



On The Fringe

Journal of the Native Plant Society of Northeastern Ohio

Program Schedule – Winter 2019

Sunday, January 29, 2:00 - 3:00 pm – The Island of Rhodes – The West Woods Nature Center - Geauga County. Take a virtual trip with Tom Sampliner, photographer and past president of the Native Plant Society of Northeastern Ohio, to the Greek Isle of Rhodes, located 70 miles from Turkey in the Mediterranean. Famous for its beach playgrounds and ancient Crusades ruins, it is a hotbed for Mediterranean flora, especially orchids, along with migratory birds, interesting insects, and other wildlife. 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.

Sunday, February 3, 2:00 - 3:00 pm – Looking Forward to Spring – Geauga West Library. Long time photographer Jack Selby spent many hours in the field with Jim Bissell photographing the interesting and diverse flora of northeastern Ohio. Join us as we share spring wildflower folklore using Jack's slides, which were recently donated to the Native Plant Society. **No registration** required.

Friday, March 29 – Ohio Botanical Symposium – Villa Milano Banquet and Conference Center, 1630 Schrock Road, Columbus, Ohio, 43229. The Native Plant Society of Northeastern Ohio will be a sponsor of the Ohio Botanical Symposium, which brings botanists, naturalists, and other nature enthusiasts together to network, provide professional enrichment, and view posters and displays on Ohio's native flora, natural areas, and rare plants. **Registration information available in the future.**



2019 Membership Renewal

You will receive your renewal form before the end of the year. If you wish a printed copy of the OTF journal mailed to you, simply check the box to receive the printed journal and add \$10 to your total.

Please also consider contributing to our endowment fund. This is the source of our Annual Grant, which supports projects that promote the use of native plants. These projects also educate the public and they bring more awareness of the benefits of native plants to our ecosystem.

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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.

The Native Plant Society of Northeastern Ohio Awards: Tom Yates The Gentian Award for 2018

Tom worked at the Holden Arboretum for forty years, from 1970 to 2019, eventually becoming superintendent of Lantern Court. While at the Arboretum, Tom was also involved in educational programming, leading tours of the natural areas. In his first few years, he added nearly 20 beds to the gardens, including the Primrose Valley, his favorite. His coworkers agree that to a very large extent, the uniqueness of the grounds of Lantern Court reflects the interests and commitments of one man: Tom Yates. As a consultant from Holden, he played an instrumental role in designing the Penitentiary Glen Nature Center butterfly gardens. Today he continues to volunteer at Lantern Court in addition to the butterfly garden at Penitentiary Glen. His knowledge and skills are immense, and he continues to teach those around him.

Tom has been involved with the Native Plant Society from its early years, attending the organizational meeting in 1981, as well as writing one of the first newsletter articles. We are indebted to Tom for the years he has given to the Society and the native plants of Ohio.

Thanks Tom!

The plaque has a picture of a Fringed Gentian and says:

Gentian Award

For Dedication to the Native Plants of Ohio

Tom Yates

2018

This tribute was given by Judy Barnhart, president of the Society, and is a composite of material from Judy, Caitlin Ambrose (Interpretive Manager of the Lake Metro Parks), Amy Gaeletz, and the Holden Arboretum. Thanks to them all.

2018 Recipients of the Native Plant Society of the Northeastern Ohio's Annual Grant

We had seven applications for our 2018 Grants, and all had interesting and compelling projects. It was difficult to choose only two. We have encouraged those who were not selected this year to resubmit their projects for consideration next year. Our two 2018 grants go to the following organizations:

Tinkers Creek Watershed Partners will purchase native plants and trees for a Rain Garden project on a property that will be used as their new office. The office will feature multiple interpretive factors to use for community outreach and engagement. The Rain Garden project will be highlighted in educational workshops and act as an example for residents. The project's progress will be tracked on public media and featured at events in the future.

The Nature Center at Shaker Lakes is restoring woodland habitat around their new outdoor amphitheater. The area will be used as a demonstration garden as well as a bird and wildlife habitat. Plants will be labeled so that visitors can use this garden as an example of plants to use in their yards. It will also be used as a bird observation area where volunteers can do annual bird counts. The grant will go toward native plants, labels and site preparation.

The Native Plant Society is proud to have supported so many excellent projects over the years. We encourage all who would like to enable us to support more projects in the future to give specifically to our Endowment fund, which supports our grants.

We thank all the applicants for their work.

Our Generous Donors

Listed below are the names of those who have made donations to the Society for 2018

Trillium

Barber, John
Cicarella, Ann
Goletz, Amy
Goodwin, Hal & Cyndy
Loria, Jean
Oberdick, William & Barbara
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Hanratty, Kathryn
Frank, Suzanne
Best, Dan

Donations

Kurapka, Duane & Jeanne
Godale, Margaret
Lutz, Ben
Fishburn, Tom
Starbuck, Mary
Flaws, Ed & Jan
Fletcher, Charles
Germaniuk, Genevieve
Limpach, Craig

**Walking Fern, *Asplenium rhizophyllum*,
*Camptosorus rhizophyllus***

By Nelson Maher



Picture taken from www.studyblue.com.

On a warm sunny day at the end of winter it's not hard to think about walking fern, *Asplenium rhizophyllum*. I know that under a great depth of snow all those walking ferns that I saw last year are in excellent shape, deep green and leathery. This species is just one of the 15 evergreen ferns that I look forward to seeing each spring as I take my first walk on the Bruce Peninsula without skis or snowshoes.

Searching for ferns is a ritual of spring for many people along the Niagara Escarpment in Grey

County. The limestone rock—more specifically dolostone, which is the harder top crust of the escarpment with its higher magnesium content—is the preferred habitat of many ferns. Centuries ago, large blocks fell away from the escarpment into the shade of the talus slope. A heavy layer of moss formed on their surface creating the ideal habitat for walking ferns. Sometimes you will find the dolostone rocks quite a distance from the escarpment, pushed there by glaciation. The bigger the rock in a wooded ravine, the better the

chance of finding walking ferns growing on its shady side.

Fanciful nature lovers might imagine the walking fern will follow them out of the woods, but the plant actually gets its name from its unusual reproductive strategy. The walking fern produces offspring when the slender tips of its fronds touch the plush moss and send out new roots. As many new plants grow, this creates a mat with overlapping fronds arching into the moss, covering the top (and often spreading down the sides) of limestone rocks. Although many

artists envision walking ferns as growing by themselves on rocks, I have never found this to be true.

Few people have seen this fern that is unique among the ferns of eastern North America. The frond is simple-cut, 10-30 centimeters (four-12 inches) long. It is cordate (heart-shaped) or auriculate (with ear-like lobes) at the base prolonged into a slender apex with a bud at the tip, most often producing a new plant in a blanket of moss. The veins are areolate (netted or chained like a fish-net). Sori or spores are elongated along the veins and appear scattered on the underside of the frond. The six to seven fronds grow from a small, erect, unbranched rhizome with dark brown scales. The stalk is reddish-brown at the base shading to green near the blade. Fertile fronds are somewhat larger than sterile ones.

Asplenium rhizophyllum is the symbol of the Bruce Trail, the Niagara Escarpment hiking trail that extends from the Niagara River to Tobermory. This lovely fern follows the escarpment in leaps and jumps, then seems to peter out north of Lion's Head Promontory only to reappear on Manitoulin Island at a few stations on the dolomite rocks.

Once a member of the genus *Camptosorus*, the walking fern was moved to the *Asplenium* genus due to the frequency of hybridization between it and other *Aspleniums* such as ebony spleenwort, *A. platyneuron*, maiden-hair spleenwort, *A. trichomanes*, hart's tongue fern, *A. scolopendrium*, and others which inhabit the same ecosystem.

Many of the limestone rocks that are home to the walking fern harbour other fern species. The fragile fern, *Cystopteris fragilis*, is the earliest to put out new growth (and the first to die back in September), quite often on the same rock where a multitude of bulblet ferns, *Cystopteris bulbifera*, may appear a week later. The common polypody or rock cap fern, *Polypodium virginianum*, can form a dense mass on top of a boulder, easily able to endure the dry exposed conditions. If the rock is large enough it will have the marginal shield fern, *Dryopteris marginalis*, a large fern that is plentiful from one end of the Niagara Escarpment to the other.

Hunting out the dolomite rocks where I have found the walking

ferns in the past is like visiting old friends. To find the plants in good shape and spreading further across the rock is cause for great elation. But sometimes I am sad to find a rock stripped by an ignorant person who does not understand that these ferns cannot be removed like an orange peel and put back on another limestone rock in their garden and expected to grow. A walking fern may have taken up to five centuries to adapt to that particular rock. Its roots extend into all the little pockets in the rock, modifying the soil beneath the moss. No other fern creates a symbiotic relationship like this.

I have been trying to grow walking ferns from spores, with little or no success until this last year. I now have about three dozen sprouts under 10 centimetres (four inches) in height. It should take two years from starting the spores to planting outside. I will surgically cut them into the moss on a 10-ton dolomite rock with plenty of shade from maple trees. About one-fifth of the rock is buried in the ground to hold moisture in the years to come. I will be ecstatic if I have a 50% success rate in three or four years.



Picture taken from www.uswildflowers.com.

Nelson Maher is a hobby naturalist and lifelong fern lover. For information on other ferns or instructions for growing ferns from spores consult *A Guide to the Ferns of Grey and Bruce Counties, Ontario* published by the Owen Sound Field Naturalists, Box 401, Owen Sound, ON N4K SP7.

Reprinted from *The Blazing Star*, the Newsletter of the North American Native Plant Society, Spring 2004, Vol 5, No 2.

Snow Trillium, *Trillium nivale*

By Stephen Johnson and Mary Stark

Midwestern native plant aficionados are particularly lucky to have one of the earliest flowering wildflowers in their midst, opening its flowers “when March is scarcely here.” The snow trillium, *Trillium nivale*, also known as dwarf white trillium, is diminutive compared to other members of the genus. For such a small plant, it has relatively large flowers that even shade the leaves. Plants of some populations may possess far more flamboyant flowers, appearing as miniature doppelgangers of the better-known white trillium, *T. grandiflorum*.

Snow trillium occurs in broad but scattered population clusters referred to as disjunct populations, occurring primarily in a broad arc from mid-Iowa south through Illinois and Indiana. Some sporadic colonies occur as far away as eastern South Dakota and eastern Pennsylvania. A single colony overlooks the Potomac River in western Virginia. *Trillium nivale* ranges north to southern Minnesota and Michigan but is undocumented in Canada. Throughout its range it occurs infrequently. In Pennsylvania, it is a state threatened species; in Minnesota, it is a species of special concern. In Michigan, it was once considered extinct but relocated by Fred Case in 1982 and now given threatened status.



Picture taken from www.thekentuckynatureblog.blogspot.com

The late Frederick W. Case, Jr., the most notable authority on the genus *Trillium*, said the species occupies raw base rich upland soil or even limestone gravel, where it is intolerant of competing ground vegetation and even leaf mold covering it. The plant also grows on lime-rich bluffs along river flood plains. Other botanists have found populations in more typical forest settings such as beneath eastern hemlock, *Tsuga canadensis*. We located a population of 25 to 30 individuals in an oak-hickory forest in a county park in southeast Iowa, south of the range indicated by Case. Perhaps this represents another disjunct population. We saw a few young plants in this colony, indicating that the population is at least growing, albeit rather slowly. Unlike the conditions indicated by Case, these plants emerge from a variably dense cover of leaf mold. In some parts of its range, snow trillium may begin flowering in mid to late February and continue throughout March. In Iowa we have not found it in flower before late March. As such an early flowering plant, it likely misses the pollinators, and so it comes as little surprise that *T. nivale* is self-compatible. Some researchers report that it is visited by honeybees, but we have not witnessed this. We have occasionally seen the flowers visited by small flies but more commonly by meligethine sap beetles. Though the beetles are visibly dusted with pollen, other researchers have found that these beetles rarely travel from one flower to another; hence they are more likely pollen predators than pollinators.

The flowers can last for nearly two weeks. Once pollination is successful, the fruits recurve and disappear beneath the leaves. By mid-June, as fruits

mature and dehisce to release seed, the above-ground growth rapidly dies back. By late June, a botanist would find no evidence that the plants were there.

Fred Case noted that snow trillium may freeze solid over a period of below freezing nights but continue to flower and set fruit showing no appreciable damage. Skunk cabbage, *Symplocarpus foetidus*, emerges almost as early in the season, but this happens due to a sugar reserve burned to generate heat

that melts snow around the plant and enables such early anthesis (the period during which a flower is fully open and functional). Snow trillium has no such capacity, although botanist F. M. Andrews in 1921 suggested the trillium did somehow cause snow to melt. He claimed to have seen hollow domes over individual plants where snow had melted when he excavated the plants to inspect them.

Within its wide range of distribution, plants and flowers of snow trillium may vary a great deal. Fred Case came to this conclusion after growing in his garden what he referred to as the Indiana form and a form from Michigan. He found the Indiana form was more vigorous and set seed better than the Michigan form. He noted that the Indiana form produced many seedlings and expanded in his garden while the Michigan form produced few viable seeds and quickly disappeared. It is the Indiana form which most closely resembles its larger relative, *Trillium grandiflorum*.

Of spring, Emily Dickinson said, "A light exists in Spring/ Not present on the Year/ At any other period." While Dickinson was speaking of the light, we feel the sentiment applies equally to this charming harbinger of spring.



Picture taken from www.perennialco.com

Stephen Johnson and Mary Stark became enthralled by the genus *Trillium* after seeing a roadside hill covered with flowering white trillium near Spooner, Wisconsin.

Reprinted from *The Blazing Star*, a Publication of the North American Native Plant Society, Winter 2015, Vol 16, No 1.

The Silence of the Bugs

By Curt Stager



Fifty-six years after Rachel Carson's "Silent Spring" warned of bird die-offs from pesticides, a new biocrisis may be emerging. A study published last fall documented a 76 percent decline in the total seasonal biomass of flying insects netted at 63 locations in Germany over the last three decades. Losses in midsummer, when these insects are most numerous, exceeded 80 percent.

This alarming discovery, made by mostly amateur naturalists who make up the volunteer-run Entomological Society Krefeld, raised an obvious question: Was this happening elsewhere? Unfortunately, that question is hard to answer because of another problem: a global decline of field naturalists who study these phenomena.

Most scientists today live in cities and have little direct experience with wild plants and animals, and most

biology textbooks now focus more on molecules, cells and internal anatomy than on the diversity and habits of species. It has even become fashionable among some educators to belittle the teaching of natural history and scientific facts that can be "regurgitated" on tests in favor of theoretical concepts.

That attitude may work for armchair physics or mathematics, but it isn't enough for understanding complex organisms and ecosystems in the real world. Computer models and equations are of little use without details from the field to test them against.

Are we in the midst of a global insect Armageddon that most of us have failed to notice? Here's another data point: A decades-long decline in plant-pollinating hawk moths has been reported in the Northeast, but its causes and consequences are

uncertain because we know so little about the ecology of these insects. In days past, compiling such information would have made a respectable life's work for a Linnaeus, Humboldt or Darwin. Now such creatures are often ignored because studying them seems unlikely to generate publications, headlines or grants that provide academics with tenure and prestige.

This leaves us with little more than anecdotal evidence to work with. A recent story in *The Telegraph* noted that automobile windscreens in Britain are no longer heavily caked with splattered insects. It reminded me of the tiny wings, legs and antennas that used to smear the front of my car after midsummer drives during the 1970s. Nowadays, a drive through northern New York, where I live, yields barely a blemish. Is it because cars are more streamlined? Not likely. Last July, I examined

parked vehicles in Saranac Lake and found little or no bug debris, even on license plates or the blunt fronts of vans.

What's behind the decline? Probably not climate change, according to the researchers in the German study who also monitored local weather during the survey. What about collisions with vehicles? Despite my experience and the dashboard observations in Britain, one study published in 2015 estimated that hundreds of billions of insects are being killed in North America by cars and trucks every year. The study's authors called for additional research to determine whether what they found is "contributing to the substantial declines of pollinating insects occurring on a global scale, thus putting the ecological functioning of natural areas and agricultural productivity in jeopardy."

Cars were probably not the culprit in the German study, though, because it focused on nature reserves where road carnage is minimal. For some experts, the process of elimination leaves pesticides among the likely suspects.

Why care about this new silence of the bugs? An across-the-board decline in flying insects, if true, means that an entire sector of the animal kingdom is in trouble, representing an immense diversity of life-forms, from butterflies and beetles to hoverflies and damselflies. The eminent biologist Edward O. Wilson, who has spent much of his life studying ants, has warned: "If all mankind were to disappear, the world would regenerate back to the rich state of equilibrium that existed ten thousand years ago. If insects were to

vanish, the environment would collapse into chaos."

So there it is. Could it be that whatever might be causing these insect deaths could be a threat to us too?

The widely reported decline of honeybees in the United States pales in comparison with the drop-off of bugs in Germany, if not in scale, then in the loss of biodiversity. Insects represent the vast majority of all animal species. Because they are pollinators and a vital part of the food chain, their absence would strike deep at the roots of life on earth.

I'm a lake scientist, and my colleagues and I have been struggling to explain our own mystery: a restructuring of plankton communities in lakes worldwide in recent decades, which we've documented by examining sediment cores extracted from lake bottoms. This could signal problems for water quality, fisheries or other aspects of lake ecology. Had we not taken the core samples, the geographic scale of this change might remain undetected, because funding and rigorous field monitoring of plankton composition in lakes has often been lacking.

Some experts have attributed the plankton shift to climate change, others to nitrogen pollution from agricultural runoff, but we need more long-term field studies to confirm the cause and anticipate its effects. The German insect data suggests another possibility. Could agricultural chemicals be poisoning aquatic organisms, including plankton and insects that begin their lives as aquatic larvae? We simply don't know.

In Britain, the news report about car-insect collisions was based on a study that relied on data from

volunteers who monitored gridlike "splat-o-meters" on their license plates. We need more of this sort of scientist-directed crowdsourcing. Citizen scientists and a few field-research-oriented college communities like my own at Paul Smith's College in the Adirondacks of New York are turning their yards, gardens, lakes and forests into long-term monitoring stations. Online clearinghouses like iNaturalist, Budburst and the North American Breeding Bird Survey compile and archive field data for others to use and show that many species are changing their ranges and migration habits in response to climate change.

In the United States, research scientists associated with a network of more than two dozen long-term ecological monitoring centers have also been conducting more detailed field research for several decades. But these efforts are still not enough to keep track of a rapidly changing world. We need new crops of professionals trained in field biology and ecology to focus on important but less charismatic or commercially valued creatures than songbirds and honeybees.

In 1996, an editorial in *Conservation Biology* warned that "naturalists are dying off," and asked: "Will the next generation of conservation biologists be nothing but a bunch of computer nerds with no firsthand knowledge of natural history?"

Two decades later, we are beginning to realize how lucky we are that dedicated expert and amateur naturalists remain to observe and record the distinctive flash of a firefly or the soft clatter of dragonfly wings. But we need more of them, and soon.

Curt Stager is a professor of natural sciences at Paul Smith's College and the author, most recently, of *Still Waters: The Secret World of Lakes*.

Reprinted from <https://www.nytimes.com>, May 26, 2018

Folklore:**Jack-in-the-pulpit, a Resourceful Species****By Guy Denny**

Few spring wildflowers have greater name recognition than Jack-in-the-pulpit. Actually, we have two species of Jack-in-the-pulpit occurring in Ohio. The more common is *Arisaema triphyllum*, which now also includes what was formally known as *A. atropurpureum*. This species grows in rich, moist woods throughout Ohio. The much rarer Swamp Jack-in-the-pulpit, *A. triphyllum stewardsonii*, is state listed as a potentially threatened species. Green Dragon, *A. dracontium*, is very similar, but it can easily be distinguished from Jack-in-the-pulpit.

The name Jack-in-the-pulpit is derived from its curious flower structure, which is characteristic of the Arum Family, *Araceae*. The tiny inconspicuous flowers are well concealed at the base of a fleshy, club-like spike called a *spadix*. A modified leaf or bract called a *spath* envelopes and folds over the top of the spadix partially concealing it. The chamber formed by the spathe is the “pulpit” while “Jack,” the spadix, is situated inside.

Other familiar Ohio wildflowers in this family include skunk cabbage, arrow arum and wild calla. Dumbcane, caladium, elephant ear and philodendron are common house plants which also belong to the Arum Family.

Jack-in-the-pulpit is a monoecious species, which means that both male (staminate) and female (pistillate) flowers occur separately on the same plant. The staminate flowers are situated just above the pistillate flowers at the base of the spadix.

One of the most interesting features of Jack-in-the-pulpit is that it can change sex and essentially become dioecious (having only one sex present) as either a male or female plant. Researchers have demonstrated that there is a tendency for younger, usually smaller plants, to be mostly or totally male while older, usually larger plants tend to be female.

It takes a great deal of resources for a plant to maximize production of fruit and seeds, significantly less to produce pollen. Consequently, small plants tend to have their resources diverted to the production of male flowers at the expense of female flowers, which although present, fail to develop. Larger, older plants have more resources available for allocation to fruit and seed production, so they can become mostly or totally female. Hence, it is vital for survival of the species that a small Jack-in-the-pulpit eventually transform into a larger “Jill-in-the-pulpit.”

The tiny flowers of this plant, as well as many other members of the family, have neither sepals nor petals. There is no need for showy petals to attract pollinators since pollination of this species is accomplished by small flies. Studies have shown that the spadix heats up through respiratory activity to release foul-smelling compounds called skatoles which attract pollinators. By autumn the fertilized pistillate flowers are replaced by a strikingly beautiful cluster of crimson berries.

Another name for this species is Indian turnip. This comes from the underground bulb-like base of the stem called a *corm*, which resembles a small turnip.

Jack-in-the-pulpit corm was a significant source of food for American Woodland Indians. However, all parts of the plant, especially the corm, contain needle-like crystals of calcium oxalate which when chewed become embedded in the membranes of the mouth and throat and cause a severe burning, almost stinging sensation. Biting into a freshly dug Jack-in-the-pulpit corm is a most unpleasant experience. The Algonquin name for this plant is



E-hawsho-gowhich, which means “bite the mouth.”

The presence of calcium oxalate is characteristic of the Arum Family, which worldwide consists of about 115 genera and 2,000 species, mostly of tropical and sub-tropical distribution. It is therefore fascinating that native peoples around the world have learned that once the oxalates are removed the tuberous rhizomes provide a nutritious starchy food source. Poi, for example, which is an important food of Hawaiian culture, comes from the Taro plant, *Colocasia esculenta*, once its oxalates have been removed by prolonged drying.

The oxalate cannot be removed by boiling. Rather, the corm must either be slowly roasted in hot ashes or sliced and dried in the sun for a few months.

Woodland Indians typically dried and ground the corms into flour.

In addition to being an important food source, Jack-in-the pulpit was also a medicine plant. Some tribes ground the raw corms and mixed the flour into lard to make a salve for treating ringworm and snakebite. Several tribes also used it for treating sore eyes. Following the native Americans’ “doctrine of signatures” where “like cures like,” the Pawnee Indians applied the dried powdered corms on the forehead and temple to treat headaches. The thought being, things which caused pain should also be able to alleviate pain. The fresh, partially dried corms were also used in early folk medicine for the treatment of asthma, whooping cough and rheumatism. Jack-in-the-pulpit corm was listed in the *U.S. Pharmacopeia* from 1820 to 1893.

Now that you know more about it, watch for the fascinating Jack-in-the pulpit on your next visit to the woods.



The bulb-like base of the stem is called a corm.
Picture taken from www.synodresourcecenter.org.

Guy L. Denny – 6021 Mt. Gilead Rd., Fredericktown, OH 43019

Picture, previous page, taken from www.brianmaurer.wordpress.com. The staminate flowers are situated just above the pistillate flowers at the base of the plant.

Morgan Swamp

By Bob Downing

One of the wettest attractions in Ashtabula County is little-known Morgan Swamp, with elevated hummocks and boggy lowlands

The 1,400-acre tract is one of the largest privately protected forested wetlands in Ohio. It is also one of the largest undeveloped interior wetlands in Ohio.

It is significant for its size, its rare plants and its proximity to the Grand River. It is known for its swamp forests with yellow birches and Eastern hemlocks, a rare Midwest ecosystem.

Morgan Swamp is owned and managed by the Nature Conservancy, the national land conservation group. It invested heavily since 1985 to purchase the wetlands. It has added and extended trails.

The preserve offers a rich diversity of plants and animals including black bears, bobcats, river otters and the Eastern massasauga rattlesnake. The snake, rarely seen, is 2 to 3 feet long. It is thick with a gray-colored body.

The preserve features plants and animals more typically found farther north, in Canada. Most are at the southern edge of their ranges in North America.

The preserve, part of what is called the Grand River Lowlands, features 115 species of birds, 24 species of fish, 28 species of reptiles and amphibians and 24 species of mammals. It is home to 60 rare plant species.



The snowshoe hare was reintroduced by the Ohio Department of Natural Resources in 2005. That effort is not doing well.

The preserve was opened to the public in 2006. Today there are now 2.75 miles of trails at Morgan Swamp and at the nearby Grand River Conservation Campus that houses the Nature Conservancy operations in northern Ohio.

Morgan Swamp features a 1.25-mile trail. The first quarter mile of that trail goes from the parking lot off Footville-Richmond Road (state Route 166) west of Rock Creek to a wooden deck.

It then becomes a more primitive trail that drops by the edge of a beaver pond and climbs a short hill before cutting across a wooded plateau. It abruptly ends at a wetland called Long Pond with another observation deck. Then you must backtrack. It is mostly flat and is marked by red blazes painted on trees.

The Nature Conservancy obtained the 58-acre campus with two dozen buildings including two gymnasiums in 2011 from the Cleveland-based City Mission. The facility, a onetime farm and later a hunting camp and lodge, includes a half-mile of frontage on the Grand River. The City Mission had operated a Christian camp there starting in 1965. Prior to that, a Cleveland-based Jewish group also operated a camp on the site off Callender Road. In 2009, the Nature Conservancy purchased 206 acres from the City Mission to add to Morgan Swamp.

On the conservation campus, there are three trails: the 0.2-mile Bliss Pond Trail with overlooks on the Grand River and an accessible fishing pier; the easy 0.3-mile Grand River Trail that connects the two other trails and runs along the river; and the moderate 1-mile Hemlock Swamp Trail. It starts near the river and winds through a unique hemlock-yellow birch forest and overlooks a beaver pond. The Hemlock Swamp Trail is the star, and the trail worth hiking to get a glimpse of the interior of Morgan Swamp.

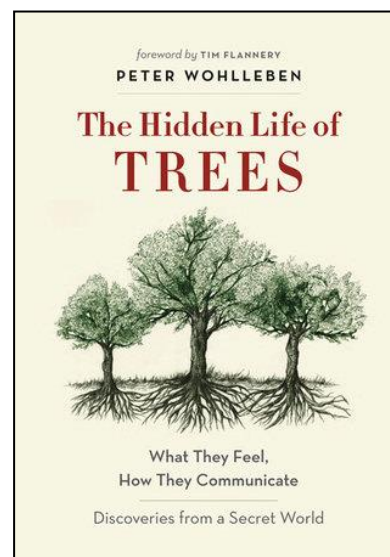
The Nature Conservancy-owned-lands cover 70 percent of the remaining wetlands that once covered five square miles when the first settlers arrived. The Ashtabula County wetlands were logged, drained, farmed and its peat was harvested and burned. But the wetlands have been largely untouched for the last 100 years and have recovered.

The wetlands are critical to the health of the Grand River that flows into Lake Erie. A 56-mile stretch of the Grand River is part of Ohio's wild and scenic river system. It was designated in 1974. It is one of 16 Ohio rivers to be honored.

Today the greatest threats to Morgan Swamp are the destruction of nearby wetlands, logging within the Grand River watershed and invasive species, the Nature Conservancy says. The conservancy has been working to fight those threats through wetland restoration, land acquisition and education.

Morgan Swamp and the conservation campus are open from dawn to dusk daily.

Reprinted from *The Blade: Toledo Ohio*, Sunday June 21, 2015, Ashtabula County's outdoor attractions.

Book Review:**The Hidden Life of Trees****By Peter Wohlleben****Publisher:** Greystone Books (2016)**Pages:** 288 pages**ISBN-10:** 1771642483**ISBN-13:** 9781771642484**Hardback****Price:** \$16.96**Review By Catherine Hollis**

Already a runaway bestseller in the author's native Germany, *The Hidden Life of Trees* now offers English-language readers a compelling look at the "secret world" of the forest. Peter Wohlleben, a forester, documents his conversion from lumber producer to tree whisperer, and in the process, he reveals the highly communicative social networks of trees.

Wohlleben notes that as humans, we have been more inclined to identify with animals than plants: We recognize a kinship across species when we notice that monkeys indulge in social grooming rituals, or that elephants mourn their dead. Using the language of anthropomorphism, Wohlleben seeks to persuade us that trees too are social beings, in constant communication with one another, caring for their sick and nursing their young. He wants us to recognize our kinship with trees, so we'll be encouraged to preserve their ecosystems more readily.

Trees "speak" to one another through scent, as African acacia trees do when giraffes begin feeding off of them. The acacias being eaten send out a warning scent, which alerts other nearby acacias to produce the bitter toxin that will dissuade the giraffes from eating their leaves. Trees also communicate through a vast fungal network twined around their roots, which transmit electrical signals and chemical compounds. Through this "Wood Wide Web," forests are truly an interconnected ecosystem—as Wohlleben demonstrates, trees in a community will send healing sugars to the roots of weak or ill trees, and some forests will keep the stumps of their elders alive long after their trunks and branches have disintegrated.

In part, Wohlleben wants to demonstrate how centuries of forestry have harmed trees, especially the practice of thinning out trees, which keeps them from establishing healthy underground communication lines. But even more, he wants to enchant readers into taking a walk in the woods and listening to the trees themselves.

BookPage's Top Pick in Nonfiction, September 2016

Review taken from <https://bookpage.com/reviews>.

Plants Are Cool Too! **Rappelling Scientists Find Rare Species Hiding for 100+ Years**

Do you know of botanist Chris Martine? He holds the David Burpee Chair in Plant Genetics and Research at Bucknell University, and he makes fun, instructive botany videos. His series, called *Plants Are Cool Too!* includes "Rappelling Scientists Find Rare Species Hiding for 100+ Years!" The video is about the field survey, led by Botanist Scott Schuette of the Pennsylvania Natural Heritage Program, to locate one rare plant, resulting in finding another! See this story unfold at Shikellamy Cliffs along the West Branch of the Susquehanna River at <https://www.youtube.com/watch?v=SFAPGT8cHcE>.

Through Woods I Went

By Johann Wolfgang von Goethe

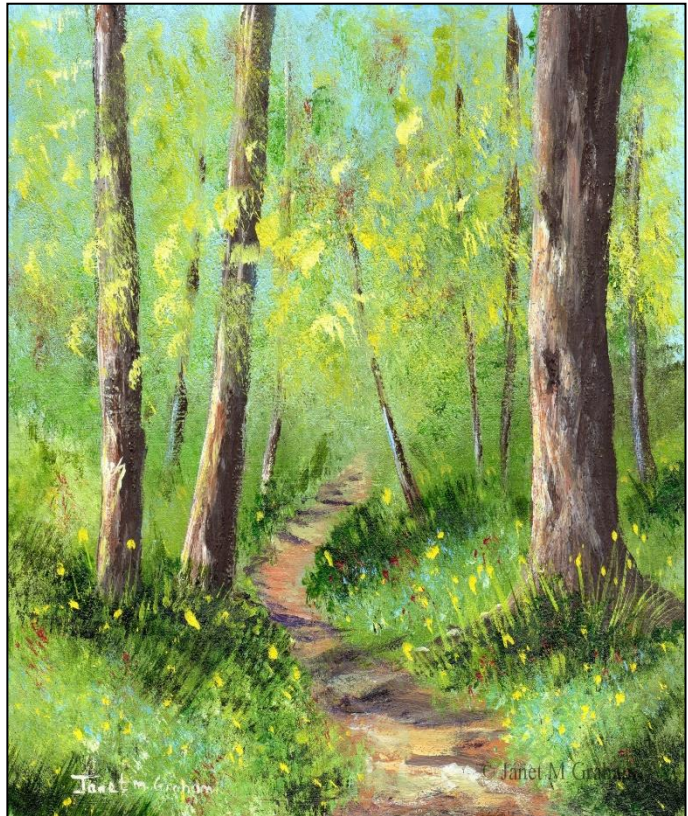
Through woods I went
Without a thought;
On nothing bent
I nothing sought.

In shade I spied
A little flower;
As star bright-eyed,
Fresh as a shower.

To pluck it I stooped;
A soft voice said,
While the flower drooped
“When plucked I’m dead.”

I dug it then,
And took it straight
To leafy glen
Close to my gate.

Now planted there
In quiet nook,
It thrills the air
With its sweet look.



From “Songs; Chiefly from the German” by J.L. Spalding, Bishop of Peoria.
Published in Chicago, 1896 by A.C. McClurg and Company, Copyright 1895.
Picture taken from www.etsy.com.

Marge Godale, a member of the NPSNEO, suggested that we print this poem that she recently came across and that she particularly liked. We appreciated her suggestion and liked the poem. We hope our other readers do as well.

~ The Editors

Invasive Plant:

Canada Thistle, *Cirsium arvense* (L.) Scopoli

By Allison Cusick

This foreigner—the vilest pest that ever invaded the farms of our country, in the form of a weed—was first observed in the Great Valley, near the Warren Tavern in 1828...and has been found, since, at Kimberton, and in one or two other localities. It appears to have been introduced among Timothy seed. The utmost vigilance will be required, to prevent it from spreading.

~Darlington, 1837

So observed William Darlington (1762-1863) of West Chester Pennsylvania in his *Flora Cestricea* (Flora of Chester). The Warren Tavern, built in 1745, still stands at the north edge of the borough of Malvern, about 25 miles west of Philadelphia. The community of Kimberton is a short distance further north on the west side of Phoenixville. It's wonderful that, thanks to Darlington, we today can pinpoint these places in Chester County as the earliest reports of Canada thistle in Pennsylvania.

Even botanists can get overly emotional when non-native species are concerned.

Darlington was not alone in his disdain for *Cirsium arvense*. Other early writers used the adjectives “pernicious” and “evil” when describing this addition to the North American flora. No one was calm or objective. Canada thistle was the 19th century equivalent of kudzu, multiflora rose, Asian bittersweet or mile-a-minute-vine. But unlike those species, which mostly impact natural habitats, Canada thistle invaded wheat and grain fields. It was a severe threat to state and national agricultural economies.

The threat of Canada thistle prompted legislatures to enact weed laws requiring landowners to destroy the species on their property. Vermont was the first state to do so in 1795, followed by New York in 1821. Pennsylvania outlawed Canada thistle in 1862; the species still retains this status in the commonwealth. It's easier to legislate than to control a living organism, though. Multiple laws failed to slow the spread of *Cirsium arvense*. The species reached Pittsburgh less than 50 years after its initial discovery in Chester County. Canada thistle soon became common throughout Pennsylvania, as it still is today.

Canada thistle is a perennial with deep-seated, creeping roots which produce both vertical and horizontal offshoots. The plants quickly form a dense mass of earth and roots. It becomes nearly impossible to dislodge Canada thistle from the soil trapped in this entangled network. Pulling and digging are futile. Any broken-off root fragment, no matter how small, regrows into another infestation. Even more discouraging, the seeds of Canada thistle remain viable in the soil for up to 20 years.

Weed control in early America largely relied on spading, hoeing and the liberal application of salt and vinegar. Such methods were ineffectual against this pest. The species is difficult to eradicate even in the 21st century with modern herbicides. Canada thistle truly is a farmer's nightmare.

Cirsium arvense is native to a broad region of northern Europe and Eurasia, where it grows in fields and on roadsides. As Darlington suspected, Canada thistle had found its way into North America as a contaminant in grass and cereal seeds. There was not a single source for the species, but a series of multiple introductions over time.

Canada thistles sprang up in freshly-sown agricultural fields throughout New England and the St. Lawrence River Valley as early as the late 17th century. Impurities were common in seeds at that time. Many non-native species in the North American flora originated as the biblical “tares among the wheat.” Modern seed-screening techniques have all but eliminated this problem.

Populations of Canada thistle today are established in cooler or temperate regions throughout the world. The species is intolerant of hot, humid conditions and thus is absent from the Tropics. Canada thistle is a significant invasive pest primarily in North America, Brazil, Australia and New Zealand.

“Canada” thistle is not a native of Canada, of course. The adjective is totally inappropriate. Why is Canada stigmatized for this European import? The answer lies in the human psyche. Human beings for millennia have routinely blamed anything negative or evil—disease, natural disasters, high prices, et cetera—on enemies, immigrants or strangers. This principle of deflection seems deeply embedded in the human brain. New Englanders, some writers suggest, blamed French-Canadians for the introduction of the weed. In New Zealand this pest is called California thistle for its supposed origin! The names creeping thistle or field thistle are used for *Cirsium arvense* in Great Britain and Ireland. The former name is most apt, descriptive of the plant's long, horizontal rootstalk. Other English names include corn thistle, cursed thistle, way thistle, small-flowered thistle and lettuce-from-hell. Creeping thistle, in my opinion, is the best name of all for *Cirsium*



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arvense. Alas, Canada thistle is too strongly entrenched in usage to be overturned. Even most Canadians call it Canada thistle!

But it would be excessively biased to ignore the positive side of *Cirsium arvense*. The flowers are excellent nectar sources for bees and butterflies. And everyone loves the goldfinches, which flock to the plants in mid-summer, gathering thistledown for the construction of their nests. The pollinators, of course, also assure ample seed-set for the thistle's continued reproduction of this weed. The thistledown is dispersed far and wide by the winds, and so the successful spread of Canada thistle is assured.

Eight species of the genus *Cirsium* have been documented from Pennsylvania. Five of these are native wildflowers; two are well-established exotics, including Canada thistle; and one is a waif which did not persist in our flora. Only Canada thistle is an invasive species in Pennsylvania. Unfortunately, this single obnoxious pest species has tarred our native thistles with guilt by association. Some people and some municipalities try to eliminate all thistles, assuming all of them are bad actors. Nothing is further from the truth. Humans are great generalizers. We too easily make assumptions on insufficient information.

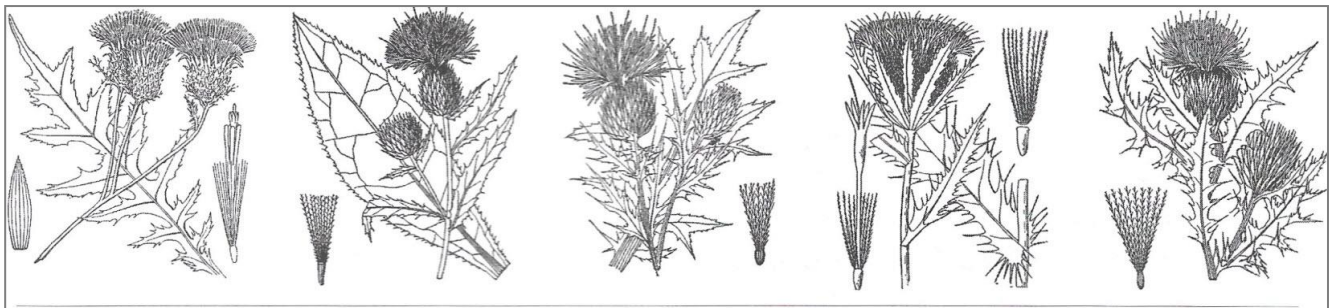
It's important to educate the public. Our beautiful native thistles—also important to insects and birds—should not be eradicated by mistake when waging war on Canada thistle.

Allison Cusick was the Chief Botanist for the Ohio Department of Natural Resources. He holds degrees from Ohio State and Kent State Universities. He is the author or co-author of three books and more than 50 scientific papers on the flora of eastern North America. He is presently a Research Associate of the Carnegie Museum of Natural History.

Reprinted from *Wildflowers* the Bulletin of the Botanical Society of Western Pennsylvania, July-December 2018. Editor's note: Canada thistle, *Cirsium arvense*, is also an invasive species in Ohio.

Picture taken from keyserver.lucidcentral.org.

Below, left to right: These five species of *Cirsium* are native to Pennsylvania: *C. altissimum*, *C. discolor*, *C. horridulum*, *C. muticum*, and *C. pumilum*. Opposite page: *C. arvense* (L.) Scop. All illustrations are courtesy of USDA-NRCS Plants Database.



Eastern Mistletoe

Anonymous

Mistletoes are parasitic shrubs that grow on trees. There are several families of mistletoes; they reach their greatest diversity in the tropics where most have large, showy bird-pollinated flowers. In the Eastern United States we have only two species, with drab minute flowers. Dwarf Mistletoe, *Arceuthobium pusillum*, is northern and occurs on black spruce, *Picea mariana*. Mature plants are only a few mm tall. The other is the very widespread, well-known Eastern Mistletoe, *Phoradendron leucarpum*, a much larger species growing on a wide array of host trees—I have even seen it parasitizing Poison Ivy!

The scientific name of Eastern Mistletoe means “growing on a tree and having white fruits,” an apt description though it has also been known as *Phoradendron serotinum* and *P. flavescens*. This mistletoe is an obligate parasite, most of its own food through photosynthesis, depending on its host for materials carried in the water system.

Unlike any other parasitic plant, mistletoes have a long tradition of use at the winter solstice, a custom Europeans brought with them from northern Europe where the European Mistletoe, *Viscum album*, was venerated by the Druids because it is green and vibrant in the dead of winter at a time its deciduous tree hosts have lost their leaves. The stark branches of the oaks and apples and other hosts look dark and lifeless yet in the upper boughs are the heavenward verdant mistletoes. How this imagery plays into the custom of kissing under the mistletoe is not clear and is not necessary to justify hanging the twigs with their white fruits over doorways.

This species is dioecious, that is, has unisexual plants, so about half of the mistletoes lack fruits. What is not generally known is that the fruiting plants are also in full flower. It takes one year for the fruits to develop. These are above the flowering branch. But you will have to look carefully to see the flowers because they are among the smallest flowers of any of our native plants. They are yellowish-green and only a few mm in size.

Unlike its purported role in bringing humans together, we know very little about what brings mistletoes together. They do not have the structure of wind-pollinated flowers as might be predicted of plants growing in trees. Rather, I think insects play a role in pollination, as there are tiny nectar-like structures in the flowers. And analysis of honey from the American South revealed mistletoe pollen in the honey, indicating bees visit the flowers. Few other nectar sources would be available to bees in the dead of winter.

Like its tropical relatives, Eastern Mistletoe depends on birds for the dispersal of its fruit. This undoubtedly explains why there are often dozens of mistletoe plants in the crown of a tree. Like pollination, we know little about the role of birds in the movement of fruits. Two scenarios have been suggested. The first is that the birds try to eat the fruits but with their abundant glue-like material, appropriately called viscin, fruits stick to the beak of the bird. Frustrated, the bird wipes its beak on a small twig and the fruit sticks, along with its seed. The other theory is that the birds eat the fruits, which then rapidly pass through their system and are deposited on a different branch.

Whatever the details of the intimate life of mistletoes, they are very successful and have become common in urban areas on both native and introduced trees. For example, in the Tidewater Virginia area Silver Maple, *Acer saccharinum*, is commonly planted, and this tree is a favored host. In my observations a mature Silver Maple can be destroyed by mistletoe in about 15 years. Red Maple, *Acer rubrum*, is also heavily infested but in my neighborhood alone oaks, birches, elms, and Black Gum, *Nyssa sylvatica*, are attacked.

Some trees, such as Hackberry, *Celtis* spp., and Black Locust, *Robinia pseudoacacia*, are initially parasitized but the mistletoe dies after a few years. My guess is that Eastern Mistletoe can start on almost any hardwood (I have never seen our species on pines), but the character of the host bark determines the fate of the introduction.

When the fruit is positioned on the tree, the seedling penetrates and links up with the xylem. In this way it can spread systemically through its host. A large parasite load can lead to water stress for the host at times of drought and also provide pathways for the invasion of pathogens. The only control measure is to cut the mistletoe.

The seeds are easy to germinate and make an interesting student project. Just collect the fruits, crush them to remove the seeds. It is impossible to remove all the viscin from the seeds (and from your hands!). Put them on a paper towel moistened with 2% hydrogen peroxide, keep the paper towel moist using only this solution or fungi will rapidly overtake the fruits. Try attaching the germinated seeds to hosts—I have done this with limited success.

If you cut mistletoe for use at Christmas, be certain to keep the plants from children and pets. Eastern Mistletoe has been documented as a poison. This common plant is the only parasite with a traditional role. But we know more about how it affects our biology than we do about it. That's why it deserves more study.

At Old Dominion University we say that our noted basketball players get athletes' foot and the botanists get mistletoe.



Eastern Mistletoe, *Phoradendron leucarpum*
Picture taken from <https://www.flickr.com>

Reprinted from *Chinquapin*, The Newsletter of the Southern Appalachian Botanical Society Vol 19, No 4, 2011.

Interesting Factoid:**You Know What Red Food Dye Is Made Of, Right?**

Red food dye has always given our beloved red velvet cupcakes their rich, festive color. But that aesthetic pleasure comes with a pretty nasty secret.

Much of the red coloring we use in food is actually made of crushed bugs. Yep, creepy, crawly bugs.

Cochineal insects are scale insects that can be found on prickly pear cacti in the North American deserts, where they spend most of their lives sucking away on the plants' sap. They produce a bitter, crimson-colored pigment called carminic acid, which they store in their guts and use to ward off predators.

To make red dye, manufacturers dry the cochineals and grind them into a powder. The powder turns a bright red when mixed with water.

It may sound gross, but humans have been brightening up life with the crushed guts of cochineals for centuries.

The Mixtec Indians of pre-Hispanic Mexico even farmed and domesticated the bugs, using the dye to color their clothing and show off their social status. By the 1900s, Americans began using cochineal dye to color a variety of foods, including sausages, pies, dried shrimp, candy and jams.

Certified colors are synthetically produced and are used widely because they impart an intense, uniform color, are less expensive, and blend more easily to create a variety of hues. There are nine certified color additives approved for use in the United States. Certified food colors generally do not add undesirable flavors to foods.

Colors that are exempt from certification include pigments derived from natural sources such as vegetables, minerals, or animals. Nature derived color additives are typically more expensive than certified colors and may add unintended flavors to foods.

Interesting Factoids:

Examples of exempt colors derived from plants include:

- Elderberry juice, *Sambucus*, provides a light pink, lavender or deep purple shade to food.
- Annatto, is a reddish-orange dye made from the seed of the achiote tree, or lipstick tree, which is native to the tropical region of South America.
- Lycopene is from tomatoes and other red fruits and vegetables such as red carrots, watermelon and papayas, but it is not found in strawberries or cherries.
- Betanin, or Beetroot Red, is a red glycosidic food dye obtained from beets. The color of betanin depends on pH; between four and five it is bright bluish-red, becoming blue-violet as the pH increases. Once the pH reaches alkaline levels, betanin degrades by hydrolysis, resulting in a yellow-brown color.
- Anthocyanins are water-soluble vacuolar pigments that, depending on their pH, may appear red, purple, or blue. Food plants rich in anthocyanins include the blueberry, raspberry, black rice, and black soybean, among many others that are red, blue, purple, or black. Some of the colors of autumn leaves are derived from anthocyanins.



When word got out that the crushed-bug dye was in Starbucks' beloved Strawberries and Creme Frappuccinos in 2012, people started to freak. Starbucks ditched the dye completely, but cochineal dye is still widely used in the food industry—just check the labels on colored Jell-O packages, candies, and yogurts for the words carmine, carminic acid or cochineal extract.

So, while the thought of eating bugs may be a little alarming, take solace in knowing it's the more "natural" option. Unless you're allergic to carminic acid, you're vegan or completely against the consumption of bugs for reasons of humanity, a little insect never hurt anybody.

Information for this article taken from *Huffington Post* (<https://www.huffingtonpost.com>) and Wikipedia (<https://en.wikipedia.org>). Picture taken from <http://www.insectimages.org>.



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On The Fringe

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