The Blazing Star

Winter 2020, Volume 21, Issue 1

A Publication of the North American Native Plant Society

Native Plant to Know

Cranefly Orchid

Tipularia discolor

by Nicky Staunton

My first discovery upon visiting the remnant forest that would become the site of my new home was a cranefly orchid (*Tipularia discolor*). I spotted the tips of the cranefly orchid's dark green, ovate leaves in the midst of a large drift of running cedar (*Diphasiastrum digitatum*), a club moss, in the lower area of the forest's narrow dell, on the south side of Parish Mountain in Novum, Virginia. Small granite, quartz and sandstone outcrops with sandy clay soils support biodiversity in these eastern mesic woods, where the soil is kept perpetually moist by springs, providing the perfect environment for this delicate orchid.

In November 2005, this fragmented, remnant forest became my home largely due to the botanical observations I had made on my first visit. November is the ideal time for locating the cranefly orchid: the green upper leaf (sometimes with raised purple spots) accented by a purple underside is clearly visible in the faded brown leaf litter under a bare tree canopy. The sun's late fall or winter rays allow photosynthesis, nourishing the corm from which a lean brown spike will emerge. The asymmetrical flowers bloom in late summer, provided the plant has been able to store up sufficient energy. By then, the single leaf has senesced (deteriorated with age).

The cranefly orchid grows 40-50 centimetres (15-20 inches) tall. The stems, with their dull colours of maroon and pale pink, can appear translucent when backlit. The raceme buds open from the bottom of the stem upward. The flower's tan, bronze or pale chartreuse petals and sepals are accented by unfurling white lips that seem to shine, perhaps to lure moths of the Noctuidae family, which pollinate the plant. Each inflorescence has a nectar spur two times longer than the flower's ovary, which is one centimetre (four-tenths of an inch) long and tilted. According to the North American Orchid Conservation Center website, a moth will insert its proboscis into the nectar tube; if there is too little nectar, it will force its proboscis deeper, increasing the chances that its compound eye will come into contact with little pollen sacs that are then carried to the next plant.

In autumn, drooping seed capsules ripen, becoming dry and brown, and their seams part to release pale golden pollen dust. A shiny, heart-shaped, often pleated leaf emerges from beneath its protective mulch of fallen tree leaves, and the process begins anew.

Cranefly orchids require decomposing wood in the soil substrata. But, according to the blog at the website *In Defense of Plants* (indefenseofplants.com/blog): "It's not so much the wood they require but rather the organisms that are decomposing it. Like all orchids, the cranefly cannot germinate and grow without mycorrhizal associations. They just happen to partner with fungi that also decompose wood. Such a relationship underscores the importance of decaying wood to forest health."

Last year in July, I was dismayed to find no signs of cranefly orchids in the dell near my house! No winter-spent, summer-survived dried stems with seed capsules, no new scape of flower buds. Worse, all the leaf litter was washed away, the forest

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ILLUSTRATION BY NICKY STAUNTON

***The Blazing Star* is . . .**

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NANPS SPRING SPEAKER SERIES 2020

The Wild and Wonderful World of Bees

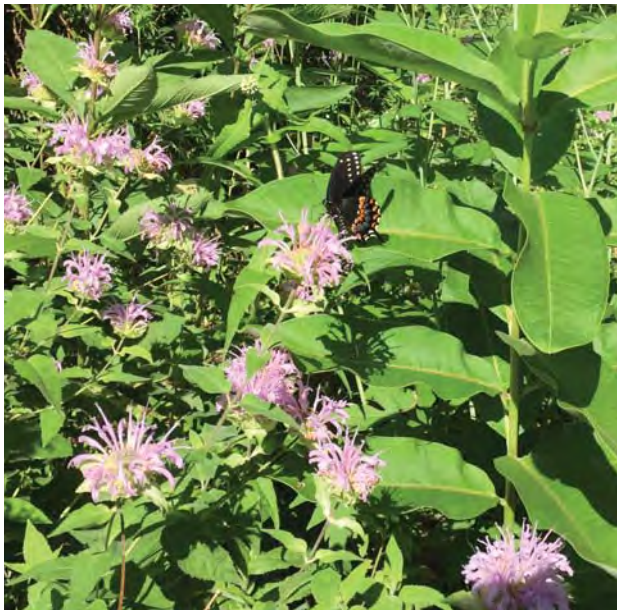
Wednesday, March 4, 7 – 8:30 p.m. – Dr. Laurence Packer

Dr. Packer is a Professor of Biology at York University. He teaches entomology and biodiversity. He has published two books: *Keeping the Bees* and *Bees: An Up-Close Look at Pollinators around the World* with Sam Droege.

The Wild and Wonderful World of Butterflies

Wednesday, April 15, 7 – 8:30 p.m. – Jessica Linton

Jessica Linton is a Waterloo-based biologist and environmental consultant, and the president of the Toronto Entomologists Association. She has spent a lifetime studying, researching and observing butterflies in Canada and around the world.



PHOTOGRAPH BY HAROLD SMITH

Black swallowtail butterfly on Monarda fistulosa *(wild bergamot)*

Tickets are $15 for each event for NANPS members, $20 for the public, free to University of Toronto and York University students (please show student ID).

Visit **nanps.org** to register or email Donna Lang at **dlang@nanps.org** for details.

Both talks will be held at the Multi-faith Centre (Koffler Building), University of Toronto, 569 Spadina Avenue, Toronto, Ontario. The talks are co-sponsored by Faith & the Common Good, Livegreen Toronto, and the David Suzuki Foundation.

NANPS PLANT SALES

Saturday May 2, 9:30 a.m. – 2:30 p.m.
Toronto Botanical Garden, 777 Lawrence Avenue East, Toronto
Advance sales available only at the TBG event. Pick up pre-ordered plants starting at 10:30 a.m. Visit **nanps.org** for details.

Sunday May 17, noon – 4:00 p.m.
Riverwood, 4150 Riverwood Park Lane, Mississauga. In partnership with the Riverwood Conservancy.

Sunday May 31, noon – 4:00 p.m.
Christie Pits Park, 750 Bloor Street West, Christie subway station, Toronto

Knowledgeable volunteers on hand at all NANPS plant sales.

In Loving Memory: Jim Hodgins

James Hodgins, pioneer of the urban native garden movement in Toronto, co-founder of the Canadian Wildflower Society (CWS) and editor of *Wildflower* magazine, passed away peacefully in October 2019. His love of nature inspired countless people to plant native gardens, learn more about botany or simply enjoy what the natural world has to offer.

Photograph by Zile Zichmanis

Colorado writer, artist and botanist Evan Cantor echoes the sentiments of many when he writes, "Jim Hodgins was, to me, friend, mentor and big brother all wrapped up in one. As a naturalist, Jim was the living embodiment of John Muir and Aldo Leopold. His enthusiasm for all things in nature was boundless and his vision of a North America united by its flora and fauna from Greenland to points south of Mexico was unparalleled. He reached out to me at a time in my life when I was insecure about my art and gave me the confidence to go forward. I miss Jim already, but am grateful and privileged to have known him and called him my friend."

A native Torontonian, Jim studied biology and philosophy at the University of Guelph. In the 1970s, he moved with his young family to Jamaica, where he taught high school biology and chemistry. Upon their return to Canada, he continued teaching high school and then worked for several decades at the Department of Zoology at the University of Toronto. With his wife, artist Zile Zichmanis, he co-authored *Flowers of the Wild*, a coffee table book dedicated to Ontario's wildflowers, published by Oxford University Press in 1982.

Tom Atkinson, a native tree enthusiast and former president of the Canadian Wildflower Society (the forerunner of the North American Native Plant Society), speaks of three significant contributions that Jim made to the native plant movement. First, "Jim suggested early on that we collect and package native plant seeds and make them available as a perquisite to CWS members. We stumbled at first, but it worked. The Seed Exchange became a cornerstone of our organization." Tom also praises Jim for having developed *Wildflower* into a first-class botanic publication, with well-researched botany and superb photographs and artwork, many created by his wife, Zile. Finally, with the help of other enthusiasts, Jim solicited donations to purchase a unique wilderness property in Norfolk County to be preserved in perpetuity by CWS and later NANPS. The land harbours a substantial number of cucumber magnolia trees (*Magnolia acuminata*), known as "shining tree" to the local First Nations, and has come to be known as Shining Tree Woods.

Jim Hodgins's obituary, published in the Toronto Star on November 2, 2019, ends with this request: "In lieu of sending flowers, Jim would have been thrilled if those who knew him were to plant a native wildflower in their garden or neighbourhood in his memory."

Our deepest condolences to Jim's family and friends.

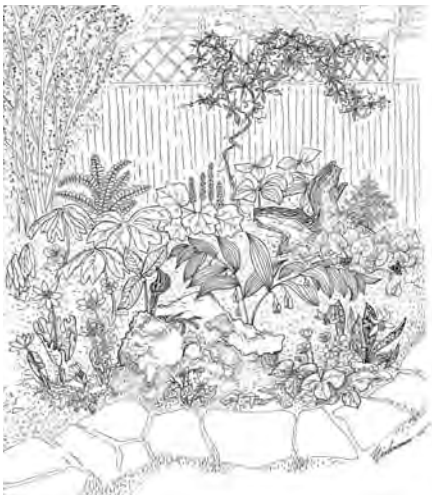
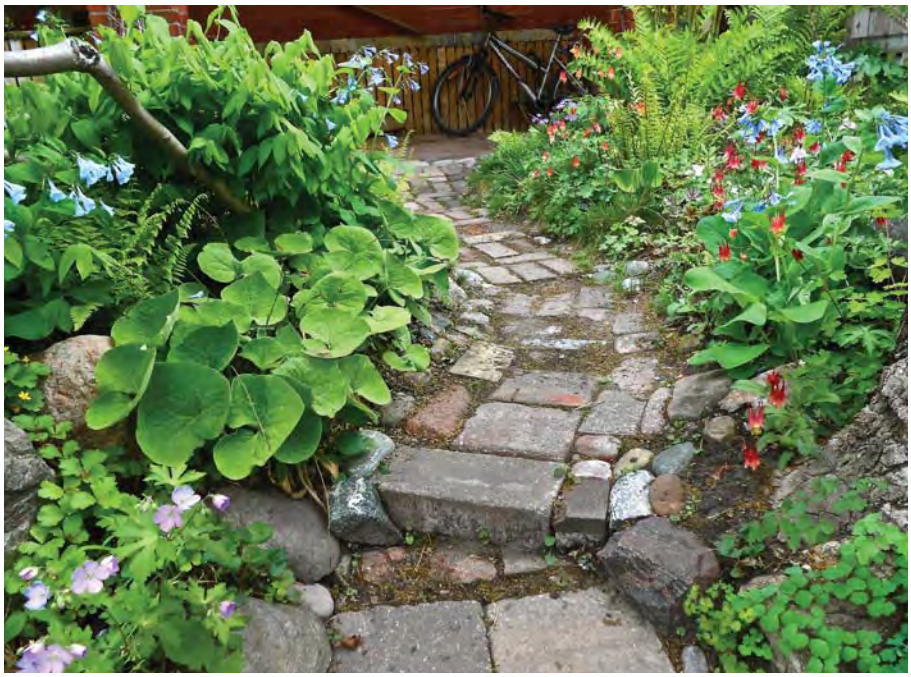


Illustration by Zile Zichmanis



Photograph by Zile Zichmanis

Jim and Zile's native plant garden

I Let Nature Take Over

by Flora Nadafi

How much of this lawn do I really need to keep? That's what I asked myself as I surveyed the lawn surrounding parts of my small, container-grown, native tree nursery in Mulmur, Ontario.

A monoculture lawn does not have a beneficial function in natural environments and ecosystems (although it's great for playing and walking on) and can be disruptive of nature's ways. To look perfect, lawns need many inputs: water to keep the grass green, fuel to power lawn mowers, and herbicides and pesticides to keep "weeds" away and wildlife from digging for the grubs and other goodies below the sod. Since energy use leads to carbon dioxide (CO2) emissions contributing to climate change, I have always used a reel (or push) mower to cut the lawn.

PHOTOGRAPH BY FLORA NADAFI

Ostrich fern

PHOTOGRAPH BY FLORA NADAFI

Common blue violet and Solomon's seal

I decided that I really don't need much lawn except for narrow paths at the entrance and around trees. My plan was to let nature take over the rest. I stopped mowing for almost four years where there were no walkways and let it go wild. It came as no surprise that this plan led to wonderful results. Many native wildflowers, woody plants and ferns, which had been mown down before, grew and bloomed.

My first gift was seeing blue-eyed grass (*Sisyrinchium montanum*) coming up on a cold April morning (it snowed that afternoon). In early spring, I've come to enjoy thick patches of common blue violets (*Viola sororia*). Later, wild geraniums (*Geranium maculatum*) and Bicknell's geraniums (*Geranium bicknellii*) start taking over their corner of lawn.

Native violets usually bloom a bit earlier than non-native dandelions (*Taraxacum officinale*). According to bee expert Heather Holm, native violets and wild geraniums are among the best spring flowers for pollinators. They provide higher-quality pollen and pollen protein counts than dandelions, which also do not attract native specialist bees. My own observations confirmed this: where both blue violets and dandelions were present, bees chose the violets. Common blue violets have another advantage over dandelions. In mid-summer, when the flowers are gone, insects feed on the leaves of common blue violets, while dandelion leaves remain untouched.

Later in spring and early summer, bunches of hairy Solomon's seal (*Polygonatum pubescens*) start popping up in the lawn and ostrich ferns (*Matteuccia struthiopteris*) begin brightening shady areas. Another member of the geranium family, herb

robert (*Geranium robertianum*) appears with its small pink flowers; patches of blue columbine (*Aquilegia brevistyla*) bloom in growing numbers in many places. Prickly wild rose (*Rosa acicularis*), with its delicate, sweet aroma, sends out shoots, spreading all over. Later in the season, enchanter's nightshade (*Circaea alpina*) shows off an abundance of little two-petalled white flowers at the ends of tall stems.

Mauve-blossomed self-heal (*Prunella vulgaris*), host plant for painted lady butterflies, and common yellow woodsorrel (*Oxalis stricta*) introduce more colour. The short Philadelphia fleabane (*Erigeron philadelphicus*) peppers the lawns with flowerheads arrayed with as many as 35 tiny blossoms. Virginia creeper (*Parthenocissus quinquefolia*) soon covers the ground and wire fence, making for a beautiful sight in the fall when its leaves turn red-burgundy. Common blackberry (*Rubus allegheniensis*), with its long, arching branches, produces small white flowers and then berries, which birds enjoy. A few white avens (*Geum canadense*) with their fascinating fruit (a burr-like mass of seeds and pointed receptacles with numerous protruding dried styles) have also found their place.

In mid-summer, when Philadelphia fleabane flowers are almost gone, daisy fleabane (*Erigeron annuus*) comes into its own and the flowers stay around until early fall.

Since I stopped mowing the lawn, a chokecherry tree (*Prunus virginiana*) from the neighbouring ravine started sending out root suckers and now saplings grow at the border of my property. I enjoy the lovely flowers and spectacular fall leaf colours.

A few years ago, I rescued a seedling of the gorgeous trembling aspen (*Populus tremuloides*), which someone had thrown away as a weed, and planted it. It has grown to six metres (20 feet) tall and soon its suckers will cover a significantly large area. Seedlings of black walnut (*Juglans nigra*), bur oak (*Quercus macrocarpa*) and various maples (*Acer* spp.) are scattered all over, thanks to the work of wind, birds and squirrels.

PHOTOGRAPH BY FLORA NADAFI

Bicknell's geranium

PHOTOGRAPH BY FLORA NADAFI

Prickly wild rose

A research team from Iowa State University studied the milkweed (*Asclepias*) preferences of monarch butterflies in the field during the 2015-2017 breeding seasons. Nine native species of milkweed, including butterfly milkweed (*Asclepias tuberosa*), were included in the study. The results demonstrated that common (*Asclepias syriaca*) and swamp milkweed (*A. incarnata*) are the two most preferred species by monarchs for oviposition in the field.

You can imagine my excitement when I noticed that common milkweed had started growing on my property. However, some were growing in areas (e.g., over a septic leaching

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field) that were not suitable for their long tap roots. I had read that common milkweeds are hard to transplant, but I managed to move them to other spots anyway. They started to grow immediately, probably because they were young and hadn't developed their strong tap roots yet. Since they propagate via their rhizomes as well as their seeds, there were many more milkweeds the next year.

In late summer and fall, the two most common goldenrods of southern Ontario, Canada goldenrod (*Solidago canadensis*) and tall goldenrod (*Solidago altissima*), brighten the waning days with their blooms, attracting huge numbers of insects. Tall goldenrod gets the classic goldenrod gall, which birds peck open for food in winter. This summer, early goldenrod (*Solidago juncea*) showed up as well.

Accompanying the goldenrods are clusters of three beautiful asters: arrow-leaved aster (*Symphyotrichum urophyllum*), heath aster (*S. ericoides*) and amethyst aster (*S. x amethystinum*). The latter is a hybrid between heath and New England asters (*S. novae-angliae*). Although I haven't seen any New England aster on my property, there are many in the neighbouring ravine. Interestingly, the pollinators have done a good job of bringing in amethyst aster, but not the New England species – yet!

The presence of these native plants brought increasing numbers of pollinators to the nursery and its surroundings. It's fascinating to watch dozens of butterflies (including monarchs), moths, bees, other beneficial insects and birds flitting and buzzing about the plants.

Native plants give each other room to grow. You don't need to consider how to layer, plan and design the native flower "garden." There are flowers in every season providing food for pollinators. Given a chance, native plants will displace non-native species (except the most tenacious invasives – you have to be persistent, sometimes back-breakingly so, with these). Non-native creeping harebell (*Campanula rapunculoides*) and St. John's wort (*Hypericum perforatum*) once dominated sections of my uncut lawn, but most have now disappeared and I can easily pull out the few that show up.

The introduced plants will never completely disappear. As Douglas Tallamy notes in his book, *Bringing Nature Home: How You Can Sustain Wildlife with Native Plants*, "One of the great tragedies of alien introduction… is that the invasion will never stop altogether." Still, if we pay attention, we can usually ensure that the natives receive preference and the undesirable non-natives fade into insignificance.

Photograph by Flora Nadafi

Common blackberry and bees!

Photograph by Flora Nadafi

Arrow-leaved aster

Flora Nadafi is a professional engineer. When she lost her beloved son, Faraz, who was hit by a car in 2013, Flora resigned from her profession and moved from Toronto to Dufferin County to start a native tree nursery in Faraz's memory (forfaraz.com).

To Tree or Not to Tree

by Don Scallen

Years ago, I read a book called *The Simple Act of Planting a Tree*, about the undeniable benefits of planting trees. I've since learned that, although the physical act of planting a tree is simple, the decision to do so shouldn't be.

Don't get me wrong. I love trees and I value forests. I grow trees from seed and I've been known to hug trees – especially big, old trees. Planting native trees almost always makes good ecological sense in urban landscapes dominated by lawns, concrete and asphalt. But beyond the city, we need to think carefully about planting trees. Especially when planting lots of them. This doesn't mean abandoning reforestation, but it does mean thinking critically about it. We need to be open to changing our approach and, in some cases, putting our spades back in the shed and leaving well enough alone.

> Tree planting figures prominently in climate change action plans. It has obvious appeal as a low-tech, environmentally sound method of carbon capture. And it has mass appeal as a feel-good activity that just about anyone can do. But mass tree planting merits careful thought. We have an obligation to do it right, and sometimes, maybe, not do it at all.

A poster from Forests Ontario features this caption: Idle Land? Plant Trees. What a curious statement! I challenge anyone to identify "idle" land. Meadows? Abandoned farmland? Fields? Truth be told, there is no such thing as "idle land." Land devoid of trees is vibrant with plant and animal life that thrives in sun-saturated environments: grasses, goldenrods, asters, milkweeds, butterflies, bumblebees, wasps, praying mantids, grasshopper sparrows, bobolinks, meadowlarks, groundhogs, milksnakes, chorus frogs…

There can be excellent reasons to plant trees in places where they currently do not grow. But let's not pretend it's because those places are "idle." They are anything but.

Consider these questions before undertaking reforestation:

As far as can be determined, what type of habitat prevailed in the area historically?

Answering this question may provide some guidance. If historically the landscape was predominantly treed, as it was in most of southern Ontario, it could be argued that as much land as possible should be returned to that "primeval" state. In southern Saskatchewan or Iowa, restoration to prairie might be more appropriate.

However, complexity intrudes here, as it often does in ecological matters. One of the ways First Nations peoples managed the land, including the land

Photograph by Don Scallen

Shagbark hickory, a tree seldom included in planting mixes.

Photograph by Don Scallen

An Ontario meadow in September. This land is not idle but teeming with life.

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Photograph by Don Scallen

This photo shows how nearby forest can reclaim adjacent meadows without our help and in a far more natural manner.

in southwestern Ontario, was with fire. This permitted small-scale agriculture and perhaps boosted hunting opportunities by providing fodder – sun-loving herbaceous plants – for elk and deer. The legacy of forest gaps, created by First Nations people, should be considered in our landscape management decisions.

A more modern legacy needs to be considered as well. Large acreages of marginal farmland have been abandoned in recent decades. Former farmland is the source of most of the meadows in southwestern Ontario, which have become important habitat for numerous meadow or prairie animals and plants. Though anthropogenic in origin, they have become wonderful ecosystems.

What is the character of the greater landscape? Is it largely urban? Forested? Agricultural?

The land use of a region should inform decisions about tree planting. In Essex County, Ontario, which has only 8% forest cover left, the decision to plant more trees should take on greater urgency than in Halton Region, with about 22% forest cover, or Peterborough County, with over 40%.

What is the proximity of natural woodland to the site in consideration for planting?

Seeds are made to travel… by squirrels, wind, birds (in their droppings) and other means. A meadow environment adjacent to woodland will invariably grow up in trees. It may happen over a longer time period than we are comfortable with, but it will happen. The land will proceed through all the ecological stages that provide sustenance to a succession of biological communities. We sometimes demonstrate hubris in our decisions to reforest, moving ahead with the assurance that we know best. Moreover, in our haste to reforest, we sometimes spend time and treasure planting trees that will eventually appear of their own accord. Sometimes this natural regeneration is so vigorous that the trees we've carefully planted are soon overwhelmed by trees planted by nature.

Sometimes our tree planting is redundant. I recently found white cedars (*Thuja occidentalis*) planted in a Caledon, Ontario meadow, carefully protected from voles and rabbits by plastic sleeves. The meadow is immediately adjacent to a woodland full of white cedars – a casual search in the meadow revealed scores of naturally seeded white cedars sprouting vigorously. The funds and effort spent planting trees at this site could have been directed to other causes.

What is the current ecological value of the land to be planted in trees? How many species at risk are supported by the existing landscape? What plants and animals will benefit if reforestation takes place?

Undertaking an ecological assessment of an area to be planted in trees should be standard procedure. The question to be posed: What will be lost?

Consider a hypothetical reforestation at Forks of the Credit Provincial Park, an expanse of woodland and abandoned farmland in southern Ontario. The former farm has transitioned into meadow and old field habitat. If tree planting is undertaken, the at-risk bobolinks, meadowlarks and monarch butterflies that live in the meadows would gradually decline and disappear. So too would locally uncommon plants like *Penstemon digitalis* (foxglove beardtongue) and *Verbena stricta* (hoary vervain). Lost as well in reforesting the meadows at Forks of the Credit Provincial Park would be an abundance of wildflowers like asters (*Symphyotrichum* and other genuses), goldenrods (*Solidago* spp.) and milkweeds (*Asclepias* spp.) that provide rich food sources for pollinating insects and butterflies.

Of course, reforesting meadows like the ones at Forks of the Credit Provincial Park could also be seen in a positive light … if that reforestation

provided for a diverse mix of native trees. Eventually, as those trees matured, habitat would be created for salamanders, wood frogs, wood pewees, wood thrushes, trilliums (*Trillium* spp.) and hundreds of other woodland-dependent species.

It's a conundrum that requires humility on our part. We need to weigh the options carefully after assessing the existing ecology.

Is the site suitable for the planting of trees?

Most upland sites are suitable for planting trees. Floodplains aren't. And yet we do it. Floodplains are very dynamic systems, scoured by ice and high water in late winter and spring, and home to beavers, superlative ecosystem engineers.

Years ago, I witnessed the planting of aspens (*Populus* spp.) along Etobicoke Creek in Brampton, Ontario. The response from the local beavers was swift and predictable. They began harvesting the trees, prompting a costly response from the municipality: the erection of frost fencing around the aspens to keep the beavers out.

This winter I discovered that the practice of planting on floodplains continues. I hiked the Humber Valley Trail in Bolton, Ontario, and found newly planted trees protected from voles and rabbits by plastic sheathing. It didn't deter the beavers – they just cut the trees above the plastic.

If the decision is made to proceed with reforestation, we should proceed clear-eyed in the knowledge that our actions will create biological winners… and losers.

If, after careful consideration of the preceding questions, tree planting is given the green light, consider these questions to guide species selection:

Will a variety of native trees be planted?

There was a time that Scots pine (*Pinus sylvestris*) was an abundant component of reforestation projects. Now, thankfully, most trees planted are native. We recognize native trees as crucial components of healthy ecosystems. They are best at feeding the invertebrates (caterpillars and others) that in turn feed birds and other vertebrates. Having accepted the necessity of planting native, it behooves us to plant a diversity of them. Too often in the past – and even now – too few species were planted. Usually they were conifers, including white spruce (*Picea glauca*), red pine (*Pinus resinosa*) and white pine (*Pinus strobus*). There is nothing wrong with these trees, but they should be part of a greater mix. Different tree species support different insects, birds and mammals. A forest composed of 10 tree species will support greater diversity than a forest comprising only one or two.

We learned this hard-won lesson by planting only a few species along our urban streets. American elms (*Ulmus americana*) and, later, ash (*Fraxinus* spp.) died en masse, victims of Dutch elm disease and emerald ash borer respectively. Diverse forests are resilient. If one species of tree falls victim to a pathogen, there will be many other species to fill the gaps.

Will the selection of trees be constrained by cost?

Some trees are more expensive than others to plant. Oaks (*Quercus* spp.) and hickories (*Carya* spp.) cost more than mass-produced conifers like white spruce. But defaulting to the cheapest trees will reduce diversity. The more expensive trees are often less common on the wider landscape and are very important for wildlife, producing abundant mast for birds and mammals. Their leaves feed lots of invertebrates that then feed birds.

Would it be prudent to include tree species that are rare or uncommon in the local landscape?

At Terra Cotta Conservation Area in Halton Region in southern Ontario, a meadow was planted with trees – white pine and white spruce, two excellent native species – in 2000. Terra Cotta Conservation Area is

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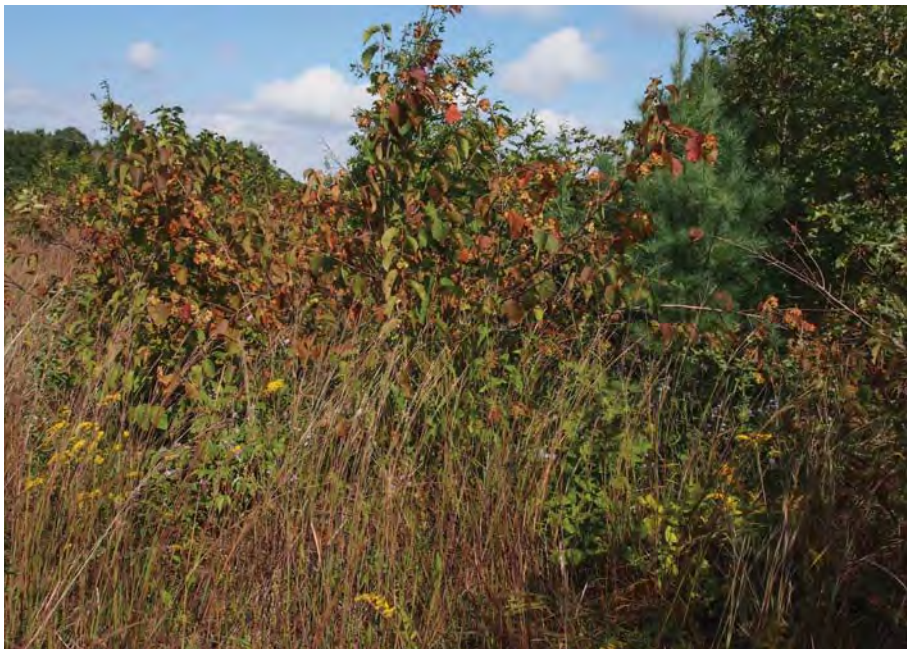

Photograph by Mary Gartshore

*At a Norfolk County restoration site, 13 years after direct seeding, American hazel (*Corylus americana*) is pictured in the centre with a black oak (*Quercus velutina*) on the right and a white pine (*Pinus strobus*) that has self-seeded. Various native grasses, asters and goldenrods also grow in this early successional habitat.*

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notable, though, for its fine example of oak and hickory woodland. With climax forest in this part of Ontario usually dominated by sugar maples (*Acer saccharum*), the oak or hickory outliers are biologically valuable. Most of the oaks at Terra Cotta are red oaks (*Quercus rubra*), but a few white oaks (*Quercus alba*) occur here, a very rare tree in north Halton Region. And shagbark hickories (*Carya ovata*) at Terra Cotta are near the northern limit of their range in this part of Ontario.

If left alone, the planted meadow would have succeeded into forest. Sun-loving oaks and hickories would likely have been part of the mix of trees to become established, their nuts planted by the resident squirrels and blue jays. That is less likely to happen now because the space where they would grow is occupied by the conifers planted in the reforestation project.

Prior to reforestation, it would have been prudent to do an inventory of the existing trees at Terra Cotta. With regionally rare trees identified, a logical action would be to include them in the planting mix, thus enhancing their populations.

Would it be prudent to include species that are not locally native?

This is a controversial proposition, but it merits consideration. We are losing trees such as beech (*Fagus* spp.) and butternut (*Juglans cinerea*) to disease and introduced insects, such as beech bark disease and butternut canker. Through their seeds and nuts, such trees feed birds and mammals. It could be argued that through our reforestation efforts we could introduce other species to increase diversity and offer food to wildlife. In Ontario this might mean planting in sites that are further north species that are now largely confined to the Carolinian region (the extreme south of the province). Such species could include swamp white oak (*Quercus bicolor*), chinquapin oak (*Quercus muehlenbergii*), hackberry (*Celtis occidentalis*) and tulip tree (*Liriodendron tulipifera*). Another possible justification for the planting of "Carolinian" trees further north is a warming climate – helping trees move into areas now climatically suitable for their growth.

In conclusion

Planting a diversity of native trees can be an excellent option for managing an open landscape, but should not be the only option. Before any large-scale tree planting is done, we should learn something about the plants, animals, birds and insects that currently occupy the site. Nature will often handle the job of reforestation better than we can. If we decide to plant trees, let's be creative and imaginative, adding regionally rare trees to the mix to bolster their populations and contribute to biodiversity. With tree planting, as in other arenas of our interaction with nature, complexity and ambiguity are givens. Large-scale tree planting needs to be guided by caution and critical thinking.

Photograph by Don Scallen

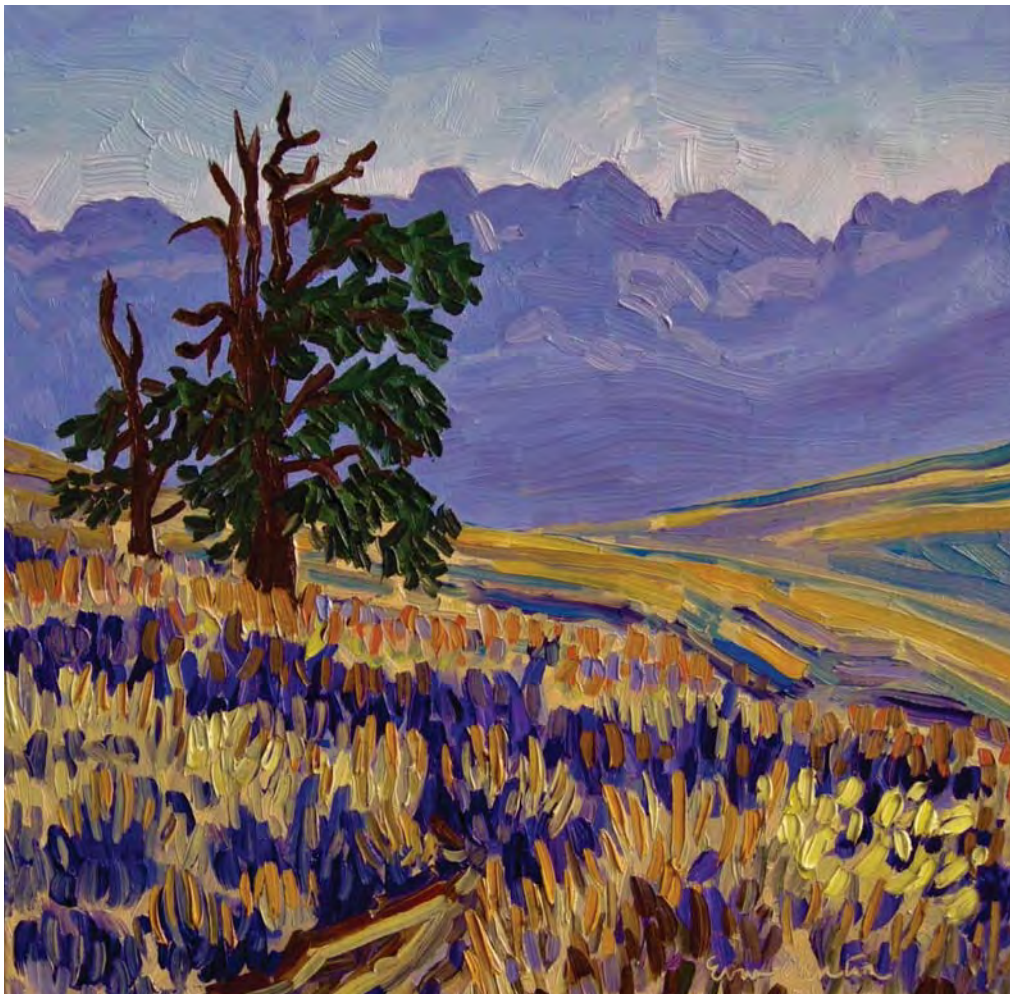
Diverse natural Ontario woodland in autumn.

Don Scallen is an educator, writer and life-long naturalist. He was smitten by trees at an early age and grows a diversity of natives in his suburban Georgetown, Ontario yard.

The Schulman Grove

by Evan Cantor

I have long harboured the ambition to visit the oldest known living individual organisms on planet Earth, the Great Basin bristlecone pines (*Pinus longaeva*) of the Schulman Grove in California's White Mountains. Some scientists believe that a particular aspen clone in the Wasatch Mountains of Utah may be 80,000 years old. Because aspens (*Populus tremuloides*) are clonal organisms, like blades of grass connected to a single root system, the claim cannot be documented. No individual creature anywhere has outlived the bristlecone pines straddling the border of southern California and Nevada.



"Grandpa", oil, 14" x 14" by Evan Cantor

The Schulman Grove is named for Dr. Edmund Schulman. A leading dendrochronologist who revolutionized the study of climate through tree-ring core analysis, he arrived at the White Mountains in 1953. Schulman's work re-created the climate history at Pueblo Bonito (Chaco Canyon, New Mexico), revealing the cycles of drought that led to the abandonment of the ancient Puebloan civilization. Convinced that dendrochronology held vital clues to the history of the earth's climate, he had been searching for the oldest trees anywhere since 1939. He had identified an 860-year-old ponderosa pine (*Pinus ponderosa*) in Bryce Canyon, Utah, and a 975-year-old piñon pine (*Pinon* var.) nearby. In the summer of 1953, Schulman identified a 1,650-year-old limber pine (*Pinus flexilis*) near Sun Valley, Idaho. Rumours of old trees led him that same summer to the White Mountains, where a ranger had located a bristlecone with a circumference of 37 feet (11 metres) at the base.

The ranger bestowed the name Patriarch upon the evidently ancient tree. This tree turned out to be "only" 1,500 years old. When Schulman examined the core of a nearby tree named Methuselah, he estimated the tree's age at 4,600 years. Later researchers felled a tree called Prometheus in 1964 and counted 4,900 rings. In 2013, a tree was thought to be 5,069 years old, but a 2017 review was unable to find the core sample, so it was taken off the rolls. Methuselah resides in the grove subsequently named for Dr. Schulman. Visitors can see it, although they may never know when they are looking directly at it. Inyo National Forest authorities refuse to publicly identify Methuselah for fear that it might be loved to death by well-meaning visitors.

The Ancient Bristlecone Pine Forest of the Schulman Grove is at an elevation of 10,000 feet (3,048 metres) on a sky-island surrounded by miles of open country above a fringe of piñon-juniper forest, itself overlooking sagebrush slopes. The approach is from a valley over 6,000 feet (1,830 metres) below, on old asphalt that novelist Jack Kerouac

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might have traversed during his adventures in the 1950s. A meandering strip of pavement narrows to one lane for a slot canyon section, then connects to an even narrower 12 miles (20 kilometres) of asphalt that winds its way round, ascending through the piñon-juniper to the crest of the White Mountains. It goes up and up. Just when you think you can't go any higher, it turns another corner and keeps going. Above the last juniper (*Juniperus* spp.), in wide open rabbit-brush (*Chrysothamnus nauseosus*) and scraggly bunchgrasses, the view reaches into a hazy infinitude. The precipitous east face of the Sierra Nevada, a mile-tall wall, looms across the valley to the west. To the south and east, far below, are hundreds of miles of desert. The view stretches across the north end of Death Valley, the lowest elevation in North America at 282 feet (86 metres) below sea-level, to Mount Whitney at 14,505 feet (4,421 metres), the highest elevation in the contiguous United States.

At the Schulman Grove, a sign indicates that if you wish to see Patriarch, the "largest" of the ancient trees, you must go further up the road to the Patriarch Grove. Other signs ask you to stay on the trail and to "respect the ancients." My wife and I had come a long way to get to the Schulman Grove and size was not the attraction. We had already seen gargantuan trees a few days earlier in Yosemite: sequoias (*Sequoiadendron giganteum*), sugar pines (*Pinus lambertiana*), with their foot-long cones, incense cedars (*Calocedrus decurrens*) and the hugest ponderosas we had ever seen.

So just how old were those trees in the Schulman Grove? Nobody can know for sure unless they start coring trees like crazy, but science makes a convincing case for the oldest of them topping out at 5,000 years. Strolling about the grove, it was rather mind-boggling to consider that the oldest of these trees had germinated during the reigns of Zoser (an Egyptian pharaoh of the third dynasty), Cheops (the Egyptian pharaoh who commissioned the Great Pyramid of

Photograph by Evan Cantor

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Photograph by Evan Cantor

Giza in the 27th century B.C.) and the legendary Sumerian king, Gilgamesh. It was astounding to think that some of these seedlings took root during the building of the Great Sphinx at Giza, the first terraced temple towers in Mesopotamia and the height of civilization in ancient Babylon, where the wheel was first used on a vehicle.

It stood to reason that trees making their home on the summits of the White Mountains would offer a valuable record of climate conditions. Dr. Schulman had initially assumed that trees growing in humid climates would live the longest, but he was incorrect in terms of both age and climatology. Sequoias, although long-lived, proved to be unreliable indicators of climate history because ground water helped them survive drought periods. He discovered that the stressful conditions found in upper-forest zones at elevation produced both the oldest trees and the most sensitive at recording cycles of wet and dry years.

At the Schulman Grove, the bristlecones grow fastest and densest on the north-facing slopes, due to the persistence of snow, which often lingers into late spring. The Great Basin bristlecone prefers the dolomite soil found at the summits to the granitic soil at lower elevations. The soil type, along with conditions at elevation, determines the lower extent of the grove. The highest summits are already the upper limit. Will global climate change cause the trees to retreat uphill? Only time will tell, but one thing is for certain: they can't go any higher up the mountain.

Great Basin bristlecones grow in three predominant forms: massive slabs, eagle's aeries and pickabacks. The massive slab trees have one great trunk. The eagle's aeries rise to numerous diverging snags. The pickabacks possess several separate trunks or stems, emerging from one central base; they could be cored straight to the heart low down on the trunk. At the Schulman Grove, we saw examples of all three. Methuselah is a pickaback tree, as was Prometheus. Upon Prometheus' demise, Methuselah gained the distinction of oldest known living thing.

But what about that monumental aspen clone in the Fishlake National

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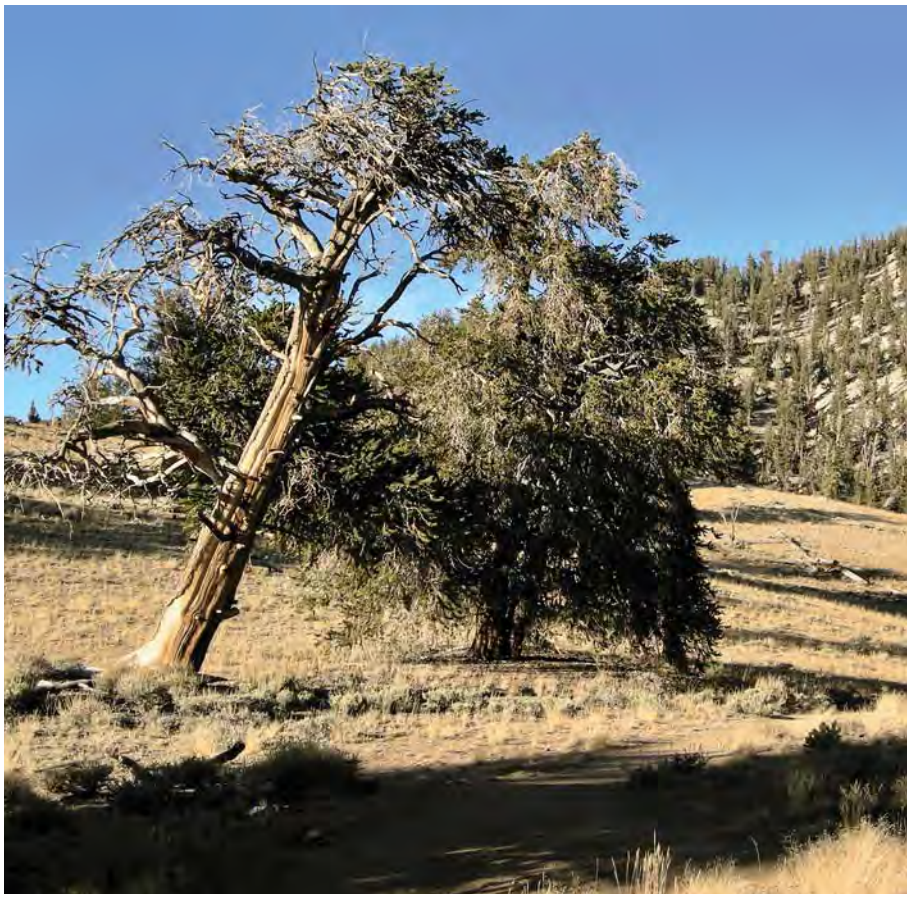
Forest, in south-central Utah? Named Pando in 1992, it is indeed a single organism. This gives it the distinction of being perhaps not only the oldest known living organism, but also the largest and the heaviest. The age of such an organism, however, cannot be determined with dendrochronological accuracy. The 80,000 years assigned to Pando is an estimate based on a complex combination of factors, all of them debatable to some degree. There are other candidates for oldest, largest and heaviest organisms, including fungal mats, ancient clonal creosote bushes (*Larrea tridentate*) and a clonal marine plant (*Posidonia oceanica*) found in the Mediterranean. So far, none of these organisms can prove their age the way Methuselah can through its tree rings.

Spending an afternoon, as we did, strolling through the Schulman Grove is a special experience. The trees' cycle of life ensures that they will not only outlive any visitor, but the foot-tall seedlings may very well be alive and thriving 5,000 years from today. It is far easier to unlock secrets from the past than those of the future. What changes on the face of the earth will the Great Basin bristlecone pines witness? Who will stand among them, as we do today, five centuries from now? It is humbling to wander among such venerable organisms, awash in child-like wonder at the existential themes proposed by these trees. Although signs request that visitors stay on the trail, we couldn't help but approach one of the old trees, treading as lightly as possible, to give it a kiss and a hug, to express our appreciation and admiration.

***Evan Cantor** is an artist, musician and occasional nature writer living in Boulder, Colorado. He and his wife Robin dedicate their Schulman Grove visit to the memory of Jim Hodgins, a dear friend and dedicated conservationist.*



Photograph by Evan Cantor

The understory

by Brenda Clews

Driftwood of innards,
ends, broken splints,
doubts, what is
torn within,
the hole in the tree.

You grow around
what you lose.

The white oak, in hundreds
of years growing, formed a crust
of bark around the gouge
like a lip.

Sometimes you hide
the loss under scars;
sometimes you can't.

But you manage.

Your trunk forks
and you grow split
but strong
above the fissure.

The imbedded burl,
a keyhole
into a landscape
of ridges and precipices,
shaggy crevices
for insects and small birds.

A churning inner ocean
frozen in wood,
like a slow mass of
memories
that flicker and fly.

***Brenda Clews** has written* the luminist poems *(a chapbook),* Tidal Fury *(a poetry collection) and* Fugue in Green *(a novella). Her poem,* The understory, *was originally published in* Heartwood *(League of Canadian Poets, 2018).*

Continued from page 1 – **Cranefly Orchid**

floor scoured by recent heavy rains! Two perfect white corms with roots interwoven were perched on bare, moist soil. Rain torrents had rushed through the narrow dell between steep slopes. Nearby, the exposed soil was covered with white fungi, mycorrhizae.

Several days later, as I turned into my driveway, I could just see the tiny tips of leaves peeking through leaf litter on a low slope. Braking, I looked more closely: within a few feet of my driveway were dark green leaf tips unfurling! I had found a new site for *Tipularia* that I could easily monitor. A few days later, I spied another group of cranefly orchids, on a steep bank some distance away! I managed to get a photo of a woolly bear caterpillar munching a flower lip. The caterpillar was gone the next morning, but the flower remained to seed.

When searching for August-blooming cranefly orchids, it can be helpful to know that the species often lives alongside other orchids such as the spring-flowering puttyroot (*Aplectrum hyemale*) and the fairly common rattlesnake plantain (*Goodyera pubescens*). Within a year of my move, I discovered other flowering orchids in the dell: showy orchis, also known for obvious reasons as purple-hooded orchid (*Galearis spectabilis*); lady's tresses (*Spiranthes* spp.); lady's slippers (spectacular members of the Cypripedioideae subfamily); large twayblade (*Liparis liliifolia*); an autumn coral root (*Corallorhiza odontorhiza*) colony as well as various ferns downhill from my porch.

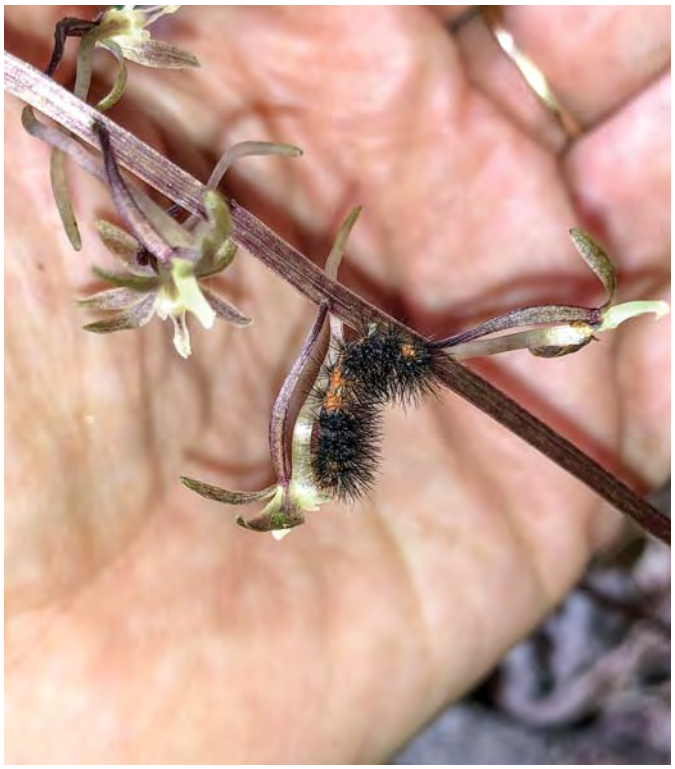
The genus name *Tipularia* originates from the flowers' similarity in appearance to members of the cranefly insect family, *Tipula. Discolor* refers to the orchid's two-coloured leaf. *T. discolor* is the only North American species of the genus *Tipularia*. It is, luckily, plentiful throughout my home state of Virginia, from coast to lower altitude mountains. It ranges in the southeastern United States from Texas to Florida and north to the Catskills.

The plant's four sites in Michigan's Berrien County are considered endangered and are being monitored. The few remaining plants in New York and New England have similar status.

With 800 genera and 22,000-35,000 species, Orchidaceae is one of the largest families of flora. Orchids have devised unusual pollination methods over eons. Many rapidly occurring modern threats to their survival – habitat loss, pollinator decline, herbicides, weather extremes and the Plant blindness of *Homo sapiens* – may be preventing the species from evolving as it would naturally. On a more hopeful note, a warmer climate might help *Tipularia discolor* reach Canada before another eon has passed.

PHOTOGRAPH BY NICKY STAUNTON

Tipularia *leaves peeking through leaf litter on a low slope*



PHOTOGRAPH BY LOU STAUNTON

A wooly bear caterpillar predator on a stem of cranefly orchid flowers on August 10, 2019 in Novum, Virginia.

***Nicky Staunton** has been an advocate for keeping native plants in their natural habitats since 1982, when the Virginia Native Plant Society began conserving wildflowers and wild places. She was a director for the Flora of Virginia Project.*

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