On The Fringe

Journal of the Native Plant Society of Northeastern Ohio

Program Schedule – Summer 2019

Thursday, June 20, 6:30 – 8:00 pm – 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. Meet at the Kent State Geauga Campus, 14111 Claridon Troy Rd, Burton, OH 44021. **No Registration required.**

Thursday, July 18, 6:00 – 9:00 pm – Mentor Marsh Restoration. From helicopter spraying of invasive phragmites to reseeding the marsh with native species, the Cleveland Museum of Natural History has been busy restoring the marsh to its former glory. Mentor Marsh Naturalist Becky Donaldson gives an overview of the history of Mentor Marsh and the restoration efforts at the Carol Sweet Nature Center before relocating to the rebuilt board walk to see what is blooming. End the evening enjoying the sunset from the boardwalk. **Directions:** Meet at Nature Center 5185 Corduroy Rd., Mentor. **Registration required** by emailing Judy at Judysbarnhart@gmail.com.

Saturday, August 17, 11:00 – 1:00 pm – Walking Fern Excursion. The seldom seen Walking Fern, featured in the Winter 2019 Journal, with its overlapping fronds arching over limestone rock, is highlighted on this hike with member David Orndoff at 4H Camp Whitewood's Warner Hollow. Hike is moderate with steep areas and creek crossings. Meet at the camp: 7983 S Wiswell Rd, Windsor, OH 44099, waiver needs to be signed before hiking. **Registration required** by emailing Judy at Judysbarnhart@gmail.com.

Jane McCullam Memorial

Long time Native Plant Society Journal Editor and Membership chair Jane McCullam lost her battle with cancer on April 25. She, and good friend and founding president, Ann Malmquist spent countless hours publishing a quality Journal and adding chapters around the state. Jane was editor from December 2000 until 2009 when she turned it over to the current editors Diane Christensen and Bill Oberdick, though still proofing articles. Due to her exceptional computer skills, Jane laid out the yearly program of events flyer, the annual membership renewal notice, the 30th anniversary booklet and corrected my one-handed typing. She encouraged me to resume activities with the Society after I suffered a stroke, often driving me to board meetings and programs. I dedicated Saturday's hike on April 27, 2019 with Jim Bissell at Stanton Forest to her. Jane loved sharing her Newbury property along the Chagrin River with the Society. She co-led a spring wildflower walk to see the numerous green dragons on the flood plain in May of 2017. Jane's family celebrated her life on Saturday May 4th at her daughter's house on the property she loved.





Jane would have turned 79 on May 4th.

Judy Barnhart, President of the Native Plant Society of Northeastern Ohio

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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.

National Pollinator Week is a Time to Celebrate Pollinators and Spread the Word About What You Can Do to Protect Them

Twelve years ago, the U.S. Senate's unanimous approval and designation of a week in June as "National Pollinator Week" marked a necessary step toward addressing the urgent issue of declining pollinator populations. Pollinator Week has now grown into an international celebration of the valuable ecosystem services provided by bees, birds, butterflies, bats, and beetles.

June 17-23, 2019 has been designated National Pollinator Week by the U.S. Department of Agriculture and the U.S. Department of the Interior.

Light Footsteps Farm
Chardon, Ohio

Just minutes from historic downtown Chardon, Ohio is a permaculture homestead and learning center with a special emphasis on human and environmental health. Christine and Michael, along with their daughter Cora Luna, are stewards of this land on which they hope to demonstrate a resilient, Earth-centered lifestyle in which humans are integral members of the vast polyculture we call "nature". Light Footsteps Farm is a 23-acre parcel of land growing many medicinal herbs along with a homestead garden and orchard.

Many of the herbs grown are used to make herbal wellness products that are sold at the farmers' market and online.

In their first full season on the farm, Christine and Michael (along with a number of volunteers) installed a 2500 sq. ft. keyhole garden, a medicine wheel garden, a hügelkultur orchard, and began planting native woodland medicinals like goldenseal, *Hydrastis canadensis,* and ramps, *Allium tricoccum,* into their 20-plus acres of forest. A flock of chickens also came to the land, along with a hive of bees and several milking goats.

Their mission is to strive to help women and families reconnect with the natural world by educating about natural living and herbal remedies rooted within the rhythms of the Earth.

Visit the website; www.lightfootsteps.com, for more information.

How To Fight Plants with Plants

By Nancy Lawson

What's to love about native plants that spread like crazy? Everything! Enlist these hardy troopers to help reclaim habitat from invasive species.



Pollinators, birds, and many other animals need food—and lots of it. Vigorous natives like this golden ragwort, *Packera aurea*, provide that. So, what are we so afraid of? Photo by Nancy Lawson.

They were the last lonely leftovers: seven pint-size transplants I couldn't even give away. Other beauties—boneset, coneflowers, bee balms, asters—had flown off the shelves of my cubicle wall, where a "Free to Good Home" sign invited friends and colleagues to give them a new spot in their own gardens.

But the golden ragworts, still small and fairly nondescript, had a harder time selling themselves. It didn't help that their name sounded like "ragweed," the plant everyone loves to hate, or that I repeatedly responded with an enthusiastic "Yes!" when asked: "Does it spread?" My fellow gardeners, trained to panic in the face of plants that refuse to be kept down, backed away in terror, eyeing the pots as they would a petri dish of ebola virus.

So it was that the remaining stash of this underappreciated groundcover—which feeds bees and shelters many other creatures—ended up back in my yard, though not in its rightful place in the ground. Putting the plants aside under some sassafras trees by our driveway, I intended to give them a better home, but life got in the way. As the leaves dropped and the snow fell and one season passed into another, there they sat, neglected and trapped in their plastic pots.

That spring, though, the plants gave me an unexpected gift in spite of my poor stewardship. As I headed past the driveway to tackle the onerous spring ritual of removing garlic mustard, *Alliaria petiolata*, a persistent invasive species, I discovered the little ragworts had gotten a head start on the task. Refusing to be held captive, their roots had burst forth from the holes in the bottom of the pot and rambled fearlessly into the garlic mustard patch.



Going head to head: The silver-tinged leaves of garlic mustard, an invasive species, once covered the ground layer beneath our sassafras grove. Some renegade golden ragworts took it upon themselves to solve the problem.

To understand what a revelation this was, it helps to know a little about garlic mustard. Originally from Europe and Asia, it's allelopathic, releasing chemicals that inhibit the growth of other species. It's a threat to forest understories in the U.S. and Canada and also to the West Virginia white butterfly, which seems to mistake garlic mustard for its host plant, laying eggs of caterpillars doomed to die on leaves they can't eat.

But in my yard, garlic mustard has finally met a worthy contender. Watching a habitat-harming plant succumb to an equally hardy native has opened my eyes to a more creative, life-affirming method of curtailing invasives on my property. Since it's not in my nature to want to fight nature, I find the process of cutting, digging and pulling plants—no matter their provenance—a little heart-wrenching. And because I don't want to support products that harm the land and the creatures who survive off it, I avoid herbicides. Besides, I'd rather not remove any vegetation that's providing even minimal habitat if there are few other alternatives for nesting and food. Even my preferred, seemingly harmless, method of laying down cardboard to kill grass has its consequences, potentially smothering the homes of native bees and other creatures nesting in the ground.

The idea of adding more wildlife-friendly plants while gradually removing less helpful ones, then, appeals to my sensibilities much more than declaring chemical and mechanical warfare to clear the land—and, in at least some cases, it can be more effective in the long term. Here are a few experimental methods that have proven successful on different types of sites, including my own.

1. Guerilla garden: Insert natives into patches of invasives.

Following the ragwort's unexpected coup, I added more to the 12-by-12-foot garlic mustard patch and watched delightedly as it claimed the whole territory. And it took only three years—about the same length of time a similar experiment played out in the yard of Sue Barton, a University of Delaware associate professor and extension specialist. In her original attempts to eliminate Japanese stilt grass, *Microstegium vimineum*, an invasive species that crowds out other plants, she'd tried all the standard approaches—mowing, herbicides, replanting with low fescue, and pulling the remaining scattered interlopers that sprouted. Ultimately, the effort had failed. "It's now just solid stilt grass," she says.

When Barton later confronted a second patch of stiltgrass in the backyard, she changed her approach, manually weeding out the space before planting a combination of native woodferns, in the *Dryopteris* genus, and Japanese painted ferns, *Athyrium x 'Branford Rambler*. By spring, the fall project had taken hold and the plugs were thriving. "But the stiltgrass started to grow, and so that summer, it was like a treasure hunt, looking for the little fern plugs in amongst the two-feet-tall stilt grass," Barton says. She again weeded the stiltgrass out by hand, and in the third year, the 1,000-square-foot space had filled in entirely with ferns. Disliked by deer, the plants were also large enough to shade the ground and prevent further germination of stiltgrass.

"I don't necessarily know that ferns would work in every situation—what works in one instance is not guaranteed to work another," says Barton. "It's just our best guess."



Winning! By last spring, the sizable patch of garlic mustard had been mostly overtaken by the ragwort, which covers the ground with beautiful round leaves for most of the year and produces flowers for several weeks in early spring.

2. Employ Defensive Linebackers: Practice preventive planting.

Some native plants can hold their ground even against the most impressive offensive lineup. At one Maryland site, Southeastern wild rye, *Elymus glabriflorus*, has been observed staking its claim in a garden otherwise overtaken by invasive Canada thistle. Proactively planning for this type of "competitive exclusion"—a term for describing species duking it out for the same resources—is the best way to ensure long-term sustainability in landscapes expected to thrive on their own, says Claudia West, coauthor of *Planting in a Post-Wild World: Designing Plant Communities for Resilient Landscapes*.



Ferns inserted into a patch of Japanese stiltgrass, which can produce up to 1,000 seeds from a single plant, quickly began to cast shade that prevented further stiltgrass germination in Sue Barton's garden.

"I'm on a consistent mission right now to find highly aggressive and thuggish native plants," she says. "I am looking for native species that have all the ecological value, and that can outcompete some of the invasive stuff we're dealing with."

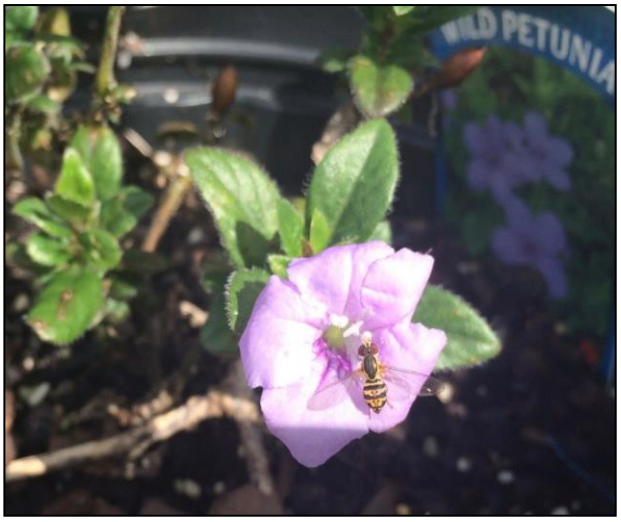
In planting projects she undertakes as the ecological sales manager for North Creek Nurseries, West sometimes sneaks in tough native spreaders like wild petunia, *Ruellia humilis*, and native sedges—species that provide food and cover for wildlife that has evolved to depend on them. Though some of the plants won't leave room for much else, the tradeoff is worth it. "I'd rather have a very thuggish, vigorous native plant take over an area than have it covered in honeysuckle or autumn olive, especially for landscapes that we know from the beginning will not receive a lot of care," says West. "Think about all the storm water maintenance along highways. Think about parking lots. We're looking for plants that can stand their ground."

It's a useful strategy in many home landscapes as well, especially for gardeners with a heart and mind for helping wildlife but a property covered in turfgrass edged by invasive vines and shrubs. Preventing further encroachment of these plants in my own yard are mountain mint, blue mistflower, bee balm, elderberry, gray dogwood, Pennsylvania sedge, and other stalwart defenders. Planted little by little over many seasons in areas where they can freely spread their wings—and roots and seeds—they've started to fill in previously barren or invasive-prone spots in our two acres.

3. Recruit Volunteers: Encourage self-starters.

"If I do nothing, what will happen?" asks pioneering landscape designer Larry Weaner in his 2016 book, *Garden Revolution: How Our Landscapes Can Be a Source of Environmental Change*. While not advocating for a cessation of gardening, Weaner encourages readers to use the question as a guiding principle for creating an ecological landscape or restoring a degraded site. In other words, what native plants are already lying dormant in the land, waiting for us to stop mowing them down? What valuable seeds might migrate into the garden on the breeze or in the bellies of birds? Weaner has seen this strategy come to fruition in his planting projects, as when he added Indiangrass, *Sorghastrum nutans*, to a client's meadow and later saw it thriving in an adjacent lawn that a neighbor had let go—and grow.

Refusing to be held back, such unexpected visitors are an increasingly common occurrence on my property as well.



Does it spread readily, even aggressively? I'll take it! After hearing that wild petunia is a vigorous grower, I knew I had to try it. The flower fly who came to visit the pot while I was at the nursery helped seal the deal.



I've transplanted bits and pieces of this original bee balm—one of the first perennials in my new garden 17 years ago—all over our property. It has never let me (or the hummingbirds) down, filling in large spaces with its spectacular firecracker blooms just in time for the Fourth of July. Invasive species don't even try to get near its dense clumps.

Learning who they are and how they grow has been one of the great joys of gardening (or what I'm starting to think of as "un-gardening"). Some are diminutive, like the blue-eyed grass, *Sisyrinchium angustifolium*, that came up singly in a patch of old turfgrass by our back deck. Others make themselves known with wild abandon, like the hyssop-leaved thoroughwort, *Eupatorium hyssopifolium*, that shot up high above an old bulb garden we inherited from previous homeowners, beckoning fall-migrating monarchs. An entire field of broomsedge, *Andropogon virginicus*, and purpletop grass, *Tridens flavus*, graces our backyard where there used to be only mowed lawn, making way for more wildflowers—and eventually trees—with each passing year

Two summers ago, as I pondered how to address invasive ground ivy, *Glechoma hederacea*, in the front yard, my husband stopped mowing there so the bees could feed on the plant's early flowers and nest in the bare patches of soil between. By fall, when the ground ivy had continued to spread and I was still plagued with indecision, we discovered that nature had been thinking much more creatively. An inspection of the area revealed nine baby Eastern red cedars peeking up through the leaves, humbling me once again: the previous spring, I'd spent $30 on three diminutive plugs of the same species, and here were three times as many coming up for free. They were healthy and strong and ready to provide nesting, cover, and fruit for many bird species, as well as food for foxes, rabbits, raccoons, and butterfly caterpillars who call that tree species home.

Ground ivy, the plant I didn't want, was serving as a kind of nurse plant for the one I did—something that could only have happened when we'd stopped cutting everything off at the knees.



The joy of discovery: Watching what comes next is part of the fun of letting the lawn go.
Above: Turfgrass turned into broomsedge, which then put out the welcome mat for purpletop grass, frost asters, and hyssop-leaved thoroughwort that attracts common buckeyes and other butterflies, who greet us on our mowed path leading to the compost pile.

For more tips on working with nature in your garden, check out Nancy Lawson's new book, *The Humane Gardener: Nurturing a Backyard Wildlife Habitat.*

Reprinted from The Humane Gardener website; www.humanegardener.com, March 2, 2017.

Photos by Nancy Lawson.

Recreation of a Van Gogh Painting Using Over an Acre of Native Plants



Stan Herd has been doing these types of artworks or "earthworks" since 1981.

The world is Stan Herd's canvas. Recently, he transformed a field into Van Gogh's 1889 Painting "Olive Trees" by cutting it into a meadow of long grass and wild flowers near Minneapolis' St-Paul International Airport. Herd used rototilling to cut the frame and dug furrows to accentuate the shadows and details of the image. The "Earthwork is comprised of mainly large native plants and materials. He planted oats, squash, gourd, pumpkin and melon to add color and dimension to his "painting".

Steve Herd refers to his outdoor art pieces as "earthworks". His first was a 160-acre portrait of Native American chief Satanta in 1981, and he's done many pieces since. "Olive Trees" is a much humbler undertaking, taking up "only" 1.2 acres. "It's an iteration of Van Gogh's painting writ large in native plants and materials," Herd said in an online interview. "The opportunity to engage with one of my favorite artists in the world was pretty unique for me."

If you are flying through Minneapolis-St. Paul International Airport this fall, look down. You can keep an eye out for Vincent van Gogh's "Olive Trees" from your airplane window. It will not be hard to miss. This aerial crop art covers more than an acre of land.

Van Gogh painted "Olive Trees" in 1889. It was one of many paintings he did of olive trees. He painted 15 alone between June and December of 1889.

The one seen on the field is at the Minneapolis Institute of Art, in Minnesota.

There are strong shades of yellow in the painting. They might show the olive trees in the fall months. He was trying to catch the olive trees. "They are old silver, sometimes with more blue in them, sometimes greenish, bronzed, fading white, above a soil which is yellow, pink, violet tinted orange...very difficult."

It was made to honor two milestones. The first is the Minneapolis Institute of Art's 100th birthday. The second is the 125th anniversary of van Gogh's death.

It took Herd six months of digging and planting to make van Gogh's 1889 painting. The work is currently on display at the MIA. Herd planted crops to copy the artist's iconic brushwork. He grew patches of pumpkins. He grew squash and watermelons. He also grew cantaloupes. He placed mulch, rocks and soil to create darker lines.

"Olive Trees" will be on display through the fall. But Herd plans to mow it down. He will do that in concentric circles. This should help copy van Gogh's brushstrokes.

Information for this article taken from taken from: www.canyouactually.com, posted on March 19, 2019; www.tweentribune.com and www.demilked.com.

Insect Diversity

By Adam Thomas

Not only do native plants do a better job of hosting and supporting local insect communities than their non-native counterparts, but a University of Delaware study shows that non-native plants are compounding the problem of declining species diversity by supporting fewer herbivores across landscapes.

The research was conducted by UD alumna Karin Burghardt and Doug Tallamy, professor of entomology in the University's College of Agriculture and Natural Resources, and published in a recent issue of *Ecology Letters.*

To conduct the study, the researchers planted imitation yards with different common gardens of both native and non-native tree species and collected data over a three-year period, measuring the herbivore communities and species found on those plants.

They compared native trees to non-native trees that had no close native relative and to non-natives that are closely related to the native community.

Within the distantly related group, they found that herbivores were less diverse when they looked at individual non-native tree species, and as they moved from one non-native tree species to another, they found similar species of herbivores using those trees.

"You get this compounding effect where you have a lower diversity of herbivores per tree but then you also are getting more similar species as you move between trees species and among sites, so you end up with even less diverse communities than you would expect," said Burghardt.

They found this to be especially true of non-native plants that had no close native relative.

"There is this group of species of non-natives that do not have any close native relatives at all. These non-natives support more generalized and redundant herbivore communities than the native plants that they're potentially replacing on landscapes," said Burghardt, who added that this is especially true for young herbivores that use the plants for food.

Tallamy said that finding young herbivores on a plant is a good indication of how that plant is supporting the local ecosystem, as opposed to finding adults, which could be on a plant for a number of reasons, such as resting or looking for a mate.

"The relationship between the adult and food is far weaker than the relationship between immatures and food, so when you find adults on the non-natives, it doesn't mean that much. When you find immatures, that's what you should be measuring," Tallamy said. "Those are the plants that are creating those immatures and so we do get significant differences between the immatures that are using native plants versus the immatures using non-natives."

When it comes to non-native plants that are congeners—non-native plants with a close native relative, such as Norway maple and



Norway Maple, Photo taken from www.austinbotany.wordpress.com.



Red Maple, Photo taken from www.publicdomainpictures.net

Non-native plants that are congeners—non-native plants with a close native relative, such as Norway maple and red maple—the researchers found that those seem to support herbivore populations across sites more similar to those on natives than the non-native plants that have no native relatives at all.

red maple—the researchers found that those seem to support herbivore populations across sites more similar to those on natives than the non-native plants that have no native relatives at all.

Tallamy said that few unique species were found on these non-native congeners, as most species found were also living on their native relative.

He also stressed that that native plants always do the best job per tree of supporting herbivore communities when compared to their non-native counterparts. This study expands the understanding of that fact by looking at whether that lower per tree diversity is magnified further by non-natives hosting more similar communities across trees species and locations.

Burghardt said the goal of the research was to understand how the composition of the plants that homeowners plant in their yards affects herbivore communities.

"If you think about it, you're driving around the suburban environment, and every time a new development goes in, you have a lot of decision making happening as to what plant species are going to be planted around those properties," Burghardt said. "If we do all that landscaping with non-native plants, are we limiting the wildlife and conservation support system that could be available within that given plot of land? What the gardens we constructed for the study are trying to replicate are landscaping
decisions that people might make if they wanted to support native insect communities that in turn support much of the diversity around us."

Doug Tallamy has authored 84 research publications and has taught Insect Taxonomy, Behavioral Ecology, Humans and Nature, Insect Ecology, and other courses for 34 years. He is the author of the award-winning book, *Bringing Nature Home*.

Reprinted from *Wildflowers*, the Bulletin of the Botanical Society of Western Pennsylvania, Fourth Quarter 2015. This article is also on-line at https://canr.udel.edu/?s=professor+look+at+effects+of+non-native+plants+on+herbivores+

Invasive Insect:

Spotted Lanternfly, *Lycorma delicatula*

It's the spotted lanternfly (SLF), and if you haven't heard much about it yet, you will. The spotted lanternfly's Latin name is *Lycorma delicatula*. The insect is native to China, Vietnam, and India.

What is the spotted lanternfly?

SLF is an invasive pest from Asia that primarily feeds on tree of heaven, *Ailanthus altissima*, but can also feed on more than 70 types of plants and crops, including grapes, hops, apples, and peaches as well as oak and pine trees. The spotted lanternfly is a planthopper. Although it has two pairs of wings, it jumps more than it flies.



Spotted lanternfly fourth (final) instar nymph (immature)
Photo taken from www.bugguide.net.

Identification

Nymphs are black with white spots and turn red before transitioning into adults. They can be seen as early as April. Adults begin to appear in July and are approximately 1 inch long and ½ inch wide at rest, with eye-catching wings. Their forewings are grayish with black spots. The lower portions of their hindwings are red with black spots and the upper portions are dark with a white stripe. In the fall, adults lay one-inch-long egg masses on nearly anything from tree trunks and rocks to vehicles and firewood. They are smooth and brownish-gray with a shiny, waxy coating when first laid.

Where are they located?
SLF were first discovered in Pennsylvania in 2014 and have since been found in New Jersey, Delaware, New York, and Virginia. It is now considered an invasive species in eastern Pennsylvania, southwestern New Jersey, and northern Delaware.


SLF with closed wings,
Photo: Lawrence Barringer, Pennsylvania Department of Agriculture, bugwood.org

What is the risk?
SLF pose a significant threat to agricultural and forest health. Adults and nymphs use their sucking mouthparts to feed on the sap of more than 70 plant species. This feeding by sometimes thousands of SLF stresses plants, making them vulnerable to disease and attacks from other insects. SLF also excrete large amounts of sticky "honeydew," which attracts sooty molds that interfere with plant photosynthesis, negatively affecting the growth and fruit yield of plants.
Although native insects also secrete honeydew, the size of SLF and the large populations that congregate in an area result in large accumulations of it. The sticky mess and the swarms of insects it attracts can significantly hinder outdoor activities. In Pennsylvania, where SLF populations are the densest, people can't be outside without getting honeydew on their hair, clothes, and other belongings.

How do they spread to new areas?
SLF can only jump and fly short distances; they spread primarily through human activity. They often hitch rides to new areas when they lay their eggs on vehicles, firewood, outdoor furniture, stone, etc. and are inadvertently transported to new areas.

What are the signs of an infestation?
- Sap oozing or weeping from tiny open wounds on tree trunks, which appears wet and may give off fermented odors.
- One-inch-long egg masses that are brownish-gray, waxy and mud-like when new. Old egg masses are brown and scaly.
- Massive honeydew build-up under plants, sometimes with black sooty mold.


Left: Unhatched spotted lanternfly egg masses. Right: Hatched spotted lanternfly egg masses.
Credit: Pennsylvania Department of Agriculture; www.aphis.usda.gov

Information for this article taken from www.dec.ny.gov and www.wikipedia.com.

An Alternative Urban Green Carpet

How can we move to sustainable lawns in a time of climate change?

By Maria Ignatieva and Marcus Hedblom



An alternative grass-free (tapestry) lawn boasts native plants. Picture taken from www.blogs.reading.ac.uk.



A lawn in dominated by decorative parterre in a formal garden. Picture from www.ferrebeekeeper.wordpress.com

Lawns are a global phenomenon. They green the urban environment and provide amenable public and private open spaces. In Sweden, 52% of the urban green areas are lawns. In the United States, lawns cover 1.9% of the country's terrestrial area, and lawn grass is the largest irrigated nonfood crop. Assuming lawn would cover 23% of cities globally [on the basis of data from the United States and Sweden], it would occupy 0.15 million to 0.80 million km (depending on urban definitions), that is, an area bigger than England and Spain combined or about 1.4% of the global grassland area. Yet, lawns exact environmental and economic costs, and given the environmental and economic impacts of climate change, it is time to consider new alternative "landscapes" in urban planning as beneficial and sustainable alternatives.

Although lawns are widespread, their properties have received less attention from the scientific community compared to urban trees or any other types of green areas. Designers, urban planners, and politicians tend to highlight the positive ecosystem services provided by lawns. For example, lawns produce oxygen, sequestrate carbon, remove air pollution (although this has not been supported by good quantitative studies), reduce water runoff, increase water infiltration, mitigate soil erosion, and increase groundwater recharging. But perhaps the most important positive ecosystem service is the aesthetic and recreational benefits they provide. Aesthetics are a primary factor in modern urban planning and landscaping practice. For example, in developing countries located in arid zones, designers argue that lawns and irrigated turfs considerably enhance the quality of urban life.

Recent heat waves and an increasing prevalence of droughts have raised economic and environmental concerns about the effects of urban lawns on climate change. These circumstances have encouraged researchers and the public to reconsider the green-carpet concept and assess the controversial aspects of lawns. It has been argued that lawns moderate urban temperatures, but this when they are compared to the absence of any vegetation. In arid regions of the United States, lawn irrigation accounts for 75% of the total annual household water consumption. Another concern is the contamination of groundwater or run-off water due to overuse of fertilizers, herbicides, and pesticides. In 2012, the U.S home and garden sector used 27 million kg of pesticides. The positive effect of soil carbon sequestration on the climate footprint of intensively managed lawns was found to be negated by greenhouse gas emissions from management operations such as mowing, irrigation, and fertilization. Gasoline-powered lawn mowers emitted high amounts of carcinogenic exhaust pollutants. Moreover, substituting plastic lawns for degraded open green areas eliminates real nature from cities and arguably reduces overall sustainability given that they reduce habitats, decrease soil organisms, pollute runoff water, and may well have yet unknown negative consequences for human health through plastic particles.

However, the most noticeable constraint to new alternative lawn thinking may be the contribution of lawns to urban aesthetic uniformity and urban ecological homogenization,

where lawn plant communities become similar across different biophysical settings. From the vast variety of the grass genera, only a limited number of species are selected for lawns. In cold-season countries, *Festuca rubra, Lolium perenne, Poa pratensis,* and *Agrostis* spp. are the most frequently used grasses, and in warm-season countries, *Cynodon dactylon, Paspalum* spp., *Stenotaphrum secundatum,* and *Zoysia japonica* are the dominant species. In many regions, lawn grasses are becoming invasive. The main intent of lawn care is to keep the dominance of only a few species and eliminate the presence of others (all considered as lawn weeds).

The reason behind lawn uniformity may lie in its origin. Grass plots in ornamental gardens most likely appeared in medieval times and were probably obtained from the closest pastures and meadows. They were small and quite biodiverse (containing a large number of meadow herbaceous plants). In the 17th century, the role of lawns increased in the decorative grounds of geometrical gardens. For example, in iconic French Versailles, short-cut green grass was perfectly blended with the ideology of the power of man over nature. The English landscape, or the "natural" style of the 18th century, introduced an idealized version of urban nature: grazed grasslands with sparsely planted shade trees and the "pleasure ground" next to the mansion with a short, smoothly cut lawn. With the introduction of mowers and lawn-seed nurseries, the English pastoral vision flourished further in the public parks during the second half of the 19th century. In the 20th century, the modernistic prefabricated landscape was based on the same English picturesque model as the "natural" landscape, which was often mistaken for ecological quality. Consequently, monoculture and intensively managed lawnscapes dislodged the majority of native zonal plant communities in urban environments. At the beginning of the 21st century, perfect green lawns became part of the uptake by non-Western countries of the ideal Western lifestyle and culture.

Since the end of the 19th century, there have been numerous attempts to create alternatives to homogeneous short-cut conventional lawns. For several decades, British researchers tried to promote the idea of an urban meadow (infrequently mown) as an alternative to high-maintenance lawns. There are different typologies of such urban meadows: Sheffield's "naturalistic herbaceous plantings" (mixed native-exotic meadows of native grasses and different herbaceous plants with added exotic plant forms) and the use of mostly native meadow (prairie and tussock grasslands) plants in urban parks and private gardens, popularized in Europe and the United States. Unfortunately, none of these ideas flourished because the lawn has been an unquestioned norm and people perceive lawns as urban nature.

What is the state of alternative lawnscapes today? The most dramatic implementation of new lawn thinking is in Berlin, Germany, where spontaneous vegetation is accepted as a fundamental landscape design tool. In Gleisdreieck Park and Sudgelande Nature Park (both established on abandoned railways), some areas were left to "go wild" and thus have been colonized by spontaneous vegetation. This has successfully challenged societal norms of conventional green lawns and has been accepted by local people. Recent research in the United Kingdom and Sweden showed that people desire to change the monotonous lawn to a more diverse environment. Grass-free lawn is one of the latest movements in both nations and is based on the use of low-growing native (in Sweden) or native and exotic (in the United Kingdom) herbaceous plants without the use of grasses. The goal is to create a dense biodiverse and low-maintenance mat, which can be used for recreation.

What about future research on urban lawns? Of course, new plant species that can survive heavy tramping or long drought, for example, are desirable. Beyond plant research, studies on planting design must go beyond the theoretical. Specific geographical, cultural, and social conditions of each country must be factored into such alternative lawn planning research. In Australia, South Africa, and Arizona, alternative lawns might be based on xeriscape local plants. In Chinese cities, historically proven groundcover species could provide sustainability and a sense of place. Lawns could become a universal model for experimental sustainable design and urban environment monitoring.

New alternative lawns represent a new human-made "wild" nature, which is opposed to the "obedient" nature of conventional lawns. Creating a new, ecological norm requires demonstration displays, public education, and the introduction of "compromised" design solutions. For example, a strip of conventional lawn can frame prairie or meadow and other "wild" vegetation and show a presence of culture in nature. The use of colors such as gray, silver, yellow, and even brown in lawn-like covers can add a feeling of real nature. Thus, one crucial challenge is how to accelerate people's understanding of sustainable alternatives and acceptance of a new vegetation aesthetic in urban planning and design.

Reprinted from *Insights*, a publication of Science Magazine, October 2018, Vol 362, No 6411.

Folklore:

Sprites in our Wetlands

By Ray Stewart

Water Sprites are mythical creatures associated with all variety of wet places. They have the ability to breathe air or water equally well. Thought to be composed of spirit as much as corporeal substance, they are very small. One source claims that among their favorite pastimes is to tease butterflies and ride on the backs of fireflies. Folktales describe these whimsical Water Sprites as good flyers with excellent endurance but a short attention span. Story-telling and ancient traditions are interesting to explore, but did you know that there are actual sprites right here in Ohio? Yes, and they have a number of things in common with lore and legend of distant places in the deep past. Sprites are diminutive flying creatures that inhabit the low vegetation and mosses near water sources, especially wetlands. Their transparent wings are nearly invisible, disguising their means of sustained flight. They move through the vegetation with grace and skill, seeming to appear out of nowhere, then vanish in the blink of an eye. Their lives are lived partially swimming under water and at other times in an aerial ballet.



I am describing our smallest members of the order Odonata. These are the sprites, a type of narrow-winged damselfly. In Ohio there are two species of sprites, the Sedge Sprites and Sphagnum Sprites. The males are more brightly colored than females, with a bright metallic shine. They differ from the Eastern Forktail damselfly, which is readily observed almost anywhere Odonata are found. Sprites are smaller, close to an inch in length, are shiny and lack the eyespots seen in bluets, another common type of narrow-winged damselflies. The genus name for sprites, *Nehalennia*, refers to a second century goddess from the low country of Zeeland in Holland. That area is mostly river delta, where several rivers reach the North Sea, including the Rhine. Today most of the 'reclaimed' land is below sea level. *Nehalennia* was worshiped by travelers, many of whom traded goods from the heart of Europe and into the British Isles. Once again, the mythology ties these creatures to wetlands and spiritual connections from many centuries ago. Their names describe their preferred habitats. The sedge sprite can be quite common in the sedges and other emergent plants that enjoy wet soils. Their range extends across southern Canada and the northern half of the U.S. While common and widespread, they are often overlooked because of their tiny size; they appear to be flying needles. The sphagnum prefers the boggy wetlands with mats of sphagnum moss either floating or on the surface above saturated soils. Its range covers most of the eastern US from Wisconsin to Main south to northern Florida.

While the sprite's stature is unassuming, they must have a significant effect on their surrounding ecology. They are carnivores, and in their space, they are considerable predators. As airborne adults, they capture and consume all manner of flies, gnats and mosquitoes. Looking closely at their legs reveals lengthy spines used in the capture of lesser creatures that get too close. As aquatic larvae, they eat anything smaller than themselves.

Flight time for sprites in Ohio peaks in June through August. When you next explore a wetland in summer, bend down to scan the vegetation. If you search carefully, perhaps you'll spot one of these mythical beings in the material world.



Reprinted from *Wetland Trumpeter*, a newsletter of the Ohio Wetlands Association, September 2018.

Center; Imagined image of a Water Sprite, taken from www.pinterest.com.

Sphagnum Sprite, *Nehalennia gracilis. Photo taken fro*m www.dragonhunter.net.

Why This Invasive Plant Has A Shot At Some Redemption

By Barbara Moran

Robert Buchsbaum walks into a salt marsh on Boston's North Shore. Around him towers a stand of bushy-topped *Phragmites australis*, an invasive plant commonly known as the common reed. Or, as some call it: the all-too-common reed.

Buchsbaum kneels in the mud and begins to dig. *Phragmites* is an enemy that this regional scientist with the Massachusetts Audubon Society knows all too well. The plant, which typically grows about 13 feet high, looms over native marsh plants, blocking out their sunlight. When *Phragmites* sheds its lower leaves, or dies, it creates a thick layer of wrack that keeps native plants from germinating. Its stalks clog waterways, thwarting fish travel. Salt marsh sparrows avoid them. The roots, or rhizomes, secrete a chemical that prevents other plants from growing, and they grow so deep they are nearly impossible to pull out.



Bushy heads of Phragmites plants at the edge of the Rough Meadows marsh.

That's what Buchsbaum is kneeling in the mud at Rough Meadows Wildlife Sanctuary to demonstrate. He grabs a *Phragmites* root with both hands, leans back and pulls with all his might. Nothing. *Phragmites* isn't going anywhere.

"It's very resilient," says Buchsbaum. "You need to keep after it, and you're going to be doing it forever."

But this stubborn bully of a plant might have a shot at redemption. A recent study from the Smithsonian Environmental Research Center found that the very traits that make *Phragmites* a tough invader—larger plants, deeper roots, higher density—enable it to store more carbon in marshy peat. And as climate change races forward, carbon storage becomes a bigger part of the ecosystem equation.

"We're living in a high CO2 world," says Ian Davidson, lead author on the Smithsonian study. "So, it's become pretty interesting to understand how much carbon is stored in the biosphere, and in particular types of habitats."

Davidson is quick to say that his research doesn't advocate removing native plants in favor of *Phragmites*.



Phragmites skirt the edge of Rough Meadows marsh.

"There's fairly universal agreement that we should try to reduce and prevent invasions as much as we can. But there's also the world we have right now," he says. "[Carbon storage] is one factor that should be considered among many when managers are trying to make decisions about how to help the system function."

While scientists have long studied carbon sequestration in forests and farmlands, says Davidson, they've more recently started to examine "blue carbon," which is stored in marine habitats like marshes and mangroves. His study is one of the more recent to look at the differences in carbon storage between

native and invasive coastal species. And while Davidson's study is not definitive, its findings on *Phragmites* were surprising, and gave local ecologists food for thought.

"That paper was very interesting," says Anne Giblin, a senior scientist and interim director of the Ecosystems Center at the Marine Biological Laboratory in Woods Hole. "[It] did a very nice job talking about the balance between having increased carbon storage, but perhaps having slightly lower ecosystem services for other things, such as biodiversity."

Giblin says the tradeoffs are complicated. *Phragmites* gives off methane, a potent greenhouse gas. And the plant only stores carbon permanently when it decomposes into peat, and the peat is left alone. But *Phragmites* may offer another advantage in the face of climate change—since it builds up so much, it can buffer marshes against sea level rise and storm surges.

"In the mid-Atlantic where they are losing a lot of the marshes really quickly, there [are] discussions about whether or not they should be treating frag because it is one of the few plants that is keeping up with sea level rise," says Nancy Pau, a biologist at the Parker River National Wildlife Refuge on Plum Island. "So those discussions are happening at kind of localized levels."

No scientists are advocating for actually planting *Phragmites*, and Mass. Audubon, the state, the National Park Service and many other groups have active programs to combat it. But where the invader has already won, or has overtaken a mudflat or brownfield, some think it may best be left alone.

Back on the marsh, Mass. Audubon's Buchsbaum says he bears the invader no ill will. But he doesn't want to use it to combat climate change.

"Should we be depending on an invasive species, which causes a degradation to the habitat, to make up for our foibles of emitting too much carbon into the atmosphere?" asks Buchsbaum. "Is that the right approach to take, or should we be doing something to reduce our carbon footprint?"

But reducing our carbon footprint quickly enough to avoid the worst consequences of climate change won't be easy. And it may mean opening our minds to some of our old enemies.



Fall colors in the marshes around Plum Island Sound

Information taken from the WBUR website; https://www.wbur.org, November 27, 2018. A segment also aired on this date on WBUR 90.9.

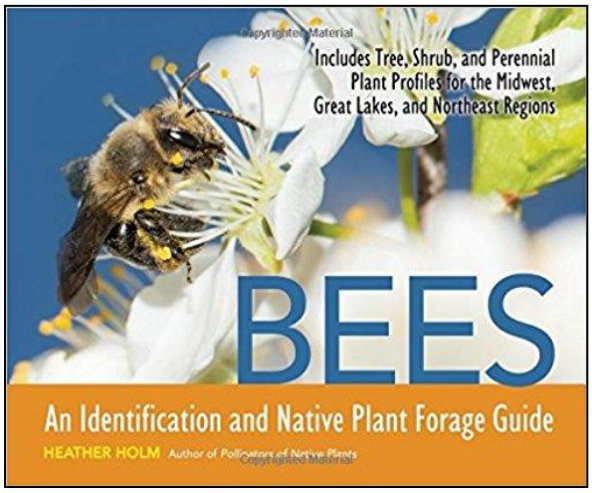
Barbara Moran is the senior producing editor for WBUR's environmental vertical. For more than 20 years, she has worked as a science journalist committed to covering issues of public health, environmental justice and the intersection of science and society. She has written for many publications, including *The New York Times, New Scientist, Technology Review* and the *Boston Globe Magazine*, and produced television documentaries for *PBS, The Discovery Channel, The History Channel* and others.

Photos by Robin Lubbock.

Book Review:

Bees: An Identification and Native Plant Forage Guide

By Heather Holm



Publisher: Pollination Press LLC; 1st ed. February 2, 2017
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Paperback
Package Dimensions: 10.2 x 8.2 x 0.8 inches
Price: $22.95

Review By MaryLaura Lamont

Some people may wonder why I am reviewing and highly recommending a book on bees in the newsletter of a botanical organization. The answer is that while it is an excellent guide to just about everything you may want to know about bees and their life histories, over half the book deals with the important plants these bees depend on.

Author Heather Holm has done an outstanding job of writing about bees and the plants they interact with. She discusses the insects' all-important nectar sources as well as plant materials certain bees use for nesting. These plants include wild and cultivated flowers, native shrubs, and large and small trees. She shows flowering timelines and which bees use each plant. She discusses the plants' habitats and soil types and their sun and shade tolerances. This larger-format field guide discusses just about everything you could think of concerning the interconnected nature of bees and plants.

The top-notch close-up images are not just of bees, but the flowers and plants they depend on. Icons of butterflies, other insects and birds denote the importance of the plant for other species. Additionally, Holm writes about the factors causing bee declines, such as the awful pesticides that contain neonicotinoids.

The book covers bees found from the Northeast to the Midwest. For every book purchased one dollar is donated to the Wild Bee Squad Fund to support native bee research by the University of Minnesota. This book is very worthwhile and a great resource guide. I highly recommend it.

"It would be hard to imagine a book more chock full of the information we need to save our native bees. From helpful ID tips, to body size ranges, to seasonal distribution, to 99 species of the trees, shrubs, and perennials preferred by 27 genera of our most common bees, Heather Holm covers it all. This is the book pollination biologists and homeowners alike have been waiting for!"
Douglas Tallamy, author of *Bringing Nature Home*

Reprinted from the Quarterly Newsletter of the Long Island Botanical Society, Summer 2017, Vol 27, No 3.

Walking in Henrietta Miller's Steps at The Miller State Nature Preserve



Miller State Nature Preserve is adjacent to the Highlands Nature Sanctuary and is the oldest of any preserves on the Rocky Fork Gorge. Miller State Nature Preserve has a rich and compelling display of Appalachian flowers, with dense carpets of ginger, Solomon's Seal, bellwort, bluebells, shooting stars and waterleaf. The preserve is dissected by pristine creeks and boasts beautiful limestone rock formations. The hiking paths are well designed and make use of several small bridges to ford the preserve's musical spring-swollen riffles. Take one or two of the short loop trails from Henrietta Miller's old house site and be sure to pause in the woods below the stone archway, where you can rest on the long run of wooden stairs descending into the gorge.

Be sure to look for the furry clumps of red bats sleeping in the bare trees. In the spring, red bat residents are not only waking up and feeding after spending most of the winter buried under the leaf litter, but they are also migrating through Ohio from the south, heading to the boreal country of Canada. Before the tree leaves unfurl, Miller is a great place to spot them. Look for red bats in young beech trees, six to eight feet above the ground. Young beeches often hold onto little clumps of last year's burnished leaves, and they provide a bit of camouflage for the bats.

Henrietta Miller once owned and loved the land that is today managed as the 85-acre Miller State Nature Preserve. A portion of the preserve was donated to the state back in the mid-1980's by Henrietta and her husband, Eugene. In 1995, Henrietta Miller expanded her philanthropy to include the newly founded Highlands Nature Sanctuary, before it became the Arc of Appalachia Preserve System. Considering that at the time the Sanctuary was only a fragile idea and possessed neither money nor land, Henrietta's initial donation of $20,000 was an immense act of faith. Her gift helped buy the Sanctuary's first acquisition, a portion of 7 Caves, a cave theme park, and leveraged the Arc to be the successful and inspiring non-profit that it is today.

When Henrietta turned over her check to Arc Director, Nancy Stranahan, she said, "Now you bring the Sanctuary of yours all the way up to Miller, okay?" Nancy nodded almost imperceptibly, so little was her confidence. Miller Preserve was nearly a mile away from 7 Caves and it was very hard to imagine the Sanctuary ever being so large as to join the two together. So, Nancy blurted out the safest thing she could think of. "Henrietta, I'll do my best."

It turned out Henrietta's faith was well-placed. The Highlands Nature Sanctuary was indeed destined to grow not only to the outer boundary of Miller State Nature Preserve, but around it and beyond. In 2007, when Henrietta passed from this earth, she left behind a mighty legacy. This you will see for yourself when you walk Henrietta's beloved land in her footsteps, AND when you take the time to visit the Highlands.

Information for this article taken from www.arcofappalachia.org.

Interesting Factoid:

Floral Fidelity

Floral fidelity makes honey bees special. Although honey bees are polylectic, which means they visit many different species of flowering plants, they also exhibit floral fidelity, which means that a bee visits only one kind of flower on any given foraging trip. If there are enough flowers of one type available, a honey bee will continue to visit that same kind of flower all day long. This is great for the plants because the pollen that lands on the stigma is the type needed for fertilization.

In fact, individual bees are likely to keep collecting the same pollen for many days. Only when the source dries up does the forager switch to something else.

Floral fidelity is the reason you seldom see honey bees on small plantings. If you have just a little of this and a little of that in your garden, the flowers are more likely to be visited by native pollinators than by honey bees. A honey bee forager wants to see at least two basket-loads of pollen—probably more—before she starts to collect.

The two different foraging patterns go hand-in-hand with different flight ranges. Honey bees can fly for extremely long distances—a trait that allows them to keep searching for that same flower type and, consequently, allows them to pollinate huge tracts of monocropped farmland. Native bees fly only very short distances, so they are compelled to forage on anything they find within their range—think of honey bees as obsessive/compulsive and native bees as pragmatic.



Interesting Facts:

- Flower fidelity has been observed for thousands of years, since Aristotle in about 350 BC.
- Floral fidelity is one of the main reasons that honey bees are such great pollinators of agricultural crops. When released into an apple orchard, for example, the honey bees will just keep working the apples; they will pay little attention to the weeds flowering at the side of the field or growing between the rows.
- A honey bee has a proboscis which works like a tiny drinking straw that sucks up nectar from flowers. There are two stomachs in a bee. Some nectar goes into a bee's main stomach to digest for food and energy, the rest of the nectar goes into a special stomach where the bee can process the nectar into honey and transport it back to the hive.
- For the honeybees the downside to floral fidelity is this: if the crop they are working has low-quality pollen, most of the pollen coming into the hive during the flowering period of that crop will have the same low-quality.
- Bees store the pollen they collect in pellets. Pollen pellets are the actual pollen off of the bee's legs. Although you can see bicolored pollen pellets frequently on bumble bees, you almost never see them on honey bees. Pellets have distinct colors—sundry shades of white, yellow, orange, blue, and gray. Each pellet is made of one color from one plant species.

Caption: A bumble bee foraging on a self-heal flower, *Prunella vulgaris*. Notice the bicolored pollen pellets—orange fading into white. Photo by Rusty Burlew ©.

Information for this article taken from Honey Bee Suite, www.honeybeesuite.com; Benefits of Honey, www.benefits-of-honey.com and SciFlow, www.scielo.org.

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