



inpaws journal

Indiana Native Plant and Wildflower Society

Summer 2015

Bradford pear

A pretty (awful) tree

By **Cliff Chapman**

If you visited Wapihani Nature Preserve this spring, you might have seen people from the Central Indiana Land Trust, Inc. (CILTI) working to eradicate something that a lot of people spend good money to get: Bradford pear trees.

Why is this such a problem at Wapihani? In part because it sits in the middle of an area of high commercial and residential growth. A 77-acre plot along the White River in Hamilton County, Wapihani is in Fishers, one of the fastest-growing suburbs in the country. These days, where you have residential and commercial growth, you tend to have a lot of Bradford pear trees – they've long been a favorite among landscapers because of their disease and insect resistance.



James H. Miller, USDA Forest Service, Bugwood.org

The Bradford pear, a popular landscape tree, threatens Wapihani Nature Preserve and sites across the eastern US.

Despite its lovely white flowers and popularity in landscaping, the Bradford pear tree (a cultivar of Callery pear, *Pyrus calleryana*) has taken a particular toll on the Wapihani Nature Preserve. In an area of the preserve set aside for prairie grasses with islands of tree seedlings, hundreds – if not thousands – of Bradford pear trees are now cropping up. While some are mere seedlings, others have grown to six or eight feet in height.

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Once upon a time, that would not have posed a problem. The first Bradford pears introduced here (native to China and Vietnam) tended to be sterile, which was a selling point as they weren't messy. Unfortunately, they also had weak branches and often cracked in severe weather. So the sterile variety was crossed with the parent tree to make stronger branches. Now we have stronger trees but they also bear fruit. This means they can spread – and they do, prodigiously.

Being insect-resistant, the Bradford pear provides no food for local insects. As a result, insect populations can plummet where the tree grows. Because insects are the main protein source for much of our native wildlife, this cre-

Awful – continued on page 2

A pretty (awful) tree

Continued from page 1

ates a chain reaction that can reach all the way up the food chain.

Similar stories can be told about other invasive species threatening our natural heritage in Indiana. Each spring hundreds of volunteers across the state spend countless hours helping land trusts like CILTI battle plants like Asian bush honeysuckle, garlic mustard, glossy buckthorn and purple winter-creeper.

This spring, volunteers at Wapihani focused on turning back the Bradford pear invasion.

Purchased in 2006, Wapihani Nature Preserve has seen a lot of restoration work already. It serves as part of the Central Indiana Land

Trust's larger initiative called "Greening the Crossroads," which engages public and private partners in an effort to conserve more than 300,000 critical acres of green space and forested stream corridors throughout nine counties.

After buying the property, the land trust divided it into two sections: on the south portion of the property we planted more than 19,000 hardwood trees; to the north we planted prairie grass and button bush, the latter a native but rare plant for central Indiana. It's in this prairie grass section that the Bradford pear trees are cropping up, or at least where they are most visible – we will continue to monitor for them in the southern tree area as well.

We're repelling this invasion in two steps. Step one involves bush-hogging the prairie section, cutting the trees down in the process. In step two, we are monitoring the property to

watch for Bradford pear trees to re-sprout, at which time we'll apply a foliar spray to the trees. As is our practice, we'll do this when the trees are less than knee-high to avoid affecting other plants with overspray and to make the process safer for the person applying the spray.

Unfortunately, this will not be a one-and-done process. We need to continually monitor the preserve to fend off the ongoing invasion.

After all, even if we're able to one day convince all developers and property owners to stop planting Bradford pears, we still have to contend with the trees that are already here – and that are all too capable of spreading their seeds.

If you're interested in volunteering to help CILTI on the Wapihani Nature Preserve or other properties, please contact Stacy Cachules at 317-631-5263 or scachules@conservingindiana.org.

Cliff Chapman is executive director of the Central Indiana Land Trust.

Corrections

Mark Twain wrote to an acquaintance in 1897, "The report of my death is an exaggeration." So thought INPAWS member Christine Carlson when she saw her name under an "In memory of" heading in the list of Letha's Fund donors on page 6 of our spring issue. The error occurred when the list was converted from one file type to another and became misaligned. We are happy to report that Christine, who has been a Letha's Fund donor for several years, is alive and well. We are sorry for the consternation this error caused our readers.

The bio note for Hilary Cox on page 3 of the spring issue, at the conclusion of her article "Define spring: April in the Midwest," was incorrect. She is a long-time INPAWS member but is not a past president.

We regret that the draft of the spring issue that was sent to the printers was not the final draft. The corrected draft is available at inpaws.org. A link was e-mailed to members in April.

It's not just for monarchs! Got milkweed?

By Holly Faust

Monarch butterflies are the most talked-about insects when it comes to the milkweed (Asclepiadaceae) family, but many other fauna also depend on the 14 native species of milkweed we have in Indiana.

The monarch lays its eggs on various species of milkweed and its caterpillars eat the plants' leaves. Common milkweed (*A. syriaca*) is the most familiar species across the state because it is an early succession plant, thriving in areas recently disturbed. Other species thrive in only certain counties. White milkweed (*A. variegata*) is on the state watch list, and Mead's milkweed (*A. meadii*) is a climax succession plant, federally threatened and considered extirpated in Indiana due to disappearing climax prairie communities.

Other milkweeds native to various parts of Indiana are tall and short green, purple, Sullivant's, four-leaved, swamp, butterfly, thin-leaved, poke, sand, and whorled milkweed. Their flowers range from bright orange (butterfly) and pink (common) to white and green.

Literally hundreds of insects use milkweeds in some way. This may be as herbivores, nectivores, parasites, predators, decomposers, scavengers or passersby. ("Passersby" are organisms that use the plant only as a resting place or eat other insects found on the plant.) Let's explore just a few insects that are directly dependent on milkweeds.

Adults of the frequently seen milkweed beetle, *Tetraopes* spp., feed on milkweed leaves and flower buds in June. These beetles give a squeaking sound when disturbed and leave characteristic chew marks on the tips of milkweed leaves. In late summer they lay their eggs close to the ground on the stem. The larvae then hatch and burrow into the stem and roots and overwinter on the roots. They pupate underground and emerge as adults in early summer. These insects don't have a fashionable orange and black coloration, warning would-be predators that they are not a good choice for a meal.

Large milkweed bug (*Oncopeltus fasciatus*) and small milkweed bug (*Lygaeus kalmia*), better known as seed bugs, are two common species of milkweed insect. They are more abundantly seen in late August when milkweed seeds are ripening. Large milkweed bug adults eat milkweed plant matter and maturing milkweed seeds. The small

milkweed bug's preferred food is milkweed seed as well, but it also preys on other milkweed bugs, monarch caterpillars and chrysalides when seeds are few or non-existent. Once it starts to get cold in late summer or early fall, both species either overwinter in the leaf litter or they, too, must migrate south as far as central America, while the monarchs go to Mexico.

We know monarch caterpillars hatch on and eat milkweed leaves, but did you know that the caterpillars of milkweed tussock moths, a.k.a. milkweed tiger moths (*Euchaetias egle*), also feed on milkweed? This makes the monarch butterfly and milkweed tussock moth competitors. Monarchs lay up to 400 eggs, one at a time on various milkweed plants over a large area, whereas milkweed tiger moths lay all 50 or so eggs in one cluster on a milkweed leaf.

The tiger moth's caterpillars hatch and feed together in a mass. Its fifth instar (harlequin) caterpillars are quite pretty, with orange and black hairs that are irritating to would-be predators. If disturbed, they curl up and fall to the ground. They over-winter as pupae, and the adults are nocturnal, with silver to gray-brown wings and yellow abdomen with three rows of black spots.

There are four species of milkweed butterflies in the US in the subfamily Danaina: monarchs, queens, soldiers and tiger-mimic queens. Several other butterfly and moth families use milkweed flowers for their nectar, including swallowtails, whites and sulfurs, gossamer wings, brush-footed butterflies, skippers, sphinx or hawk moths, unexpected *Cycnia*, delicate *Cycnia*, plume moths, smoky moths, pyralid moths and ermine moths.

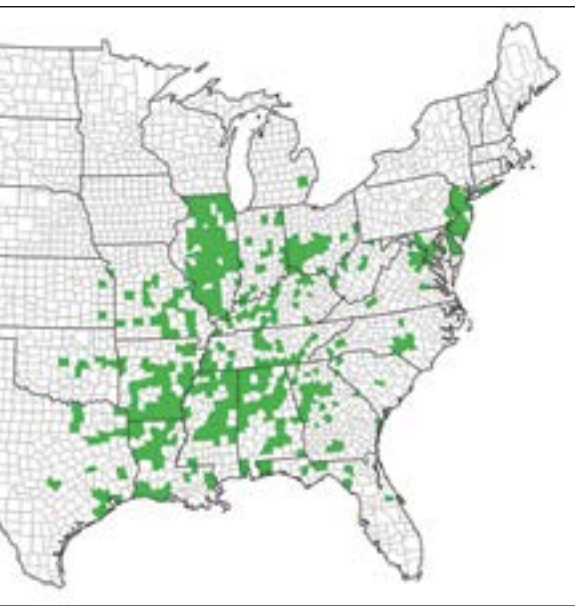
Many native pollinators visit milkweed plants. These include adults in the Hymenoptera order: several species of sawflies, hornets, parasitic wasps, braconids, ichneumon wasps, chalcids, cuckoo wasps, stinging wasps, spider wasps, vespid wasps, potter wasps, yellow jackets, hornets, paper wasps, bees and ants.

Milkweed – continued on page 9

Host Plant



Caterpillars of milkweed tussock moths (Euchaetias egle) compete with caterpillars of the monarch for precious real estate on milkweed leaves.



Distribution map of Callery pear infestation from the Early Detection & Distribution Mapping System, to which anyone can contribute data on invasive species with the Great Lakes Early Detection Network (GLEDN) app for smart phones

Seed Dispersal Hitchhiking Indiana

By Ben Hess

Seeds have many ways to travel. They can hitchhike on your pants, socks, boots, your dog, a deer. The better a seed can connect to you, and the less easily you can remove it, the farther it can travel to spread its genes.

Did you stay on the trail or, since no one was watching, did you venture off on a side



National Park Service

This dog is covered with the seeds of houndstongue (*Cynoglossum officinale*), a species that has invaded a number of Indiana counties from the Indiana Dunes to the Ohio River.

trip? Did you get a closer look at a wildflower through taller vegetation? Did you ever look down and see seeds you didn't recognize clinging to your clothing or stuck under a boot lace? When did those seeds ever so slyly attach to you? You try to remember what plant you brushed against, stepped over or on, but nothing comes to mind. Were you in a wetland? A prairie? A woodland? Was it an annual, biennial, or perennial? Is that seed a native plant or worse – a non-native invasive species?

To keep our natural areas clean of non-native invasives, plant species out of place, a.k.a. weeds, keep your field gear clean. After hiking check your packs, pant legs, coat sleeves, and the tread on your boots. Make

sure no seeds make their way to another site, whether it's the same day or a hike weeks later. Seeds will wait patiently under boot laces, in your boot treads, on the bottom of your pack. As a seed dries, the sheath becomes more brittle, and a slight touch may just release it to its new home.

If you do happen to find seed tucked under the laces of your boots, as I do many times, take this time to learn something new. Attempt to identify a plant based solely on its

Seeds will wait patiently under boot laces, in your boot treads, on the bottom of your pack.

seed. It's okay to cheat at first – hey, that's how this happened anyway, your detour off the beaten path. Do an internet search. Go back to where you last wore those boots and try to find a dead plant or old leaf to help with identification. If you are not seeing plants with that seed, the easiest thing to do is to follow your own footsteps. Chances are it will happen again.

Look around. Are there many plants, or just a few? Can you identify the plant family or genus? If you know what species it is, can you figure out what plant community it's in? How far it traveled from the parent plant? Are there migratory birds moving through the area right now? What might they have brought with them? What are they taking with them? How far will these seeds travel?

Plants can be identified by seed, bark, buds, bud scars and dried leaves. The seed of a plant is unique. It has distinctive curves, textures and shapes. Go out, take a hand lens, and get a closer look! And be on the lookout for hitchhikers.

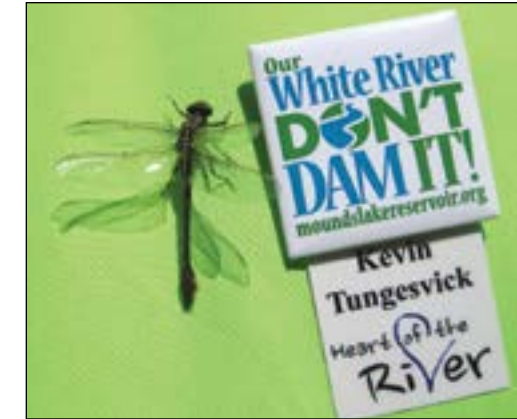
Ben Hess is east central regional ecologist for DNR. Based at Limberlost State Historic Site in Geneva, he covers 14 counties.

Mounds reservoir fight continues

By Tom Hohman & Jesse Kirkham

The fight to stop the proposed Mounds Reservoir, which would dam a section of White River at Anderson, is entering a critical stage. INPAWS is one of over 20 Hoosier organizations opposing the project, which would flood one-third of Mounds State Park and the entire Mounds Fen State Nature Preserve. Ancient Native American archaeological sites are also endangered.

The battle is centered around getting eight local city councils or commissions in Madison and Delaware counties (communities from Anderson to Muncie) to appoint representatives from their governing bodies to form a Mounds commission, where proponents of the reservoir want this commission to take charge of building the reservoir. Opponents want to stop the creation of this commission.



Kevin Tungesvick wrote that during a "paddle protest last year, I rescued a newly emerged clubtail dragonfly from the current. It dried its wings on my hand and then alighted on my shirt just long enough for me to snap this photo."

To keep apprised of the rapid pace of events, check the Heart of the River Coalition web site at www.moundslakereservoir.org and "like" their Facebook page at facebook.com/moundslakereservoir.

Boots on the ground

DNR Division of Nature Preserves will offer several more guided hikes this year. These Field Day hikes are from 10 a.m. till 12 noon. All are open to the public, but registration is requested at www.in.gov/dnr/naturepreserve.

Date	Preserve	County	Co-sponsor
July 18	Fisher Oak Savanna	Jasper	NICHES
Sept. 5	Eagles Crest	Marion	INPAWS
Sept. 19	Beanblossom Bottoms	Monroe	SLT
Sept. 26	Pine Station	Lake	INPAWS
Oct. 3	Pipewort Pond	Elkhart	INPAWS
Oct. 10	Dustin	Allen	ACRES

ACRES = Acres Land Trust; NICHES = NICHES Land Trust; SLT = Sycamore Land Trust

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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.

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- Spring – Jan. 23 for April 1 mailing
- Summer – April 22 for July 1 mailing
- Fall – July 22 for Oct. 1 mailing
- Winter – Oct. 22 for Jan. 1 mailing

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.

2015 Annual Meeting

Conference speakers set

By Tom Hohman

Rounding out the slate of speakers for INPAWS' annual conference November 14 at IUPUI, Indianapolis, will be **Laura Rericha**, a wildlife biologist with the Forest Preserve District of Cook County (Chicago). She is currently working with Jerry Wilhelm on an expanded, more comprehensive version of the classic *Plants of the Chicago Region* entitled *Flora of the Chicago Region*.

Speakers previously announced include:

Douglas Tallamy, author of *Bringing Nature Home: How Native Plants Sustain Nature in our Gardens*

Rich Darke, author of several books, most recently (with co-author Douglas Tallamy) *The Living Landscape: Designing for Beauty and Biodiversity in the Home Garden*

Mike Homoya, botanist with Indiana DNR Division of Nature Preserves and author of *Wildflowers and Ferns of Indiana Forests and Orchids of Indiana*

Jim McCormac, Ohio Division of Wildlife botanist and author of *Birds of Ohio*

Last year's expanded exhibitor area proved very successful, so it will return again. It presents a rare opportunity to interact with representatives of other conservation organizations, as well as some of our conference sponsors. Exhibitors for non-profits are allotted space for a minimal cost, while a range of pricing levels is available for sponsors. Details for sponsors and exhibitors are available at www.inpaws.org.

Another popular item from last year that will return is the silent auction. If you have rare or unusual items that you want to donate for the silent auction, please contact Tom Hohman at conference@inpaws.org.

Tom Hohman is 2015 INPAWS conference chair.

"The sun, the moon and the stars would have disappeared long ago ... had they happened to be within the reach of predatory human hands."

– Havelock Ellis



Doug Tallamy (left) and Rich Darke posed in front of a venerable red oak in Easton, Maryland, in this publicity image for the new book they co-authored, *The Living Landscape*.

INPAWS awards grants

The INPAWS small grants committee has awarded a total of \$5,000 to seven organizations for various projects that use native plants for educational purposes, environmental improvement or community enhancement.

Recipients include:

- Friends of the Limberlost, Fort Wayne, \$1,000
- Franklin College, Franklin, \$495
- Keep Stockwell Beautiful, Inc., Stockwell, \$750
- James Cole Elementary School, Lafayette, \$490
- Knox County Parks and Recreation Dept., Vincennes, \$675
- Oak Farm Montessori School, Avilla, \$890
- Downey Avenue Christian Church, Indianapolis, \$700

On Common Names

By Barbara Plampin

As Li'l Abner would say, common names of plants can be "confoosin." For years, our local native plant sale marketed blue-eyed grass (*Sisyrinchium* sp.) as a grass instead of as an iris family member. Neither are these plants grasses: common bog arrow grass (*Triglochin maritima* in the Juncaginaceae); grass pink (*Calopogon tuberosus*), an orchid; yellow star grass (*Hypoxis hirsuta*), a lily formerly classed as an amaryllis; and grass of Parnassus (*Parnassia glauca*), a saxifrage.

Then there are regional differences: Manitoba maple is our box elder; both are *Acer negundo*. In Indiana, sycamores grow along the Wabash; abroad, they can be sycamore maples (*Acer pseudoplatanus*).

Some common names stand for more than one plant. Bluebells can be grape hyacinth (*Muscari botryoides*), Pitcher's leatherflower (*Clematis pitcheri*), or *Mertensia virginica*, a.k.a. Virginia bluebells, Virginia cowslip, tree lungwort or Roanoke bells. The bluebells of Scotland are our harebell (*Campanula rotundifolia*), and botanists have finally decided the bluebells of an English wood are *Hyacinthoides non-scripta*, lily family.

As confusing as they are, common names testify to our ancestors' and to our own creativity, sense of humor, fondness for rhyme or poetic effects. They also help us avoid the embarrassment of mispronouncing botanical names that usually don't help us visualize the plants we're talking about anyway.

For a feast of common names, I enjoy browsing the "English Index, Including Popular Plant Names" in volume III of Britton and Brown's *An Illustrated Flora of the Northern United States and Canada*, a 1970 reprint of their 1913 work.

Leading the creativity list is probably cleavers or annual bedstraw (*Galium aparine*) with at least 70 common names including catch weed, bur-head, wild hedge bur, stick-a-back, grip, loveman, and sweethearts, as well as poor Robin, turkey grass, gosling grass, beggar's lice and scratch grass.

What are your favorite common names? Journal editor Patricia Cornwell likes redwhisker clammyweed (*Polanisia dodecandra*) and curly-cup gumweed (*Grindelia squarrosa*). (Summer

2013 *INPAWS Journal*, "A Wildflower from Outer Space?")

When small, my sons liked bee "bomb" (*Monarda didyma*, bee balm) until they found it didn't explode. Now grown up, one son likes to refer to *Lobelia siphilitica* (blue lobelia) as both "highbelia" and "lowbelia." He gets a kick out of greeting the plant, "Hi, Belia!"

My own favorites include whippoorwill's boots for pitcher plant (*Sarracenia purpurea*), pepper-and-salt for harbinger of spring (*Erigenia bulbosa*), missey-moosey for mountain ash (*Sorbus decora*), and tippetty witchett for Venus flytrap (*Dionaea muscipula*).

For pure irony, I like enchanter's nightshade for the *Circaea* species. Circe was an enchantress, but her flowers are minuscule, and she covers you with burs. Then there's oxydaddy or quitch for Culver's root (*Veronicastrum virginianum*). I'd like to ask, "Have you drunk bunk?" and surprise people by revealing that bunk is a name for chicory (*Cichorium intybus*), the coffee additive. Bunk also names the poison hemlock (*Conium maculatum*) Socrates drank.

Perhaps less harmful is my favorite: Soopoolalia for buffalo berry (*Shepherdia canadensis*), again extinct in Indiana. After pronouncing it extirpated, DNR found a small living shrub which then died. Find this cousin of invasive autumn olive (*Elaeagnus umbellata*), and your name will go up in lights.

Invention continues. Floyd Swink and Gerould Wilhelm supplied or invented common names for all the Chicago Region sedges. Common oak sedge is easier to say and remember than *Carex pensylvanica* and avoids the orthographical trap --only one "n" in the species name. Floyd's best invention: Obe-Wan-Conobea for the figwort *Conobea multifida*. Clearly he is a "Star Wars" fan.

NOTE: Most botanical names here come from Swink, F. and G. Wilhelm, *Plants of the Chicago Region, Fourth Edition*, Indiana Academy of Science, 1994. Alas, though Dover Publications still sells volumes I and III of Britton and Brown, they don't supply volume II. Inquire of Tracy_McDonalddoverpublications.com.

Barbara Plampin is a life director of the Shirley Heinze Land Trust and a field biologist.



Wikimedia

Among the many plants that go by the common name of bluebell are (from top) *Clematis pitcheri*, *Hyacinthoides non-scripta*, and *Mertensia virginica*.

FYI

- A film documentary called "Hometown Habitat" about the importance of restoring native plant species is receiving a \$500 contribution from INPAWS, thanks to a March e-vote by the council. INPAWS will collaborate with Indianapolis Museum of Art to show the film.
- West Central Chapter is joining the Wabash River Enhancement project as a partner.
- East Central Chapter plans to co-sponsor hikes with the local Audubon Society.
- South Central Chapter is publicizing itself at various events. David Mow is personally working on an herbarium for Brown County State Park.
- INPAWS membership was 560 individuals and families in 2014. As of February, 2015, only 203 had renewed or joined. It is easy to do at www.inpaws.org.
- Next quarterly Council meeting is August 11 at 3 p.m. at The Nature Conservancy, 620 E. Ohio St., Indianapolis. All members are welcome.

Milkweed – from page 3

Adult wasps feed on the nectar of the milkweed plants, possibly pollinating them. Bees are the best pollinators due to their branched hairs and pollen combs, although this does not necessarily work well for milkweeds.

The pollination of a milkweed flower is a very specialized procedure, and the complex structure of the flower often defeats the purpose. Each milkweed pod represents only one flower out of an umbel of 30 that was successfully pollinated. Each seed pod contains approximately 150 seeds attached to silky hairs to carry them off in the wind when the pod dries and splits open.

Adult blister beetles (*Epicauta* sp.) are commonly found as herbivores on flowers and foliage of milkweeds. When disturbed, these slender black or brown beetles exude blood which can irritate the skin. Blister beetle first instars climb onto flowers and attach themselves to visiting bees. The bees carry them back to their nests and the subsequent

instars eat the bee eggs. Larvae of this family (Meloidae) usually feast on grasshopper eggs.

Milkweed plants also attract a species of aphids not native to North America, the oleander aphid (*Aphis nerii*), thought to originate in the Mediterranean region. These aphids reproduce asexually; males do not occur in the wild. They can be parasitized by wasps, (*Lysiphlebus testaceipes*) and aphids (*A.colemani*).

In the Chrysomelidae family of leaf beetles, the cobalt milkweed beetle (*Chrysochus cobaltinus*) is a beautiful metallic beetle whose adult form feeds on the leaves of milkweed.

Many species that have evolved to feed on milkweed and related dogbane have a habit of severing the leaf vein that feeds into the part they are preparing to eat, so as to reduce the toxicity of the leaf. Not all milkweed plants have the same level of toxicity, even individuals of the same species in a given area.

In the insect world, the list of relationships with the milkweed plant goes on and on, whether a species is merely a passerby or its larvae solely depend on the plant in order to survive.

This plant - in all its diverse habitats, from disturbed areas to established areas, wet to dry, full sun to partial shade - is part of a bigger, more complex community, ever changing and interacting with the flora and fauna surrounding it. Abiotic factors such as soil, climate, microclimates, air quality, water quality and availability, natural or man-made structures all have effects on milkweed communities.

Now when you think of milkweed, there is a lot more to think about than just monarchs. What a wonderful, complex world!

Holly Faust is an interpretive naturalist with Hamilton County Parks and Recreation at Cool Creek Park.



Eledra Lyman

The female cobalt milkweed beetle lays her eggs on the leaves of milkweed plants; the larva consumes the leaf tissue between the veins, leaving nothing but a skeleton. On occasion the larva also eats the root system of the plant.

- Wikipedia

Conservation Day promotes priorities

By Jane and David Savage

Conversations with legislators were lively during Conservation Day at the Statehouse March 25. Topics included the Indiana Conservation Alliance's (INCA) priorities for Indiana's 2015-2016 budget.

Senator Michael R. Crider (R-Greenfield) was named "Legislator of the Year" for his 2014 work helping defeat a bill that would have legalized high-fenced hunting preserves ("canned hunting").



Photo by Chris Torp

Senator Michael R. Crider, INCA recipient of "Legislator of the Year" award, and INCA co-chairs Holly Jones and Jim Sweeney

INCA priorities for the two-year budget were: \$2 million for Clean Water Indiana (CWI); \$2.5 million for Indiana Heritage Trust (IHT) in the second year of the biennium; an overall increase in budget for the Department of Natural Resources (DNR); and opposition to the legalization of shooting fenced deer.

The CWI program was funded at \$1million each budget year. This program was created to protect and enhance the water quality of Indiana's lakes, rivers and streams by reducing the amount of polluted storm water runoff entering surface and groundwater from urban and rural lands.

Funding for IHT was not increased. Instead the fund will receive \$94,090 per year. IHT protects important natural lands for state and local parks, forests, fish and wildlife areas, nature preserves, state recreation areas and historic sites.

There was some increase in funding for state parks. Many DNR positions cannot be filled due to continued lack of funds. There is also a need for ongoing maintenance and repair to properly manage all of the infrastructure and land owned by DNR. DNR is one of Indiana's most important agencies, focusing not only on the quality of life, but also the quality of place for all Hoosiers who value the state's outdoor lands.

Although House Bill 1453 (Hunting Preserves), which would have legalized "canned hunting," passed in the House in 2015, it was defeated in the Senate.

Jane and David Savage are co-chairs of INPAWS conservation committee and board members of the Brown County Native Woodlands Project.

Thanks

to INPAWS members who signed up to receive Indiana Conservation Alliance emails. If you haven't, go to: www.inconservation.org and click on "Join INCA's email list" to receive information about INCA priorities and what needs to be communicated to legislators. Thanks also to those who contacted legislators in support of INCA goals.

~ Jane and David Savage

"A true conservationist is a man who knows that the world is not given by his fathers but borrowed from his children."

— John James Audubon

What's the Buzz on Native Bees?

Buzz – from back cover

The most complete data exist for bumble bees. Historically, there were 16 bumble bee species known from Indiana. By comparing three intensive collecting periods (1950-67, 1975-80, 1998-2009), Rob Jean (2010) was able to show that three species of bumble bees declined dramatically in the past 50 years (*Bombus affinis*, *B. fratermus*, and *B. pennsylvanicus*), and another species (*B. variabilis*) is extirpated (locally extinct). Another 2010 study specifically focused on the Indiana Dunes identified six species of bumble bees, compared with a 1933 survey that identified 12 species (Grundel, et al., 2010). These observations are consistent with the national trend: bumble bee species are in dramatic decline (for example, Bartomeus, et al., 2013; Cameron, et al., 2011; Grixti, et al., 2009).

Other examples of native bees in Indiana are sweat bees, mining bees and leaf cutter bees. Unfortunately, many of these native pollinators are also at risk due to the same problems that honey bees face. In fact, honey bee hives can be a source of pathogens for solitary bees (Ravoet, et al., 2014). The National Academy of Sciences has noted that declines in many pollinator groups are associated with the loss, fragmentation and deterioration of habitat; diseases and pathogens; and pesticides (NRC, 2007).

Pesticides, such as the neonicotinoids, are especially harmful to both honey bees and native bees. These chemicals are directly sprayed on agricultural, commercial, and residential landscapes and have a long-lasting effect in the nectar and pollen of plants. The pesticide residuals persist in the soil for a long time as well. Research to date indicates that these residuals have a negative effect on both social and solitary bees (Hopwood, et al., 2012).

Native bee species are equally effective as honey bees at pollinating plants – they just are not managed by humans. In fact, many of our early spring wildflowers, shrubs and deciduous trees flower before honey bees are active. These plants rely on queen bumble bees and numerous species of solitary bees, which are active in March or early April, for pollination.

Native bees are an integral part of native plant communities and there are many examples of

their coevolution. Dutchman's breeches (*Dicentra cucullaria*) can be effectively pollinated only by long-tongue bumble bee species. We have some species of bees that are specialists on one genus of plant. My favorite example is a small mining bee, *Andrena erigeniae*, which collects pollen only from spring beauty (*Claytonia virginica*) and can be seen loaded with pink pollen.

Global climate change is expected to pose additional challenges to native bees and associated plant communities. Seasonal changes can alter flowering phenology or the emergence of bees, and historic coevolved relationships may be out of sync.

The timing of environmental cues such as temperature, snow melt and rainfall may change. Scientists do not fully understand the relationships among weather and climate, pollinators, and plant communities, and changes to these relationships will undoubtedly yield many surprises.

What can we do to help native bees? Find replacements for dangerous pesticides to use in your gardens, farms and yards. Become aware of pesticide-related matters and voice your opinion to the Environmental Protection Agency. Bees need a food source through the growing season, so plant a variety of native flowers to provide pollen and nectar each month. Provide bees with nesting habitat. Some, like bumble bees, need overgrown fields where they use abandoned mice nests; some solitary bees need hollow stems; others need bare soil for excavating holes. Check out the resources provided by The Xerces Society for Invertebrate Conservation (www.xerces.org/pollinator-conservation).

Leslie Bishop is a retired professor of biology from Earlham College, Richmond. She volunteers as an Interpretive Naturalist at Brown County State Park and writes a monthly nature column for the Brown County Democrat.



springbeetles.wordpress.com

*"We have some species of bees that are specialists on one genus of plant. My favorite example is a small mining bee, *Andrena erigeniae*, which collects pollen only from spring beauty (*Claytonia virginica*) and can be seen loaded with pink pollen."*



Indiana Native Plant & Wildflower Society

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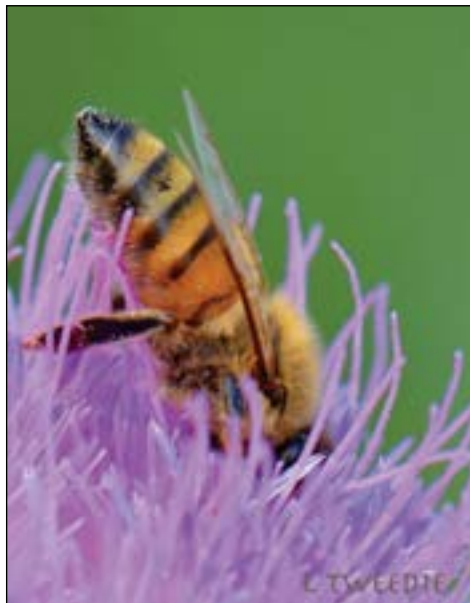
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What's the Buzz on Native Bees?

By Leslie Bishop

Fifty-two years ago Rachel Carson published *Silent Spring* in an attempt to alert the world to the devastating effects of pesticides, DDT among others. Carson's opening chapter presents a fable of a town in America that once lived in harmony with nature, alive and vibrant, but which then transforms into silence – no singing birds and no buzzing bees, a specter of death all around. *Silent Spring* not only began the modern environmental movement, but it also taught us that protection of each part of nature, including pollinators and plant life, is required for a healthy environment.

As I walk through fields, I try to imagine a world without the buzz of bees. To many people, this buzzing is a sound that evokes the fear of getting stung. But to me it's the sound of healthy nature – clean air, fertile soil, and growing plants. Scientists estimate that 85% of all flowering plants worldwide require an animal to transfer pollen from one plant to another for successful reproduction to occur. These animals include butterflies, flower beetles, bats, hummingbirds and bees. Of these, bees are the most effective pollinators because they actively forage and collect pollen to feed their young, and because they exhibit "flower constancy," which ensures that flowers of the same species benefit from the transfer of pollen. In the US, crop species such as alfalfa, sunflower and clover as well as numerous fruits and vegetables depend on bee pollination, at an economic value of about \$29 billion per year (Calderone, 2012).



The health of pollinators should be of great concern for INPAWS members. When pollinators decline, native flowering plants decline.

The evening news keeps us well-informed of the status of honey bees, an introduced species in the US, which are managed for crop pollination. Since 2006, honey bee colonies have been dying at an alarming rate due to Colony Collapse Disorder (CCD). Recent data from the USDA show a 23% mortality of managed hives in 2014 and a 30% loss in 2013.

Honey bee health is complicated and is influenced by factors such as viruses and other pathogens, parasites like varroa mites, problems of nutrition from lack of diversity in pollen sources, and effects of pesticides. Research indicates that CCD is a result of a combination of stressors. A recent study demonstrates the interaction of pesticides and pathogens on honey bee larvae and adult mortality (Labarussias, et al., 2015).

What is less well known is the status of our native bees. In North America there are 4,000 species of native bees. Indiana hosts at least 416 documented species of native bees. However, we do not have a complete picture of species distributions. Recent studies and historic records from museum collections are biased to the western part of the state in relation to Purdue University, Indiana State University, and Indiana Dunes National Lakeshore (Jean, 2010). Yet these data still provide useful information about the status of species.

Buzz – continued on page 11