



Native Plant to Know

Kentucky Coffee Tree

Gymnocladus dioicus

by Stephen Johnson

Although it's native to much of the midwestern United States from northern Louisiana in the south to a line from southern Minnesota, Wisconsin and adjacent southern Ontario in the north, I imagine few people have seen a wild Kentucky coffee tree (*Gymnocladus dioicus*). Botanist Donald Culross Peattie, in *A Natural History of Trees of eastern and central North America*, describes the surprise of the first white settlers who crossed the Appalachians and encountered the tall tree with the curiously large and very hard fruits. He suggests that it was the appearance of the fruits and large seeds that induced those settlers to roast the seed and call the resulting beverage coffee. It was the strange nature of the tree with its hanging, durable fruits that lead settlers to plant it far beyond its range on the eastern seaboard of America and even ship it back to England as a curiosity.

The scientific name of Kentucky coffee tree sheds some light on a few of its oddities. *Gymnocladus* means "naked stem" and refers to the tree's late production of leaves in the spring and early drop in the autumn. *Dioicus* is for the dioecious nature of the tree, bearing sexes on distinct male and female trees. The large fruits are

indehiscent, meaning they cannot shed their seed once mature; they need a missing seed dispersal agent. The fruits are full of a sugary pulp that is toxic to all potential fruit eaters today including humans.

Why is the fruit so seemingly eye-catching and yet so toxic? That sugary pulp and indehiscent nature (as well as the fact that the fruit lingers on the parent tree through autumn, winter and into early spring) are all part of a suite of characteristics designed to attract a megaherbivore such as a woolly mammoth, mastodon or giant ground sloth. However, unlike plants showing the same characteristics such as honey locust (*Gleditsia triacanthos*) and pawpaw (*Asimina triloba*), the fruits of *Gymnocladus* are toxic!

Recent research suggests that the toxicity was an adaptation intended to lure appropriate large-bodied herbivores, i.e. those with a bacterial gut-flora capable of detoxification. It seems that *Gymnocladus* is very well adapted for a small set of (now extinct) elephant-like seed dispersers living in North American, elephant-

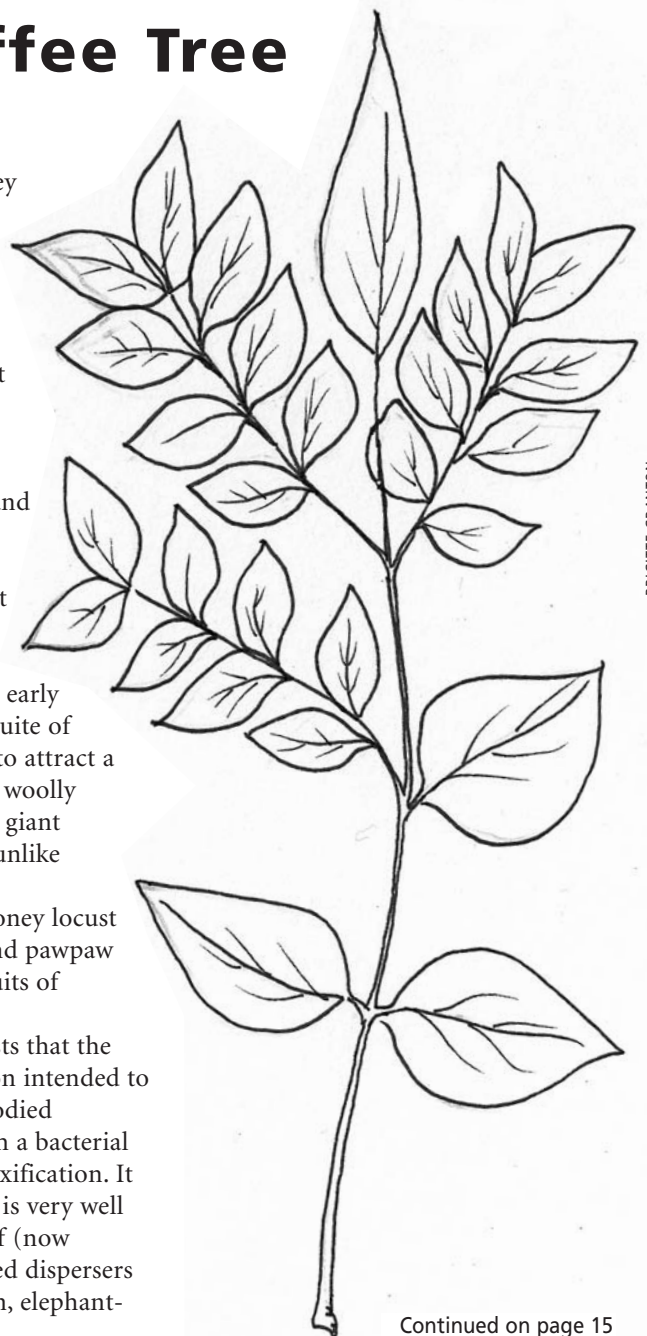


ILLUSTRATION BY BRIGITTE GRANTON

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 2011

Volume 12, Issue 4

Editor: Irene Fedun

Production: Bea Paterson

Printed by: Guild Printing,
Markham, Ontario

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North American Native Plant Society,
formerly Canadian Wildflower Society,
is a registered charitable society, no.
130720824 RR0001.

Donations to the society are tax-
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NANPS Membership:
CAN\$20/YEAR WITHIN CANADA,
US\$20/YEAR OUTSIDE CANADA

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Editorial

Meeting countless luminaries of the environmental world, some well-known, some tireless, behind-the-scenes types, and coming to call them my friends must be the most special part of my involvement with NANPS over the past decades.

I admit to feeling taxed by the work sometimes but that burden is lifted by the sheer joy of watching nature unfold at NANPS conservation properties and in a growing number of native plant gardens. Even though I have visited only a handful of those across Toronto and around North America, it helps tremendously to know that they exist and that they are gradually finding acceptance in the hearts of those who do not share our views of nature's role in urban areas. While fighting for the rights of these gardens in Toronto has largely defined the past few years for me, there remains so much more to be accomplished!

Thank you to all the NANPSters who have invited me into their gardens, physically and virtually (through their garden award submissions), and who have shared their love of nature by supporting NANPS endeavours. I have enjoyed listening to your presentations,

working alongside you at environmental fairs and in committees, and even pulling garlic mustard at restoration projects.

The 2010 plant salvage operations – covering two of six pristine forests destroyed by the extension of Ontario's Highway 404 – were undertaken with tremendous sadness. These were woods that rivaled NANPS own conservation properties in terms of beauty, biodiversity and rarities. Hundreds of volunteers came out to save tiny pieces of these communities, but that in no way mitigated their loss. Many thousands of plants, birds, amphibians and other animals lost their homes or their lives. We have no way of knowing if the endangered butternut trees (*Juglans cinerea*) of these woodlands would have withstood the ravages of canker disease...only that they had not yet been touched by it. Seeing adjacent empty land, slated for housing by developers, valued over these unique habitats must strengthen our determination to protect those areas that remain and to educate those who do not yet understand.

*Deborah Dale, retiring NANPS
Director*

A NOTE OF APPRECIATION

MANY, MANY THANKS to Deborah Dale and Harold Smith who retired from the NANPS Board this year for their ongoing commitment to preserving and restoring native habitats and for all the work they have done – and continue to do – for the North American Native Plant Society.

A hearty "Welcome Back!" to returning directors Miriam Henriques and Howard Meadd. We are also delighted to be welcoming new board members Jenn South and Dr. Gerda Werkele. Jenn is an avid native plant gardener studying environmental science at the University of Western Ontario. She is starting a native plant

nursery and ecokids, a program focused on teaching kids about nature. Gerda is Professor and Planning Program Coordinator in the Faculty of Environmental Studies at York University, Toronto. She maintains a native plant garden on campus as well as gardens at her home and cottage.

Thank you to all directors, seed collectors, writers, illustrators, photographers, invasive plant removers and native plant rescuers, educators and all other volunteers who contribute to our mission to study, conserve, cultivate and restore North America's native flora. Your efforts are very much appreciated!

NEW VOLUNTEERS ALWAYS WELCOME

Join NANPS Land Conservation Team! Join a rare tour to Shining Tree Woods in Norfolk County, Ontario on Saturday June 16, 2012 to be preceded by two winter training workshops about invasive species and bio-surveying. Help maintain this beautiful property, learn what makes it so special, and have fun with your fellow NANPSters. Contact land@nanps.org or watch for details at www.nanps.org

Volunteers requested to help set up/staff information booths:
Toronto, ON: Landscape Ontario Congress Trade Show and Conference, Toronto Congress Centre, January 10-12, 2012

Guelph, ON: Organics Conference, University of Guelph, January 26-29, 2012

Toronto, ON: Canada Blooms, Direct Energy Centre, March 16-19, 2012

Niagara Falls, ON: Greater Niagara Region Home & Garden Show, April 13-15, 2012

Contact volunteer@nanps.org

NANPS 2012 Members Challenge: 2012 volunteer hours. Visit www.nanps.org/volunteer for ideas on how you can help NANPS achieve this goal! Register your hours via volunteer@nanps.org.

2011 Paul McGaw Memorial Conservation Award Winners

The Meduxnekeag River Association, Woodstock, New Brunswick was honoured for the preservation of 53 hectares (over 132 acres) of watershed lands, their educational and advocacy work, and their current project restoring the Red Bridge gravel pit.

Escarpment Biosphere Conservancy was formed in 1997 to establish, maintain and manage a system of nature reserves on the Niagara Escarpment including the Niagara Escarpment World Biosphere Reserve and they have been highly successful in this endeavour preserving almost 3,300 hectares (8,151 acres) in 102 reserves to date.

High Park Stewardship Program and High Park Nature support Toronto's efforts to maintain the health and sustainability of the city's west-end 54-hectare (135-acre) park, control invasive plants and restore the black oak (*Quercus velutina*) savannah.

Volunteer of the Year

Linda Read was honoured as NANPS Volunteer of the Year for her long-standing service to the organization. In addition to generous financial support, Linda participates actively in our Land Management Committee, has worked tirelessly on restoration projects, particularly in maintaining our flagship conservation property, Shining Tree Woods, and on plant rescue operations. A fabulous nature photographer, Linda has provided many photographs of our properties, and of native plants from around North America to NANPS and other environmental organizations.



PHOTOGRAPH BY DEBORAH DALE

Linda Read relaxing with her garlic mustard haul from Shining Tree Woods in 2010.

Silver Memories

With the help of others, I have written a behind-the-scenes look at the activities of the Canadian Wildflower Society/North American Native Plant Society for our 25th anniversary. All our achievements are recorded in detail and the booklet features some of the fine art from past issues of WILDFLOWER and other sources.

Most importantly, we will have an enduring, complete

record of our unique contributions to the conservation movement. We hope to print and distribute a copy to every member of the Society and all contributors with extras for promotional purposes.

For further information please contact me at goldenarm1@sympatico.ca.

Jim French, NANPS Honorary President

In Remembrance: Frederick W. Case, Jr.

Botanist Frederick W. Case, Jr., an Honorary Director of the North American Native Plant Society, passed away in January. An outstanding biology and natural science high school teacher, Fred found many ways of sharing his knowledge with fellow enthusiasts. Fred lectured extensively and wrote numerous articles for magazines and scientific journals about native orchids, trilliums, insectivorous plants, gardening and related topics. With his wife Roberta, Fred authored three books including one entitled simply

Trilliums. Fred was the recipient of numerous awards for his botanical discoveries and he was a Lifetime Fellow of the Cranbrook Institute of Science.

Expressions of sympathy will be gratefully received as donations to the Nature Conservancy of Alabama, the Roberta Case – Pine Hill Reserve, the Michigan Nature Association or the Children's Zoo at Celebration Square. Our deepest condolences to Fred's family.

Seedhead Quiz

Here's a treat for all native plant lovers, gardeners and wilderness explorers alike. These photographs were taken by Darcie McKelvey in her garden in Caledon, Ontario. Guess which plants are represented by their seeds in these photos and send your answers to editor@nanps.org or phone 416-631-4438 and leave a message. Your prize will be two mystery seed packets of plants native to Ontario. Good luck!



PHOTOGRAPH BY DARCIÉ MCKELVEY



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PHOTOGRAPH BY DARCIÉ MCKELVEY

North of Superior

by Barbara Yurkoski

North of Superior. The words evoke images of an unending spruce and pine forest on the rocky Canadian Shield. But beneath the trees flourishes a rich diversity of flora that is often overlooked in this popular image.

The Thunder Bay Field Naturalists' nature reserves were established to protect strategic areas of ecologically sensitive lands in northwestern Ontario. Through donation and purchase, the club holds title to over 1,000 hectares (2,500 acres) of ecologically significant land in 12 separate reserves. The reserves extend from Schreiber Point along the Lake Superior shore to the east... to the Painted Rock Reserve, which surrounds a small lake west of Thunder Bay. Protected areas include forests, wetlands, Lake Superior shoreline and offshore islands. As this selective tour of the reserves will show, an important factor in acquisition priorities is protection of a range of native plant communities.

Arctic Alpine Disjuncts

Certain plants normally found in Arctic and mountainous regions have also survived along the harsh shores of Lake Superior. These disjuncts, or isolated communities, trace their origins back to the time before the glaciers retreated. Though temperatures warmed, the cold windswept Lake Superior shore continued to provide suitable microclimates, while reducing competition from other species.

One small but unusual disjunct, *Saxifraga paniculata* (encrusted saxifrage), grows in crevices on cliffsides where calcium carbonate (lime) is present in the bedrock. The lime produces a white crust which edges the toothed margins of the distinctive flat leaves. In late spring, clusters of white flowers add a softer touch.

TBFN Nature Reserves Committee Chair Sue Bryan determined that

conditions at some of the lakeshore reserves met the requirements for this disjunct. After much determined and patient searching, she and her husband Mike found *S. paniculata* on cliffsides at the Schreiber Point and Pine Bay reserves.

In June, mauve clouds scattered on rocks and beside splash pools proclaim the presence of another tiny disjunct, *Primula mistassinica* (bird's-eye primrose). Although ranked as uncommon provincially, this perennial with a delicate purple flower atop a leafless stem grows in masses at three of TBFN's reserves along the lake: Paradise Island, Schreiber Point and Caldwell Lake.

Paradise Island, which lies in the open waters of Lake Superior, provides ideal habitat for another cool survivor, *Empetrum nigrum* (black crowberry). The trailing matted branches of this evergreen bush are covered with needle-like leaves. Clusters of firm glossy berries, coloured the purple-black of crows, are responsible for its name. The berries are edible; in more northerly areas where crowberry is common they are used, either on their own or in combination with other berries, to make jams, jellies, muffins and pies.

Lake Superior is responsible for another notable feature of Paradise Island. The entire base consists of a series of raised and ridged cobble beaches. Each ridge formed by the round stones that make up these beaches represents a berm, created by storm waves over several thousand years. The gravelled ridges rise toward the island's centre, noticeable even

under the lichen-heath blanket and patches of forest that grow where the waves no longer reach. For the most part they have remained undisturbed



Sundew

PHOTOGRAPH BY RYAN LEBLANC

on this remote island that is visited mainly by adventurous kayakers. The covering of lichen-heath is, somewhat ironically, responsible for the island's name. From a distance, it gives the park-like appearance of a neatly mown lawn, dotted with hardy spruce trees that are able to survive in the harsh climate.

Orchids

In view of northwestern Ontario's cooler climate, the presence of Arctic plants may not be too surprising. However, the number of orchids – plants more often associated with tropical conditions – is astonishing. A total of 36 species have been documented in northwestern Ontario; TBFN's reserves protect 24 of them.

To survive, all wild orchids rely on various kinds of fungi that infect their roots. These fungi provide the orchid with nutrients, growth regulators, vitamins and moisture. Depending on their particular requirements, the

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orchids in TBFN's reserves find the conditions they need in wet or dry soil, rich or calcareous forests, bogs, fens or swamps, cold shorelines or sheltered streambanks.

One of the most sought-after orchids in eastern North America, *Listera auriculata* (auricled twayblade), requires a specific habitat and finds it underneath an alder grove on a beach along Lake Superior in the Pine Bay Nature Reserve. This orchid, with paired round leaves and dainty green and white flowers that cluster around a narrow stalk, is provincially rare. It grows here in larger numbers than in any other known site in Ontario. And the regionally rare *Platanthera psycodes* (small purple-fringed orchid), a pinky-purple flower with slender leaves, is found in large numbers in deciduous floodplains of this reserve. The Pine Bay Provincially Significant Wetland, one of only a few large wetlands along Lake Superior's north shore, includes a rich conifer swamp where Sue and Mike have found *Platanthera hookeri* (Hooker's orchid), a provincially vulnerable plant. *Listera cordata* (heartleaf twayblade), distinguished by a narrow lip that

resembles a snake's tongue and, of course, heart-shaped leaves, also grows here.

Cypripedium reginae (showy lady's-slipper), as lovely as any cultivated orchid with its spectacular pink-and-white pouched flower crowning a throne of veined leaves, flourishes on one remote reserve on the Black Bay Peninsula. Conditions here also favour *Cypripedium parviflorum* var. *pubescens* (yellow lady's-slipper), which is hard to distinguish from *C. reginae* until its deep yellow flower blooms. TBFN also monitors a site on Crown Land in northwestern Ontario, managed by the Ontario Heritage Trust, where both these lady's-slippers abound. Volunteers annually monitor them and 15 other orchid species at this location.

In addition to the Arctic alpine disjuncts it supports along the Lake Superior shore, the Caldwell Lake Reserve includes a small lake surrounded by a fen, with a floating bog mat. This wetland hosts *Arethusa bulbosa* (dragon's-mouth), an unusual orchid that thrives among the sphagnum of the fen. The vivid pink flower has an upper semi-circle of three upright sepals. Underneath this, two petals arch to form a hood over the large white and yellow fringed lip. A single arethusa is a delight to see, but this small orchid grows by the thousands at Caldwell Lake, sprinkling the fen with colour in late spring and early summer.

Insect-eaters

Northwestern Ontario provides habitat for several carnivorous plants, so called because they make up for the lack of nutrients in the ground by catching and digesting insects for their



TBFN Nature Reserve Pine Bay Two

PHOTOGRAPH BY RYAN LEBLANC

nitrogen. *Sarracenia purpurea*, the northern species of pitcher-plant, thrives in wet open areas on reserves where sphagnum is plentiful. This large and sturdy plant with its broad red petals atop a long stalk, and thick red-veined pitcher-shaped leaves below, catches the eye among the moss and drabber low-growing plants. The pitcher forms a pitfall trap which holds rainwater; it was used by aboriginal people as a source of drinking water when they were out in the forest.

Nectar glands on the pitcher lure insects inside, where they lose their grip and slide down a shiny surface. Hairs then catch them in a section deep inside where they drown; juices begin the process of digestion. These killer plants can even eat small frogs that sometimes fall in when attracted by the insects.

Sundews are among the strangest-looking plants in northwestern Ontario. The flat round leaves of *Drosera rotundifolia* (round-leaf sundew) form a rosette which hugs the ground. Stalked glands that edge each leaf produce a circle of droplets that glisten in the sun to attract insects and glue them to the leaf. The dewy secretions then asphyxiate and digest the prey. This plant, and its cousins, *Drosera anglica* (English sundew) and *Drosera linearis* (slender-leaf sundew) can be seen at work in open wetlands on five of TBFN's nature reserves.



PHOTOGRAPH BY RYAN LEBLANC

Cypripedium reginae

Pinguicula vulgaris (common butterwort), another insectivorous plant that takes the sticky approach, is also an Arctic alpine disjunct. Its pale green leaves that curl inward along the edges, and its nodding purple flower, make butterwort stand out among the three-toothed cinquefoil (*Potentilla tridentata*) growing in patches of soil along the rocky Lake Superior shore at Caldwell Lake, Schreiber Point and Paradise Island. An adhesive mucous on the flat leaf surface traps insects. Enzymes then break down the prey's body to allow the plant to digest it.

Trees

TBFN lists wetlands, lakeshore habitats, and rare and interesting plants as its most important acquisition priorities, but does not neglect the trees. When the club acquired the Pine Bay reserve, a young aspen forest (*Populus* spp.) dominated

part of the site as a result of decades of logging with no replanting. In the spring of 2011 the Nature Reserves Committee undertook a major tree planting project in an effort to restore the historic forest. With contributions from the local university, businesses and government agencies, 40 volunteers from the club and the community came out to plant 6,400 red and white pine (*Pinus resinosa* and *strobus*) and white spruce (*Picea glauca*) seedlings. As these trees mature, the site should provide habitat for a diverse range of wildlife, including moose, wolf, pine marten and lynx.

The protected status of TBFN's rich assembly of nature reserves ensures that rare and common native plants have the undisturbed habitat they need to survive and thrive, providing visitors with the opportunity to learn about and enjoy the diversity in the

wild lands north of Lake Superior.

Barbara Yurkoski is a member of the TBFN's Nature Reserves Committee. Showing an affinity with Arctic alpine plants, she winters in Ottawa and summers in Thunder Bay, with side trips to the Yukon.

The Thunder Bay Field Naturalists (www.tbfn.net/reserves) is a many-faceted, all-volunteer organization that offers field trips, indoor meetings, a junior club, newsletter, Project Peregrine and Bluebird Recovery programs. The club is an active partner with the Ontario Ministry of Natural Resources, Bird Studies Canada, Sleeping Giant Provincial Park and the Canadian Coast Guard in operating the Thunder Cape Bird Observatory. The Nature Reserves Committee is currently working to protect another island in Lake Superior. Contact: Nature Reserves Committee Chair Sue Bryan at bryan@tbaytel.net.



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My First Pond (Garden)

by Mark Funk

As a university student who had become obsessed with native plants, I was thrilled to hear my parents say that they would like to put a native pond garden in our front yard last year. I had been entertaining the idea of a career in natural landscaping, so our yard became the perfect stage for me to practise and hone my skills. Being my first real venture into natural landscaping, the pond was an experiment and a learning experience.

My parents' home sits on a vineyard in the Niagara Region in southern Ontario's Carolinian Zone – known for its natural, but imperiled, diversity. Our goal was to create a beautiful pond that we could enjoy along with others, while contributing to the ecological communities of southern Ontario. I decided that the best way to do this was to mimic the patterns and associations that can be observed in nature.

A landscape architect friend of mine, Mattson Meere, designed the pond shape for us, as well as the surrounding garden shape, complete with armour stone retaining wall and berms. The pond is an irregular shape, somewhat triangular, and approximately 10 metres (33 feet) at the widest point and 12 metres (39 feet) at the longest. It is about 1.5 metres (five feet) deep in the middle with a 70-centimetre (28-inch) deep shelf that runs around the perimeter. After having the pond excavated in



PHOTOGRAPH BY MARK FUNK

This picture was taken in early July 2011 almost a year after the pond garden was planted

spring of 2010, we installed a liner to ensure that the pond would have adequate water levels year-round. Then we added soil on top of the shelf for planting aquatic species. We left the bottom section of the pond without soil to prevent vegetation from growing there. This will help to maintain an area of open water in the centre of the pond where the vegetation won't encroach.

Once the pond was excavated, liner installed, and soil added, it was time to do the planting. My family and I planted over 500 plugs and pots over two hot July days, which tested our

dedication, but ultimately proved very rewarding. Despite the fact that we completed the planting just before a two-week hot spell with no rain, most of the plants flourished with only a few good waterings. Of course, the plants that were planted into the water or moist soil around the pond were not as susceptible to drought, but the upland plants around the perimeter didn't seem to be bothered much either! The plants that did the worst were the shade-loving species that I shouldn't have planted into full sun conditions in the first place, such as wild ginger (*Asarum canadensis*), Jack-

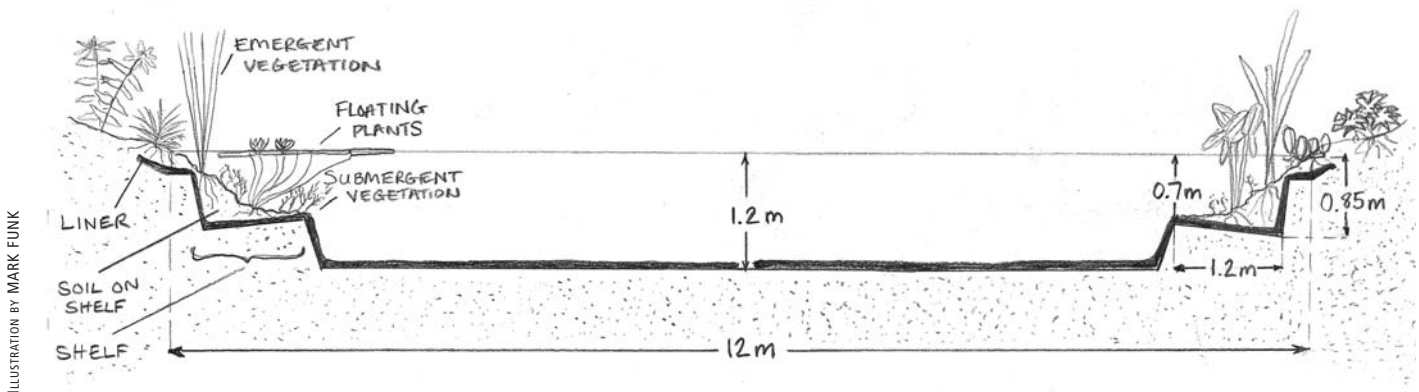


ILLUSTRATION BY MARK FUNK

X-Section of pond

in-the-pulpit (*Arisaema triphyllum*) and bloodroot (*Sanguinaria canadensis*). Some of these species wilted and appeared to have died within a week of planting, but to my surprise, sprouted again this spring. Adding a heavy layer of “forest mulch” (a combination of shredded wood and bark chips) to the garden helped to suppress weeds and retain soil moisture.

The pond is bordered by a variety of plants from a number of native plant communities. I selected an array of wetland plants for the moist areas, and then a mix of prairie, meadow and forest plants for the surrounding garden, which includes a full spectrum of sun conditions. In total, over 55 species of plants native to southern Ontario were planted.

Wetland plants incorporated include great blue lobelia (*Lobelia siphilitica*), cardinal flower (*Lobelia cardinalis*), fringed sedge (*Carex crinita*), sweet flag (*Acorus americanus*), pickerelweed (*Pontederia cordata*), fox sedge (*Carex vulpinoidea*), swamp milkweed (*Asclepias incarnata*), soft rush (*Juncus effesus*), ironweed (*Vernonia missurica*), marsh marigold (*Caltha palustris*), sensitive fern (*Onoclea sensibilis*) and arrowhead (*Sagittaria latifolia*). On the upland soils we planted big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), Indian grass (*Sorghastrum nutans*), butterfly milkweed (*Asclepias tuberosa*), black-eyed Susan (*Rudbeckia*

hirta), red osier dogwood (*Cornus sericea*), Canada anemone (*Anemone canadensis*), white snakeroot (*Eupatorium rugosum*), sky blue aster (*Aster oolentangiensis*), wild columbine (*Aquilegia canadensis*), woodland

vervain (*Verbena hastata*), blue flag iris (*Iris versicolor*), swamp milkweed and alternate-leaved dogwood (*Cornus alternifolia*), all within a couple of kilometres of our pond!

Although the project's total cost was



PHOTOGRAPH BY MARK FUNK

A silver maple (*Acer saccharinum*) reflects off the pond on a June evening. *Acorus americanus* and *Nymphaea odorata* in the foreground to the right.

sunflower (*Helianthus divaricatus*), New Jersey tea (*Ceanothus americanus*), wild bergamot (*Monarda fistulosa*), wild geranium (*Geranium maculatum*), green-headed coneflower (*Rudbeckia laciniata*) and many others.

One of my goals for the project was to make the pond garden a landscape feature that could interact with, and improve, the integrity of local plant communities. For this reason, I planted many of the species that can be found growing in the small fragment of forest and swamp across the road from our house. After we planted the pond, I found it rewarding to discover local populations of the species I had planted, such as blue

about \$5,000 (CDN), the Niagara Peninsula Conservation Authority (NPCA) funded \$1,500 through their Water Quality/Habitat Improvement Project, covering 75% of the plant material costs. The NPCA provides grant assistance for a variety of rural and urban stewardship activities taken on by landowners. We could have cut costs by not using a rubber liner, which cost \$1,500, and by reducing the amount of mulch we applied. We're happy with the design and materials we used, but there is no reason a native plant garden cannot be created for far cheaper. Had we used traditional pond landscaping methods, such as exotic plants typical of the

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horticultural industry or an ornamental fountain, there's no doubt in my mind the price tag on the project would have been significantly higher.

The wildlife that has already appeared in our ecologically isolated yard is incredible! American toads, green frogs and leopard frogs all arrived within a month of the pond's installation, and in significant numbers too! Along with the frogs and toads came boatmen, water-striders, dragonflies, butterflies, increased bird activity and a great blue heron sighting at the pond's edge. In Year Two we welcomed the addition of a painted turtle, which had wandered onto our yard, and two largemouth bass which I brought in from a friend's nearby pond. In addition to the new fauna on our property, species of flora that were not planted by us have found their way into our mini-ecosystem, such as nodding bur marigold (*Bidens cernua*) and cattails (*Typha* sp.). This tells me that our yard is already interacting with the local environment as seed dispersal and exchange occurs.

High nutrient levels in the topsoil we added into the pond during construction resulted in an algal

bloom at the end of the pond's first summer. Manual removal of the algae with a pool skimmer seemed the best way to control it. I've been told that a pond often needs two to three years for its water chemistry to balance. Shading from aquatic plants can also help control algae by lowering the water temperature. The algae have not been an issue so far in the second year.

The plants are flourishing, filling bare ground as individuals grow bigger and seeds spread. We've added logs to the woodland section of the garden by salvaging pieces of fallen trees nearby and we continue to record wildlife species that come to visit.

In addition to the aesthetic and



PHOTOGRAPH BY MARK FUNK

Monarch caterpillars feeding on a swamp milkweed

ecological value we derive from the pond, we have also used it for swimming in the summer (despite having a backyard pool) and ice hockey in the winter, making it a multi-season recreational opportunity.

By putting it in the front yard we are voluntarily enduring the scrutiny of every passer-by. It's rare that we see a car drive by without the driver doing a double take! I enjoy the social and environmental statement the pond makes. It says that we are willing to step outside of societal norms to improve habitat and biodiversity on our property. Many people have taken notice of that, and we have received lots of positive feedback and interest. But ultimately, the reward is seeing the beauty and functionality of the pond as its plants put on their stunning displays and the fauna begin to return to our yard.

Mark Funk recently completed an environmental studies degree at the University of Waterloo, Waterloo, Ontario and is currently studying landscape design in order to pursue his ecological restoration interests.



PHOTOGRAPH BY MARK FUNK

*Nodding bur marigold (*Bidens cernua*) with white water lily (*Nymphaea odorata*) on the water in the background.*

Putting Native to Plants Work on Missouri's Landscapes

by Bonnie Chasteen

If you're a gardener or farmer, you know the value of a well-stocked tool box. Imagine a set of tools that help you do just about every job more effectively. Improve your ability to cope with drought and flood. Produce great summer forage for cattle and restore quail habitat – even encourage children to read. This amazing “technology” isn't the result of years of research and development – unless you count the ultimate designer, Mother Nature herself.

The toolbox we're talking about is Missouri's suite of native plants – trees, shrubs, vines, grasses and wildflowers. Products of the last ice age, these plants have endured 10,000 years of drought, disease, foraging, flood and fire.

Once you know how resilient Missouri's native plants are, it comes as no surprise that people all over the state are using them to solve problems and bring more life to their landscapes.

Natives for neighborhoods

In Belton, Missouri, neighbors Ray Gann and Jan Jones share a love of wild things, and their adjoining properties show it.

Gann stopped mowing his three acres (1.2 hectares) several years ago. “I got tired as I got older, and I thought, this is really stupid,” he says. “I decided to stop mowing and see what would happen.” What happened is a lot of native prairie and glade plants popped up – rattlesnake master (*Eryngium yuccifolium*), little bluestem (*Schizachyrium scoparium*), Indian grass (*Sorghastrum nutans*), yellow and purple coneflowers (*Echinacea paradoxa* and *purpurea*), wild indigo (*Baptisia tinctoria*) and black-eyed Susans (*Rudbeckia hirta*). Gann continues to mow the area along the north side of his house to keep the thorny locusts down, but he leaves the brambles in the field for the wildlife to enjoy.

Gann has enjoyed an impressive response to drought from his “no mow, let it grow” approach. “After last year – with not one molecule of moisture and 100° temps – I thought, I'm not going to see a thing,” says Gann. “But what I got was more species. This year I saw a cast of pink, orange and yellow – it's that tall *Echinacea*.”

Gann's neighbor, Jan Jones, began her property's conversion process in October of 2001 when she called

Missouri Department of Conservation's Kansas City Region urban watershed conservationist Ruth Wallace. She said, “My neighbour has this beautiful natural area in his backyard, and I want my backyard to look just like his. Can you help?”

Wallace arranged a site visit and wrote up a plan for restoration. The Jones' biggest challenge was fescue (*Festuca* spp.). Their backyard was full of it.

Because the city of Belton forbids landscape burning, Wallace and her team developed a plan to chemically burn the Jones' two acres (.8 hectares) and to overseed the area with a wildlife habitat seed mix. Due to last year's drought, the Jones' backyard isn't what they had hoped for, but with some additional spot spraying of



PHOTOGRAPH COURTESY OF MISSOURI DEPARTMENT OF CONSERVATION

Prairie plants, such as this Indian grass, offer a variety of textures for landscaping.

the undesirables and another year of native seed in the ground, the team expects to see a better field next year. It shouldn't be too long before both backyards will be seen as one prairie field – a vision from Missouri's past.

Making every acre work for cattle, timber, and wildlife

Martin Turner's 1,000 cow-calf operation is fairly typical for Macon County. His grass is mostly fescue, and he hasn't heard the quail call on his place in years.

To benefit wildlife, Turner has worked with Missouri Department of Conservation (MDC) staff members Elsa Gallagher and Ted Seiler to make his farm friendlier for quail as well as

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for cattle. On a steep, relatively unproductive hillside, Turner has planted strips of pine (*Pinus* spp.) and native shrubs such as plum (*Prunus* sp.), indigo bush, and sumac (*Rhus* sp.) to shelter quail from predators and provide them with winter forage. The shelter belts will also protect cattle from bitter winter winds and their water tank from freezing.

In addition, Turner is in the process of converting over 100 acres (40 hectares) of fescue to native warm season grasses, forbs and legumes. Seeded in the spring of 2003 with the help of an Environmental Quality Incentives Program, his mix includes Indian grass, big bluestem (*Andropogon gerardii*), little bluestem and sideoats grama (*Bouteloua curtipendula*), as well as black-eyed Susan, purple prairie clover (*Dalea*

summer months.

Although the nearest quail population is still several miles away, Turner hopes that by making a place for them with native grasses, forbs and shrubs, they will eventually return to his farm. "I manage so that every square foot on my farm might contribute to wildlife, cattle and timber," he says.

It's a family affair

In Calloway County, a young family is making native plants the centerpiece of their landscape and family activities. Jim and Andrea Kennedy got interested in native plants years ago when they noticed wildflowers growing along Missouri's roadsides. "At first we didn't know that most of those wildflowers aren't native. As we learned more, it became really special

Shaw Nature Reserve in Gray Summit.

After so much research and first-hand experience, they began yearning for a landscape that could become a life-long restoration project for them and their kids. They looked for a property that would give them as much diversity as possible, and they soon found a parcel near Readsville. The combined 93 acres (38 hectares) they manage in common with Andrea's dad, Frank Timmermeier, includes upland prairie, timber and thin, rocky out-croppings called glades. "We have ridges in all directions," says Jim, "and that gives us a great amount of diversity."

They bought their property in 1990 and used their Steyermark's to begin identifying what native species they had, as well as what would have grown there naturally before settlement. "We wanted to gear our efforts toward pre-settlement restoration," Jim says. They found 350 different native plant species, and they added others from several Grow Native! member nurseries. When they began periodically burning their landscape, Missouri's yellow lady's slipper (*Cypripedium calceolus*) started popping up. Now they have their prairies and thinned woodlots on a regular fire schedule, burning some parcels annually and others only once every three years.

Although prescribed burning is central to their native landscape management, Jim and Andrea caution others who are interested in prairie restoration not to use fire until they've been trained and have some experience with it. "Fire is a great management tool," Jim says, "but you have to know what you're doing."

In addition to tracking the number of native plant species, Andrea, Jim and their kids also keep a bird list. "We've seen 142 species, including Henslow's sparrows, a scissor-tailed flycatcher and an upland sandpiper," Andrea says.

It's obvious that the Kennedys spend a lot of time thinking about their



PHOTOGRAPH COURTESY OF MISSOURI DEPARTMENT OF CONSERVATION

Native warm-season grasses, such as this little bluestem, improve livestock forage and quail habitat.

purpurea), Illinois bundleflower (*Desmanthus illinoensis*) and partridge pea (*Cassia fasciculata*). Aside from benefiting quail, Turner's aim with the conversion is to give his cow-calf herd a mid-summer rest from fescue, which can be toxic to cattle in the hot

when we saw an area that was all native."

Their research led them to Steyermark's *Flora of Missouri*, as well as to working with the Cuiver River State Park in Troy, and eventually to attend prescribed burn workshops at

landscape, working with it and enjoying it. I ask them if it has become the core of their family life. "It has," Andrea says. "The kids love to help with the projects and name the plants and birds." Jim agrees. "We'll be working on this forever, and we don't really have an end in mind. It's just great to see how things change from one year to the next."

Overhead a red-shouldered hawk wheels and cries. It's hard to imagine a more heavenly place to raise a family – or a better way to teach them about their natural heritage.

Native plants for outdoor classrooms

Down in the southwestern part of the state, a secret garden grows in the middle of Marshfield's Edwin P. Hubbell Elementary School. Totally enclosed by the school building, the Secret Garden features cozy reading areas beneath canopies of native dogwood (*Cornus* spp.), redbud (*Cercis canadensis*) and hawthorn (*Crataegus* spp.), and on late spring afternoons, you might find kindergarteners napping in the shade. But the Secret Garden wasn't always this picturesque. Hubbell's principal Anita Lael tells the story.

"A group of teachers actually initiated in the Secret Garden in the mid-90s. But by the time I arrived in '01, those teachers had all retired, and the outdoor classroom was just grown up, full of bugs – a disaster!"

Lael's first response was to get the school district to resume mowing the area. After that, the teachers took a new interest in it. Upkeep and development proved to be a problem, though, and that's when MDC education consultant Jay Barber got involved.

Barber acquired native shrub and wildflower species from the state nursery and Missouri Wildflowers (a Grow Native! member nursery). Since then, he's developed several activities, including a butterfly life cycle lesson that shows the link between Monarchs

and native milkweed (*Asclepias*) species.

"Secret Garden is a great way to do cross curricular activities, and I encourage other schools to develop their own if they can," says Lael.

Grow Native!

Missouri's homeowners, farmers and teachers are getting a big helping hand in their efforts to put native plants to work on their landscapes. Grow Native!, an education and marketing program jointly administered by Missouri Departments of Conservation and Agriculture, makes it easy for any Missourian to discover, choose, purchase and successfully use native plants.

The Grow Native! website (www.grownative.org) combines both departments' efforts to educate people about native plants and to help them find and purchase them. Through the site, MDC provides a searchable database of over 200 native plant species. This tool lets users sort plants according to their site requirements, colour, texture and value to wildlife. The website also features ready-made designs to help first-time users add native species easily to their landscapes. To make purchasing easy, MDA provides a shopping feature that lets users search for native plant nurseries, products and landscape



PHOTOGRAPH COURTESY OF MISSOURI DEPARTMENT OF CONSERVATION

Partridge pea, a native forb, provides forage for cattle and seeds for ground-nesting birds and other wildlife.

services in their zip code areas.

For more information about native plants or the Grow Native! program, email info@grownative.org or call (573) 522-4115 X3833. Professionals interested in the business development and marketing side of Grow Native! should call (573) 522-4171.

Bonnie Chasteen is MDC's editor. This article originally appeared as Putting Native Plants to Work in the December 2004 edition of the Missouri Conservationist. It is edited and reprinted here with permission from the Missouri Department of Conservation.

New & Noted

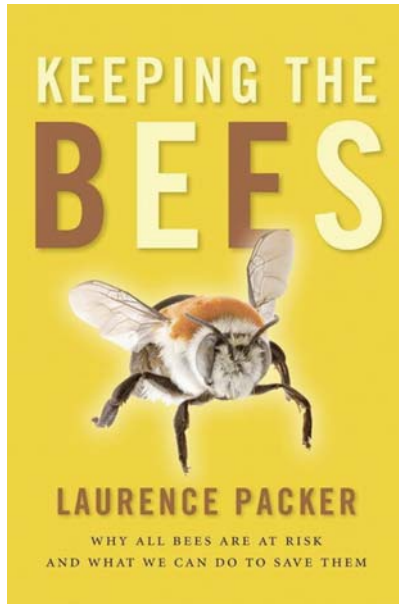
Keeping the Bees: Why All Bees Are at Risk and What We Can Do to Save Them

By Laurence Packer
Toronto: Harper Collins Publishers Ltd.,
2010
Hardcover, 273 pages

Every year, the leaves of the young redbud (*Cercis canadensis*) in my backyard get eaten. For a long time, I had no idea what creature was munching circles around the edges, creating a scalloped pattern in the leaves, and I found it kind of disturbing. Shouldn't I be doing something to stop the damage? Then, help arrived

in an unlikely form: a doctoral student doing research on bees. "Oh look," he said, pointing to my tree, "Leafcutter bees at work!" All my worry dissolved. My redbud was providing pollinator habitat and, in my eyes, the scalloped leaves took on a functional glow.

Laurence Packer's brilliant book, *Keeping the Bees*, will likewise lead you to ecological epiphanies. With offbeat humour, adventurous spirit and unflagging narrative energy, he guides readers through a world many of us rarely notice: the world of bees.



Sometimes the journey is to distant places such as the Atacama Desert in northern Chile; other times, it's closer to home, to Arizona and Toronto. But wherever he takes us, you can be sure that there's surprise, enlightenment

and a few laughs along the way. His take on honey, for example: "honey is really bee vomit." Of course, he spends relatively little time writing about honey, since less than five percent of bees make honey at all, but his description of an exotic tropical honey made by stingless bees will have you contemplating a trip to the Yucatan.

Keeping the Bees is about as far from a dry textbook as you can get, but Packer's mission is pedagogical and his skill as a teacher shines through every page. Clearly and plainly he cuts through the myths and fears that many of us harbour about bees, explaining, for example, that only female bees can sting and, indeed, even many female bees cannot sting at all; that most bees lead entirely solitary lives; that rather than living up to the caricature of "busy as a bee," many bees are rather inactive.

One of the delights of this book is Packer's skill as a story-teller. He has

the narrative timing of a comedian, backed up with a scientist's eye for the unusual, telling detail. He writes, for example, of lachrymophagous bees – tropical Asian stingless bees that collect tears – and of seeing photos of a researcher's eyeballs being licked by these creatures. He explains bees' process of defecation late in their juvenile lives: "Once their intestines and rectum are connected, they let out all their waste in one extended dump. Then, after a day or more of continuous defecation, they are ready to pupate." Here's his description of the life purpose of male bees: "Male bees are randy little buggers whose sole aim is to mate with females that will use their sperm." Or, his analogy to describe the effect of a parasitizing beetle on a hapless bee: "akin to you chatting up some attractive person at a bar and then finding that he or she has disintegrated into seven hundred rat-sized parasites that attach themselves to your back and that you are forced to take them home where they proceed to eat your children."

And just when Packer has thoroughly hooked us by his passion, he guides us through a series of practical bee-conserving measures we can all take in our own lives. Passion, purpose and play – they're all found in this wonderful book.

Review by Lorraine Johnson

Lorraine's latest book, *City Farmer: Adventures in Urban Food Growing*, is now available in bookstores.



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managed forests. These ranged from the Miocene *Gymnocladus wadii* of Oxaca whose fruits may have been eaten by more primitive elephants such as gomphotheres... to the Pliocene *G. casei* discovered in Oklahoma and probably consumed by mastodons... to the Pleistocene era and *G. dioica*, where mammoths may have joined mastodons as the necessary frugivores (fruit eaters). Those ancient forests, bulldozed and fertilized by elephants, were undoubtedly more open and sunny and looked nothing like the dense forests of today where the shade-intolerant Kentucky coffee tree cannot survive without intervention from man.

Today, the only animal capable of dispersing *Gymnocladus* and establishing new populations is us! To that end, I decided to grow *G. dioicus* from seed. I collected seeds from a single female tree located in a park near Pella, Iowa. Thinking that the seeds were once scarred by the giant molars of mastodons and mammoths, I tried to replicate this effect by grinding seeds on a rough sidewalk. It worked! In the span of two weeks a shoot emerged and grew.

Since the trees may only live to be 100 years old, all existing trees were planted by man. Though I could find no evidence of Native American planting of *Gymnocladus*, there is evidence for its long-term Native American use for rattles, game pieces and more.

In *The Natural History of the Long Expedition*, Howard Ensign Evans says that Stephen Long encountered its use by Native Americans near the Sioux River and said that the Kentucky coffee tree provided "a palatable and wholesome beverage." Melvin Gilmore studied the interactions of native peoples and plants in the midwestern U.S. and wrote *Uses of Plants by the Indians of the Missouri River Region*. There he points out that Kentucky coffee tree was important to several nations: *Wahnahna* to the Dakota,

Natita to the Omaha-Ponca, *Napashakanak* to the Winnebago and *Tohuts* to the Pawnee. The tree's most important use for all the tribes was as relief for recalcitrant constipation! Gilmore says that the curative was derived from the bark and that "it was said to be an infallible remedy" and "used from time immemorial." Gilmore also says that the Pawnee roasted the seeds and ate them "as chestnuts" and also used the dried and powdered fruits as a snuff to induce sneezing to relieve headaches. The Winnebago used the seeds "for counters or tally checks in gambling."

I was fortunate enough 18 years ago to be on Konza Prairie Biological Station where a magnificent 80-foot (24-metre) tall *G. dioicus* towered over tallgrass prairie, hundreds of fruits still hanging there in springtime, the ground littered with many more. I became very interested in those anomalous fruits, so capacious and durable enough to function as a case for eyeglasses.

Gymnocladus is a genus shared with



ILLUSTRATION BY BRIGITTE GRANTON

the flora of China. There *Gymnocladus chinensis* is a nearly identical twin.

The dioecious nature of *Gymnocladus* seems in modern times to be a severe limitation. Its flowers are rather unexceptional and made for general pollinators, but it is quite unlikely that a pollinating insect will travel with pollen from a male tree over several miles to a receptive female. And because it's dioecious, it cannot produce fruits by autogamy (successful self-pollination) as many other and more successful species do. So the trick, when trying to establish trees in a park situation, is to make certain that you have both female and male saplings – not an easy task since juvenile trees are identical. Botanist William Chambers Coker relates in *Trees of the Southeastern States* how *G. dioicus* was planted in Chapel Hill, North Carolina but that the trees produce no fruits since they are all male.

Further research seems to dim Peattie's assertion that the pioneers based the coffee-substituting ability of *Gymnocladus* on the appearance of the seeds and fruits. A new alkaloid has been isolated from Kentucky coffee tree, appropriately named dioicine. The authors of that study suggest that this alkaloid and its hydrolysis products were probably what made the plant an appealing coffee substitute tree. As this research progresses it may even herald a future for this Pleistocene refuge.

Stephen Johnson, a freelance plant ecologist and botanist living in Pella, Iowa, is always on the search for interesting plants and plant-animal interactions, including the ghosts of such an interaction, the Kentucky coffee tree.

ILLUSTRATION BY BRIGITTE GRANTON

The Blazing Star: Bigger & Better

No doubt readers have noticed that this issue of *The Blazing Star* is 16 pages long. You'll be happy to know that this is a permanent change to the newsletter's format. It allows us to include longer articles or simply more short ones... with more stunning images. And it reduces our mailing costs freeing up money to be used for valuable conservation work.

We urge you to subscribe today – the sooner you renew your membership, the less time and expense we incur.

On behalf of our native flora and all the life that depends upon it, we thank you all and wish you a joyous Holiday Season and a prosperous and productive New Year.

Irene Fedun
Editor, The Blazing Star

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