

On The Fringe

Journal of the Native Plant Society of Northeastern Ohio

Program Schedule – Spring 2017

Friday, March 24 – 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 <http://naturepreserves.ohiodnr.gov/stay-informed/2015-ohio-botanical-symposium>.

Thursday, April 20 – 9:00 am – 12:00 pm – Sawdust Tract – Ashtabula County.

Jim Bissell, Curator of Botany at Cleveland Museum of Natural History, leads this joint trip with NEON to the museum's Sawdust Tract in western Ashtabula County on Mill Creek with large stands of Carolina Spring Beauty. **Directions:** from I-90, travel south on SR 528 for about 2.5 miles until you reach Ross Road. Make a left on Ross (east). At the Ashtabula county line, Ross becomes Cold Cork Springs Rd. which ends at Atkins Rd. Make a right on Atkins Rd and travel south about 2 miles until you reach Belle Rd. Meet at the NE corner of Belle and Atkins Rd. **Registration required:** email Judy at judysbarnhart@gmail.com. GPS: 41.698936, -80.993185

Saturday, June 17 – 9:00 am – Noon at the West Woods Nature Center – Fern Identification

Workshop. Discover the lush diversity of ferns found in northeast Ohio. An introductory session will be followed by a hike to observe species. **Directions:** take SR 87 east from SR 306 in Russell Township approx. 2 miles to the park entrance on south side of the road. 9465 Kinsman Road, Novelty, Ohio 44072. **Registration required:** Contact the Geauga Park District at 440-279-0880. GPS: 41°27'29.5"N 81°18'13.9"W

2017 Membership Renewal

You should have already received your 2017 renewal form. Please renew at the highest level you can. If you wish a printed copy of *On The Fringe* mailed to you, simply check the box to receive the printed journal and add \$10 to your total.

Please also consider making a contribution to our endowment fund. This is the source of our Annual Grant and is a lasting tribute to our founder, Ann Malmquist. With the low interest rates, we need to increase the principal.

☛ PLEASE RENEW NOW ☛

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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.

**Discover the Forest**

Looking for a forest or a park near you to enjoy this summer? The new web site, (www.discovertheforest.org), courtesy of our government, is just what you are looking for. A comprehensive site with various tabs (entitled: Before You Go; What to Do; Share the Forest; More to Explore; and About the Forest) that allow you to select (with its locator function) a park near you or where you are traveling this summer. The locator feature has seven activities to refine your research. Additionally, the locator has a “site type” selector that features among its choices: National Forest, National Park, State Forest or Park, Museums, Playground, Visitor Center Info, etc. It even has a link to the government’s “Every Kid in the Park” program, where your 4th grader can get a free pass, after completing an online activity, for free entry into federal parks and waters.

One of my favorite links was the “About the Forest” link with tips and facts from scientists to help one appreciate and conserve our national lands. This is—no fooling—a “try it, you’ll like it” site!

Reprinted from *Wildflowers*, the newsletter of the Wildflower Association of Michigan, Spring/Summer 2016, Vol 18, No 11, by R.J. Krueger.

The Native Plant Society of Northeastern Ohio Awards: The Wilderness Center, Gentian Award for 2016

By Lisa Schlag

The Native Plant Society created the Gentian Award in 2012 to honor those individuals or organizations we believe made a significant contribution to our Society's goals and mission of promoting the study, appreciation, and conservation of Ohio's native plants and plant communities. Each past recipient, Perry Peskin, Judy Semroc, Fred Losi, and our founding President Ann Malmquist, uniquely shared their understanding and appreciation of nature in a manner that helped widen the scope of what we look at and inspired us to discover more.

The recipient of this year's Gentian Award provides opportunities for discovering, observing, studying, and experiencing nature both indoors and very importantly outdoors—in essence, widening our scope of awareness and understanding about what surrounds us and our part in the natural cycle of life. This year the Native Plant Society ("NPS") is very proud to honor The Wilderness Center ("TWC") and its dedicated team of staff and volunteers, who are responsible for planning and carrying out the activities that support TWC's mission to connect our community with nature, educate people of all ages, conserve natural resources, and practice environmental stewardship.

For over half a century, TWC has been home to those who understand the importance of connecting with nature. Established in 1964, TWC is a nonprofit nature education and land conservancy organization located in Wilmot Ohio. The nature interpretive building, astronomy education building, solar array, and miles of nature trails are situated on approximately 650 acres of forest, meadow, wetland, and prairie. Through its various land trust activities, TWC protects thousands of additional acres of land and Ohio's biodiversity.

Through all its programs, ventures, special events, and nature playscape, TWC encourages and promotes the importance of learning about nature and our environment, protecting and respecting our natural habitats and resources, and getting outside for health and enjoyment. The nature center is home to many special interest clubs whose members gather together for learning, camaraderie, and fun. TWC's Botanizers Club and the NPS have enjoyed many past outings together. John Burroughs considered nature the greatest of the three most precious resources in life. The other two resources being friends and books.

We wish to thank TWC for inspiring our sense of wonder and curiosity about the whole natural world surrounding us and for creatively pursuing ways to be a good steward of the natural environment for over half a century and for future generations to come.

It is with great delight and honor that we present TWC with the Gentian Award for 2016. Please join me in congratulating TWC and in welcoming Carrie Elvey, Senior Naturalist of TWC, who is here to accept our Society's Gentian Award on their behalf.

The plaque has a picture of a fringed gentian and says:

Gentian Award

For Dedication to the Native Plants of Ohio

The Wilderness Center

2016

Lisa K. Schlag, Treasurer and Webmaster of the Native Plant Society, gave this introduction at the Annual Meeting on October 29, 2016 before presenting Carrie Elvey, Senior Naturalist of The Wilderness Center, with the Gentian Award.

To read more about The Wilderness Center and the services they offer, go to www.wildernesscenter.org.

Disjunct Medicine: A History of the (Two) Mayapple(s)

By Sasha M. White

When Europeans came to North America, the mayapple, *Podophyllum peltatum*, also called mandrake, raccoon berry or wild lemon, was one of the earliest plants to be noticed. Samuel Champlain noted Huron tribes eating the fruit in 1616, and shortly thereafter it was collected and cultivated in gardens in Europe. Linnaeus gave the plant its official scientific name, *Podophyllum peltatum*, in his 1753 publication *Species Plantarum*. A perennial herb native to moist woodland edges from southern New England south to Georgia and west to Texas, mayapple became popular not just for its beautiful flower, edible fruit, and horticultural novelty, but also for the medicinal properties of its root.



As early as 1731 Mark Catesby described the medicinal use of American mayapple root in his *Natural History of the Carolinas*. Image courtesy of the Lloyd Library & Museum.

Medical theory of the 17th and 18th centuries relied on balancing the “humors”, or secretions of the body, to treat disease. Purgatives, bloodletting, sweating, and vomiting were general remedies for all types of illness. The dried or roasted rhizome and roots of mayapple were used by some Native American tribes as a purgative, and the medicine was quickly adopted by early American doctors to treat various types of fever, dropsy, rheumatism, and syphilis. As an indigenous herb, mayapple could replace expensive foreign remedies, such as ipecac, *Cephaelis ipecacuanha*, and jalap, *Ipomoea purga*, and also avoid the deleterious side effects of mercury (Barton). In the 19th century Eclectic practitioners developed disease-specific remedies and began using mayapple as a low-dose alternative for glandular disease, rheumatism, chronic hepatitis, and atonic conditions of the digestive system. They also used the compound resin derived from mayapple as a stimulant to the sympathetic nervous system of the solar plexus, to normalize secretions in such afflictions as diarrhea, constipation, gallstones, and gastric catarrh.

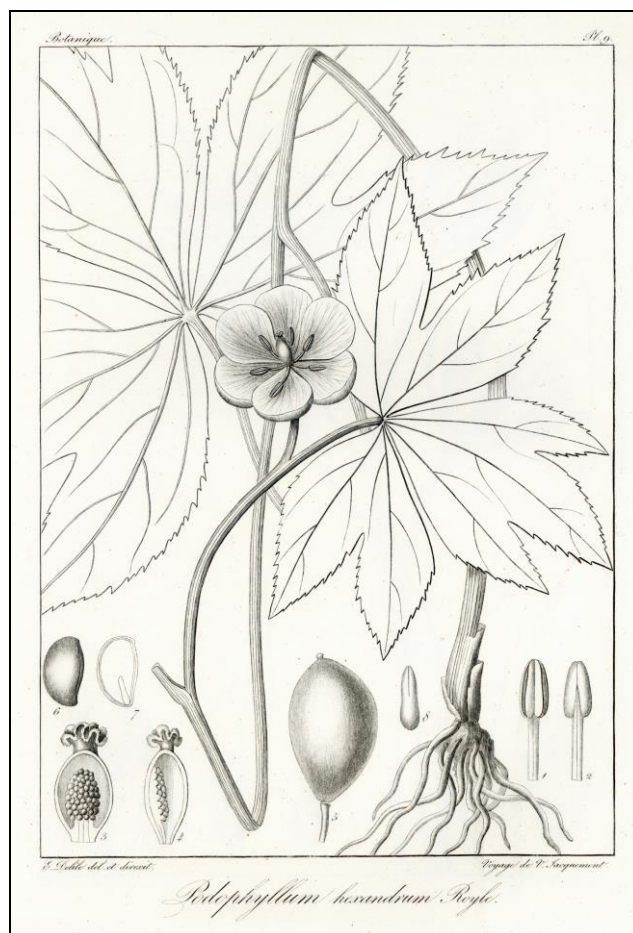
This compound, popularized as *podophyllin*, became the first commercially produced botanical medicine.

Along with other herbaceous members of the *Berberidaceae* found in Eastern North America, mayapple was for many years believed to be the sole member of its genus. In 1824 a second species of mayapple was discovered growing in Asia. *Podophyllum hexandrum* syn. *P. emodi*, the Himalayan mayapple, grows in small, widespread populations in the alpine regions of Northern India, Pakistan, Bhutan and western China. Like American mayapple, it has a single flower, ranging from white to pink, borne between two lobed and peltate leaves. Both produce an edible fleshy fruit, the American most often yellow, the Himalayan red. Unlike the American species, which varies in both petal and stamen number, Himalayan mayapple consistently has six petals and six stamens and blooms before its leaves are fully open. And while American mayapple grows in large, clonal, generally self-incompatible colonies, spreading by its stoloniferous rhizomes, the Himalayan species is self-pollinating. This characteristic is believed to have evolved when the Himalayan Mountains lifted the

mayapple into an alpine zone depauperate in spring pollinators. An effective reproductive strategy for the long-range dispersal of fruits eaten by birds and herbivores, it has also created the great morphological variation documented between the Asian populations.

The two mayapples, one Asian, one American, are part of what is known as the Eastern Asian-Eastern North American Floral Disjunction. In the 1800s, as Western explorers gained greater access to Eastern Asia, their botanical collections displayed a stunning similarity to the flora of Eastern North America. The two regions share more closely related species and genera than either does with Europe, Western North America, or Western Asia. Based on collections made in Japan, botanist Asa Gray outlined the first theory of the EA-ENA Disjunction in 1849. The theory continues to be refined to present day through interdisciplinary research in botany, paleobotany, phytogeography, geology, chemistry, and palynology. Generally, it is believed that beginning around 50 million years ago, a vast, deciduous boreo-tropical forest spread across the Northern Hemisphere, utilizing land bridges across the North Pacific and the North Atlantic Oceans. During subsequent climatic periods of cooling and glaciation and geological shifts, such as the collision of India with Asia and the rise of the Rockies in America, the forest shifted its range, changed, diversified and, in some places, went extinct. Eastern Asia and Eastern North America remained relatively hospitable to these ancient plants and hundreds of closely related taxa, now isolated from each other, continued to evolve and grow in these regions. The two mayapple species, called “sister species”, are believed to have diverged from one another around 6 or 7 million years ago, concomitant with the rise of the Himalayan Mountains. Many of the plants that are part of the EA-ENA Disjunction have been used similarly in the traditional systems of medicine in their regions. Himalayan mayapple is called “bakra” in the vernacular and is thought to be a traditional bile-expelling plant of Sanskrit writings; its fruits are eaten as a mild laxative and for female reproductive issues. In the 1890s colonial administrators and pharmaceutical companies in British India began exploring the economic possibilities of Himalayan mayapple, hoping to supplant the American domination of the European market for *podophyllin*. Chemical assays of the Asian root were promising, reporting two to three times the amount of *podophyllin* as compared to the American mayapple. But the remote, mountainous habitat of Himalayan mayapple made the cost of harvest and transport too high to be profitable, and the market for it was slow to develop.

Mayapple is not a medicine to be used without caution. The fresh root is a violent, sometimes fatal emeto-cathartic, used among some Native American peoples for suicides and poisonings.



Victor Jacquemont's *Voyage dans l'Inde* of 1844 established the scientific name for Himalayan mayapple. Image courtesy of the Lloyd Library and Museum.

Even dried, a large dose can be fatal. In early American medicine its purgative or cathartic doses were usually modulated by the addition of such botanicals as hyoscyamus, *Hyoscyamus niger*, and belladonna, *Atropa belladonna*, to dull the pain of intestinal griping. The Physio-Medicalist William H. Cook came to eschew the use of mayapple almost altogether. He describes it in his 1869 *Dispensatory* as a powerful stimulant to the secretory organs, useful perhaps in moderation for atony of the digestive organs, but exacerbating and debilitating even in small amounts to disease states. It is escharotic to the skin, and workers with the powdered drug have reported severe inflammation in mucous membranes and other sensitive

areas. This property has been put to use both historically and contemporarily as a topical treatment for various types of skin lesions including genital warts. In 1947 mayapple was investigated for its anti-cancer properties and was found both to be anti-tumoural and to cause toxic side effects in the patient. By the late 1960s, semi-synthetic drugs, such as etoposide and teniposide, were being derived from podophyllotoxin, one of the lignans found in *podophyllin* and mayapple. These anti-cancer drugs have mitigated some, but not all, side effects. In addition to possible gastrointestinal distress, studies have shown that podophyllotoxin is damaging to the bone marrow, liver, and central nervous system, as well as tetragenic and detrimental to the development of the fetus. Still, these drugs are being used extensively and effectively against cancers of the lymph, lungs, brain, breast, and testes.

Anti-cancer drugs are now the driving force behind the wild harvest of mayapple. In 1970, 130 tons of American mayapple were dug from the wild. The higher amounts of podophyllotoxin found in the Himalayan species, however, quickly shifted pharmaceutical manufacturers' interest to Asia.

Today, far from being the "abundant" and "plentiful" plant promoted by British colonial administrators, Himalayan mayapple is an endangered species. It is listed in the Convention on International Trade in Endangered Species Appendix II, along with goldenseal, *Hydrastis Canadensis*, and American ginseng, *Panax quinquefolius*, (both of which are also part of the EA-ENA Floral Disjunction). These plant species may not be immediately threatened with extinction, but it is feared they soon may be if their trade is not closely regulated. Despite this status, Himalayan mayapple's dwindling wild populations continue to be the main pharmaceutical source of

podophyllotoxin. Harvest data are difficult to obtain, as the market from digger to buyer is secretive, but Asian Internet wholesalers offer supply abilities of *Podophyllum* extract of up to 10 tons per month. With 50 plants of Himalayan mayapple required to make a single kilogram of dried root, the harvest rates are "well over natural regeneration".

One recent author lamented the disappearance of plants from their Himalayan study populations: in the area of Prashar the average number of plants per quadrant decreased from 2 to .6 over the course of two growing seasons. Attempts at cultivation of this alpine plant have been hampered by poor seed viability and germination, as well as a maturation time of anywhere from 6 to 12 years from planting to harvest of marketable rhizomes. The uses of tissue culture and fungi to synthesize podophyllotoxin are still in early stages of investigation.

Possibly, what may save Himalayan mayapple is the American mayapple. Recent assays on the leaves of the American species report levels of podophyllotoxin in some populations equal to or greater than the amounts found in the Himalayan roots. Growers are finding American mayapple does not require the use of shade cloth and that it thrives under cultivation. Thus, it could provide a renewable source of podophyllotoxin and allow for the recovery of the Asian species. Simultaneous to cultivation efforts, the restoration of savanna and fire-dependent woodland ecosystems would also ensure that wild American mayapple populations have ideal habitat, increasing fruit set and genetic diversity. Mayapple has graced the earth for millions of years. If protected from overexploitation, these sister species, one of alpine meadows, one of open woodlands and savannas, will continue to give us powerful medicine

Reprinted from the *Journal of Medicinal Plant Conservation*, a United Plant Savers Publication, Spring 2015.

The color image of a turtledove and *Podophyllum peltatum* comes from Mark Catesby's *The Natural History of Carolina, Florida, and the Bahama Islands* (1731).

The black and white image of *Podophyllum hexandrum* comes from Victor Jacquemont's *Voyage dans l'Inde* (1841).

This article was written as part of a Curtis Gate Lloyd Research Fellowship at the Lloyd Library and Museum in the winter of 2015, focused on medicinal species of the EA-ENA Floral Disjunction. The writer is an artist and plantswoman living in Eugene, Oregon. Her artist's book, *Desiderata*, also based on this research and featuring the two species of Mayapple, is available for viewing at the Lloyd Library in Cincinnati.

If you would like information regarding references used for this article, please contact the editor at dbpolice@roadrunner.com.

Getting to Know the Pussytoes Genus *Antennaria*, Asteraceae

By Arie Tal

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 of 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.

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

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

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 of our species have leaves that are "spoon shaped"; that is, with an ovate blade that tapers to a wedge-shaped petiole.



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



Figure 2. Inflorescences
pistillate (left), staminate (right).

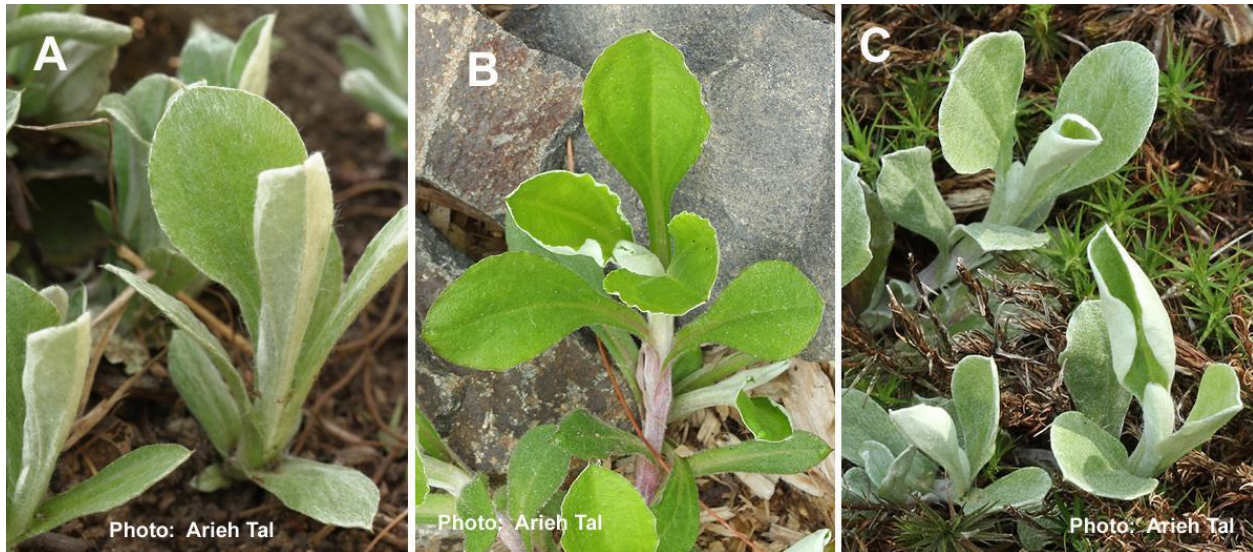


Figure 3: Comparison of basal leaves of (A) *Antennaria plantaginifolia*, (B) *A. parlinii* ssp. *parlinii*, and (C) *A. parlinii* ssp. *fallax*.

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* being 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*. All of 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 appear variously gray-green or whitish.

A large number of insect species have been found visiting *Antennaria*, either for nectar or larval food. The butterfly *Vanessa virginiensis* (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>
Summary of outcomes using basal leaf size and sexual distribution. (Assume that only one species is present at the site.)		

Reprinted from *Solidago*, the Newsletter of the Finger Lakes Native Plant Society, March 2016, Vol 17, No 1.

The primary reference for this article is: Bayer, R. J. 2006. *Antennaria*. In: Flora of North America Editorial Committee, eds. 19+ vols. New York & Oxford. Vol. 19, pp. 388-415. An excellent reference for faunal associations has been created by Dr. John Hilty (john@illinoiswildflowers.info.) It can be found at his website: <http://www.Illinoiswildflowers.info>.

The Life of a Forest

By Matthew Knittel

This year Cleveland Metroparks celebrates its 100-year anniversary. Thus, the forests that were first preserved with the founding of Cleveland Metroparks are at least 100 years old. Many forests in the first reservations are even older than that, especially North Chagrin's A.B. Williams Woods. However, it can take hundreds of years for forests to reach their "full maturity", or "climax conditions". Like all things in nature, forests have a life cycle as well; different stages of succession.

Forest succession loosely follows stages, but these stages depend on stable climatic conditions (temperature, precipitation, wind, etc.), soil conditions (nutrient availability, drainage, moisture levels, etc.), and the avoidance of catastrophic conditions (fires, windstorms, floods, logging, etc.). Over hundreds of years it proves to be difficult to keep all three stable. In addition, there are no hard-set beginning dates and end dates for each stage. They often intertwine and blend within each other. That being said, there is a basic outline of the stages, assuming that conditions remain constant throughout succession.

At the beginning, before a forest exists, often there is a grassland. (We could go back in time before the

grassland, to perhaps a wetland that is slowly accumulating soil, and before that a pond; or perhaps there was no wetland, and just rock and soil, slowly colonized by lichens, and then small grasses, then taller grasses and shrubs. For this example, we'll begin with our grassland.) Pioneer species—species that are best adapted to spreading their seeds far distances, and colonizing new areas—will begin to inhabit the grassland first. This will include many shrubs (roses, blackberries, sumacs, etc.), and then a few tree species. Trees likely to begin colonization of a meadow include white pines, locusts, or black cherries. These trees are well adapted to thriving with lots of sunlight, and thus take advantage of growing taller and broader than the surrounding grasses and shrubs. This stage could take up to 20 years or longer—again, all depending on climatic, soil and catastrophic conditions.

The next stage could take place between the 20th year and 70th year of our grassland. This stage brings the replacement of the pioneer species—which tend to be short-lived when compared to other trees. Our new tree species—red maples, tulips, ash, and tupelo—grow up in the partial shade that was provided by the

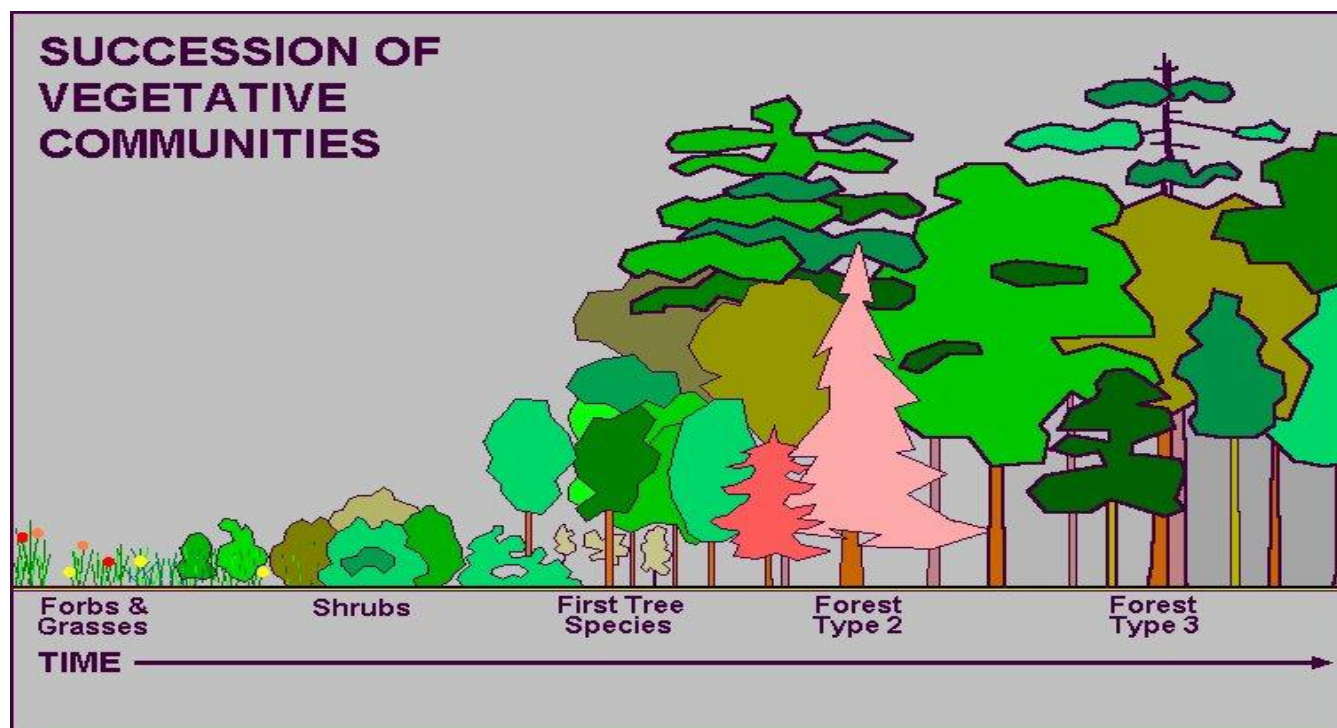


Image taken from <https://sjegeog.wikispaces.com/temperateforests>

pioneer species. These trees do not fare as well in direct sunlight, and thus require the pioneer species to provide some shade in order to grow. As our second wave of tree species continues to grow, they will provide more shade, allowing for even more shade tolerant species to take root.

These species will include hardwoods like oaks, hickories, and maples. As these trees grow (over the course of 70 to over 100 years in our former grassland's life), the canopy is now becoming more crowded. Sunlight is becoming a rarer resource in the lower levels of the forest. When the oaks and hickories dominate the canopy, there is little sunlight making it to the forest floor. This provides the best conditions for our truly shade tolerant trees—sugar maples and beech—to begin growing, and populate the understory.

Soon, the sugar maples and beech will overtake the oaks and hickories and dominate the canopy. At this point, the canopy will have become so thick, that the understory will also be comprised of only sugar maple and beech trees. This is what is known as a climax community. The succession of this forest is “over”. However, if one of our three conditions mentioned earlier (climate, soil, catastrophe), changes, that could alter the landscape, and thus change the makeup of the forest. In addition, when large sugar maples or beech trees die and fall, they will leave a gap in the canopy allowing sunlight to once again reach the forest floor. At this point, it is a race to the top for any species that may be in the understory, or possibly lying as a dormant seed—waiting for this exact moment.

So why is this information that you should know? Understanding forest succession can tell you the story of the forest you're hiking in. If you're surrounded by beech and sugar maple trees—from the understory to the canopy—you'll know that you're in an old forest; one that took over a hundred years to reach this stage. If you find a patch of oak and hickory trees, that might tell you that a large beech or maple fell, allowing for sunlight to reach the forest floor, providing enough light for the oaks and hickories to grow. Being able to piece together the story of the forest around you creates a stronger sense of place, and increases the enjoyment of your hike.

So go on! Get out there and “read” your next “story”.



A beech and maple tree growing adjacent to each other.
Photo taken from Wikipedia.com

Reprinted from www.clevelandmetroparks.com,
Posted: 6/9/2016.

Invasive Plant:

Dame's Rocket, *Hesperis matronalis*

IN BRIEF

Dame's rocket is a tall, showy, short-lived perennial in the mustard family. A prolific seed-producer, it has escaped from gardens and now invades roadways, woodland edges, and forest interiors.

DESCRIPTION

Plant Habit. First-year plants develop into low rosettes at ground level and stay green all winter. Flowering plants start as a rosette in early spring, but soon send up an erect, 2-4-foot-tall flower stem. Flower clusters branch out from the upper parts of the plant. It often grows in extensive stands.

Leaves. Rosette leaves are up to 6 inches long. Flowering-stem leaves are pointed and lance-shaped, 2-6 inches long, wider at the base, and attached alternately along the stem. Leaves decrease in size up the stem. Lower leaves usually have short petioles (leaf stalks), while the upper leaves attach directly to the stem. There are widely spaced teeth along the leaf edges. Both stems and leaves are covered with fine hairs.

Flowers. Each flower is 4-petaled, with colors on different plants ranging from purple or pink to white. Blossoms are $\frac{3}{4}$ -1 inch wide and grow in branching clusters that lengthen over the 4-6-week flowering period. Each flower develops into a seedpod called a silique. Blossoming continues at the tips of the flowering branches, while at the same time seedpods ripen below. Flowers typically bloom from mid-May through June. If flowering parts are cut off, plants often will bloom again.

Fruits / Seeds. Ripening occurs over the summer and large quantities of seeds are produced in thin, wiry seedpods that are 2-5 inches long and slightly hairy. In late summer and fall they split lengthwise to release tiny dark brown seeds. Each plant is capable of producing hundreds of seedpods, each with abundant seeds. Seeds remain viable in the soil for many years.

Roots. The root system consists of a taproot and branching secondary roots.

Habitat. Dame's rocket prefers partial sun, moist to semi-dry conditions, and fertile loamy soil, but avoids acidic soil. It will tolerate full sun if there is sufficient moisture. Preferred habitats include lowland forests, moist meadows, woodland edges and openings, open woods, thickets, semi-shaded fence rows, and banks of ditches and roadsides.



Showy flowers of Dame's rocket

DISTINCTIVE FEATURES

4-petaled flowers, characteristic of the mustard family

Long blooming season with showy clusters of purple to white flowers

Lance-shaped, alternate leaves become progressively smaller up the stem

LOOK-ALIKES

Dame's rocket resembles *Phlox*—but all phlox species have opposite leaves and 5-petaled flowers. The non-native Garden phlox, *Phlox paniculata*, is tall, blooms July to September and requires full sun. The native blue-flowered Forest phlox, *Phlox divaricata*, is smaller (up to 2 feet), grows in denser shade, and blooms April to June. Dame's Rocket also resembles another non-native mustard—Money plant, *Lunaria annua*—which is grown in gardens and escapes as a weed. *Lunaria* has large, round, coin-like seed capsules, and leaves that are indented where they join the leaf stalk.

LIFE HISTORY AND INVASIVE BEHAVIOR

Reproduction is only by seed. Dame's rocket produces a basal rosette the first year and flowering stems the second and later years. Flowering stems die back to rosettes in fall. It lacks natural predators and diseases in North America and thus successfully competes with native species for water, light and nutrients, often forming dense monocultures. This species is at a relatively early stage of encroachment, so the extent of its impact on native vegetation and its patterns of spread are not well-documented. It is increasingly moving into high quality forests. Unfortunately, part of its success as an invasive plant is because of its widespread distribution in commercial "wildflower" seed mixes. Seeds readily escape gardens and enter natural areas via rainwater runoff, waterways, vehicle tires, footwear, and animal fur.



In bloom Dame's Rocket closely resembles *Phlox*

IMPACTS ON FORESTRY AND FORESTERS

4-petaled flowers

On Forestry: It competes with native herbaceous plants at the edges of woodlands, in woodland openings, and in semi-open forests. This competition for light, moisture, and nutrients may inhibit tree seedling germination and growth.

On Foresters: Seeds are easily spread via mud on tires and other equipment, and by sticking on or falling into boots, shoes, and clothing.

HISTORY AND LORE

The genus name for Dame's rocket, *Hesperis*, is derived from the Greek *hesper*, which refers to the evening, possibly because this plant is known to be more sweet-scented in the evening. The species name *matronalis* means 'of matrons.' Other common names for this plant include Sweet rocket, Dame's violet and Mother-of-the-evening. Dame's rocket was introduced for ornamental purposes from Eurasia in the early 1600s. Its spread nationally has been accelerated by the inclusion of Dame's rocket in "wildflower" seed mixes for gardens. The leaves, oil, and seeds of this plant are edible. The young leaves are rich in vitamin C and can be eaten raw as a cress substitute in salads. The plant is also cultivated for its essential seed-oil, which is used in perfumes.



Sharply toothed leaves that decrease in size as they ascend the stem.



Rosette in spring with last year's dead flower stems.



Rosette in fall, first-year plant.

Information taken from the Forest Invasive Plants Resource Center website:
<https://www.na.fs.fed.us/spfo/invasiveplants/factsheets/pdf/dames-rocket.pdf>.

Folklore:

Virginia Spring Beauty, *Claytonia virginica*

By Stephen Johnson

Ralph Waldo Emerson said that the "Earth laughs in flowers" and few plants symbolize the glorious flush of spring or the way the Earth might smile in springtime quite as well as Virginia spring beauty, *Claytonia virginica*. It isn't the earliest to flower or the most flaunting. It is often, however, the most abundant and gleaming of the spring ephemerals.

Spring beauty was once a diminutive member of the Portulacaceae, now the Montiaceae, having 25 congeners.

in North America, sharing the east with only two others. Morphologically simple, it has a small cluster of basal leaves and a paired set of succulent, grass-like stem leaves. Its flowers are nearly symmetric stars, with petals ranging in colour from pearl white to pale rose pink. It is often striped with darker pink starkly contrasting with the bright petals; this creates a pattern suggesting a discoid candy cane. This floral characteristic is found in other *Claytonia* species. The west coast species *C. sibirica* is even known as candy flower.

The genus is named for one of the first botanists in the Virginia colony, Dr. John Clayton. Virginia spring beauty was but one of Clayton's many contributions to the modern Linnaean classification system. Clayton also essentially authored the first Virginia flora, *Flora Virginica*, in 1742. Two hundred and fifty years later, the second *Flora of Virginia* was published and features John Clayton's spring beauty on its dust jacket.

Despite the plant's simple morphology, several visible and chemical variations occur, enough to make *Claytonia virginica* a model organism for scientific studies. One study showed that throughout eastern North America there are four distinct flavonoid races. Flavonoids are phytochemicals responsible for aromas and flavours as, for example, in tomato fruits. Race I is mid-Atlantic ranging west to Kentucky. Race II is southern ranging to Louisiana. Race III is northern ranging from Virginia to Iowa and north to Quebec and Ontario. Race IV is narrowly Midwestern ranging from western Kentucky to southeast Iowa. Another study found four distinct flower colour classes ranging from white to deep rose. It showed that pollinator selection favoured plants with redder flowers but that herbivores, such as slugs, tended to favour plants with whiter



Photo taken from www.greenmylife.in/ephemeral-flowers

flowers driving selection pressure toward plants with white flowers, maintaining the range of flower colours described in the first paragraph here.

Taxonomists have also played with a suite of morphological traits. *Claytonia virginica* var. *virginica* with broad stem leaves is typically northern while *C. virginica* var. *acutiflora* with narrow stem leaves is typically southern. Plants with pale yellow flowers belong to *forma flava* while plants with apricot to canary yellow flowers found in atypically moist habitats are variety *hammondiae*. The flowers of all forms and varieties are also dynamic, being initially staminate for just one day. For a few days afterward the flowers are pistillate. This mechanism evolved to encourage cross pollination.

Over the course of two to three weeks Virginia spring beauty completes its floral trajectory. Its racemes unfurl, revealing a succession of up to 15 flowers pollinated by a plethora of native bees from the mellifluously named *Ceratina* to *Andrena erigeniae*, a probable Virginia spring beauty specialist. By the time the tree canopy closes, spring beauty is difficult to find: its leaves have yellowed and it's now sprouting numerous cryptic capsular fruits. Seeds are typical of temperate forest herbs—shiny black orbs with attached fat bodies (eliasomes). Eliasomes are dinner bells for ants, which avidly gather seeds, detach the delectable eliasomes and consign the seed to the garbage heap, a perfect substrate for growth.

The commonality of Virginia spring beauty makes the plant easy to find by pollinators but also by pathogens such as the fungus *Puccinia mariaewilsoniae* var. *mariae-wilsoniae*, another specialist of this spring ephemeral which can devastate populations. The fungal infestation is spectacular in that it contorts



A mining bee is one of several pollinators that visits Darcie McKelvey's Carolina spring beauties.



Carolina spring beauty, *Claytonia caroliniana*

the stem leaves into vertical orientations where numerous tan cups characteristic of *Puccinia* are easily observed. We hypothesize that this orientation presents the spore-generating cups to stronger wind currents and thus aids spore dispersal. *Puccinia mariaewilsoniae* is autoecious meaning it needs no other host. A dormant spore insidiously passes winter, germinating in spring to infect a new *Claytonia virginica* plant.

The densities of Virginia spring beauty also lead to copious herbivory. Mammals ranging from chipmunks and field mice to black bears excavate and eat the

corms. In southern forests the diet of feral hogs may consist of 58% Virginia spring beauty corms.

There are few reports of Native Americans using Virginia spring beauty as food; only the Algonquin of Quebec are said to have boiled the corms rather like potatoes. In the 1940's, Harvard botanist Merritt Lyndon Fernald referred to the corms as "fairy spuds" and suggested harvesting from areas where the plants were abundant. Samuel Thayer, in *Forager's Harvest*, discusses harvesting methods and points out that the best time to find corms is when the plants are in flower. However, that is when the corms contain the lowest starch content. Before or after flowering, when the corms are hidden, is when spring beauties have the highest caloric content. Thayer notes that the leaves are welcome additions to a salad.

If you try to grow Virginia spring beauty at home, you just might have some success. While it favours calcareous soils, it can tolerate a soil range from basic to neutral to even very low acidity as long as the structure is loam. *Claytonia* is not fond of clay. So go ahead and plant them, just don't be surprised if a chipmunk decides that your spring beauty is its sprightly meal.

Stephen Johnson is fascinated by the stories of the early Virginia plant explorers. He studied Ralph Waldo Emerson in graduate school and looks forward to seeing the first spring beauty.

Reprinted from *The Blazing Star*, a Newsletter of The North American Native Plant Society, Spring 2013, Vol 14, No 2.

The Spring Beauty

A man was sitting in his lodge by the side of a frozen stream. It was the end of winter, the air was not so cold, and his fire was nearly out. He was old and alone. His locks were white with age, and he trembled in every joint. Day after day passed, and he heard nothing but the sound of the storm sweeping before it the new-fallen snow.

One day while his fire was dying, a handsome young man approached and entered his lodge. His cheeks were red, his eyes sparkled. He walked with a quick, light step. His forehead was bound with a wreath of sweet-grass, and he carried a bunch of fragrant flowers in his hand

"Ah, my son," said the old man, "I am happy to see you. Come in! Tell me your adventures, and what strange lands you have seen. I will tell you of my wonderful deeds and what I can perform. You shall do the same, and we will amuse each other."

The old man then drew from a bag a curiously wrought pipe. He filled it with mild tobacco, and handed it to his guest. They each smoked from the pipe and then began their stories.

"I am Peboan, the Spirit of Winter," said the old man. "I blow my breath, and the streams become still. The water becomes stiff and hard as clear stone."

"I am Seegwun, the Spirit of Spring," answered the youth. "I breathe, and the flowers spring up in the meadows and woods."

"I shake my locks," said the old man, "and snow covers the land. The leaves fall from trees, and my breath blows them away. The birds fly to a distant land, and the animals hide themselves from the cold."

"I shake my ringlets," said the young man, "and warm showers of soft rainfall upon the earth. The flowers lift their heads from the ground, the grass grows thick and green. My voice recalls the birds, and they come, flying joyfully from the Southland. The warmth of my breath unbinds the streams, and they sing the songs of summer. Music fills the groves wherever I walk; and all nature rejoices."

And while they were talking thus a wonderful change took place. The sun began to rise. A gentle warmth stole over the place. Peboan, the Spirit of Winter, became silent. His head drooped, and the snow outside melted away. Seegwun, the Spirit of Spring, grew more radiant, and rose joyfully to his feet. The robin and the bluebird began to sing on the top of the lodge. The stream began to murmur at the door, and the fragrance of opening flowers came softly on the breeze.

The lodge faded away, and Peboan sank down and dissolved into tiny streams of water that vanished under the brown leaves of the forest. Thus, the Spirit of Winter departed, and where he had melted away, there the Indian children gathered the first blossoms, fragrant and delicately pink—the modest Spring Beauty.

Submitted by Gordon Mitchell, who works for the Columbus, Ohio Metroparks and was a member of the Central Ohio Native Plant Society, which merged with the Columbus Historical Society in the Spring of 2010.

Sawmill Wetlands at Risk



Several years ago, a developer constructing a large development just east of Columbus, which in part destroyed a wetland, was required by the U. S. Corps of Engineers to mitigate the loss of that wetland by acquiring and permanently protecting a higher quality wetland in accordance with the Nation's no net loss of wetlands policy. The mitigation site acquired in 1996 known as Sawmill Wetlands is by Ohio EPA standards a very high quality 17.85-acre wetland located within the Interstate 270 loop around Columbus. It is surrounded by very high-priced Dublin-area developments. As part of the protection in perpetuity deal, this wetland was transferred to the ODNR

Division of Wildlife as “a natural area to be used by the public for the observation of flora and fauna.” The Division constructed a boardwalk and fenced it off and named it the Sawmill State Wildlife Education Area. It is the last remaining “wild area” in an otherwise heavily populated, highly developed commercial area which makes it ideal as an outdoor educational facility for all Ohioans to enjoy. In recent years the Friends of Sawmill Wetlands was established to partner with the Division of Wildlife to enhance the wildlife value of the site and provide public educational tours. The Friends of Sawmill Wetlands have been very actively engaged with the public and it has been a great partnership up until recently.

Unbeknownst to the Friends of Sawmill Wetlands, on April 12, 2012, a former Chief of the Division of Wildlife initiated a contract with another developer, JDS So Cal, Ltd., to transfer Sawmill Wetlands to that developer in exchange for 43.33 acres along the bank of the Olentangy River adjacent to Highbanks Metro Park in Delaware County. The developer reportedly planned to build

a hotel or assisted-living facility on the wetland. What is incredibly unbelievable, even absurd, is that the contract, as drawn up by ODNR, stated that if the state defaulted on the contract, the Sawmill Wetlands would be given to the developer at no cost; public lands probably worth over a million dollars. Another questionable provision in the contract was that ODNR agreed to work with the developer to obtain a release of the “public use” restriction on the Sawmill property. In December 2012 during a meeting between the parties to the agreement, according to court documents presented, the ODNR Assistant Director expressed concern about the viability of the project and stated to JDS representatives that ODNR could back out of the land swap contract. Subsequently, the decision was made by ODNR to default on the contract. Although JDS was in negotiation to purchase the replacement property in Delaware County, JDS never purchased that property knowing that ODNR was defaulting on the contract. Columbus and Franklin County Metro Parks purchased the property instead.

Consequently, JDS sued ODNR on December 16, 2014.

On September 2, 2016, Franklin County Common Pleas Judge Christopher Brown’s summary judgment findings determined ODNR breached its obligations under the contract and therefore must give Sawmill Wetlands for nothing to the developer since it breached the contract it had with him. Judge Brown ordered ODNR to deliver the deed and all rights and interest in Sawmill Wetlands to the developer no later than thirty days from the effective date of his entry. Since then Ohio Attorney General Mike DeWine has appealed Judge Brown’s decision. The battle to save Sawmill Wetlands is not over yet. But one has to wonder, “What in the heck were top administrators in ODNR thinking when they agreed to the absurd provisions of this contract.” Or, for that matter, just trying to divest themselves of this prime educational natural area in the first place on the basis that as a result of development around the Sawmill Property, ODNR determined “there is very limited utility for the Property to serve its originally intended purposes.”

Reprinted from *ONAPA News*, a publication of the Ohio Natural Areas and Preserves Association, Winter 2016-2017, Vol 4, No 1.

Book Review:

Life in the Soil: A Guide for Naturalists and Gardeners

By James B. Nardi

Publisher: University of Chicago Press (2007)

Pages: 336 pages

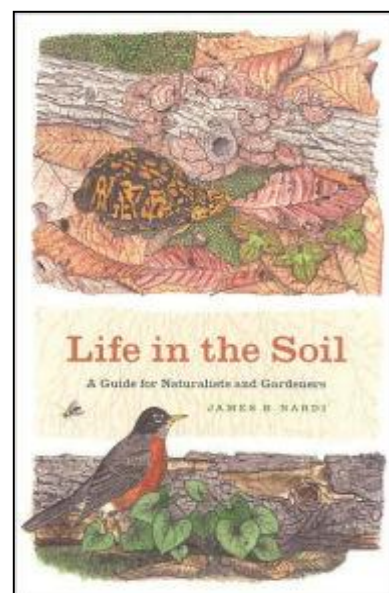
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Paperback, E-book

Price: \$25.00 paperback, \$10.00 - \$25.00 E-book

Size: 5.5 x 8.5"



Review by Amy Perry

Life in the Soil: A Guide for Naturalists and Gardeners is like an educational coffee table book. It invites browsing. It is fun to open it at random and see what pictures and facts that particular section serves up. Scientific but written for lay people, the book contains fascinating botanical and biological information, an ecological perspective, green gardening methods, tips for backyard naturalists, descriptions of chemical and physical processes, and illustrations on almost every page, including a diagram of the current thinking about phyla and domains. Nardi is a biologist at the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. The book, lives up to my expectations for one published by that eminent source, the University of Chicago Press. Nardi's clear and engaging writing conveys the science along with empathic feel for the creature and its world. The book features 67 color plates, some of them taken through a microscope. The figures look as if they were drawn with a very soft fine pencil; they're almost charming enough to appear in a children's book, yet their scientific precision is indubitable (a bar showing scale occurs in every figure). The book's geographic range includes all five main continents, but concentrates on North American temperate life forms. It discusses natives by implication, when it describes natural outdoor processes.

Part One, "*Marriage of the Mineral World and the Organic World*," presents the soil and its denizens as a complex system and a part of the environment in general. For example, Nardi points out that plant and animal decomposition supplies soil with chemical elements that ultimately come from air and water, resulting in the soil's being far richer in nourishment than the air and water we are aware of above-ground. Natives are definitely implied in Part One's description of the life cycle of soil—its creation from rocks and its enrichment and stabilization by early succession plants, followed by the role of roots in nitrogen-fixing, in extraction of essential minerals, and in improving the soil. Part One also explains the reasons for many gardening principles and makes them easier to remember. If you've ever wondered exactly how clover and legumes fix nitrogen, or why it's good to plant cover crops in a vegetable garden, or why fresh green plant matter is a good addition to a compost pile, here is where you can find out.

The largest part of the book, Part Two, "*Members of the Soil Community*," describes how 78 types of animals ranging from the microscopic, such as bacteria, to the large, such as woodchucks, interact with soil. In each animal's section a *Fact Box* gives the common name, classification (phylum, class, order, etc.), place in food web (decomposer or digger, for example), impact on gardens (ally, adversary, or absent), size in metric units, and number of species. Next the author describes individual examples, such as, in the birds section, the woodcock. This bird shuffles around in leaf litter for its dinner. Its eyes are set far back on its head so it can keep a lookout for danger. Its legs are very short so its long bill can easily poke into the detritus and soil. Although the woodcock is still funny-looking to me, I appreciate its suitable design as a litter-poking machine.

Part Three, "*Working in Partnership with Creatures of the Soil*," discusses how to enrich farm and garden soil. It covers preventing erosion, maintaining soil structure, discouraging invasive species, and composting as an antidote to soil abuse, among other green topics. An appendix, "*Collecting and Observing Life of the Soil*," teaches ways naturalists can see for themselves some of the creatures covered in the book. For example, the author tells how to make an emergence box to make soil invertebrates emerge from their leaf-litter or rotting-mushroom habitat. A science teacher or parent of a curious child—or a curious adult!—will find this section helpful. A glossary, index, and list of books for further reading complete the book. This book is worth its price for the illustrations and fact boxes alone. It describes the stage on which our beloved native flora flourish and interact with fauna, and results in an appreciation of the marvelous, endless complexity of life on Earth.

Amy Perry is a retired editor, a recording secretary of INPAWS, and a member of the Central Chapter.

Reprinted from *Inpaws Journal*, a publication of the Indiana Native Plant and Wildflower Society, Spring 2015, Vol 22, No 1.

Interesting Factoid:**Seed Bombing Native Plants**

Seed bombs originated in Japan and are an ancient technique called *Tsuchi Dango*, which means "Earth Dumpling." They were reintroduced by Japanese microbiologist Masanobu Fukuoka in 1938. Fukuoka pioneered the world of

sustainable agriculture by initiating “Natural Farming,” a philosophy whereby gardening techniques do not include weeding, pesticides, fertilizers or tilling. Mother Nature is left to take care of the seeds we sow, and she decides which crops to provide us with. This is similar to the process of natural selection, because ultimately nature decides what will grow and when germination will occur, be that in seven days or several seasons away.

In the 1970’s, a group of garden activists called the “Green Guerrillas,” founded by artist Liz Christy, threw seed bombs in abandoned lots and wasteland. The group’s mission was to combat empty and ugly vacant lots around New York City. Today the organization remains a stronghold for sustainability within city limits, championing over 600 community gardens. This was the start of the guerrilla gardening movement. Since then, there have been many types of seed bombs invented: some were made of condoms or balloons filled with water, fertilizer and wildflower seeds, and some were even made from Christmas baubles filled with compost and seeds. Most guerilla gardeners prefer to use the ancient methods and use natural materials like that used by Masonobu Fukuoka, whose recipe was entirely natural, made from earth, clay, and seeds.

What exactly is seed bombing? Here is Wikipedia’s definition: Seed bombing, or in some cases aerial reforestation, is a technique of introducing vegetation to land by throwing or dropping seed balls (compressed bundles of soil containing live vegetation). Often, seed bombing projects are done for arid areas or land that is traditionally off-limits. Watering is usually left to Mother Nature. Guerrilla gardening is the act of gardening on land that the gardeners do not have the legal rights to utilize, such as an abandoned site, an area that is not being cared for, or private property.

Interesting Factoids:

- The earliest records of aerial reforestation date back to 1930. In this period, planes were used to distribute seeds over certain inaccessible mountains in Honolulu after forest fires.
- Seed bombs are also widely used in Africa; where they are put in barren areas or areas that are simply grass. With technology expanding, the contents of a seed bomb are now placed in a biodegradable container and “bombed” grenade-style onto the land. As the sprouts grow, the container biodegrades into the soil. The process is usually done as a large-scale project with hundreds dropped in a single area at any one time. Provided enough water, adequate sunlight, and low competition from existing flora and fauna, seed-bombed barren land could be host to new plants in as little as a month.
- The International Sunflower Guerrilla Gardening Day, scheduled on the 1st of May of every year, is an annual international event when guerrilla gardeners plant sunflowers in their neighborhoods, typically in public places perceived to be neglected, such as tree pits, flower beds and roadside verges. It has taken place since 2007, and was conceived by guerrilla gardeners in Brussels.
- In this country, John Chapman, known as “Johnny Appleseed,” traveled through settler towns in Pennsylvania and Ohio in the early 1800s sowing apple seeds. He planted nurseries, constructing fences to protect them from livestock and enlisting a caretaker for each property. Trees were sold on shares, and Appleseed returned regularly to tend the nurseries.

Guerrilla gardening has been used for ages as a means of protest, to beautify a neighborhood, cultivate food, and build community. It’s often done illegally, on appropriated land, and while some have equated it to vandalism and trespassing, plenty of others argue it affects a locale positively, greening abandoned and forgotten spaces. While Johnny Appleseed could be considered our nation’s first guerrilla gardener, there are positive ways to make a difference today. Seed bombs containing native plant seeds can offer a way to beautify a vacant swath of earth into a pasture of wildflowers. The act of guerilla gardening and throwing bombs could represent a “a different kind of society, one that is happier, more sociable and sustainable.”

So, if you are thinking about seed bombing a parcel of land, stick to these three basic rules: Use only land that is unused or undesired, use seeds that would germinate on the land you have chosen, and leave the land in better condition than you found it. After all, what is subversive about planting flowers?

This article was based on material taken from www.wikipedia.com and www.seedfreedom.net. Pictures taken from www.livingearthcreations.wordpress.com.





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