



inpaws journal

Indiana Native Plant and Wildflower Society

Spring 2014

Nativars: Friend or Foe?

By Michael A. Homoya

There has been considerable interest of late regarding the use (or misuse) of “nativars” in landscaping, natural community restoration, and utility, e.g., erosion control. A nativar is a cultivar of a native plant, hence the title “nativar.” A

sumac. These have all been selected for particular traits that we find desirable, and are well known nativars of *Physocarpus opulifolius*, *Itea virginica*, and *Rhus aromatica*, respectively.

Some people avoid growing nativars, but why? After all, a native plant with desirable landscaping traits is a good thing, right? In some cases yes, but desire may also have a dark side. Before delving into this issue further, let me state that I’m addressing the use of nativars in home landscaping, not for natural



Birkshirebotanical.org

*In a designed landscape, the nativar *Rhus aromatica* ‘Gro-Low’ provides a band of orange and red foliage during the fall. Gro-Low is a fragrant cultivar of a native sumac. It is not a good idea, however, to plant nativars where they may cross with local native populations.*

nativar is typically developed from a wild native plant or group of plants manifesting a particular desirable trait(s) e.g., growth habit, size, color, etc., that is then cloned or otherwise selectively bred and propagated. Some may also consider a plant a nativar if it’s the product of hybridization between two different native species. This is stretching the definition a bit, especially if the hybridization event could not have occurred naturally in the wild.

Most of the native plants available in the retail nursery trade are nativars. You may know, and possibly even grow, ninebark with purple leaves, or Virginia sweetspire with brilliantly colored fall foliage, or perhaps a low-growing fragrant

Inside

Book Review	14
Hikes	9
Host Plant	16
INPAWS at Work	10
Issues	5
Plant Profile	2,12
Plant Sale & Auction	7

community restoration. Regarding the latter, I’m a strong opponent of utilizing nativars or non-local genetic stock in such projects, but instead advocate using a diversity of local genotypes, originating from as close to the restoration site as possible. There are certainly consequences if the latter is not done (see link in paragraph 5 below). For home landscaping I have less of a concern about using nativars or non-local plants of a given native species, but as we shall see there are considerations to take into account when using them.

It is likely that a particular nativar for purchase originated from an area some distance away from where you wish to grow it. Since a species typically exhibits genetic and morphological differences across its natural range, a nativar that’s been developed from it may exhibit traits

Friend or Foe? – continued on page 6

Colorful

By Barbara Plampin

I predict that early this June, I'll be knee-deep in gold. The gold is thousands of orchid-like flowers magically rising from a firm-bottomed, clear-water pond near my house in what is normally a nearly dry marsh of almost solid blue joint grass (*Calamagrostis canadensis*).



Janet Creamer Mason—Indy Parks



Janet Creamer Mason—Indy Parks



Museum of Science Boston

Cause of this magic? Our extra-heavy 2014 snows, now melted and imprisoned by the underlying clay soil until the moisture evaporates in late summer, and the reproductive mechanism of the "orchids," the great or common bladderwort (*Utricularia macrorhiza*, a.k.a. *U. vulgaris* in the Lentibulariaceae). Usual habitat: less firm-bottomed marshes and fens and mucky, black-watered swamps and bogs. I feel very fortunate to enjoy "my" gold so pleasantly.

With a pouch (palate) on its lower lip and a spur, a 4/5-inch great bladderwort flower does suggest an orchid, but an orchid flower doesn't combine these features. The flower has an upper lip. Six to 20 flowers clothe a thick stem rising to 10 inches above the water. Some think the flowers resemble snapdragons, an apt comparison.

The plants are rootless. Supporting the flowers below the water are floating masses of

forked thread-like leaves, dense and plummy, and numerous tiny sack-like bladders functioning as suction traps. Prey include paramecia. Once, through my microscope, I saw what looked like a tiny pink shrimp (a copepod?) half in, half out of a bladder.

When a friend said she'd seen a TV show claiming that one could hear great bladderwort traps snap shut, we dashed to the marsh and scooped up hanks of submersed plants. Standing each on her own hummock, we held leaves and traps to our ears and listened and listened. Not a peep.

Great bladderwort functions somewhat like a resurrection plant (*Selaginella lepidophylla*). The ends of the leaf-bearing stolons roll themselves into tight balls called turions. When the remainder of the submersed plant dries up, the turions fall to the floor of the marsh. They remain dormant until the right conditions enable them to develop new plants.

How long is dormancy? The usual habitat has enough water for plants to emerge most years. I suggest very long-term dormancy for plants in blue joint marshes. Botanists recorded flora in a blue joint marsh in Dune Acres, Porter County, for decades without spotting great bladderwort there. Most likely, turions arrived on wildfowl feet, as they probably did in a man-made goose pond south of US 20 in that county, where great bladderwort now flourishes. A further guess is that turions may simply remain dormant for three or more years.

At any rate, when the great bladderwort goes dormant this summer, I should be able to find several patches of normal-sized, state-rare intermediate bladderwort (*Drosera intermedia*), another carnivore which last year dwindled to one plant with pinhead-sized leaves.

Can you have your own sea of gold? In his excellent *Carnivorous Plants of the United States and Canada* (second edition, Timber Press, 2002), Donald E. Schnell gives directions for cultivation both indoors and out. Schnell points out that great bladderwort traps enough mosquitoes to affect human comfort. However, a friend and I unsuccessfully Googled for a supplier of plants. (Some places sell a pesticide that does in bladderworts!)

Paint me purple? Indiana has 10 of the 214 or so of the planet's bladderwort species. Of the

Predictions

nine Duneland species, my favorite is the elusive, state-rare purple bladderwort (*U. purpurea*) which in a nearby lake, sends up only two or three flowers most years. However, on July 4, 1976, an artist (Seurat, perhaps) painting this lake would have had to paint a river of purple zig-zagging through the lake, so profuse were the blossoms. Let's hope the heavy 2014 snow melt repeats this aesthetic treat.

Barbara Plampin is a field botanist and a life director of the Shirley Heinze Land Trust. She lives in the Indiana Dunes.



Botany.wisc.edu



wikimedia

On these two pages, clockwise from above: blue joint grass (*Calamagrostis canadensis*); spoonleaf sundew (*Drosera intermedia*); a bladderwort magnified by a factor of 100; leaves and stems of bladderwort; and common bladderwort (*Utricularia macrorhiza*) blooming at Southeastway Park in Indianapolis.

One person's weed is another person's flower

Be cautious of pesticides or herbicides which may kill native water plants. Aquacide Products sells a pesticide that kills great bladderworts, among other species. See www.killakeweeds.com/pages/bladderwort. To grow great bladderwort (*Utricularia vulgaris*), it is important to obtain local genotypes. The best way to ensure this is to find someone in your area who will share theirs or to rescue plants from a local area slated for destruction.

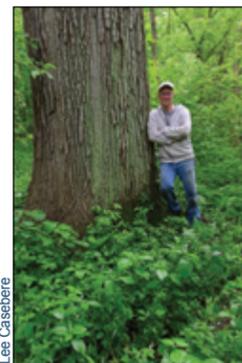
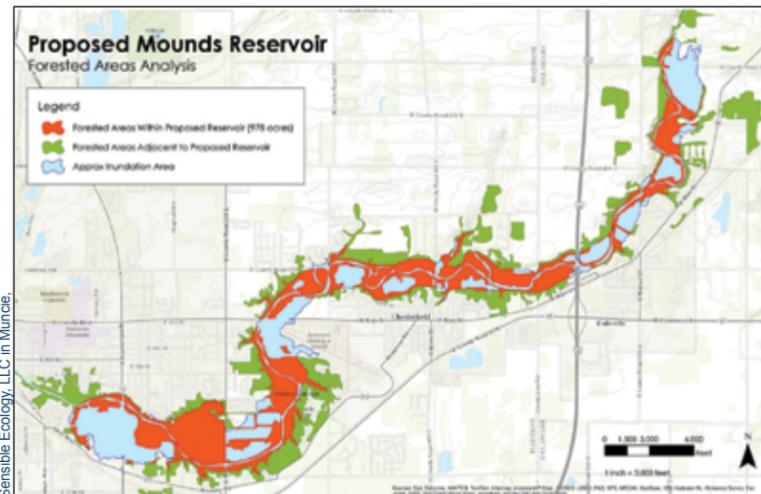
One supplier of great bladderwort turions (dormant buds) turns out to be in the Czech Republic. Although it claims to follow US legal requirements, it certainly can't provide genotypes local to any part of Indiana, nor can US suppliers outside the state. A quick internet search turned up no suppliers in Indiana. If you do find a supplier in the state, be sure to ask where the plant material originated.

Dam Poor Idea

By Lee Casebere

"To build a road is so much simpler than to think of what the country really needs."

— Aldo Leopold, *A Sand County Almanac* (1949)



A map of the proposed Mounds Lake Reservoir shows the 978 acres of forested land to be flooded in red.

Lee Casebere stands beside a huge burr oak in the White River floodplain at Mounds State Park.

It should be of concern to INPAWS members that there is a proposal to build a dam on the White River that would flood parts of Anderson and over seven miles of riparian habitat in Madison and Delaware counties. The reservoir is being couched as a stimulus for economic development in a city that has fallen on hard times.

Anderson was once a bustling factory town catering to the automotive industry, but today those jobs have gone to Mexico and Asia. In addition to economic development, the reservoir is also being billed as a potential water source for the Indianapolis area.

The reservoir would flood over one-third of Mounds State Park, a site of significant natural and cultural resources. The primary purpose of Mounds State Park is that it preserves the best examples in Indiana of mounds built by the pre-historic Adena-Hopewell culture.

Remarkably, the park also contains a significant series of groundwater-fed natural communities including graminoid (grass-related) and forested fens of state-wide significance. Also present are high-quality examples of mesic

and dry-mesic upland forests with mature and old-growth trees of impressive size.

A dedicated nature preserve is intended to protect at least parts of these significant communities, but the entire nature preserve would be destroyed by the proposed reservoir.

Fens are among Indiana's rarest natural communities, and their existence is a product of our glacial past. They nearly always occur near deep, extensive deposits of sand and gravel laid down as the glaciers retreated. Where these highly permeable deposits are underlain by less permeable soils such as clay, groundwater seeping downward reaches the less permeable layers, where it then flows parallel to the ground, and eventually surfaces as seepage and springs in places where drops in elevation expose the water at the surface. At such locations, specialized plant communities develop in the soggy, springy ground. Numerous rare plants and animals live in these special places, many of them habitat-restricted species.

As this reservoir drama unfolds, claims will surface that natural resources lost through flooding will be "mitigated" by replacing them elsewhere through habitat restoration. One of the great fallacies of our day is the lie that re-creating habitats through mitigation is somehow an equal and satisfactory substitute for destroying significant natural communities.

In this case, how do you replace, on a landscape scale, a glacially-created, groundwater-fed, complex system whose parts are not fully known or understood? It can't be done. How then, can one begin to fairly mitigate, and fairly compensate, such a significant loss?

INPAWS hopes to host a program (or piggy-back with another organization) sometime this spring to more fully inform interested folks about the proposed dam. Watch for announcements on the INPAWS blog or in your e-mail.

A group called the Heart of the River Coalition has formed to fight this proposal. For more information, visit their website at: www.moundslakereservoir.org.

Lee Casebere recently retired as assistant director of the Indiana Department of Natural Resources Division of Nature Preserves. He is vice-president of the INPAWS Central Chapter.

INPAWS' stance on reservoir

By Tom Hohman

On February 11, the INPAWS Council passed a resolution that states:

The proposed Mounds Reservoir, on the White River at Anderson, would inundate a rare and unique dedicated state nature preserve, as well as significant areas of mature riparian habitat. The Indiana Native Plant and Wildflower Society believes that this would represent irreparable damage to the flora and fauna of Indiana, and is opposed to the project.

The INPAWS position was based in part on the specific damage that this reservoir would do, which would be significant. However, it is also believed that this project would undermine the state nature preserve law, which has not faced such a challenge since its passage in 1967.

State law provides that a state-dedicated nature preserve may not be disposed of or used for other purposes unless there is determined to be an "imperative and unavoidable public necessity." If economic development is determined to provide that necessity, then no nature preserve in the state would be truly safe.

Tom Hohman is a retired civil engineer who worked for DNR for 39 years. An INPAWS past president, he is currently team leader for the 2014 conference and head of Central Chapter's Invasives SWAT Team.



Left: A spring runs through a skunk cabbage seep in a forested fen at Mounds State Park. One-third of the park would be flooded by the proposed dam.

April 26

Hendricks Gardeners to Host Show

The annual Hendricks County Master Gardeners "Gardening for All Ages" show will be April 26 from 9 a.m. to 4 p.m. at Hendricks County 4-H Fairgrounds, Danville. The free event offers exhibits, speakers, and free trees for the first 800 visitors.

Presentations will discuss food preservation, soil improvement, attracting pollinators, and more. A "Garden Wizard" will answer questions. A children's booth will have games and demonstrations, and youngsters can plant a seed to take home in a pot they decorate. Those interested in becoming a Master Gardener can learn about it at the Master Gardeners booth.

More than 40 exhibitors will offer plants, garden décor, bird-watching supplies, lawn care items and more. Popular booths last year featured "fairy gardens," bluebird houses, rain barrels and Indiana honey. Meal service will be available, and the tradition of offering free seed packets continues. For more information, visit www.hendricksgardeners.com.

Friend or Foe?

continued from page 1

different from those of your area, and may “behave” differently. It might cause large-scale problems in the local landscape, including invasiveness. On the flip side, it may not prosper. And since all individuals of a nativar are typically of one genetic makeup, if one is invasive, or is susceptible to a particular pathogen or pest, such will be the case for all.

One of the more serious problems of growing nativars is the introduction of foreign genes from the nativar into the local population of the same species. This is the result of cross-fertilization between the two and can result in genetic “pollution” of the local species. This is particularly an issue with wind-pollinated species, but with insect-pollinated species as well (many pollinators can fly!). The results from such gene mixing range from poor adaptation of progeny to the local environment to inability of the population to respond to environmental change. (http://nrs.ucop.edu/research/guidelines/non_native_genotypes.htm)

All said, does this mean that we should avoid nativars? Not necessarily. What often matters is placement and context. In a landscape setting – and one that is typically far removed from natural areas – there is less likelihood of gene flow occurring between nativar and locally wild populations. I have a Virginia sweet-spire ‘Henry’s Garnet’ in my back yard (central Indiana). Since Virginia sweet-spire is naturally very rare and restricted in Indiana (found in just 3 far southern counties), the chance of gene exchange between my plant and those growing in the wild is virtually nil. On the other hand, growing it near the Patoka River might pose the risk of cross-fertilization since naturally occurring Virginia sweet-spire grows there.

Will insects and other herbivores feed on nativars? It is possible that a particular nativar may not be palatable to local wildlife, especially insects. There is documentation to support such for some species (most have not been tested), but consider this: the vast majority of insect species and other invertebrates is found only in the context of natural areas, and rarely if ever ventures from them. In comparison, the diversity

of insects in our backyards is comparatively low. Certainly this is due in part to the dominance of exotic plants, but mostly it’s because of the significant alteration of the character and complexity of the natural landscape in which we live. Thus, will it make much difference whether the native plants with which we landscape are of the local genotype, or a nativar of that species, when our landscape won’t harbor most of the fauna that might feed on either of them anyway? Yes, to a degree it will make a difference, and I understand and appreciate that every bit we do to help our native flora and fauna is worthy of our effort. But in the big scheme of things, I believe our **foremost** focus should be on protecting and managing our remaining remnant natural areas. It is abundantly clear that the latter offers the greatest hope in saving the full slate of biodiversity in our state.

Here are a few recommended guidelines to follow for use of nativars. They are by no means complete.

1. To prevent possible genetic contamination, avoid planting nativars in proximity to wild populations of the same species. This is possibly the most significant reason not to use nativars.
2. If proven to be sterile, a nativar may be acceptable for use near areas where wild populations occur. While the downside of sterile plants is possible lack of nectar, pollen, etc., and loss of seed production, it is the safest approach to avoid genetic contamination.
3. Avoid nativars sold as insect- and disease-resistant. These are less likely to support herbivores which in turn support animals higher up on the food chain.

Here are a couple of links to articles with different positions on the use of nativars.

www.wildones.org/wp-content/uploads/2011/12/Nativars-Statement.pdf
<http://gardeninacity.wordpress.com/2013/12/14/are-nativars-the-enemy>

Mike Homoya has been a botanist/plant ecologist with the Indiana DNR Division of Nature Preserves since 1982. He is the author of Wildflowers and Ferns of Indiana Forests: A Field Guide and Orchids of Indiana, both from IU Press.

May 10 Plant Sale & Auction

By Deb Bell Bonte & Ross Nelson

The 2014 INPAWS Annual Plant Sale and Auction will be May 10 at Park Tudor High School, 7200 N. College Ave., Indianapolis. It is one of INPAWS’ most fun and lively events and its most important fundraiser. There are some important things that members can do to contribute to the sale’s success.

Empty pots and cardboard boxes are necessities at every plant sale. If you have unused cardboard boxes or pots, don’t put them in the recycle bin. Instead, set them aside and drop them off from 4:00 to 8:00 pm. the day before the sale or from 7:00 to 9:00 am. the day of the sale at the “upper gym” of the school. Anyone who has wagons and/or wheelbarrows that INPAWS can borrow would help immensely, especially toward the end of the sale when auction buyers are ready to be tallied.

Plant donations from individual donors are INPAWS’ number one source of plant sale plants. As soon as the ground is thawed to let you dig (right now?), please take up any plants you can spare, put them in pots and “babysit” them until the sale so they get strong and attractive. Some enthusiastic members propagate plants just for the sale and begin planning a year in advance. Others consider which plants in the garden need to be divided or thinned and will bring this bounty to the sale the night before. Plants can be brought to the school Friday from 4:00 to 8:00 p.m. or Saturday from 7:00 to 9:00 a.m.

The event starts at 9:30 Sat. with a half-hour presentation on “Native Shrubs and Trees to Enhance your Garden and Yard” by Sally Weeks, Purdue University botanist and author. There is a \$10 fee for the talk, which can be applied towards an auction purchase. The sale is open to the public from 10:15 a.m. to 12:30 p.m. and the auction takes place at 11:00 a.m. Books on native plants, other merchandise, and coffee and snacks will also be sold.

INPAWS uses VolunteerSpot, an online sign-up tool, as an easy way for members to volunteer services. If you are a past volunteer or checked “Plant Sale” as an interest when you joined, you should have received an email invitation already. If you are new or have not received an invitation, e-mail Deb at plantsale@inpaws.org as soon as

possible. Then you can use VolunteerSpot for updates and schedules.

For questions about the plant sale and auction, check www.inpaws.org under “Gatherings” or email Deb at plantsale@inpaws.org. We hope to see you at this year’s plant sale!

Deb Bell Bonte leads the 2014 plant sale team. Ross Nelson led the team for the past three years. Both are members of the Central Chapter of INPAWS.

Native Plant Sale & Auction May 10

Park Tudor High School Upper Gym
7200 North College
(Enter from 71st Street)

FRIDAY, MAY 9 4:00–8:00 p.m.

Bring donated plants, pots & boxes.

SATURDAY, MAY 10 7:00–9:00 a.m.

Bring donated items.

9:30–10:00 a.m.

Presentation: “Native Shrubs and Trees to Enhance your Garden and Yard”

Speaker: Sally Weeks, Purdue University botanist and author.

Fee: \$10, which can be used as a coupon towards an auction purchase

10:15 a.m.–12:30 p.m.

Sale opens to the public.

11:00 a.m.

Plant Auction—choice items and rare finds. Also available: books on native plants, other merchandise, coffee and snacks



At top is the nativar *Physocarpus opulifolius Luteus G (Diablo)*, a cultivar of the native *ninebark* that was bred for the deep purple color of its leaves as they emerge.

Below is *Itea virginica 'Henry's Garnet'* Virginia sweet-spire *Henry's Garnet*, developed for larger flowers and showier fall foliage than the native species.

Oregon State.edu

Missouri Botanical.org

Check out
INPAWS'
great blog at
inpaws.org



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Submissions

All are invited to submit photos, articles, news, and event postings. Acceptance for publication is at the discretion of the editor. INPAWS welcomes differing points of view.

Please submit text and high resolution photos (300 ppi) via e-mail to journal@inpaws.org. Submission deadlines for specific issues are:
Spring—February 15 for April 1 mailing
Summer—May 15 for July 1 mailing
Autumn—August 15 for October 1 mailing
Winter—November 15 for January 1

Membership

INPAWS is a not-for-profit 501(c)(3) organization open to the public at inpaws.org.

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Please direct information of interest to webmaster@inpaws.org.

President's Message

By Jeff Pitts

I'm writing this in mid-February, trusting that by the time you read it, the long frigid nights of winter will have induced a more profound appreciation for the warmth, fragrances and buzzing of Spring.

I am optimistic and enthusiastic as I assume the responsibilities of this office. Established 20 years ago with 16 charter members, INPAWS now boasts over 500 members in six chapters and spearheads a host of valuable programs and events. Thanks to the passion and hard work of many people, INPAWS has seen success and growth.

I joined INPAWS in 2009 after being summarily converted by evangelist, er, entomologist Doug Tallamy. I had attended his lecture at Butler University on the importance of native plants, particularly as the foundation for a healthy natural order which provides ecosystem services necessary for human beings to thrive on earth. I didn't have a place in my heart for indigenous flora prior to that, much less a warm place. I needed someone to help me connect the dots.



INPAWS president Jeff Pitts

This concept – that indigenous species are foundational to life on earth – still seems to be unknown by the vast majority of the people you and I know. As we move into the next 20 years, I believe INPAWS can do even greater things. I am particularly motivated to see us continue to spread this critical message. We are a logical choice for this task.

Over the next two years, in addition to working to maintain and improve what INPAWS is already doing, I will put energy into three specific areas:

We must maximize our resources to educate

Explore with the Division of Nature Preserves

Ecologists from the Indiana Division of Nature Preserves will lead several spring hikes on IDNP's properties. Hikes are free, but registration is required at www.in.gov/dnr/naturepreserve.

April 12 – Wesselman Woods, Vanderburgh County

May 3 – Bryan Memorial, Clinton County

May 17 – Tribbet's Woods and Wells Woods, Jennings County

June 21 – Ambler Flatwoods, LaPorte County

June 29 – Mounds Fen, Madison County

others on the critical role of indigenous species in maintaining healthy ecosystems.

For our influence to be optimized, we must broaden our ranks to include more youth and young adults. Many of us have gray hair – we need to be infecting the next generation with our passion, so as to tap their energy, ideas and longevity.

We must collaborate with like-minded others to most effectively accomplish our mission. The whole is greater than the sum of its parts; we can see greater accomplishments over the long term if we collaborate with those who share our passions and commitments.

Historically, a steward is one appointed to care for the property of another. The Earth is not ours; we are here only for a while. We are sojourners, and we are called, during our pilgrimage on Earth, to be its stewards. Environmental stewardship has never been more important. May our society become an army of environmental stewards moving into our spheres of influence knowledgeably, persuasively and peacefully, to protect, preserve and reclaim our natural heritage for coming generations.

Hikes

INPAWS funds forbs in prairie restoration

By Adam Thada

For 20 years, students and faculty of Taylor University have been conducting research at the Upland Prairie Restoration, a Grant County site that has become overly dominated by warm-season grasses such as *Andropogon gerardii* (big bluestem). This dominance is likely the result of limited forb seed in the original seed mix, as well as the lack of historically appropriate disturbances over the past two decades. One of our main restoration goals is to increase the native floral diversity of the site.

In such a competitive environment, some disturbance is needed to compromise *A. gerardii* and open up light resources for germinating seeds. Thanks to a grant from INPAWS, I was able to purchase local ecotype prairie seed for my thesis project. I researched two different types of disturbance methods used to aid interseeding of forbs:

1) biomass removal of the accumulated thatch (haying vs. burning) and 2) application of a grass-specific herbicide. Five species were sown in the spring of 2013 after thatch removal: *Parthenium integrifolium* (wild quinine), *Eryngium yuccifolium* (rattlesnake master), *Baptisia alba* (white indigo), *Pedicularis canadensis* (wood betony), and *Rudbeckia hirta* (black-eyed Susan). Herbicide was applied in May and June while *A. gerardii* was actively growing. The grass was visibly browned and stunted, but there was no mortality even after two applications. As expected, treated sites had significantly less aboveground biomass. Untreated sites grew thick and tall with grass, which quickly shaded out

many of the sown seedlings.

Overall, forb seedlings were 50-75% more abundant in herbicide-treated plots, especially those of *B. alba*, *P. integrifolium*, and *R. hirta*. *E. yuccifolium* did equally well in treated and untreated plots, suggestive of its “conservative” establishment habit. Many land managers have praised *P. canadensis* for its hemiparasitic relationship (ability to live independently or as a parasite) to *A. gerardii*, but it failed to germinate in my trial.

Plants also differed in size as well as abundance. *P. integrifolium* seedlings in untreated plots were quite small, rarely growing more than two inches. Many of the seedlings in treated plots were four inches or larger, the tallest reaching eleven inches. Not a bad first year as far as perennial prairie plants go!

These results suggest that a grass-specific herbicide may be an appropriate and affordable tool for adding forb diversity to grass-dominated prairie restorations.

No differences were found between hayed and burned plots in the first year, though some research suggests that in comparison to fire, haying could cause less damage to establishing forbs and be less stimulating to warm-season grasses.¹

During the course of my field work, I recruited and trained several volunteers to assist with seedling identification, biomass estimation and plot maintenance. I also presented my research at several regional conferences, including the Indiana Academy of Science.

I am indebted to the INPAWS membership for making this research possible, to my advisors (Scott Namestnik, Robert Reber, and Dr. Paul Rothrock), and to Leland Boren for making the prairie available. Thank you for supporting the stewardship of our natural heritage.

Adam Thada lives in Grant County on the Mississinewa Moraine. He is finishing his Master of Environmental Science degree at Taylor University and is looking forward to a career in natural resources stewardship.

¹ Tix D, and Charvat I. 2005. Aboveground biomass removal by burning and raking increases diversity in a reconstructed prairie. *Restoration Ecology* 13:20–28.

INPAWS at work



Wild quinine (*Parthenium integrifolium*), top, and wood betony (*Pedicularis canadensis*) were among the native species sown in an attempt to increase floral diversity at a site in Grant County.

yuccifolium (rattlesnake master), *Baptisia alba* (white indigo), *Pedicularis canadensis* (wood betony), and *Rudbeckia hirta* (black-eyed Susan). Herbicide was applied in May and June while *A. gerardii* was actively growing. The grass was visibly browned and stunted, but there was no mortality even after two applications. As expected, treated sites had significantly less aboveground biomass. Untreated sites grew thick and tall with grass, which quickly shaded out

Polyculture & “the amiable farmer”

By Hilary Cox

Recently I have been popping over to Hazel’s for my lunch breaks to watch the James Herriot series “All Creatures Great and Small.” (She has Netflix!) The early series recalls my parents’ era – the 1930’s, prior to World War II. The middle series is from my childhood and takes me on a nostalgic trip down the 1950’s memory lane.

Each year in July our teacher parents would pack us three children and all our camping equipment into our Ford Thames van – proudly named Cake’ole, Yorkshire slang for a large mouth, so-called for the van’s capacity to swallow five people plus everything else – and off we would go on our summer holiday.

We would head off to various parts of the UK, wherever the weather promised the best, find a suitable farm with an amiable farmer, and set up camp.

These farms were similar in their set-up across the British Isles and very similar to those in the TV series: a few sheep, a couple of cows, some pigs with piglets, chickens, maybe a horse or two, though these were getting scarce even then. There would be hayfields, cornfields (“corn” in England is actually wheat), a vegetable garden, maybe a small orchard with apples, pears and plums. Well-tended hedgerows provided nuts and berries. Diversity at work.

With the farmer’s encouragement we learned the arts of milking cows, ringing pigs, gathering eggs. If the farm was situated close to the coast, we would rent a rowing boat and go mackerel fishing. Idyllic.

Fast forward to today.

With the advent of industrial agriculture, those diverse small farms have disappeared off the face of the earth, and in their place are large herds of cattle milked by machines; chicken and turkey factories; and vast expanses of land covered in a single crop, with no dividing hedgerows – all on a previously unimaginably large scale. In the process, much of what little was left of Britain’s natural habitat disappeared, too.

One term for this kind of agriculture is “monoculture,” the opposite of diversity, and with it has come a multitude of “unexpected” problems. By the 1980’s British farmers were already experiencing soil erosion and unprecedented “dead

spots” on land where nothing would grow ... ever again. If a pest, virus or bacteria hit, the whole crop/herd would be endangered, threatening the farmer’s livelihood, instead of just one small part of a diverse farm. Of course, this all happened on a much grander scale and somewhat earlier in the US.

Now we need “studies” done: Andersson, G. K. S., K. Birkhofer, M. Rundl and H. G. Smith (2013). “Landscape heterogeneity and farming practice alter the species composition and taxonomic breadth of pollinator communities” to tell



us “the effects of landscape heterogeneity and farming practice on species composition.”

Studies have already been conducted into those effects on species richness! And we have to be told that “species richness declines with decreasing landscape heterogeneity but taxonomic breadth only declines ... on conventionally managed farms” – “conventionally” meaning using current practices. But aren’t these results just common sense? Didn’t those old-time farmers know these things without being told?

Amiable Farmer – continued on page 13

Resurrection Fern

Plant Profile

By Michael A. Homoya

When searching for wild ferns, most people look to the ground or on rocky slopes or cliffs, but to see one certain species, binoculars and a crooked neck are sometimes in order. The species, known as resurrection fern (*Pleopeltis polypodioides*), creeps along on bark high in the branches of trees.

Its growth habit is epiphytic, a term describing plants that grow on other plants (epiphyte: epi = upon, phyte = plant). Although resurrection fern anchors its roots on tree bark, it does not penetrate the stem. Thus it is not a parasite because it does not siphon water and nutrients from its host.

The big deal for us about resurrection fern is the simple fact that it grows here. No other true vascular epiphyte occurs within Indiana's borders. And although there are other epiphytes here such as mosses and liverworts, they are typically very small and without vascular

tissue. Vascular tissue, which functions something like an animal's circulatory system, carries nutrients and water throughout the plant. All of our "big" plants – flowering plants, conifers, and ferns – have vascular tissue.

Resurrection fern isn't always an epiphyte, however. Most Indiana populations of this fern grow on rock. Indeed, in Indiana it is an extremely rare sight to see it growing on a tree. Charles Deam, Indiana's dean of field

botany, stated in his 1940 *Flora of Indiana* that he had observed it as an epiphyte only once (Posey County).

Likewise, I have encountered the fern as an epiphyte at only one place, on an elm tree in southern Harrison County. One other report from along Little Blue River in Crawford County brings the total known epiphytic occurrences to three. Although it commonly grows as an epiphyte in the deep South, it obviously isn't common here!

All of the Indiana populations of resurrection fern occur south of Bloomington. A related and similar-looking species, the common polypody, is also mostly southern but does occur on the sand dunes near Lake Michigan. It is not epiphytic. Common polypody is easily confused with resurrection fern, but is larger and does not possess the latter's numerous scales on the stem and blade under-surface.

Two adaptations allow resurrection fern to grow at our latitude. One is its tolerance of cold temperatures. The other, and perhaps most important, is its ability to survive drought. Tree bark retains little moisture, and thus in dry times the fern grows in a virtual desert.

During drought the fern blade curls down and inward, transforming it into what looks to be a dried-up leaf ball. It may appear dead, but it's not, as this posture allows the plant to conserve precious moisture. Weeks of drought may pass, and then with the next rain the fern blades unfold. "Resurrection" has occurred.

Resurrection fern is evergreen and so can be seen in winter. Dry rock cliffs with a southern exposure are the most likely sites for discovery. To find it on rocks is challenging enough, as the fern is rare here, but if you really want to test your hunting skills, just remember to look up!

Mike Homoya has been a botanist with the Indiana Division of Nature Preserves since 1982. He is the author of Wildflowers and Ferns of Indiana Forests and Orchids of Indiana, both from IU Press.

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Richard Fields

At a height of 30 feet above the ground, resurrection fern grows on an elm tree in Harrison County. Dry slopes with southern exposure provide suitable habitat for the rare Indiana specimens.

Indy Cultural Trail

Plant-wise Guides Wanted

By Deb Bonte Bell

Do you live in the Indianapolis area? Do you enjoy the vibrant downtown, meeting people, and educating others about native landscaping? The Indianapolis Cultural Trail is looking for volunteers with native plant expertise to guide hiking or biking tours of the trail.

The Indianapolis Cultural Trail is an eight-mile paved trail through the heart of the main cultural districts of Indianapolis. In 1999, the city officially designated six cultural districts: Massachusetts Avenue, Fountain Square, The Canal and White River State Park, Indiana Avenue, the Wholesale District, and Broad Ripple.

Cultural Development Commissioners (CDC) were appointed, charged with promoting the city's cultural assets. Brian Payne, president of Central Indiana Community Foundation, was a CDC who believed the cultural districts could be connected by an urban version of the Monon Trail for pedestrians and bicyclists.

In 2004 funding was found to begin the trail, including a generous \$15 million gift from Eugene and Marilyn Glick. Different sections were completed each year using city sidewalks and easements. It opened to great national attention last May with a total cost of \$63 million.

Visitors can hop on and off the trail at any point; there is no beginning or end. It is a delightful tour that includes IUPUI campus, the Central Canal, and downtown streets in a safe, friendly environment. It also connects with the Monon Trail, which runs as far north as Westfield.

A feature showing great foresight and ecological awareness is that the trail is lined with many native plants and outfitted with stormwater planters. The landscaping was designed by a team under Kevin Osburn at Rundell-Ernstberger, a landscape architecture firm that has won INPAWS awards in past years. It is maintained year-round by the Brickman Group along with volunteers.

The trail truly is a treasure as a resource to educate the public on native plants and to beautify and improve the ecology of downtown Indianapolis. A listing of the plants you might

see there is on their website.

A two-person staff can supply you with information to use if you wish to become a guide. They are happy to work around volunteers' schedules and would be thrilled to have INPAWS members add plant expertise to their tour team.

For more information on the trail, listings of plants used, or becoming a guide, visit their website at www.indyculturaltrail.org or call Lauren Day at 317-454-8527.

Deb Bonte Bell is a member of the INPAWS Central Chapter.

Amiable Farmer – from page 11

And along comes polyculture, by definition: "agriculture using multiple crops in the same space, in imitation of the diversity of natural ecosystems, and avoiding large stands of single crops." (Wikipedia)

Dr. Peter Raven, who gave the keynote speech at INPAWS' 20th annual conference, equated diversity to sustainability. So my equation goes like this: Polyculture = Diversity = Sustainability.

Which takes me right back to James Herriot and his stories and my experiences on the small farms of Great Britain in the 1950's. Without any studies to tell them how, those farmers practiced sustainability and diversity because otherwise they went out of business. So maybe by returning to a more observant style of agriculture, under whatever name we choose, by fixing broken and destroyed habitats (see "reconciliation ecology," Wikipedia) we might expect to see some of our wildlife return ... especially pollinators.

Nowadays the small farm with the amiable farmer willing to let a strange family camp on his property and encourage three young children to learn about farming and nature is hard to find. For the sake of the future of our planet, I hope they do still exist and that they understand polyculture.

Hilary Cox is a garden designer, freelance writer and photographer, and member of INPAWS Central Chapter.



A holey oak leaf is evidence of the food chain at work. Insects munch leaves; birds munch insects, and so on and on. (photo by Lynne Tweedie)

By Tony Juniper

What Has Nature Ever Done for Us?

Book Review

Review by Patricia Happel Cornwell

Tony Juniper is not a tree-hugger. He is a scientist.

The not-so-subtle subtitle of Juniper's book *What Has Nature Ever Done for Us?* (Synergetic Press, Santa Fe, 2013) is *How Money Really Does Grow on Trees*.

For those searching for factual ammunition to back up their intuitive sense that the planet is in peril, this book is a treasure trove of data about the services nature renders to mankind and their monetary worth. The author

of world we are leaving to future generations. Juniper, as Raven, refrains from screaming "The sky is falling!" and sticks to facts to demonstrate to what degree we are simultaneously using up and degrading the natural resources upon which our very lives – and those of our grandchildren – depend.

Juniper is well aware of the short-sighted economic drivers that motivate the destruction of habitat around the world. He weighs the short-term gains and long-term losses of many human decisions. He writes of the loss of forests:

STATISTICS

100	Percent of human support systems dependent on nature
1	Number of planets capable of supporting human life
Larger than Germany	Area of forest cleared 2000 – 2010
\$1 trillion	Annual sales dependent on animal pollination
0.03 %	Proportion of world's water that is fresh rather than salty
\$200,000 - \$900,000	Value of 1 square kilometer of mangrove forest
\$6.6 trillion	Annual global environmental damage caused by human activities
\$72 billion	Annual sum needed to avert mass extinction of animals & plants
1.2	Percent of world GDP represented by \$72 billion

From the book *What Has Nature Ever Done for Us?*

discusses the work that soil, light, water, plants and pollinators do, how their effectiveness is in many places being compromised by human interference, and how interwoven our lives are

"None of us is outside nature."

with other elements of sea, sky and earth.

As I read, I heard echoes of the sustainability presentation made by Dr. Peter Raven at the INPAWS conference last November. This book underlines the urgency of facing up to the kind

"For what are evidently reasons of culture, we treat the carbon in trees as for the most part worthless, whereas diamonds, made of pure carbon, are exchanged for huge sums. Diamonds have some industrial applications but, considering the climatic benefits of carbon in trees, this comparative valuation is utterly perverse."

He explains how mangroves diminish the landfall impact of tsunamis and hurricanes, saving human lives and property, yet in some places they are being destroyed to make room for shrimp farms or commercial

development. I remembered how the tangled roots of mangroves hurt my bare feet as I waded from a boat to an iguana island in Lago Oviedo in the Dominican Republic in 2012. Suddenly, I understood how they could indeed slow down a storm surge in Louisiana or India.

participants. (As I write, 16 species of birds pick seeds out of the snow beneath my window. A fox pokes around at the pond. A herd of white-tailed deer slips silently over the hill. Meanwhile, my granddaughter is growing up in a city.)

Juniper writes: "At no point in our history have so many humans spent so little time in physical contact with animals, plants and the processes that govern the natural world. We are suffering from Nature Deficit Disorder."

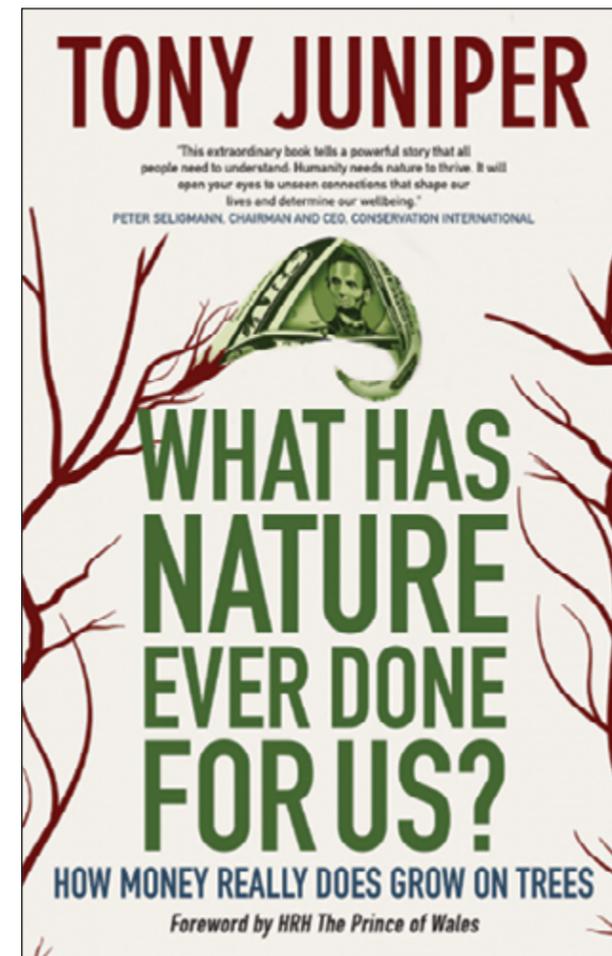
Interestingly, he uses without attribution a term coined by Richard Louv in *Last Child in the Woods*: "Nature Deficit Disorder."

What Has Nature Ever Done for Us? is full of fascinating information about everything from algae to asteroids, reefs to rainforests, wetlands to wolves. Juniper is a Brit, so you may occasionally have to convert a kilometer to miles or a kilogram to pounds, but it is well worth the effort.

An "independent environmentalist," he is advisor to the Prince of Wales Charities, a fellow of the University of Cambridge Program for Sustainability Leadership, and first president of the umbrella organization, the Society for the Environment. HRH Charles, Prince of Wales, wrote the foreword to this latest book. It's a keeper.

Patricia Happel Cornwell is an Indiana Master Naturalist, a bird-counter for Cornell Lab of Ornithology, a freelance writer and editor of the INPAWS Journal. She lives in Harrison County.

*"When one tugs at a single thing in nature, he finds it attached to the rest of the world."
– John Muir*



Juniper delves into the health effects of contact with nature. Studies show that people who live near green spaces feel healthier than those who do not. The greater the wildlife diversity, the higher the level of psychological well-being also reported by study



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Oaks – the mastiest of our native plants



Lynne Tweedie

Host Plant

Oaks are champions at producing mast. Mast is the term for foods produced in natural habitats from trees, shrubs and other plants. The supply of mast affects survival and reproduction of many species in our environment.

Leaves, twigs, and especially acorns are mast. Indiana's Department of Natural Resources website reports that "acorns are perhaps the most important food source for a variety of wildlife, including ducks, songbirds, woodpeckers, ruffed grouse, turkey, quail, pheasant, deer, rabbits, squirrels, chipmunks, and mice"

Oak trees also top Douglas Tallamy's list of "Best Bets: Woody Plants" (www.bringingnaturehome.net) According to the famous entomologist's reckoning, oaks support 534 species of butterflies and moths. Those butterflies and moths, in turn, feed spiders, birds, and many other species.

In other words, planting an oak tree could be the best thing you can do for your little piece of the planet. Indiana is home to 19 species of oak including white, red, scarlet, black, swamp, shingle, overcup, swamp chestnut, chinkapin, cherrybark, shumard, pin and post. Over the centuries, in collaboration with other species, oaks adapted to our many microclimates. Perhaps there's an oak tree just right for yours.