*, the lifeline which allows these truly weird plants to not only survive, but to thrive over a large position of the globe. That diagram is reproduced here (Figure 4), supplemented with a photomicrograph of fungal hyphae on the root's surface (Figure 5).

If you have read this far with understanding, it should be obvious why it is impossible to transplant Ghost Pipes from their natural forest habitat to your wildflower garden. The act of digging a  
(See *Ghost Pipes*, page 12)



Figures 2 and 3. Mushrooms potentially parasitized by Ghost Pipes. Figure 2. *Lactarius indigo*, Indigo Milk Cap Mushroom. Figure 3. *Russula silvicola*, one of the Red-capped *Russula* Mushrooms.

# Woods & Water

by Aaron Sincere Kershaw

*This poem, written by Aaron Kershaw, a board member of the Virginia Native Plant Society and DEIJ Chair, reflects on the complex relationship that many African Americans have had with the outdoors. He shares his mother's experiences growing up during segregation, when access to parks and beaches was limited. For many, the woods and water often carried genuine fears of danger and exclusion—these burdens were passed down to Aaron, leaving a profound impact.*

*Woods & Water acknowledges this history and honors the validity of those fears. It also expresses a hopeful vision for today: a desire for our conservation community to be a welcoming space where everyone feels safe, invited, and able to enjoy Virginia's natural areas.*

Woods & Water,  
 They say it's irrational how we fear them,  
 Soft laughter about how Black folk don't camp, can't swim,  
 And don't wander too far from the roads,  
 Acting like they don't know why, I remember,  
 The trees can recall,  
 The sound of our swinging bodies still ricochets off the bark,  
 Our names whispered amongst the branches,  
 Here's my secret: there's a warning label in my genes,  
 An evolutionary caution hardwired into my DNA,  
 A forest? Never simply a forest,  
 It's the place you'd find your son or daughter after a three-day search if you're lucky,  
 And the water?  
 They say we sink,  
 As if we have iron bones,  
 No! You see, oceans transported our chains,  
 Lakes swallowed our screams,  
 Emmett Till refused to bow, so the water became his grave,  
 There were victims prior to Emmett and after,  
 Harriet used woods & water successfully evading capture,  
 With the North Star as her only master,  
 But hell,  
 Today, woods produce fresh leaves,  
 Water glitters with a glimmer of Black's forgiveness,  
 Beaches are no longer segregated,  
 They can't pour acid in our pools no mo',  
 The parks can't bar me because of my complexion,  
 And every step I take on a trail feels like a little rebellion,  
 Can't wait to freedom stomp my feet this summer at Myrtle Beach,  
 Declaring, "I too belong to the woods and water that were once stolen from me."

# Love was in the air at native plant symposium



From the  
President  
Nancy Vehrs

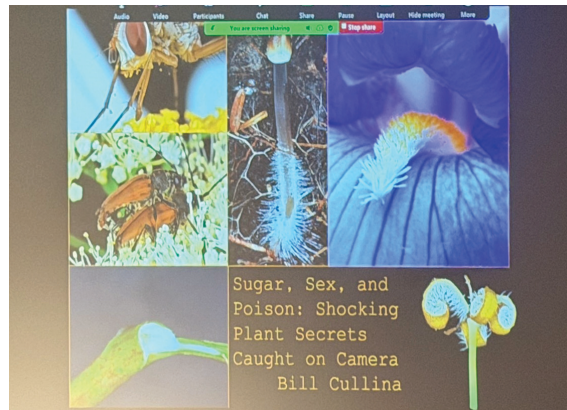
After a brutal winter here in Virginia, we deserve spring this year! Having survived “Snowcrete,” (snow followed by freezing rain turning into ice) and single digit temperatures, we should appreciate those delicate spring ephemerals even more this year.

In February each year, in anticipation of native plant gardening season, a partnership of local government entities, environmental nonprofits, and area colleges plans and executes a native plant symposium in my home town. It started when a member of the Prince William Board of Supervisors was inspired by Doug Tallamy’s *Bringing Nature Home* and called on staff to spread the word by hosting an event. The first Prince William Native Plant Symposium was born in 2019 and was limited to 100 attendees because of the venue’s capacity. The recent 8<sup>th</sup> Annual Prince William Native Plant Symposium was held on Valentine’s Day (“Fall in Love with Native Plants”) with roughly 300 people registered to attend in person at the George Mason University’s Technology Campus in Manassas, and 100 registered to participate online. Native plant lovers from around the Commonwealth and further afield could all participate from home. During the Covid pandemic, the entire symposium was online only.

The symposium is a marvelously successful all-day event with a keynote speaker, three sets of six break-out sessions, lunch, and exhibit tables

for environmental nonprofits and related government entities. To make it as affordable as possible, we secured sponsors, utilized our partnerships, and employed local talent for presenters. The cost for an in-person all-day symposium? A bargain at \$45 in person, with \$5 off for those who registered under the early-bird option, and \$25 online.

After being inspired by Doug Tallamy last year, William Cullina was the keynote speaker this year. Bill is the current executive director of the Morris Arboretum at the University of Pennsylvania, and, prior to that, he was president and CEO of the Coastal Maine Botanical Gardens in Boothbay, Maine. *But* he made his mark as the Director of Horticultural Research for the New England Wild Flower Society (now Native Plant Trust) in Massachusetts. In that capacity, he authored some classic native plant propagation books including *Growing and Propagating Wildflowers* in 2000 that sells for \$207 on Amazon because it is out of print. All but one of his books is out of print. I asked him if there was any chance of reprints, and he replied that he does not own the copyrights, and the original publisher was swallowed up in an acquisition by another publisher. Visit your library to find his books. His keynote speech focused on science with the salacious title, “Sugar, Sex, and Poison: Shocking Plant Secrets Caught on Camera.” His photos were exceptional, and his knowledge and enthusiasm engaged even novices to the plant world.



Keynote speaker Bill Cullina had everyone’s attention from his opening slide! (Nancy Vehrs photos)

The energy of the in-person event was tremendous. Noise levels in the hallways were high as enthusiastic participants engaged with exhibitors and networked with each other. As the AI summary of the attendee evaluations noted, “The 8<sup>th</sup> Annual Native Plant Symposium was a **major success**, with strong educational value, excellent speakers, and enthusiastic participants.” In September, the planning team will start the process for the 9<sup>th</sup> annual event.

Later this month, VNPS will present our annual workshop online on two evenings, March 18 and 25. Education Chair Maeve Coker has planned an excellent educational event with the theme “The Wild World of Virginia’s Wetlands.” Read about our speakers and their topics elsewhere in this issue and consider donating when you register.

Now, get outside and enjoy  
SPRING! ❖



Bill Cullina, left, prepares to speak to a packed house.

# Fundraiser helps keep Flora science current

As the benefactor of the Virginia Native Plant Society (VNPS) annual Fund Drive in 2025/2026, The Flora of Virginia Project (The Flora) is profoundly grateful for your generous donation to our work.

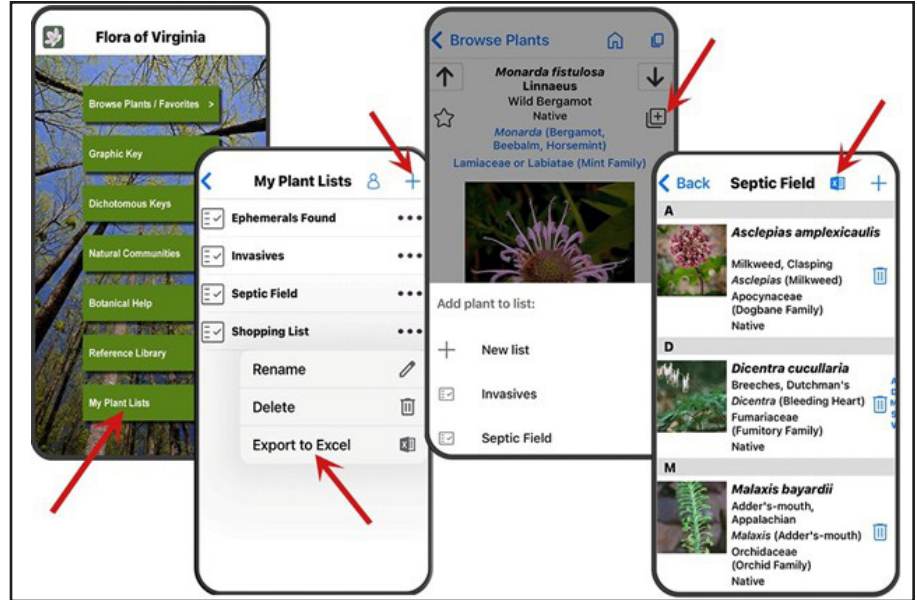
VNPS has supported The Flora since we were established in 2001. Society members donated countless hours, money, and expertise to publish *Flora of Virginia* in 2012 and then assembled that content to develop and launch the Flora App in 2017.

This year, the Fund Drive generated **\$49,138.04**, 98% of the VNPS \$50,000 goal, to benefit the work necessary to move our data to a custom botanical database on the platform of the Flora of the Southeastern United States.

The Flora data currently resides in a 630,000 cell spreadsheet. Manual updates are challenging and often do not capture all of the ripple effects a complex update may create. The new database will improve our data security, the timeliness of our updates,



Learning to key in the Flora Ambassador Program



Flora of Virginia App lists

and the accuracy of the data, so those working hardest to protect our native flora have the most current data available at their fingertips. All of the data has been moved, and work continues on user interfaces to make edits and sharing data easier – the project will be completed this summer.

In addition, we would like to thank those chapters who regularly contribute to our seasonal fund drives – John Clayton, Piedmont, Jefferson, Pocahontas, South Hampton, Blue Ridge and Prince William. Regular supporters like you help fund the administrative

work necessary to keep an organization like ours moving.

As our partnership thrives, we continue to look for opportunities to work together. Many VNPS members have completed their training to become Flora of Virginia Ambassadors and can lead educational programs on identifying flora and using the Flora App, Flora speakers appear regularly at VNPS events, and we will announce an exciting publishing project this summer.

-- Jenny Norwood is the executive director of the Flora of Virginia Project.



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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:

March 31, 2026

# Forestry Mulching: A tool for restoring NAPs

From Your  
Natural Heritage  
Program

By Claiborne Woodall  
Southwest Regional Supervisor



Among the many challenges confronted by natural areas managers is what to do about woody encroachment into open natural communities that support rare flora and fauna. Throughout Virginia, many of these natural communities historically experienced frequent disturbances such as fire and grazing that helped keep habitats open and allowed shade-intolerant herbaceous plants (grasses and forbs) to persist and thrive. Prairies, glades, savannas, and open woodlands all depend on frequent disturbance. In the absence of disturbance, succession marches on and woody plants increase in abundance, drastically changing community structure, reducing sunlight at ground level, reducing water availability, and resulting in increased layers of litter and duff. Prescribed fire is often the preferred management tool for these situations. However, sometimes fire alone is ineffective or impractical and mechanical treatments such as thinning and mastication can be used to meet restoration goals.

From the Coastal Plain to the Ridge and Valley, the Virginia Natural Heritage Program's Stewardship Section has used thinning and prescribed fire to restore many rare natural communities on state Natural Area Preserves (NAPs). In some cases, commercial logging has been employed where merchantable timber such as loblolly pine (*Pinus taeda*) is

removed to further restoration goals. This combination of commercial logging and subsequent implementation of a frequent prescribed fire regime has been widely used in both the longleaf pine (*Pinus palustris*) restoration work in southeastern Virginia (e.g. Chub Sandhill and Antioch Pines NAPs) and prairie and savanna restoration in the southern Piedmont (e.g. Difficult Creek NAP). It is important to note that any proceeds from these timber harvests are invested back into the NAP system.

However, many of the challenges we face come in the form of *non-commercial* woody encroachment – think Eastern Redcedar (*Juniperus virginiana*), Smooth Alder (*Alnus serrulata*), Red Maple (*Acer rubrum*), White Pine (*Pinus strobus*) and other fire-intolerant opportunistic species. This same phenomenon holds true for some non-native invasive woody plants, such as Autumn Olive (*Eleagnus umbellata*). Often, woody encroachment can be addressed by hand-removal with hand-tools or chainsaws. However, hand-removal is not always practical or effective due to the scale and/or density of the encroachment. In these situations (and where practicable), it has



Before and after: At top, a track loader mounted with a drum-style forestry mulching head in action in late summer 2023 at a limestone glades and woodlands restoration site in The Cedars Natural Area Preserve. The bottom photo from June 2025, two months after a prescribed fire, shows the same restoration site. (Claiborne Woodall, top, Laura Young, bottom)

become increasingly common to employ machinery that masticates, or shreds, the undesirable encroaching vegetation. High-flow hydraulic track loaders (or “skid steers”) mounted with high-speed rotating hydraulic drums or disc heads with sharp cutting teeth can shred woody vegetation up to eight inches or greater in diameter. This mastication treatment is commonly referred to as “forestry mulching” and has become commonplace in many aspects of land management, including highway and utility right-of-way maintenance, wildfire

mitigation, and even residential development. In natural areas management, forestry mulching is most often used as a restoration tool where undesired species composition or structure has developed over long periods of fire exclusion. Mulching quickly opens community structure, stimulates herbaceous plants, reduces competition, increases resource availability (e.g. light, water, nutrients), and perhaps most importantly, enables more effective and safer subsequent applications of prescribed fire by rearranging vertical “ladder” fuels and reducing the potential intensity of the prescribed fire. It has also been observed that the light scarification of the soil caused by the machine’s tracks helps stimulate the native seed bank.

Outside of Virginia, forestry mulching has been used in the restoration of northeastern Pitch Pine-Scrub Oak barrens, limestone glades in central Kentucky and Tennessee, and midwestern oak savannas. For the past decade or so in Virginia, the Virginia Natural Heritage Program has used forestry mulching to restore limestone glades and woodlands in southwestern Virginia and native grasslands in the Shenandoah Valley. In The Cedars Natural Area Preserve in Lee County, forestry mulching and subsequent prescribed fires have been used to restore several limestone glades and woodlands that support rare plants such as Northern Rattlesnake-master (*Eryngium yuccifolium* var. *yuccifolium*), White Blue-eyed grass (*Sisyrinchium albidum*), and Yarrow-leaved Ragwort (*Packera millefolium*), among other rarities, often occurring in a diverse matrix of native warm season grasses and sedges. These glades are found in

areas with thin soils and a sparse canopy of trees such as Post Oak (*Quercus stellata*), Chinquapin Oak (*Quercus muehlenbergii*), Shumard Oak (*Quercus shumardii*) and even Blackjack Oak (*Quercus marilandica* var. *marilandica*). In the absence of disturbance such as fire, these glades will undergo succession and become dominated by woody plants such as Eastern Redcedar and Eastern Redbud (*Cercis canadensis* var. *canadensis*).

The Natural Heritage Stewardship Section has contracted out most of this forestry mulching work to date, partly using funds generated by the commercial harvesting of loblolly pine on NAPs in central and southeastern Virginia. We monitor these mulching contracts very closely and stipulate that the contractor’s equipment must be clean upon arrival to ensure that non-native invasive species are not introduced onto the NAP. Desirable “leave” trees are marked, and sensitive areas are flagged “do not enter” in advance. Soil moisture conditions are monitored closely throughout to avoid negative impacts to soil and soil structure. Following the mulching treatment, stewards closely monitor the vegetation response and take immediate action if any non-native invasive species pop up. The ideal window to introduce prescribed fire is between six months and up



A limestone glade in The Cedars NAP in 2015. Note the very dense even-aged Eastern Redcedar. The same site in 2022 following mulching treatment and two prescribed fires. (Claiborne Woodall photos)

to two years following the mulching treatment. This allows the mulched debris to cure and better carry fire. Between consumption from the prescribed fire and natural oxidation over time, the mulched debris is typically gone after two burns or so.

Forestry mulching has proven to be an extremely valuable and powerful tool for some specific ecological restoration projects where prescribed fire alone will not meet objectives or cannot be applied safely. Employed with caution (and some precision), forestry mulching has enabled the rapid and remarkable recovery of rare plant communities. ❖

# Mojave Desert plants provide survival lessons

Article and images by Nancy Sorrells, *Sempervirens* editor

I love traveling to new places around the globe and having my eyes opened to the amazing diversity and beauty of our world. And, after serving as editor for the Society's state newsletter for more than 30 years, I can't help but focus on the plants that I encounter in those special places.

In mid-February a friend and I traveled to the greater Mojave Desert region of Nevada and California specifically to experience the natural areas of Death Valley National Park, Mojave National Preserve, and Desert National Wildlife Refuge. All three public lands come under the auspices of the U.S. Department of Interior, the first two being National Park Service sites and the last one operates under the oversight of the U.S. Fish & Wildlife Service. The Native American peoples of the region work in tandem with the Interior staff to help protect and interpret the lands that are woven into the cultures of the indigenous peoples. In Death Valley that would be the Timbisha Shoshone. At Desert National Wildlife Refuge, the Nuwuvi (Southern Paiute) share stewardship and decision making powers of their



Brown-eyed Evening Primrose  
(*Chylismia claviformis*)

ancestral lands.

I would recommend visits to all three of these special places where you will find trails to hike, visitors centers to guide you into a deeper understanding of the desert ecosystems and the peoples who have lived on the land, and you will experience landscapes that will visually blow you away.

Although generally one can classify this area as desert, the diversity of plants and animals varies greatly depending on factors such as geology, elevation, and amount of rainfall. There is great variety, but regardless, the denizens of the ecosystems here have evolved to live in a region of extremes. Death Valley, for instance, where dueling mountain ranges are pulling and stretching the land apart, is the world's hottest place (up to 134 degrees F) as well as the lowest place in the western hemisphere at 282 feet below sea level. Because it is located in a rain shadow, this place also gets less than two inches of rain a year and the salts and minerals that streak down the hills and crystallize in the dried up lakes and rivers provide a challenge to all living things.

In Mojave National Preserve, on the other hand, with an average elevation of several thousand feet, rainfall that might top 10 inches, and the remnants of much more volcanic activity, different ecosystems have



Brown-eyed Evening Primroses at sunrise in Death Valley NP.

developed. Here one finds one of the largest concentrations of Joshua Trees in the entire world. At Desert National Refuge, just outside Las Vegas, higher elevations make great habitat for Desert Bighorn Sheep.

In the desert at all of these places, plants have developed a number of survival techniques. Many have hairy leaves and stems that reflect light and protect from water loss. Some, such as cacti, have waxy surfaces to prevent water loss, while others have developed darker pigmented leaves to help absorb sunlight and grow faster in the winter. On the other hand, some plants, like the Desert Holly, have developed lighter colored leaves to help reflect sunlight and stay cool on hot days. Some plants have spotted leaves to help blend into the gravel and soils of the desert and provide camouflage



Joshua Trees, the world's largest yuccas, at Mojave National Preserve.

from munching animals. Other plants have spines, also as protection from animals, and to shade their surface area.

No matter which ecosystem one is talking about in the desert, water is a key factor. Plants wait, sometimes years, for just the right amount of rain to flower. When the rain happens, plants grow, bloom, and seed quickly before the soaring temperatures cause essential moisture to evaporate.

Wildflowers begin flowering in February and finish by April on the valley floor. Every few years when there is abundant (an inch) of rainfall in the fall and unusually abundant rainfall in the spring (another inch), a super bloom of wildflowers occurs.

The flowers we saw were impressive. The color of the flowers is also very important, especially in the desert. Yellow flowers attract large numbers of pollinators in a short period of time, important in the late winter when flowers must take advantage of small windows of time to bloom before the arrival of summer's intense heat.

Then there are the white

flowering plants that open at night when the world is cooler. The white flowers reflect moon and starlight and can be seen by pollinators at night. The most prominent of these is the Brown-eyed Evening Primrose (*Chylismia claviformis*) that opens fully at night to attract the White-lined Sphinx Moth as its main pollinator. We were lucky enough to see these tiny flowering beauties in full glory at sunrise, just before they began closing up shop for the day after a night of seducing moths.

Despite the differences in various desert ecosystems, the environment is harsh and the plants in particular that have developed here are often found nowhere else on earth. The Nuwuvi peoples understood this and within their creation stories is woven the modern scientific idea of endemic species. Their stories tell of how plants and animals were placed on the land in specific places for specific purposes.

Honey Mesquite trees, for instance, have roots that can go 100 feet deep to tap into underground water. The Nuwuvi relied

upon the Honey Mesquite for food. Seedpods were eaten raw or cooked or were ground into flour. The mesquite wood was used for fuel and tools.

The Nuwuvi also harvest pine nuts from the Pinon Pine, found at elevations of 4,500 feet or higher. The Mojave Yucca is another important plant. Its spiky leaves contain fibers used to make rope and cloth and the roots are used for soap.

Coyote Melons are small melons with an inedible pulp, but edible. *(See Plants find a way, page 10)*



Nuts from the high elevation Pinon Pine provide food for wildlife and native peoples



The Nuwuvi used depressions in the bedrock to grind mesquite pods into flour. These mortar stones, as well as the iron sculpture at left depicting traditional Nuwuvi daily activities, can be seen on a trail at the Desert National Wildlife Refuge

## Plants find a way to thrive in the desert

(Continued from page 9)

ble seeds are used for oil and food. The vines of this plant bear fruit and then dry up completely, only resprouting when the rains return.

The plant that we most wanted to see in the Mojave National Preserve was the Joshua Tree (*Yucca brevifolia*), so named by the early Mormon settlers because when they saw the plant's outstretched, scraggly arms they were reminded of Joshua in the Bible guiding his people.

The indigenous people of the area had many other names for this plant that is so much a part of their culture. In reality, these plants aren't trees at all; rather they are the world's tallest yucca plants. The native people wove its

leaves into shoes and baskets and ate its flower buds and seeds.

Although we saw a few small Joshua Trees in Death Valley National Park, most of the elevation was too low. The elevation is a bit higher at Mojave National Preserve, and these giant slow growing yuccas are densely clumped along the granite outcroppings that dominate the landscape here.

Joshua Trees thrive within the hot, arid landscape of the Mojave Desert, but they don't grow fast. While they can reach heights of 40 feet or more, it takes eight years for them to grow a foot. That means that a 20-foot tall tree is more than 150 years old.

We were dismayed, then, to see

large stretches of blackened dead Joshua Trees in the preserve as we were driving through. Park Service employees told us that those trees were killed in the 2020 Cima Dome Fire that wiped out a million trees – 13 percent of the world's population. Because the trees grow so slowly, it will take several hundred years to replace what was lost in that conflagration.

Like the Brown-eyed Evening Primrose, Joshua Trees have a special relationship with a nighttime moth, specifically the Yucca Moth. The moths lay their eggs in the tree flowers, thereby pollinating the trees in the process and ensuring that seeds will form as food for the caterpillars when they hatch. Neither the tree nor the moth could survive and reproduce without the other. ❖



Two plants that have figured out how to thrive in Death Valley are, left, Brittlebush, a member of the sunflower family, and Desert Holly, seen here looking healthy and happy on the hot dry beds of salt and borax.

# Annual Workshop dives into Virginia's Wetlands

Join other native plant enthusiasts for our virtual Annual Winter Workshop on two consecutive Wednesdays in March for a deep dive into “The Wonderful World of Virginia’s Wetlands.” In each evening of the Zoom sessions, Education Chair Maeve Coker will host two speakers discussing wetland and marine environments. Topics will cover eelgrass restoration, wetland delineations and regulations, tidal freshwater marshes, and wetland restoration. Each two-hour session begins at 7 p.m. for the first speaker of the evening, followed by the second speaker at 8 p.m.

The workshop kicks off on Wednesday, March 18, with a presentation by Bo Lusk, a coastal scientist leading the Volgenau Virginia Coast Reserve’s marine restoration work. The subject of his talk is “Eelgrass Restoration in Virginia’s Coastal Bays: An Ongoing Success Story.”

“We’ll discuss the natural history of native eelgrass on the Eastern Shore’s Atlantic coastal bays. I’ll talk about why seagrasses like eelgrass are important, how we lost our eelgrass, how we are bringing it back, and what benefits we are experiencing as a result of that restoration,” Lusk said.

At 8 p.m. Eli Wright, the Founder and President of W3 Environmental Solutions, a Virginia-based natural resources consulting firm focused on wetlands, waters, and regulatory compliance, will present “Wetlands and Virginia’s Regulatory

**2026 VNPS Annual Workshop**

**“The Wonderful World of Virginia’s Wetlands”**

Via Zoom: <https://vnps.org/events/vnps-annual-workshop-2026-via-zoom/>

**Wednesday, March 18 (Part 1)**

**7 p.m. Bo Lusk** *“Eelgrass Restoration in Virginia’s Coastal Bays: An Ongoing Success Story”*

**8 p.m. Eli Wright** *“Wetlands and Virginia’s Regulatory Landscape: Why Delineation and Permitting Matter”*

**Wednesday, March 25 (Part 2)**

**7 p.m. Kelly Ridenhour and Grayson Harlow** *“Life in the SWMP: A restoration journey through Virginia’s streams and wetlands”*

**8 p.m. Doug DeBerry** *“Tidal Freshwater Wetlands in Virginia: Habitat, Trends, and Conservation”*

Landscape: Why Delineation and Permitting Matter.”

“Wetlands are among Virginia’s most ecologically valuable landscapes, yet many people are unfamiliar with how they are formally identified and regulated,” Wright explained. “This presentation will provide an overview of how wetlands are delineated in the field, how state and federal regulatory frameworks apply, and why permitting plays an important role in balancing conservation and development.”

On Wednesday, March 25, the second part of the virtual workshop kicks off at 7 p.m. when colleagues Kelly Ridenhour and Grayson Harlow discuss “Life in the SWMP: A restoration journey through Virginia’s streams and wetlands.” Ridenhour is a land protection specialist and Harlow is a restoration ecologist at TNC Virginia.

The pair will talk about TNC’s Stream and Wetland Mitigation

Program, which has been in existence for 30 years. To date the program has protected and restored more than 20,000 acres—nearly half of which is public land—and prevented many tons of sediment from entering Virginia’s waterways. The talk will bring viewers through some of Virginia’s most important stream and wetland communities and highlight how TNC establishes healthy, functioning systems from highly degraded ones.

The workshop concludes at 8 p.m. with a presentation by Doug DeBerry on “Tidal Freshwater Wetlands in Virginia: Habitat, Trends, and Conservation.”

DeBerry is Research Assistant Professor of Environment and Sustainability at William & Mary. He will share insights from the research that he conducts on ecosystem dynamics in restoration, biological invasion, ecological integrity, and floristics/conservation. ❖

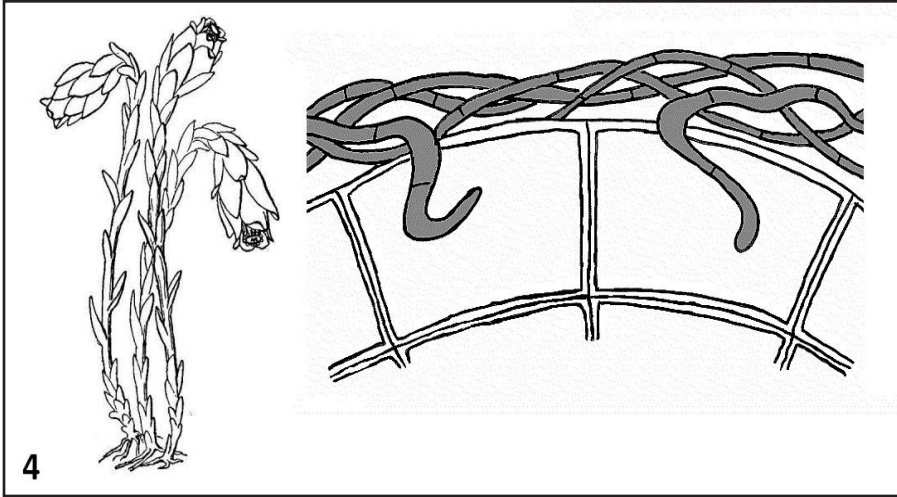


Figure 4. Diagrammatic representation of the mycoheterotrophic interface between mushroom hyphae (dark gray) and Ghost Pipe root epidermis cells; see Figure 5 for an example of how extensive the fungal hyphae can be; Ghost Pipe drawing from Britton and Brown (1913); hyphae and cells drawn by W. J. Hayden.

## Ghost Pipes

*(Continued from page 2)*

Ghost Pipe would inevitably sever it from the fungal hyphae that keep it alive. Transplanted Ghost Pipes will starve. And do not think that taking a large volume of soil will retain enough fungal biomass to sustain your Ghost Pipe, because that fungus is kept alive, in large

part, by means of its connection to one or more nearby trees. In stark, cold, scientific terms, it is a fool's errand to attempt to grow a parasite (Ghost Pipes) by disconnecting it from its obligate host (mushrooms). Don't even contemplate trying. It is much better to enjoy these fantastically weird plants whenever encountered in their natural, undisturbed,

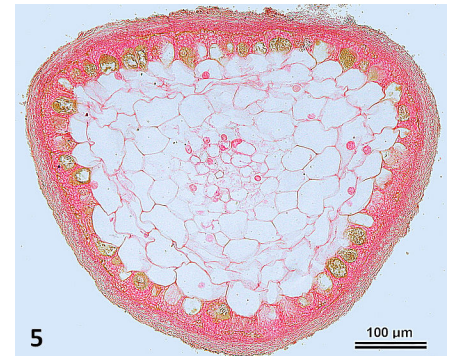


Figure 5. Cross section of the root of *Monotropa uniflora*. A thick layer of fungal hyphae, stained red, covers the root; many hyphae also extend between epidermal cells of the root while relatively few hyphae enter those cells. Photomicrograph by W. J. Hayden.

woodland habitat. Of course, that perspective should apply to all our native plants. Native plants for gardens should be obtained only from vendors who source their plants responsibly. ❖

### LITERATURE CITED

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Hayden, W. J. 2015. When it comes to *Clethra*, roots matter. *Sempervirens* Summer 2015: 10-12.

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