The Blazing Star

Summer 2006, Volume 7, Issue 3

Newsletter of the North American Native Plant Society

Native Plant to Know

Pickerelweed

(Pontederia cordata)

by P. Allen Woodliffe

I first encountered pickerelweed as a summer student at Rondeau Provincial Park on the north shore of Lake Erie. I was exploring Rondeau's huge coastal marsh looking for plants to use in an interpretive display. Among the large stands of cattail *(Typha* spp.*)* were channels where the water was deeper, allowing me to paddle my canoe more easily. However, within these open patches were clusters of emergent vegetation that slowed my progress – much to my delight. The dark green, shiny, heart-shaped leaves in combination with a robust spike of delicate, richly-coloured, bluish-purple flowers left an indelible impression on me. My field guide to wildflowers identified this gem of the wetlands as *Pontederia cordata.*

Pickerelweed is a perennial and a member of the water-hyacinth (Pontederiaceae) family. The genus '*Pontederia*' was named in honour of Giulio Pontedera (1688-1757), a botany professor in Padua, Italy. The species name '*cordata*' refers to the cordate or heart-shaped leaves. The common name pickerelweed was given to this striking plant as it was believed that the wide leaves shading the water below provided good habitat for fish. Adding support to this idea is the fact that in the Ojibway language pickerelweed is known as 'kinozhaeguhnsh' or pike's plant.

Pontederia cordata is typically, and sometimes abundantly, found in freshwater streams, ponds, marshes or around the shallow, muddy edges of small lakes. Its native range extends throughout the U.S. and southern Canada east of the Rockies, although it is more common east of the Mississippi. It grows south as far as Argentina.

The plant can be over a metre (four feet) tall, although it is often in water half a metre (two feet) or more deep so it appears shorter. Its long green stem leads downward and is anchored to a rhizome in the soft mud and organic material of slow-moving or still water. The leaves, which can be up to 25 centimetres (10 inches) long and 15 centimetres (six inches) wide, are often fairly upright, but may be more horizontal and almost floating on the water. Frogs use the

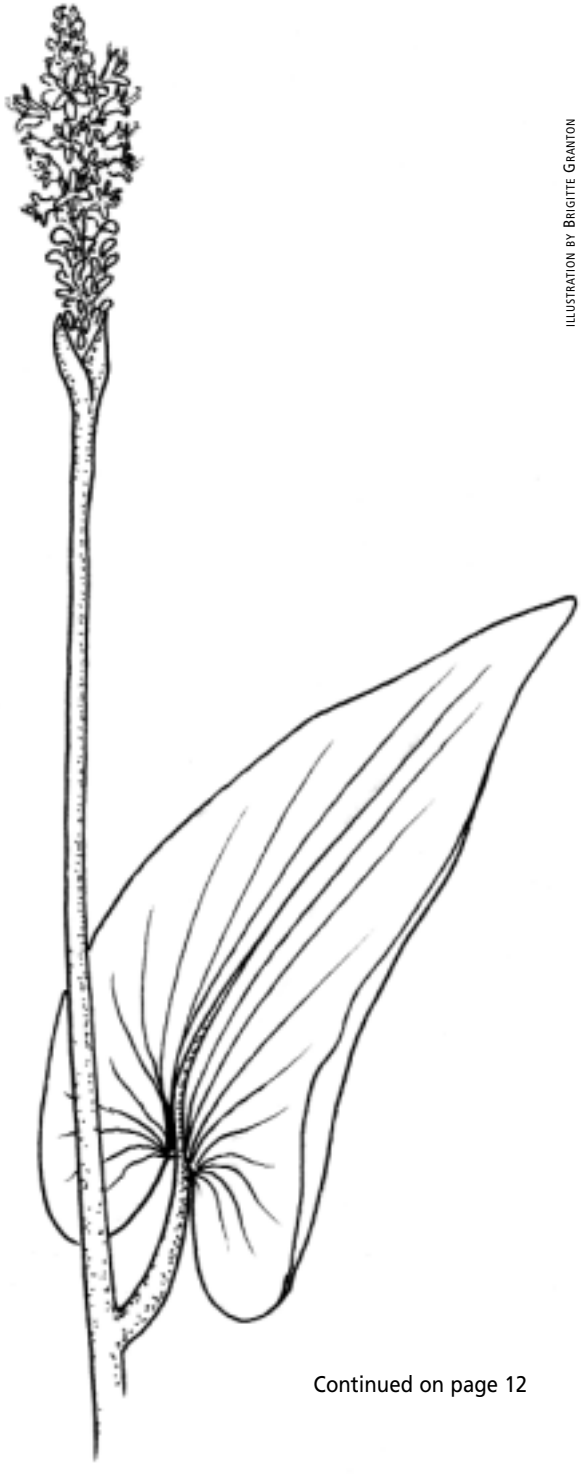

Illustration by Brigitte Granton

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The *Blazing Star* is . . .

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NANPS Annual Plant Sale

On May 6th NANPS once again hosted its fundraising plant sale, this time in the beautiful Markham Civic Centre Atrium. Thanks go out to the Markham councillors, especially Erin Shapero, who went to bat for NANPS and got us this lovely space.

Along with a spectacular selection of wildflowers, shrubs, trees, ferns, vines, grasses and sedges we were fortunate to have The Forest Bookshop with its vast collection of books on native plants. Oak Ridges Moraine Land Trust and the Toronto Green Community also had booths. Free seminars were presented by Frank Shaw, Janet May of the York Regional Environmental Alliance and Natalie Helferty.

A huge thanks to all the volunteers who helped with the sale and without whom the sale would not have come to fruition (we always need more volunteers for the sale itself and set-up the day before, so please consider joining us next year).
This year's plant sale committee was a fun and hard-working lot - Tom Atkinson, Grif Cunningham, Eva D'Amico, Deb Dale, Monica Dennis, Greg Hagan, Miriam Henriques, Howard Meadd, Stacey Shannon & Howard Smith. A special thanks to Miriam who chaired the plant sale committee for the second year in a row (and she's volunteered to do it again in 2007. What a woman!). It's a huge job and she did it with her usual quiet dedication and grace. Thanks also to growers Paul Heydon and Paul Morris who stayed on and offered their expertise at the sales tables.

We had a very successful sale this year but as we know all the planning in the world doesn't guarantee that those little unforeseen bloopers don't occur- like a broken elevator on the day of the sale, advance sales room not quite ready… Things don't always go perfectly but we try, folks.

It was great meeting and chatting with the folks of Markham and beyond. It's exciting seeing someone happily walking away with a native plant they have been looking for or one they just learned about at the sale. A heartfelt thank you for supporting NANPS! This sale allows us to do the good deeds we do in the name of native plant conservation.
Hope to see you all at next year's sale.

Monica Dennis

NANPS ANNUAL GENERAL MEETING

Saturday, September 30, 2006

1 PM – 5 PM
Markham Civic Centre,
101 Town Centre Blvd., Markham
(north of Hwy 7, west of Warden)

- election of 2006 Board of Directors. If you are unable to attend the AGM you may submit a written proxy to a member in attendance or a member of the executive prior to the meeting
- presentation of the 2006 Paul McGaw Conservation Award
- plant sale and seed exchange
- refreshments served

Native plant propagator and nursery owner Paul Heydon will give a fascinating talk on how to propagate native plants and he will stress the importance of using local genotypes.

Remember to bring your excess plants and collected seeds for the exchange!

Letter to the Editor

Catherine Siddall's article on *Chionanthus virginicus*, or Fringe tree, was a delight. She writes well, in ways compelling the reader to go find such a tree, or learn more about it. I would add 2 points at this time:

1. Fringe trees are both male and female. Therefore, your chances of getting seed depend in large measure on your having, or knowing where there are, adjacent male and females trees.
2. It is reputed that the male Fringe tree produces superior flowers (but, of course, no seed).

Tom Atkinson

Goldenrod and its Visitors

by Jim Dyer

If there's anything that tells me that summer has hit its peak, it's the appearance of goldenrods in late July. Although all 125 species of the genus *Solidago* are native to North America, many gardeners consider it to be a weed. A tenacious perennial that can form thick, tall vegetative patches, it thrives in poor soil for decades. Goldenrods are members of the Composite or Aster Family known for the floral clusters that appear like individual flowers. Hay fever sufferers often blame goldenrod for their sneezing but it cannot be held responsible since its pollen is just too heavy to blow in the wind. All species of goldenrod attract hordes of pollinating insects and their predators.

Since 2003, I have spent many summer days stalking bugs as part of an initiative by Environment Canada (EC) to engage volunteer observers in monitoring wild insect pollinators. Pollination is an intimate relationship between flowering plants and foraging insects. Without it, major ecological collapse would occur. Due largely to human-created stresses such as pollution and habitat destruction, there is concern that the pollination community may be experiencing decline. Numerous volunteer observations would help us understand how pollinators are faring. It would also be useful to better understand insects that prey upon the pollinators and EC is now considering whether volunteers should report predator sightings as well. I was enlisted to suggest possible guidelines for this extra reporting.

I found clumps of Canada goldenrod *(Solidago canadensis)* to be my best site for making this assessment. Goldenrod is especially attractive to a predator known as the ambush bug. This was not a survey in the strictest sense, and I did not attempt to measure the spatial density of pollinators or predators. What I did was to count how many and what types of pollinating insects were found on the goldenrod in the 10 minutes after I saw an ambush bug. The numbers were impressive.

In the seven sunny days between August 24 and September 12 last year that I visited 25 clumps of goldenrod in Cambridge, Ontario, I counted a total of 57 ambush bugs and 274 foraging insects of all types, including 75 bees, 84 wasps, 25 flies and 88 beetles (with an average daily ratio of pollinators to ambush bugs of 6.8). Beetles, wasps and ambush bugs appeared in large numbers one day and were mostly absent on others. Ambush bugs were remarkably common and easy to spot since I usually found them on any healthy clumps of goldenrod where foraging pollinators could be seen. There were always plenty of small wild bees. During the entire observation period I saw only two small white butterflies. While butterflies beautify the garden, as pollinators they are not as effective as wild bees and hover flies. Butterflies forage less frequently and do so with a long thin tongue to which pollen is unlikely to stick.

PHOTO COURTESY JIM DYER

Even as she is being courted, this female ambush bug is capturing a black blister beetle.

Among the 57 ambush bugs, I counted 10 mating pairs, which suggests that the other 15 to 20 males were after mates, rather than prey. This leaves much more prey available to females. I observed four kills. An ambush bug snatches an insect by a leg or antenna and grips it relentlessly waiting for the insect to tire. After a few minutes it reels its victim in, stabs it and sucks its insides out through its beak. Female ambush bugs continue hunting even during courtship. They are astonishingly efficient hunters, succeeding in 95% of their attacks. I even saw a much larger yellowjacket (itself a predator) succumb to an ambush bug.

Most people are not fond of the aggressive Canada goldenrod. In fact, some native plant nurseries are fighting a war against this species because it so easily overwhelms more delicate plants. But there's no doubt that *Solidago canadensis* is an important pollinator food source, and it offers us a fascinating glimpse into the world of pollinating insects and their tiny, ruthlessly efficient predators.

Jim Dyer is a consultant working on agro-environmental issues. He is currently developing a volunteer pollinator-monitoring program for Environment Canada.

WANTED: SEED DONORS

The seeds of *Aquilegia canadensis*, *Geum triflorum* and *Penstemon digitalis/hirsutus* are ready and waiting to be carefully set aside for the NANPS seed exchange. Please don't disappoint your plants, who have invested their energy so that their progeny will flourish in someone else's garden.

Don't delay. Send today. Seeds can be mailed to NANPS, Box 84, Station D, Etobicoke, ON M9A 4X1, or stored for the NANPS AGM.

"D germinators" (hydrophilic woodlanders with early seed dispersal) should not be stored in the refrigerator, but rather kept bagged in damp vermiculite.

Meadowlily Butterfly Habitat Restoration

by Stan Caveney and Jane Bowles

Early this summer, lit by the late afternoon sun, an old-field meadow in the Meadowlily Nature Preserve was a whirl of freshly-hatched common inornate ringlet butterflies. The numerous ringlets appeared to be constantly in motion, together with northern crescents and a few other species of butterflies flying quickly between the flowers of common fleabane *(Erigeron philadelphicus)* and bramble *(Rubus* spp.*)*. Butterflies often emerge in a synchronized fashion, and the day's ringlets provided a good example. Skimming dragonflies exploited the bonanza of flitting butterflies by plucking them out of the air. One ringlet photographed flew off and seconds later became dinner for a clubtail dragonfly. Although sun-filled meadows offer a wide range of grasses, rushes and shrubs as food for the small caterpillars of skippers, blues and some smaller brushfoots, this habitat lacks many of the food plants required by the larger caterpillars of our spectacular native butterflies, such as swallowtails and larger brushfoots.

The Thames Talbot Land Trust (TTLT) decided to address this issue in the Meadowlily Nature Preserve, a natural area of just under six hectares secured by the Trust in 2002 through a private donation. The site is part of the Meadowlily Woods Environmentally Significant Area (ESA) in London, Ontario and consists of a section of Thames River shoreline, an old-field meadow on a former floodplain terrace, a previously manicured lawn and a forest incorporating a meandering ravine. The Management Plan calls for renaturalization of the manicured area and enhancing butterfly habitat. Conventional butterfly gardening is clearly inappropriate in a significant natural area, where the emphasis needs to be on maintaining ecological integrity by using native species adapted to the local conditions.

TTLT is planning two very different approaches. In the manicured area, where the long-term objective is to recreate native forest, we are concentrating on encouraging trees that are food plants for native butterflies. Furthermore, since deer browse is a problem, we plan to use direct seeding to populate the site. This more closely mimics - but will speed up - the natural processes that would occur if we left the area alone. Site preparation will involve removing the sod-forming lawn grasses and the spreading large amounts of seed of the chosen trees. The principle is that if large numbers of seedlings are present some will survive the onslaught by deer, but the cost per plant will be kept to a minimum. Volunteers will collect all the seed in the London area. Training is to be provided by the Forest Gene Conservation Association through a Seed Collectors' certification course.

Butterfly caterpillars might be termed fussy eaters. Most exploit a very restricted set of food plants and their dietary needs are an essential consideration in butterfly restoration projects. But why are they such specialist feeders? One likely explanation is provided by the host plant's defensive chemistry. Many secondary chemicals stored or exuded by plants are strong feeding deterrents, or even toxic. The cardiac glycosides produced by milkweeds *(Asclepias* spp.*)* and dogbanes (*Apocynum* spp.), for example, are normally extremely toxic to insects (and humans!). Yet monarch (milkweed) caterpillars are able to tolerate high glycoside levels because they make the caterpillars distasteful to birds and other vertebrate predators. The negative effects of toxins on the health of a caterpillar are balanced by the increased odds of not being eaten and thus reaching adulthood. Similarly, viceroy and mourning cloak butterflies (and other large brushfoots) are able to feed on willow *(Salix* spp.*)*, aspen and cottonwood *(Populus* spp.*)* because they are able to tolerate the high salicylic acid content of the leaves. The host plant selectivity seen in many caterpillars may be the result of the long-term "co-evolutionary battle" waged

Photo courtesy Stan Caveney

Gomphid dragonfly eating an inornate ringlet butterfly at Meadowlily Nature Preserve

between the chemical arsenal produced by the host plant and the ability of caterpillars to neutralize it. Giant swallowtail caterpillars feed mainly on plants in the Rutaceae (citrus) family, such as prickly-ash *(Zanthoxylum americanum)*. This family synthesizes similar distasteful, even toxic, aromatic oils and photosensitive toxins. Most swallowtail caterpillars store the pungent aromatic oils obtained from their host plants in a special gland behind their heads, and when provoked, release them into the air. Unlike monarch butterflies, which later use the dietary toxins acquired as caterpillars as defensive chemicals, our local swallowtails do not retain these aromatic deterrents into adulthood. Instead they rely on being able to mimic the appearance of other distasteful butterflies to escape predation by birds.

Other chemical compounds made by plants serve as rendezvous signals for courting butterflies (i.e. help a butterfly find a mate) and also trigger egg-laying behaviour in mated females. Before laying her eggs, the female scrapes her forelegs on the surface of a leaf to confirm that a host plant detected from afar (by sight and scent) is indeed suitable food for her caterpillars. This "drumming" behaviour brings chemicals on the leaf's surface into contact with receptors on the tips of the female's legs. Unlike moths, butterflies usually lay only a few eggs on individual plants, so that the leaf damage caused by feeding caterpillars is less noticeable to predatory birds. As a side benefit, the impact of feeding is less stressful to the host plant. Female butterflies even appear to be able to sense when another female has laid her eggs on a food plant, and move on to find another one.

Eventually Meadowlily Nature Preserve will have a range of vigorous young plants to offer up to the ravages of caterpillars. The dominant trees in the mature upland forest currently include sugar maple *(Acer saccharum)*, black cherry *(Prunus serotina)*, white ash *(Fraxinus americana)* and American beech *(Fagus grandiflora)*. Although these species do not host many butterflies, they are used by a good variety of moths. We shall enhance the butterfly habitat merely by choosing among other species already on offer at the preserve (see Selected Butterfly Plants list on page 6) without resorting to the ecologically dubious practice of introducing new species to the margin of the natural woodland.

In the meadow on the floodplain terrace we will be using a different strategy. The area is flanked by a mixture of early- to mid-successional trees such as hackberry *(Celtis occidentalis)*, black walnut *(Juglans nigra)*, basswood *(Tilia americana)*, cottonwood and big-toothed aspen (*Populus deltoides* and *P. grandidentata)* and Manitoba maple *(Acer negundo)*. We want to maintain the area as an open meadow, with the grasses, sedges, common milkweed *(Asclepias syriaca)*, and other food plants that are already there and simply enhance some of the plants that provide nectar for adult butterflies and other insects. Again, we will use what is already present, but increase the abundance of native butterfly plants by planting plugs of selected species. In the fall, the meadow will offer goldenrods *(Solidago* spp.*)* and asters *(Aster* spp.*)* as rich sources of nectar for migrating monarchs as well as for butterflies preparing to overwinter, such as mourning cloaks and red admirals. Butterflies may not be important flower pollinators, but they add drama and spectacle to a meadow.

Meadowlily Nature Preserve has a well-maintained trail and is open to the public during daylight hours. TTLT plans to host demonstrations on how to create butterfly-friendly habitat with local native plants.

Stan Caveney is a freshly-minted emeritus professor in entomology at the University of Western Ontario. His passion is in preserving and restoring the diversity of Carolinian Forest habitat along the north shore of Lake Erie. Jane Bowles is a freelance botanist and ecologist, director of the Sherwood Fox Arboretum at the University of Western Ontario and curator of the UWO Herbarium.

Thames Talbot Land Trust

Canada's "Deep South", the Carolinian Zone, lies north of Lakes Erie and Ontario, south of a hazy line stretching from about Grand Bend to Toronto. The region includes less than one percent of the landmass of Canada, but more than 25% of the human population and one third of the species at risk. Before the massive clearing of forests that took place following European settlement, most of the land was forested. Now it contains urban areas and transport corridors crisscrossing some of the best agricultural land in the world. Forest fragments occupy about 10% of their former spread. Much of this region is under private ownership and there is little formal protection for the remaining natural features.

The Thames Talbot Land Trust – one of 34 private land trusts in Ontario - is playing a pivotal role in conserving and restoring the landscape. TTLT's objective is to protect lands and waters of ecological, agricultural or cultural value through land acquisition, conservation easements, landscape restoration, education and other mechanisms. Both the geographical context and cultural heritage of the Thames River watershed and the historic Talbot Trail are expressed in the name of the Trust, which focuses its activities in London / Middlesex and Elgin County regions.

Selected Butterfly Plants

Woody Plant	Caterpillars feeding
Dogwoods *(Cornus* spp.*)*	Spring azure
Basswood *(Tilia americana)*	Eastern tiger swallowtail
Bitternut *(Carya cordiformis)*	Banded hairstreak, hickory hairstreak
Black cherry *(Prunus serotina)*	Eastern tiger swallowtail
Blue beech *(Carpinus caroliniana)*	Eastern tiger swallowtail
Choke cherry *(Prunus virginiana)*	Eastern tiger swallowtail
Eastern cottonwood *(Populus deltoides)*	Eastern tiger swallowtail, viceroy, red spotted purple
Elms *(Ulmus* spp.*)*	Question mark, mourning cloak
Gooseberry *(Ribes cynosbati)*	Grey comma
Hackberry *(Celtis occidentalis)*	Hackberry butterfly, mourning cloak, question mark, snout, tawny emperor
Hawthorn *(Crataegus* spp.*)*	Red spotted purple
Shagbark hickory *(Carya ovata)*	Banded hairstreak, hickory hairstreak
Spicebush *(Lindera benzoin)*	Spicebush swallowtail
Willows *(Salix* spp.*)*	Acadian hairstreak
Wood nettles *(Laportia canadensis)*	Eastern comma, Milbert's tortoiseshell

Herbaceous plant	Caterpillars feeding
Canada wild rye *(Elymus canadensis)*	Wood nymph
Common milkweed *(Asclepias syriaca)*	Monarch
Dogbanes *(Apocynum* spp.*)*	Monarch
Field pussytoes *(Antennaria neglecta)*	American painted lady
New England aster *(Aster novae-angliae)*	Northern checkerspot, pearl crescent
Turtlehead *(Chelone glabra)*	Baltimore checkerspot
Violets *(Viola* spp.*)*	Great spangled fritillary

Unlikely Allies:
Cacti in the Human Sphere

by Zoe Dalton

Sometimes it isn't the prettiest plant that most inspires admiration, but the most tenacious, the one that thrives even in the toughest conditions. Such are the spiny, lumpy, bumpy, often portly cacti, some of the hardiest floral specimens out there.

In their home environments, these remarkable plants contend with conditions intolerable to most flora, including extended droughts, intense sunlight, drying winds, dramatic temperature fluctuations, and poor soil. To deal with these unfavourable conditions, cacti have evolved specialized features, some of which make them very difficult to harvest. Despite these challenges, prehistoric humans discovered the plants' value and learned to make the most of them.

Native almost exclusively to the Americas*, cacti (members of the Cactaceae family) are found in such diverse locations as British Columbia, Arizona, Patagonia and southwestern Ontario. Wherever they occur, they have proved invaluable as sources of food, building materials, medicines, and other resources. Evolved from woody jungle plants, cacti exist today in a great diversity of morphological forms: from the 12-metre (40-foot) saguaro *(Carnegiea gigantea)* of the Sonoran desert to southwestern Ontario's low and spreading eastern prickly pear cactus *(Opuntia humifusa)* to the tropical *Pereskia* genus of leafy trees, shrubs and vines.

Of the 2,000 or so cactus species classified, the most ethnobotanically relevant may be members of the *Opuntia* genus. Known broadly as the prickly pear cactus or cholla, *Opuntia* species are found throughout the Americas with three in Canada.

Like most cacti, *Opuntia* have well-developed mechanisms for absorbing and retaining water when it becomes available, and for minimizing its loss once stored. Thus in the arid regions where *Opuntia* are found, their basic service to humans (and other thirsty fauna) has been the provision of water. After carefully de-spining the fresh cladodes or pads using bunches of grass or other methods, aboriginal peoples pounded the cactus to release a sweet juice. With a moisture content as high as 90% the cladodes can be significant sources of water.

Survival in arid ecosystems requires adaptations of two factors fundamental to plant life – heat and moisture. The succulent stem has become the be-all and end-all in the cactus world. Made of tissues specially modified for water storage, this organ serves the cactus through dry periods, efficiently swelling with water when this resource becomes available, and storing it for periods when external moisture is in short supply. Roots positioned close to the soil surface assist this process by ensuring that even minimal rainfall is captured and sent up to the water-storage tissues for later use.

The green cactus stem has also taken over from the leaves as the primary location for photosynthesis. (Leaves on most cacti have been modified over evolutionary time, now existing as spines which serve the plant by deterring herbivory, deflecting incoming solar radiation, and, in combination with the downy hairs found on the stem, trapping a layer of air close to the epidermal surface to regulate temperature and decrease moisture loss via air movement). Unfortunately for the water-conservationist cactus, the most basic of all metabolic processes, photosynthesis, includes the process of transpiration. Given cacti's need to minimize moisture loss, the plants' stomata (those tiny epidermal pores which allow for gas exchange during photosynthesis) have developed the trick of opening at night rather than during the day as most plants do.

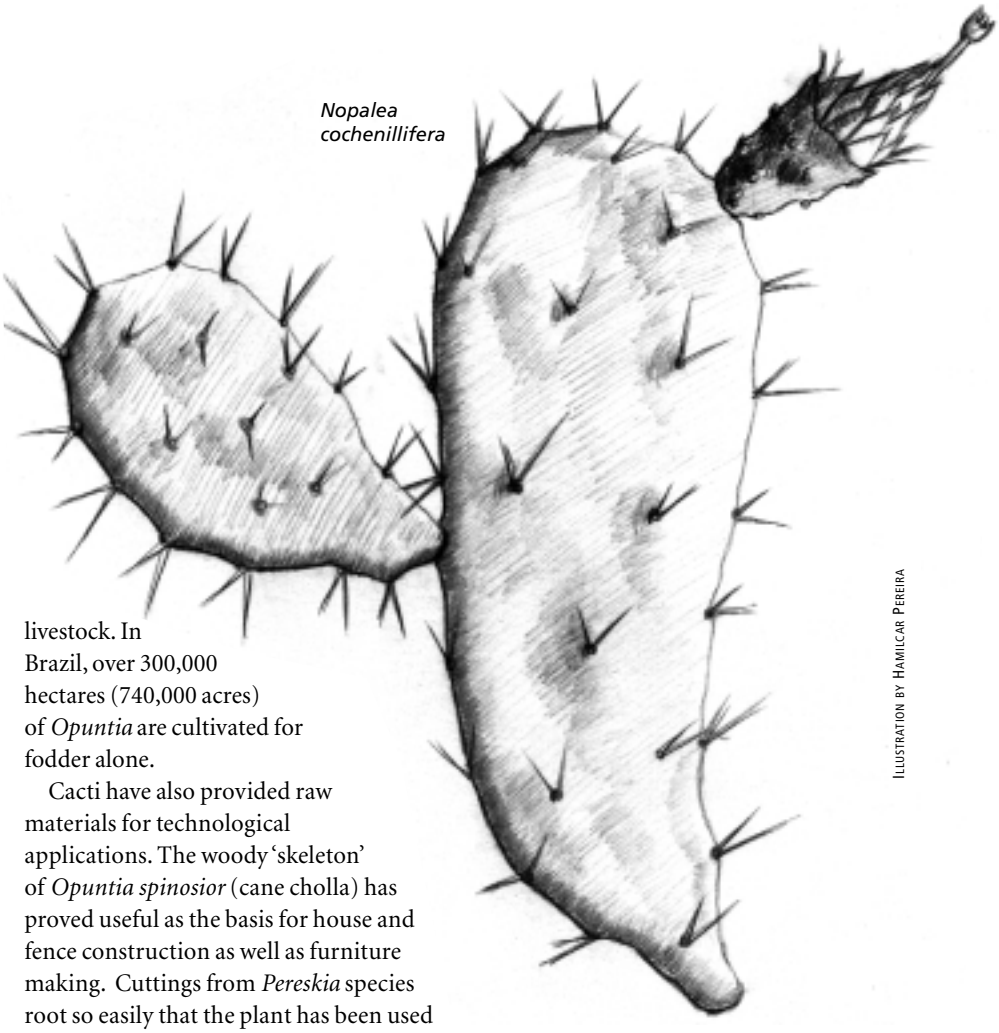
* *Rhipsalis baccifera* is the one exception, occurring in tropical regions of both the new world and the old.

Cooler nighttime air is much less drying than hot daytime air.

But cacti are much more than watering holes. Their fruits, often conspicuous and brightly-coloured, have been prized for both their flavour and nutritional value by people throughout the Americas for thousands of years. The fruits of *Opuntia* species are said to vary in flavour from that of strawberries to watermelons to figs. First peoples of Mexico and the southwestern United States made full use of the fruit of various cactus species, eating the rind, pulp, and seeds. Seeds were often dried in the sun and ground for later use as a nutritious gruel. Given cacti's often significant spines, gathering the fruit presents some real challenges. Long forked sticks were often used by the gatherer to avoid being impaled.

Several cactus species have been considered useful in treating physical disorders. For example, the Hopi chewed the cholla's root as a treatment for diarrhea; the Blackfoot used *Opuntia* fuzz to treat warts; and some 19th century doctors treated wounds with baked *Opuntia* cladodes. Today, cacti such as *Selenicereus grandiflorus* (night-blooming cereus) are being processed for use in homeopathic remedies to treat ailments ranging from urinary tract infections to heart disease. Tribes such as the Navajo have great respect for the prickly pear cactus, with culturally-embedded taboos and prohibitions regarding the plant's use, as well as special ceremonies related to its harvest.

Opuntia plants have been domesticated and grown in family-controlled plots since 3,000 BC. Their importance in Mexico and the southern US remains significant. Today, over 250,000 hectares (over 600,000 acres) of plantations can be found in Mexico alone. *Opuntia* cultivation generates over $50 million in revenue each year with tens of millions of dollars in *Opuntia* products exported to Europe and Asia annually. The scale of cultivation today, and the plants' economic importance, are due not only to human consumption of the cladodes and fruit of cacti, but also to the fact that *Opuntia* is an excellent fodder for livestock. In Brazil, over 300,000 hectares (740,000 acres) of *Opuntia* are cultivated for fodder alone.



Nopalea cochenillifera

Illustration by Hamilcar Pereira

Cacti have also provided raw materials for technological applications. The woody 'skeleton' of *Opuntia spinosior* (cane cholla) has proved useful as the basis for house and fence construction as well as furniture making. Cuttings from *Pereskia* species root so easily that the plant has been used to create impenetrable living fences. The mucilaginous properties of boiled cactus pulp have led to its use as an adhesive (e.g. in ensuring that whitewash adheres to walls). *Nopalea cochenillifera* (nopal cactus) was highly valued for centuries because it is the host for the cochineal insect that could be processed into a much sought-after red dye.

Like many introduced organisms worldwide, various *Opuntia* species have become serious pests in far-flung locations such as Australia and parts of Africa. Roaming livestock and wildlife consume the cactus fruits and spread the seeds across broad areas; the result has been cactus infestations across millions of hectares of land. Australia has been fortunate in that its experimental introduction of the cactus moth (a natural *Opuntia* predator in South America whose larvae dine on the cactus) has brought the *Opuntia* infestation down to manageable levels – without leading to an infestation of the moth species.

In cacti's home range the opposite problem exists: there is concern regarding population declines among certain species. The *Opuntia* of southwestern US and Mexico are now threatened by the northward movement of the cactus moth, and populations of these plants could be decimated by the insect's arrival. In southern Ontario the eastern prickly pear cactus is listed as a species at risk due to human disturbance (trampling and collection from the wild) in its limited range and invasion of its habitat by woody plants .

The story of the cactus is a familiar one for North American botanists, bringing together the significance of plants in human culture and history, the potential invasive nature of species introduced to exotic locations, and the threats that natural and anthropogenic changes can pose to wild populations.

Zoe Dalton is a freelance nature writer. Her husband, illustrator Hamilcar Pereira, is a digital sculptor.

A Minnesota Neighborhood Goes Native

Photographs courtesy Joanna Eckles

Goldfinches collect seeds from Gallardia aristata *that blooms all summer long in this Stillwater, Minnesota garden.*

by Joanna & Klay Eckles

Our native plant lust began slowly. We could probably attribute our original conversion to a "Meadow in a Bag." That sly marketing pitch 15 years ago put us on the road to natives. Never mind that none of the plants were native or suited for long-term survival in Minnesota. That realization hit a couple of seasons later – there is a real difference between wildflowers and natives.

We started over after acquiring some basic knowledge and a good custom seed mix from a local native nursery. Initially we thought this too had failed, but after a year it was clear that the process of establishing a prairie required a different timeframe to measure success. The native plants eventually thrived where our instant meadow fizzled – both growing and learning were an evolution. When we moved to a new suburban home we got right to work on big prairie plans.

Our plans were well underway when we heard about a Minnesota Department of Natural Resources (DNR) program called Neighborhood Wilds. The DNR had funds available for neighborhoods willing to work together to plant natives. It was a great concept – working across property boundaries to create corridors of native habitat that no single family could accomplish on their own. Our neighborhood was new, the sense of community was very high and many people were still getting their bare lots established. We were excited by the prospect of breaking out of the paradigm of mowed grass and repetitive gardens of the same dozen hybridized nursery plants.

We set a meeting date and circulated a newsletter explaining the grant program. Our chances were good. The wetland and trout stream adjoining our neighborhood were a priority habitat for the DNR. The offer of free plants would pique the interest of our neighbors, but many also had a genuine interest in environmental issues and moved here in part because of the creek and natural area. Meetings continued and we determined who was interested and on what level. We had a record 15 of 19 families on board when we applied for the grant in the winter of 2001-2002. Our efforts were rewarded that spring with a US$15,000 grant.

Our final project had several components, all designed to enhance water quality in the wetland and creek and to provide habitat for wildlife. A primary goal was to increase the existing buffer between the neighborhood and the creek. This was accomplished by first killing a good portion of sod. We seeded a native prairie mix directly into the dead sod, eliminating the fear of erosion. We also removed willows *(Salix* spp.*)*, reed canary grass *(Phalaris arundinacea)*, thistles *(Carduus* spp.*)* and other invasive plants along the buffer edge and reseeded it with a wetland edge mix.

To catch runoff going to the street and increase the connections between the seeded back buffer and the rest of the neighborhood, we discussed the idea of planting the front boulevards (the area between sidewalk and street) with native plants and establishing native gardens in front of and between houses. Despite concerns about the effects of plowing, snow load and salt, the idea quickly spread and became one of the highlights of our finished project. In all over 15,000 native plants now link the entire neighborhood along the boulevards and in gardens. In most cases, these gardens were planted across property lines – an accomplishment and level of cooperation rarely seen in urban or suburban neighborhoods. Eight families planted all or part of their boulevards in natives and six families joined together to form beautiful communal gardens all at the expense of lawn grass. These areas have thrived despite the pressure of Minnesota winter road maintenance.

We learned a lot that could help future crusaders in the native landscaping movement. Although the neighbors were interested in environmentally sound landscaping, and were highly motivated

Boulevard planting of Tradescantia ohiensis, Campanula rotundifolia, Geum triflorum, Heuchera richardsonii, Amorpha canescens...

by the potential grant money, it became clear early on that there was a formidable knowledge gap. This deficit would prove to be our greatest foe. The age-old teachings of our parents and decades of toiling at turf grass and vegetable gardens did not provide a basis for jumping into native landscaping.

We knew this would be a challenge, and our plans included numerous ways for participants to learn the basics. We had handouts, books, seminars, and visits from local experts. Several people with serious interest learned quickly and became mentors. Overall, these few people guided the project, kept it going over time, and continued to deal with issues that came up. Long-term it remains to be seen whether the neighborhood retains the interest, expertise and understanding to perpetuate the native landscaping features. Without some kind of ongoing education/diligence, whether provided by other neighbors - who do grow weary of it - or contracted from outside, these plots may succumb to weeds, to a current whim, or to grass when a new owner moves in.

We anticipated that maintenance would be a potential Achilles heel. People were encouraged to get involved only at the level they could maintain. Because "everyone was doing it" perhaps some got in deeper than their time and interest allowed. Also, many people interpreted "Low Maintenance" to mean "No Maintenance." After several years we did "lose" a section of the boulevard that had fallen into disrepair. The work required to get it back after years of neglect outweighed the owner's commitment and the area was converted back to lawn grass.

Long-term maintenance for the seeded buffer areas will continue to be a thorny issue. In the beginning, the neighborhood enjoyed the expert service of the consultant that planted the large seeded areas. Weaning the neighborhood off this assistance and helping individuals take ownership of the project has not been wholly successful. While a subset of people have made prairie maintenance part of their routine, others haven't. We've tried a number of things to help. The most recent effort involved circulating information sheets on problem plants. The sheets included information, photos and instructions for removal. Weeks later, the "plants to remove" were still there and going to seed.

Some neighbors tried hard to do the right thing, but hadn't educated themselves enough to know exactly how. During the second growing season, a few residents remembered that mowing had been discussed as a good way to manage weeds in a young prairie. Consequently, three large sections of the buffer were given a "stubble cut" at the height of a drought. We feared that the tiny prairie seedlings would die without the shelter of the early cover crop of plants. Fortunately, this little misunderstanding didn't prove disastrous. The prairie can be forgiving.

Despite the challenges, our neighborhood did create something special. For several people, native plants were just the thing. They got fully involved in the project and created incredible, ever-changing and maturing native gardens that benefit the whole community. Walking down the sidewalk is now a beautiful adventure as we look for new and different blooms every week and through the years. We've watched pheasants emerge from the wetland, walk through the back prairie buffer, follow the native corridor between houses, then cross the street to find refuge in yet another prairie area.

The project also gave our neighborhood much more visual continuity. In our grant application we wrote: "We hope to create a neighborhood 'feel' that immediately tells residents and visitors that this is something different." While we each have our favorite plants and each garden reflects these tastes, overall the result is distinctively native. The communal gardens across property lines exemplify the teamwork and relationship that was created as a result of taking this on together.

To the purist, our project was not a complete success. We have turf grass, we have invasives, and not everyone was a convert. We've seen that things change, people change, and natives aren't for everyone. Our experience has also shown that ongoing communication and education are vital to this communal approach. We know that everyone in the neighborhood has gained a better appreciation of native landscaping but, best of all, we have almost 50 children who will grow up in a "Neighborhood Wild".

Giant wands of Liatris pycnostachya *among native grasses and* Asclepias tuberosa.

Joanna Eckles is an environmental educator who works for World Parrot Trust, an international parrot conservation organization. Her husband Klay is a City Engineer who has successfully integrated native plantings and environmentally friendly designs into city and regional projects.

American Columbo in the Cartwright Nature Sanctuary

by Carl Rothfels

Last year, on the Hamilton Naturalists' Club's spring botanical inventory of the Cartwright Nature Sanctuary, I was stunned to see the floppy, cabbage-like leaves of American columbo *(Frasera caroliniensis)*, one of Ontario's rarest plants. American Columbo is listed as a Species of Special Concern in Canada*, so it was especially rewarding to discover it growing on the sanctuary, an 18.6-hectare (46-acre) property located between the Niagara Escarpment and Cootes Paradise. The land was purchased in December 2004 by the Hamilton Naturalists' Club (HNC) and Conservation Hamilton.

American columbo is a bizarre plant in the gentian family. It grows as a rosette of smooth leaves for several years, often in dry forest understories. There it gradually builds up energy and increases in size. Eventually, when the plant has sufficient reserves (this may take more than seven years), it grows a tall flowering spike – this is known as bolting. Then it blooms, produces seed, and dies. Each plant only blooms once before dying, a highly unusual strategy for a perennial.

Obviously, if one columbo in a population blooms by itself, it won't be pollinated by another member of its species, and it won't get a chance to try again! So the plants tend to bloom synchronously. For example, in the surveys of the Ontario populations of *Frasera caroliniensis* in 2004, I saw hundreds of rosettes, but not a single blooming plant. In the summer of 2005, every population I visited had multiple blooming plants, including the Cartwright population. This year none of the columbo at the sanctuary flowered.

No one knows what triggers columbo to bloom, although the "decision" to flower is made several years before the flowers actually appear (it takes that long for the flowering tissues to mature before blooming). The fruiting stalk can stand upright for a year or more providing a quick and easy marker for columbo patches.

American columbo is not particularly common anywhere in its range, and is not found in most of the field guides for eastern North America or Ontario. There are good sites for images on the web (for example, 2bnthewild.com/plants/H193htm), but the best local resource is the HNC's *Head-of-the-Lake Pocket Nature Guide.*

We are privileged in the Hamilton/Halton area because we have more populations of this endangered species than any other region in Canada. There are approximately five populations in Halton Region (all in the Aldershot area), two in Brant County, one in Haldimand-Norfolk County and three in Niagara Region. The Cartwright population is the second record for Hamilton, and possibly the only extant population here. The first population was small, perhaps only six plants and has not been seen since its discovery in the Borer's Falls Conservation Area in 1989.

The Cartwright columbo occupy the same general habitat as the other Hamilton and Halton populations: a gentle to steep, open, dry ravine slope below the Niagara Escarpment, usually on clay, with oaks and hickories. Unlike the Aldershot populations, many of the Cartwright plants are in fairly flat areas, and are on grey clay instead of the thick red clay more typical of this species locally.

The Cartwright population also fills a gap between the more western populations (Brant County, and the other Hamilton site) and the Aldershot populations. As such it may be an important bridge, facilitating gene flow between the Ontario populations.

The American columbo stand in the sanctuary is a significant population. The Hamilton Naturalists' Club found 287 plants in a June 2005 census, 24 of which were bolting. In 2006, 257 plants were counted. However, since seeds remain viable for at least five years, the decline in population may be temporary.

We are a lucky club to have this jewel of a plant on our new sanctuary. Our stewardship work at Cartwright has barely begun (and we still have to pay off the mortgage!) but already the property has more than proven its worth as a natural heritage site.

PHOTOGRAPH COURTESY CARL ROTHFELS

** American columbo was recently recommended for upgrading to Endangered status by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)*

Carl Rothfels was, until recently, the Field Botanist and Herbarium Curator at Royal Botanical Gardens, and an active member of the Hamilton Naturalists' Club.

To obtain a copy of HNC's Head-of-the-Lake Pocket Nature Guide *visit www.hamiltonnature.org.*

On the Propagation of *Anemonella thalictroides*

by Darcie McKelvey

Former NANPS Board member Kathy Edgar, who has a lovely garden and a prospering patch of *Anemonella thalictroides*, offered me a lot of seed in June of 2004. I agreed to try to germinate them with some misgiving.

I still remember the moment when I first saw the white flowers and airy foliage of the spring-blooming rue anemone sitting in pots at Humber Nursery. It was love at first sight! But when I tried to germinate them from seed, I met with limited success. Not total failure, as I have had occasional seedlings that survived Toronto winters, but not roaring success either.

I was faced with two big questions. I knew that the germinating pattern was warm-cold-warm (or "D" germinators using William Cullina's bible of propagation*). I also suspected that the seeds, although hydrophilic, rotted if faced with too much moisture. The big questions in my mind were (1) what's the best medium to sow them in for the initial warm period, and (2) whether to stratify them outside or in a spare refrigerator. I do find many woodland plants are happier with outdoor treatment, but I was concerned about the Zone 5 conditions where I currently reside.

Because I had sufficient seed, I decided to conduct a "scientific experiment". I divided the available seed into thirds. One-third was bagged in damp vermiculite. The other two-thirds were sown in two pots at the end of June. As a growing medium I used real woodland soil. The seeds were lightly covered.

One of the sown seed pots was put outside and remained there from the end of June 2004 until the spring of 2005. I did not water it. The seed pot that remained inside under more critical scrutiny was watered occasionally. The vermiculite group was checked sporadically to ensure that there was some slight detectable moisture in the baggie. On December 16, the potted seeds were placed in the refrigerator. On the same day, the seeds that had been stored in vermiculite were sown in woodland soil and placed in the refrigerator as well.

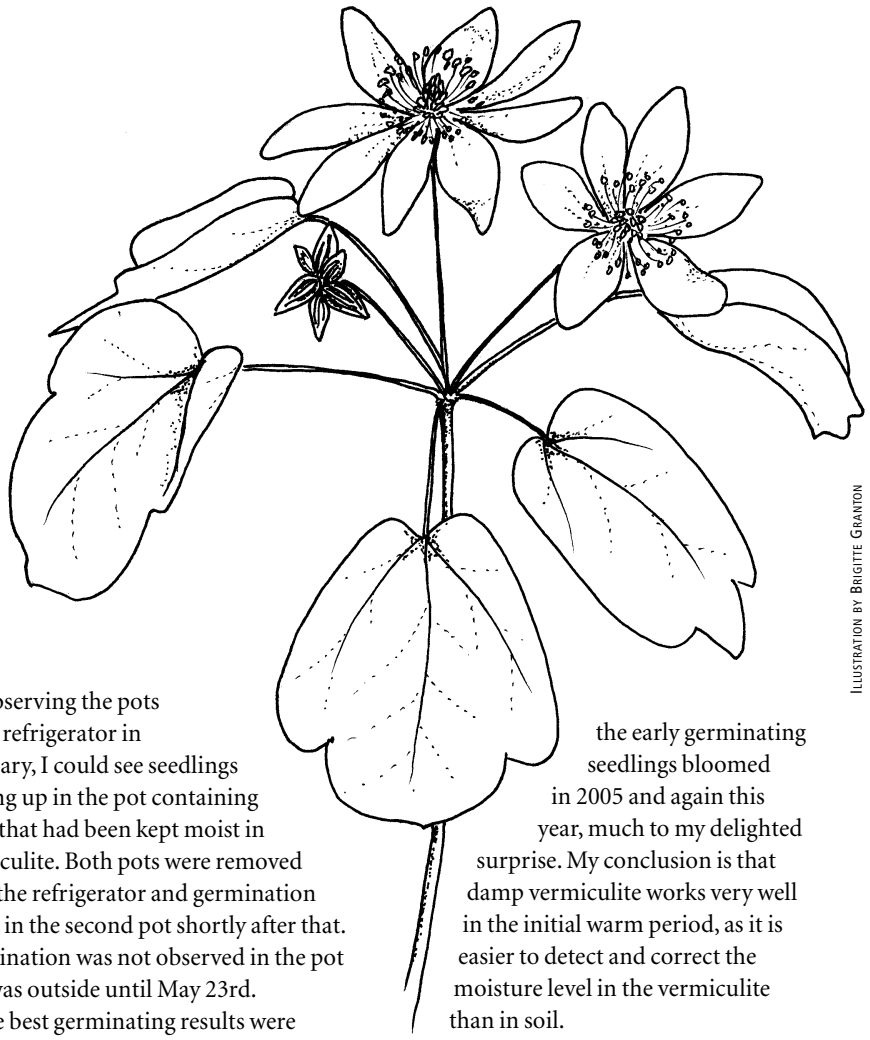


Illustration by Brigitte Granton

On observing the pots in the refrigerator in February, I could see seedlings coming up in the pot containing seeds that had been kept moist in vermiculite. Both pots were removed from the refrigerator and germination noted in the second pot shortly after that. Germination was not observed in the pot that was outside until May 23rd.

The best germinating results were obtained from the seeds originally sown in vermiculite where the success rate, determined by the number of germinations divided by the number of seeds started, was 82%. Of seeds sown in soil and kept inside, only eight out of 28 seeds germinated (29%) and all eight seedlings grew on one side of the pot (as if human error was involved). Outdoor treatment resulted in only six germinations (21%). I was surprised that the outdoor group did so well. However, as noted above, the germination was much delayed (by about three months) relative to the two groups that had been kept in the refrigerator.

All the seedlings that germinated survived. Many of the early germinating seedlings bloomed in 2005 and again this year, much to my delighted surprise. My conclusion is that damp vermiculite works very well in the initial warm period, as it is easier to detect and correct the moisture level in the vermiculite than in soil.

I propagated more this year (using vermiculite, the most successful method) and it worked. Now I'm doing the same with *Uvularia* and *Anemone quinquefolia.*

Darcie McKelvey loves growing plants from seed.

** New England Wildflower Society Guide to Growing and Propagating Wildflowers of the United States and Canada,* published in 2000.

Continued from page 1

leaves as resting places.

The individual flowers bloom for a single day and then die. However, the spike is crowded and other flowers quickly bloom in succession, usually beginning with the lowest flowers and continuing upward. In the southern part of its range it can bloom from late May through November, but for a much shorter period in northerly regions. Each flower is funnel-like, about one centimetre (a half inch) wide, and has a three-lobed upper lip with two yellow dots on the middle lobe. The most common pollinators of pickerelweed are bees, which are typically attracted by bluish colours, but butterflies, dragonflies, damselflies and hummingbirds also visit.

Pickerelweed flowers are tristyly, meaning there are three distinct types, each on a different plant. One type has a long pistil, a set of three medium stamens and three short stamens. The second has a medium-length pistil and a set of three short and three long stamens. The third has a short pistil and a set of three medium and three long stamens. Each length of stamen produces pollen of a different size and constitution. The healthiest seed is produced if pollen is brought from stamens to a pistil of the same length. When a bee arrives to collect nectar pollen adheres to a certain part of its body, and when it visits another pickerelweed the pollen will touch a pistil of the same length.

The day after flowering, the blossom withers whether it is pollinated or not. If it has been pollinated, the seeds slowly develop. Once most flowers have been pollinated, the flower stalk bends over so that the fruit head sinks just under the water surface, where the seeds ripen. Each pollinated flower will produce one small seed. After ripening, the seeds are released where they float on the surface for a while. Even though this species produces an abundance of seed, it reproduces more successfully vegetatively - by extending its rhizomes through the soft muck.

Pickerelweed is of great value to wildlife. The stems and leaves are eaten by muskrats, as are the rhizomes. White-tailed deer and Canada geese may also eat the leaves. The stems of the previous year's growth may be used as nesting material by sandhill cranes. Dragonflies and damselflies rest on the plant and may lay their eggs on it. The abundant seeds are often eaten by 'puddle' ducks such as northern pintails or gadwalls.

Pontederia cordata can be propagated easily by rootstock division in spring. It can also be grown from seed and does best after a period of cold, wet dormancy. Note that it can be prolific and, due to the extremely high rate of transpiration via its large leaf surface, can cause an accelerated lowering of the water level in which it is growing.

Some studies have shown pickerelweed to be an effective filter of aquatic contaminants. Its presence is certainly an indication of a good quality wetland. Combined with its striking looks, these are good reasons to grow it.

P.Allen Woodliffe is District Ecologist for the Chatham and Aylmer districts of the Ontario Ministry of Natural Resources.

Calendar of Events

September 30, 2006
NANPS AGM
Markham Civic Centre
Markham, Ontario
Visit www.nanps.org.

March 8-10, 2007
XERISCAPE COUNCIL OF NM CONFERENCE
Albuquerque, New Mexico
Contact scott@xeriscapemn.com.

April 10-12, 2007
MANOMIN WATERSHED CONFERENCE
International Falls, Minnesota
Exploring ways to protect and enhance the environmental health of the Manitoba, Ontario and Minnesota basins.
Visit www.manominconference.ca.