



inpaws journal

Indiana Native Plant and Wildflower Society

Winter 2017-18

Host plant spotlight

Colorful spicebush supports many species

By Jordan Marshall

Throughout Indiana's hardwood forests, spicebush (*Lindera benzoin*) is an important shrub-layer species. Habitat for spicebush is broad in moisture (dry to wet) and light (deep

on the undersides of young leaves. Once larvae hatch, they feed from the edges inward near the leaf tip, spinning a silk mat on which they rest and folding the leaf over them. Developing through five instars, larvae continue to feed at night; they produce silk mats during later instars, curling leaves into shelter during the day. Mature spicebush swallowtail larvae produce silk girdles attached to slender branches and pupate. Prior to pupation, larvae often leave the host plant. Early season pupae will develop into adults in about 10 days, while late season pupae will overwinter and develop into adults in the spring. Adults live about 14 days and feed on nectar. The list of larval host plants is relatively short; however, the list of adult nectar plants is extensive. Spicebush swallowtails produce



Lynne Tweedie

Spicebush swallowtail freshly emerged from its pupa (*chrysalis*)

shade to sun), which allows this species to be successful in variable forest types across the state (mesic beech-maple to more xeric oak-hickory). However, optimal growth for spicebush occurs in mesic, shady forests.

Spicebush is aesthetically pleasing with its aromatic leaves, stems and fruits which produce a sweet, spicy fragrance. The species is also colorful, producing yellow flowers in spring, red berries and golden foliage in fall.

Spicebush serves as a larval host for two common lepidopterans: spicebush swallowtail (*Papilio troilus*) and spicebush silkmoth, also called promethea silkmoth (*Callosamia promethea*).

Spicebush swallowtail uses both spicebush and sassafras (*Sassafras albidum*) as larval hosts. Females lay green-white eggs singly

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three broods a year in the southern portions of their range, two broods in the northern portions.

Spicebush silkmoth has larval host preferences similar to spicebush swallowtail. Additional larval hosts include white ash (*Fraxinus americana*) and black cherry (*Prunus serotina*). Unlike spicebush swallowtail, spicebush silkmoth females lay clusters (4-10) of flat white eggs on the upper sides of leaves. Larvae feed together in early instars,

Spicebush – continued on page 3

Conference educates and entertains



Michael Huft

By Patricia Happel Cornwell

A crowd of 315 native plant fanciers gathered Oct. 28 at Bloomington's Monroe Convention Center for the annual INPAWS conference with the theme of "Aldo and Friends: Phenology, Biology and Saving the World."

In welcoming conferees, president Mike Homoya noted that 2018 will be INPAWS' 25th anniversary. The organization started in 1993 with 150 members and currently has almost 900 dues-paying members and 10,000 participants in its Facebook group.

Election of board members tapped Ellen Jacquart as new vice-president, Paul Rothrock as a new at-large director, Greg Shaner to continue as secretary and Don Gorney to continue as treasurer. They will serve two-year terms beginning in 2018.

Dr. Stanley Temple, senior fellow with the Aldo Leopold Foundation and Beers-Bascom Professor Emeritus at the University of Wisconsin-Madison, spoke

on the value of Leopold's decades of records of plants' bloom dates, birds' migration and other changes in the natural world. Temple showed that some co-evolved species such as birds, insects and plants can "get out of sync if they respond differently to climate change."

David Gorden, ASLA, a landscape architect with Mark M. Holeman, Inc., in Indianapolis, presented gardeners in the audience numerous options for incorporating native plants into structured home

landscapes that will not cause neighbors to complain about "weeds." He encouraged listeners to "show human intervention" by massing sweeps of a single species of flower, trimming shrubs, mowing, using borders, fences or other "hardscape" elements.

Dawn Slack, Southern Indiana land steward with The Nature Conservancy (TNC), gave an update on the Indiana Invasive Species Council's multi-media campaign. Their updated web site is indianainvasivespecies.org. The group, which has introduced a new draft of the state's terrestrial plant rule for consideration by the Natural Resources Commission, will have a conference Feb. 15 at the Hendricks County 4-H Center in Danville.

Mike Homoya led an entertaining and informative trivia game in which tables of participants vied to get the most correct answers about "natural Indiana." The multiple-choice exercise tested their knowledge of the state's native plants, animals, history and geography.

Douglas Ladd, a conservation biologist with TNC in Missouri, discussed the impact of humans on the ecosystems of the earth and the need for individuals to document the environmental changes they observe. "It's amateur citizen scientists who are going to preserve individual species. Be a good naturalist," he urged. "Document what you see, share it. It's critical that you do this, because nobody is going to do it for us."

Cheryl Coon, forest botanist for Hoosier National Forest (HNF), spoke on methods used to protect and manage the forest's 24 "Special Areas," so designated for their geologic, archeologic or biologic significance. Together, they contain 89% of Indiana's endangered species. Since 2015, HNF and DNR personnel have been cooperating to monitor rare plant populations and remove invasive species from these areas.

Patricia Happel Cornwell is co-editor of INPAWS Journal and a member of South Central Chapter.

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Spicebush – from page 1

but separately in later instars. After progressing through five instars, larvae secure a leaf to a branch with silk, then spin a cocoon inside the leaf, curling the leaf around them in the process. They overwinter as pupae. Adults emerge in late spring and do not feed, producing one brood per year.

Both species use mimicry to avoid predation. For spicebush swallowtails, the important mimicry occurs as larvae. Early instar larvae for these resemble bird droppings. Later instars have eyespots (color patterns resembling eyes) that make the larvae appear snake-like, which discourages birds from feeding on them. Spicebush silkworm does not use mimicry as larvae; however, its pupal cocoons protect larvae from predation. Spicebush swallowtail larvae also possess osmeterium—smelly, fleshy tubercles that can be extruded out from behind the head if they are disturbed. The osmeterium deter some predators, including ants.

As adults, both use Batesian mimicry, named after naturalist Henry Walter Bates, where a harmless species mimics the appearance of a harmful species. Spicebush swallowtail adults, both male and female, mimic color patterns of pipevine swallowtail (*Battus philenor*), which is bitter-tasting and

potentially poisonous to predators. Spicebush silkworm also mimics pipevine swallowtail, but only in males, while female color patterns are more camouflage and cryptic.

Besides its importance to these insect larvae, spicebush is a key food source for wildlife species, including several small to medium mammals and numerous bird species, especially wood thrush (*Hylocichla mustelina*).

Spicebush berries are a high-quality fall food source for songbirds, with a relatively high crude fat content, which is important for migration or overwintering in place. Due to its low to medium palatability to white-tailed deer (*Odocoileus virginianus*), spicebush flourishes in forests under heavy herbivory. Additionally, eastern tiger swallowtail (*Papilio glaucus*) larvae can develop successfully on spicebush.

As with any native plant, there are co-evolved relationships with animals, and spicebush is no exception. While spicebush individual plants do not necessarily benefit from the larval feeding of spicebush swallowtail or spicebush silkworm, the herbivory does not result in major harm or stress to the plants. Songbird feeding on fruits is key to survival of the birds and the dispersal of spicebush seeds. Planting spicebush, along with other native plants, provides necessary habitat and food for numerous animal species.

Jordan Marshall is associate professor of biology at Indiana University-Purdue University Fort Wayne.



Lynne Tweedie



Wikimedia



Lynne Tweedie

Spicebush swallowtail, spicebush blossoms and spicebush swallowtail larva

Preliminary results in for

By Donald Ruch

A 24-hour bioblitz was held June 10-11, 2017, sponsored by Red-Tail Land Conservancy (RTC) and Indiana Academy of Science (IAS), on two properties owned or maintained by RTC: White River Woods (WRW) in Delaware County and McVey Memorial Forest (MMF) in Randolph County.

The term "BioBlitz" (also written "bioblitz") was coined by Susan Rudy, a US National Park Service naturalist, while helping to organize the first BioBlitz at Kenilworth Aquatic Gardens, Washington, DC, in 1996 (Ruch et al, 2010; Post, 2003). A bioblitz, short for biodiversity blitz, is a rapid assessment of the flora and fauna living in a particular area at a given point in time

(Field Museum, 2007). It is essentially a "snapshot in time" of the living organisms of a particular site.

A full bioblitz must take place over a 24-hour period since different organisms will be found at different times of day or night. It should be noted that since the species pool changes throughout the year, a one-day bioblitz does not produce a complete inventory of the biodiversity of a site.

Southeast of Muncie and just north of Prairie Creek Reservoir, WRW is a 117-acre nature preserve adjacent to the White River. It is composed

of a large riparian woodland, an upland forest and several old fields in various stages of succession. MMF, a 249-acre preserve, lies on State Rd. 1 approximately seven miles north of Farmland. Edna McVey established this nature park in her will so future generations could enjoy it. MMF is a wonderful example of upland forest, river bottom woodland, prairie and wetlands. Bush Creek meanders through the woods to the Mississinewa River which borders the property on the north.

The event attracted over 70 scientists, naturalists and volunteers working in 18 teams focusing on ants, aquatic macroinvertebrates, bats, bees, beetles, birds, butterflies, fish and snails, herpetofauna, moths, mushroom and other fungi, non-vascular plants, odonates (dragonflies and damselflies), singing insects and other insects, snail-killing flies, spiders, small mammals and vascular plants. An archaeology/geoarchaeology group also participated.

Preliminary results from the bioblitz have recorded to date a total of 1,028 taxa. Results are presented here in this order: taxonomic group, total number of species/taxa found, number at WRW and number at MMF. Since a species/taxon can occur at both sites, the total number of taxa/species at WRW and MMF can exceed the total number reported.

The results to date include ants (15 species, nine at WRW, 11 at MMF), aquatic macroinvertebrates (90 taxa, 67 at WRW, 77 at MMF), bats (eight species, three at WRW, eight MMF), beetles (60 species from MMF), birds (78 species, 59 at WRW, 66 at MMF), butterflies (25 species, 19 at WRW, 15 at MMF; Fig. 3), herpetofauna (12 species comprised of five amphibian species and seven reptile species; five at WRW, 11 at MMF),



1
Iris pseudacorus, pale yellow iris (Paul Rothrock)



2
Rhodotus palmatus, netted rhodotus or wrinkled peach (Steve Russell)



3
Limenitis arthemis, red-spotted purple butterfly (Paul McMurray)



4
Enallagma exulans, stream bluet damselfly (McMurray)



5
Gomphus crassus, Handsome clubtail dragonfly (McMurray)

Red-Tail Conservancy bioblitz

moths (51 taxa all at MMF, no sampling at WRW), mushrooms (51 species, not separated by site; Fig. 2), non-vascular plants [mosses] (29 species, 22 at WRW, 24 at MMF), odonates (28 species comprised of 18 dragonflies and 10 damselflies; 20 at WRW, 20 at MMF; Figs. 4 & 5), singing and other insects (11 species, four singing insects, seven other insects, not separated by site), snail killing flies (11 species all from MMF; Fig. 6), spiders (81 species including six new state records, 27 at WRW, 64 at MMF); and vascular plants (478 taxa, 289 at WRW, 406 at MMF).

Reports from the bee, beetle, fish and mussel, and small mammal teams have not been submitted yet.

A complete analysis of the flora of both sites has not yet been completed. However, the plants occurring at the sites were typical for the various habitats found in east central Indiana. Some examples of plants occurring at WRW were climbing wild rose (*Rosa setigera*) (Fig. 7), common hoptree (*Ptelea trifoliata*) (Fig. 8), waxy-leaved meadow-rue (*Thalictrum revolutum*) (Fig. 9), pale yellow iris (*Iris pseudacorus*) (Fig. 1), cow parsnip (*Heracleum maximum*), early wildrye (*Elymus macgregorii*) (Fig. 10), and purple-stemmed angelica (*Angelica atropurpurea*). There were no state endangered, threatened or rare species found at either site.

Approximately 25% of the species were non-native (69 of 289 taxa at WRW, 104 of 406 taxa at MMF). The majority of the non-natives occurred in more disturbed sites, such as roadsides, old fields and woodland edges, especially the edges adjacent to agriculture. One interesting find at MMF was a small planted prairie along State Rd. 1 with nearly two dozen compass-plants (*Silphium*

laciniatum) and many showy goldenrods (*Solidago speciosa*). Overall, parts of WRW and most of MMF are of nature preserve quality and contain some noteworthy remnants of the natural quality of east-central Indiana.

As overall coordinator of the 2017 bioblitz, I would like to express my sincere appreciation to the RTC staff, particularly Barry Banks, executive director, and Micayla Jones, stewardship director, as well as all who participated to make the bioblitz an enormous success. Through the generous support of RTC, IAS and the Robert Cooper Audubon Society, participants were provided overnight lodging, lunch and dinner on Saturday and water and snacks both days. Everyone enjoyed the camaraderie, seeing new nature preserves and describing their biodiversity.

Although the dates have not yet been set for the 2018 IAS-sponsored bioblitz, it will be held at Eagle Creek in Indianapolis. As plant enthusiasts and experts, you are encouraged to join the fun and to contribute to our understanding of the biodiversity of Indiana. If interested, please contact me at druch@bsu.edu.

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Donald Ruch is professor of biology at Ball State University and a member of INPAWS East Central Chapter.



6
Limnia bosicii, a snail-killing fly (Steve Marshall)



7
Rosa setigera, climbing wild rose (Ben R. Hess)



8
Ptelea trifoliata, common hoptree (Hess)



10
Elymus macgregorii, early wildrye (Rothrock)



9
Thalictrum revolutum, waxy-leaved meadow-rue (Hess)

How does pollination work?

By Adrienne Funderburg

Newsome

Imagine you are a flowering plant. You wave gently in a warm breeze and are in full bloom, looking and feeling lovely. All you want is to live and help propagate your species by making seeds. There's a catch, though. You need

to get your *male gametes* (sperm) over to fertilize your *female gametes* (eggs) before you can begin forming seeds. But the male and female gametes aren't produced in the same place on a flower. Sometimes they aren't even on the same flower or the same individual plant. It seems you are going to have to recruit some help in order to get your DNA where it needs to go.

In flowering plants, the male gametes are carried by tiny pollen grains produced by the anther. The female gametes are produced in the ovules of a flower, contained within the flower in an area called the ovary. The female gametes are completely contained within the flower – there is no way for a pollen grain to reach them directly. Instead, pollen grains need to land on the stigma of a flower, which is like a tiny landing pad specialized to catch the grains. Successful arrival of a pollen grain onto the stigma is called *pollination*. Biochemical interactions on the stigma then signal the pollen grain to grow a *pollen tube* through the top of the stigma, down through the style to reach the ovary, and finally into an ovule. There, the sperm fertilizes the egg and a seed begins to develop.

Fertilization is when the male and female gametes fuse. The resulting offspring varies genetically from both parents; it has a

mixture of parent genes rather than being an exact copy of one or the other. This “genetic recombination” strategy, using two organisms to create offspring, is called sexual reproduction, while asexual reproduction only requires a single organism and does not involve the fusion of sperm and egg. Sexual reproduction, performed by plants and other organisms, increases a population's genetic diversity, which helps prevent inbreeding and the negative health effects that go along with it. Genetic diversity also gives populations a greater chance of survival in case of habitat changes. Changes to the environment (such as climate change, changes in precipitation, or the introduction of invasive species) will impact a large number of individuals in a suffering population, but with a wide gene pool, there may be individuals that have genetic strengths to resist the change and may survive more successfully than their counterparts.

While great for genetic health, sexual reproduction can be energetically expensive and a bit risky. What if your pollen doesn't get where it needs to go, and no other pollen gets to you? Bees, bats, wind and other organisms and phenomena increase the odds of successful pollination between individuals. This passing of DNA between plants is called *out-crossing*. Nectar may be produced as a lure and reward, and some plants, like orchids, mimic biochemical signals of some insects in order to trick them into interacting with their flowers. Each time a pollinator maneuvers around a flower, it picks up pollen on its body and ends up depositing previous flowers' pollen. It's no wonder that pollinators are so fundamental for plant health and reproduction; they are responsible for the genetic strength and long-term survival of many plants that humans love and are incredibly dependent upon.

Instead of using pollinators, some plants *self-fertilize*; a single plant's pollen will fall onto the stigma of its own flower, which will fertilize the eggs within and develop into offspring. This is a relatively simple way to ensure that pollination and fertilization occur and that seeds are made, as pollen and stigma are in close proximity

Pollination – continued on page 14

Botany basics



Wikimedia



Violets (Viola spp.) are an example of a plant that produces both out-crossing flowers (above) and cleistogamous flowers (below) on the same individual. Cleistogamous flowers, which remain closed and are often underground, seal their pollen within, ensuring self-fertilization.

Weed Patch Hill gets new look

By Leslie Bishop

If you have visited Brown County State Park (BCSP) in the past year, you may have noticed changes on Weed Patch Hill. Since the 1800s the Hill has morphed from farmland to game farm (early 1900s) to airstrip (1935) to state park (1941). For years, the Hill was maintained as a large mowed lawn and used as a playing field. But in 2014, Weed Patch Hill began its transformation into a wildflower meadow. Mowing large expanses of grass is not only a waste of energy; it also removes land from the pool of habitat resources needed by wildlife (Xerces, 2011).

An initiative sponsored by Friends of BCSP raised \$12,000 in grants to fund the meadow project, including a generous \$5,000 contribution from INPAWS. Other grants were received from US Fish and Wildlife Service (USFWS), REMC, Brown County Lions Club and the J.F. New Foundation. Mike Homoya, botanist with DNR's Division of Nature Preserves, approved the plant list and seed source.

In North America, insect pollinators are in trouble. There has been a great deal of publicity on the decline of managed honeybee colonies from colony collapse disorder. What is less known is that wild insect pollinators such as bumblebees also are declining. In a 2006 study, the National Research Council warned of the cumulative problems of parasites, diseases, urbanization and pesticide poisoning as threats to insect pollinators. In addition, with the increase in agricultural acreage used for single crops, floral diversity has decreased, resulting in poor nutrition for pollinators (Calderone, 2012). As human activities continue to have deleterious effects on insect populations, it is more important than ever to create natural habitats like the new BCSP wildflower meadow, with diverse native flowering plants.

Each step of the project brought new challenges. Once DNR approved the site change in December, 2013, a year-long task of site preparation began. The management protocol was that suggested by the Xerces Society for Invertebrate Conservation (Xerces, 2012), which entailed herbicide treatment to kill the grass, frequent mowing and invasive plant removal. Volunteers from Friends of BCSP and Brown County Native Woodlands Project turned out for the invasives

removal day.

Planting was delayed from November, 2014, until March, 2015, due to an unusually wet season. When planting day finally arrived, an inspiring collaboration gathered at the meadow: Rex Watters from DNR Lake Monroe, with the largest tractor I have ever seen; park staff with a special no-till seed drill rented from Bartholomew County Soil and Water Conservation; Rich Geboy from USFWS, with experience in planting prairies; Doug Baird, BCSP property manager; and Jim Eagleman and me representing BCSP Nature Center.

The first summer for the new meadow was an exciting time. Even though bloom was not yet prolific, we noted good starts of an array of flow-

ers from June to late September. Since that first summer in 2015, we have been recording species in bloom. We are seeing not only species from the original seed list but also other common species that have dispersed in naturally. As the meadow matures, these native plants are attracting a diverse assemblage of insect pollinators.

The new meadow is intended to benefit pollinators in two ways. First, the profusion of native flowering plants throughout the summer increases the abundance of local pollinators such as bees by increasing pollen and nectar resources. Second, the meadow includes host plants for larval butterfly development, including several native sedges (*Carex* spp.), thus increasing the abundance of butterfly pollinators. In addition, the meadow has increased habitat diversity in the park and is providing nesting habitat for field birds as well as native bees.

In a visit to the meadow last October, I watched in amazement as insects visited patches of lavender mistflower (*Conoclinium coelestinum*), lacy white boneset (*Eupatorium perfoliatum*) and the last remaining New England asters (*Symphotrichum novae-angliae*). We had yet to have our first frost. I also watched two species of



Leslie Bishop

During its first three summers, the meadow has already attracted an abundance of local pollinators.

Weed patch – continued on page 13



Mission

To promote the appreciation, preservation, scientific study, and use of plants native to Indiana.

To teach people about their beauty, diversity, and importance to our environment.

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President's Message

By Mike Homoya

Greetings, fellow wild ones!

If you were at our conference in October, you might understand my greeting. On the final slide of my presentation titled "Natural Indiana: It's Wilder Than You Think," the text that appeared was "Born to Be Wild." Maybe those present thought it was intended for amusement, but I like to think it was celebrating wild things (and not the wild man flailing in the stinging nettles!).

It was a wild thing . . . a wild plant . . . in a wild place that turned me on to native plants and natural areas. You might remember that, in my first journal message as president, I mentioned the first time I saw native azaleas growing wild near my hometown. There they were, growing wild, practically under my nose! I was transfixed. No longer was the subject of my interest confined to captivity. Soon I learned there was more wildness within my grasp, including other amazing wildflowers, wild ferns, even wild orchids! I soon became a wild one.

My hope is that everyone will appreciate the wilder things in life. I am proposing a couple of initiatives for 2018 to get people outside and fired up about native plants. One is to develop a team of ambassadors for native plants and natural areas. It would involve instruction in various aspects of

Clarification

In our fall issue, the heading for the list of monarch-friendly plants on page two called them all "host plants." While only milkweeds are reproductive hosts to monarchs, the other plants are all needed as nectar sources to sustain them on their migration. Several dictionaries define "host plants" broadly as those that serve as cover, habitat, reproduction sites or food for another organism, but in strict botanical terminology, it is restricted to mean a reproduction site. In the note at the end of the related article, we said Amber Barnes is with Pollinator Project; we should have said Pollinator Partnership. For more on how you can help monarchs, go to www.pollinator.org/MWAEBF.

native wild plants, including identification, habitat, life history, uses and conservation. Graduates of the program would be awarded a certificate and shirt which prominently identify them as ambassadors. Since the mission of the ambassador is to share the mission of the ambassador is to share native plant information with the public, particularly while hiking in a favorite park or nature preserve, the shirt could proclaim in bold letters "I know native plants" or "Ask me about native plants" to initiate a conversation.

Another project is an annual state-wide challenge to count spring wildflowers. Besides being fun and another method of promoting our organization and native plants, it could be a great longterm citizen science project, documenting the blooming dates of our Indiana flora. It could also help build our finances. Similar efforts counting birds, known as "birdathons," have been very successful garnering monetary contributions. The more funds we have, the better we can spread the word about native plants. If you are interested in playing a role in either or both of these programs, please contact me.

Let's get wild!



INPAWS President and wild one Mike Homoya (right) joked with speaker Douglas Ladd during INPAWS Conference 2017.

Save the date!

INPAWS Native Plant Sale Sat., May 12 Park Tudor School Indianapolis

Help science in Project BudBurst

If you can't wait to get out in the woods and fields and look for the first signs of spring, here's a great project for you: Project BudBurst, a citizen science program of Chicago Botanic Garden. Similar to Cornell Lab of Ornithology's eBird reporting system, BudBurst participants report the first leaf, flower, fruit and other aspects of individual plants, as single observations or over a period of time. The collected data contribute to the understanding of the effects of climate on plant and animal life. To see how it's done, check out budburst.org/observing-plants.

Chapters out and about

INPAWS In Action



Central

Central Chapter members shared the summer blooms in their yards with others through well-attended, short-notice “pop-up” tours around the Indianapolis area. (See “Pop-up garden tours,” opposite.)

Bobby Kimball and family staffed the INPAWS table at the McCloud HoneyBee Fest in Hendricks County in August, sharing information about native plants and bees with the crowd. Bobby made the table especially enticing to children with kid-related activities.

Third graders at Indian Creek Elementary School in Marion County planted milkweed seeds in their butterfly garden with seeds and assistance from chapter members.

Dr. Rebecca Dolan, director of Butler University’s Friesner Herbarium, spoke to members about the Indiana Plant Atlas at Butler on Nov. 12.

Northeast

In August, Northeast Chapter held a members picnic at a unique private home in Noble County. Members explored the owners’ prairie with more than 100 native species and learned how their alternative septic system uses native wetland plants to treat wastewater. For the field trip, the group traveled to Chain O’ Lakes State Park to explore Glacial Esker Nature Preserve, home to several state-endangered plants. Hikers saw elm-leaved goldenrod (*Solidago ulmifolia*), late horse gentian (*Triosteum perfoliatum*), pickerelweed (*Pontederia cordata*) in bloom, white lettuce (*Prenanthes alba*) and Virginia white grass (*Leersia virginica*).

Wendy Ford made the two-hour trek up north to help our chapter focus its abundant energy. We did a “SWOT” (strengths, weaknesses, opportunities, threats) analysis to come up with three goals for 2018. We decided to (1) develop a consistent message for all chapter communications, (2) increase member families to 100 and (3) pair 25% of chapter activities with a stewardship or hands-on activity that improves biodiversity.

In September, the chapter partnered with Fort Wayne City Utilities to organize a wildflower hike at Camp Scott (See “From POW camp to wetland,” page 16.). This event drew not only members, but the public. Non-members learned how natural

spaces benefit when invasive species are actively managed.

In October, members and their families attended the annual meeting at Gene Stratton-Porter State Historic Site. Committee chairs summarized their efforts in 2017 and discussed exciting new programs for 2018. Members voted to elect a new vice-president, Jennifer Caseldine-Brach. We also unveiled our chapter goals for 2018. Tiffany Conrad, naturalist, led the group on a tour of the site’s newly restored wetland and prairie, where American water plantain (*Alisma subcordatum*), softstem bulrush (*Schoenoplectus tabernaemontani*), and partridge pea (*Chamaecrista fasciculata*) were observed.

Southwest

Southwest INPAWS (SWINPAWS) members heard a presentation by Will Drews on invasive plant identification and control at the chapter’s July meeting at Wesselman Woods Nature Center in Vanderburgh County. Drews, natural resource specialist with Knox County Soil and Water Conservation District (SWCD), brought specimens from his work, including a six-inch diameter cross-section of invasive wintercreeper removed from a wood lot in Knox County.

Later in July, members hiked at Vectren Conservation Park in Gibson County, led by Dr. Cris Hochwender of University of Evansville (UE). The 1,100-acre property, surrounded on three sides by the Wabash River, had been farmed since the early 1800s. In 2001, it was purchased by Vectren Corp., an energy company, and is being restored from agricultural use to natural habitat. In 2002, Vectren planted over 136,100 trees obtained from DNR’s Vallonia Nursery. The site, which includes wetland and riparian forest, is now leased by UE and managed by Hochwender.

At the group’s September meeting, Andrew Smith, urban conservationist with Warrick County SWCD, updated members on his work to introduce native plants to urban landscapes in the Evansville area and to educate the public about them. Following his talk, Deb Schade and Kate Lynch shared their expertise in raising monarch and black swallowtail butterflies, respectively, with the help of caterpillars and chrysalises they brought along.

SWINPAWS held a native plant sale Oct. 14 at the Southwest Indiana Master Gardeners Display

“Pop-up” garden tours

By Amy Perry

INPAWS Central Chapter hosted 11 “pop-up” native garden tours in 2017. A pop-up is a tour of a private garden, announced on short notice. Pop-ups enable visitors to see many gardens in progress over the course of a summer. Each tour can be customized to reflect the gardener’s personality and preferences. Garden styles ranged from a remnant forest to color-themed plots, controlled prairies and extensive shoreline gardens.

Public natural areas were added as self-guided tours in connection with nearby residential gardens. A pop-up tour in late September, hosted by Joe and Vicki Dwenger, highlighted native plants in the Dwenger home landscape and at Southeastway Park. Sister Angela Jarboe hosted visitors to the Peace and Nature Garden at Benedict Inn Retreat and Conference Center, Beech Grove. Two other public sites toured were in Fishers, including plantings in the Ridgefield subdivision and pond-edge planting by Weaver Creek Property Owners Association.

People attending the summer’s garden tours totaled 380, including 146 non-members. Guests enjoyed:

- Seeing native plants’ growth habits throughout the season, especially unusual species
- Getting to know other chapter members
- Exchanging gardening ideas
- Educating non-members about native plants and INPAWS
- Increasing botanical and horticultural knowledge (e.g., bank stabilization methods, invasive removal techniques, shade utilization, landscape design, learning new species)

Team leader Amy Perry thanks team members Barbara Goldblatt and Cathy Donnelly; tour hosts Michelle Arfman, Mary Durkin, the Dwengers, Barbara and Irv Goldblatt, Sarah Gray, Judith Houser, Sister Angela Jarboe, Harry and Cherie Kuhn, Bill McKnight, George Peregrin and Jackie Sundboom; and helpers Steve Cline, Irv Goldblatt, Linda Haas, Cindy Monnier, Paige Robbins, Amy Shelton, Suzanne Stevens, Debra Stoll and friends and family of hosts.



Nearly 400 people attended pop-up tours put on by INPAWS Central Chapter last summer.

Amy Perry is a very active member of INPAWS Central Chapter.

Chapters — from left

Garden to provide native plant stock to the public and raise funds for the chapter. Over 900 plants of more than 100 species were sold, and public interest exceeded the inventory. Plants were contributed from members’ gardens, the UE native garden and Knox County SWCD. Plans are afoot to make next year’s sale even bigger.

West Central

Members of West Central Chapter’s RIP (Remove Invasive Plants) Squad were hard at work from October until late December. They pulled invasives in Tippecanoe County at Prophet’s Rock Park, Ross Hills Park and Ross Hills Camp. They were assisted by Purdue University students from Alpha Phi Omega service organization.

In October, the group conducted two “Pulling for Bats” events, one at Prophet’s Rock, the other at Ross Hills Camp. The programs involve removing

non-native invasive shrubs which negatively affect the habitat for native bats as well as birds and plants.

Dawn Slack, southern Indiana land steward with The Nature Conservancy, spoke on “The Importance of a Biodiverse World: Ecology and Invasives” at the chapter’s Sept. 25 meeting. On Oct. 23 Mike Jenkins, associate professor of forest ecology in Purdue’s department of forestry and natural resources, addressed members on “The Diversity in Indiana’s Forests – Will it Last?” Don Ruch, professor of biology at Ball State University, spoke on “Mushrooms, Mycelia and Morels” at the Nov. 27 meeting.

Topic of the Jan. 22 meeting will be “The Lafayette Park System and You,” presented by Don Staley, natural resources and recreation planner for Lafayette Parks and Recreation Dept.

The chapter will meet at Lilly Nature Center in Celery Bog Park, West Lafayette, at 7:00 p.m. on 4th Mondays in February, March and April.

SCINPAWS visits prairie

By Ellen Jacquart

Members of South Central INPAWS Chapter visited two beautiful prairie gardens last summer, both developed by women with a real passion



Ellen Jacquart



(top) Phyllis Schwitzer who developed the prairie garden is front left, in purple shirt. (above) Paul Rothrock shares information on native plants with SWINPAWS members.

sion to attracting wildlife and butterflies to enjoying the beauty of a semi-wild area. Phyllis purchased seed for native prairie flowers and grasses and prepared the two-acre field by spraying with

Roundup, tilling, then spraying and tilling again. In June 1993, she hand-planted the seed, crisscrossing the area to spread it evenly.

The field was mowed to six inches tall a few times the first year to discourage perennial weeds from competing with the seedlings. By the third year, prairie flowers were blooming, and today this prairie garden is magnificent, with a succession of blooms as the season progresses. Phyllis's ongoing maintenance includes annual brush-hog mowing, mowing of paths and occasional use of grass-specific herbicide to keep tall grasses from dominating the planting.

Myriam Wood bought the land in Owen County that became her "Fish Creek Preserve" in 1973. Like Phyllis,

for native plants.

The path each took was different, but the results are beautiful. Paul Rothrock led both field trips, identifying the plant species that bloomed in profusion. Groups visited the Schwitzer prairie July 24, the Wood property Aug. 10.

The Monroe County land on which Phyllis Schwitzer's prairie sits was purchased in 1971. At that time, the area was planted in soybeans and had been farmed for many years, creating erosion and loss of topsoil. After a house was built, the rest of the hilltop field was planted in fescue and other grasses and was mowed frequently. It was a rough, weedy area and, after a while, it seemed pointless to mow so many acres as if they were a lawn.

Around 1991, Phyllis heard Neil Diboll of Prairie Nursery speak at an INPAWS conference. She was inspired to create a prairie when she learned the many benefits of a prairie, from reducing ero-

she was inspired by Neil Diboll at Prairie Nursery to start a prairie garden, but she took a different tack. Myriam took the "prairie pocket" approach, combining a variety of native plants into discrete garden beds. Starting in 2008, she turned the lawn around her house into mowed pathways that wind around prairie plantings of different sizes and shapes.

One pocket, for instance, has brilliant red royal catchfly (*Silene regia*) towering above shorter blue wild petunias (*Ruellia humilis*) that border the pocket. Another features purple coneflower (*Echinacea purpurea*) blooming above mistflower (*Conoclinium coelestinum*). As areas were being cleared to turn into prairie pockets, unexpected treasures popped up, like purple fringeless orchid (*Platanthera peramoena*).

Changes Myriam has made over time to make her prairie pockets more attractive to pollinators include planting blocks of native plants rather than single individuals scattered about and planting for continual blooms from early spring to late fall.

A mowed path leads down the wooded hill to the floodplain along Fish Creek. Here there are open wetlands that already had many native wet prairie species when the Woods acquired

gardens

Weed patch – from page 7

the property. Myriam enhanced the wetlands with native species like rose-mallow (*Hibiscus palustris*), prairie dock (*Silphium terebinthinaceum*), cupplant (*Silphium perfoliatum*), Culver's root (*Veronicastrum virginicum*), tall coreopsis (*Coreopsis tripteris*) and big bluestem (*Andropogon gerardii*).

Myriam has learned a lot in her years of prairie gardening. She offers these lessons:

- Start small; clear a spot through cultivation or smothering of weeds for a year or so.
- Work with the land. Observe carefully; take time to see what is already there but hidden.
- Be curious, learn from every source possible and change course when things don't work out.
- Once started, plantings take serious management. Don't 'over-plant' and don't underestimate the time it will take to manage weeds or water new areas.

Ellen Jacquart is a member of the South Central Chapter of INPAWS.

2018 Dates of Note

2/2	World Wetlands Day
2/27	Int'l Polar Bear Day
3/3	World Wildlife Day
3/9	Solar Appreciation Day
3/20	World Sparrow Day
3/21	Int'l Day of Forests
3/21	World Fish Migration Day
3/22	World Water Day
4/22	Earth Day
4/22	Arbor Day
5/12	INPAWS Plant Sale
5/12	Int'l Migratory Bird Day
5/18	Endangered Species Day
5/23	World Turtle Day
6/5	World Environment Day
6/8	World Oceans Day
7/29	Int'l Tiger Day
8/22	National Honey Bee Day
9/30	World Rivers Day
10/24	Int'l Day of Climate Action
11/15	America Recycles Day
12/5	World Soil Day

native bees and four species of butterflies sipping nectar from flowers. I even saw three monarch butterflies (*Danaus plexippus*) working their way slowly across the field from one patch of flowers to the next. It is unusual to see this much insect activity in late October, and I am pleased that the meadow was still providing resources for insects so late in the season.

The educational potential of the meadow on Weed Patch Hill is tremendous. Thousands of visitors pass through BCSP yearly. A large field of blooming native flowers is aesthetically pleasing and beckons visitors to stop and look. The most recent addition to the meadow is an educational kiosk (also paid for by grant money) on the edge of the meadow. The kiosk provides a shaded bench under a roof and has interpretive displays explaining the importance of supporting native insect pollinators, as well as the history of Weed Patch Hill. Hopefully, visitors will be inspired to plant native flowers in their own yards at home and to create their own pollinator habitats.

The next stage of the project will include a walking trail around the perimeter of the meadow. I hope to find funding that will enable us to design a wheelchair accessible trail for at least part of the meadow.

As citizens, we can encourage county, state and federal agencies to include naturalized areas planted in native flowers and grasses in their management plans. The wildflower meadow at BCSP is a good example of how management practices can adapt to current ecological needs.

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Leslie Bishop is professor emerita in biology at Earlham College, Richmond, a member of INPAWS South Central Chapter and Friends of BCSP.



Britton, N.L., and A. Brown. 1913

The BCSP meadow includes several native sedges (*Carex spp.*). Larvae that feed on sedges include butterflies and moths. Sedge seeds also appeal to a number of bird species.

New rules for INPAWS grants

By Daryn Fair

The INPAWS grants program started in 1995 with a \$50 contribution to the Brown County Wildflower Foray. Since then, we have contributed thousands of dollars to worthy native plant projects all over the state. To streamline the program, we have developed new grant guidelines.

Starting in 2018, the application deadline for grants will be October 1. Successful grant recipients will be notified the first week of November, and funds will be provided after a project is completed and a report received and approved.

Applications must be in one of three categories: Research, Land Management and Restoration, or Demonstration Garden.

Research projects involve studying native plant propagation, habitat needs, life cycle and restoration, or finding more effective ways to control invasive plants. The committee will look for a clear hypothesis, feasibility of the project, number of partners or other funding sources, and outreach components.

Land Management and Restoration projects are those that focus on ecological management and restoration of natural areas. Applications must address the significance and quality of the natural area, the intended ecological benefit of the work, plans for long-term maintenance and whether there are partners or other funding sources.

Demonstration Garden projects must involve an organized volunteer group constructing a garden or gardens accessible and visible to the general public. The committee will look for a clearly described project, native plant selection, number of people who will participate in planning, installation and maintenance, who will benefit and whether there are partners or other funding sources.

For other news about grants, see “Letha’s Fund sends youth far and wide” at right. Check inpaws.org for more about both the grant program and Letha’s Youth Outdoors Fund.

Daryn Fair is chair of the INPAWS grant committee and a member of Central Chapter.

to one another. A gust of wind or jostling of the plant can cause pollen to get where it needs to go. Even more sure-fire self-fertilization occurs in cleistogamous flowers, which remain closed and are often underground. Pollen produced in these flowers stays sealed within, with only the stigma of the same flower to land on. Violets (*Viola* spp.) are an example of a plant that produces both cleistogamous and out-crossing flowers on the same individual.

Only the pollen from the same species of plant will successfully grow a pollen tube and fertilize the eggs. The pollen “knows” what plant it’s on based on the biochemical signature of the stigma, which can trigger pollen tube growth. This biochemical signature is how some plants avoid self-fertilization; if the genetic profile of the pollen is too close to that of the flower it landed on, pollen tube growth is inhibited. Genetically varied

pollen grains have the advantage in the race for fertilization in many species of plants.

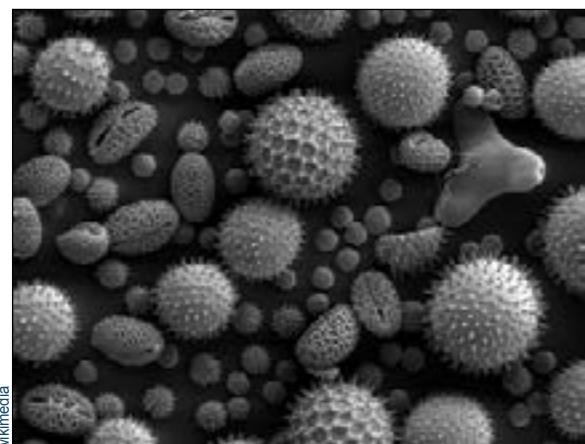
We’ve covered a pollen-grain-sized amount of information here, compared to how much more there is to know about the pollination and fertilization of flowering plants, but hopefully this introduction has equipped you to learn more about the subject and to recognize some of the remarkable processes going on in the plant kingdom.

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Adrienne Funderburg Newsome is a senior at Huntington University, where she studies biology and environmental science. Her favorite pollinator is the fruit bat.



Magnified about 500 times are grains of pollen from a variety of common plants including sunflower, morning glory, hollyhock, lily, primrose and castor bean.

Letha’s Fund sends youth far and wide POW camp – from back cover

By Angela Sturdevant

Since its inception in 2008, Letha’s Youth Outdoor Fund has awarded over \$56,400 to schools and youth organizations, making it possible for almost 14,700 kids to have high quality experiences outdoors. This is an impressive legacy of Letha Bolles Queisser, “Indiana’s Wildflower Lady”! (See “Letha’s Story” by Cindy Monnier in the summer, 2017, *INPAWS Journal*.)

Some of the natural areas visited by youth over the years with funding from Letha’s Fund include: Six Riverwatch stream locations in northern Monroe County
Amigo Centre (Sturgis, MI)
Bean Blossom Creek at Trevlac (Brown County) and Bean Blossom Bottoms (Monroe County)
Camp Tecumseh (Brookston)
Charlestown State Park (Clark County)
Eagle Creek Park Earth Discovery Center & Ornithology Center (Indianapolis)
Fernwood Nature Preserve (Buchanan, MI)
Gene Stratton-Porter State Historic Site (Rome City)
Greene Environmental Learning Center (South Bend)
Holliday Park & Nature Center (Indianapolis)
Indiana Dunes West Beach Succession Trail
Marian University Ecolab (Indianapolis)
Mary Gray Bird Sanctuary (Connersville)
McCormick’s Creek State Park (Spencer)
Merry Lea Environmental Learning Center (Noble County)
Oxbow County Park (Elkhart)
Red Mill County Park (La Porte)
Shakamak State Park (Jasonville)
Southeastway Park (Indianapolis)

We have also awarded grants for creation of educational greenspaces and native plant projects at schools. These projects now fall under the reorganized INPAWS grants program (at left). Letha’s Fund will continue to focus on educational field trips, funding for transportation, fees and supplies.

Grant applications are accepted on a rolling basis, and so are your donations. Information is at www.inpaws.org/education/letha. A check, payable to INPAWS with “Letha’s Fund” on the memo line, may be mailed to INPAWS, P.O. Box 501528, Indianapolis, IN 46250.

Angela Sturdevant is chair of the Letha’s Outdoor Fund committee and a member of South Central Chapter.

“From the outside, you don’t see there’s a wetland because of the fence and embankments. It’s virtually hidden,” Sanders says. “It’s unusual that the wetland is higher than the point it serves, so the whole property is a bit surreal.”

Property managers simulated natural conditions as much as possible. Upland plants were seeded in drier areas, wetland plants in shallow areas. Trees that died when areas were flooded were left as bat habitat. A three-quarter-mile path encircles the property and a large pier stretches into the final pond. Workers actively manage invasive species such as autumn olive (*Elaeagnus umbellata*), as well as nuisance wildlife.

“We have a bit of a groundhog problem,” Slaton notes. “They dig holes in our berms, so we have to manage them, too.”

Four common warm season grasses are present at Camp Scott, along with button-bush (*Cephalanthus occidentalis*), hardstem (*Schoenoplectus acutus*) and green (*Scirpus atrovirens*) bulrush, and rose-mallow (*Hibiscus moscheutos*). At the open house, hikers also enjoyed blooming New England aster (*Symphotrichum novae-angliae*), grass-leaved goldenrod (*Euthamia graminifolia*) and American bugleweed (*Lycopus americanus*).

As a result of all this work, Camp Scott functions like a real wetland, complete with nesting green herons, migrating birds and other wildlife. City-conducted tests show an improvement in the quality of the water leaving the wetland. The wetlands help reduce bacteria in the water and settle suspended solids.

“We talk so much about improving water quality,” Sanders says. “For the City to understand that a wetland could help clean the water before it goes into the Maumee River, and then construct a unique solution, is pretty progressive. It’s an elegant solution to a common problem.”

Camp Scott is closed to the public, except on limited occasions and for private tours. A classroom curriculum is available for school groups and field activities. Interested persons can call 260-427-8311 for information.

Kim Miser is communications chair of INPAWS Northeast Chapter.

Seed Swap

Hamilton County Master Gardeners Association will host the Central Indiana Seed Swap Saturday, Jan. 27, 2018, 9 a.m. - 2 p.m., at Hamilton County Fairgrounds, Noblesville.



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Camp Scott: From POW camp to wetland

By Kim Miser

At first glance, Camp Scott seems an unlikely place to find wildflower enthusiasts. In the heart of Fort Wayne's industrial sector, it's a mystery property, closed to the public and encircled by a chain link fence. But for a few hours in September, Camp Scott opened its gates, allowing the public rare access. What's going on behind the fence is simply remarkable.



Kate Sanders

Camp Scott once served as an army training center and, during World War II, as a German prisoner of war camp. The property eventually was abandoned and for decades was an unofficial dump. Today Camp Scott serves a new, surprising purpose — as a constructed wetland.

The catalyst for transforming Camp Scott into a wetland arose because city leaders were trying to solve a problem. Mary Jane Slaton, program manager for Fort Wayne City Utilities (FWCU), says older sections of Fort Wayne, like the neighborhoods in the Camp Scott area, have combined sewer pipes.

“During heavy rains, combined sanitary sewage and storm water overflowed into the rivers,” Slaton says. “For older neighborhoods, combined sewers could mean sewer back-ups.”

In the 1990s city leaders devised an unusual relief plan that included a constructed wetland. City workers hauled tons of garbage from the Camp Scott site, filling more than 60 dump trucks with junk. New storm sewers were installed in several neighborhoods, a huge underground storage tank was placed under a nearby park, and Camp Scott was seeded with native plants.

The massive tank collects runoff from storm sewers. From there, the water is pumped to the property where it flows through a man-made “influent structure” that looks like a natural waterfall. The water then moves through a series of constructed wetlands just as it would in nature, using overland flow, gravity and ground water.

“The system solves two problems,” Slaton says. “It not only relieves combined sewer overflows and sewer backups, but improves water quality before finally discharging into the Maumee River.”

In September, Camp Scott held an open house for curious residents. Partnering with FWCU, INPAWS Northeast Chapter organized a wildflower hike led by Kate Sanders.

POW camp – continued on page 15