

The Blazing Star



A PUBLICATION OF THE NORTH AMERICAN NATIVE PLANT SOCIETY

Native Plant to Know

Seedbox

Ludwigia alternifolia

by Lisa K. Schlag

On a winter walk in a nearby park a few years ago, curiosity led me down a narrow, overgrown path between a pond's margin and a wetland where I discovered the dried stalks of a plant with distinctly shaped fruit capsules. The brown capsules were shaped like little square boxes. Intrigued, I later learned that this plant was called seedbox (*Ludwigia alternifolia*).

Seedbox is the only plant with a square fruit capsule. Throughout the winter, the seeds are shaken out by the wind and escape their container through a small apical pore. The capsules can also float. Wind and water carry the many seeds to new locations. The loose seeds tumbling around inside their live container have given the plant another of its common names: rattlebox.

L. alternifolia is a member of the evening primrose family, Onagraceae. Seedbox is one of 82 species currently classified within the genus *Ludwigia* whose specific epithet, *alternifolia*, describes its leaf arrangement: leaves that are alternate, not opposite, to each other on each side of a stem. Carl Linnaeus named the *Ludwigia* genus after Christian Gottlieb Ludwig (1709 – 1773) a German botanist and professor of medicine in Leipzig, Germany.

Seedbox is a multi-branched, herbaceous wetland perennial that grows two to three feet (up to a metre) tall with a fleshy and fibrous root system. The stems are glabrous (lacking hairs) and have a habit of reclining on neighbouring plants. A prominent identifying feature of this plant, typical of members of the evening primrose family, is that the flower parts are in fours, including a four-branched, cross-like (lobed) stigma. The solitary, bright yellow four-petalled flowers with four petal-sized green sepals and four stamens are supported by short stalks that develop in each upper leaf axil. The green, lance-shaped leaves have a toothless edge and taper to a point on either end. The small flowers bloom from June to August. The plant usually sheds its delicate petals after one day, leaving the lovely green sepals. When I visited a population of seedbox in September, I observed the leaves and sepals had begun to display reddish coloration. Below the sepals, the fruit capsules containing the seeds were developing.

Seedbox prefers full to partial sun in wet to moist conditions with acidic, sandy soil; it would complement cardinal flower (*Lobelia cardinalis*), great blue lobelia (*Lobelia siphilitica*), marsh marigold (*Caltha palustris*),

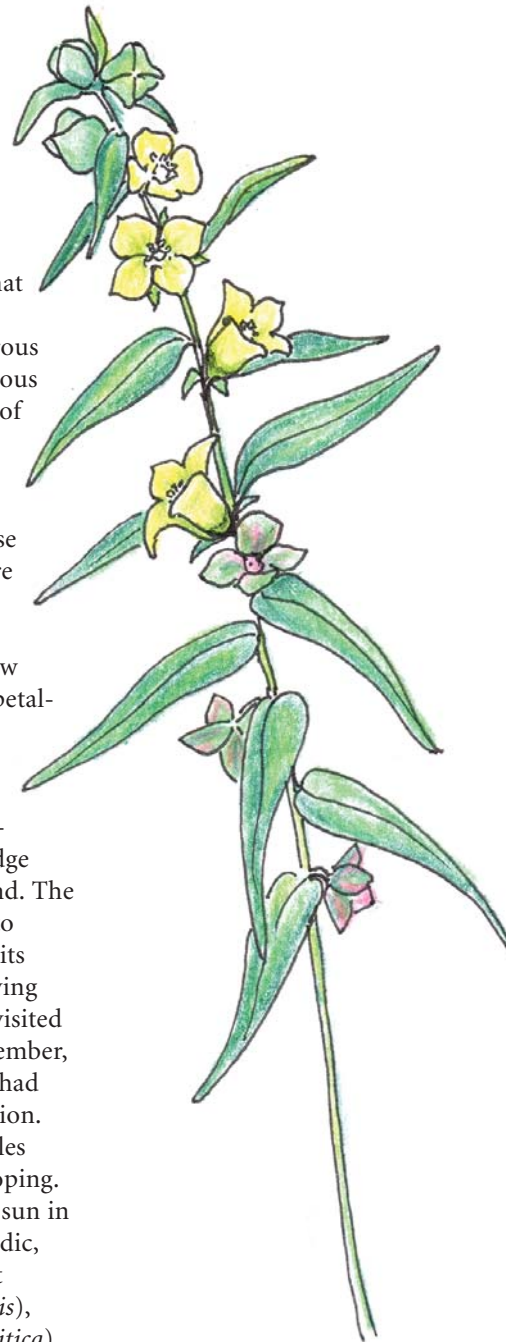


ILLUSTRATION BY BRIGITTE GRANTON

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The *Blazing Star* is . . .

The *Blazing Star* is published quarterly (April, August, November, February) by the North American Native Plant Society (NANPS). Contact editor@nanps.org for editorial deadlines and for advertising rates. The views expressed herein are those of the authors and not necessarily those of NANPS.

The North American Native Plant Society is dedicated to the study, conservation, cultivation and restoration of North America's native flora.

Fall 2018
Volume 19, Issue 4
ISSN 2291-8280

Editor: Irene Fedun
Production: Bea Paterson
Proofreader: Vicki Soon-Ai Low
Printed by: Guild Printing,
Markham, Ontario

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formerly Canadian Wildflower Society,
is a registered charitable society, no.
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2018 Annual General Meeting

On October 27, the North American Native Plant Society held its Annual General Meeting and Social at the Toronto Botanical Garden. This year, as one of the member groups of Ontario Nature, Lake Ontario North region, NANPS hosted the regional meeting in conjunction with our AGM.

We are very fortunate that all the NANPS directors stood for re-election this year. And we welcome our newest director Nishaa Agarwal who will be taking on the role of treasurer in 2019.

The NANPS **Volunteer Award** went to two invaluable volunteers this year: Dilys Bowman and Ryan Godfrey, who both generously contributed their time, extensive knowledge and enthusiasm for native plants with NANPS.

The 2018 **Founders Conservation Award** was presented to Riverwood Conservancy, a 150-acre property in Mississauga, Ontario. Their focus is on gardens, stewardship, native plant propagation and environmental education. The conservancy provides a beautiful green space open to the public every day of the year. Visit theriverwoodconservancy.org.

Paul Heydon was the recipient of the **Richard Woolger Cultivation Award**. Paul is a biologist and landscape designer who operates Grow Wild!, a small company that provides biological consulting, ecological restoration, ELC surveying and contract growing for native tree and plant restoration projects. He will lead a seed cultivation workshop on March 2, 2019. See next page for details.

The 2018 NANPS **Garden Award** went to Susan Beharriell, a King City, Ontario gardener whose property includes pollinator-friendly gardens, a pond, walking trails and more. Susan gave a presentation on the steps she took planning and planting her garden.

We capped off the day with a guided hike through nearby Wilket Creek Ravine, led by Alan Colley of Toronto Aboriginal Eco Tours.

Highlights of the hike for me: spotting

thimbleberry (*Rubus parviflorus*), whose delicious berries are appreciated by humans and wildlife, and seeing remnants of the historic uses of the area, such as the old metal tubes used for tapping maple syrup in sugar maples (*Acer saccharum*).

Danielle Tassie
NANPS Communications
Coordinator



NANPS AGM attendees gathered outside the Toronto Botanical Garden at the start of a botanical tour of nearby Wilket Creek Park led by Alan Colley.



Wilket Creek

A Graceful Flower Clings to Mountain Gorges in the Carolinas

by Kay Wade

The story of *Shortia galacifolia* is rooted in the history of Jocassee Valley, the Toxaway River and the river valley known simply as the

gracing moist ravines and steep banks of the many streams pouring out of the mountains. No records, oral or written, appear to exist acknowledging the plant's usefulness as medicine or food.

dried, broken fragments of a plant he did not recognize. Upon inquiry, he learned that no botanist in America was aware of its existence. He described the specimen as best he could in the absence of a flower and named the new plant *Shortia galacifolia*. The quest to discover *Shortia* living in its native habitat would occupy Dr. Gray for most of the rest of his life. More than a century would pass before the plant would again be found in Jocassee Valley. In the meantime, a small patch of the sub-species *Shortia galacifolia* var. *brevistyla* was found in the headwaters of the Catawba River in North Carolina. Dr. Gray visited the state to see the plant before his death, declaring his life complete. Dr. Gray likely never saw *Shortia* in flower.

Gray's friend and fellow botanist Charles Sargent discovered *Shortia galacifolia* during a botanical



PHOTOGRAPH BY KAY WADE

Shortia galacifolia

Horsepasture in the southeastern United States. Here, where the Blue Ridge Mountains face south, headwaters of the Savannah River have cut deep gorges through ancient mountain rock. Here, where an imaginary line divides the Carolinas, is where *Shortia galacifolia* clings to the thin soil of steep mountain slopes. When a power company made the decision to dam the Toxaway River and flood these valleys, few people knew – or cared – that the move would eliminate the majority of the world's habitat for this rare mountain species.

The Cherokee people who lived at the base of the Jocassee Gorges were surely well acquainted with *Shortia*. By the mid-1700s the Cherokees had mostly left these valleys, their towns abandoned to war and disease, but dense mats of *Shortia* remained,

The first documented collection of Oconee bells was made by France's royal botanist, Andre Michaux, in 1787. Michaux, perhaps the first European to penetrate these wild lands, botanized his way up the Savannah River until it became the Seneca and then the Keowee. A couple of miles shy of where the Keowee River split once again into the Toxaway and Whitewater Rivers, Michaux collected a specimen of an evergreen groundcover he merely described, misleadingly, as growing in the "high mountains of the Carolinas."

Michaux's botanical collection eventually became the property of the Museum of Natural History in Paris, France. There it languished for more than half a century.

In 1839, American botanist Asa Gray visited France and examined Michaux's collection, discovering

GROWING NATIVE PLANTS FROM SEED WORKSHOP

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Paul will lead participants through seed harvest and germination techniques. These include moist-cold stratification, scarification, double dormancy, seeds that germinate without any pre-treatment, slow-growing woodland plants, and orchids and ferns, if there's time. Tickets available soon. To register: <http://nanps.org/events/seed-germination-workshop/>.

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Greetings from...
JOCASSEEE GORGES

*Home of the rare
Oconee Bell*

North Carolina

South Carolina

Lake Jocassee

NATHAN D
DONALDSON
2018

ILLUSTRATION BY NATHAN DONALDSON

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exploration of the Jocassee Gorges in 1886 and called the graceful flowers Oconee bells. Thick stoloniferous mats of Oconee bells were documented along the banks of the Toxaway, the Horsepasture, the Thompson and the Whitewater Rivers, and along the multitude of creeks flowing into the rivers. As *S. galacifolia* grows up steep mountain slopes the patches become progressively smaller and spread further apart. Its native range is narrow, limited to elevations between 800 feet (240 metres) and 3,800 feet (1,160 metres), from the Eastern Continental Divide to the South Carolina Piedmont, and entirely within the upper Savannah River watershed.

To imagine the beauty of *Shortia galacifolia* without benefit of pictures, one needs to conjure the image of a fresh fruit salad. The plant's rosette of slightly oblong, serrate leaves

has the colour and gloss of a waxy green apple, with pinnate veins so prominent the leaves appear almost crinkled. When Oconee bells bloom, long slender scapes the colour of pink grapefruit hold aloft persistent bud scales reminiscent of ripe papaya, which in turn hold a persistent calyx. The calyx has the blush of a honeydew

melon, melding into cantaloupe at its tips. The bell-shaped flowers are white to pale pink, with beautifully veined petals both rounded and lobed, appearing as fringed as the buckskin dresses worn by Cherokee women. The flower nods to the ground. Banana yellow stigmas hold five pie-shaped anthers that point towards a much taller style. Rarely does the height of the plant, flower and all, exceed 4 inches (10 centimetres).

In the twentieth century, logging

remaining populations cling to thin soil right where ancient mountain rock meets lake, peeking out from under masses of rhododendron and mountain laurel. Some of the remaining habitat is protected by the states of South and North Carolina. The rest, we pray, is protected by the private power company that built the lake.

Find this sliver of temperate rainforest called the Jocassee Gorges and come, mid-March to April, to see



Oconee bells

PHOTOGRAPH BY KAY WADE

roads began to crisscross Oconee bell habitat, and in the late 1960s a dam was built to create Lake Jocassee. This clear, sparkling lake, nestled at the base of the southern Blue Ridge Escarpment, drowned roughly 80% of the plant's original habitat, as documented prior to 1970. The

the bell-shaped flowers bloom.

Kay Wade is a professional gardener, environmental garden writer and co-owner with her husband Brooks of Jocassee Lake Tours in South Carolina, jocaseelaketours.com.

Bee Attraction to Native Flowers in a Small Yard

by Mary Stark and Stephen Johnson

Imagine standing in a residential driveway in summer and suddenly finding yourself part of the aerial display of dozens of Virginia carpenter bees (*Xylocopa virginica*). If you stand still, these bees will fly near and around you as if you were a tree.

As a professor of nature writing and environmental literature, I have been learning about the diversity and interactions of bees and plants from ecologist Stephen Johnson. He has created an amazing sanctuary on less

with “deep to shallow floral tubes such as penstemons and salvias, and some with flat landing pads or shallow bowls such as most species of poppies, geraniums and sunflowers.”

The jewelweed bumble bee (*Bombus impatiens*), one of the first bee visitors in the spring, has a medium tongue length and is attracted to medium-length flower tubes such as those found in some wild indigos (*Baptisia* spp.), but this bee is quite versatile. In early spring, *Bombus impatiens* queens search out Virginia bluebells (*Mertensia virginica*) for nectar to fuel

petals to get to the nectar.” Or the bee may become a nectar thief, chewing through the base of the petals and bypassing pollen collection.

The jewelweed bumble bee workers have a trick shared with other bees. They exploit plants with anthers that rely on vibratory sound to disperse pollen, instead of just shedding it as most plants do. This process is called sonication or buzz pollination. *B. impatiens* workers in Stephen’s yard sonicate such species as Virginia meadow beauty (*Rhexia virginica*) and southern wild senna (*Senna marilandica*). I am astonished by sonication. I like the idea that the sound of buzzing dislodges the pollen, which flies to the bee as if by magic.

Other early spring visitors are the green bees of the tribe augochlorini, from the vast bee family Halictidae. They are commonly lumped together under the moniker “metallic green sweat bees,” but, with a little observation and practice, we can see that the bees are distinct to genus. The smallest, *Augochlora pura*, is a common visitor that favours small, radial flowers such as pokeweed (*Phytolacca americana*) or short, tubular ones such as lance-leaved frogfruit (*Phyla lanceolata*) as well as fall-blooming asters (*Symphyotrichum* spp.). Bees of the genus *Augochlorella* are slightly larger and brighter green. In Stephen’s garden, *Augochlorella persimilis* appears on Kankakee mallow (*Iliamna remota*), an exceedingly rare plant in the wild that is endemic to Langham Island in Illinois. The largest and possibly hairiest metallic sweat bee is the *Augochloropsis*. *A. metallica*, another species capable of sonication, frequents Virginia meadow beauty and southern wild senna in Stephen’s yard along with wild roses (*Rosa* spp.).

The long-tongued American bumble bee (*Bombus pensylvanicus*) workers are attracted to the flowers of the spring ephemeral known as midland shooting star (*Dodecatheon media*). Early spring is an important time for bumble bee queens and, in Stephen’s



PHOTOGRAPH BY STEPHEN JOHNSON

Bombus bimaculatus male on purple coneflower

than a quarter of an acre (one-tenth of a hectare) in Pella, Iowa. Since 2012, I have visited this National Wildlife Federation Sanctuary in spring and summer to explore and record the phenology of plants and bees.

Chronicling the visitation of the bees has kept us as busy as bees! I record my observations to help me remember and understand the intricacies of the bees’ behaviour, then Stephen reviews them for accuracy.

Among bees, floral selection is usually dependent on tongue length. In order to attract the greatest diversity of bees, says Stephen, it’s a good idea to grow a variety of plants

their metabolism and pollen to feed their growing colonies. The workers of this species progress through other short-tube or discoid flowers through the summer such as blue and white wild indigos (*Baptisia australis* and *B. alba*), gumweed (*Silphium integrifolium*), Culver’s root (*Veronicastrum virginicum*), giant purple hyssop (*Agastache foeniculum*), pickerelweed (*Pontederia cordata*), white turtlehead (*Chelone glabra*) and closed bottle gentian (*Gentiana andrewsii*). As Stephen says, the latter two “require the worker bee to force her way past tightly clasping upper and lower petals or completely fused

yard, Carlin's digger bees (*Andrena carlini*). Stephen notes that for the past four years, his yard has attracted not only the queens of jewelweed bumble bees but also those of two-spotted bumble bees (*Bombus bimaculatus*) and female and male Virginia carpenter bees (*Xylocopa virginica*). The latter two are attracted to the flowers of Virginia bluebells, while the jewelweed bees follow the phenological path laid out earlier. The two-spotted bumble bee queen, an open forest species, also visits

Dutchman's breeches (*Dicentra cucullaris*). Two-spotted bumble bee workers rely on Solomon's seal (*Polygonatum biflorum*), summer-flowering Kankakee mallow, blueberry plants (*Vaccinium* sp.) and purple coneflower (*Echinacea purpurea*). I recall that Thomas Fleischner suggests "paying attention to the bigger world outside our own heads" in his introduction to *The Way of Natural History*. In this little sanctuary, I

practice "mindfulness." I try to focus, forget the cell phone and block thoughts about a to-do list. Although the bees dart, weave, hover and land, I remain still and attentive.

Carlin's digger bees collect pollen from – and even mate on – the flowers of bloodroot (*Sanguinaria canadensis*). This bee also likes yellow-flowered merrybells (*Uvularia grandiflora*). This past spring, Stephen watched a female Carlin's digger bee taking a circuitous route to return to her nest hole near

the base of a big bluestem (*Andropogon gerardii*) in a bare patch of an area of his yard he calls "prairie." He also discovered holes made by other females in the ground nearby. Stephen waited for half an hour, watching two females emerge from holes and fly in straight lines away from them. Three females returned to the nests, always following what he describes as "an imperfect helical descent." Stephen

well. It is a fine example of what Dave Goulson describes in *A Sting in the Tale* as a type of bee-assisted weediness, a process where bee pollination increases the seedset and subsequent expansion of some plant populations. Purple coneflower in Stephen's sanctuary attracts six species of bumble bees plus honeybees and



Good vibrations: *Augochloropsis metallica* buzz pollination of Virginia meadow beauty



Bombus pensylvanicus and *Xylocopa virginica* on *Salvia azurea* (azure blue sage)

PHOTOGRAPHS BY STEPHEN JOHNSON

explained that this is no doubt a response to a kleptoparasitic female bee that lays her eggs in the *Andrena* nest. She is a non-pollinating bee of the genus *Nomada* and, in this case, looks very much like a yellowjacket. I am conscious of the challenge of identifying bees and other insects, but I have become more confident of identifying plants correctly.

Summer-blooming purple coneflower is a strong bee magnet. It is easy to grow and will spread fairly

several aster specialists such as *Svastra atripes atripes*. To Stephen, this last bee looks like an extraordinarily hairy but small Virginia carpenter bee. Another common visitor to *Echinacea purpurea* is the sunflower leafcutter bee (*Megachile pugnata*). Both males and females visit the flower heads and the females make nests in its stems. Stephen finds the *M. pugnata* males engaging as they seem to "prance" among the disk flowers of *Echinacea*.

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Perhaps because I also teach children's literature, I start to anthropomorphize and wonder if this little *Megachile* lives up to his pugnacious name by fighting off other bees on the purple coneflower. Stephen says the opposite is true; he usually sees other bees chase off sunflower leafcutter bees.

Foxglove beardtongue (*Penstemon digitalis*) attracts an assortment of bees, including two species of small leafcutter bees and a larger, distant

stem all winter, until her offspring have completely developed. Once several broods of small carpenter bees are mature, we may see them on wild petunia (*Ruellia humilis*), sunflowers (*Helianthus* spp.) and asters. The garden reminds me to be patient as I wait for the seasons to unfold.

The blue orchard bee (*Osmia lignaria*) comes to flowers of wild geranium (*Geranium maculatum*) and wild hyacinth (*Camassia scilloides*).

the brown-belted bumblebee also enjoys the short-tubed yellow wild indigo (*Baptisia sphaerocarpa*). Blackberries also draw several species of digger bees such as *Andrena vicina* and the Milwaukee digger bee (*A. milkwaukiensis*).

Amorpha, a genus of plants in the pea family, is a favourite with numerous bee species. Digger bees are attracted to a 12-foot (three- to four-metre) tall *Amorpha nitens* that has been in his yard for 15 years. Also frequenting this plant are honeybees, brown-belted bumble bee workers and difficult-to-identify andrenids, including an *Amorpha* specialist known as *Andrena quintalis*. This last has been a consistent visitor for the last three years. The dwarf species *Amorpha nana* (fragrant or dwarf false indigo) attracts jewelweed bumble bee workers, but also diminutive and delicate leafcutter bees of the genus *Hoplitis*, including a blue-eyed male *Hoplitis producta*.

Plants in the Verbenaceae family are attractive to a range of bees. Certain small leafcutter bees from what is termed by bee experts as the "rotundata" group – meaning nearly indistinguishable close relatives of the alfalfa leafcutter bee (*Megachile rotundata*) – visit lance-leaved frogfruit. Stephen notes that "males are entertaining to watch as they belligerently knock each other off the finial-like, compressed floral spikes of frogfruit. More spectacular yet are the tiny, highly active, yellow-eyed males of *Calliopsis andreniformis* that perform amazing acts of aerial-mating competition." Stephen watched enthralled as three males, "all facing each other, flew in an unwavering, imperfect (off by about three degrees), right-triangle formation all within a human hand-sized opening in the densely packed



Hoplitis producta on dwarf false indigo



Agapostemon virescens on *Echinacea purpurea*

relative of the honeybee named the red-tipped anthophora (*Anthophora terminalis*). In order to keep the anthophora visiting his garden, Stephen must keep rotten logs somewhere on his land to provide nesting spots for the females. He tells me it's a good idea to leave the dead beardtongue stems standing in the fall. Come early spring or late winter, break the dead stems about a foot or two off the ground; you'll notice that they're hollow. Later in the spring, go back to see if a small carpenter bee (*Ceratina* sp.) is nesting in the hollow stems. The female may stay in her

Judging by its floral choices, it is likely that the blue orchard bee has a short- to medium-length tongue. Another *Osmia* species, the minuscule *O. pumila*, appeared in Stephen's sanctuary for the first time in 2017, visiting only the flowers of wood poppy (*Stylophorum diphyllum*). The females industriously chew the edges of strawberry leaves, using the leaf paste to partition their nests.

When wild blackberry (*Rubus* sp.) is in bloom, its flowers will attract a few honeybees, but more likely workers of the brown-belted bumble bee (*Bombus griseocollis*). As a short-tongued bee,

frog-fruit. Suddenly one male broke the formation, dropping out of sight. The other two males remained in formation and only fled when they saw a movement [from him].” One researcher calls these and other *C. andreniformis* male contests “mixed martial arts.”

Next to the *Phyla* in Stephen’s garden is a butterfly milkweed (*Asclepias tuberosa*), which attracts members of the *Megachile rotundata* group mentioned in the previous paragraph. Their legs are too short to accomplish pollination, but their tongues are long enough to extract nectar. The female two-spotted longhorn bee (*Melissodes bimaculatus*) has legs long enough to contact the pollen, but, according to Stephen, “the nectar alone can draw in unexpected oddities such as a wee resin bee of the genus *Heriades* from the Megachilidae [family].”

In late July or early August, I return to the garden soon after the butterfly milkweeds have finished flowering. Stephen shows me the seven-foot (two-metre) stems of Pitcher’s sage (*Salvia pitcheri* or *S. azurea*) towering over their senescing bodies, bearing sky-blue tubular and lipped flowers. Pitcher’s sage attracts many larger, medium- to long-tongued bees such as the ever-present jewelweed bumble bee, but also the workers and beautiful golden male of the American bumble bee. The plant is also a favourite of Virginia carpenter bees.

Another later bloomer is obedient plant (*Physostegia virginiana*). Its moderately deep, pale pink tubes



PHOTOGRAPH BY STEPHEN JOHNSON

Colletes latitarsis on ground cherry

attract jewelweed bumble bees, but more often minuscule masked bees (*Hylaeus* sp.) that come to eat the pollen. Stephen explains that, having no external hair on their bodies, these attractive, painted-faced bees and other species of the family Colletidae are not efficient pollinators. Another colletid, a specialist of ground cherry (*Physalis* spp.), began to show up in 2016 when Stephen let a colony of long-leaf ground cherry (*Physalis longifolia*) proliferate. Now each spring when *Physalis* is in flower, its specialist bee, *Colletes latitarsis*, can be seen stationed on *Physalis* leaves.

The midsummer flower known as ox-eye (*Heliopsis helianthoides*) draws the yellow longhorn bee (*Melissodes agilis*), a sunflower specialist, and the occasional bicoloured agapostemon (*Agapostemon virescens*). (The

bicoloured agapostemon also loves purple coneflower and Kankakee mallow.)

On the cusp of fall, the asters come into their floral glory. New England aster (*Symphotrichum novae-angliae*) presents its lavender and pink-rayed heads to many bees, including *Megachile mendica*, *M. texana*, *Bombus impatiens*, *Ceratina calcarata*, *Augochlorella* spp., the ligated gregarious bee (*Halictus ligatus*) and – in seeming synchrony with the changing season – the beautiful, autumnal orange long-horned bee (*Melissodes trinodis*).

Observing the bees, I am reminded of Fleischner’s “many gifts” of “natural history mindfulness” and its regenerative power.

Mary Stark is the John and Anna Poole Professor of Humanities and English at Central College in Pella, Iowa. Stephen Johnson is a botanist and plant ecologist. In 2018, his yard was designated a pollinator habitat with The Xerces Society for Invertebrates, a non-profit organization that advocates for conservation.



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Proactive weeding of our gardens of the future

by *Bethany Bradley*

When I moved back to Massachusetts several years ago and started planning my garden, my mother dug out an old backyard planting guide published sometime in the 1970s and sent it to me. Reading it later, I was chagrined to discover that the guide was a “who’s who” of northeast invasive plants. Oriental bittersweet (*Celastrus orbiculatus*), Japanese barberry (*Berberis thunbergii*), autumn olive (*Elaeagnus umbellata*) and buckthorn (*Rhamnus cathartica*) all made an appearance. I was not surprised.

Before I began studying invasive plants, or nonnative species that spread and have negative impacts on native species and ecosystems, I thought that most species arrived accidentally – inadvertently stuck to a sock or passing through the stomach of a woolly sheep. A series of unfortunate events, but nothing to do with me. It turns out that’s not the case. In our enthusiasm for variety, colour and beauty, gardeners and property owners have become the major vectors of introduction and dispersal of invasive plants. More than 1,300 plants are identified as invasive in the United States and by far the most prominent pathway to their introduction is the ornamental plant trade. Of those species with known introduction histories, 53% were introduced and spread as ornamentals, according to a 2013 study published in *The American Journal of Botany*.

It would be nice to imagine that our unfortunate planting decisions went out with polyester in the ’70s, but it’s likely that we’re continuing to make similar mistakes. A challenge for controlling invasive plants stems from something invasion ecologists refer to as the invasion “lag phase.” For many species, the time between when a plant is initially



PHOTOGRAPH BY LINDA READ

Non-native Japanese barberry produces countless seeds which can easily find a purchase in neighbouring soils and grow into new plants, crowding out native plants.

Planting “local-ish” reduces the likelihood that we will inadvertently introduce an invasive species and also helps to expand the ranges of native species, thus helping them keep up with climate change.



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introduced and when it is identified as invasive can be upward of 50 years! By the time a label like “problematic invasive” can be applied to a plant, it’s far too late to eradicate it and often barely possible to control it. Our grandkids may well have my same chagrined reaction when looking at planting guides from the 2010s.

Not only are we good at introducing new invasive plants, we also do an excellent job of spreading them around the country. Usually the spreading around happens early in the lag phase, which is before we recognize a plant as invasive. A 2015 study published in *Global Ecology and Biogeography* analyzed the distribution of native vs. invasive plants in the lower 48 U.S. states and found that invasives were far more widespread. The median latitudinal range for an invasive plant was 14 degrees (for reference, the lower 48 states span 25 degrees of latitude) vs. only 7 degrees for native plants. Longitudinal extent differences are similarly striking (50 degrees for invasives vs. 9 degrees for natives). Introduced as ornamentals, invasive plants easily overcome distance as well as dispersal barriers (like mountains) that otherwise restrict native plants.

Our widespread introduction of invasive plants relative to native plants is particularly alarming in the context of climate change. The current rate of climate change is unprecedented in Earth’s history. The closest analog to our current rate of change happened about 55 million years ago, during the Paleocene-Eocene thermal maximum, when temperatures rose by about 6°C (10.8°F), over a span of 20,000 years. If emissions continue on our current trajectory, it is likely that temperatures will rise by 6°C in less than 200 years. Current change is incredibly fast. Put another way, my home state of Massachusetts could have a climate more akin to today’s North Carolina.

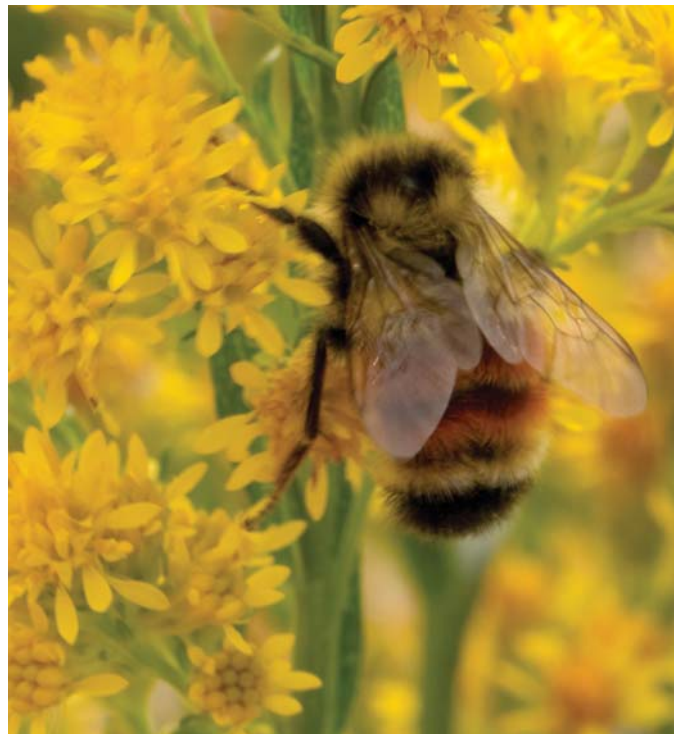
If species are going to survive through this massive and rapid change, they need to move. Many studies have already observed ranges of species shifting poleward and upward in elevation in response to climate change. But, plants have a hard time keeping up. Not surprisingly, plants tend to stay rooted in place and are slow dispersers on their own. One study in southern Vermont analyzed forest composition change over 40 years and found that northern hardwoods had migrated up into formerly boreal forests by about 600 feet during that time period. To keep up with climate change, those same trees would need to move 300 miles (500 kilometres) over the next 40 years. For the vast majority of species, natural dispersal is just not enough.

Ironically, human dispersal of invasive plants means that they will have little trouble keeping up with climate change. Scientists have been debating the merits and perils of “assisted migration,” which would involve transplanting native species to help ranges shift with climate change. Species transplanted between continents are 40 times more likely to become invasive than ‘natives’ transplanted within a continent, a 2012 study found. Transplanting natives is not



Great spangled fritillary on purple coneflower (*Echinacea purpurea*)

PHOTOGRAPH © CAROL L. EDWARDS



Goldenrods (*Solidago* spp.) are very popular with pollinators such as this orange-belted bumble bee

PHOTOGRAPH BY LINDA READ

Continued on page 12

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risk free, but it's far less risky than the status quo of importing and introducing new species from other continents. Nonetheless, very few native species have yet been assisted due to concerns about risks to ecosystems on the receiving end. Yet, most homeowners have few qualms about introducing species from far and wide into our yards. It is these species that will seed ecosystems of the future.

But, is it worth the effort of trying to expand the ranges of native species when we don't know whether they'll be able to persist in cooler climates? One trait of invasive plants is that they tend to have broad ranges and therefore broad climatic tolerances. Until recently, many narrow-ranged native plants were thought to have correspondingly narrow climatic tolerances. But, recent studies of plant biogeography have cast doubt on that assumption. For example, a 2007 study of trees in Europe showed that their distributions are more closely aligned to the extents of the last glacial maximum some 21,000 years ago than they are to current climate. Assumptions we make about the climatic tolerance of European trees based on their distributions are

biased by this ancient barrier to northward dispersal. Similarly, a 2016 study of plants endemic to the U.S. that have been introduced as ornamentals showed that these species thrive well outside the climate conditions found in their native range. The typical species was found in climates 3°C (5°F) warmer than their native range. Thus, even narrowly distributed native species are likely to establish successfully in cooler zones, ultimately providing that much-needed head start on climate change.

Planting "local-ish" reduces the likelihood that we will inadvertently introduce an invasive species and also helps to expand the ranges of native species, thus helping them keep up with climate change. A win-win!

If you haven't seen them already, two great resources for identifying nurseries that specialize in native plants in your area are plantnative.org and nanps.org. If you don't have a specialty nursery nearby, these websites also list plants native to your region that are commonly found in most nurseries. Another good resource is Wild Ones Seeds for Education Nursery Partners.



PHOTOGRAPH © CAROL L. EDWARDS

Monarch butterfly on Joe Pye weed (Eupatorium maculatum)

Late October Woods

Glen Sorestad

I love autumn aspen woods –
the clinging pungence
of fallen leaves,
a sudden sense of antiquity
gathering in the nostrils like
musty cellar memories,
a constant reminder
of how earth
replenishes itself yearly.

I love the way
each footfall releases
a burst of aromas to the senses.
I can even empathize
with these
wind-stripped trees,
how they stand stoic,
denuded,
awaiting winter's breath
to turn them
brittle skeletons
clacking and clattering
against each other
like ill-fitting dentures.
These trees will be
locked into
long night dreams
of re-awakenings,
of finding Spring.

Glen Sorestad, who lives in Saskatoon, was Saskatchewan's first poet laureate. This poem was reprinted with permission from Heartwood: Poems for the Love of Trees.

If you're interested in "assisted migration" of native species, try looking at native plant lists from states (or provinces) that are slightly warmer than your current locale for ideas. Encourage specialty nurseries to consider expanding their stock of native plants to test out greater varieties from the region. Planting local-ish reduces the likelihood that we'll accidentally introduce an invasive species, supports native birds and other wildlife, and will give a much-needed assist to native species in light of climate change.

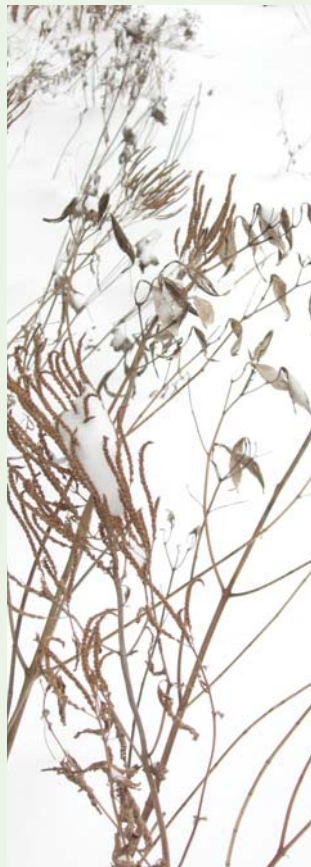
Bethany Bradley is an associate professor of biogeography and spatial ecology at the University of Massachusetts Amherst, and an investigator with the Northeast Climate Science Center. Learn more about her research at <https://people.umass.edu/bethanyb/people.html>. This article was reproduced with permission from Wild Ones Journal, published by Wild Ones: Native Plants, Natural Landscapes, wildones.org.

SEEDS STILL WANTED!

Thank you to everyone who has taken the time to collect native plant seeds from their gardens or the wild for NANPS annual seed exchange. Please keep them coming. Seeds will be distributed on a first-come, first-served basis to anyone who requests them, although seed donors get first pick!

Send your seeds, separated by species and identified with the source/parentage, to NANPS Seed Exchange, Box 69070, St. Clair Post Office, Toronto, Ontario, M4T 3A1. Visit nanps.org/seed-collection-reaping-what-you-sow/ for tips on how to collect

Thank you!

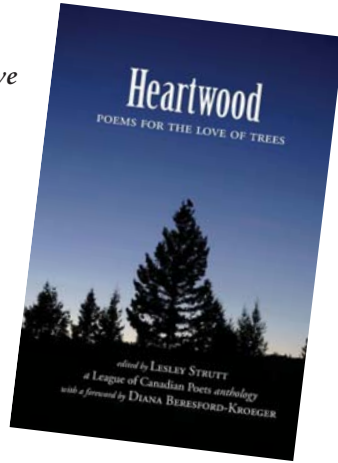


Verbena hastata and Asclepias incarnata

New & Noted

Heartwood: Poems for the Love of Trees

Edited by Lesley Strutt, with a foreword by Diana Beresford-Kroeger
2018, The League of Canadian Poets, Toronto
ISBN 978-1-896216-51-5
(softcover)
275 pages



A review of this exquisite anthology seems superfluous. Suffice it to say that poets and their gems are mined from every corner of Canada resulting in a rich, vibrant collection that reflects the love we all have for our trees. Renowned botanist Diana Beresford-Kroeger draws on her inner poet in the foreword: “We must turn to poets to expand their dreams. This is because trees are the parents to the child deep within us. Forests bear silent witness to the tides of time upon which we will be judged. Trees are a gift of the galaxies, their fabric a web of stardust. The web holds the great plane of creation. The entire music of the universe, *ceolta na cruinne*, is held in the trees. It is amplified again, again, and again within the forest. To listen to this music is to meditate. Taken alone, this is sufficient reason to make all forests sacred. And us accountable.”

Editor Lesley Strutt alighted upon the idea of an anthology of tree poems after hearing Diana speak and recognizing the reverence in which she held trees. Diana urged her: “Write poems about trees and remind people that we need trees to survive.” Lesley found that so many other poets had written about trees it seemed natural to collect the poetry into a book. Her colleagues at the League of Canadian Poets championed her vision, asking poets in each region of the country to make contributions.

Lesley writes: “Poets are ordinary people who pay close attention. We watch, we listen, and we feel things deeply, beyond the self. Trees matter, and we have written about them with the windows of our hearts open, breathing in the good air that forests provide.”

The book is available at amazon.com/Heartwood-Poems-Trees-Lesley-Strutt/dp/189621651X/ for \$21.50 for the softcover and \$9.16 for the Kindle version plus shipping and taxes. Funds from its sale will be directed to educational poetry and ecological programs across Canada in partnership with the *Call of the Forest* initiative. Visit calloftheforest.ca to watch the trailer of a one-hour documentary that follows visionary and scientist Diana Beresford-Kroeger on a journey to the most beautiful forests of the northern hemisphere. The documentary shows what has been done to protect trees and forests and what we can all do.

Review by Irene Fedun, editor of The Blazing Star

I saw a perfect tree today

Lillian Allen

I saw a perfect tree today
From my cabin bed on a Via Rail train
Through the North of Ontario
I saw a perfect tree today
It was tall and thin
and scraggly and prim
Then I saw another just as perfect
Short and sturdy with branches and brambles
And then another with a rugged fat trunk
Older than the rest, but just as perfect

I saw a dozen trees in a clump sharing the light
So their growth was stunted
But regal they were, plumped and perfect
And then a small twisted tree
with leaves fallen, trunk slanted
all the more perfect

I saw tens and hundreds, and thousands
And hundreds of thousands of trees
Not one single tree exactly like another
And yet they were all perfect, all perfect trees

A man-child from Mississauga heading to bend steel
To make his fortunes in the Alberta oil fields;
“I’ve never seen so many trees in my whole life”
A balding dude 30 years a social worker
Retiring home to Winnipeg, calms;
“Where I come from they cut them all down,
long, long, long before I was born.”

And I am reminded – This land, this land
Where cities have sprouted,
Blooming glistening skyscrapers at night
T’was all covered with trees once
One big forest we were once
All perfect trees.

Lillian Allen is an internationally acclaimed dub poet and language innovator. She is a long-time professor of creative writing at OCAD University and a member of the League of Canadian Poets. This poem was reprinted with permission from Heartwood: Poems for the Love of Trees.

Calendar of Events

FEBRUARY 12, 2019

LONDON'S URBAN FOREST

7-8:30 p.m.

Central Library

251 Dundas Street, London, Ontario

Sara Rowland, Urban Forestry Planner for the City of London, will discuss the city's urban forest with a focus on climate change. Co-sponsored by Nature London and the London Public Library. Free admission.

FEBRUARY 19, 2019

WOODLAND RESTORATION FROM THE GROUND UP

7-8:30 p.m.

Central Library

251 Dundas Street, London, Ontario

Roseann McKay of the Garden Club of London's Woodland Restoration Project will talk about the legacy we leave behind in nature, focusing on conservation and stewardship. Co-sponsored by Nature London and the London Public Library. Free admission.

FEBRUARY 28 – MARCH 1, 2019

LAND & WATER SUMMIT 2019: WORKING TOGETHER FOR WHOLE BRAIN SOLUTIONS

Albuquerque, New Mexico

Presented by the Xeriscape Council of NM and the Arid LID Coalition. Keynote speaker: Benjamin Vogt, author of *A New Garden Ethic: Cultivating Defiant Compassion for an Uncertain Future*. Visit landandwatersummit.org for the speaker list and to register.

Continued from page 1 – **Seedbox**

monkeyflower (*Mimulus* spp.), and various rushes and sedges in a wetland or garden setting. It would do well in a rain garden.

In an 1892 edition of the *Botanical Gazette*, Illinois biologist Charles Robertson noted that it was primarily bees that visited the seedbox flowers for nectar (bumble bees) and pollen (mining bees) from July 19 to August 10 of that year. A century later in 1991, while conducting research on the relationship between a leaf beetle and seedbox, Texas State University biologist James R. Ott also observed that bees were the primary pollinators: the introduced honeybee, native bumble bees and the eastern carpenter bee. He also reported on other faunal associations throughout the seasons. Seedbox is the host plant for a leaf beetle whose larva feeds on its seeds. In early fall, small mammals, such as white-footed mice and field voles, selectively consume fruit containing the beetles. During winter months, white-throated sparrows sometimes open and consume the insect contents of the fruit capsules. Flea beetles and pearly wood-nymph moth caterpillars are also dependent on various parts of seedbox.



Seedbox ranges from the U.S. Eastern Seaboard to Colorado and into the Canadian provinces of Ontario and Quebec. In my home state of Ohio, *L. alternifolia* is found in 53 of our 88 counties. In 2014, *L. alternifolia* was assessed as globally secure by NatureServe. However, in

Canada, this species is extremely rare and can only be found in isolated populations such as the Ojibway Prairie near Windsor, Ontario.

It was a delight for me to discover seedbox growing at Lake Metroparks Veterans Park in Mentor, Ohio. I showed it to fellow nature lovers and waxed enthusiastic about its peculiar traits while leading a Native Plant Society of Northeastern Ohio discovery walk. Wherever your walks carry you throughout the seasons, observe the intricacies and interesting relationships that abound in nature; perhaps you too will find seedbox growing in the wild.

Lisa K. Schlag is an Ohio Certified Volunteer Naturalist (OCVN) with The Wilderness

Center (wildernesscenter.org) chapter in Wilmot, Ohio. She is the treasurer and web administrator for the Native Plant Society of Northeastern Ohio (nativeplantsocietyneo.org) and a wildlife and plant enthusiast who enjoys learning about nature through discovery, observation, and recording.

PHOTOGRAPH BY LISA K. SCHLAG



FALL 2018

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