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Native Plant to Know

Jack-in-the-Pulpit

Arisaema triphyllum

by Judy Barnhart

Poking up through the rich, beech-maple, spring forest floor is a stately plant commonly known as Jack-in-the-pulpit. Or is it really Jill-in-the-pulpit?

As with all members of the Araceae or Arum family, *Arisaema triphyllum* does not have typical flowers with sepals and petals. Instead, small, petal-less flowers occur on a club-like spadix, referred to as the *jack*. This structure is protected inside a sheath with a hood, botanically known as a *spathe* – that's the pulpit. The spathe emerges from the fork in the leaves and varies in colour from green to purple to brown. By carefully peeling open the spathe to get a view of the bottom of the spadix, you can sex the plant. If it's a young plant, it's most likely a male flower, where you'll see that stamens have developed. Young staminate plants typically have one leaf. Since it takes less energy to produce pollen, male flowers develop first; female flowers may be present below the staminate flowers, but do not develop. As the plant ages, more food is stored in the underground corm, allowing the female flowers to develop. (You might also see a second leaf.) Energy is required to produce the flower and the fruit and seeds that follow. If brilliant crimson berries form on a plant midsummer, you

know you have a Jill-in-the-pulpit!

Inside the spathe, the warm conditions release odours unpleasant to humans but attractive to small flies, particularly fungal flies. They find a meal and the plant is pollinated.

The genus name *Arisaema* combines the Greek word *aris*, meaning arum, with *haema* meaning blood; some sources claim the latter refers to the maroon colour of the spathe while others say it describes the reddish blotches on the leaves of some species. The word *triphyllum* refers to the pair of three-parted leaves with long petioles that overtop the spathe.

There are nearly 2,000 species in the Arum family, in 100 genera, most of which are tropical. Temperate species include the early-flowering skunk cabbage (*Symplocarpus foetidus*), wild calla (*Calla palustris*), sweet flag (*Acorus calamus*), with its finger-like, yellow-green spadix, and arrow arum (*Peltandra virginica*). All are found in swampy habitats. Another close relative to Jack-in-the-pulpit is the fascinating green dragon (*Arisaema dracontium*), which has an exceptionally long tongue extending far off the tip of its spathe. This plant grows naturally on floodplains, but can also be cultivated in native plant gardens.

Jack-in-the-pulpit is found

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ILLUSTRATION BY BEATRICE PATERSON

The Blazing Star is . . .

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Keep an eye on our website, nanps.org, for upcoming details about both events.

Showcasing NANPS Members' Gardens

Elliot Storm was one of the finalists in NANPS 2023 Native Plant Garden Video Contest. Here is his story with a couple of photos from his garden: snow covering coneflowers and a bee nectaring on blue-stemmed goldenrod (*Solidago caesia*) last fall.

"Even though I spent much of my childhood on my grandparents' farm and my mother is a three-time Trillium Award winner for her gardening prowess, I had no interest in plants or gardening until I purchased my first home and had to confront the prospect of maintaining a lawn. In 2020 I started sheet mulching and spent the first summer of the pandemic watching milkweeds (*Asclepias* spp.), false sunflowers (*Heliopsis helianthoides*), Kalm's St. John's wort (*Hypericum kalmianum*), hairy beardtongue (*Penstemon hirsutum*) and purple coneflowers (*Echinacea purpurea*) establish themselves. Since then I've removed almost all the lawn and replaced it with 79 native species.

My favourite part of this journey – aside from the small sense of agency it gives me in the face of my sorrow about and fear of climate change – is seeing people notice. Many of my neighbours (some of whom were initially deeply skeptical of the sheet-mulching process) have become appreciative and interested. Neighbours I hadn't properly met have stopped their cars in the middle of the street to compliment me on the transformation, and a few total strangers who are also native plant nerds have introduced themselves."



PHOTOGRAPHS BY E. STORM

Great Lakes Lilies

by Peter Fuller

Few things in the wild stop me in my tracks faster than the sight of a wild species of *Lilium*. Encounters with North American members of this genus are etched in my memory. Whether abandoning my backpack along a trail in the Cascade Mountains of British Columbia to look at Columbia lilies (*Lilium columbianum*) or slamming on the brakes on backroads of Manitoba to struggle through weedy ditches to see wood lilies (*L. philadelphicum*), I recall the rush of excitement of each event in sharp detail.

Invariably it is the startling yellow-orange bloom suspended above the surrounding vegetation that catches my eye. Not as showy as garden lily varieties, North American species tend to have smaller flowers on longer stems and a finer texture, producing a more graceful effect.

There are four *Lilium* species growing in the Great Lakes region. Three of them are grouped in my mind as close cousins because of their form and habit: Canada lily (*L. canadense*), Michigan lily (*L. michiganense*) and Turk's-cap lily (*L. superbum*). All have hanging flowers with recurved tepals, although Canada lily curves back only partially to form an elegant bell. Within each species, the colours range from deep yellow to orange or red, sometimes with darker petal margins and a lighter interior. Turk's-cap lily usually has a green star at its centre. All are speckled with large brown or maroon dots. A conspicuous stigma surrounded by pollen-heavy anthers is exerted from the inflorescence; this often leads to rusty stains on the arm or sleeve of the careless observer!

Mature clumps reportedly reach 1.5 metres (five feet) or more, but only Canadas and Turk's-caps have reached this height in my gardens. Each unbranched stem features whorls of elliptical leaves topped by multiple blossoms. The flowers grow on pedicels from leaf axils, which increase

in number as the clumps mature. In my eastern Ontario gardens, Michigan lily bloomed first around mid-June and the other two at the beginning of July. They have overlapping ranges. Michigan lily grows from southwestern Ontario west to Minnesota and south to Arkansas. Canada lily has a more easterly range, from Nova Scotia and the St. Lawrence Valley to Lake Erie and south to Alabama. Turk's-cap lily grows from New York south to the Gulf of Mexico. Habitats include moist to wet meadows, clearings, thickets and woodland edges most often with sandy, acidic soils (though sometimes more alkaline, for Michigan lily). Hummingbirds and large butterflies coming for nectar are the most common

pollinators. Blossoms produce little or no scent. Chipmunks or voles will dig and eat bulbs, while deer or rabbits may browse the tops and flowers of plants, preventing seed set.

The fourth species, wood lily, has one or two upward-facing blooms at the top of a 30-100 centimetre (12-40 inch) stalk. It also has orange to red petals that are heavily dotted. Wood lily grows from the Rockies east across

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L. canadense bulbets

PHOTOGRAPH BY PETER FULLER



Lilium canadense (Canada lily) in full bloom

PHOTOGRAPH BY PETER FULLER

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the prairies to the Canadian Shield, the Great Lakes and south to northern Georgia. Bloom time and growth habit are variable across this huge range. Some sources recognize eastern and western forms (*L. var. philadelphicum* and *var. andium*, respectively). In Manitoba, I have observed it as a short plant in moist, sunny ditches growing with wild rose (*Rosa* sp.), bottle gentian (*Gentiana andrewsii*) and *Liatris* spp. (blazing stars), whereas in Ontario I have seen taller plants along logging roads and forest openings in granitic sands. Pollinators for this species are listed as swallowtail butterflies, but I have also observed smaller species such as northern crescent butterflies visiting the plants.

The easiest way to add them to your garden is by growing them from seed. Seed capsules contain hundreds of flat, papery seeds. You can harvest them when they turn brown (September to October) and begin to split. Not all the seeds in a capsule are viable, but you can quickly sort them by placing the seeds on a piece of glass over a light. Seeds with a dark line through the central circle have a complete embryo and will likely germinate.

Some sources describe lily species as difficult to propagate, but growing these species from seed doesn't require much effort, just patience. From October to December, start by placing the dry seeds in a small plastic bag with damp potting mix or vermiculite, labeling them and storing them in a warm, dark spot for two to three months. By that time many seeds will have formed small bulblets. Move the bag to the fridge for another two to three months. In spring, plant the bulblets in a 3.8-litre (one-gallon) pot of potting mix covered with one centimetre (two-fifths of an inch) of the mix and spaced one to two centimetres (up to an inch) apart. If they have formed a long root while in the bag, you can use a pencil to make a hole for the root. Water and label the pot.

Keep the pot under lights or outside



Lilium michiganensis (Michigan lily)

PHOTOGRAPH BY PETER FULLER



Lilium philadelphicum (wood lily)

PHOTOGRAPH BY PETER FULLER



Lilium superbum (Turk's cap lily)

in a lightly shaded spot for the summer. Each bulblet will send up a single leaf that goes dormant by mid-summer. Keep the pot from drying out; water with half-strength fish-emulsion fertilizer every two or three weeks during active growth.

In the fall, put the whole pot in a plastic bag and store it nestled inside a bag of leaves in a protected spot, such as an unheated shed or garage, for the winter. Or you can store the plastic bag in the fridge, if you have room.

Take the pot out in the spring and let the seedlings grow again. If the pot seems crowded, slip the contents into a 7.6-litre (two-gallon) pot without disturbing the bulbs. You should see stems with multiple leaves the second year. You can scratch in a teaspoon of slow-release perennial fertilizer or water the pot every two to three weeks with dilute fish emulsion. Once again, when the plants go dormant, store the pot in a bag in a protected spot. The third spring, plant the contents of the pot in the

garden or gently split them apart to create two or three clumps. Lilies have contractile roots that pull the bulbs down to the depth they prefer. Not all the original seedlings will make it this far, but those that do will produce healthy clumps.

Taking care to avoid disturbing the roots and bulbs, I have been rewarded with a few blooms from robust plants in the third summer; the remaining plants started blooming the fourth summer. Canada, Michigan and Turk's-cap bulbs will send out rhizomes with new bulbs that may be carefully severed and replanted in the fall, but aim for minimal disturbance and replant the severed portions immediately so they don't dry out. Any fragile bulb scales that break off can also be replanted; they will eventually form new bulbs. If they are disturbed too often, bulbs may delay blooming by a year or two.

All four species need steady moisture in the spring. Even a bit of flooding or standing water seems fine. A sandy loam worked best in my gardens, but an average garden soil amended with organic matter was successful, too. I tried them in a variety of settings and found that full to partial sun worked well. Leaf mulch was beneficial for retaining moisture and providing nutrients since I didn't fertilize my gardens beyond adding

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L. superbum bulbs

SEEDS STILL AVAILABLE

For anyone wishing to grow native plants from seed there are still some seeds remaining from our annual NANPS Seed Exchange.

Visit nanps.org/nanps-seed-exchange for more information and a list of available seeds.

Thank you for contributing to native plant restoration!



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mulch and compost. A clump of Canada lilies grew very well on a mound in a rock garden (sandy loam and gravel soil) where its roots stayed cool beside a large boulder and could reach the high water table in spring. Plants became quite dry some summers but remained vigorous. I didn't do any watering, except of the newly planted individuals. Blossoms in full, hot sun tended not to last as long as those in dappled shade under high pine trees.

Turk's-cap lily produced the tallest plants in the shortest amount of time, but Michigan lily patches expanded the fastest. The most adaptable and easiest to propagate in my eastern Ontario garden was Michigan lily; wood lily was the slowest and most particular about conditions. I suspect success in growing wood lilies results from matching garden conditions to the habitat of the seed-source plants.

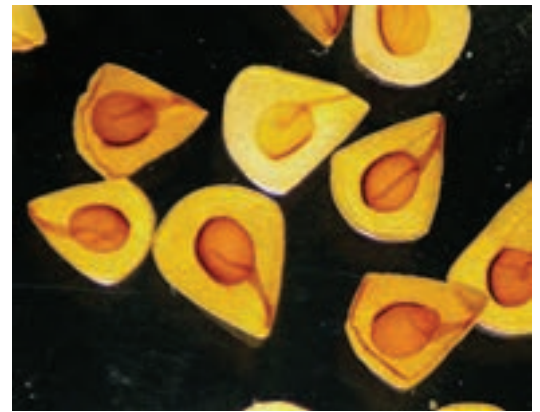
Since chipmunks and voles were often a nuisance, I covered seed pots with bird netting in the summer and during winter storage. I had less

trouble with the animals digging up garden bulbs except in drought years. I experienced few pest problems with the hundreds of lilies I grew from seed. Rabbits browsed a few flowers in one patch, but did not destroy the plants. Deer didn't come to my gardens, but if you have them in your area they will browse unprotected buds. Lily leaf beetles showed up on some plants but not as much as on garden lilies. Species lilies in my garden were slower to emerge in the spring, allowing me to spot and remove adult beetles before they laid their eggs. I did periodic checks for eggs and larvae throughout the season.

Lilium species deserve a space in gardens. Although tall, the native species are not overbearing and combine well with grasses, shrubs and other perennials. A group of bulbs makes a glamorous accent that retains interest, even after blooming, by producing large seed capsules. Clumps are long-lived and

increase without being invasive. With a small investment of time and a bit of waiting you can have the beauty of one or dozens from just a few seeds.

Peter Fuller ran a native plant nursery in eastern Ontario before relocating to southern Manitoba to help with a family orchard business and vegetable gardens. Living on the Pembina Escarpment, with its diverse habitats, he has many opportunities for bird population surveys and prairie plant propagation.



PHOTOGRAPH BY PETER FULLER

Seeds of Michigan lily



PHOTOGRAPH BY PETER FULLER

Canada lily paired with lance-leaved coreopsis (*Coreopsis lanceolata*)

Native Plants in Agricultural Landscapes

by Katie MacDonald

Hazel hadn't seen a garter snake in years. Then, one summer, there were snakes everywhere – in the wood pile, in the gardens, slipping along the fence, sunning themselves on the washstand. She smiled, knowing her actions had welcomed the snakes back onto her Bruce County farm.

Agriculture is changing. In response to historical, ongoing and emerging environmental challenges, more farmers are recognizing the importance of working with nature through a whole-ecosystem approach to restore to health the fields, soils and waterways we depend on to produce our food. Farm practices are becoming more sustainable; agroecology and

regenerative agriculture systems are increasingly seen across the continent; and organic production acreage is on the rise. The re-introduction of native plants to agricultural landscapes is being widely adopted by farmers as an essential component of sustainable farming practices.

Farmers often plant trees between fields or along roadways as hedgerows or windbreaks, protecting crops and livestock from harsh winds and preventing soil erosion in open fields. Similarly, shrubs and trees can be planted along waterways as riparian buffers, filtering excess runoff so that sediment transport, stream bank erosion and nutrient loads are all reduced. This, in turn, prevents flooding and protects water quality.

These living fences may also serve as wildlife corridors, within and between various habitats.

It is standard practice in agriculture to rotate crops between harvests and occasionally rest a field to restore fertility. Native plants may be used in these fallow fields as cover crops. They improve soil quality, as their deep, fibrous roots anchor the soil, stabilizing it and reducing compaction. Native plants can be chosen that target the needs of particular soils, amending them naturally. For example, after many successive crops, productive lands tend to become deficient in nitrogen. By using nitrogen-fixing plants such as prairie clover (*Dalea purpurea*),

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PHOTOGRAPH COURTESY SAUGEEN VALLEY CONSERVATION AUTHORITY

Bundle of tiny white pines ready to be planted

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farmers can re-introduce crucial macro-nutrients back into the soil.

By planting a wide variety of native forbs, shrubs and trees that bloom sequentially throughout the growing season, farmers also create habitat for a diversity of native pollinators, ensuring that shelter and regular sources of nectar and pollen are available. A typical planting for a riparian buffer could include willow (*Salix* spp., flowering April to June), elderberry (*Sambucus canadensis*, mid- to late July), swamp milkweed (*Asclepias incarnata*, June to September) and bog goldenrod (*Solidago uliginosa*, August to October). This combination offers excellent sources of nectar and pollen from spring through fall.

It is equally important to meet the habitat needs of pollinators through all their life stages, for instance by providing larval host plants and undisturbed nesting sites. This, in turn, can benefit farmers by increasing agricultural yields. Native pollinators are often found to be better pollinators than exotics, such as honey bees. They are present earlier in the growing season, active over longer periods of time each day, are less bothered by local weather conditions, and are more efficient at distributing pollen.

Native pollinators are also more effective at controlling pests, including nuisance or harmful insect populations that damage crops or act as disease vectors for livestock. Native birds, bats and beneficial insects can significantly reduce pest populations by consuming thousands of “enemy insects” such as leafhoppers, beetles, stink bugs, aphids, grubs, snails, ants and mosquitoes, as well as corn-borers, earworms and cutworms in the adult (moth) stage.

Some birds, such as purple martins,

feed exclusively on flying insects and can help control flies in pastures or other grazing areas, thereby reducing the incidence of pink eye in livestock. Particularly while raising their young, female bats can consume almost their own body weight in insects per day. Both purple martins and bats – four out of eight of our native species of bats are now listed as endangered – have been significantly impacted by habitat loss over the past decades. Other wildlife, such as Hazel’s garter snakes, which prey upon rats and other serious agricultural pests, have experienced similar losses.

By restoring or creating new habitat for such beneficial species, farmers can manage pests and diseases naturally. This process, known as biological control, reduces the need for synthetic pesticides, saving farmers money and the environment from harmful chemicals. Scientific studies consistently report increased numbers of birds, bats and other wildlife on organic farms, compared to conventional ones.

Crucially, in addition to incorporating native plants into traditional agricultural practices,

farmers are also setting aside natural areas. Many farmers have come to recognize that by increasing biodiversity, improving soil and water quality, and reducing flood and erosion risks, they can make their farms more resilient and better adapted to the changing climate.

Tree planting on farms in cooperation with local conservation authorities

Many conservation authorities (CAs) offer a range of services designed to assist farmers in managing their lands. In Ontario, the Saugeen Valley Conservation Authority (SVCA) is one of 36 CAs that work to protect and restore natural areas in the province. For over 60 years, SVCA has been planting trees in the local region in consultation with researchers and landowners to help improve and create habitat, specifically through the use of native trees and shrubs.

Since every parcel of land is different, SVCA provides site assessment, technical support and customized planting plans to determine where native tree and shrub planting will have the greatest impact.



Saugeen Valley Conservation Authority staff machine-planting pines

PHOTOGRAPH COURTESY SAUGEEN VALLEY CONSERVATION AUTHORITY

Forest technicians determine the type of planting that will best suit the chosen site, be it a windbreak, riparian buffer or forest restoration or afforestation project. Together with the farmer, they also decide which species of trees and shrubs to plant. Conifers make excellent windbreaks and help prevent snow drift, while basswoods (*Tilia americana*) and willows improve honey production for beekeepers. Poplars (*Populus* spp.) can be used for biofuel projects, black walnut (*Juglans nigra*) can be grown for future harvesting as hardwood and native hazelnuts (*Corylus* spp.) can be a cash crop. And all trees attract wildlife, while absorbing rainwater and even odours from farm animals.

After the decisions have been made, SVCA sources the trees and shrubs through local nurseries, larger provincial or federal programs, or their own annual spring tree sale. The

tree sale is a fun day that allows landowners and community members to chat with SVCA staff about the benefits of choosing native species; it inspires great conversations about achieving shared environmental goals within a community. SVCA forestry staff can also assist with securing significant subsidies or grants to reduce the cost of tree planting to farmers.

On planting day, SVCA brings a crew and all the tools and equipment required. Every year SVCA assists in the planting of tens of thousands of trees by machine or by hand during spring and fall. The majority of their projects take place on farms.

Jill Wiersma, an SVCA technician involved in tree planting, notes that she “has been met with a lot of enthusiasm from farmers who feel the significance of their role in caretaking the land. They want to choose trees

and shrubs that are going to benefit wildlife and support the ecosystem as a whole.” Jill recently planted trees for a dairy farmer who expressed that “she wanted her farmland to be integrated into the ecosystem and has been working hard to do so over the years by implementing stewardship projects.” While Jill and the farmer were walking through the fields, discussing where the trees would be planted, they listened to bobolinks, a designated species at risk, and many other birds singing. Jill noted that the dairy farm is “a real testament to the benefits of planting native species and working to naturalize marginal farmland.”

Planting native trees and shrubs provides excellent benefits to farms and their surrounding communities. Even small, strategic planting projects can address environmental challenges

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on the farm, enhance natural infrastructure, and provide the necessary habitat to support resilient pollinator communities. From planting windbreaks, pollinator strips and buffer zones all the way to retiring a productive field or meadow to reforest areas, it is encouraging to see how farmers are managing their farms in ecologically beneficial ways. In the words of Jill, the SVCA technician, “It makes the days planting in the pouring rain or with the black flies and mosquitoes feel worth it!”

Katie MacDonald holds a Ph.D. in Environmental Geography and has worked extensively throughout the Amazon River basin with Indigenous communities, responding to large-scale environmental and land-use change. Since returning to the shores of Lake

Huron, Katie has created her own wildflower garden and strives to demonstrate the importance of native plant ecology in the primarily agricultural area.

For tree-planting resources, visit <https://forestsontario.ca/en/program/50-million-tree-program>. For a list of Ontario conservation authorities, visit <https://ontarioconservationareas.ca/>.

Help Needed Monitoring for Invasives

The Invasive Species Centre is looking for woodlot owners/managers in the southwest region of Ontario to help monitor for Hemlock Woolly Adelgid through the HWA Monitoring Network. The Network successfully completed its first pilot year with 50 volunteers across southern Ontario, who deployed eDNA traps in the woodlots they own or manage, looking for HWA. As a result, one

new HWA infestation was identified that may have otherwise gone unnoticed. Participants of the network keep their traps, only sending in samples, so they can repeat efforts year after year. In 2024, the centre is looking to expand the network by adding an additional 50 traps targeting the southwest portion of the province. Anyone interested in learning more is asked to visit the [registration page](#).



PHOTOGRAPH BY CLEMENT KENT CC BY SA 3.0

*This old farm property in Elmvale, Ontario, was replanted with native grasses to support bobolinks and eastern meadowlarks. The native grasses have struggled over the past three years and the grassland birds have yet to return. However, goldenrods (*Solidago* spp.), asters, such as the arrowhead aster (*Symphyotrichum urophyllum*) featured in this photo, common milkweed (*Asclepias syriaca*) and other native forbs have come back. The Couchiching Conservancy (couchichingconserv.ca) provided assistance with the planting.*

Fens and Their Floristic Communities

Part One: Fen or Bog?

by Don Scallen

Fens are among the most compelling floristic habitats in eastern North America. Peat-based systems with unique hydrologic characteristics, they support orchids, carnivorous plants and a host of other floral wonders.

Wetlands are roughly divided into four broad categories: swamps, marshes, bogs and fens. Undoubtedly, the least understood of these wetland sub-categories is fen. As Ronald B. Davis writes in his book *Bogs and Fens*, “The term ‘fen’ barely evokes recognition by most people.”

Truth be told, I had only a hazy understanding of this term until

recently. I was motivated to learn more when I was invited to do a talk on fen flora for a wildflower group.

I’m hardly an expert on fens now, but I have finally succeeded in clearing up my muddy thinking about the differences between bogs and fens. I had a better concept of swamps and marshes. In simple terms, swamps are wetlands featuring significant woody growth of both deciduous and coniferous trees. Marshes are wetlands dominated by herbaceous growth and are usually inundated with standing water year round.

Visual differences can be used to identify these two common wetland types. But separating fens and bogs by

their appearance only can be a challenge. In short, fens and bogs are not easily distinguished and we need to embrace complexity in our efforts to understand them.

Let’s start with the commonalities: bogs and fens are both water-saturated habitats. Secondly, they are both peat-based systems. Peat is an accumulation of partially decomposed organic material. It doesn’t decompose completely because acidic and anaerobic (low-oxygen) conditions inhibit the flourishing of bacteria and fungi that would further break it down. In bogs, much of this peat is composed of dead sphagnum moss. Peat in fens also contains the remains of sphagnum moss but is usually augmented by more graminoid material, such as sedges, grasses and rushes.

Now the differences. Groundwater is mostly inaccessible to bogs. There is, however, a gradient. The margins of a bog, where the peat mat is thinner and in closer contact with subsoil, may be able to access some groundwater. The term used to describe these bog edges is *minerotrophic*: more minerals are present in these bog peripheries because of accessible mineral soils nearby. But, as one progresses from the margins to the centre of the bog, the peat layer, from decades or centuries of accumulation, deepens, effectively blocking groundwater upwelling. This peat can accumulate to such an extent that it rises well above the bog’s edge. Such bogs are referred to as raised; this feature further separates the accumulated peat from groundwater. The technical term for these areas of bogs that are insulated from groundwater is *ombrotrophic*.

Ombrotrophic means that rain is the only source of water for these mid-sections of bogs. Clean, “natural” rain has a somewhat acidic pH of 5.6 to 5.8, having absorbed carbon dioxide from the atmosphere. Rain, then, helps to acidify the bog. Sphagnum, which



PHOTOGRAPH BY DON SCALLEN

Showy lady's slipper (Cypripedium reginae) is a wildflower dependent on moist soils ranging in alkalinity from basic to slightly acidic. Commonly found in fens.

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flourishes in acidic conditions, also contributes to the acidity of bogs as it decomposes. This means that at the centre, bogs can have pH levels of 4.2 or less – about the acidity of beer. This acidity decreases the closer one gets to the edge of the bog.

The rain that hydrates bogs at their ombrotrophic centres contains trace minerals picked up in the atmosphere, but the tiny mineral input is wholly insufficient to appreciably raise nutrient levels. This nutrient deficiency, combined with near-constant water saturation and enabled by the sponge-like qualities of sphagnum and peat, limits or prevents the growth of many species. However, bog species, such as many types of sphagnum, flourish in these conditions. A truism among naturalists is that environments unhealthy for some plants can mean opportunity for others.

The minerotrophic edges of bogs – which have access to some groundwater minerals – have a higher pH than their centres and provide hospitable habitat for a greater array of plants.

This raises a point that still has me flummoxed. These minerotrophic bog edges are floristically similar to what are called poor fens – acidic fens that have limited access to groundwater. This can mean that, in some situations, using plant occurrence to distinguish fens from bogs is fraught. Davis, in his book *Bogs and Fens*, does a great job of identifying habitat preferences for hundreds of plants that grow in wetland habitats. But almost all the plants he identifies as growing in poor fens he also identifies as growing in the minerotrophic margins of bogs. Separating poor fens from bog margins poses a challenge as murky as trying to peer through peat-infused water.

It's also worth noting that fens can turn into bogs over time, as the peat mat thickens and precludes groundwater. This begs the question: where does the fen end and the bog



PHOTOGRAPH BY DON SCALLEN

Tamarack (Larix laricina) grows in both bogs and fens, demonstrating the frequent overlap of species in those two habitats.



PHOTOGRAPH BY DON SCALLEN

Tuberous Indian plantain (Arnoglossum plantagineum)



Sifton Bog in London, Ontario

begin? Humans don't like ambiguity, but nature manifests ambiguity everywhere. Perhaps an analogy is useful here. Any sighted person with normal colour vision can identify the colour orange and agree with their peers that they are looking at the colour orange. But as that orange



Dorcas Bay fen on the Saugeen-Bruce Peninsula, Ontario

bleeds into red or yellow, disagreements and ambiguity will arise as to the colour being perceived. Some fens are unarguably fens. But where fens bleed into bogs, the distinction blurs. This is true as well for the interface of wooded fens – fens that have a substantial treed overstorey – and wet woodlands. Once again, the transition is blurred. Where does the wooded fen end and the wet woodland begin?

Part two of this article, which will appear in the spring 2024 issue of The Blazing Star, will offer more thoughts on bog/fen delineation and take a deep dive into different types of fens and the plants they support.

Don Scallen is the author of Nature Where We Live.



Winterberry (*Ilex verticillata*) is a common fen species in eastern North America but will also grow in the minerotrophic edges of bogs, where more nutrients are available.

New & Noted

Garden Revolution: How Our Landscapes Can Be a Source of Environmental Change

by Larry Weaner and Thomas Christopher
328 pages
Timber Press, 2016
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Early on in *Garden Revolution*, Larry Weaner asserts that traditional horticulture, wherein one imposes a preconceived design onto a plot, “involves a relentless struggle with the site’s attempts to express itself.” This arresting notion—that garden sites possess a will to self-expression—underlies much of Weaner’s approach to landscaping, which begins with deep observation of a site and proceeds by guiding how the vegetation on the land will change through time.

Change through the dimension of time is a key theme: “Just as you cannot step into the same river twice, if you are gardening ecologically, you won’t find the same garden on two different visits.” Whereas traditional gardens are static, natural gardens are dynamic. Yet the gardener is not a mere bystander. Through case studies of and vignettes from individual sites he has worked on, Weaner shows how to strike a balance between doing and letting be. It’s a balance that requires many seemingly incongruous skills and mindsets—to garden as Weaner does, one must have an ecologist’s broad scientific knowledge; a landscaper’s practical know-how; an artist’s vision; and, even, a spiritualist’s commitment to the living land.

The three broad sections of the book encompass “The Learning Process,” “Design,” and “In the Field.” In the first section, Weaner introduces several key ecological concepts, the most important of which is ecological succession. In most of eastern North America, meadow will give way to shrubland, which in turn will give way to forest. The aim in ecology-based landscaping is to shape and arrest this process as desired, working in concert with rather than overriding nature. Using the ecologist Frank Egler’s notion of “initial

floristic composition” (the existing seed bank of any site), Weaner advocates minimizing (or, rather, judiciously applying) soil disturbance to avoid stimulating the germination of weeds. To this end, his “cut, don’t pull” approach to weeding saves time and labour, as well as preventing unnecessary disturbance (see his article “Little Disturbances” in the summer 2023 issue of *The Blazing Star*).

The design process begins with site analysis, which includes an understanding of the land’s disturbance history. From deep and detailed observation, an “ecologically connected master plan” can emerge that maximizes, with the least disturbance, the site’s capacity for hosting wildlife. Weaner shares interesting insights about how the shape and size of designated successional zones (that is, meadow, shrubland, or forest) may determine how useful that zone becomes as habitat for wildlife. This is where ecology meets aesthetics. Through arranging “masses” and “voids” in a pleasing way that minimizes the creation of edge effects, habitat patches may be designed that favour nesting birds while discouraging the presence of predators and invasive weeds.

In the final section, Weaner shows how “to get a living process in motion, one that the gardener will guide but also be guided by.” These chapters are full of thoughtful, practical advice to save on cost and effort: Weaner generously includes tips, for instance, on how best to order seed mix, even how to use a no-till drill seeder for seeds of various sizes. The respective chapters that show how to create the various types of successional zones reveal insights gained over years of experience, such as that pampered, nursery-grown plants are not likely to



do as well as “sparsely leaved, modest-sized, thrifty plants, which can focus their energy on spreading their roots into the soil.”

The book is handsomely illustrated with photographs. Many are breathtaking, but,

more than that, they provide a visual education on the aesthetic dimension of ecological gardening. Those new to native plants are often advised to “plant this, not that”—a fine way to ease into a different way of thinking about horticulture—but the book’s photos point to the profound and subtle beauty of a landscape that is allowed to become what it wants to be, guided lightly and wisely in harmony with nature.

Though co-author Thomas Christopher helped structure the book, he generously cedes the narrative to Weaner, “because it is his story.” Some of the most interesting and instructive parts of the book are also the most personal, as when Weaner relates what his landscape design shares in common with his music compositions: “a musical piece unfolds over time, as does a process-based natural garden.” The postscript on how he influenced the growth patterns of his own yard by gently nudging things in one way or another is fascinating and an inspiration to all of us who want to garden with “brains over brawn.”

As a guest on the podcast *Backyard Ecology* (January 8, 2023), Weaner speaks of the joy in tending a piece of land over the long term as a “rewarding way to live.” By his generosity and thoughtfulness in sharing some of what he has learned as a pioneer of ecological landscaping, he has made a rewarding book to read.

Review by Vicki Low

throughout eastern North America. Depending upon which source you seek out, two or three species or subspecies may be mentioned, which have integrating forms or are, possibly, hybrids. There is great variation in size, degree of corrugation or fluting in the spathe, spathe colour, leaf colour and symmetry, and flowering time.

The plant's exceptional shape has awakened the creative spark in many a plant lover. Whimsical names for Jack-in-the-pulpit include bog onion, cuckoo plant, dragon root, dragon turnip, Indian turnip, lords and ladies, meadow turnip, memory root, pepper turnip, priest's pintle, starchwort, swamp turnip, three-leaved arum, wake robin and wild turnip. The word *turnip* pops up often in these common names because the corms, which are actually bulb-like stems, are shaped like the vegetable.

All parts of Jack-in-the-pulpit are poisonous. Its calcium oxalate crystals make consumption of the plant unpleasant, causing a burning sensation in the mouth. Country kids would tease their city cousins, claiming the berries tasted really good. But, in truth, it was like "eating a mouthful of red-hot needles," a phrase I picked up from a respected naturalist friend. Native Americans would roast the corms to deactivate the crystals, then grind them into flour. To alleviate headaches, they would pound the root into a pulp and apply it to the forehead.

In my native garden I have a large Jill-in-the-pulpit gracing the edge of my front porch and producing lots of crimson berries each year. Last spring, I crawled under the porch to harvest the young Jacks that had germinated from the berries. I potted them up and gave them away at an introductory botany program I presented at the Native Plant Society of Northeastern Ohio. I often encounter the turnip-shaped corms when digging a hole for a new plant to add to the garden.

Propagating Jacks from seed is time-consuming. Snip off the crimson berries as soon as they mature. Few

animals, other than game birds such as quail or wild turkey, will beat you to them, the crystals being a deterrent to consumption. Each berry contains one to six white seeds. To remove the seeds, soak the berries in water for 10 minutes or until the red skin slides off, gently squeezing them from the berries. Gloves are highly recommended as the crystals can irritate the skin.

Seeds require cold moist stratification to unlock dormancy. Place them with damp sand or vermiculite in a plastic baggie or small food storage container. Store them in the refrigerator for two to 2 ½ months. Plant them ¼ inch (six millimetres) deep in a soil-less potting medium.

Jack-in-the-pulpits have an interesting growth pattern. Don't be surprised when, during the first year, all you see is a tiny stalk with a single, heart-shaped leaf. Don't panic when the plants peter out after three months; that is part of their life cycle. Once the plants begin to wither, either put the entire pot in a cold location for two to three months or remove individual corms from the potting soil and store them once again in a cold, moist environment. My preference is the refrigerator.

Seeds can also be sown directly outdoors, by scratching the soil near the parent plant or in a place with similar growing conditions. Cover them with one inch (25 millimetres) of leaf mulch and let Mother Nature take care of the stratification over

the winter.

I was successful in propagating my green dragon by burying the berries in a pot of soil. After two years of sitting in my greenhouse, they finally germinated. I ended up giving the pot to a friend as the plants readily reseed in my garden; a single plant is now a patch two feet (60 centimetres) in diameter. Jack-in-the-pulpits are equally prolific, given the right conditions, and equally welcome.

While leading nature hikes, I often stop at a Jack-in-the-pulpit, carefully opening the spathe for participants to peek inside to see the reproductive structures. They are invariably fascinated.

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Jack-in-the-pulpit emerging in the spring

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