



On The Fringe

Journal of the Native Plant Society of Northeastern Ohio

Program Schedule – Spring 2019

Friday, March 29, 2019 – Ohio Botanical Symposium – Villa Milano Banquet and Conference Center.

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. **Address:** 1630 Schrock Road, Columbus, Ohio. **Registration:** register online at <https://www.cmnh.org/ohio-botanical-symposium>.

Spring Weekly Wildflower Walks – Wednesdays at 6:30 pm

No registration is required for these walks. All walks will take place rain or shine.

These easy walks will explore the parade of spring blooming woodland flowers from the first skunk cabbage to the final waterleaf and wild geranium. **Guests are always welcome.**

April 17 – Lakeside EcoEternity Forest, Conneaut. Lakeside EcoEternity Forest is a mature forest that offers a natural, environmentally-friendly alternative to traditional burials. We will explore the natural beauty of the surrounding forest for vernal discoveries. **Location:** 7611 Poore Road, Conneaut 44030, Ashtabula County.

Directions: Take I-90 to the Route 193 exit (Exit 235). Follow Route 193 north to US Route 20 east. Take US Route 20 east to Poore Road. Travel north on Poore Road to the Conrail tracks. Pass the Cleveland Museum of Natural History North Kingsville Sand Barrens property. Lakeside EcoEternity Forest is on the west side of Poore Road just north of the North Kingsville Sand Barrens. There is a sign located at the entrance.

April 24 – Russell Uplands Preserve, Geauga County. See early spring flowers at this Russell Township Park. Past Park trustee Roy Podojil will share history of the park. **Directions:** 15200 Russell Road. Russell Road is approximately 1¼ miles east of the RT 306 & RT 87 intersection. Park ¼ mile down on the right.

May 1 – Audubon Society of Greater Cleveland's Hach Otis Sanctuary and State Nature Preserve, Lake County. Cleveland Audubon member John Lillich leads this trip to see the 81-acre forested tract overlooking the beautiful Chagrin State Scenic River valley. **Directions:** Parking at the end of Skyline drive, first road north of Rt 6 off Chagrin River Road.

May 8 – Hogback Ridge, Lake County. Hogback Ridge Park includes upland hardwood forests, hemlock ridges, and the floodplains of Mill Creek and the Grand River. An abundance of spring wildflowers provides a spectacular show. The trail system includes a 1,300-foot accessible boardwalk, overlook deck, gravel trails, and timber steps that lead down into the floodplain. Joint program with Lake Metroparks. **Address:** 4885 Emerson Rd., Madison, OH 44057.

May 15 – South Chagrin Reservation, Cuyahoga County. Joint program with Cleveland Metroparks naturalist Fred Losi, who leads this hike to see Wild Hyacinth along with other Chagrin River species. **Directions:** Meet at Jackson Rd. field just North of Jackson Road on Chagrin River Road.

May 22 – Swine Creek Reservation, Geauga County. Enjoy the diversity of flowers in this lush beech maple forest. Joint program with Geauga Park District. **Directions:** From downtown Middlefield, take Rt. 87 east 2 ½ miles to Hayes Road. Turn right (south) 1 ½ miles to park entrance on right. Bear right to Woods Edge Parking. 16004 Hayes Rd, Middlefield, 44062.

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On The Fringe

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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.

May 29 – Euclid Creek Reservation, Cuyahoga County. Past board member Brian Gilbert leads this hike along the Woodland Trail. Along the way hear about the new app he has developed for keying out species. **Directions:** meet at Highland Road picnic area. 850 Euclid Creek Parkway, off the Highland Road entrance of Euclid Creek.

Saturday, April 27, 9:00 am - 12:00 pm – Stanton Forest, Ashtabula County. Jim Bissell, Curator of Botany at Cleveland Museum of Natural History, leads this joint trip with NEON to the museum's Stanton Forest, with a 40-acre uncut old growth forest. **Directions:** Exit I-90 at OH Rt. 11 north. Follow Rt. 11 north to Seven Hills Rd. Travel east on Seven Hills Rd. 0.5 mile to State Rd. Turn left at State Rd. and travel 0.5 mile north to Plymouth Ridge Rd. Turn right onto Plymouth Ridge Rd. Follow Plymouth Ridge Rd. and cross the bridge that goes over I-90. You will then make a right on to Benetka Rd. heading south. Park on the right side of Benetka road about 400 feet south of the intersection where there is a small grass pull-off. **Registration required** by emailing Judy at judysbarnhart@gmail.com.

Saturday, May 11, noon - 1:30pm – Pallister State Nature Preserve/James K Bissell Nature Center, Ashtabula County. ODNr staff member Adam Wohlever leads us through this mixed hardwood forest dotted with vernal pools and small buttonbush swamps. Sizeable trees amongst a diversity of wildflowers, including twin-leaf and bloodroot, and home to several plant species associated with northern climates, including goldthread, starflower, and spotted coralroot. Be prepared for possible wet walking. **Directions:** Park along Wilderness Trail, a dead end road south off of Callender Rd, the east boundary of Pallister Preserve. **No Registration required.** For questions contact Chuck at 440-834-8392 or email him at cf6613@att.net. Afterwards relocate to the James K Bissell Nature Center at the Grand River Conservation Campus at Morgan Swamp Preserve at 3973 Callender Road, Rock Creek Ohio, 44084. The center features exhibits depicting the natural history of Morgan Swamp and the Grand River. The nature center is open weekends 1:00-5:00 pm. There are also self-guided trails.

Thursday, June 20, 6:30 - 8:00 pm – Kent State Campus, Geauga County. A Different Look at Invasive Species. Can some woody native species become invasive due to climate change? Kent State professor Dr. David Ward shares his research in both Ohio and Africa. Afterwards, see where some of his students are conducting experiments behind the campus. **Location:** Meet at the Kent State Geauga Campus, 14111 Claridon Troy Rd, Burton, OH 44021. **No Registration required.**

Wild Ones' Philosophy

Wild Types:

Differentiating between Native Plants and Horticultural Specimens

By Maryann Whitman

Bill Schneider of Wildtype: Design, Native Plants and Seeds, Ltd. and a Wild Ones' member in southern Michigan offers this opinion:

The landscaping-with-native-plants-movement really blurs the lines between gardening and restoration, between cultivation and naturalization. We really do not know to what degree it matters, though we have plenty of evidence that we are not nearly as smart as we think we are, which is what compels me to stick with local genotypes.

A question often arises that is phrased something like this: Red and blue lobelias are native to my part of the country. I just saw some white ones at my garden center. Why shouldn't I plant a couple of flats in my wetland? They would add such a spark of color!

The immediate answer is that the hummingbirds and insects that feed on and in turn pollinate red and blue lobelias, do so because they recognize and know what to do with them. They might not recognize the white ones. So while the white ones are "eye candy" to people, they won't do anything for the wetlands ecosystem into which you plan to introduce them, but they will take up space that might have been occupied by an interactive native wild type.

Genetic lineage. At the heart of the differentiation between native wild types and horticultural specimens is their parental or genetic lineage. For a native plants person, "provenance" covers questions of ecoregion and econiche: from which area of which county, in which state (or province), did the plant come; how long has the stand of related plants existed in the area; how did the seed arrive—on the wind, riding the fur of an animal or by human hand; and, who were the likely parents?

Sexual reproduction. This last question would cover the genetic lineage of the plant and whether uncontrolled sexual reproduction was involved. When plants or animals reproduce by sexual reproduction, the parental DNA in the gametes (the sperm and the ova, or egg) is mixed and matched so that each offspring is genetically different from either parent and from the other offspring. A stand of wild blue lobelia, *Lobelia*

siphilitica, for example, is composed of genetically different plants that together represent the local genotype. A white lobelia appearing in a stand of blue ones represents a phenotypic (visible) reflection of the genetic variability of the stand, that is, what the stand is capable of producing in this environment. The stand evolved by interacting with and adapting to its environment. A white lobelia is an accidental product of a wild stand and a genetic rarity, something special to enjoy but then let go of. It either passes on its genes to future generations or not. Wild Ones argues that the natural order of things involves much more than that single plant, rather the



Blue Lobelia, *Lobelia siphilitica* L.
Picture taken by Jane McCullam

whole ecosystem that the plant grows in, including other plants, mammals, birds, bees, microbes and so on. All are interrelated and interdependent.

Maximum predictability in horticulture. While horticulturists are equally interested in the provenance and parental lineage of a specimen, their goals are quite different from those of Wild Ones. Horticultural specimens are reproduced in a controlled manner to ensure maximum predictability in the appearance of the offspring. Indeed, large numbers of horticultural plants are genetic clones, the plants having been reproduced vegetatively: hence our fast-food-chain landscaping across the country. The same plants appear from east to west. The several flats of white lobelia available at a garden center are more than likely vegetatively reproduced.

Genetic diversity in the wild.

The genetic diversity contained in a stand of plants that are wild types allows them to change over time with their environment. Species that lack genetic diversity and the capability to adapt, are moribund. And every individual life form that interacts with or depends on that species is then also likely on the path toward extinction. We need to keep in mind that plants are the bottom of the food chain. They alone are capable of photosynthesis, converting the energy of the sun into a chemical form that feeds all life on this planet.

So there we have it: unrestrained sexual reproduction produces genetic diversity, which permits adaptation over time to changes in the ecosystem. The furnace of evolution is fueled by natural selection and survival through adaptation within naturally occurring systems. We became

members of Wild Ones to promote, protect and try to restore the integrity and biodiversity of the natural ecosystems that surround us.

GENOTYPE: The genetic constitution, latent or expressed, of an organism, as contrasted with the phenotype; the sum total of all the genes present in an individual.

PHENOTYPE: The physical appearance of an organism; the phenotype results from the interaction between the genetic constitution (genotype) of the organism and its environment.

WILD TYPE: In genetics, the phenotype or genotype that is characteristic of the majority of individuals of a species in a natural environment.

From P. Raven's *Biology of Plants*, 6th edition; WH Freeman and Co/Worth publishers, 1999.

Wild Ones is a U.S. not-for-profit educational organization whose mission is to educate its members and the public about the benefits of using native plant species in natural landscaping.

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

The Trout Lily Project

The Trout Lily Project was recently discussed on the *In Defense of Plants* podcast. The podcast is a conversation between Matt Candeias and Dr. Emily Austen, an evolutionary botanist who is doing a post doctorate at the University of Ottawa. She provides an update on the results of the 2016's citizen science report and a call for more citizen scientists to help with the Trout Lily Project. She is trying to determine the significance of the difference in color of the stamens of the Trout Lily.

Trout lily, *Erythronium americanum*, exhibits striking variation in the color of its anthers and pollen grains. Anthers that lack red pigment are pure yellow in color, whereas those that produce red pigment range in color from pale orange to deep brick red. Although this variation is well known, its ecological significance remains virtually unstudied.

The goal of the Trout Lily Project is to document the frequency of the yellow and the red-orange anther morphs across the range of American trout lily, *Erythronium americanum*.

The geographical areas she has no sightings for are Montreal, some of the Maritime Provinces—and Ohio. If you're out admiring the spring ephemerals this year, please take a closer look at the trout lilies, and submit your observations to the website below.

In *Defense of Plants* podcast (103) discussion of the project can be found at www.indefenseofplants.com/podcast/2017/4/9/ep-103-the-trout-lily-project. It is roughly 25 minutes long. The survey can be found at The Trout Lily Project website: <https://troutlilysurvey.wordpress.com>.

Getting to Know the Pussytoes Genus *Antennaria*, Asteraceae

By Arie Tal



Figure 1: A small colony of *Antennaria plantaginifolia* in flower.

Pussytoes, *Antennaria* species, are low-growing, colony-forming, native plants that are among the first wildflowers to bloom in spring, some starting as early as the first or second week of April. There are only four species of *Antennaria* found in New York, yet they are surprisingly difficult to distinguish from each other. They're closely related by ancestry, share many characteristics, and all seem to prefer dry, sandy or rocky, open to wooded habitats, at higher elevations, under thin canopy. Some are commonly found on lawns.

All the species in our region produce a solitary flowering stem from a tuft of basal leaves. The inflorescence, located at the summit of the stem, consists of a tight cluster of small, unisexual flower heads. The flowers are rayless. Stems tend to be thin, densely hairy, and scarcely exceed 10 inches in height.



Figure 2. Inflorescences of *Antennaria plantaginifolia*. pistillate (left), staminate (right).

Antennaria flower heads are unisexual, not just on each stem, but in an entire colony. Populations may contain just male colonies, just female colonies, or both. In many instances, depending on the species, only plants with female (pistillate) heads are present. Check the gender of all of the colonies located in a particular population. Multiple species of *Antennaria* may sometimes be found growing together.

Populations of Plantain-leaved Pussytoes, *Antennaria plantaginifolia*, Figs. 1-4 and Table 1, and Field Pussytoes, *A. neglecta*, Table 1, may often contain colonies of both male (staminate) and female (pistillate) clones. By contrast, Howell's Pussytoes, *A. howellii* Fig. 3 and Table 1, and Parlin's Pussytoes, *A. parlinii*, Fig. 4 and Table 1, typically produce

colonies with only pistillate (female) flower heads, and only rarely produce staminate (male) plants. These two species are capable of setting seed without fertilization from a second plant.



Figure 3: Basal leaves of *Antennaria plantaginifolia* (top row) and *Antennaria howellii* (bottom row)

The four species are also distinguished in part by their basal and stolon leaves. *Antennaria neglecta* and *A. howellii* both have basal leaves with one prominent vein, and sometimes two additional less evident veins. Their basal leaves grow up to 2 cm in width, when fully expanded. By comparison, the basal leaves of *Antennaria plantaginifolia* and *A. parlinii* have from three to five prominent veins, and their basal leaves may grow to as much as 3.5 cm in width, when fully expanded. With respect to the shape of the basal leaves, all our species have leaves that are “spoon shaped”; that is, with an ovate blade that tapers to a wedge-shaped petiole.

It should be noted that basal and stolon leaves may not attain their full size until somewhat later in the season. Thus, it is often helpful to look for basal leaves of the previous season, if still present.

Antennaria species have also been called “Ladies’ Tobacco” by some authors. However, this vernacular name has also been applied to other species, particularly “Sweet Everlasting”, *Pseudognaphalium obtusifolium*. The etymology of this fanciful name is not certain. Perhaps in the distant past, when women were not allowed to smoke tobacco, they turned to smoking dried pussytoes leaves instead. That’s conjectural, and *not* recommended here.

Of the approximately 45 species of *Antennaria*, 34 are found in North America—in temperate and arctic/alpine regions. The remaining species are found in either Mexico, South America, or Eurasia. The majority of North American species are located along the west coast and in the mountain states, and throughout much of Canada up to the Arctic Circle. Six species grow in the states east of the Mississippi River. Of those, four are in the New York/New England region. *Antennaria virginica* and *Antennaria solitaria* are also found elsewhere in the eastern part of the country, south and west of New York.

Within the composite family, Asteraceae, the pussytoes are most closely related to the “everlastings”, *Pseudognaphalium* and *Anaphalis*, and the “cudweeds”, *Gnaphalium*. These species have flower heads with rayless florets, alternate stem leaves, and a covering of more or less dense, matted, and often stranded (cobweb-like) hairs. Because of the dense hairs, stems and leaves of most of these species, they appear variously gray-green or whitish.

Many insect species have been found visiting *Antennaria*, either for nectar or larval food. The butterfly American Painted Lady is most often cited as a visitor to these species.

Table 1

	Staminate (male) flowers present	Staminate (male) flowers absent
Basal leaves up to 2 cm wide	(1) <i>A. neglecta</i>	(2) <i>A. neglecta</i> or <i>A. howellii</i>
Basal leaves up to 3.5 cm wide	(3) <i>A. plantaginifolia</i>	(4) <i>A. plantaginifolia</i> or <i>A. parlinii</i>
Table 1. Summary of outcomes using basal leaf size and sexual distribution. (Assume that only one species is present at the site.)		

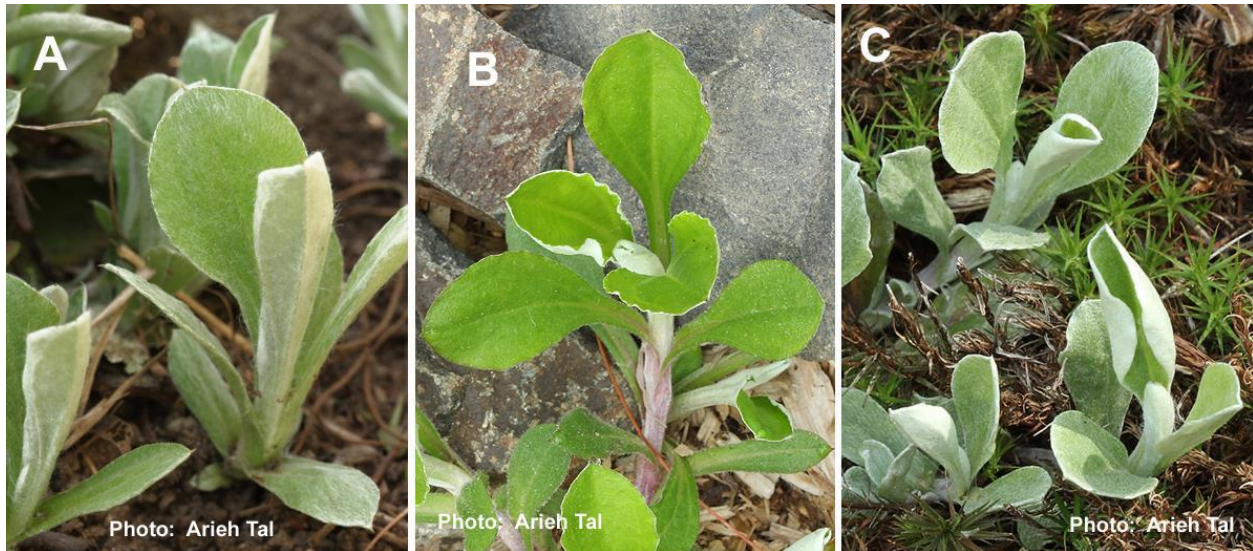


Figure 4: Comparison of basal leaves of (A) *Antennaria plantaginifolia*, (B) *A. parlinii* ssp. *parlinii*, and (C) *A. parlinii* ssp. *fallax*.

Reprinted from *Solidago*, the Newsletter of the Finger Lakes Native Plant Society, March 2016, Vol 17, No 2.

Butterfly, Dogwood Linked in Circle of Life

By W. John Hayden

What would it be like to live on a diet of nothing but flowers? From the perspective of human nutrition, conventional wisdom suggests that it would be difficult to obtain a well-balanced diet from flowers alone. We do, however, have the legend of the lotus-eaters, people encountered by Odysseus and his crew on their epic return journey from Troy. As recounted in the *Odyssey*, lotus-eaters lived life in a perpetual stupor, and the two crew members who sampled lotus flowers immediately lost all interest in returning to their homes in Ithaca. Upon seeing the danger of consuming these flowers—the botanical identity of which is the subject of some debate—Odysseus hastily departed the strange land of lotus-eaters. That story, of course, is legend, and I doubt that there have been any successful human cultures that have subsisted entirely on flowers.

But insects are another story. In particular, many butterflies in the genus *Celastrina*, known as blues or azures, truly do live on a diet of flowers. In many *Celastrina* species, female blues lay their eggs directly on flower buds, the caterpillars consume buds and open flowers, and the short-lived adult butterflies sip nectar from flowers of diverse plants. Further, some of the blues are highly selective in their choice of larval food flowers. As described recently, the Appalachian Azure

specializes in flowers of Common Black Cohosh, *Actaea racemosa*. Similarly, the Spring Sooty Azure, a.k.a. the Dusty Azure, specializes on the flowers of Goat's-beard, *Aruncus dioicus*. And our 2018 Wildflower of the Year, Flowering Dogwood, has its own specialist, the Spring Azure.

Actually, the situation with Spring Azures is somewhat complicated. Lepidopterists recognize two subspecies of Spring Azures. The northern subspecies, *C. ladon* ssp. *Lucia*, occurs from the Canadian subarctic to southern New Jersey and a few high-elevation locations in Virginia and West Virginia; they are specialists on the flowers of the Highbush Blueberry, *Vaccinium corymbosum*. The southern subspecies, *C. ladon* ssp. *ladon*, the Flowering Dogwood specialist, is found from (roughly) mid-Ohio and mid-Pennsylvania south, but is found only somewhat sparsely in the coastal plain of the mid-Atlantic states.

Promoting native plants for the benefit of butterflies has the inevitable downside that caterpillars eat their host plants. You can't really have butterflies without accepting some loss (and sometimes considerable loss) of plant tissue. In the case of Spring Azures and Flowering Dogwoods, however, the downside of this unavoidable trade-off is relatively



Flowering Dogwood, *Cornus florida*
Picture taken from www.keywordhungry.com

minor. The showy parts of Flowering Dogwood in bloom are leaf-like bracts, which are not particularly nutritious. Little damage from caterpillars is found on the bracts. Rather, the caterpillars consume the small yellow flowers that are tightly packed in the spaces within each group of four bracts. Consequently, damage from Spring Azure caterpillar herbivory is not easily noticed without careful, closeup inspection. The advantage for the insect is clear: pollen-containing anthers provide protein; nectar—produced because it entices pollinators—yields carbohydrates; and the succulent cells of floral tissue include at least a modicum of minerals, lipids, and nucleic acids.

In general, floral organs, especially anthers and ovaries, are highly nutritious, providing much more food value than leaves or floral bracts. In this case, appreciative naturalists can have their pretty dogwoods and cute little azure butterflies too.

Evidently, the small yellow dogwood flowers provide an abundance of sugary molecules (carbohydrates). Not only do sugars from dogwood flowers satisfy the caterpillar's metabolic needs, they also enable Spring Azure caterpillars to secrete sugary droplets that are fed upon by ants. In return, the ants protect the caterpillars from potential predators. (The same mutualistic relationship occurs between ants and Appalachian Azure caterpillars feeding on Black Cohosh; ditto for several other species of *Celastrina*.) Of course, active feeding by Spring Azure caterpillars is limited to the relatively brief time that Flowering Dogwoods are in bloom. Nevertheless, in this brief period, the caterpillars manage to accumulate sufficient food to feed the ubiquitous and protective ants, grow to a size appropriate for pupation, and store enough food for the dormant pupa to survive until the following spring when it emerges as an adult Spring Azure butterfly. There really is no other food source; from egg to the emergence of adults, Spring Azures are wholly fueled by Flowering Dogwoods. When you think about it, little Spring Azure butterflies flitting in the springtime sun are, literally, bits of Flowering Dogwood molecules, reconfigured by biochemistry into the body of a butterfly—just another of the many everyday miracles of life on planet Earth that we are privileged to observe and, in this case at least, understand.



Spring Azure
Picture taken from www.wildlife.ohiodnr.gov

Reprinted from *Sempervirens*, The Quarterly of the Virginia Native Plant Society, Summer 2018.

The Great Black Swamp

By Diane Christensen

It is hard to believe that there once lay a swamp in northwest Ohio. It was the Great Black Swamp, an oozing mass of water, mud, snakes, wolves, wildcats, biting flies, and clouds of gnats and mosquitoes. It was nearly big enough to cover the entire state of Connecticut.

The Great Black Swamp is a vast wetland ecosystem directly connected to Lake Erie through the Maumee and Portage river drainage basins. The glacially-derived wetland included marshes, poorly-drained soils, and lush forest cover. It covered nearly 900,000 acres in northwest Ohio, land which today is completely or partially included in 13 counties in Ohio and one county in Indiana. Settlement and development of northwest Ohio was delayed due to the swamp's presence. The historic Great Black Swamp stretched from Sandusky Bay to Toledo and west to Ft. Wayne, Indiana.



The vast swamp was a network of forests, wetlands, and grasslands. In the lowest, flattest areas, prone to permanent inundation, deciduous swamp forests predominated, characterized especially by species of ash, elm, cottonwood and sycamore. In slightly higher areas with some topographic relief and better drainage, beech, maple, basswood, tulip tree and other more mesic species were dominant. On elevated beach ridges and moraines with good to excessive drainage, more xeric species, especially oak and hickory, were dominant. Unlike other swampy areas of the Great Lakes, such as northern Minnesota, there were no conifers. The area contained non-forested wetlands, particularly marsh and wet prairies, with marshes being particularly extensive along the Lake Erie shoreline east of Toledo.

The impassibility of the swamp was an obstacle during the so-called Toledo War (1835–36); unable to traverse the swamp, the Michigan and Ohio militias never came to battle. Settlement of the region was also inhibited by endemic malaria. The disease was a chronic problem for residents of the region until the area was drained and former mosquito-breeding grounds were dried up.

In 1825, the first road through the swamp was completed. The Maumee and Western Reserve Road, as it was called, was a corduroy road (a road made of tree trunks laid across a swamp) that linked Sandusky County's seat, Fremont, then known as lower Sandusky, with Perrysburg in Wood County. The placement of the road caused a damming effect and obstructed the swamp's natural drainage. Increased flooding near the road was widespread. The wooden planks that made up the corridor frequently submerged into the muddy ground. The 31-mile road would sometimes take weeks to travel and was once dubbed the worst road in the country. In 1838, it was paved with gravel. Today, the four lane US Route 20 follows the route of the Maumee and Western Reserve Road.

The Black Swamp was Ohio's last frontier, and in the 1850s, Ohio's General Assembly passed the first of many laws authorizing the drainage of the Great Black Swamp. Consequently, many drainage ditch networks were dug in the watershed including the Jackson Cut Off project in Wood County. It drained 30,000 acres of wetlands in the upper Portage River Watershed and diverted the water nine miles to the Maumee River basin. The exposed land throughout the former Great Black Swamp offered tremendously rich and productive soils which are extensively farmed today. The drainage ditches and subsurface drainage tiles in the former swamp are also maintained to prevent the swamp from returning.

Information for this article taken from www.wikipedia.com; coastalohio.gov; and www.historicperrysburg.org.

The map of The Black Swamp, indicating its extent in the nineteenth century taken from www.wikipedia.com.

Distinguishing Black Cohosh from Look-Alikes

By Karen Johnson Heeter, Laura Price, and Sunshine Brosi

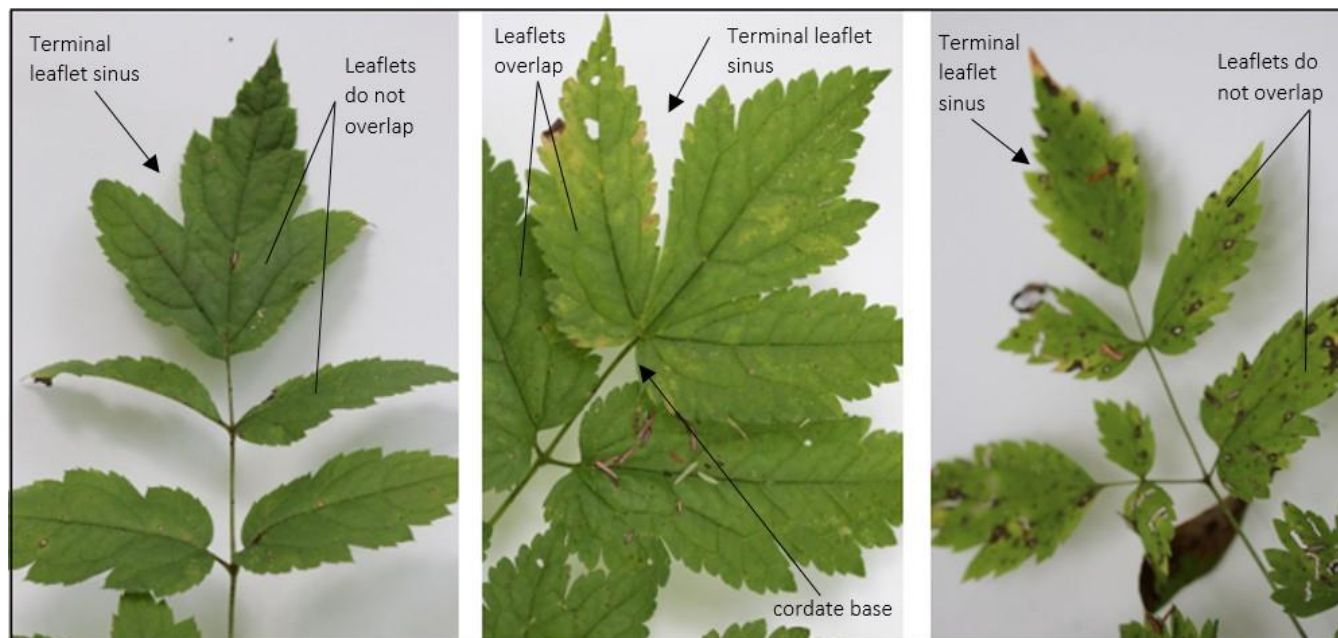


Figure 1. Leaves of black cohosh, *Actaea racemosa*, on the left and two look-alike species, mountain bugbane, *Actaea podocarpa*, (middle) and doll's eye, *Actaea pachypoda*, (right) for comparison. *A. racemosa*: Leaflets do not overlap each other, and terminal leaf sinus is approximately $\frac{1}{2}$ the length of the entire terminal leaflet. *A. podocarpa*: Leaflets, with cordate bases, overlap one another and terminal leaf sinus is greater than $\frac{1}{2}$ the length of the entire terminal leaflet. *A. pachypoda*: Leaflets do not overlap one another and terminal leaf sinus lacking or is less than $\frac{1}{2}$ the length of the entire terminal leaflet.

Black cohosh, *Actaea racemosa* L., *Ranunculaceae*, is an herbaceous, medicinal plant found within the understory of rich, moist woods throughout North America. Its native range runs from Maine to Florida to as far west as Iowa. As an endemic species, it contributes to the richly diverse ethnobotanical history of Appalachia, being used for a broad range of ailments. The Algonquians, Cherokee, and Iroquois used the rhizome for hives, kidney troubles, backaches, constipation, colds, and rheumatism. Today, the rhizomes are primarily harvested for their commercial value as dietary supplements, which are typically used for menopausal complaints, such as hot flashes.

Annual market values establish black cohosh as one of the top ten selling herbal supplements in the U.S., and such high demand raises concerns about the sustainability of massive-scale wild harvesting. Annual harvests of black cohosh can equate to as much as 500,000 pounds in dry weight per year, 97% of which is being sourced from wild habitat. Black cohosh is

critically imperiled in Mississippi, Massachusetts, and Illinois, where it is also state-listed as endangered.

Wild harvesting proposes a particular health threat as supplements may be cross-contaminated with other species. For instance, DNA sequencing used to analyze black cohosh supplements found that three out of seven capsules tested did not contain any black cohosh DNA. One supplement contained a species native to China, while another contained only rice DNA. In addition, several species of North American *Actaea* are easily mistaken for black cohosh. These include mountain bugbane, *Actaea podocarpa* D.C., Appalachian bugbane, *Actaea rubifolia*, doll's eye, *Actaea pachypoda*, and red baneberry, *Actaea rubra*.

Mountain bugbane has a native range that runs from Pennsylvania to Georgia to as far west as Illinois. It is typically found at high elevations on western slopes of the Allegheny Mountains. It is listed as endangered in Illinois, imperiled in Maryland, and vulnerable in Pennsylvania, West Virginia, and Georgia. Mountain bugbane is often found under

eastern hemlock, *Tsuga canadensis* L. Carrière, which is facing declines due to the hemlock woolly adelgid, an invasive insect. This poses an additional threat of overstory habitat loss.

Appalachian bugbane is also typically confined to western slopes. Its native range runs from Illinois to Alabama to as far east as Virginia. This species is imperiled in Illinois, Kentucky, and Virginia and critically imperiled in Indiana. Appalachian bugbane is also experiencing declines throughout its ranges due to habitat fragmentation.

The native range of doll's eye, a look-alike that is toxic, runs from Minnesota to Florida to as far west as Nebraska. It is listed as imperiled in Louisiana and critically imperiled in Delaware, Oklahoma, Kansas, Nebraska, and Florida. The unintentional harvest of doll's eye is concerning because all parts of the plant are toxic when ingested and can cause vomiting, diarrhea, and seizures.

Red baneberry has an expansive range and is found in many of the western lower 48-states. It is listed as vulnerable in Pennsylvania and Illinois and imperiled in Ohio and Indiana. Red baneberry is also toxic, especially for children, and ingestion can lead to severe gastroenteritis or death.

Floras focus on separating these species based on reproductive characteristics, which may not be present on every plant or at the time of harvesting. Vegetative characteristics separating these species can be found on Figure 1 and Table 1. Black cohosh has the distinction of non-overlapping leaflets, unlike mountain bugbane. The terminal leaflet sinus of mountain bugbane is also greater than $\frac{1}{2}$ the length of the terminal leaflet, unlike black cohosh or doll's eye. Black cohosh also has a smooth basal stalk, without the groove found in mountain bugbane. The ability to distinguish these species from leaf characteristics may aid in the conservation of species of concern as well as benefit public health due to reducing contamination.

Table 1. Distinguishing Characteristics of Black Cohosh and its Look-Alikes

	black cohosh	mountain bugbane	Appalachian bugbane	doll's eye	red baneberry
Height with racemes	up to 8 ft.	up to 6.5 ft.	up to 5 ft.	up to 2.5 ft.	up to 3 ft.
Basal Stalk	no groove; slender; terete;	grooved; deep, broad, sometimes darkened along groove	no groove; stout at base, becomes narrower towards the summit	terete; no groove; narrow	no groove; usually branched 2-3
Leaflets	20 or more leaflets; cuneate, rounded, or subcordate base; 3 prominent veins arising from base; leaflets do not overlap and terminal leaf sinus is about $\frac{1}{2}$ length of entire terminal leaflet	20 or more leaflets; deeply cordate base; 3 prominent veins arising from base; leaflets do overlap and terminal leaf sinus is more than $\frac{1}{2}$ length of entire terminal leaflet	3-9 leaflets; maple-like; deeply cordate base; 5-9 prominent veins arising from base; leaflets do not overlap and terminal leaf sinus is more about $\frac{1}{2}$ length of entire terminal leaflet; cordate base	20 or more leaflets; cuneate, rounded, or subcordate base; 3 major veins arising from the base; leaflets do not overlap and terminal leaf sinus is less than $\frac{1}{2}$ length of entire terminal leaflet	generally cuneate, rounded, or subcordate to cordate base; leaflets may or may not overlap; terminal leaflet sinus is less than $\frac{1}{2}$ length of entire terminal leaflet
Flowers	racemes elongated; over 1/2 ft. long; 12-35 in.; staminodia present; 1-2 carpels, sessile; 1 pistil, sessile	racemes elongated, slender; over 1/2 ft. long; 8-16 in.; staminodia present; 2-8 carpels, stalked; pistils 3-8 (mostly 5), stipulate	racemes elongated; 6-24 in.; long staminodia lacking; 1-3 carpels, sessile; pistils 1-2, sessile	racemes compact; less than 2 in. long; staminodia present; 1 carpel, sessile; 1 pistil; sessile (distinctively exaggerated; ovate)	racemes compact; ovoid; 2-4 in. in length; staminodia present; 1 carpel
Flowering Time	May-Aug	July-Sept	Aug-Oct	April-May (Early bloom)	May-July
Fruit Type	Dry; ovoid, firm-walled follicles; pale green to dark brown; dehiscent; 1/4 to 1/3 in. long	Dry; flattened, papery follicles; pale green to light brown; "beaked"; 1/2 in. or longer	Dry; thin-walled, follicles; pale green; "beaked"; up to 3/4 in. long	Fleshy; globular berries; white; attached to thickened, red pedicels; 1/4 to 1/3 in. long	Fleshy; ovoid, glossy berries; attached to slender, pale green pedicels; 1/10 to 1/2 in. long
Rhizomes	vascular tissue in a central 3, 4, or 5 armed cross or star	lunate bundles of vascular tissue with circular arrangement	vascular tissue lacks thickly knotted structure	vascular tissue in a central 3, 4, or 5 armed cross or star	

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Reprinted from the *Journal of Medicinal Plant Conservation*, Spring 2017.

Another Plant to Thrill: Marsh Marigold, *Caltha palustris*

By Mark Dilley

A member of the Family Ranunculaceae, Buttercup Family, Marsh Marigold brings early season brilliance to forested wetland seeps and fens. A large population of this plant can be seen brightening the soggy understory of Cedar Bog (actually a fen) in Urbana, Ohio, usually in mid-April. It often grows in areas with another "thriller" plant, Skunk Cabbage, which also occurs in groundwater-influenced wetlands. Both are obligate wetland plants that cannot persist without regularly-saturated soils. Perhaps because of its preference for growing in hillside seep areas that might prove a challenge to bovine wanderers, the plant also has a common name of Cowslip, as well as Cowflock, Kingcup and, in the UK, the Mollyblob!

Marsh marigold, as this author prefers to call it, is pollinated by hoverflies and some beetles, and its seed dispersal mechanism is water dependent (hydrochory). When the follicles open, they form a "splash cup." When a raindrop hits one at the right angle, the walls are shaped such that the seeds are expelled and can then travel with the water flow to settle and germinate in new locations.

Early spring greens are reportedly edible when cooked. The preparation instructions are to cover the young leaves with 2-3 changes of boiling water until barely tender; cut into bite-sized pieces, salt lightly, and cover with butter and some vinegar. Sounds delicious, right? Since I'm not one to dispense advice on plants to eat, my usual response when asked if a plant may be consumed is "You can eat anything...ONCE." The juices of this plant can cause blistering or inflammation on skin or mucous membranes on contact and can result in gastric illness if ingested. The leaves are toxic, but only in large quantities. Symptoms include burning of the throat, vomiting, bloody diarrhea, dizziness, fainting, and convulsions. Given these risks and its stunning beauty, I think the sustenance I derive from this plant will be of a more spiritual than physical nature. This would be my recommendation to our readers as well!



Reprinted from *Wetland Trumpeter*, a newsletter of the Ohio Wetlands Association, March 2017.

Picture taken from www.wikipedia.org.

Book Review:**Milkweed Matters**

By Lisa Connors
Betty Gatewood, illustrator

Publisher: Createspace Independent Publishing Platform (2016)

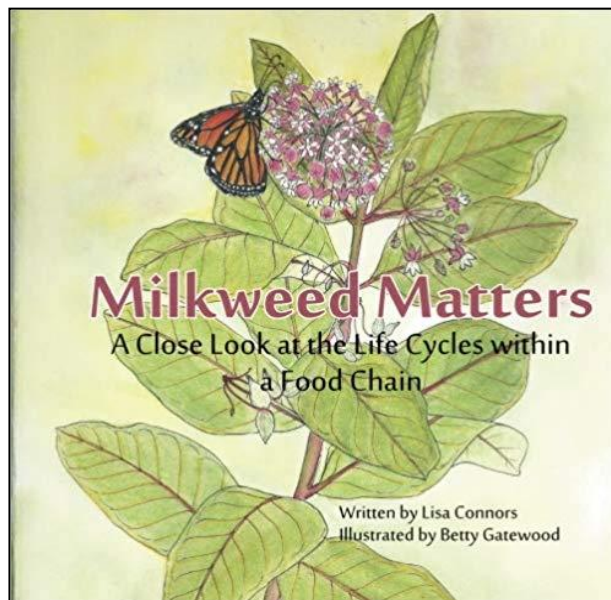
Pages: 40 pages

ISBN-10: 1540720934

ISBN-13: 9781540720931

Kindle, Paperback

Price: \$4.99 Kindle, \$10.95 paperback

**Review by Nancy Sorrels**

When two teachers team up, well, you had better watch out! Former elementary school teacher Lisa Connors has taken her first step into the publishing world with an illustrated children's book, *Milkweed Matters: A Close Look at the Life Cycles Within a Food Chain*. A number of the illustrations, including the stunning cover image, are the creations of award-winning botanical artist and former middle school teacher, Betty Gatewood.

The oversize color paperback takes children through life cycles in a fashion not unlike that in the kid's song about the "old lady who swallowed a fly." Some will remember the poor lady who swallowed the fly and then had to swallow a spider to eat the fly and then had to swallow a bird to eat the spider and onward. In this case, Lisa chooses to make the milkweed-Monarch connection the centerpiece of the food-chain circle, rather than a fly. The food chain also includes the sun, a mouse, an owl, and a beetle.

"I got the idea because when I taught fourth grade, students learned life cycles and food chains, but not necessarily together, and I don't think they readily grasped how the two are connected and how each species is potentially connected to another," Lisa explained. "I wanted to find a way to show that, and that is how this book idea came about. I could have chosen any food chain and portrayed the life cycles involved, but I wanted to use a species familiar to children so that there was less new material to grasp. So, I chose the milkweed-Monarch connection."

From writing to self-publishing took Lisa about three years, off and on. The milkweed idea was one of several stories Lisa had written. When she decided to move forward with producing a book, she presented the stories to Betty and asked her which one she would like to illustrate. Betty chose the milkweed and Monarch project because of her botanical illustration expertise and her love of Monarchs and milkweeds. In addition to Betty's illustrations, the book includes several of Lisa's own illustrations and photographs. The book also includes a glossary, with words like chrysalis, metamorphose, and migrate to help students understand the scientific language to which they are being introduced.

Lisa admits that her first foray into the publishing world was successful because of help from several others including a brother-in-law who is a graphic designer and her husband, who helped with the layout software.

"I know very little about design," she said, "so I based a lot of my layout ideas on what I liked in other picture books."

With *Milkweed Matters* behind them, Betty and Lisa are off on other projects. Look for Lisa's first traditionally published book, *Oliver's Otter Phase*, coming soon from Arbordale Publishing. Betty is constantly producing illustrations for note cards, calendars, and other publications, even occasionally for *Sempervirens*.

Reprinted from *Sempervirens*, The Quarterly of the Virginia Native Plant Society, Winter 2017.

Invasive Plants:**Japanese Honeysuckle & Asian Bittersweet,
Lonicera japonica, *Celastrus orbiculatus*****Description:**

Japanese honeysuckle is a vine with entire (sometimes lobed), oval-oblong, opposite leaves from 1½ -3 inches long. In Ohio, the plants are semi-evergreen with leaves persisting into late winter or early spring. The stems are usually hairy and hollow, reaching a length of 30 or more feet. Flowers are tubular, with five fused petals, white to pink, turning yellow with age, very fragrant, and occur in pairs along the stem at leaf junctures from April through June. The many-seeded black fruit is pulpy and matures in autumn. Identification is essential to avoid confusion with the native honeysuckle vines, *L. dioica* and *L. reticulata*; the native species bear fruit at the ends of stems and the upper leaves of the stem are joined together.



Japanese honeysuckle, *Lonicera Japonica*

Picture taken from www.nyc.books.plantsofsuburbia.com

Asian or Oriental bittersweet is a vine with finely toothed, rounded, alternate leaves, up to 4 inches long. The stems often have noticeable lenticels and may reach a length of 60 feet. Plants produce small greenish flowers in axillary clusters (from most leaf axils), and each plant can produce large numbers of fruits. The fruit is a conspicuous, yellow, 3-valved capsule that splits open at maturity revealing three red-orange seeds. The increasingly rare native bittersweet, *C. scandens*, can be distinguished by its elliptical leaves and the flowers and fruit, which arise at the tips of stems. American bittersweet has fewer, larger clusters of fruits, whereas Oriental bittersweet is a prolific fruit producer with multiple fruit clusters emerging at many points along the stem. Unfortunately, hybrids of the two species occur, which may make accurate identification more difficult.

Habitat:

Both Japanese honeysuckle and Asian bittersweet thrive in disturbed areas such as roadsides, fencerows, forest edges, and forest gaps. Areas of special concern are woodland edges, early successional forests, and riparian corridors. Although preferring sunny areas, both are shade tolerant and can live in marginal habitats until favorable conditions arise.

Invasive Characteristics:

Japanese honeysuckle and Asian bittersweet are fast-growing trailing or climbing woody vines capable of covering large areas of ground or extending into the treetops. They can severely damage native plant populations by limiting available sunlight, constricting nutrient flowing stems, and weighing down treetops, which increases the likelihood of wind damage. Both are prolific seed producers; seeds are often dispersed by birds. The root systems are very persistent and capable of extensive root suckering.

Information taken from the Ohio Invasive Plants Council website; www.oipc.info



Asian Bittersweet, *Celastrus orbiculatus*

Picture taken from www.Gobotan.newengland.org

Coltsfoot, *Tussilago farfara*

By Guy Denny

Coltsfoot, *Tussilago farfara*, a member of the Aster or Sunflower Family, Asteraceae, is one of our earliest spring bloomers: typically, in March and early April. It is a common perennial species of northern Europe and Asia that has become well established and naturalized in North America from Newfoundland to Minnesota, and southward. This non-native, conspicuous roadside plant is fairly common and widespread in Ohio, especially in the eastern half of the state. It is most commonly found growing on disturbed soils such as along highway embankments, along stream banks, in abandoned strip mines and other such waste places where bare soil is exposed. Its bright yellow solitary flowers, borne on 4 to 10-inch-tall, white-wooly scaly leafless flower stalks, somewhat resemble dandelion flowers at a distance. The leaves, from which it gets its common name, do not become noticeable until after it blooms. When this species goes to seed, the fluffy bright white pappus bristles of the seed heads also become quite noticeable.

The leaves start out rather slowly, but rapidly grow in size after the flowers have gone to seed. The shallowly lobed leaves are somewhat shaped like a colt's hoof, and grow to about the same size, hence the origin of the common name "coltsfoot." The underside of the otherwise green leaves has a distinctive white-hairy surface which also stands out well after the plant has set seed later in the growing season.

The genus name *Tussilago* is from the Latin word *tuss*, "cough," and *agere* "to chase," meaning "to chase away or dispel a cough." From earliest times, people have used coltsfoot to treat coughs and asthma. The specific epithet *farfara* is the ancient Latin name for this plant. In times past, coltsfoot was used as the main ingredient in cough syrup and asthma teas. An extract from the roots and fresh leaves was once used for making cough drops. Reportedly, the dried leaves were also steeped to make a throat-soothing tea. Up until the modern discovery of antihistamines, the dried leaves of coltsfoot were also used as the basic part of the herbal smoking mixtures to which asthmatics resorted for hundreds of years. Reportedly, the smoke has been



Coltsfoot, *Tussilago farfara*

inhaled to relieve bronchial congestion since early Greek and Roman times. The leaves and flower heads are said to be aromatic and edible, but caution is required since the leaves contain, among other compounds, a high alkaloid content which can cause sickness if eaten in more than very small quantities. Reportedly, modern laboratory tests using mice and rats reveal that ingesting coltsfoot may cause cancer if taken in large doses or repeatedly in small doses.

Coltsfoot has been so highly regarded as a medicinal plant, that for generations the outline or silhouette of a coltsfoot leaf has been used as a symbol for apothecary shops signs in Europe. Early colonists from Europe, for whom this plant was so highly regarded as a medicinal plant, brought coltsfoot with them and introduced it to North America. This is one of the few white man's plants that the Iroquois also adopted for the treatment for coughs and tuberculosis. Fortunately, even though coltsfoot is a non-native species, it is not terribly invasive inasmuch as it requires exposed mineral soils in which to germinate and is then typically squeezed out once other taller plants become established on such sites. At the very least, coltsfoot offers a welcome bright yellow splash of color to our otherwise drab very early spring landscape.

Reprinted from ONAPA, News a newsletter of the Ohio Natural Areas & Preserves Association, Spring 2018, Vol 5, No 2.

Folklore:**Bloodroot, *Sanguinaria canadensis*****By Marilyn DuFour**

Bloodroot has the surprising appearance of a plant that bleeds, thanks to the orange red juice which oozes from the stem and rootstock when they are broken or scraped. The plant is always a welcome sight when it makes its appearance as early as February, but generally in March or April.

Bloodroot is a member of the Poppy family, *papaveraceae*, and the only member of its genus. Its scientific name suggests the blood-like color of its juice and that it was probably first identified in Canada. The plant is found in rich woods and shady borders from Nova Scotia to Florida and as far west as Manitoba and Nebraska.

This early bloomer is a perennial which makes its entrance with the help of sugars stored in its rootstock over the previous growing season. The leaf appears wrapped around the budded flowerstalk and continues to offer some protection

to the flower until pollination. The seven to twelve petals of the pure white blossom can last a week or more in mild weather but are generally knocked off in a few days by wind or rain.

Although it produces no nectar, the petals and bright yellow anthers of Bloodroot attract bees and other pollen-eating insects. If early spring temperatures prevent the transfer of pollen by these visitors, the plant can self-pollinate, thanks to a tight ring of stamens which can eject pollen directly onto the stigma.

Bloodroot's juice stains everything that it touches and has been successfully used as a dye.

The Indians mixed it with animal fat and used it to paint their faces, dye baskets, decorate weapons and tools, and color their clothing. Colonists also used the juice to dye wool and other cloths a reddish orange color with the help of an alum mordant.

Herbalists and medicine men have historically considered Bloodroot's apparent bleeding as a sign that it was good for treating ulcers, ringworm and other skin problems and for use as a blood purifier. This method of discerning a plant's medicinal uses is called the Doctrine of Signatures.

Both Indians and colonists found that sucking on a lump of maple sugar, with a few drops of Bloodroot juice added, helped to relieve coughs and sore throats.

More recently, the plant has been used as an expectorant, especially in the treatment of subacute and chronic bronchitis, and as a treatment for minor cancers of the nose and ear. In 1983, an extract called sanguinarine was added to Viadent toothpaste and mouthwash and discovered to be a promising plaque fighter. This discovery is a significant one in the fight against gum disease.

Reprinted from the Ottawa Park Nature Education Center, City of Toledo Parks, Recreation & Forestry 2000 *Teachers' Resource Packet*.

Picture taken from www.oehmevansweden.wordpress.com.

Interesting Factoid:**Prairie STRIPS**

Prairie STRIPS is a farmland conservation practice that delivers enormous soil, water, and nutrient benefits while increasing wildlife habitat. STRIPS stands for Science-based Trials of Rowcrops Integrated with Prairie Strips. The STRIPS project is composed of a team of scientists, educators, farmers, and extension specialists working on the prairie strips farmland conservation practice. The research shows that prairie strips are an affordable option for farmers and farm landowners seeking to garner multiple benefits.

The practice was developed and tested by the STRIPS team at the Neal Smith National Wildlife Refuge in Iowa. The STRIPS research team is multi-institutional, primarily housed at Iowa State University, but also at the University of Nebraska, USDA Agricultural Research Service National Lab for Agriculture and the Environment, and USDA Forest Service Northern Research Station. The STRIPS team works with a broad array of partners across the Midwestern region to research the impact of prairie strips.

Because of research demonstrating the benefits of prairie conservation strips, Iowa farmers and farm landowners have become interested in experimenting with the practice. The first farmer-collaborator installed prairie strips in 2012, and as of 2015 over 30 farmers had signed up as additional collaborators. Researchers are working with farmers to install prairie strips and continue to monitor benefits of the practice.

Prairie strips are planted with native perennial prairie species. Species include grasses, forbs, legumes, and sedges. Typically, plantings include stiff-stemmed warm season grasses (e.g., Indiangrass, big bluestem, and little bluestem) and a wide range of erect forbs, including species of aster, beebalm, blazing star, bush clover, coneflower, goldenrod, and native sunflower.

Given rising concerns about Monarch butterfly and native pollinators, the team has been giving special attention to include several milkweed species (e.g., common, swamp, and whorled) and early spring blooming plant species (e.g., Canada anemone and golden alexanders) in their seed mixes.

Biodiversity is important in agricultural landscapes because it can contribute to enhanced water quality, the suppression of pest-insect and weed populations, and recreational opportunities. For this reason, monitoring the response of plants, insects, and birds to watershed and field treatments is a key component of STRIPS research. Researchers expect the gains in native species and the ecosystem services these species provide to be disproportionately greater than the extent of area converted to diverse native perennials. They also track plant and insect populations to determine if prairie strips exacerbate weed and pest problems for farmers. Thus far, their research suggests increased beneficial native biodiversity with prairie strips and no increase in weed and pest problems.

**Interesting Facts:**

- By converting 10% of a crop field to diverse native perennials, farmers and farmland owners can reduce the amount of soil leaving their fields by 90% and the amount of nitrogen leaving their fields through surface runoff by up to 85% and the amount of phosphorous up to 90%.
- Prairie strips also provide potential habitat for wildlife, including pollinators and other beneficial insects. Prairie strips provide both abundant and diverse flowering plants to agricultural landscapes, which are essential for supporting honey bees and conserving wild bees and butterflies. Flowers provide critical food resources for these insects: nectar for adult bees and butterflies, and pollen for the young bees. Furthermore, a

growing body of scientific literature indicates that bee health is improved when they are provided a diverse diet of plants.

- Economic analysis shows that prairie conservation strips are one of the most affordable conservation practices available to farm landowners.

The STRIPS team has shown that integrating small amounts of prairie into strategic locations within corn and soybean fields—in the form of in-field contour buffer strips and edge-of-field filter strips—can yield disproportionate benefits for soil, water, and biodiversity. Prairie is expected to provide these disproportionate benefits to a greater degree than other perennial vegetation types because of the diversity of native plant species incorporated, their deep and multilayered root systems, and their stiff-stems, which hold up in a driving rain. STRIPS research also shows that prairie strips may be one of the most affordable and environmentally beneficial agricultural conservation practices available.



Information for this article taken from Iowa State University, Natural Resource Ecology and Management website: www.nrem.iastate.edu.

First picture taken from www.myfarmlife.com/crops/the-promise-of-prairie-strips. The second picture taken from www.phys.org

Spring Pools

*These pools that, though in forests, still reflect
The total sky almost without defect,
And like the flowers beside them, chill and shiver,
Will like the flowers beside them soon be gone,
And yet not out by any brook or river,
But up by roots to bring dark foliage on.
The trees that have it in their pent-up buds
To darken nature and be summer woods—
Let them think twice before they use their powers
To blot out and drink up and sweep away
These flowery waters and these watery flowers
From snow that melted only yesterday.*

~ Robert Frost



Vernal pool in Gahanna Woods State Nature Preserve

Reprinted from *Wetland Trumpeter*, a newsletter of the Ohio Wetlands Association, March 2017.
Picture taken from www.distanthillgardens.org.



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On The Fringe

In this issue:

Wild Ones' Philosophy – Maryann Whitman
Website: The Trout Lily Project – In Defense of Plants
Getting to Know the Pussytoes, Genus *Antennaria*, *Asterceae* – Arie H Tal
Butterfly, Dogwood Linked in Circle of Life – W. John Hayden
The Great Black Swamp – Diane Christensen
Distinguishing Black Cohosh from Look-Alikes – Karen Johnson,
Laura Price, and Sunshine Brosi
Another Plant to Thrill: Marsh Marigold, *Caltha palustris* – Mark Dilley
Book Review: *Milkweed Matters* – Review by Nancy Sorrels
Invasive Plants: Japanese Honeysuckle & Asian Bittersweet,
Lonicera japonica, *Celastrus orbiculatus*
Coltsfoot, *Tussilago farfara* – Guy Denny
Folklore: Bloodroot, *Sanguinaria canadensis* – Marilyn Dufour
Interesting Factoid: Prairie STRIPS – Diane Christensen
Spring Pools Poem – Robert Frost

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