

Marilyndica

Newsletter of the **Maryland Native Plant Society**

FALL 2023 Vol. 14 No. 2

***Celebrating Maryland's
Coastal Plain and
Salt Marshes***





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Cover: The salt marsh off of Rily Roberts Road in the Deal Island State Wildlife Management Area depicts the fascinating life that occurs where Coastal Plain lands join saline waters.

Photo by Jim Brighton.

Greetings fellow MNPS Members!

Both as an individual and as MNPS President, I'm overjoyed with the success of our Fall Field Trip Weekend September 16-17. I'm grateful to all who made the array of events possible. It was my great pleasure to join trip leaders Kathy Daniel and David Braun at the American Chestnut Land Trust property in Calvert County. The group had a great time exploring the local flora and helping each other identify species using iNaturalist and deductive reasoning. I met some new friends, both plants and people. What fun!

Thank you to all of our members who organized trips for this weekend of events across the state. I hope more of our members will consider hosting a trip in their neck of the woods, it's a great way to connect with other native plant enthusiasts. All that you need to lead a trip is enthusiasm, knowing a fun natural space with good trails, where to park, where to walk, and details such as access to bathrooms. You don't need to be a native plant expert—we are all going out there to learn and each of us have different pockets of knowledge to share. If you are interested in organizing a field trip, please email Sujata Roy at: fieldtrips@MDFlora.org



Continuing with the theme of my prior President's Lens—empowering and inspiring members to take action—I'm excited to share what several of our members are doing to help preserve Maryland's botanical heritage. Please check out the new "**Member Spotlight**" on page 15 to read about the amazing things that members Merikay Smith and Chuck Woolery are doing to support the mission of the Maryland Native Plant Society. Their efforts give me hope and motivate me to step forward and lend a hand where I can.

I hope you too will be inspired by Merikay and Chuck or the many other MNPS members who give their time and talents to protect Maryland's native plants and communities. This work doesn't require a degree in botany or vast knowledge of ecology. What is more important is a commitment to lifelong learning and the time and willingness to step forward as a leader or a participant. Say yes, it may well be the most rewarding experience you ever have!

Lauren Hubbard, PhD

Above: Lauren in her garden. Photo by William Kilgore.

MNPS Field Trips like this Winter Solstice Walk at Travilah Barrens in Montgomery County, bring people and wild places together. Photo by Bob Taylor.



Maryland’s Geographic Diversity

by JIL SWEARINGEN

The State of Maryland is home to five physiographic provinces—Coastal Plain, Piedmont, Blue Ridge, Ridge and Valley, and Appalachian Plateaus (figure 1), and six ecoregions—Middle Atlantic Coastal Plain, Southeastern Plains, Northern Piedmont, Blue Ridge, Ridge and Valley, and Central Appalachians (figure 2).

Physiographic provinces are large-scale geographic areas formed by geological and climate forces acting over millennia. As a result, these areas have unique landscapes, topography and physical features. Ecoregions are smaller geographic areas within the boundaries of the physiographic provinces and are characterized by unique plant communities and other ecological components.

In this issue, we’re featuring the Coastal Plain Province and two of its ecoregions—the Middle Atlantic Coastal Plain and Southeastern Plains—with an article on Maryland’s salt marshes by Jim Brighton. We’ll examine other regions of the state in future issues of *Marilandica*.

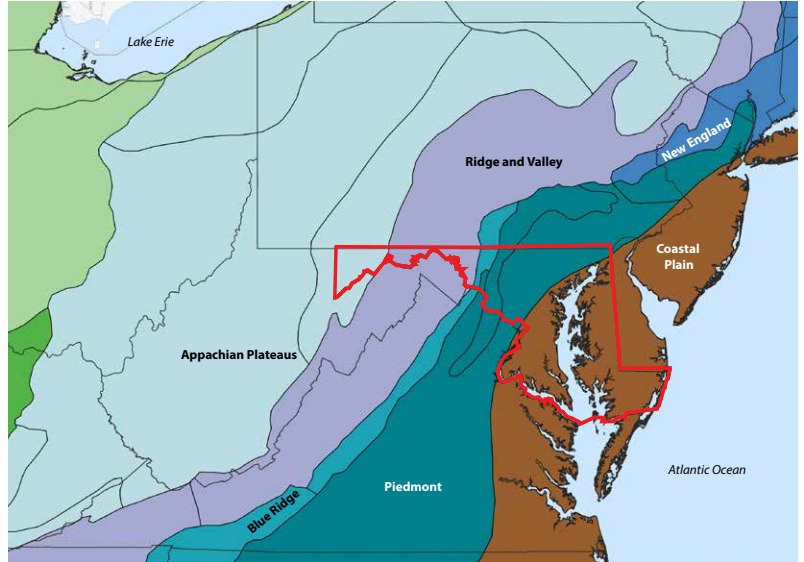


Fig. 1. Physiographic Provinces of the Mid-Atlantic
U.S. Physiographic Provinces (USGS 2021). Graphic by crehakt. Red outline of Maryland by E.C. Fisher.

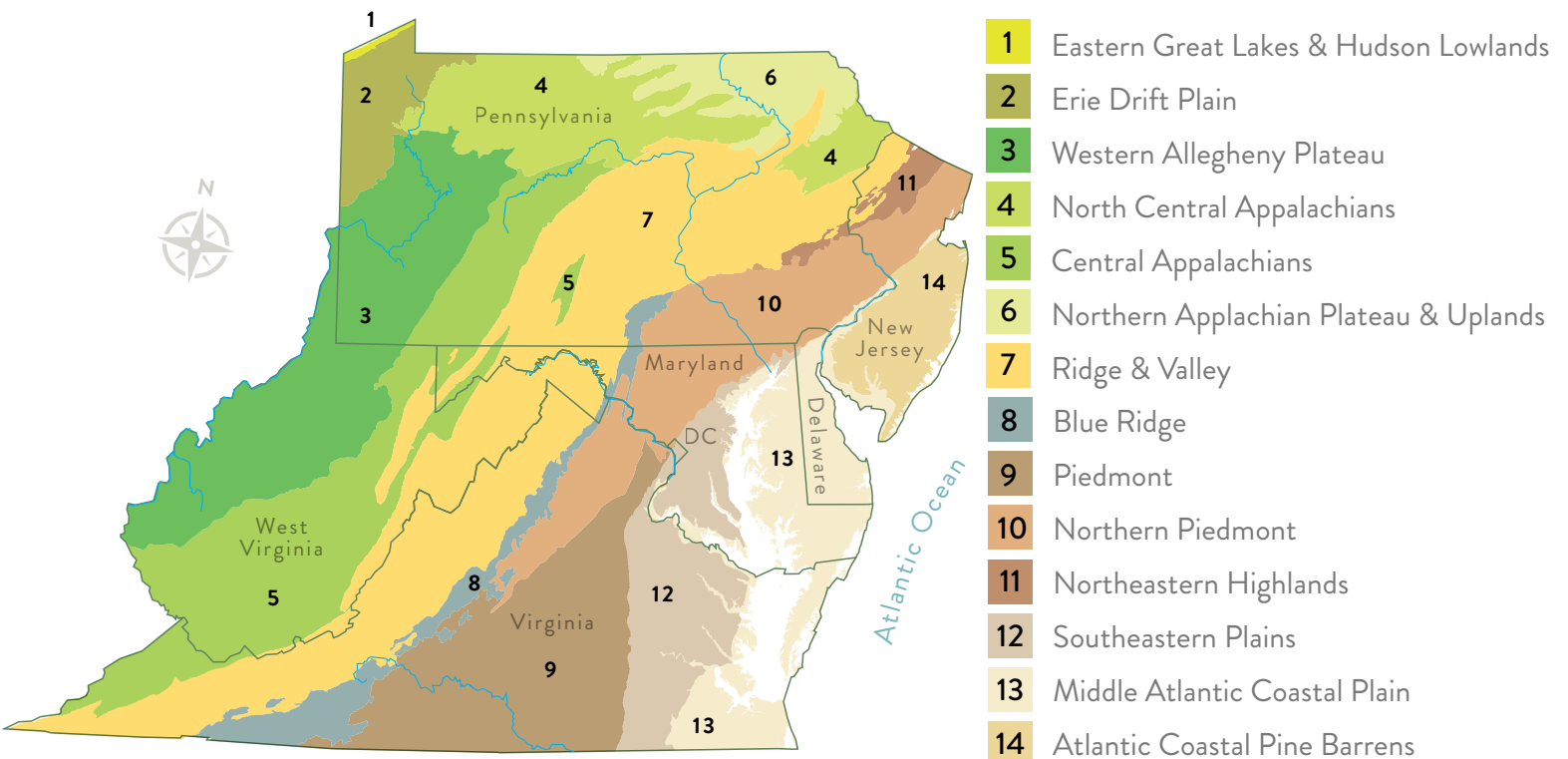


Fig. 2. Level III Ecoregions of the Mid-Atlantic

Graphic by Amanda Wray. Based on data from the April 2013 Continental United States Map. Courtesy of U.S. Environmental Protection Agency National Health and Environmental Effects Research Laboratory.

Plants of Maryland's Salt Marshes

by JIM BRIGHTON

Photos by Jim Brighton

According to the Chesapeake Bay Program, there are approximately 282,290 acres of tidal wetlands bordering the Chesapeake Bay. Add another 35,000 acres of wetlands along Maryland's Coastal Bays, and you have over 300,000 acres of tidal wetlands in Maryland. Salt marshes are a large part of this acreage. Erik Vance describes the salt marsh in his article "The Place Between" as a bridge, "...between aquatic and terrestrial ecosystems, sustaining life forms that can't live in either." From Saltmarsh Sparrows to Sea Lavender, the salt marshes of the Chesapeake Bay and Maryland's Coastal Bays contain creatures and plants that one cannot find anywhere else in the state.

In basic terms a salt marsh may be broken down into two different areas: low salt marsh and high salt marsh. The low salt marsh is inundated on every tide, while the high marsh is only occasionally flooded during higher tides. The dominant plant of the low salt marsh is Smooth Cordgrass (*Sporobolus alterniflorus*). The roots of Smooth Cordgrass are the cement of the Chesapeake Bay's salt marshes, and it is considered the first line of defense against erosion.

Plant diversity is higher in the high salt marsh where Saltmeadow Cordgrass (*Sporobolus pumilus*) is an important component. This delicate, wiry grass forms large patches, called 'salt meadows', that often have a distinctive windblown appearance. The rare Eastern Black Rail (*Laterallus jamaicensis*) depends on salt meadows for breeding grounds.



Jim Brighton (from Facebook)

Black Needle Rush (*Juncus roemerianus*) is another dominant plant of Maryland's salt marshes. This tall rigid rush grows in waist-high clumps interspersed among the salt meadows of Saltmeadow Cordgrass. Marsh Wrens (*Cistothorus palustris*) and Virginia Rails (*Rallus limicola*) depend on large stands of Black Needle Rush for nesting habitat.

While Smooth Cordgrass, Saltmeadow Cordgrass, and Black Needle Rush are three of the most commonly encountered plants of the salt marsh, a careful search will reveal many other plant species. The sedge family (*Cyperaceae*) is represented by Common Threesquare (*Schoenoplectus pungens*), Chairmaker's Bulrush (*Schoenoplectus americanus*), and Sturdy Bulrush (*Bulboschoenus robustus*). These three species can be very common in the high salt marsh. In the autumn, Marsh Fimbrity (*Fimbristylis castanea*) can easily be found growing on the edges of salt meadows, while the Long-bracted Sedge (*Carex extensa*), native to Eurasia,

is becoming more common in many of Maryland's salt marshes.

Big Cordgrass (*Sporobolus cynosuroides*) is the tallest native grass found in the salt marsh. Unfortunately, populations of Big Cordgrass are often smothered by the highly invasive non-native Common Reed (*Phragmites australis* ssp. *australis*), introduced from Europe. These two species can appear similar, but an inspection of the inflorescence will easily differentiate them. The inflorescence of Big Cordgrass is much less feathery and dense than the invasive Phragmites. Another common native grass found in the salt marsh is Seashore Saltgrass (*Distichlis spicata*). This small grass grows in drier areas of the salt marsh and is the host plant for the Saltmarsh Skipper butterfly (*Panoquina panoquin*).

For plant enthusiasts, autumn is the best time to visit Maryland's salt marshes. This is when the marsh bursts into bloom. Seapink (*Sabatia stellaris*) is our salt marsh gentian and one of the showiest flowers of the marsh. It is most often found

continued on page 6

Truitt's Landing



growing in salt meadows. Seapink flowers can be pink or white, and most Maryland populations have both colors, though the pink flowers seem to dominate.

Sea Lavender (*Limonium carolinianum*) is another common plant of the salt marsh and can be found blooming from late August until the first frost. A large patch of wispy Sea Lavender can make the usually monochrome salt marsh turn brilliant hues of purple and blue. The plant is often harvested, dried, and used for wreaths, flower arrangements, and other decorative purposes. However, Sea Lavender grows very slowly and picking plants can seriously affect populations.

While few shrubs call the salt marsh home, Marsh Elder (*Iva frutescens*) and Groundselbush (*Baccharis halimifolia*) both thrive in this salty environment. These two members of the Aster family are often found along ditches and other waterways that snake through the marsh. While appearing similar, a close look will reveal that Marsh Elder has opposite leaves and Groundselbush has alternate leaves. This is one of the easier ways to tell the two species apart.

If you would like to visit one of the largest Maryland salt marshes, I recommend driving Elliott Island Road in Dorchester County. This road winds

through miles of salt marshes south of Vienna. Deal Island Wildlife Management Area in Somerset County can also be easily explored by car. Driving down Riley Roberts Road or Game Reserve Road will give you amazing views of the salt marsh. To explore the salt marshes of Maryland's Coastal Bays, I recommend driving Truitt's Landing Road or George's Island Road in Worcester County.

Some of the native plants you may encounter in Maryland's salt marshes are listed below. More images are available at marylandbiodiversity.com.

Grass family *Poaceae*

Seashore Saltgrass - *Distichlis spicata*

Smooth Cordgrass - *Sporobolus alterniflorus*

Big Cordgrass - *Sporobolus cynosuroides*

Saltmeadow Cordgrass - *Sporobolus pumilus*

Sedge family *Cyperaceae*

Sturdy Bulrush - *Bolboschoenus robustus*

Dwarf Spikerush - *Eleocharis parvula*

Marsh Fimbry - *Fimbristylis castanea*

Chairmaker's Bulrush - *Schoenoplectus americanus*

Common Threesquare - *Schoenoplectus pungens*

Rush family *Juncaceae*

Saltmeadow Rush - *Juncus gerardii*

Black Needle Rush - *Juncus roemerianus*

Amaranth family *Amaranthaceae*

Perennial Glasswort - *Salicornia ambigua*

Dwarf Glasswort - *Salicornia bigelovii*

Virginia Glasswort - *Salicornia virginica*

Annual Seepweed - *Suaeda linearis*

Pink family *Caryophyllaceae*

Salt Sandspurry - *Spergularia marina*

Gentian family *Gentianaceae*

Seapink - *Sabatia stellaris*

Mallow family *Malvaceae*

Virginia Saltmarsh Mallow - *Kosteletzkya pentacarpos*

Leadwort family *Plumbaginaceae*

Sea Lavender - *Limonium carolinianum*

Broomrape family *Orobanchaceae*

Saltmarsh Gerardia - *Agalinis maritima*

Aster family *Asteraceae*

Groundselbush - *Baccharis halimifolia*

Marsh Elder - *Iva frutescens*

Marsh Fleabane - *Pluchea odorata*

Seaside Goldenrod - *Solidago sempervirens* var. *mexicana*

Seaside Goldenrod - *Solidago sempervirens* var. *sempervirens*

Eastern Annual Saltmarsh Aster - *Symphotrichum subulatum*

Perennial Saltmarsh Aster - *Symphotrichum tenuifolium*

Note: The well known genus *Spartina* was recently synonymized under *Sporobolus* and *Spartina patens* has been renamed *Sporobolus pumilus*.

Salt marsh at Smithville boat ramp



Marsh Fimbry, *Fimbristylis castanea*



Virginia Glasswort, *Salicornia virginica*



Per. Saltmarsh Aster, *Symphyotrichum tenuifolium*



Chairmaker's Bulrush, *Schoenoplectus americanus*



Seapink, *Sabatia stellaris*



Salt Sandspurry, *Spergularia marina*



Sea Lavender, *Limonium carolinianum*



Saltmarsh Gerardia, *Agalinis maritima*



Va. Saltmarsh Mallow, *Kosteletzkya pentacarpos*



Big Cordgrass, *Sporobolus cynosuroides*



Saltmeadow Cordgrass, *Sporobolus pumilus* (foreground)



Ozark Milkvetch (*Astragalus distortus*) is an herbaceous perennial that grows exclusively on shale barrens in the mid-Atlantic. Shale barrens are characterized in part by rocky soils that lack a well-developed organic layer. Photo by A. Weeks.

Mid-Atlantic Hunt for Ozark Milkvetch

by ANDREA WEEKS and EMILY POINDEXTER

This spring, I was fortunate to receive a research grant from the Maryland Native Plant Society to support conservation efforts on Ozark Milkvetch, a rare native legume. This study will use genetic techniques and fieldwork and will constitute the Master's thesis research of my incoming graduate student, Emily Poindexter, at George Mason University in Fairfax, Virginia. Our first full field season of relocating this species in the mid-Atlantic has concluded with exciting discoveries that we want to share with the society's membership.

What is Ozark Milkvetch and why study it?

Ozark Milkvetch (*Astragalus distortus* Torrey & A. Gray; Fabaceae) is a small,

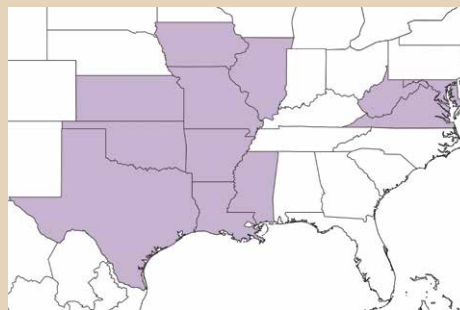


Fig. 1. Ozark Milkvetch is native to twelve US states. Map by A. Weeks.

pink-flowered herbaceous perennial native to Maryland, Virginia and West Virginia (Fig. 1). While it is broadly distributed in the sunny glades and grasslands of the south-central United States, it is extraordinarily rare in the mid-Atlantic and is restricted to shale barren ecological

communities. It has a state conservation ranking of Imperiled (S2) in Maryland and West Virginia and Critically Imperiled (S1) in Virginia. Knowledge about Ozark Milkvetch populations in the mid-Atlantic is dangerously out of date given the need to protect this rare species. For instance, Ozark Milkvetch had the ranking of State Historical (e.g., possibly extirpated) in Virginia until 2022. When we relocated a large population of it in the Massanutten Mountains last year, the Virginia Natural Heritage Program upgraded its ranking to S1. Many historical stations of the species have not been revisited in decades. One of our project goals is to relocate as many populations as possible to analyze this species' genetic diversity in order

to inform conservation management decisions in the mid-Atlantic.

Ozark Milkvetch also presents an evolutionary and taxonomic puzzle that our project will solve with comparative genetic methods. Its disjunct distribution suggests that mid-Atlantic and south-central US populations may be separate evolutionary lineages that would warrant separate taxonomic status. As currently circumscribed based on morphology, *Astragalus distortus* comprises two varieties: *A. distortus* var. *distortus* and *A. distortus* var. *englemannii*. The former grows in both regions, whereas the latter is mostly restricted to Texas, Arkansas, and Louisiana. We will sample south-central US populations to test these taxonomic hypotheses and to clarify the evolutionary relationships of Ozark Milkvetch populations across the country.

What are emerging insights about Ozark Milkvetch's persistence in the 21st century?

Using the tried-and-true fieldwork strategy of due diligence, collaboration, and persistence, with a little bit of luck, we have relocated live populations of Ozark Milkvetch at six historically tracked stations in Maryland, Virginia and West Virginia. We have also discovered in Maryland and Virginia three new stations for the species. Our working dataset for exploration included all historical element occurrences of the species tracked by the states' Natural Heritage programs, localities drawn from herbarium specimens that were collected in the mid-Atlantic from the late 1800's onwards, and geological maps that showed the location of probable shale barren communities in the tri-state area. Assembling these data, obtaining scientific collection permits and coordinating land-owner permissions took months of work ahead of the narrow window for fieldwork in April and May when Ozark Milkvetch flowers and can be spotted easily.

From this year's fieldwork, we share three emerging insights about this species' persistence in the mid-Atlantic in the 21st century:



Fig. 2. Half of the historic stations for Ozark Milkvetch (*Astragalus distortus*) in the mid-Atlantic area we visited this year—including the River Road barren in Montgomery County, Maryland (left), which has become invaded by Amur Honeysuckle — no longer harbor this species. Uninvaded, high quality shale barren ecological communities—such as this one in the Green Ridge State Forest in Allegany County, Maryland (right)—receive bright sunlight at ground level and support healthy Ozark Milkvetch populations. Photos by A. Weeks.

1. Ozark Milkvetch is probably an obligate heliophyte, as has been demonstrated experimentally for other plant species similarly restricted to shale barren ecological communities (Baskin & Baskin 1988). Such plants require bright sunlight to complete their lifecycle and cannot compete successfully in heavily shaded conditions. We base our hypothesis on the observation that Ozark Milkvetch was absent from half of the historically

tracked stations that we visited this season and most of these sites were heavily shaded by invasive plants, such as Japanese Honeysuckle (*Lonicera japonica*), Amur Honeysuckle (*Lonicera maackii*) and Autumn Olive (*Elaeagnus umbellata*) (Fig. 2, left). Every site where we encountered living populations of Ozark Milkvetch had full sun exposure at ground level.

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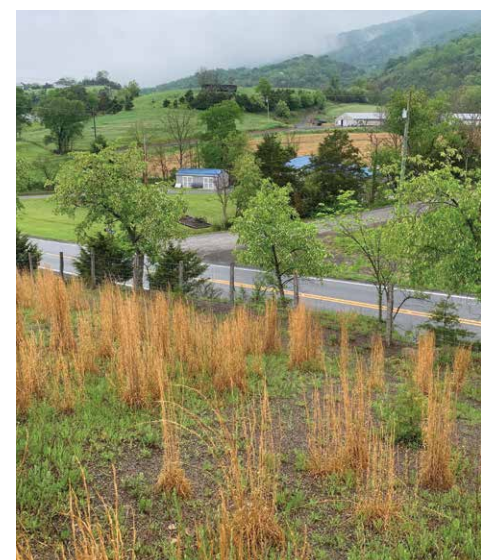
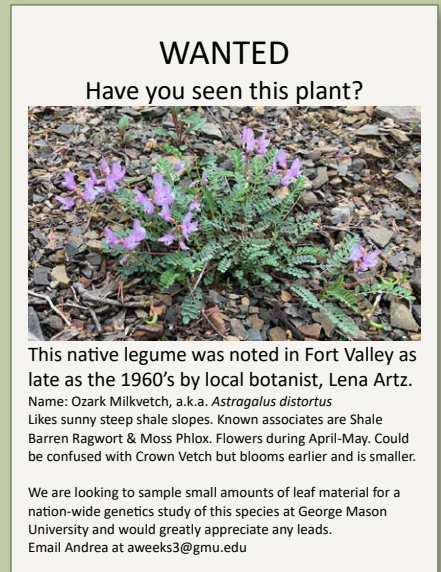


Fig. 3. Anthropogenic habitats can harbor Ozark Milkvetch. An old power line right-of-way that is kept clear of underbrush (left), harbors Ozark Milkvetch, which can be seen along the bottom-center edge of the image. An ungrazed pasture that includes invasive star-thistle (*Centaurea stoebe*) and is mown by the landowner to prevent soil erosion and encroachment by woody plants (right), also provides habitat for Ozark Milkvetch. Photos by A. Weeks.



Fig. 4. Lena Artz (1891-1976) was born in Woodstock Virginia and grew up along the North Fork of the Shenandoah River at the foot of the Massanutten Mountains. In 1935, she earned a Master of Arts degree from George Washington University, in Washington DC. Her thesis research, “*Plants of the shale banks of the Massanutten Mountains*” described the vascular flora of the shale barren ecosystems within this mountain range. From Wikipedia, en.wikipedia.org/wiki/Lena_Clemmons_Artz, accessed October 14, 2023.

Artz’ research has been critical to finding extant populations of Ozark Milkvetch in the mid-Atlantic and inspired the design of our “Wanted” poster that ultimately led to the discovery of a new station for the species in Virginia. Poster by A. Weeks.



II. Ozark Milkvetch can thrive in habitats that are disturbed by people. Of the nine living populations we have observed, three are found in power line rights-of-way and in an ungrazed pasture. People mow these areas occasionally to exclude trees and shrubs (Fig. 3) yet do not necessarily remove all invasive plants. Two of the new populations that we discovered were found thriving in these types of anthropogenic habitats. This suggests that simple management tactics, such as physically removing encroaching woody species, might be part of an effective strategy that would protect existing populations of Ozark Milkvetch or restore this species to historical stations that no longer support it.

III. Local knowledge is a key part of the emerging story of Ozark Milkvetch in the mid-Atlantic. Relocating some

extant populations would have been impossible without the foundation of research created by Lena Artz (Fig. 4), who is a hidden figure of mid-20th century Virginian botany. Lena Artz (1891-1976) dedicated her life to documenting the flora of the Massanutten Mountains in Virginia, which are rife with shale barren ecological communities (Weeks submitted; Wikipedia Contributors 2023). Her herbarium specimens of Ozark Milkvetch were critical to our relocating this species in Virginia in 2022, and her paper, “Notes on *Astragalus distortus*” (Artz 1937), reported that extensive populations were once present in Fort Valley, the central valley of the Massanutten. By searching most of the roadsides in Fort Valley this spring, we relocated one new location in a power line right-of-way (Fig.

3, left). Because most of the land there is privately held, we created a ‘Wanted’ poster and hung it at Fort Valley’s only gas station, in the hope that nearby property-owners might notice other populations on their land.

Three weeks later, we were contacted by an individual with information that led to our recording the second new location for Ozark Milkvetch, on land from which they had painstakingly removed all invasive shrubs in recent years. Based on this encouraging result, Emily will expand postering and start a social media campaign in the tri-state area in Spring 2024 to engage more landowners in the hunt for this special plant.

We are grateful to John Parrish and Rod Simmons for helping us relocate the probable historical station of Ozark

ACKNOWLEDGMENTS

Sabiha Basit (who was supported by a Research Experience for Post-Baccalaureate Students supplement to US National Science Foundation award #2022918), for her assistance with collecting historical locality data for Ozark Milkvetch, and Clara Thiel, Sarah Brown, and Angela Moxley, who guided our fieldwork in western Maryland.

The MNPS Research Grants Program was established to support research on Maryland’s native plant species and plant communities. Studies can be conducted within Maryland as well as outside of the state as long as the results are applicable to Maryland native plants. Research on invasive species (plants, animals, and pathogens) that threaten Maryland’s native plants are also welcome. The 2024 Call for Proposals will be announced on February 1 and the deadline for submission is March 25. For more information, go to mdflora.org/grants.html

Milkvetch in Montgomery County, Maryland (Fig. 2, left). The original location data were not precise. They called our attention to the proposed River Road Shale Barrens Conservation Park in Montgomery County, Maryland (Montgomery County Planning Commission, 2022). This fascinating area spans part of the geological outcropping of shale in the county. It still harbors some shale-barren specialist species and is an excellent candidate for habitat restoration through consistent removal of invasive plants.

What's next for the Ozark Milkvetch project?

This academic year, Emily will extract DNA from the leaf-tissue samples of Ozark Milkvetch that we collected this season and will use genotyping-by-sequencing to measure population genetic diversity among the mid-Atlantic populations. While the snow flies this winter, we will be busy planning a spring-time social media campaign to raise awareness of this species among landowners in Maryland, Virginia and West Virginia as well as charting out a long-distance road-trip throughout the south-central US to collect more populations of Ozark Milkvetch. We anticipate that in two year's time we will be able to answer the foundational questions of this project and to report a more complete understanding of this species' conservation genetics, taxonomic boundaries and evolutionary origin. Stay tuned!

Personal Reflection by Emily Poindexter

Note: Emily Poindexter is a new graduate student in the Weeks Lab at George Mason University in Fairfax, Virginia. Her thesis work will study the phylogeography and conservation needs for Ozark Milkvetch (pictured in the lower half of the image).

My passion for rare plant conservation originated in natural history collections and my own boots-on-the-ground experiences. A couple of years ago, I worked as a summer field botany technician for the Virginia Department of Conservation and Recreation, surveying US Forest Service tracts. During this time, I got to visit populations of the imperiled Small-whorled Pogonia Orchid (*Isotria medeoloides*) and discover new populations of the rare Swordleaf Phlox (*Phlox buckleyi*). For a summer, it felt like I was taking part in this incredible, botanical scavenger hunt. I wanted to stay in the game forever. Then when the summer work ended, and I realized I wasn't going to be a part of following up on those populations, I knew I had to make my life about the scavenger hunt and the science.

Since then, I've been working at the US National Herbarium. There, I get to see the work produced by millions of fellow scavenger hunt enthusiasts from the past two centuries. Every day, I interact with the life's work of scientists, past and present, from all over the world. And it's only made me yearn more to find my place among them.

When I came across the opportunity to work on the *Astragalus distortus* project, I leapt at it. This project, so far, has been a classic example of the intersection between historical collections and modern field botany. I feel immensely privileged to be able to walk in Lena Artz' footsteps and to have seen a few of the rare mid-Atlantic populations of *A. distortus* with my own eyes. My experience in the field this past summer has been rather bittersweet upon reflection. It's devastating to know that in some instances human interactions have wiped out habitats where it was historically known, and those populations are not coming back. But it also makes me feel incredibly hopeful to have hiked the shale barrens where it's currently being protected and to know that there are other hard-working biologists and naturalists out there who also care about this plant and its ecosystem.



Emily Poindexter. Photo by A. Weeks.

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The Many Gifts of Ferns

by PRU FOSTER

Ferns are some of the most remarkable of plants. For starters, they are very likely the original source of seeds, and hence the progenitors of flowers and fruits. They are one of the oldest plant groups on the planet, with fossil records dating back to at least the Devonian Period 390 million years ago, predating the dinosaurs by 150 million years. During the Carboniferous (300-370 million years ago), ferns dominated the terrestrial landscape. When these ancient ferns died, they piled up in swamps along with other plant material. The layer of dead plant material was subsequently buried, leading to the formation of the global coal fields that literally helped fuel the Industrial Revolution.

Climate coolers

Ferns also put a stop to what may have been a runaway greenhouse effect about 49 million years ago. At that time, carbon dioxide (CO₂) levels in the atmosphere were much higher than they are today and the planet was much warmer. A tiny water fern named *Azolla* was able to thrive in the Arctic Ocean, which was so warm at that time that it hosted crocodiles. It is believed that when the *Azolla* ferns died, they sank to the bottom of the ocean, taking with them large blankets of carbon.

This went on for about 800,000 years and reduced the carbon dioxide in the atmosphere from 3,500 parts per million (ppm) to about 650 ppm. For reference, humans have “only” increased the CO₂ in the atmosphere from 280 to 419 ppm since the Industrial Revolution. The massive drawdown of carbon, caused by the buried blankets of *Azolla*, is thought to have driven a global cooling of a whopping 35 degrees Fahrenheit – making the planet hospitable to a completely different set of life forms. Pretty remarkable for a tiny little fern!

Clean Up on Aisle Earth

Another notable fact about ferns is that they are capable of cleaning up toxic messes. In addition to being highly tolerant of many growing conditions and chemical compounds, they are also highly effective at contaminant removal. They've been used to remove heavy metals, radioactive materials, nutrients, hydrocarbons, and volatile compounds from soil and water. In addition, they are able to quickly colonize sites that other plants can not, thus kick-starting the process of soil and ecosystem regeneration.

From Ferns to Flowers, Spores to Seeds

Finally, and perhaps most interesting to us plant lovers, ferns may well have given us flowers. Like all other land plants, ferns have a sexual component to their reproductive cycle, which of course is what flowers are all about. But their reproductive cycle is different from flowers. The fern fronds we recognize are the direct product of sperm and egg union, and are therefore the “baby” stage of the fern. However, the sperm and egg don't come from parents that look like the fern baby. Instead, fern frond parents are very different, looking like tiny pieces of wet kale about the size of a fingernail. Because the fern frond parents tend to lie flat on the ground, only the most avid of naturalists will have ever noticed them. These soggy little kale-like leaves are called *gametophytes*, as they produce eggs and sperm (a.k.a. gametes) and are plants (a.k.a. phyte). To be successful at reproduction, gametophytes must grow in damp areas because the sperm they release need ambient water to swim through as they seek an egg to fertilize.

Continuing the life cycle, mature fern fronds produce spores in little capsules, called *sporangia*, on their surface. The sporangia often appear as little brown spots on the underside of the fronds. At some point, the sporangia capsules open and the spores scatter, often carried by wind to distant places. Fern fronds are thus known as sporophytes (plants that produce spores). If the released spores land in a hospitable spot, they can grow into a gametophyte – those mini kale leaves that can release a sperm or an egg whose union leads to a baby fern frond. There is thus a switching of plant forms from gametophyte to sporophyte to gametophyte and so on. This process of reproduction is known as the *alternation of generations* and it is common in the plant kingdom.

Most ferns produce male and female spores that are microscopic. However, one family of ferns, called “seed ferns” and known only from the fossil record, evolved to produce both the familiar microscopic male spore, and a much larger female spore. The female megaspores are not ejected, but rather they are retained inside of the sporangia. Within this cozy capsule, the megaspore develops into a gametophyte, which in turn produces an egg. In this case, the vegetative phase of the gametophyte is nearly eliminated. Seed ferns also evolved structures to capture



The author in front of Ostrich ferns (*Matteuccia struthiopteris*) in her garden. Photo by Dakota Walter.

continued on page 14



Above: Interrupted Fern (*Claytosmunda claytoniana*) along Cherry Creek, Garrett County, Maryland; Below left: Northern Maidenhair Fern (*Adiantum pedatum*); Middle: Netted Chain Fern (*Lorinseria areolata*); Right: American Wall-rue (*Asplenium ruta-muraria* var. *cryptolepis*) in cracks of Tomstown Formation limestone and dolostone. Photos by R.H. Simmons.





Fiddlehead of Cinnamon Fern (*Osmundastrum cinnamomeum*). Photo by Lauren Hubbard.

airborne fern sperm, referred to as *pollen* in flowering plants. Even though the “seed” ferns don’t actually produce a seed, the process is edging very close to seed production. If ferns were the pathway to seed evolution, it means that ferns have given us fruit and nuts, wheat and rice, tomatoes and cotton.

Rhizing to the Occasion

Now that we’ve worked our way through fern reproduction, note that most fern individuals do not come from this alternation of generations. Groupings of ferns almost always arise from vegetative reproduction, commonly spreading by rhizomes. Each fern in such a colony is a clone of the first fern, all with the exact same genes as the original plant. Why then, the complicated alternation of generations, if this simple vegetative reproduction is possible? In terms of evolution, sexual reproduction introduces genetic options that are critical during times of stress and when species are faced with unique challenges. Furthermore, spore distribution promotes widespread colonization. Ferns are clearly a successful group of plants because they have survived for nearly 400 million years, a thousand times longer than humans have been in existence.

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Ferntastic Diversity

Because ferns have been around for so long, they have evolved into a dizzying collection of forms. There are moonworts (*Botrychium lunaria*), small ferns with halfmoon-like pinnae. Moonworts were much beloved by the witches and alchemists of the past who would collect it during the full moon and use it to stop bleeding, to access the fairy world, and to create gold. Resurrection Fern (*Polypodium polypodioides*) fronds completely dry up under drought conditions and then bounce back to life with the first rains. There’s the amazing vine-like Climbing Fern (*Lygodium palmatum*) whose alternating palmate-lobed “leaves” are actually pinnae and the whole “vine” is the frond and the Walking Fern (*Asplenium rhizophyllum*) that strolls along by producing new plants at leaf tips that touch the ground. In contrast are the tropical tree ferns, growing to over 80 feet tall.

Finding Ferns

The MNPS celebrated ferns as the “Plant of the Year” in 2011. At that time, and updated in 2014, Dwight Johnson developed a handy key for identifying the common ferns of Maryland (see link below). This is a fun way to learn to identify some of our ferns. I hope you’ll join me in heading outside to seek some of these ancient, world-changing, flower-giving plants. Today, there are more than 10,000 fern species worldwide. And, while most are found in tropical regions, the US and Canada are home to around 450 species. The Maryland Biodiversity Project lists 74 species of ferns that have been observed in the state with Christmas Ferns topping the list at over 1,500 records.

Ferns can be found almost anywhere, but here are a few places in Maryland where there have been at least a dozen or so fern species spotted:

- Gunpowder Falls State Park, *Hereford Area, Mingo Valley Trail, Baltimore County*
- Snyder’s Landing, *Chesapeake & Ohio Canal, Washington County*
- King’s Landing Park, *Calvert County*
- Wincopin Trail Area, *Howard County*
- Tawes Garden, *Department of Natural Resources building, Annapolis, Anne Arundel*

MNPS has run field trips to the first three sites and there are plant lists from those trips on the MNPS website (see link below).

Merikay Smith

Merikay Smith learned about native plants and their ecological value through the Master Gardener (MG) Program. She led the MG Speakers' Bureau and created a talk titled "Less Lawn: More Life" which, ten years on, she still gives frequently to garden clubs and other groups. While speaking to an interfaith group, Merikay was introduced to the Muddy Branch Alliance (MBA) and the Seneca Creek Watershed Partners (SCWP), two local watershed groups. She joined the boards of both organizations and eventually served as President of the SCWP. Working with these groups since 2013, Merikay personally distributed as many as 450 native tree seedlings per year and provided advice on planting. Handing out seedlings and chatting plants is one of her favorite annual activities. Spring 2024 will be the 10th year Merikay has led this project. This relatively simple endeavor has resulted in many new native tree advocates and thousands more native trees growing in our watershed.

In addition to handing out free seedlings, Merikay helped launch the MBA's annual native plant sale, providing local ecotype natives in the Gaithersburg area. Next, Merikay and I (Lauren Hubbard, MNPS President) worked together on a Chesapeake Bay Trust (CBT) supported project to install a native meadow at the Izaak Walton League of America, to serve as a demonstration site. And finally, through another successful CBT proposal written by Merikay, additional native plantings were



installed at Historic Pleasant View (PV) to manage stormwater at the source. Led by Merikay, the PV garden was installed and has been maintained by more than 400 volunteers..

Merikay says, "This has given me the chance to teach all who help at least a bit about the benefits of native plants. For many this is new information and changes the way they plant in their home gardens. People who help at PV often go on to plant native trees, shrubs and perennials at home. One couple even completely redesigned their backyard (adjacent to the Muddy Branch) to remove lawn and create a conservation landscape funded with Rainscapes. Surprising what learning about native plants has done! Much of it planting one native tree or shrub at a time. I still don't feel particularly knowledgeable about native plants—especially compared with some in the MNPS— but even amateurs can learn to plant the seeds of growth in others!"

Chuck Woolery

Chuck's bio provides a framework for his many interests and talents: "Linking vital US national security interests to achieving global humanitarian needs and generating media attention that frames national security needs within the context of both conservative and liberal values. Mobilizing and effectively organizing bipartisan grassroots efforts to generate media attention and political will to achieve progressive legislative goals." His interest in caring for people and the planet is evident in the work he has done to promote public health policy and tackle environmental issues.

When I asked Chuck if it would be ok to share about him in this column, he replied that he had just finished a tree survey of his ½ acre residential property in Rockville. He has 43 trees, only 3 of which are not native. Not surprisingly, not a hint of lawn can be found, the place is filled with natives which he regularly shares with anyone who is interested.

Chuck's influence goes well beyond his own yard. As a certified Montgomery County Weed Warrior Supervisor, he



"loves to identify and attack invasive species in our parks." Recently, Chuck was recognized as the Montgomery County weed warrior with the most volunteer hours! As if his MoCo hours weren't enough, he also leads the Weed Warrior volunteer initiative within the City of Rockville, filling the gap in weed warrior coverage that occurs due to jurisdictional boundaries. If you are interested in joining Chuck on one of his fun weed warrior outings check out the Weed Warrior opportunities in Rockville (<https://www.rockvillemd.gov/639/Weed-Warriors>).

Chuck was also honored for Outstanding Leadership in Environmental Practices for his work on the Twinbrook Park Forest Restoration Project. In 2019, certified Weed Warriors and volunteers, led by Anne Goodman, Sarah Salazar and Chuck Woolery, in coordination with City of Rockville staff, spent 118 hours removing hundreds of non-native invasive plants throughout nearly two acres of parkland in the Twinbrook neighborhood. In 2020, volunteers partnered with Pope Farm Nursery and the city to plant 649 locally grown native plants to revegetate the areas.



Hairy Lettuce (*Lactuca hirsuta*) at edge of Acidic Cove Forest, Garrett County, Maryland. Photo by R.H. Simmons.

Hairy Lettuce, a Rare Native Composite

by R.H. SIMMONS

Hairy Lettuce (*Lactuca hirsuta*) was rediscovered in July 2022 in Garrett County, Maryland, along Rock Lodge Road at the edge of Acidic Cove Forest (USNVC: CEGLo05043), where a single plant was found. Nearby edge associates in the canopy include Northern Red Oak (*Quercus rubra*), Sweet Birch (*Betula lenta*), Canadian Hemlock (*Tsuga canadensis*), Black Cherry (*Prunus serotina*), and Red Maple (*Acer rubrum*). The shrub layer includes Witch Hazel (*Hamamelis virginiana*), Great Laurel (*Rhododendron maximum*), Smooth Blackberry (*Rubus canadensis*), Mountain Holly (*Ilex montana*), American Fly-honeysuckle (*Lonicera canadensis*), Gooseberry (*Ribes* sp.), and others. The herb layer includes



Hairy Lettuce (*Lactuca hirsuta*). Photo by G.P. Fleming.

White Baneberry (*Actaea pachypoda*), Thimbleweed (*Anemone virginiana* var. *virginiana*), Hairy Woodland Brome

(*Bromus pubescens*), Fibrous-rooted Sedge (*Carex communis*), Blue Cohosh (*Caulophyllum thalictroides*), and many others.

According to the Rare, Threatened, and Endangered Plants of Maryland (Frye 2021), Hairy Lettuce in Maryland was formerly listed as “SH X” (state historical, extirpated) and largely “represented by a few pre-to-early 1900s collections mostly from the vicinity of Great Falls”. There is also a very old collection of this plant from Baltimore County. Brown and Brown’s 1984 *Herbaceous Plants of Maryland* notes *Lactuca hirsuta* var. *sanguinea* as the most common variety in Maryland.

Reported distributions of Hairy Lettuce outside of Maryland are provided on the following page.

North America

The Biota of North American Plants (BONAP) overall range map for *Lactuca hirsuta* shows a wide, but very scattered distribution for the species, as of 2014.

New England

According to GoBotany, “Tall hairy lettuce is a native biennial uncommon throughout its range. In New England it can be found in dry fields, roadsides, forest edges, woodlands, and clearings. Although it has been collected in all six New England states, it is rare in all of them.”

New York

The New York Natural Heritage Program reports that, “In New York, *Lactuca hirsuta* has been found in... Dry open woods and clearings (Gleason and Cronquist 1991, Fernald 1950)... The long term trend appears to be a significant decline.”

Pennsylvania

The Pennsylvania Natural Heritage Program reports that, “In Pennsylvania, [Hairy Lettuce] has been found scattered throughout the state. The Pennsylvania Biological Survey considers [it] to be a species of special concern, based on the relatively few occurrences that have been confirmed in the state.”

Virginia

Ninety-nine percent of the Virginia material of this species is *Lactuca hirsuta* var. *sanguinea*, according to the Digital Atlas of the Virginia Flora.

North Carolina

The North Carolina Vascular Plant Atlas reports that Hairy Lettuce is “Formerly uncommon in the northern Coastal Plain, and rare over the central and southern



Hairy Lettuce (*Lactuca hirsuta*). Photo by G.P. Fleming.

Coastal Plain, the eastern Piedmont, and in the Mountains. Certainly it has declined in the state, apparently alarmingly, and few if any recent botanists/biologists have seen it.

Thus, the editors are making a drastic suggested State Rank of S1? (from the NCNHP's S3? rank) and believe that it should go onto a Watch List, and probably onto the Significantly Rare list. The disappearance of the species from NC mirrors that from some or many other areas within its fairly large range...”

Illinois

Illinois Wildflowers reports that, “[Hairy] Lettuce is a rare native plant in Illinois and it is state-listed as ‘endangered.’ Thus far, this species has been collected from a single county [Pope County] in southern Illinois.”

Missouri

Missouri Plants reports: that “This species is considered uncommon in Missouri...”

Sensing a trend here??? This could also be a sign that *Lactuca hirsuta* is a weak competitor compared to other native lettuce species. It seems to lack the aggressive weediness of Tall Lettuce (*L. canadensis*) and to be less shade-tolerant than either Tall Blue Lettuce (*L. biennis*) or Woodland Lettuce (*L. floridana*). The situation in the Allegheny Mountains may be totally different, but in the central Virginia Piedmont it is “frequent,” almost always occurring in small populations of scattered individuals. It seems to prefer habitats that are partially shaded to open—such as small forest openings, powerlines, and edges—that are not weedy and have good native diversity BUT lack heavy competition from dense grass sods or tall, colonial forbs.

As a result of its rediscovery in Maryland, the state rank of Hairy Lettuce has been changed to “S1” or “S1?” (“critically imperiled”). As to the state status ‘X’, which is unique to Maryland, much more field work is needed before an official state status can be determined.

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Camphorweed Found in the City of Alexandria

by R.H. SIMMONS

One of the Washington, D.C. region's rarest plants was recently discovered in the City of Alexandria, Virginia. This is a new addition to the Alexandria Flora and is the third known location in northern Virginia for this plant—all in Fairfax County. The Alexandria population consists of three plants, two with abundant seed. A voucher specimen of diagnostic parts of a plant, not a whole or uprooted plant owing to its rarity, was carefully collected and is housed in the City of Alexandria Herbarium (AVCH).

Pluchea camphorata, known as Camphorweed, is a member of the aster family (Asteraceae) that flowers in late summer and early fall in our area. It was previously collected in Fairfax County from “Eakin Park” by John Strohl in 1969 (John R. Strohl s.n., 9 Oct 1969, “In Eakin Park”) and “Mount Vernon” by William Hunter in 1877 (W. Hunter s.n., 23 Sep 1877, Mount Vernon, Va.). The Strohl specimen is housed in the George Mason University Herbarium (GMUF) in Fairfax, Virginia; the Hunter specimen in the U.S. National Herbarium (US) in Washington, D.C.

The Fairfax County plants (including those from the City of Alexandria) are geographically disjunct from the south and central Coastal Plain and outer southern Piedmont populations where it is “frequent to locally common” (Virginia Botanical Associates 2023). It is considered “imperiled” in Maryland (S2) with an Endangered (Proposed Threatened) status (Maryland Natural Heritage Program 2021).

The D.C. region is the northernmost extent of this primarily southeastern U.S.



Camphorweed (*Pluchea camphorata*) at the Telegraph and Duke Meadow Complex, City of Alexandria, Virginia. Photo by R.H. Simmons

species. Maryland locations occur at the northern extent of the species' range and were previously considered localized to the Western Shore, but new locations were recently added to the flora of the Eastern Shore along the upper Choptank

River and the Pocomoke River. Several older reports from salt marsh habitats are not *P. camphorata* but rather the more common *Pluchea odorata* (Maryland Natural Heritage Program 2021).

R.H. Simmons collected *Pluchea*

camphorata in 1998 from a wet meadow and beaver impoundment at Chapman Forest South in the Mattawoman Creek watershed in Charles County, Maryland (R. Simmons, s.n., Aug 1998, “Chapman Forest”). This specimen is deposited at the DC Herbarium and represents the only Maryland specimen in the collection within the geographical limits of the Flora of the Baltimore-Washington Area.

This most recent discovery, in Alexandria at the Telegraph and Duke Meadow Complex, occurred during a site visit by R.H. Simmons, Mary Farrah, and

Sara Tangren on October 23, 2020 to film a discussion of best practices and native biodiversity of managed meadows for the regional Meadow Working Group. The meadow complex is a 5-plus-acre suite of native successional meadow habitat that has been actively stewarded by Alexandria Natural Lands Management for nearly 27 years.

The entire complex of meadows overlies a massive lens of heavy, shrink-swell, hardpan clay of the Potomac Formation (Arell clay). The largest meadow parcel, where the *Pluchea* was

found, overlies the heaviest clay and is seasonally wet.

This recent discovery underscores the importance of preserving and carefully managing open grassy areas and meadow habitat as critical refugia for native species requiring such conditions. It also shows the great wealth of native diversity in the seedbank that eventually re-emerges following the abatement of regular mowing practices and with the vigilant control of non-native invasive plants.

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UPCOMING EVENTS

MNPS Programs

2023

Oct. 31 Madeline Potter. *Lessons From an Insect Egg Hunt: How Plant Selection Can Impact Sustainable Control of Insect Pests.*

Nov. 28 Damien Ossi. *Invader Detectors. Monitoring Invasive Species in the DMV.*

2024

Jan. 30 Sara Tangren. *Are Native Plants Warming to a Changing Climate? Potential Effects of Climate Change on Maryland’s Native Plants.*

Feb. 27 Joe Chambers & Andrew Putnam. *Tiny Forests, Big Results? Testing the Miyawaki Tiny Forest Concept in Urban Landscapes.*

Mar. 26 Art Gover & Luke Flory. *Trying to Put the “B” in BMP (Best Management Practices) for Controlling Stiltgrass (Gover); How Stiltgrass Removal Method Affects Native Plant Response (Flory).*

Registration is required. Unless otherwise indicated, all programs are by Zoom and are recorded. Zoom opens at 7:00PM for pre-program board update and member Q&A. Presentations begin at 7:30PM and generally run until 8:45PM. Please check mdflora.org for details, updates, and recordings of past presentations.

Cardinal Flower, *Lobelia cardinalis*. Photo by Judy Fulton.



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Maryland has over 300,000 acres of tidal wetlands to explore. See Jim Brighton's article (pages 5-7) for an overview of Maryland's salt marshes and some of the plants associated with them.