On The Fringe

Journal of the Native Plant Society of Northeastern Ohio

Program Schedule – Winter 2018

Saturday, January 27, 10:00am – noon – Chagrin Falls Library – ***Shrink Your Lawn with Native Plants* and *Urban and Suburban Meadows* video.** Amy Roskilly with the Cuyahoga Soil & Water Conservation District will present a program on her "Shrink Your Lawn" project for which she recently received a Native Plant Society grant. Her program will be followed by a showing of the video *Urban and Suburban Meadows, bringing meadowscaping to big and small spaces; just say no to lawns, a hands-on approach*. **Directions:** 100 East Orange Street, Chagrin Falls, 44022, just east of Main Street. **No registration** required.

Sunday, February 4, 2:00 – 3:00 pm – Wild Orchids across North America – The West Woods Nature Center-Geauga County. Tom Sampliner, photographer and past president of the Native Plant Society of Northeastern Ohio, shares his long-time interest in wild orchids. He has gone to many places throughout North America in search of wild orchids. This show will depict some of his favorites and those with interesting stories to tell. Presented in conjunction with Geauga Park District. **Directions:** take St. Rt. 87 east from Rt. 306 in Russell Township approx. 2 miles to the park entrance on south side of the road. 9465 Kinsman Road, Novelty, Ohio 44072. **No registration** required.

Wednesday, March 7, 7:00 – 8:30 pm – Beech Leaf Disease Update – The West Woods Nature Center-Geauga County. What's happening with our native Beech Trees? Constance Hausmen, PhD., Plant and Restoration Ecologist with Cleveland Metroparks, will give an update on Beech Leaf Disease and how it is affecting Northeast Ohio woodlands. Presented in conjunction with Geauga Park District. **Directions:** take St. Rt. 87 east from Rt. 306 in Russell Township approx. 2 miles to the park entrance on south side of the road. 9465 Kinsman Road, Novelty, Ohio 44072. **No registration** required.



Kent Scott, noted Northeast Ohio naturalist, passed away at home in the care of hospice. Kent will be deeply missed by all who knew him, especially those who love nature. Kent was a dynamic educator who loved to share his vast knowledge of the flora and fauna. As a founding member of The Native Plant Society of NE Ohio, Kent was always a joy to be with on our walks and programs, you could always learn something from him. Kent was the recipient of the Native Plant Society's 2017 Gentian Award for his lifetime of dedication to the natural world. We will miss him.

Kathryn Hanratty, President of the Native Plant Society of Northeastern Ohio



2015 Recipient of the Native Plant Society of Northeastern Ohio's Annual Grant

The Nature Conservancy's Grand River Conservation Campus at the Morgan Swamp Preserve in Ashtabula County was the recipient of our 2015 grant award. They wanted to create a learning garden adjacent to a new Nature Center in an existing building. The $500 Grant helped provide native plants and shrubs which will increase nectar sources and habitat for pollinators and birds. It will also help the public and school groups achieve a better understanding of what native plants are and how their communities are critical to a healthy ecosystem. The following is a letter we received from Elisa Demis, the Donor Relations Manager for the campus.

Board

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On The Fringe

The Journal of the Native Plant Society of Northeastern Ohio is published four times a year at Novelty, Ohio. ISSN 8756-6087. Questions or comments are welcome and may be addressed to chief editor, Diane B. Christensen, 8400 Top Rail Lane, Novelty, OH 44072; 440-666-4870, dbpolice@roadrunner.com; or co-editors Bill Oberdick, 986 Bushwood Ln., Columbus, OH 43235-5016; 216-392-7027, bill2016ober@gmail.com or Jane McCullam, 9880 Fairmount Blvd., Newbury, OH; 44065, cattermole@windstream.net, 440-338-3253.

The Mission of the Native Plant Society of Northeastern Ohio is to promote the study, appreciation and conservation of the native plants and plant communities of Ohio.

To Native Plant Society of Northeastern Ohio,

I write to share our report from The Nature Conservancy in Ohio for the very helpful and appreciated grant from the Native Plant Society of Northeast Ohio for our native plant garden at the Grand River Conservation Campus on the Morgan Swamp Preserve in Rock Creek. Since the grant was awarded in November 2015, our team has been working hard to develop our Dr. James K. Bissell Nature Center. We are pleased to announce that the center opens on Saturday, October 21, 2017. As part of opening the center, the new native plant garden has been created from scratch. In the enclosed photo you can see what it looks like before and after.

We have wonderful native trees, shrubs, and plants in place through your generosity. These include Wild Geranium; Meadow Blazingstar; Bottle Gentian; Mountain Mint; Jacob's Ladder and White Turtlehead plants. Trees include Amelanchier 'Autumn Brilliance.' Also incorporated are: *Hamamelis virginiana*, Ilex 'Southern Gentlemen;' Ilex 'Winter Red,' *Nyssa sylvatica*; *Viburnum acerifolium*, and *Viburnum cassinoides*.

We welcome the Native Plant Society out to see it in full stride in spring next year. My colleagues responsible for our site, Jacqueline and Ken, would be happy to help you further in any way that you see appropriate. Please share our report with your members.



Start of installation



Completed project

Recalcitrant Nuts

By Diane Christensen



Have you ever tried growing tree seedlings from fallen nuts? If you have, you will soon discover that the nuts are simply recalcitrant. Recalcitrant is a technical term applied to seeds that indicates they lose viability upon drying. The practical implication of this is that such seeds cannot be stored long term.

One would think it would be easy to grow a tree from a nut. Nuts have fallen for centuries and have taken root. If it happens so easily on its own, why can't we plant the nut and grow a tree ourselves? Well, it appears that the nuts are finnicky about how they lie in the dirt and at what depth. I guess that is why a tree drops so many nuts; the more nuts, the higher the survival rate.

If you want to try growing tree seedlings from fallen nuts, here are some steps you can take. With a few exceptions described below, these steps apply to all nuts. The first step is never to let the nuts dry out; keep them in the shade while harvesting, so they don't heat up. Nuts lose their ability to germinate if allowed to dry out. When the trees begin to drop nuts, don't gather the first ones that fall. Wait until the second flush begins, and then collect several handfuls. Do not pick the nuts from the trees; fallen nuts are more mature. Sow the nuts right away. To ensure success you should plant more than you need, because germination rates are low. You can always remove the weaker ones later and keep the best one, or just transplant them apart.

A general rule of thumb for most seeds is never to plant them too deeply. What you want to do is to make a hole big enough to cover the seed. So, place the nut in the ground at a depth roughly 2x the thickness of the seed, or 1-2" deep. Put down a light mulch, just as if nature was taking care of them. Dry leaf litter is fine, when the snow falls it will protect it. Do not water, the seasons will take care of it. It typically rains in the fall, so the nut will go through winter in a moist state. Nuts do require a period of cold stratification to enable germination in the spring. So, planting in the fall will naturally do this for you.

Once you have planted them, you can cover the ground with hay and or chicken wire to prohibit the squirrels from stealing; a lot easier said than done, however; these little animals can be quite persistent. If all goes well, you will notice tree saplings coming up in early spring, and they will grow well over a foot in the first season, maybe even two.

The tree saplings are in danger of being consumed by wildlife. So, place cages over newly planted saplings and replace them with chicken wire fences as the saplings grows. Keep the tree protected until it is at least 5 feet tall. Keep the area surrounding your trees free of weeds and grass. The roots will not get the required moisture if they must compete for it. In the absence of rain, water the soil around the tree. The tree won't develop strong roots in dry soil.

Acorns.
Visually examine your acorns and throw away any that have small holes where an insect may have bored in, as well as those that are off color or moldy. The caps of mature acorns come off easily, so remove these before planting. An acorn is to be placed in its hole sideways.

Buckeyes.
Buckeye seeds will ripen and start hitting the ground in September and October and should be collected and planted immediately. The longer you wait, the lower your chances of successfully germinating the seed. Buckeyes are to be planted with the eye down.

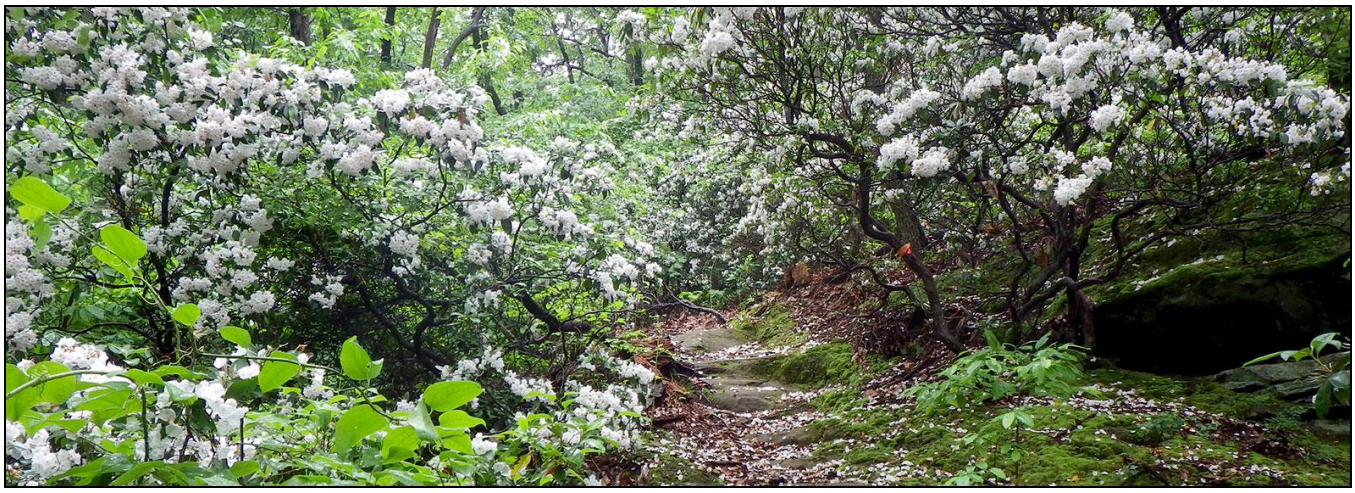
Hickories.
Hickory nuts are to be planted sideways with the husk off.

Black walnuts.
The challenge with black walnuts is how to get to the seed. The best method is to drive your car over it. The husk is extremely hard. Walnuts are to be planted sideways with the husk off.

Information for this article taken from a conversation with Charles Tubesing, the Plant Collectors Curator at the Holden Arboretum. Picture taken from www.centurycustomhardwoodfloor.net.

Christmas Rocks State Nature Preserve
Charles R. Goslin Nature Sanctuary

By Dick Moseley



Christmas Rocks is one of the outstanding geological features of the unglaciated hill country south of Lancaster but is not as well-known as many of the other parks and preserves in the Hocking Hills. This preserve, nestled in the foothills of Fairfield County, is a 554-acre area that has spectacular rock formations made of the Black Hand sandstone. The preserve derives its name from the massive sandstone blocks that had slumped away from the ridge of the parent Black Hand sandstone bedrock. According to Mark Howes, the preserve's first manager, these rocks soon became known as Christ's Rocks, in reference to the Biblical account of the earth being "torn asunder" following Christ's crucifixion. He also noted that pioneer women dug evergreen ferns off the rocks to provide greenery to decorate their dreary log cabins around Christmas. These ferns became known as Christmas Ferns and through a combination of the names the formation became known as Christmas Rocks.

The original 208-acre site was dedicated on December 4, 1973 and became Ohio's 10th State Nature Preserve. The preserve is also known as the Charles R. Goslin Nature Sanctuary in honor of the renowned Lancaster outdoor writer, historian and naturalist of the time. An additional 207 acres were added to the preserve on January 9, 1995 when the Ohio Department of Rehabilitation & Correction dedicated the south side of Oil Mill Hollow Valley. This property was part of the Southeastern Ohio Correctional Training Center—now known as the Southeastern Correctional Complex—and is administrated by the Ohio Department of Rehabilitation and Correction. The dedication of this site was significant since the joint cooperation of these two state agencies resulted in the protection of over a mile of the Arney Run watershed through the preserve.

A well-known geological feature in the preserve is a sandstone cliff known as Jacob's Ladder. This 90-foot Black Hand sandstone exposure juts out 310 feet above the Arney Run Valley and offers one an outstanding vista of the surrounding Appalachian foothills of Ohio. The view is especially glorious when fall color is at its peak in late October.

Another feature enjoyed by the visitor is the Mink Hollow Covered Bridge, which was built in 1887 over Arney Run. The covered bridge at the west end of the preserve is now protected as a small county park. The 4.5-mile trail system affords the visitor the opportunity to enjoy not only the massive rock formations but also the flora typical of the unglaciated plateau region of southeastern Ohio.

The area is primarily a mixed hardwood forest community of chestnut oak, Virginia pine, mountain laurel and other members of the heath family (notably deerberry and low blueberry) on the dry thin soils along the ridge tops. Other species found here include sourwood, scarlet oak, pitch pine and serviceberry. On the south-facing slopes, visitors will walk through an oak-hickory forest association that features several species of oaks and hickories, as well as tulip tree and

beech in wetter sites once in the Oil Mill Hollow Valley, along with Sycamore, birch, maples and spicebush, which dominate the richer glacial soils.

Christmas Rocks is a wonderful preserve to see wildflowers in the spring. Orchids like the pink lady's-slipper, showy orchis, and rattlesnake plantain as well as the large-flowered trillium, drooping trillium, trailing arbutus, spotted wintergreen, mountain laurel and other common spring flora can be found along the preserve's hiking trails. A variety of ferns carpet the floor of the forest and rock formations, including the Christmas fern and New York fern, as well as the rock polypody, mountain spleenwort, and Bradley's spleenwort, which are typical Appalachian Plateau species.

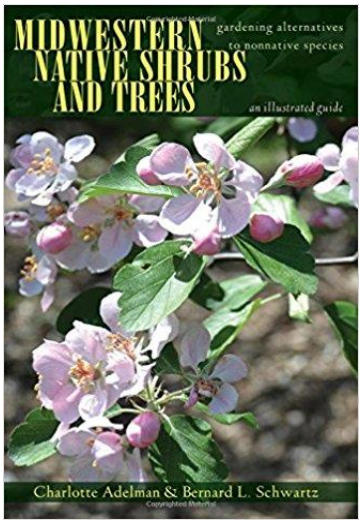
The preserve is located at 2360 Meister Road SW, Lancaster, Ohio. For more information and directions to Christmas Rocks State Nature Preserve go to the Natural Areas & Preserves website at naturepreserves.ohiodnr.gov/findapreserve.

Reprinted from the ONAPA Newsletter, Vol 4:1, Winter 2016/2017.

Book Review:

Midwestern Native Shrubs and Trees Gardening Alternatives to Nonnative Species

By Charlotte Adelman and Bernard L. Schwartz



Publisher: Ohio University Press (2011)
Pages: 430 pages
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ISBN-13: 9780821421642
Hardcover, Paperback and Kindle
Price: $72.58 Hardcover, $28.87 paperback, and $27.43 Kindle
Size: 6" x 9"

In this companion volume to the bestselling *The Midwestern Native Garden: Native Alternatives to Nonnative Flowers and Plants,* Charlotte Adelman and Bernard L. Schwartz offer another indispensable guide to replacing nonnative plants with native alternatives. This time, their subject is the native woody species that are the backbone of our gardens and landscapes.

Among other ecological benefits, native shrubs and trees provide birds and butterflies with vital food and reproductive sites that nonnative species cannot offer. And they tend to be hardier and easier to maintain. The authors provide a comprehensive selection of native woody alternatives that, season by season, provide effects similar to those of nonnative shrubs and trees used for ornamental purposes and shade. These plants are suitable for all garden styles, provide blooms and fall color, and have the same cultivation requirements as their nonnative counterparts. The book's nature notes alert readers to the native species' unique ecological roles.

Unlike other gardening guides, *Midwestern Native Shrubs and Trees* goes beyond mere suggestion to provide gardeners with the tools they need to make informed, thoughtful choices. Knowing which native species to plant for desired effects empowers landscapers and gardeners to take on a greater role in protecting our midwestern environment.

Charlotte Adelman and Bernard L. Schwartz are the authors of *Prairie Directory of North America – The United States, Canada, and Mexico* and *The Midwestern Native Garden: Native Alternatives to Nonnative Flowers and Plants,* winner of the 2012 Helen Hull Award from the National Garden Clubs. In 2014, Adelman was awarded an Audubon Chicago Region Habitat Project Conservation Leadership Award.

The publisher sent an announcement of this book directly to the NPSNEO. The book will be published in March.

Endless Symbioses Most Intricate*

By W. John Hayden



Figure 1. Downy Rattlesnake Plantain, *Goodyera pubescens.*



Figure 2. Seeds of Downy Rattlesnake Plantain as viewed through a compound microscope. The dark central mass of cells is the embryo; thin-walled empty cells constitute the seed coat.

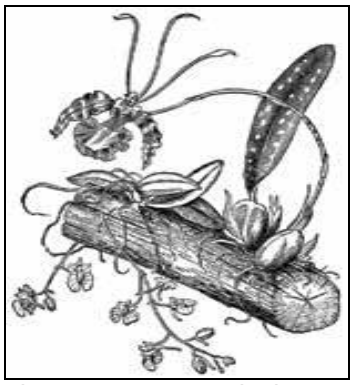


Figure 3. Some tropical epiphytic orchids. From Asa Gray's *How Plants Grow: A Simple Introduction to Structural Botany* (New York: American Book Company, 1858).

When I was much younger than I am now, I enjoyed reading science fiction. Much of what I read so long ago is irretrievably lost in the nooks and crannies of memory. But one story left in me a lasting impression. I can remember neither title nor author, but the plot involved, as usual, intrepid explorers discovering alien new worlds. One such exploration involved a world bathed in an ocean teeming with life. Initially the biologists among the spaceship crew were eager to retrieve samples, but everything they tried to pull out of the ocean was attached to something else. Big kelp-like algae were intimately entwined with lobster-like animals that were, in turn, connected to other life forms, and those to still others, and so on. All efforts to retrieve a single specimen failed, because every organism in that fictional watery world was physically connected to every other. As described in the story, this world of total symbiotic connection intimidated and repulsed the explorers, who soon blasted off to other worlds and other adventures.

Like the characters in the story, I found the story's depiction of rampant symbiosis and interconnectedness of species to be disturbing, at least initially. Perhaps what troubled me stemmed from the fact that, at that time of life, as young people do, I was busy constructing my own sense of self, whereas the creatures on that alien planet seemed to have scarcely any vestige of self or individuality. At that same time, I was beginning to learn about the life forms of planet Earth by poring through field guides—both the Golden Guides and Peterson series were important to me in those days—and the glimpses of life on this, my own planet, as depicted in these field guides, clearly emphasized the individuality of species. That fictional watery world of pervasive symbiosis was just shockingly strange to me at that time.

But I am older now, and I have learned a lot more about life on planet Earth since reading that science fiction story. And that fictional world no longer seems as strange to me as it once did. Most life forms on Earth are not as connected in a direct and physical way as those depicted in the story, but the creatures of Earth are most certainly connected ecologically; all are part of the web of life. Each species impacts many others.

Orchids, such as our Wildflower of the Year for 2016, Downy Rattlesnake Plantain, *Goodyera pubescens*, (Fig. 1), exemplify the interconnectedness of life on Earth. As would be the case for many kinds of plants, pollination comes readily to mind as a prominent example of mutualistic symbiosis. Downy Rattlesnake Plantain is pollinated by bumblebees and other native bees. The bees gain nectar and the orchid gets an efficient means to move pollen from one flower to another; each organism gains benefit from the interaction, the very definition of mutualism. Pollination by bees is widespread among the orchids, but there can be much variation in the nature of the pollinator reward (nectar, resin for building nests, and fragrance for attracting mates), and the choreography of bee behavior in the flower is as varied as the sizes and shapes of orchid flowers.

If pollination is successful, and it often is for Downy Rattlesnake Plantain, the result is a capsule full of seeds. Orchid seeds are minute, dust-like, and easily dispersed by wind; they are also produced in prodigious numbers. Small, light-weight seeds, however, cannot contain much in the way of stored food for the future seedling. In fact, orchid seeds have essentially no stored food at all; they consist merely of a thin seed coat and a tiny embryo (Fig. 2). It really does take a microscope to perceive them in detail.

So how do orchid seedlings get established without a stash of food to draw upon for their earliest efforts at existence? To answer that question, it must first be acknowledged that many orchid seeds simply perish. Passive dispersal by wind will

drop many seeds in spots not at all favorable for growth. A lucky few, however, will come to rest in a spot with adequate moisture, some—but not too much—light, and one more essential ingredient: the right fungus.

Initial stages of orchid seed growth may occur without fungal interaction, but to continue growing and developing the orchid embryo must encounter a fungus that penetrates the seed and interacts with the embryo. Not all contacts between an orchid and its symbiotic fungus work. Sometimes the fungus consumes the orchid just as any pathogenic fungus digests cells of its host plant. Sometimes the orchid kills the fungus, and, if so, the baby orchid soon dies of starvation. Other times the orchid and fungus are compatible, and orchid cells are able to obtain essential nutrients from the fungus, permitting it to grow, albeit slowly at first. When a successful symbiosis is established, the fungus and orchid embryo form a structure called a protocorm, a slowly growing ball of orchid cells and fungal hyphae (chains of fungal cells). It can take weeks to more than a year for the little green protocorm to acquire sufficient nutrients from its fungal associate and grow large enough to form its first root and leaf—and once a leaf has formed, the baby orchid can begin the process of photosynthesis in earnest. The situation is analogous to mycorrhizae, but the orchid seed tissue penetrated by the fungus is not a root, and it is difficult to imagine that the minute orchid embryo has much to give the fungus. But once the seedling makes leaves and roots, mycorrhizae in the strict sense can form, the orchid receiving mineral nutrients from the fungus and the fungus receiving carbon compounds formed by photosynthesis in the plant. It is sobering to think that every orchid you encounter in nature owes its very existence to early nutritional assistance from a fungus.

Many orchids, especially those in the tropics, cling to life on the bark of a tree (Fig 3). Such species are termed epiphytes, and the symbiotic relationship between orchid and tree is characterized as commensal, beneficial for the orchid, but with neither benefit nor detriment to the tree. Epiphytic orchids are not parasites; their roots penetrate only the most superficial layers of bark, and the orchid receives no nutritional benefit from the tree. In extreme cases, however, heavy epiphyte load on a tree can lead to the breaking of branches or the interception of significant amounts of sunlight that would otherwise have illuminated leaves of the tree. In most cases, however, presence of a few epiphytes is of no consequence to the tree.

Other orchids, like Downy Rattlesnake Plantain, are terrestrial, rooted in soil. As any organic gardener will tell you, soils are (or should be) swarming with microbes (bacteria, protozoa, algae, invertebrates, and so on) and macroscopic life forms (worms, insects, burrowing vertebrates). It is life in the soil that controls the cycling of mineral nutrients and the penetration of oxygen and water between soil particles. Terrestrial orchids, like all higher plants, benefit greatly from activities of myriad life forms in soil.

Of course, not all interactions between plants and other species help the plant. Many woodland orchids, including Downy Rattlesnake Plantain, and especially their flower stalks, are relished by deer. In this case, the orchid's lost reproductive potential is the browsing animal's gain, i.e., a nutritious morsel of food. And it is not just the occasional deer that eats or preys upon or infects orchid plants. All sorts of hungry insects and pathogenic fungi and bacteria are ready, willing, and able to convert orchid biomass to that of their own species. Sometimes the orchid wins, sometimes it loses, but win or lose, the life of an orchid is inextricably intertwined with a multitude of other species.

This essay has focused on connections between orchids and other forms of life. Similar stories of ecological connectedness could be told for any species, only the details would differ. Life on Earth is, indeed, woven into a complex fabric. What might first appear to be an individual organism will prove, on careful study, to be one of the numerous interconnected threads that make up the tapestry of life. And that tapestry, followed with patience and persistence, will be found to encompass the entire biosphere—much like the alien life forms in that story I read so long ago. Little did I know then that a piece of juvenile fiction would become central to my understanding of biology.

*The title echoes "endless forms most beautiful," words used by Charles Darwin in the closing passage of his *Origin of Species.*

WHAT DID JOHN MUIR SAY?

A wonderful quotation sums up the pervasiveness of symbioses among the life forms of Earth: "When one tugs at a single thing in nature, he finds it attached to the rest of the world." This aphorism is commonly attributed to John Muir, and it certainly sounds like something he might have said. Unfortunately, according to the Sierra Club—and they ought to know—these are not the words of their founder. What Muir wrote is, "When we try to pick out anything by itself, we find it hitched to everything else in the universe." The same sense is there, but the compass of Muir's actual words is far greater and, consequently, their pertinence to the ecology of the blue marble that we call home is less direct, less compelling—which, no doubt, explains the popularity of the misquoted version. For a discussion of Muir's words on this subject, actual and misquoted, see: http://vault.sierraclub.org/john_muir_exhibit/writings/misquotes.aspx v.

Reprinted from the Virginia Native Plant Society newsletter, *Sempervirens,* Summer 2016 Issue. Article and photographs by W. John Hayden, Botany Chair of the Virginia Native Plant Society.

Folklore:

Christmas Fern, *Polystichum acrostichoides* [Michx] Schott

By Gordon Mitchell

During the Christmas holidays, many people like to decorate their homes with various green plants. Unfortunately, most native plants are not green during the Christmas holiday season. However, there is one little known native plant that is green during that time. That plant is the Christmas Fern, *Polystichum acrostichoides* [Michx] Schott, which is highly noticeable in the winter.



Christmas Ferns are members of the Division *Pteridophyta*; the Class *Filicopsida*, *Polypodiopsida* or *Pteridopsida*; the Order *Polypodiales*; the Family *Dryopteridaceae*; and the Subfamily *Dryopteridoideae*. The prefix, *pteris*, is Greek for "fern".

Previous scientific names for this species were *Aspidium acrostichoides* Swartz, *A. Schweinitzii* Beck, *Dryopteris acrostichoides* Kuntze, and *Nephrodium acrostichoides* Michaux. Another common name for this plant was Dagger Fern.

The generic name, *Polystichum*, is Greek for "many rows," referring to the rows of sori. *Polys* is "many" and *stichos* is "row." The specific epithet, *acrostichoides*, is Greek for "spreading across the surface," also referring to the sori. It was derived from *Acrostichum*, a genus of the tropical Leather Fern. A sori is a cluster of sporangia (structures producing and containing spores) in ferns and fungi.

Description

Perennial
Height: Its height is 1-3 feet.
Rhizomes: Its rhizomes are dark evergreen, short, slender or stout, branching, creeping or erect, and scaly. It has several growing tips for forming multiple crowns. It also has a fibrous root system underground.
Fronds: Its fronds are arranged in circular, stiff, arching, tufted clumps that arise from a central rhizome. They are leathery, about 1-2½ feet long, about 1½-5 inches wide, glossy dark green above, lighter below, thick, and coarse to medium texture. The fertile fronds are taller, more slender, and more erect than the sterile fronds. The sterile fronds are located at the peripheral edge of the clump. After a hard frost, these fronds all fall to the ground. The fronds emerge in the early spring from crownless rootstocks as stout, scaly, silvery-gray fiddleheads. White-tailed Deer, Wild Turkey, and Ruffed Grouse may eat these fronds.
Blade: Its blade is lanceolate, linear, broadest at the base, and tapering toward the tip. It is pinnately compound with 20-40 pairs of pointed pinnae.
Pinnae: Its pinnae (or pinnules) are lanceolate and tapering with 1 auricled, triangular basal lobe or ear located where it is attached to the rachis. Most pinnae are alternately arranged. The lowest 2 pinnae are smaller, opposite, and point downward. The pinnae have an asymmetrical, truncated base and an acute or an acuminate tip. The fertile pinnae are smaller than the sterile pinnae. Each pinnae has bristled, serrated margins with widely-spaced,

incurved teeth that point upwards. It also has straight and forked lateral veins that reach the margins. Pinnae (or pinna) are Latin for "feather".



Rachis: Its rachis is green, stout, and scaly.

Stipe: Its stipe is dense and scaly. Its base is light brown and its upper section is greenish yellow. Its upper side is grooved. It measures about one quarter to one third of the total length of the blade.

Sori: Its sori, the spore-bearing structures, are located upon the underside of pinnae of the terminal 1/3 of the fertile fronds. They are large, oblong, numerous, and are arranged in 2 or more rows along the mid-vein. These sori crowd the pinnae underside. The sori are covered with red-brown, circular indusia that are attached at the center. The indusial disappear when the spores are released. These spores are rusty brown.

Habitats: Its habitats consist of rich woodlands and shaded rocky slopes. It tolerates moist to slightly dry sites.

Range: Its range covers the eastern U.S. and southeastern Canada, as far west as the Great Plains. It is not found in southern Florida. It may have migrated south during the Ice Age.

Folklore

The Christmas fern is distinctively a hillside fern, so much so, in fact, that oftentimes in walking through thick woods the first notice a traveler receives that he is approaching a hillside is the presence of this fern. It is no weakling either. It is immune alike to the most severe cold and the strongest winds. Its grip on the hillside is firm and secure, as one will ascertain if he but attempts to pull it up by the roots.

Native Americans used this fern to treat a variety of complaints. A tea from the roots was used as a blood purifier, emetic, and febrifuge and in the treatment of chills, fevers, pneumonia, stomach or bowel complaints, and rheumatism. The root was also used as a poultice or decoction in the treatment of rheumatism. The Cherokee used the fiddleheads for food.



As early settlers moved from the east coast to Kansas and Texas, they would keep seeing this remarkable fern in the woods and along the shady pathways. Evergreen in the winter, it was sometimes the only plant that was still green. From their Native American friends, they learned to use this plant for medicine and food. Settlers from New England carried their holiday traditions to their new homes, including using this fern for decorations.

It's unclear how the Christmas fern, *Polystichum acrostichoides*, got its name. Some think it's due to the shape of its leaflets, which resemble a stocking or a winter sleigh. It could also be because the Christmas fern is one of the few woodland plants still green in December, making it ideal for use in holiday decorations. Theses ferns also serve as a welcome splash of color during any winter hike.

During the Middle Ages, ferns were thought to flower and produce seed only once a year—at midnight on St. John's Eve, June 23, also called Midsummer Eve. Since the seeds couldn't be seen, they were believed to be invisible. Many attempts were made to collect them because it was also believed that they allowed people to become invisible, see into the future, and have eternal youth.

Gordon Mitchell works for the Columbus, Ohio Metroparks and was a member of the Central Ohio Native Plant Society, which merged with the Columbus Historical Society in the Spring of 2010.
A similar article by Gordon Mitchell appears in the Indiana Native Plant and Wildflower Society's website, www.inpaws.org, under the Native Plants tab and in Gordon Mitchell's Plant Profiles tab.
All pictures taken from plants.usda.gov.

New Trillium Species Discovered in Eastern Tennessee

By Meredith Warfield



The Trillium *tennesseense*, a rare yellow wildflower, is only found in the deciduous forests of eastern Tennesssee. Photo by Marty Silver, Tennessee State Parks.

When Mark Dunaway and his wife purchased land in eastern Tennessee, they had no idea they would be moving in with an unheard-of species living in their backyard.

The couple came across an unfamiliar, yellow-petaled wildflower while on a plant walk along their property one day, and after searching their field guides and finding no match, they decided to contact experts at University of Tennessee and Tennessee Native Plant Society. A team of researchers at University of Tennessee examined the flower and found themselves just as stumped as the Dunaways. The experts, comprised of Dr. Edward Schilling, Dr. Susan B. Farmer and graduate student Aaron Floden, then journeyed to the Dunaways' property and investigated the scene of the discovery. After extensive research, the team confirmed that the flower was a brand-new species of trillium—to be named *Trillium tennesseense*—now known to grow in only three locations on the slopes of eastern Tennessee. The research was conducted over the course of roughly a year and a half and was published in June 2013 in the peer-reviewed journal of the Southern Appalachian Botanical Society, the *Castanea*. Trilliums are a three-petaled wildflowers, with more than 40 different species throughout the U.S. and Canada. Several species can be spotted along the forest floor in Appalachia, blooming from late spring to early summer. The *T. tennesseense*, similar in structure to the Wateree trillium growing in South Carolina, seeks shelter on hillsides just above healthy creeks, where there is good drainage and little disturbance from agricultural activity or construction. When in bloom, its yellow petals reach delicately towards the sky above a fan of green leaves sprouting from a very narrow stem. The recently discovered flower is known to grow on the slopes of Bays Mountain in Hamblen and Hawkins counties, although Dr. Schilling and his trillium experts suspect the flower may flourish in more areas that are not yet documented. The areas surrounding the site of the flower's discovery are inhabited mostly by residential landowners such as the Dunaways. This reduces the threat of commercial and agricultural development that could harm the plant, but also makes for plenty of "No Trespassing" signs in wooded areas where the *T. tennesseense* could secretly be thriving, its rare beauty unbeknownst to scientists. "You can't just go waltzing on these landowners' property," Dr. Schilling says, but the team was able to go bushwhacking into a ravine where they found thousands of individual *T. tennesseense* flowers along a hillside. The biggest difference between the *T. tennesseense* and its fellow genus members is its floral odor. When in full bloom the flower emits a smell similar to old-fashioned shoe polish. Aside from this, the newly discovered species' relatively shorter ovary and longer stamen also differentiate it from its close trillium friends. Although the *T. tennesseense* is considered globally rare, Tennessee has no law to protect the plant species. "This is the only place in the world that it grows, so if it disappears, it will most likely be gone for good," Dr. Schilling notes. As wooded residential areas flourish where the *T. tennesseense* grows and commercial activity remains at bay, it seems the same fences that have been hiding the flower from human eyes have been sheltering it from extinction.

Information for this article was taken from the *Appalachian Voice*, 2014, Issue 2. Website: www.appvoices.org**/.../**new-trillium-species-discovered-in-eastern-tennessee.



Trillium recurvatum - This trillium occurs from North Carolina to Pennsylvania and in the central U.S. Its fully bloomed flower, known by its maroon petals, can be found under the shade of an oak tree around the month of June.

Trillium undulatum - Also known as the "painted lady," this flower ranges from Ontario to South Carolina and Michigan to Nova Scotia. It can be found under trees such as maples and spruces. It blooms in late spring with three white, curved petals topped with a pink, V-shaped mark on each.

Trillium grandiflorum - Popularly known as the "great white trillium," this flower is found in rich forests across Appalachia and eastern North America. Its attractive white petals open in late spring and remain until early summer.

Trillium erectum - Also known as the "wake robin," this trillium is a spring ephemeral and flourishes throughout deciduous forests of eastern North America. Its flower is often deep red, which is why it was named after a robin's red breast, but there is a white form as well.

Photo credits, left-right: Frank Mayfield, U.S. Fish and Wildlife Service, JackFrost2121, Ramin Nakisa

United Plant Savers

United Plant Savers' mission is to protect native medicinal plants of the United States and Canada and their native habitat while ensuring an abundant renewable supply of medicinal plants for generations to come.

Where once herbal enterprises were few and far between, it is now a competitive marketplace which has increased the demand for wild medicinal plant resources. Furthermore, other countries with an uninterrupted tradition of herbalism are experiencing a severe shortage of medicinal plants and look to the North American continent for supplying these herbs. This increased usage along with habitat destruction is causing an ever-increasing shortage of wild plant resources, including some of our most treasured medicinal species.

The work of United Plant Savers involves research, education, and conservation of native medicinal plants and their habitats.

When you visit their website, www.unitedplantsavers.org, click on the following tabs:

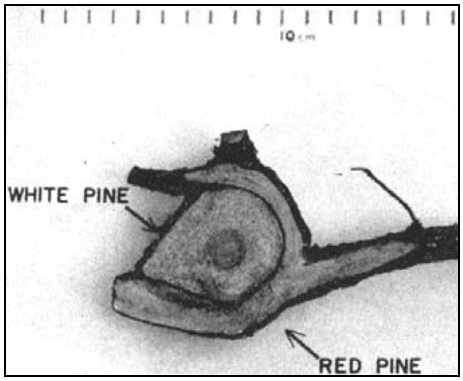
- The Species at Risk tab lists native herbal plants that are "At-Risk" and "To-Watch."
- The Species At-Risk Assessment Tool tab explains a ranking tool that was created for medicinal plants at risk of being overharvested in the wild. Though the main goal for the development of the tool was to create a methodology for scoring plants to rank their "At-Risk" status, it became apparent that this tool is a powerful teaching tool.
- The Botanical Sanctuary Network tab has a map of the United States and when you click on "Ohio," it brings you to the list of Botanical Sanctuary members in our state. One is right here in Chardon.

As United Plant Savers became more deeply involved in the complexities of medicinal plant conservation, they realized that one must first preserve and protect the habitat in which our native plant communities thrive. What better way than to create a network of sanctuaries dedicated to restoring and preserving habitat for wildlife.

The Trees Beneath Your Feet - A Tale of Graft and Corruption

By Kenneth Armson

Whether you are interested in the ground vegetation, birds, fungi or wildlife when you go for a walk in a forest, trees are ever present as a macrostructure and backdrop. Except in young forests, you are likely to see larger or older trees that have been wind-thrown, lying on the ground with a part of their root system sticking up in the air, often with soil and stones attached. You might give casual attention to the roots. Depending on when the tree was wind-thrown, and its species, much of the root may have rotted away. The soil has slumped to the surface and created a mound adjacent to the depression the wind-thrown tree left. This is the origin of the "hump and hollow" forest surface characteristic of most woodlands.



Apparent graft between two pines.
Note continuity of bark.

When we speak about the ecology of forest communities, we most often focus on the above-ground features but there is a major component which lies beneath the surface associated with the roots of the trees. Above ground the trees are usually viewed as separate individuals, each contributing to the forest community; below ground the roots tell a different story. It's relatively easy to look at and measure trees above ground but if you want to look at their roots in a comprehensive way, a lot of effort is required, as is considerable disturbance and removal of the soil around them. Species have different forms of root systems. Some are relatively plastic or flexible and can adapt to a range of soil conditions and depths. A good example of this is the red maple, *Acer rubrum*: its adaptability may partly account for its wide latitudinal range, from Florida to the southern part of the Arctic watershed in eastern North America. Other trees are not so flexible and are usually found with a series of major thick roots, often including a tap root, such as the pines, *Pinus* spp., and oaks, *Quercus* spp. Most species have a combination of roots, both vertical and lateral, of many sizes.

Roots comprise 10 to 25% of a tree, depending on species, and are the means for absorbing the nutrients and water from the soil that are necessary for a tree's growth and well-being. The main roots will provide anchorage for the tree while a tree's fine feeder roots will predominate in the surface soil layers where the mineral and organic matter provide a major source of both nutrients and water. Deeper roots in the mineral soil absorb both water and nutrients. Most interested persons are familiar with—and have expectations about—tree growth above ground, especially if they are involved with establishing a new forest plantation. Apart from competition from other plants above ground, there is unlimited space for the development of a tree's stem and crown. But what about the growth of the root systems below? The nature of the geological materials in which the soil develops, and the type of soil development usually restrict root growth. Normally restriction in root growth has a major effect on water uptake and this is what limits the above ground development of the tree.

The roots of a young tree normally grow rapidly out and down into the soil until they are limited in extension by some soil feature, usually physical, such as bedrock, a major change in soil texture or groundwater. For our northern trees, this commonly occurs within the first ten or so years of the tree's life. These roots will continue to grow in diameter; normally the growth is greater closer to the tree's stem, but there will be a continuous infilling of the initial rooting volume with age and development of the entire tree. Inevitably then, as each tree in the forest develops above ground so do its roots. Thus, roots from one tree will grow into the rooting volumes of adjacent trees. As they intermingle and grow in diameter, one or more will come into contact with another root and, as their diameter growth increases, there will be an increase in pressure at these points of contact. The roots of trees in the soil are solidly anchored; as the pressure at points of contact increases, the bark of the roots can be broken and the tissues of the two roots come into contact so that there

is a living union between them. This is the origin of root grafts. Self-grafts occur between roots of the same tree, intraspecific grafts between the roots of trees of the same species, and interspecific grafts between roots of different species.

Self-grafts are most common and generally occur close to the base of the stem of a tree. Grafts between roots of different individuals of the same species are also common and have received the most attention. Grafts between roots of different species are rare. Where root grafts are observed, the only way to be sure that there is a union of vascular tissues is by physically cutting into the apparent graft; if the bark remains intact around both roots then no union of tissues has occurred. The time for the union to take place in red pine, *Pinus resinosa*, in Ontario was found to be one to two years. Grafts between trees of different species are most likely to occur when they are of the same genus and can hybridize, as has been reported for certain oak species. "Live" stumps are the most obvious indication that root grafts are present, as shown by callus tissue on the stump surface.

This leads to the question of who benefits from the presence of grafts. What are the implications for stand development and what may best be termed "forest hygiene"? One of the most obvious inferences is that where there is extensive occurrence of grafts, for example in a stand of pine, it will impart some extra degree of wind-firmness beyond what would otherwise exist. Many scientific investigations have looked at the movement of minerals, water and organic materials between individuals that have grafted roots. It would appear that diversion of minerals and water from one tree to the other is not significant; however, this does not apply to organic materials, which are transported. When this occurs between a dominant and a smaller tree, the latter gains. Between two dominant trees the exchange is most likely neutral. However, if the live tree is keeping a stump alive, it is giving up some of its metabolites but probably gains some increase in water and nutrient absorption from the expanded root system. Payoffs are a part of the system! Where a tree takes over the portion of another root system which has died without any residual connection to the stump of the dead tree, there is an immediate enhancement of the surviving tree's root system: the benefits are water and nutrient absorption.

Another area of major study is the ability of pathogens to move from one tree to another via root grafts. Transfers of *Heterobasidium annosus* in pines, oak wilt and other pathogens have been well-demonstrated, although root grafts are not necessarily the main vector for their transmission in a stand. There are a number of forest management practices which either enhance the formation of root grafting or can be affected by the presence of grafts in a stand. Generally, the result of thinning, especially in young polewood stands (saplings to small sawlog sizes), is increased root grafting. In a study of graft occurrence in a 45-year old red pine plantation in Ontario there was a four-fold increase in root grafting in the thinned versus the unthinned stand. Chemicals injected into live trees either to kill them (silvicides) or for other purposes are likely to be readily transported to adjacent individuals via root grafts. Where roots of two or more individual trees are in very close contact without the formation of grafts, the transport of chemicals such as plant auxins between them can still occur.

The entire zone of roots in the soil, the *rhizosphere*, is a rich, biologically active one deserving of far more attention than we have given it.



Roots of an 85-year-old jack pine growing in outwash sands. Note restriction of vertical root extension at 1.3 metres (4.2 feet) due to change in soil texture.

Ken Armson is the Chair of the Forest History Society of Ontario and the former Provincial Forester for Ontario. He is a Registered Professional Forester.

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Wintergreens and Reds

By Robert Dirig



Partridgeberry, *Mitchella repens*, is an attractive "wintergreen". Picture taken from http://becuo.com

As Autumn's bright leaves drop, and herbaceous plants are withered by frost, the landscape takes on tones of brown and grey. Landforms that have been masked by foliage are suddenly exposed, revealing ridgelines, hollows, and all the subtle details of relief. And cloudy skies and cold winds may bring the first light snowfalls, icicles, and other hints of winter.

An outdoor revel with wild greenery and bright berries can dispel the gloom of these short December days! Those who look can find a surprising variety of verdure at this season, particularly in wetlands. Complementing these are dazzling red berries and crimson twigs that bring festive cheer to remote swamps and marshes.

A few conifers remain green all year—rugged Hemlocks, soft resiny White Pines, and occasional American Yews (still hiding in nooks where our resident ungulates cannot reach them). Broad-leaved evergreen shrubs like Great Laurel and Mountain Laurel spread in wonderful tangles, amid the bright twigs of Red Maple and Mountain Maple.

Mosses carpet the ground—including jade Pincushion Moss, the textured weave of Sphagnum, and several fern mosses, among them the elegant Knight's Plume. Fancy Ferns, Christmas Ferns, and Marginal Wood Ferns lend their special grace, while several club mosses add their own pretty forms and designs to the outdoor tapestry. Even the humble tussocks of Common Rush still glow greenly in their centers; while the tiny Sulphur Stubble Lichen spreads its chartreuse dust beneath an upturned tree. The lovely green leaves of Aromatic Wintergreen and Partridgeberry have their own red fruits, and Goldthread's glossy foliage spreads in masses. The brightest scarlet is seen on Winterberry, with a close second in American Bittersweet. And if we stray from the swamp, and are in a forgiving mood, even the Japanese Barberry earns its keep at this season, with cascades of crimson glory! These colorful plants are here, awaiting our greetings at this special season. Enjoy!

Scientific Names of Plants Mentioned

Hemlock, *Tsuga canadensis*; White Pine, *Pinus strobus*; American Yew, *Taxus canadensis*; Great Laurel, *Rhodo-dendron maximum*; Mountain Laurel, *Kalmia latifolia*; Red Maple, *Ascer rubrum*; Mountain Maple, *A. spicatum*; Pincushion Moss, *Leucobryum glaucum*; Sphagnum, *Sphagnum* spp.; Knight's Plume, *Ptilium crista-castresis*; Fancy Fern, *Dryopteris intermedia*; Christmas Fern, *Polystichum acrostichoides*; Marginal Wood Fern, *D. marginalis*; club mosses, *Dendrolycopodium, Diphasiastrum, Lycopodium*, and *Huperzia* spp.; Common Rush, *Juncus effuses*; Sulphur Stubble Lichen, *Chaenotheca furfuracea*; Aromatic Wintergreen, *Gaultheria procumbens*; Partridge-berry, *Mitchella repens*; Goldthread, *Coptis trifolia*; Winter-berry, *Ilex verticillate*; American Bittersweet, *Celastrus scandens*; and Japanese Barberry, *Berberis*, *thunbergii*.



Sulphur stubble lichen, *Chenotheca furfuracea,* on sandy soil. Picture taken from http://www.lichen.com.

Reprinted from *Solidago*, The Newsletter of the Finger Lakes Native Plant Society, December 2012, Vol. 13, No. 4. © 2012 by Robert Dirig. Robert Dirig is the Editor of *Solidago*.

Invasive Plant:

Spread by Global Trade, Bugs Butcher Forests

By Michael Casey and Patrick Whittle

In a towering forest of centuries-old eastern hemlocks, it's easy to miss one of the tree's nemeses. No larger than a speck of pepper, the Hemlock woolly adelgid spends its life on the underside of needles sucking sap, eventually killing the tree.

The bug is one in an expanding army of insects draining the life out of forests from New England to the West Coast. Aided by global trade, a warming climate and drought-weakened trees, the invaders have become one of the greatest threats to biodiversity in the United States.

Scientists say they already are driving some tree species toward extinction and are causing billions of dollars a year in damage—and the situation is expected to worsen.

"They are one of the few things that can actually eliminate a forest tree species in pretty short order—within years," said Harvard University ecologist David Orwig as he walked past dead hemlocks scattered across the university's 5.8-square-mile research forest in Petersham.

This scourge is projected to put 63 percent of the country's forest at risk through 2027 and carries a cost of several billion dollars annually in dead tree removal, declining property values and timber industry losses, according to a peer reviewed study this year in Ecological Applications.

That examination, by more than a dozen experts, found that hundreds of pests have invaded the nation's forests, and that the emerald ash borer alone has the potential to cause $12.7 billion in damage by 2020.

Insect pests, some native and others from as far away as Asia, can undermine forest ecosystems. For example, scientists say, several species of hemlock and almost 20 species of ash could nearly go extinct in the coming decades. Such destruction would do away with a critical sponge to capture greenhouse gas emissions, shelter for birds and insects, and food sources for bears and other animals. Dead forests also can increase the danger of catastrophic wildfires.

Today's connected world enables foreign invaders to cross oceans in packing materials or on garden plants, and then reach American forests. Once here, they have rapidly expanded their ranges.

While all 50 states have been attacked by pests, experts say



Evidence of woolly adelgids cling to hemlock needles in Petersham. The pest sucks sap from the needles, killing the tree.

forests in the Northeast, California, Colorado and parts of the Midwest, North Carolina and Florida are especially at risk. Forests in some states, like New York, are close to major trade routes, while others, like in Florida, house trees especially susceptible to pests. Others, like New Hampshire, Massachusetts and Maine, are experiencing record warming.

"The primary driver of the invasive pest problem is globalization, which includes increased trade and travel," said Andrew Liebhold, a Forest Service research entomologist in West Virginia. "But there are cases where climate change can play an important role. As climates warm, species are able to survive and thrive in more northerly areas."

The emerald ash borer, first found in 2002 in Michigan, is now in 30 states and has killed hundreds of millions of ash trees. The gypsy moth, discovered in 1869 in Boston, is now found in 20 states and has reached the northern Great Lakes, according to the U.S. Department of Agriculture.

Native bark beetles have taken advantage of warming conditions and a long western drought to rapidly range from Mexico into Canada. An outbreak in Colorado spread across 3.4 million acres of forest from 1996 to 2013, according to the Forest Service, and in California 100 million-plus trees have died in the Sierra Nevada since 2010.

Though small, bugs can easily overwhelm big trees with sheer numbers.

"They drain the resin that otherwise defends the tree," said Matt Ayres, a Dartmouth College ecologist who worked on the Ecological Applications study. "Then, the tree is toast."

Forest pests in the era of climate change are especially concerning for timberland owners, said Jasen Stock, executive director of the New Hampshire Timberland Owners Association.

"We're dealing with pests we've never been around before, never had to manage around before," Stock said. "It's something we're going to be dealing with forever."

Urban forests, too, are at risk from outbreaks. In Worcester, Mass., a city of about 180,000, an Asian long horned beetle infestation in 2008 resulted in the removal of 31,000 trees.

"You would leave for work with a tree-lined street, and you come back and there was not a tree in sight," recalled Ruth Seward, executive director of the nonprofit Worcester Tree Initiative. Most trees have since been replaced.

"Though trees can die off quickly, the impact of pests on a forest ecosystem can take decades to play out. Dead hemlocks, for example, are giving way to black birch and other hardwoods. Gone are favorite nesting spots for two types of warblers, as well as the bark that red squirrels love to eat", Harvard's Orwig said. "The birds won't die off," he said, "but their ranges will be restricted."

"It's a great example of how one species can make a difference in the forest," Orwig said. As pests proliferate, scientists seek to contain them.

Among the methods are bio controls, in which bugs that feed upon pests in their native lands are introduced here. Of the 30 states with emerald ash borer outbreaks, the USDA says 24 have released wasp species to combat them. Some scientists worry about introducing another pest; others complain they aren't effective because they can't eat enough of the fast-breeding pests to make a difference.

"With all bio controls, the hope is to create balance—balance between predator and prey," said Ken Gooch, forest health program director for the Massachusetts Department of Conservation and Recreation.

Genetic modifications also offer promise.

On a research farm in Syracuse, N.Y., are rows of 10-foot chestnut trees tweaked with a wheat gene to make them resistant to chestnut blight, a fungus that came from Japan more than a century ago and killed millions of trees. Genetic engineering could likewise be applied to fight insects, said WilliamPowell, a State University of New York College of Environmental Science and Forestry professor directing the chestnut research.

An alternative strategy, also a slow one, is to plant trees 50 or 100 miles away from their normal range so they can escape pests, or adapt to a more favorable climate, said Steven Strauss, a professor of forest biotechnology at Oregon State University.

"Mother Nature knows best," he said. "It's assisted migration."

To stop the next pest from entering the country, researchers like Gary Lovett, of the Cary Institute of Ecosystem Studies in New York, propose measures such as switching from solid wood shipping material that can harbor insects.

Article taken from www.pressreader.com/usa/sun-sentinel-broward-edition/20161214; printed version appeared in the 14 Dec 2016 edition.

Botanic Names: A Hairy Subject

By Margaret Chatham

How many ways can a botanist say a plant is hairy? Canescent, ciliate, hirsute, hispid, lanate, pillose, pubescent, tomentose, villose; this is not a complete list, and most of these can be modified, but to take these in alphabetical order:

Canescent indicates enough usually soft, short hairs to give the plant a gray or hoary color. So *Desmodium canescens* is Hoary Tick Trefoil, and *Scutellaria incana* is Hoary Skullcap.

Ciliate means with a fringe of hairs. In the case of fringed loosestrife, *Lysimachia ciliata*, that fringe is only found on the leaf petioles. *Blephilia ciliata*, Downy Wood Mint, is described by *The Flora* of *Virginia* as having canescent stems, while *Desmodium canescens* has ciliate leaves. Oh, well.

Hirsute indicates a thick covering of stiff hairs. There are lots of plants with this name, of varying hairiness: *Hypoxis hirsuta*, Yellow Star Grass, is visibly hairy; *Cardamine hirsuta*, the non-native Hairy Bittercress, requires more careful observation to find the hairs.

Hispid is like hirsute, but with fewer, stiffer hairs. The invasive exotic grass *Arthraxon hispidus*, Joint Head Grass, has stiff enough hairs for anyone, while Bristly Greenbriar, *Smilax hispida*, pushes beyond merely hairy.

Lanate means wooly, as in Velvet Grass, *Holcus lanatus*, an invasive exotic that is nevertheless very pleasing to the fingers.

Pilose means covered with soft, straight hairs. This is sometimes the case with *Symphyotrichum pilosum* var. *pilosum*, which *The Flora* of Virginia describes as having stems that are "pubescent to pilose-hirsute or villous." Now all we need are definitions of pubescent and villous.

Pubescent means covered with short, soft hairs, as you can perhaps see in the accompanying photo of Rattlesnake Plantain, *Goodyera pubescens*. So, if you feel the stem or leaves of the downy yellow violet, *Viola pubescens*, or examine them with a hand lens, you may detect the hairs there. If those hairs are lacking, you may have a smooth yellow violet, *Viola pensylvanica*, instead.

Tomentose describes densely matted wooly hairs, like those on the undersides of leaves of Princess Tree, *Paulownia tomentosa*, or Mockernut Hickory, *Carya tomentosa*.

Villous hairs are similarly long and may be shaggy but not matted, as on Hairy Alumroot, *Heuchera villosa*, or Carolina bushpea, *Thermopsis villosa*.

Add in all the diminutives, like hirtellum, hirsutula, hispidulum, or puberulum, and the superlatives like villosissimum, and you have a topic that could be described as not just hairy, but tomentose!

Article reprinted from The Virginia Native Plant Society website: vnps.org/potowmack/botanic-names-a-hairy-subject.



Hirsute leaf. Photo taken from https://roadsendnaturalist.



Pilose on Symphyotrichum piosum. Picture taken from https://www.wildflower.org.



Tomentose Leaf. Picture taken from http://davesgarden.com



Villous hairs. Picture taken from https://en.wikipedia.org.

Interesting Factoid:

The New Cash Crop: Red Gold, *Crocus sativus*

Some growers have visions of a fall-flowering crocus that produces saffron, *Crocus sativus*, the world's most valuable spice. University of Vermont researchers have been raising the exotic spice, now grown primarily in Iran, and are encouraging growers to tap into what they hope will be a cash crop. It's not a hard sell, particularly in the short growing season of the North. A crop harvested in the late fall, when other crops have died off, that tolerates extreme climates could bring in the gold. UVM researchers said the yields amounted to $4.03 a square foot, compared to $3.51 a square foot for tomatoes, and $1.81 a square foot for winter leafy greens. They estimate an acre of saffron grown in high tunnels could bring in $100,000 a season.

UVM is not the first in the U.S. to raise saffron. There are other small growers around the country, including Mennonite and Amish farmers, who have been raising it outside in Massachusetts, Pennsylvania, and Maine. UVM researchers believe the more growers, the better. Having more growers will encourage the development of a market for saffron.

One of the biggest questions for the American Spice Trade Association is whether labor costs would have a significant effect on the cost of the product. The process of picking the flowers and gathering the delicate stigmas and drying them is labor intensive. There are no machines that can separate these three delicate stigmas from the flower. So, in Iran elderly women are usually given this very tedious and difficult job.

For such an ancient and important spice, saffron is surprisingly difficult to keep alive, much less harvest. The crocus that we know today as saffron is a triploid—meaning that it has three sets of chromosomes instead of two—and it is sterile. It can only reproduce by creating more corms, never by setting seed. It is probably a mutant that has been continuously cultivated since about 1500 BC.

Each corm produces just one purple flower, during a two-week period in the fall. That flower opens to reveal the precious three-part red stigma we know as threads of saffron. To yield just an ounce of saffron takes the stigmas of four thousand flowers! Every few years, the corms must be dug up, divided, and replanted to ensure a good harvest. Although saffron crocus blooms in the autumn, it must never be confused with the autumn crocus, *Colchicum autumnale*, which is highly toxic.



Saffron is one of the few things that truly is worth its weight in gold. This product of the crocus flower adds not only pungent and aromatic flavor to foods, but also a beautiful golden color. It is native to Asia Minor, where it has been cultivated for thousands of years to be used in medicines, perfumes, dyes, and as a wonderful flavoring for foods and beverages.

Interesting Factoids:

- To combat drug trafficking, in Afghanistan a project has been set up to replace illegal opium poppy plantations with saffron.
- In addition to seasoning Indian, Asian, and European dishes, saffron has been a flavoring for beer and spirits for centuries. Archeologist Patrick McGovern believes that saffron was used as a bittering agent in ancient times; he worked with Dogfish Head Craft Brewery to create Midas Touch, a drink made of white Muscat, barley, honey, and saffron, based on residue analysis of drinking vessels found in King Midas's tomb.
- In ancient India, robes were traditionally dyed a golden color from the crocin chemical dye that is found in saffron. In fact, after Buddha had died, the Buddhist priests made this golden saffron color the official color of their robes.

Saffron is one of the most expensive spices in the world, but you could always grow your own. Growing saffron is quite easy and will add color and beauty to your fall garden. Even when the flowers fade, the attractive, grass-like foliage will continue to grow. Plant this perennial bulb in the summer in full sun in well-drained soil in a sheltered spot. Space bulbs about a foot apart. The blooms will open in the sun and close during a rainy day and at night. Saffron is not native in the United States.

Information for this article taken from: www.usnews.com*; www.bioweb.uwlax.edu;* www.finediningloversm.com*;* www.funflowerfacts.com; *and* The Drunken Botanist *by Amy Stewart.* Picture taken from https://herbologymanchester.wordpress.com**.**



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- Promote conservation of native plants and plant communities through habitat protection and other means.
- Foster public knowledge and appreciation of native plants
- Support natural landscaping
- Raise awareness of the ethical issues regarding native plants
- Encourage surveys and research into native plant species and the publication of findings
- Promote cooperation with other programs and organizations concerned with the conservation of natural resources

On The Fringe

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