



**Fredericton Botanic Garden
Association Newsletter**

**Bulletin du Jardin botanique
de Fredericton**

Vol 27 No 4

Winter 2015

This Newsletter brings you news, our Science in the Garden column and a couple of seasonal items. One of the latter is a piece by board member and well known naturalist Jim Goltz on New Brunswick's festive flora.

The second seasonal item is an invitation to contribute to the Garden. This is the season of giving and a large proportion of donations in Canada are made in December. Please remember the Fredericton Botanic Garden when you are considering the gifts you give and donations you make this season. One of the major responsibilities of the board is to raise funds to create new plantings and garden features and to develop new programs. You can help today by renewing your membership, by giving a gift membership to someone you know who shares the desire to create a beautiful and educational Botanic Garden in Fredericton, and/or by making a donation to the Garden. Every bit helps.

Staying on the topic of giving, on November 26 the board hosted a reception at Odell Lodge to recognize and thank the many members who gave their time and energy to help out with the Spring Fair, Plant Sale and Raffle, and with the Treasured Garden Tour. A relatively small number of our many volunteers were able to attend, and those who did enjoyed hot apple cider, delicious deserts and good conversation. The board is greatly appreciative of the support of everyone who helped make our major events such a great success.

Lastly, but my no means least, this Newsletter carries the news that the Lieutenant Governor of New Brunswick, The Honourable Jocelyn Roy Vienneau, has agreed to be Honorary Patron of the Fredericton Botanic Garden. We look forward to welcoming her to future special events.

Richard Tarn
Chair, Board of Directors

**Annual General Meeting
and Silent Auction**

February 20, 2016, 1:00 pm
Unitarian Fellowship, 874 York Street

Talk in the Garden

Thursday, January 21, 2016, 7:00 pm
Fredericton Botanic Garden Resource Centre,
10 Cameron Court

*Ferns Demystified:
New Brunswick's Rich Fern Biodiversity*

Speaker: Jim Goltz

The full schedule of Talks and events for the first half of 2016 will be available early in the New Year

The Fredericton Botanic Garden Association Newsletter is published four times a year by the Fredericton Botanic Garden Association, Inc. The FBGA is a registered charitable organization for tax purposes. The objectives of the FBGA are to guide the establishment of the Fredericton Botanic Garden and to foster an awareness and appreciation of plants.

To obtain information on membership and to become involved in FBGA activities please contact us: **506-452-9269 PO Box 57, Stn. A, Fredericton, NB E3B 4Y2** or fbga@nb.aibn.com
Web: www.frederictonbotanicgarden.com

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Our Plants Prepare for Winter

By Steve Heard (Professor, Biology, UNB)



Image: Winter spruce, CC-0 via Pixabay.com

Winter is here, and you've probably been getting yourself, and your home and garden, ready. Our Garden is making its own preparations. Our plants can't head inside, or put on parkas and tuques, so they have to be ready to be cold. And there's a lot more to that than meets the eye.

There are actually two problems that plants need to solve in winter. One is damage to tissues that freeze. The other is the desiccation that results when tissues containing water are exposed to low and fluctuating temperatures – the same desiccation we see as “freezer burn” in frozen food. How do plants get through the winter in the face of these threats?

Desiccation is perhaps the lesser problem. Most of the water lost from a plant is lost through the stomata (pores) of its leaves, when they're open to let in the carbon dioxide needed for photosynthesis. In winter, most plants simply don't photosynthesize (with limited exceptions in evergreens). This means they can drop their leaves (deciduous trees and shrubs), die back to ground level and regrow in the spring (herbaceous perennials), or close the stomata and retain water inside leaves coated with thick, waxy, water-impermeable cuticles (evergreen trees). Problem solved – at the cost, of course, of reversing these changes come spring.

But for trees and shrubs that keep tissue above-ground all winter, escaping freeze damage is not so easy. Our plants have a toolkit, though, and in various ways they either avoid freezing even when it's cold, or control where and how freezing happens.

How can a plant avoid freezing when it contains so much liquid water? The same way our cars' windshield-washer fluid reservoirs do: antifreeze. The simplest approach, if you're a plant, is just to store lots of sugar in your cells. Water with more dissolved solutes has a lower freezing point (which is why diet pop will freeze in your garage, while sugared pop won't), so cells with more sugar don't freeze as quickly. Sugars are normal and common molecules in plants, so they're easy to recruit for this function, but many plants take this a step further with specialized antifreeze proteins that are synthesized as temperatures drop. In spruce needles, antifreeze protein molecules coat tiny ice crystals and cloak them with a water-repellant surface, preventing their growth and keeping tissue water liquid down to at least $-15\text{ }^{\circ}\text{C}$. (Actually, antifreezes are a common strategy for life in the cold: Arctic fish, overwintering insects, and many others use them to stay liquid. The results can be spectacular, for example in the larvae of one goldenrod gall moth, which in winter can be 20% glycerol by weight, and so remain unfrozen at $-40\text{ }^{\circ}\text{C}$!)

Most plants do freeze, though, when it gets cold enough (or at least, they freeze partly). And if ice crystals are going to form inside your body, it's best if they form in ways that don't rip you apart. So that's the other strategy our plants use: controlling the “nucleation sites” around which ice crystals form. Spruce antifreeze proteins are one way of doing this: by cloaking ice crystals as they form, they steer the plant toward having many tiny ice crystals – which is much less destructive than having a few large jagged ones ripping apart membranes, cells, and tissues. Plants also control the location of ice nucleation, so that when crystals do form, they form between cells (in cell walls and intercellular spaces), rather than inside cells where they could do severe damage.

So: when your nose is nipped by this winter's cold, stop to admire the hardiness of our Garden's shrubs and trees. And admire, too, the astonishing innovations that evolution can produce, when pressed by need and given a little time!



Festive Flora: New Brunswick's Native Hollies and Mistletoe

By Jim Goltz

Many holidays, traditions, achievements and milestones in life are appropriately celebrated with plants. Plants play an especially important role in Christmas celebrations with trees, wreaths, logs, boughs, flowers and sprigs adorning many households and public places. Some plant traditions of Christmas, notably holly and mistletoe, are stylized in plastic. But did you know that New Brunswick is home to two native species of holly and one species of mistletoe? All three species can be found in wetlands, such as the large bog located near the Regent Mall in Fredericton.

Like the plastic renditions of holly, both of our native hollies typically sport brilliant red berries, but don't expect them to have green leaves at Christmas; our native hollies both lose their leaves in the late fall. **Canada Holly** (*Ilex verticillata*), also known as Winterberry, maintains its berries well into the winter and these berries have such short stalks that the fruits appear almost stalkless, closely hugging the twigs to which they are attached, singly and in small clusters.



Ilex verticillata Cape Jourmain NB 5 October 2014

Mountain Holly (*Ilex mucronata*, formerly known as *Nemopanthus mucronata*), not only loses its leaves, but also loses its berries well before the onset of winter, usually being in prime fruiting condition from late

July through mid September. In fruit, Mountain holly is easy to differentiate from Canada Holly since its berries are borne singly on stalks that are mostly at least twice as long as the fruit. Both of our native holly species may rarely have yellow fruit. Although birds and other wildlife species do consume holly fruit, the berries of many species of holly have toxic properties so should not be eaten by people. When not in fruit, it would be easy to overlook both species, but fruiting plants are strikingly obvious. In addition to occurring in bogs, both species can also be found in swamps, swales, wet thickets, ditches, margins of lakes, and other wet places.



Ilex nemopanthus Waasis NB 1 Aug 2015

Dwarf Mistletoe (*Arceuthobium pusillum*), like other members of its family, is a parasite that derives its nutrients by growing and feeding on a host plant. Black Spruce is the preferred host for Dwarf Mistletoe but there are also reports of White Spruce, Tamarack and pines being parasitized. It is unlikely that Dwarf Mistletoe will become popularized as a Christmas decoration since it is a diminutive plant, rarely exceeding 1 cm in height. Why not have some fun on a snowy winter day by trying to find it? Here's a tip. When Dwarf Mistletoe grows on Black Spruce, it often stunts the growth of both the spruce and its needles, and results in a deformity called witch's brooms, florid clusters of twigs growing tightly together and pointing skyward. Parasitic fungi can cause similar deformities, but carefully examine the spruce twigs for little structures resembling elongated mushrooms with jointed stalks and you will have been lucky to find mistletoe. If you want to





Arceuthobium pusillum Regent St. bog
Fredericton, NB 1 April 2013

see it in bloom, you will have to check out boggy sites between late March and early May. The fruit is a one-seeded berry that ripens in the fall, and contracts, expelling the seed for distances of up to 12 or more meters.

So this Christmas, do enjoy all of your traditional festive flora, but also take time to celebrate New Brunswick's rich biodiversity and natural heritage by learning to recognize some native plants that are new to you.

Lieutenant Governor to be FBG Patron

We are honoured and pleased to report that The Honourable Jocelyne Roy Vienneau, Lieutenant Governor of New Brunswick, has accepted our invitation to be Honorary Patron of the Fredericton Botanic Garden.

In the past the Botanic Garden has enjoyed the privilege of the patronage of some of our previous Lieutenant Governors. We are grateful to have Her Honour associated with the Garden and look forward to inviting her to some special events.

facebook

Join the Fredericton Botanic Garden group page on Facebook to see announcements of events, pictures of the Garden and more.

'Rhodo' Update

The James Boyd sculpture 'Rhodo' has arrived at the Fredericton Botanic Garden but is not yet installed at its final location.

We first reported on this sculpture in the Spring 2015 Newsletter. The City of Fredericton had announced a piece of public art for the FBG last year. The project is funded by the Sheila Hugh Mackay Foundation through a grant garnered by Angela Watson, Cultural Development Officer with the City of Fredericton. Following a call for proposals, James Boyd, of Hampton, was selected from three finalists to create a sculpture in the form of a large granite rhododendron bud to be placed with our rhododendron collection.

'Rhodo' turned out to be larger than expected and took longer than planned to complete and arrived on a very wet Thursday afternoon late in October. 'Rhodo' weighs in at about 2000 lbs and was too heavy to lift to the planned location. A new base has been prepared closer to the road. It is now expected a formal unveiling will take place next spring.



'Rhodo' awaiting its permanent home



- Yes. I would like to become a member/ renew my membership with the Fredericton Botanic Garden Association

<u>Membership type</u>	<u>1 Year</u>	<u>2 Years</u>	Amount
Individual/Regular	\$20	\$40	
Family	\$35	\$70	
Student/Senior	\$15	\$30	
			\$_____

Your information *Required

*First name: _____ *Last name: _____

*Address: _____ * Suite/Apt: _____

*City: _____ *Province: _____ *Postal code: _____

* Home phone: _____

Email: _____ Yes! I would like to receive the Newsletter by email.

- Yes. I would like to give a gift membership. Please complete the information above so we can tell the recipient who has gifted the membership.

<u>Membership type</u>	<u>1 Year</u>	<u>2 Years</u>	
Individual/Regular	\$20	\$40	
Family	\$35	\$70	
Student/Senior	\$15	\$30	
			\$_____

Please send my gift membership to:

*First name: _____ *Last name: _____

*Address: _____ * Suite/Apt: _____

*City: _____ *Province: _____ *Postal code: _____

* Home phone: _____

Email: _____

- Yes. I would like to make a donation to the Fredericton Botanic Garden Association.

\$50 \$100 \$200 Other \$ _____ \$ _____

Charitable receipt required? Yes No

Date: _____ Cheque enclosed for \$ _____ total amount

Mail to: Fredericton Botanic Garden Association, PO Box 57, Stn. A, Fredericton, NB E3B 4Y2

