



inpaws journal

Indiana Native Plant and Wildflower Society

Fall 2015

In Praise of a Gentian

By Lee A. Casebere

Gentians! Oh, how we love our gentians! And happily, Indiana can boast of having a fine selection of the blue ones awaiting our discovery and enjoyment. The lineup includes fringed, small fringed, bottle, soapwort, stiff and prairie, and without exception they all have beautiful flowers, some tending toward their own special

shades of blue. Another attraction related to this stellar group of plants is that, almost without fail, they grow among notable companions in equally notable habitats. What's not to love?

I have chosen to focus only on the one known as prairie gentian (*Gentiana puberulenta*), also sometimes called downy gentian. Near as is known, prairie gentian was never common in Indiana, and it is now on Indiana's rare and endangered plant list as "threatened." In *Plants of the Chicago Region*,

Floyd Swink and Gerould Wilhelm give it a C value (coefficient of conservatism value) of "10." Since a "10" is the highest C value they assign to a plant, its lofty numerical position tells us immediately that this is a special plant. Although probably always rare in the grand scheme of prairie affairs, it was surely once found within Indiana's borders by the thousands. By comparison, though, more common prairie plants were here in unfathomable numbers, some surely in the tens or hundreds of millions. Just how many clumps of big bluestem grew in three million acres of Indiana prairie at the time of settlement?

I don't remember when or where I first saw this beauty. Most likely, it was along a railroad track in northwestern Indiana where a few prairie plants persisted in making a statement about what the surrounding landscape had once been. Although I don't recall specific details of my first experience with it, there is an indelible image burned into my memory of an intense blue unlike any other I've ever known. Then and now, I'm left wondering — just what color of blue



Peter Grubbe

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is prairie gentian blue? As I've thought about it through the years, I've come to regard it as "electric" blue. My best attempt to explain what I mean by that is, like an electrical shock, it jolts our optical receptors with an intensity of blue that our senses can't adequately assimilate. It's just stunning, plain and simple!

Considering my own lofty feelings for this gentian, I decided to see if I could find examples of admiration for it from others.

In a book on the early history of Benton County, Indiana, Mary Pelton described many of the prairie flowers that she knew as a child growing up on a homestead farm in the late 1800's. Among them was the "rich deep blue downy gentian."

Gentian — continued on page 7

Gardening for life

By Tom Hohman

Excitement is building for the Nov. 14 INPAWS annual conference. This year's theme is "Bioscaping: Gardening for Life." The conference will be held in Indianapolis at IUPUI, Hine Hall (875 W. North St.). Deadline for early registration is Oct. 31 but it's still a bargain after that. Final deadline for advance registration is Nov. 7.

Registration fees before/after Oct. 31

Member	\$55/\$65
Non-member	\$70/\$80
Student	\$25/\$30



KEYNOTE SPEAKERS

Rick Darke: Looking at the Layered Landscape (1st presentation), Designing and Maintaining the Living Landscape (2nd presentation)

Rick is the author of several books, including his most recent, *The Living Landscape: Designing for Beauty and Biodiversity in the Home Garden*, co-authored with Doug Tallamy. His work blends art, ecology and cultural geography in the design and stewardship of living landscapes.

He will open the program with an illustrated discussion of the living layers in local and regional landscapes, both as they occur naturally and as they are often modified by human culture. This will provide a basis for understanding how healthy layers can be conserved and enhanced in home gardens and shared landscapes. Rick's second presentation will

illustrate and discuss how this can be put to practical use in the making and maintenance of residential gardens and community landscapes.

Doug Tallamy, PhD: Rebuilding Nature's Relationships at Home

Doug is well known to INPAWS members from previous visits to Indiana, including a previous INPAWS conference. He is a professor in the department of entomology and wildlife ecology at the University of Delaware and author of the groundbreaking book *Bringing Nature Home: How Native Plants Sustain Wildlife in Our Gardens*.



Doug will bring fresh insights into how we can help nature with our gardening choices. He will explain how plants that have evolved in concert with local animals provide for their needs better than exotic plants. He will explain why it is important to restore life to our residential properties and what we can do to make our landscapes living ecosystems once again.

OTHER SPEAKERS

Mike Homoya: This Is Indiana - The Historic Hoosier Landscape Prior to 1816

Mike has been a botanist and plant ecologist with the Indiana DNR Division of Nature Preserves for over 33 years. He is the author of *Orchids of Indiana* and *Wildflowers and Ferns of Indiana Forests: A Field Guide*. Mike has presented at the INPAWS annual conference many times and always provides entertaining and informative talks.

Annual Conference 2015

Mike will "time travel" back to a time before European settlement and share what Indiana was like at that time, a land that today exists only as a vision in the mind.

Jim McCormac: Butterflies and Moths - Their Darker Side

Jim has spent most of his career as a botanist with the Ohio Department of Natural Resources. He currently works for the Ohio Division of Wildlife. He is author of several books and writes a nature column for the *Columbus Dispatch*.

His program will explore the amazing four-part life cycle of butterflies and moths, their ecological roles in the environment and practical ways that we can support them.

Kevin Tungesvick: A Dangerous Precedent - The Mounds Reservoir Proposal

Kevin is a restoration ecologist with Spence Restoration Nursery. He is co-author of *Additions to the Flora of Mounds State Park and Preserve* published in the Proceedings of the Indiana Academy of Sciences.

He will talk about the proposed Mounds reservoir, a project that would decimate the most significant forested corridor remaining along the upper White River. It would also destroy one-third of Mounds State Park and all of Mounds Fen State Nature Preserve. Kevin will describe the threatened impacts on our natural heritage and provide an update on the status of the project.

CONFERENCE HOTEL

For the convenience of attendees from outside Indianapolis, a block of rooms has been reserved at Cambria Suites for a special conference rate

of \$89. This is a significant discount over their standard rates and includes breakfast, which their standard rates do not. Cambria Suites is located at the Plainfield exit (SR 267) on I-70, just west of Indianapolis, about a 20-minute drive from the conference site. Rooms are guaranteed at this rate until Oct. 13. If rooms are still available after that date, INPAWS will attempt to get the special rate extended. Attendees need to call Cambria Suites at 317-279-2394 and mention Indiana Native Plant and Wildflower Society or "INPAWS" to get the special rate.



PARKING AT IUPUI

Parking is available in the Tower Garage at the same address as Hine Hall. There is a charge for parking, so carpooling is encouraged. As of this writing, the cost was \$6 but it may increase for the upcoming school year.

More information on speakers and their topics, registration details and opportunities to be a sponsor or non-profit exhibitor is available on the INPAWS website, www.inpaws.org.

Tom Hohman is INPAWS conference chair.

"People painstakingly raised shade trees on the bare prairies; but where we already had the shade and beauty of the forest we have carelessly failed to preserve it, and now in many places must carefully rebuild what we have destroyed, taking years to replace what was removed in only a few days."

— Laura Ingalls Wilder, newspaper article, 1919

The joys and travails of

a “free range” botanist

As recounted by the great early botanist Constantine Rafinesque

By Mike Homoya

Constantine Rafinesque (1783-1840) is considered by some as the world's greatest naturalist. He had a voracious appetite for exploration and collecting, seemingly grabbing everything in sight and describing many of them as new to science. Most of his named species haven't withstood the test of time, but several have, including familiar Indiana species such as drooping trillium (*Trillium flexipes* Raf.), prairie spiderwort (*Tradescantia ohioensis* Raf.), and southern black haw (*Viburnum rufidulum* Raf.). Of special interest is a beautiful wild-flower known as prairie sundrops (*Oenothera pilosella* Raf.). Rafinesque collected it in 1818 near Evansville and thus it became the type specimen for his newly described species.

While born and raised in Europe, almost half of Rafinesque's life was spent in America. He was professor for a time at



Transylvania University in Lexington, Kentucky, venturing from there on collecting forays. He also botanized in Indiana, including near New Harmony and along the Ohio River near Evansville where he explored a huge canebrake with John James Audubon.

As a botanist Rafinesque was “free range,” that is, off road and trail and not confined to a walled-in laboratory. Sounds great, but as you'll soon learn, botanical exploration wasn't, and isn't, a stroll in the park. Much of the perceived glamour of “playing in woods” is commonly beset by real discomfort and potential risk to life.

Of course the joys are greater, easily offsetting the troubles. Consider the following eloquent description of Rafinesque's botanical experiences. Much of it holds true for the modern day field botanist as well.

(The text below, from *New Flora of North America*, 1836, by Constantine Rafinesque, is copied verbatim, including punctuation and spelling, except where portions have been removed for space considerations.)

Michael Homoya has been a botanist with the Indiana Division of Nature Preserves since 1982. He is author of *Wildflowers and Ferns of Indiana Forests and Orchids of Indiana*.

“During so many years of active and arduous explorations, I have met of course all kinds of active adventures, fares, and treatment. Such a life of travels and exertions has its pleasures and its pains, its sudden delights and deep joys mixt with dangers, trials, difficulties, and troubles. No one could better paint them than myself, who has experienced them all; but I must be brief in conveying a slight idea of them.

Let the practical Botanist who wishes like myself to be a pioneer of science, and to increase the knowledge of plants, be fully prepared to meet dangers of all sorts in the wild groves and mountains of America. The mere fatigue of a pedestrian journey is nothing compared to the gloom of solitary forests, when not a human being is met for many miles, and if met he may be mistrusted; when the food and collections must be carried in your pocket or knapsack from day to day; when the fare is not only scanty but sometimes worse; when you must live on corn bread and salt pork, be burnt and steamed by a hot sun at noon, or drenched by rain, even with an umbrella in hand, as I always had.

Musquitoes and flies will often annoy you or suck your blood if you stop or leave a hurried step. Gnats dance before the eyes and often fall in unless you shut them; insects creep on you and into your ears. Ants crawl on you whenever you rest on the ground, wasps will assail you like furies if you touch their nests. But ticks the worst of all are unavoidable whenever you go among bushes, and stick to you in crowds, filling your skin with pimples and sores. Spiders, gallinets, horse-flies and other obnoxious insects will often beset you, or sorely hurt you. Hateful snakes are met, and if poisonous are very dangerous, some do not warn you off like the Rattle-snakes.

You meet rough or muddy roads to vex you, and blind paths to perplex you, rocks, mountains, and steep ascents. You may often lose your way, and must always have a compass with you as I had. You may be lamed in climbing rocks for plants or break your limbs by a fall. You must cross and wade through brooks, creeks, rivers, and swamps. In deep fords or in swift streams you may lose your footing and be drowned. You may be overtaken by a storm, the trees fall around you, the thunder roars and strikes before you. The winds may annoy you, the fire of heaven or of men sets fire to the grass or forest, and you may be surrounded by it, unless you fly for your life. ...

Yet although I have felt all of those miseries, I have escaped some to which others are liable. I have never been compelled to sleep on the ground, but have always found a shelter. I have never been actually starved, nor assailed by snakes or wild beasts, nor robbed, nor drowned, nor suddenly unwell. Temperance and the disuse of tobacco have partly availed me, and always kept me in health.

In fact I never was healthier and happier than when I encountered those dangers, while a sedentary life has often made me unhappy or unwell. I like the free range of the woods and glades, I hate the sight of fences like the Indians! The constant exercise and pleasurable excitement is always conducive to health and pleasure.

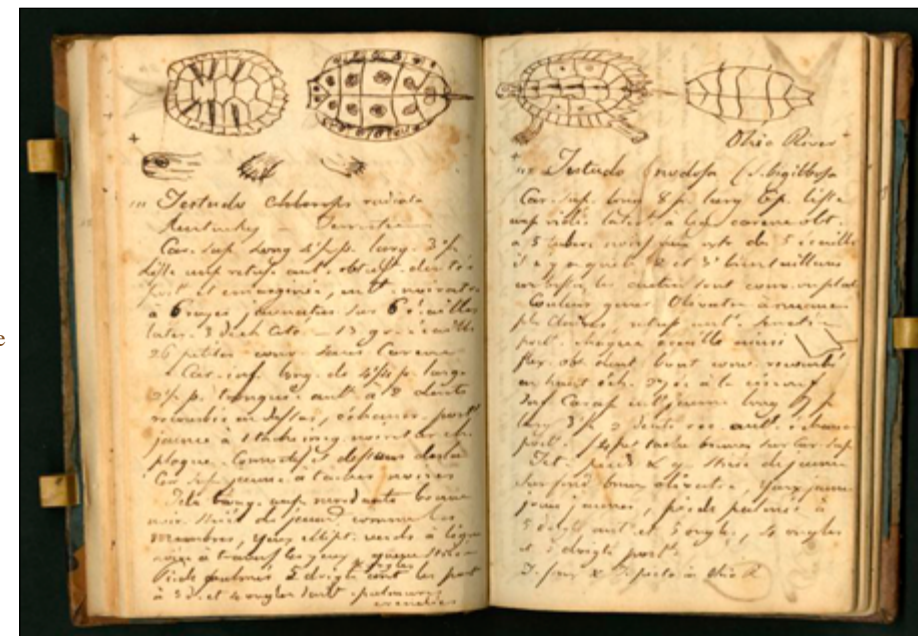
The pleasures of a botanical exploration fully compensate for these miseries and dangers, else no one would be a travelling Botanist, nor spend his time and money in vain. Many fair-days and fair-roads are met with, a clear sky or a bracing breeze inspires delight and ease,

you breathe the pure air of the country, every rill and brook offers a draught of limpid fluid. What delight to meet with a spring after a thirsty walk, or a bowl of cool milk out of the dairy! What sound sleep at night after a long day's walk, what soothing naps at noon under a shaded tree near a purling brook!

Every step taken into the fields, groves, and hills, appears to afford new enjoyments, Landscapes and Plants jointly meet in your sight. Here is an old acquaintance seen again; there a novelty, a rare plant, perhaps a new one! greets your view: you hasten to pluck it, examine it, admire, and put it in your book. Then you walk on thinking what it might be, or may be made by you hereafter. You feel an exultation, you are a conqueror, you have made a conquest over Nature, you are going to add a new object or a page to science. This peaceful conquest has cost not tears, but fills your mind with a proud sensation of not being useless on earth, of having detected another link of the creative power of GOD.

Such are the delightful feelings of a real botanist, who travels not for lucre nor paltry pay. Those who do, often think only of how much the root or the seed or the specimen will fetch at home or in the garden.

When you ramble by turns in the shady groves, grassy glades, rocky hills, or steep mountains, you meet new charms peculiar to each; even the gloomy forest affords a shady walk. Every rock, nook, rill ... has peculiar plants inviting your attention. When nothing new or rare appears, you commune with your mind and your God in lofty thoughts or dreams of happiness. Every pure Botanist is a good man, a happy man, and a religious man! He lives with God in his wide temple not made by hands ...”



Rafinesque's drawings of tortoises observed along the Ohio River, 1818.

Smithsonian Institution Archives

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Officers

President	president@inpaws.org
Jeff Pitts	317-363-1643
Past President	pastpres@inpaws.org
Art Hopkins	812-372-2862
Vice President	vicepres@inpaws.org
Karen Bird	317-263-9655
Recording Secretary	recsecty@inpaws.org
Amy Perry	317-595-9545
Corresponding Sec	corsecty@inpaws.org
Sharon Patterson	317-255-1380
Treasurer	treasurer@inpaws.org
Don Gorney	317-501-4212

Chapter Leaders

Central	central@inpaws.org
Amanda Smith	317-867-5352
East Central	eastcentral@inpaws.org
Jon Creek	765-348-4019
North	northeast@inpaws.org
Steve Sass	574-287-8939
South Central	southcentral@inpaws.org
Steve Dunbar	812-325-0968
Southwest	southwest@inpaws.org
Laura Lamb	812-455-1421
West Central	westcentral@inpaws.org
Gregory Shaner	765-447-2880

Committee Chairs

Annual Conference	conference@inpaws.org
Tom Hohman	317-831-1715
Conservation	conservation@inpaws.org
David, Jane Savage	317-873-5083
Grants & Awards	smallgrants@inpaws.org
Daryn Fair	
Hikes & Field Trips	hikes@inpaws.org
Mike Homoya	
Historian	historian@inpaws.org
Ruth Ann Ingraham	317-517-9022
Invasive Plant Edu.	invasives@inpaws.org
Ellen Jacquart	317-951-8818
Journal Editors	journal@inpaws.org
Patricia Cornwell	812-732-4890
Kit Newkirk	765-719-0414
Landscaping Support	landscape@inpaws.org
Karen Bird	317-263-9655

Letha's Fund	lethasfund@inpaws.org
Angela Sturdevant	317-829-3852
Membership	membership@inpaws.org
Wendy Ford	317-334-1932
Native Plant Rescue	rescue@inpaws.org
Jeannine Mattingly	317-626-7343
Dee Ann Peine	317-293-6282
Plant Sale Auction	plantsale@inpaws.org
Deb Bonte	317-605-0821
Public Outreach	public@inpaws.org
Karen LaMere	317-752-5444
Website	webmaster@inpaws.org
Wendy Ford	317-334-1932
Youth Outreach	youth@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:

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Summer – April 22 for July 1 mailing
Fall – July 22 for Oct. 1 mailing
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Gentian – continued from page 1

From *Flora of the Chicago Region* by H.S. Pepon (1927): "Our deepest tinted species."

From *Michigan Flora* (Part III, 1996) by Edward G. Voss: "The flowers are ordinarily a very deep, rich blue."

prairie gentian blue

late autumn's prairie beckons
though most plants bloom no more,
sweet smell of prairie dropseed grass
entices to explore.

unspoken invitation for
an ambling to begin,
with hopeful expectation of
a treasure held within.

a splash of distant color
attracting to pursue,
closer, even closer . . . yes!
that perfect shade of blue.

then, pondering in breathless gaze,
so deep and rich in hue,
the absolute intensity
of prairie gentian blue.

– Lee Casebere

Leaving the subtle comments behind, let's continue with some more obvious praise. There's a small book by Russell Kirt called *Prairie Plants of the Midwest: Identification and Ecology* (1995) that is a nicely written introduction to the plants of the tallgrass prairie. Of this plant he says: "Downy Gentian is one of the most beautiful wildflowers of the prairie." Considering that many plants of Midwestern prairies are very beautiful, the special praise given this gentian elevates it into a realm of elite company.

John T. Curtis is the author of a botanical treasure called *The Vegetation of Wisconsin: An Ordination of Plant Communities* (1959). In spite of being somewhat dated, it is still a revered reference standard of regional importance. Although the book is generally written in a staid tone, his comments about prairie gentian are quite eloquent: "Many of the xeric prairies support large populations of the downy gentian (*Gentiana puberula*), which is by all odds the most beautiful member of this genus in Wisconsin . . . unrivaled in the clarity and intensity of their deep-blue color."

And finally, there's *Where the Sky Began: Land of the Tallgrass Prairie* (1982), a book

by John Madson that examines the prairie from many different perspectives. He speaks of its metes and bounds, its flora and fauna, its beauty and complexity, its weather, its fires and its settlement and demise. Tucked into it all, Madson finds room to praise our beloved gentian: "Higher on the midslopes and prairie uplands is the superb downy gentian with its five broad, pointed corolla lobes of deep purple-blue. . . this magnificent gentian opens its blooms only in bright sunshine."

Prairie gentian has long captured the attention of botanists and wildflower enthusiasts by being no ordinary plant, but one that is uncommonly beautiful in form and of exquisite blue coloration that is deep, rich and intense. I also believe it has chosen a perfect time for flowering as it makes a daring floristic statement against the chill of winter's approach. For me, it warms my spirit in the waning days of autumn's prairie.

Although I seldom dabble in poetry, thoughts of this lovely flower have inspired me, so let me leave you with a reflection in praise of this perfectly blue gentian.

Lee Casebere is the retired assistant director of DNR's Division of Nature Preserves.



Thomas G. Barnes

Plant Sale 2015

By Deb Bonte

The annual INPAWS native plant sale is now a major event in Indianapolis and around the state and is having a big impact on gardeners' knowledge of and access to natives. We hear time and again that people wait for our



sale to plant their gardens because we have the largest selection.

The sale is also an opportunity to rescue natives from excavation sites and relocate them through the sale to private yards or public parks. It is INPAWS' largest fundraiser

of the year and helps us to make grants for many worthy education and public planting projects around the state.

A fun collaboration at this year's event was the native tree sale run by the Indiana Urban Forestry Council. We hope they will be there again next year.

Up to 50 volunteers are involved in making the sale happen—yes, it is lots of fun and, yes, volunteers come to get plants for themselves, but it is also a big job and they pulled it off again this year without a hitch. Thanks to all our wonderful volunteers.

A special thanks goes to M. J. Meneley, our morning speaker, who is a landscape architect with his own firm, Blue Marble Design. He drew a record crowd and delighted the audience with design ideas for using natives.

A big thanks goes to Monica Moran, daughter of INPAWS member and former plant sale chair Melissa Moran. Monica designed and had printed two beautiful banners for the sale.

And finally a huge thanks to the nurseries who generously gave of their time and plant material. Contributing nurseries were:

Holeman Landscaping, Indianapolis
www.holemanlandscape.com/plantsale
Richard Blankenship, 317-849-3120

Native Plants Unlimited at Geist Nursery, Fishers
www.nativeplantsunlimited.com/plantsale
Three-week-only sale in May

Spence Restoration Nursery, Muncie
www.spencenursery.com
wholesale only, Kevin, 765-286-7154

Woody Warehouse Nursery, Inc., Lizton
www.woodywarehouse.com
Pete Berg, 317-994-5487

Deb Bonte has been 2014 and 2015 plant sale chair.

EcoLab at Marian open to public

By Stephanie Schuck

The Nina Mason Pulliam (NMP) EcoLab, a 55-acre natural area on the Marian University campus, is truly a gem of Indianapolis with a rich history. Environmental restoration began 100 years ago with esteemed landscape architect Jens Jensen and continues today with Marian students, K-12 school groups and the public.

About 30 acres of the NMP EcoLab is part of the original Riverdale estate designed by Jensen for James Allison, one of the founders of the Indianapolis 500, in 1912. Allison commissioned Jensen, known for his use of native plants in "natural" groupings, to design the landscape, which had previously been cleared for farming. Jensen designed five man-made lakes, a large meadow, several wetland areas and spring-fed water features, and various structures such as cobblestone bridges, two sets of limestone steps and a colonnade. The work was completed in 1914. The current gravel trails are built on top of Jensen's original roads. Many of the structures, such as limestone stairs, benches, bridges and half-moon pools, are still intact.

In 1937, the Sisters of St. Francis at Oldenburg acquired the Allison estate and established Marian University. The area that is now the EcoLab had already begun to be used for educational purposes.

Fast forward to the spring of 2000, when the most recent rehabilitation work began, led by Dr. David Benson, a faculty member of Marian's school of mathematics and sciences. Honeysuckle that covered about 85 percent of the understory area was removed, as well as other non-natives such as bittersweet and buckthorn. This was followed by several large planting projects. Over 4,000 cubic yards of fill were excavated to restore the Jensen-designed roads to their original alignment. The EcoLab now has over 1.5 miles of trail, over 260 species of native plants and a wide variety of wildlife including beaver and mink. It also contains a diverse array of habitats and therefore is quite good for birding, with over 165 species of birds seen throughout the year.

Marian students and faculty use the EcoLab in their classes as a site for hands-on experi-

ences in a natural environment. It also provides a great location for undergraduate research and internships in ecological restoration and environmental education. The EcoLab also hosts science programs such as field trips and summer camps and provides environmental resources for pre-K-12 students and teachers. Programs are offered for the public in the form of wildflower hikes, bird walks, conservation volunteer days, night hikes, photography workshops and more.



Dave Benson

Beaver Creek is one of several water features designed by Jens Jensen, now open to the public at the Nina Mason Pulliam EcoLab.

Jensen (1860-1951) was a Danish-American landscape architect, known for his "prairie style" design work and for using not only native plants, but also native materials.

The EcoLab is open to the public every day from dawn until dusk. More information can be found at www.marian.edu/ecolab, www.facebook.com/MarianUEcolab or by contacting Dr. David Benson, science director, at dbenson@marian.edu, or Stephanie Schuck at sschuck@marian.edu.

Stephanie Schuck is restoration ecologist at Marian University.

Go 'neonic-free' in your garden Save our pollinators!

By Ellen Jacquart

Neonicotinoids, systemic insecticides used to treat crop seeds and ornamental landscaping plants, have been strongly implicated in the devastating collapse of pollinator populations around the country. We all know how important pollinators are, right? About 70 percent of the world's plants require a pollinator, including 35 percent of crop species. The value of pollinated crops in the US is \$18 to \$27 billion. One in



Can you spot seven pollinators in this image from the Canadian Wildlife Federation?

three mouthfuls of food and drink we consume is due to pollinators.

Unfortunately, one study after another is showing dramatic decline in pollinator populations in recent years. So why the crash? On March 31, the Indiana Pesticide Review Committee that I serve on hosted a Pollinator Protection Plan development meeting to bring together beekeepers, farmers, pesticide applicators, government agencies, and concerned citizens and recommend best management practices to protect pollinators. Several speakers outlined the problem and possible reasons for the crash, and a key theme to the day was that neonicotinoids ("neonics" for short) appear to be the smoking gun.

Neonics are used as a seed coating in virtually all corn and 75 percent of soybeans planted in the Midwest. A small amount of the seed

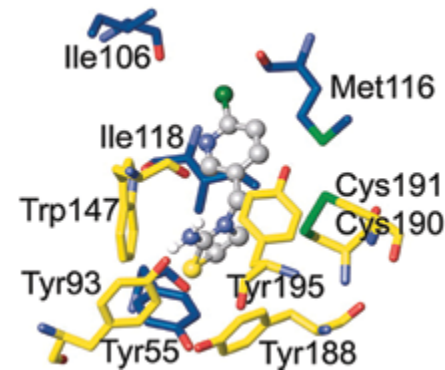
coating is taken up by the developing corn or soybean plant and protects the plant from insect damage; the rest of the seed coating ends up on the soil, moved by the wind or moved in water. Neonics are also commonly used to treat ornamental plants, so there is a very good chance that your garden has toxic plants that will kill the very pollinators you are hoping to help - literally, a death trap for bees and butterflies.

Neonics are neurotoxins that are highly toxic to invertebrates and much less toxic to vertebrates. How toxic are they? A typical application rate is 1.25 mg per corn kernel; this is enough to kill over 150,000 honey bees if it were somehow applied evenly. The vast majority of the neonic dust on the seed - over 90 percent - is not taken up by the growing plant, but instead blows away, depositing on soil and water and being taken up by other plants growing in the area. Because of the long half-life of these chemicals - measured in years - levels of neonics in soil near agricultural areas continues to climb every year. Treated ornamental plants will continue to have toxic insecticide in their tissues for years.

Even if a plant doesn't contain enough neonic to kill insects outright, it's been shown that sublethal doses disrupt bee feeding, foraging, growth rate and the production of new queens. Bees exposed to low doses appear to be more susceptible to pathogens. This should not be a surprise; the advertising for one brand of neonic for termite control boasts that exposed termites are 10,000 times more susceptible to pathogenic soil fungi. Yes, and it's likely the same holds true for all butterflies, bees and other pollinators.

A 2014 study by Friends of the Earth and Pesticide Research Institute showed that 51 percent of the garden plants purchased at Lowe's, Home Depot and Walmart in 18 cities in the US and Canada contained neonics at levels that could harm or kill bees. Gardeners should know that Home Depot and Lowe's have both

agreed to phase out neonics in their garden plants - but not until 2019. These plants are literally a death sentence for pollinators.



"A 2014 study ... showed that 51 percent of the garden plants purchased at Lowe's, Home Depot and Walmart in 18 cities in the US and Canada contained neonics at levels that could harm or kill bees."

What can you do? Before you buy any seed or plants for your garden, ask whether they have been treated with neonics. If the answer is yes or they don't know, walk away and let them know why.

If you live near farm fields, there's a strong likelihood that neonic-treated crop seed is being used and that it may be in your soil and taken up by plants in your garden. Ask questions and find out.

Watch for and comment on the Indiana Pollinator Protection Plan when it is available. It will be on the Office of Indiana State Chemist website (<http://oisc.purdue.edu/pesticide/>), and I will post the link on INPAWS Facebook group and page.

And finally - don't be bothered by insect damage on your ornamental plants. That's a badge of pride, showing that you have a healthy garden that's helping our pollinators.

Ellen Jacquart is director of northern Indiana stewardship for The Nature Conservancy, chair of the INPAWS invasives education committee and an Indiana Pesticide Review Committee member.

Why I Wake Early: New Poems by Mary Oliver

By Patricia Happel Cornwell

Mary Oliver's *Why I Wake Early: New Poems* (Beacon Press, Boston, 2004) is a virtual breath of fresh air. Winner of the Pulitzer Prize for Poetry and the National Book Award, she is best friends with trout lilies, trillium, goldenrod and pine trees, with goose, mosquito, moth and bear. Her dozen poetry books and several prose books comprise a body of work that expresses her awe at the natural world and the human's place in it.

Oliver finds fellowship with all of nature, with grazing deer at dawn and the fishing bird called yellowlegs. She shares her "own cup of gladness" with "The Wren from Carolina" who sings praise for "the early morning, the taste of the spider, for his small cup of life."

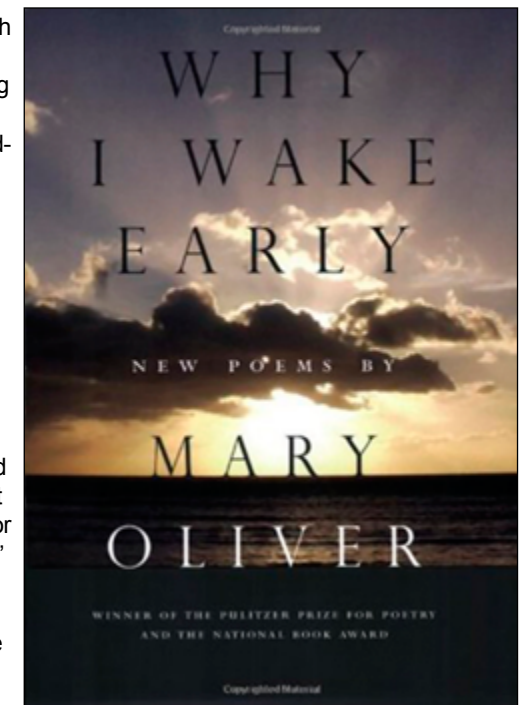
The reader may also find kinship with her in poems such as "What Was Once the Largest Shopping Center in Northern Ohio Was Built Where There Had Been a Pond I Used to Visit Every Summer Afternoon" or "The Poet Goes to Indiana."

In "What Was Once" she grieves, "Loving the earth, seeing what has been done to it ..." Who cannot relate to that? In "Indiana" she fondly describes "... a half-dozen things/ that happened to me/ in Indiana ..." including two coyotes, an owl, and a horse with "her muzzle, her nostrils, soft as violets ..."

A line in Oliver's poem "Luna" will reverberate with any hungry-minded botanizer, amateur or professional, who has ever endured insect bites, bramble scratches or hours of searching in books or internet to identify a new plant. We could all say with her, "I live/ in the open mindedness/ of not knowing enough/ about anything."

Patricia Happel Cornwell is an Indiana Master Naturalist and editor of the INPAWS Journal.

Book
Review



Glorious Goldenrods

Host Plant Spotlight

By Holly Faust

Ever walk into a bright yellow field abloom with goldenrod? I have and it was a sight to behold. I called it Goldenrod City, with all the citizens buzzing or flitting about from flower to flower. Some were sunning themselves on top of the bright flower heads, some were hiding underneath, some had embedded themselves into the stem and blown it up like a bubble, and some had even altered their goldenrod so the leaves were all meshed up together, forming an almost unrecognizable plant. This is a succession field that can be observed at the Bray



Family Homestead Park in Hamilton County. It is full of goldenrod in the fall.

Goldenrods are *Solidago* species. In Latin, *solid* means "whole" and *ago* means "resembling or becoming" which hints at its healing properties: "to make whole." The Chippewas called it "gizisomukiki" which translates as "sun medicine." It was used to calm stomachs, pass stones, cure wounds and treat diphtheria, bronchitis and tuberculosis. Zunis chewed the flowers to extract the juice which they swallowed to relieve sore throats. Alabama Indians used a poultice of the roots to relieve tooth-

aches. Some Native Americans used the seeds of some goldenrod species for food.

Several species of aromatic goldenrods, such as *Solidago odora*, were used to brew an anise-flavored tea very popular in the tea trade. In Europe, the leaves were made into Blue Mountain wine. Euell Gibbons (remember him?) called the tea "a pleasant and wholesome drink." Goldenrod has also been used as yellow dye for cloth. Ancient diviners believed the plant could be used to point the way to underground sources of water - no surprise, as the roots

of Canada goldenrod (*S. canadensis*) can grow down 11 feet into prairie soils.

Goldenrod is considered one of the most important "bee plants." Bees harvest the nectar and pollen in great quantities in autumn when many other flowers are no longer available. The Meskwaki tribes made a soothing salve for bee stings from stiff goldenrod (formerly *S. rigida*, now *Oligoneuron rigidum*). Honey from goldenrod is dark and strong. When the honey flow is strong, a light spicy-tasting, mono-

floral honey is produced. When the bees are ripening goldenrod honey it has a rank odor and taste, but when finished the honey is mild.

There are over 100 species of goldenrod in North America and 20 elsewhere in the world. It is mainly a North American species that naturally hybridizes, creating new species. Several species have been re-categorized into other groups.

While most Americans regard goldenrods as weeds, they are valued as garden plants in Europe, where the British were introducing them into their gardens long before Americans

did. However, goldenrods are considered invasive in Germany and China.

Thomas Edison sought a less aesthetic use for goldenrod. Intrigued by its natural properties, he cultivated plants whose leaves contained up to 12 percent rubber. In fact, the tires on the Model T auto that his friend Henry Ford gave him were made from goldenrod. Ford had convinced George Washington Carver to come to Dearborn, Michigan, where Carver succeeded in developing synthetic rubber from goldenrod. Somehow, the idea never took off.



Woodpeckers and chickadees are known to peck open the galls made by the goldenrod gall fly (*Eurosta solidaginis*). This parasitic insect's

Goldenrod supports 32 species of vertebrates, including birds and bats, and 155 species of insects including bees, wasps and butterflies.

whole life is dependent upon goldenrod. The small brown adult fly is about 5mm long. Gall flies do not fly well, so they spend most of their time walking up and down the goldenrods. They do not eat as adults. (I wouldn't fly too well either if I couldn't eat.) The male waits on

a bud for the female to show up. When she arrives he does a dance, and if she likes it, they mate; then she leaves to find the proper place to lay her egg inside the goldenrod. When the larvae hatch, they start eating the goldenrod stem from the inside out. A chemical in their saliva causes the plant to grow the round gall around the larvae. It will be a year until the lar-



Woodpeckers and chickadees are known to peck open the galls made by the goldenrod gall fly (*Eurosta solidaginis*).

vae reach adult size. A beetle, *Mordellistena unicolor*, and two species of parasitic wasps also depend on the goldenrod gall fly or its galls for food.

Goldenrod is considered the number one native herbaceous species to plant in one's garden. At least 32 species of vertebrates, including birds and bats, depend on goldenrod for food and/or shelter. According to an article written by Carole Sevilla Brown, based on a study by Doug Tallamy and Kimberly Shropshire, goldenrod supports 155 species of insects including bees, wasps and butterflies, as well as arachnids. If looking at a field of goldenrod doesn't bring "glorious" to mind, perhaps its value as a host plant will make you "giddy for goldenrod" the next time you encounter it!

Holly Faust is an interpreter for Hamilton County Parks & Recreation at Cool Creek Nature Center and a member of INPAWS Central Chapter.

Resource review

Natural Areas Journal

By Barbara Plampin

My uncle sometimes tossed his cat on the roof "to give her something to think about." Want your thoughts provoked? The quarterly peer-reviewed *Natural Areas Journal* (NAJ), dedicated to "the preservation of natural diversity," should do the trick.

NAJ readers must be willing to deal with – or just ignore – statistics and look up technical terms, but the book reviews and case histories of restoration projects are simpler and more accessible. The parent organization, Natural Areas Association, also offers what look like good inexpensive conferences here and abroad.

Now global in scope, NAJ has Indiana connections. At its founding, DNR's John Bacone twisted our arms to subscribe. All of volume 19, number 2, discusses the Indiana Dunes. Present editor Ron Hiebert was once chief of science at Indiana Dunes National Lakeshore,

and Noel Pavlovic of our local USGS (US Geological Survey) outpost consults with NAJ on rare plants.

In the January, 2015, "Special Issue: Using Native Plant Materials in Restoration", there are articles that deplore the dwindling numbers of government botanists and college botany courses, applaud prisons which raise native plants and butterflies for restoration, and explain the "framework" which reduces "42 approaches to climate change for conserving biodiversity" to just six.

Another article explains the Bureau of Land Management's (BLM) Seeds of Success (SOS) program which by 2014 had banked 15,123 seed collections, each containing 10,000 to 20,000 native seeds, from 43 states for conservation and research. SOS doesn't collect seeds of rare, threatened or endangered species. The

Center for Plant Conservation, which Google says is managed by the Missouri Botanical Garden, deals with those.

Havens, et al., in "Seed Sourcing for Restoration in an Era of Climate Change," approve BLM's activities but want even more "workhorse" seeds banked. They challenge the tenet that when collecting seed "local is best" on two grounds. "Local" boundaries vary too much, e.g., in the Chicago area from 40 to 320 kilometers. Even when climate is stable, seed should come from "environmentally or ecologically similar habitat" outside "strict geological limits" to assure the best adapted seeds. Future intensifying climate changes make ecological restoration more complex and collecting seeds beyond "local" even more important.

Seed should come from seed transfer zones, a.k.a. eco-regions, perhaps further subdivided into Omernik Levels III and IV. These technical terms mean dividing the US into relatively small but not necessarily local zones, defined by their environmental conditions, especially climate, land forms and soils. Zones will vary from species to species; so far, no transfer zones have been developed for "the vast majority of species." An accompanying map shows the provisional seed transfer zone which includes most of Indiana extending from New York State to beyond the Mississippi.

Seed Distribution Modeling shows that over time these zones shift and may help explain how and when, thus aiding assisted migration or "purposeful movement of species... as a management response to climate change."

Also discussed in the same NAJ issue are plant responses to climate change through plasticity (e.g., change in bloom time), adaptation (e.g., changes in heat tolerance) and migration. Taking seeds in "bad" years from poor sites helps ensure resistance to climate change and to invasives.

NAJ plans an upcoming special issue on pollinators. Individual subscriptions are \$60 per year from Natural Areas Association, P.O. Box 1504, Bend, Oregon 97709.

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



"Published quarterly by the Natural Areas Association, the Natural Areas Journal disseminates cutting-edge research, best practices and the newest knowledge related to natural areas."
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Blues – continued from back page

flupyradifurone, a systemic approved by the Environmental Protection Agency (EPA) in January, 2015, in spite of its obligation under the Endangered Species Act to consult "expert wildlife agencies." In March conservation and food safety organizations sent a formal notice of intent to sue the EPA because this and other systemics could hurt Karners.

Believed extinct in Indiana, the Karner reappeared in the Dunes in 1992 when a lone male was spotted during the environmental assessment of a proposed waste management site. IDNL, The Nature Conservancy, Shirley Heinze Land Trust (SHLT) and other organizations that owned oak savanna found

Ants are doing their part; they have a symbiotic relationship with Karner larvae.

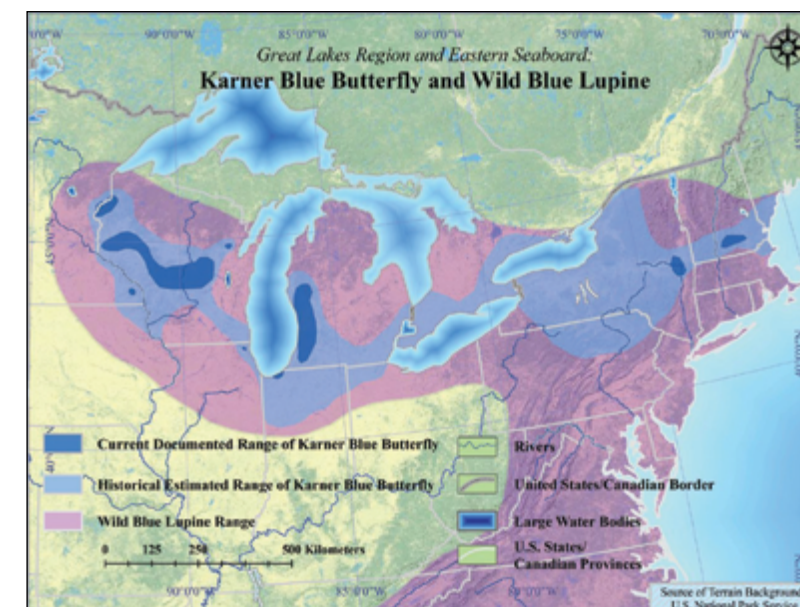
they had Karner populations. They provided appropriately timed and spaced prescribed burns, increased and preserved lupine (SHLT caged individual clumps to prevent deer browse), cut young saplings interfering with flight patterns and created flight corridors. IDNL even hired a helicopter at \$2,800 an hour to lift out abandoned cars because on-ground removal would have meant crushing lupines and the Karner eggs laid thereupon.

IDNL scientists studied adult Karner nectar preferences. Adults nectar on whatever is there, native or non-native, but prefer yellow and white flowers, especially common dewberry (*Rubus flagellaris*). Other studies included sexual preferences of canopy cover, adult life spans, flight distances and why more eggs are laid on shade-growing than open-growing lupine.

What to do? The National Park Service could approve re-introduction of the species by IDNL, which has successfully raised Karners in the past. A friend once found he couldn't use the IDNL herbarium because every surface was filled with dishes containing Karner caterpillars. I remember a scientist

proudly displaying her first hatchling clinging to her forefinger.

Ants are doing their part; they have a symbiotic relationship with Karner larvae. The larvae secrete a liquid that ants eat greedily. In return, the ants protect them. One species of ant even makes nests for the pupae out of dead vegetation.



Karner larvae leave tell-tale patterns where they feed. If you examine the leaflets of the palmate leaves of lupine near the petioles, you may see black holes and translucent "windowpanes" where larvae have eaten either the upper or lower epidermis. I'm told that at least one other butterfly makes a similar pattern on lupine leaves, but finding "windowpanes" could mean you've found a Karner site. 🌱

"Believed extinct in Indiana, the Karner reappeared in the Dunes in 1992 when a lone male was spotted ..."

"Butterflies are not insects. They are self propelled flowers."

- Robert Heinlein



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Singing “The Karner Blues”

By Barbara Plampin

The quarter-sized Karner blue butterfly (*Lycaeides melissa samuelis*) was first sighted in Karner, New York, in the late nineteenth century. In a 1990 survey in Indiana, Karners were reported at 10 of 35 potential sites.

Pronounced federally endangered in 1992, none has been seen this year in the Indiana Dunes National Lakeshore (IDNL). Only two were spotted there in 2014; whereas in 1996 1,000 or more had been seen. The crash is thought to have occurred because the early spring of 2012 enabled larvae to emerge before the appearance of their only food, wild lupine (*Lupinus perennis*). When lupines did grow, the hot dry summer killed many of the plants.

Described by their classifier, novelist Vladimir Nabokov, as “blue snowflakes,” Karners once flew in a “blue cloud” in Ontario and in 12 states from Minnesota to Maine, all lying between 41 and 46 degrees North latitude, an area corresponding to the geographic limits of wild lupine. Karners flew in all of the northernmost Indiana counties, although the reported Fountain County sighting is probably mistaken. Today Karners survive in Wisconsin, Michigan and New York and have been re-introduced in New Hampshire, Ohio and Indiana, where they now live in Porter and Lake counties only.



IDNL describes Karners as having a one-inch wing span. The sexes look different: “...the tops of the male’s wings are solid and purplish-blue with a black and white border. The tops of the female’s wings are blue in the center and brown along the outer area; a series of orange crescents with black centers are located along the trailing edge. The underside of both sexes is gray, with orange bands and black spots circled with white along the entire hind edge of the wing; this distinguishes the Karner blue from other small butterflies found here.”

Karners can be friendly, sometimes perching on your fingers, perhaps searching for salt. Usually, two broods appear each year, the first from late May to mid-June, the second between mid-July and mid-August. Karners don’t live long, some just three and a half days.

Habitat loss is the major reason for the species’ decline. Habitats include oak barrens, dune and swale, and roadsides. In the Midwest the most important, oak savanna, has diminished to 0.02 percent of its initial 30 million acres because of residential, commercial and road construction.

Pesticides appear not to threaten Indiana Karners, but Michigan and Wisconsin Karners have needed protection from them. Of special interest is potential damage from

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