



Native Plant News

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Fall 2017

Colour Comes Before the Fall: *How Plants Prepare for Winter*

*Text and Photos by Patsy Cotterill,
reprinted from Wildflower News*

*O wild West Wind, thou breath of
Autumn's being
Thou, from whose unseen presence the
leaves dead
Are driven, like ghosts from an
enchanter fleeing,
Yellow, and black, and pale, and hectic
red....*

*Ode to the West Wind
Percy Bysshe Shelley*

Fall colours, red, yellow, orange and brown

The brilliant fall colours that we are experiencing as I write (late September) may well have been enhanced by the cool, overcast weather conditions we had about a week ago. These colours appear when the green photosynthetic pigment chlorophyll begins to break down in leaves, unmasking less abundant pigments, the carotenoids, carotene and xanthophyll, and the flavonoid anthocyanin that are also present. Carotene produces the orange colour in plant tissues, xanthophyll, the yellows, and anthocyanin is responsible for red, pink, blue, and purple colours. Low temperatures above freezing favour anthocyanin production, most typically seen in the red of maple leaves, and rain or cloud increases the intensity of all



Bunchberry

these pigments, which appear at their best on cool, clear, sunny days.

Carotenoids are complex organic molecules that occur in the chloroplasts of leaves and play a subservient role to chlorophyll, which absorbs the light energy used to drive photosynthesis.

Carotene consists entirely of hydrocarbons but xanthophyll also contains oxygen. Anthocyanin by contrast falls into a group of compounds called flavonoids; it is a water-soluble molecule that occurs in almost all

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Native Plant News is a quarterly publication of the Native Plant Society of Saskatchewan (NPSS) and is one of the benefits of membership. Members are invited to submit articles, news, views, photographs and comments. Views expressed by the authors are not necessarily those of the NPSS.

Deadlines:

	Submission	Publication
Winter Issue:	November 1	December 15
Spring Issue:	February 1	March 15
Summer Issue:	May 1	June 15
Fall Issue:	August 1	September 15

Membership Dues (Year End November 30)

Individual \$30	Non-profit organization \$100
Family \$45	Corporate \$200
Student \$15	Life \$500

Please contact the NPSS office for information about the lifetime membership installment payment option.

President's Report

Fall 2017

Where does the time go? I find it hard to believe summer is gone and we're into fall already! It is bringing a welcome reprieve in temperatures and moisture to many areas of the province that felt the brunt of the high temperatures and low rainfall. And to think just a few years ago we saw some of the worst flooding in decades if not centuries. Ours is definitely a province of extremes and I like to think it makes both the people and the plants hardier stock!

While I realize most of our tours were centered in or around the Saskatoon area, I hope you were able to make it out to at least one of the tours offered this summer. There were a number of exciting outcomes from the tours. The early, warm weather may have played havoc with blooming times of some species but also made species we don't often see at the end of May more visible! There were Loggerhead Shrikes found at the Small Swale that will hopefully go a long way towards helping protect this area. Prescribed burns in the Northeast Swale over several years showed many visible differences one of which was a good Western Red Lily patch!

I'd like to offer my extreme gratitude to those folks who have regularly volunteered for us. Whether it is helping out at an event, offering an extra set of eyes or hands on our ongoing battle against invasive species or supporting any of our other endeavours it would not be possible without you! "Many hands make light work!"

The NPSS Board has seen a few changes this summer as Cheri has taken a leave to welcome a new baby to their family, Dale is stepping down from the board to pursue educational opportunities and we welcome Jacquie Bolton!

If you or anyone you know might be interested in serving on the Board for a term (or two!), would like more information about volunteering or would like to offer suggestions for tours or other events, please contact myself or Chet for more information. 🌟



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tissues of higher plants, specifically in the cell sap, and imparts colour to flowers and fruits as well as autumn leaves. Whether the hue is red, blue, purple or black depends on the pH of the cell sap, with red reflected under the most acidic conditions of low pH. Anthocyanin has an anti-oxidant role, protecting the plant against stresses such as UV light and extreme temperatures such as cold. In flowers, the colour it imparts can serve to attract pollinators, in fruits to attract animal dispersal agents, and in leaves possibly to deter herbivores. Unlike carotenoids, which are present in leaves throughout the growing season, anthocyanins are only synthesized by the plant in late summer. (An exception to this appears to be our local wild sarsaparilla, whose first leaves in spring are a dark purple, changing to green as chlorophyll synthesis develops. Anthocyanin also persists through the winter in some herbaceous evergreen leaves such as those of Bunchberry (*Cornus canadensis*). Sometimes a species'



Bur Oak (*Quercus macrocarpa*)

leaf colour in the fall is the result of a combination of these pigments with chlorophyll-breakdown products, as in

the brown of oak leaves.

Simple observation of species in the fall allows one to speculate which pigments predominate in which plant or group of plants. For example, the leaves



American Elms

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Upcoming Events

Native Prairie Restoration/ Reclamation Workshop

February 7-8, 2018

Saskatoon, SK

For more information, go to

<http://www.pcap-sk.org/upcoming-events-workshops/2018-nprrw>
or call (306) 352-0472

To submit your native plant related event to our events list, send your information (including date, contact, phone number and location) to info@npss.sk.ca.



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Red Osier Dogwood

of most poplars and members of the birch family turn yellow, as do those of Green Ash (*Fraxinus pennsylvanica*), Manitoba Maple (*Acer negundo*), American Elm (*Ulmus americana*), and Larches (*Larix sp.*), while Red Osier Dogwood (*Cornus stolonifera*), Chokecherry (*Prunus virginiana*), Lowbush Cranberry (*Viburnum edule*) and Highbush Cranberry (*Viburnum opulus* var. *americanum*) are arrayed in striking hues of pinkish-red, clearly indicating quantities of anthocyanin. While we cannot compete with Eastern Canada's native maples, our cultivated Amur Maples (*Acer ginnala*) are known for putting on striking displays of red leaves. Flower colour may give a clue as to pigment content, too and presage autumn hues; senescing leaves on Fireweed (*Chamaenerion angustifolium*) reflect its pink flowers of summer and many of the asters which have blue, purple or white flowers show purplish coloration in their leaves come September. Roses can be pink, yellow or orange in the fall, suggesting a combination of pigments, as can European Mountain-ash (*Sorbus aucuparia*) and Saskatoon (*Amelanchier alnifolia*).

Being deciduous

In temperate climates plants undergo a number of physiological changes as they prepare for the onset of dormancy during winter. Breakdown of chlorophyll occurs during the autumn in deciduous plants prior to total leaf loss over a short period. Photosynthesis

cannot occur during cold temperatures and the leaves would be a liability in incurring water loss to the plant and snow damage in trees. (Further, although I have never read this in any literature, the replacement of leaves ravaged by insects during the growing season by a new set in the spring must surely confer a tremendous advantage!) Deciduousness is usually associated with broad-leaved trees (i.e., those having relatively large, thin, flat leaves) but some broad-leaved trees, especially those growing in milder climates, can also be evergreen. In this they resemble the conifers, shedding only some of their leaves at any given time. Judging by my back yard, however, which is now covered with pale needles in the vicinity of my White Spruce (*Picea glauca*), fall appears to be the time for maximum shed for conifers too, no doubt making way for the new leaves on shoots that will open from the growing tips in spring. Conifers are adapted to winter drought and cold by having smaller leaves with reduced surface areas: needle-like leaves (spruces, firs and pines) or small, flattened ones (the cypresses) with hard cuticles to reduce water loss during winter; being able to achieve some photosynthesis during warmer spells may confer an advantage. Absence of obstructive leaves in early spring benefits wind-pollinated plants such as poplars and willows which flower before leaf-break.



Highbush Cranberry

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So, what causes leaves to fall?

Before the leaf dies, useful substances such as magnesium ions, amino acids and sugars move from the leaf into the plant stem and roots under the influence of plant hormones. In trees and shrubs two layers of cells are formed separating the base of the leaf stalk from the stem, an outer abscission layer and an inner (i.e., closer to the stem) protective layer of cells. The cell walls of the abscission layer are broken down and the protective layer, dotted with the remains of vein tissues, remains on the now leafless twig as a leaf scar.

Buds for next year

Since most woody plants produce next year's leaves and flowers during the growing season of the current year, protection of these embryonic shoots as buds during the winter is important for the plant's continued growth. A terminal bud forms at the end of the growing shoots, but most buds are axillary, nestled in the angles between the leaf stalk and the stem, and the tiny tissues inside are protected from desiccation and mechanical damage by a covering of modified leaves called bud scales.



Fireweed

The resinous substance that gives Balsam Poplar (*Populus balsamifera*) its lovely balsamic fragrance in spring provides additional protection, particularly against water loss. Most buds are small and inconspicuous at this time of year, and will only swell and

break at the onset of spring using food reserves stored inside them. However, if you look carefully at birch family members such as Paper Birch (*Betula papyrifera*) and Beaked Hazelnut (*Corylus cornuta*), you will see next year's male catkins as narrow, slender buds projecting from the twigs.



Saskatoon

Outsmarting frost

I have always been intrigued by how the above-ground stems of trees and shrubs manage to survive the brutal subzero temperatures of Canadian winters. Why doesn't every living cell freeze to death, cell water turning to ice which breaks the cell walls and kills the cytoplasm? Finding the answer hasn't been easy for scientists but research suggests three processes may operate: first, the usually rigid cell walls of stem tissues become more pliable, and water moves out of the cell into the spaces between the cells, where it freezes but in so doing does not harm the cell; second, the cells convert starch to sugars and concentrate them, forming a sort of antifreeze, so that freezing temperatures are lowered; and third, cell contents become viscous and capable of supercooling without freezing. I am not clear which of the three processes or all of them occurs in our climate, or whether it is species-dependent, so if anyone can enlighten me, please

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comment. Many of the cells in the vascular tissue (the wood, and sap-transmitting cells) are already dead and function to transmit fluids or provide mechanical support, but clearly enough cells remain alive at the end of winter to allow their woody owners to resume growth in the spring! (I remember a grade 5 student telling me that trees “die” in the winter. I said, you know that can’t be true, because they come alive again in the spring, and dead things can’t come back to life!)

Laying up winter stores

Herbaceous plants employ a variety of strategies to survive the winter. Annuals persist not as individuals but as the next generation, as seeds, but the majority of our temperate plants are perennials, storing food in underground organs such as roots, tap-roots (think carrots and parsnips), horizontal underground stems (rhizomes), bulbs (collections of leaves, underground buds, if you like), corms (swollen stem ends), and tubers. The fact that such organs must store food to initiate the plant’s growth the next spring, especially where no above-ground leaves remain to resume photosynthesis, has enormous beneficial consequences for animals, including ourselves, of course, who



Tamarack (*Larix laricina*)

steal these food reserves to promote our own survival.

So, while we enjoy palettes of fall magnificence or shuffle through drifts of fallen leaves thinking of the winter ahead and how we are going to survive

it, we should give a thought too to the physiological processes that are going on unseen inside these food-producing factories, and their amazing adaptations for survival. *



Close-up of Tamarack

Register Now for the NPSS Annual General Meeting and Conference

Plan now to attend the upcoming NPSS annual general meeting and conference on January 27-28, 2018 at the Conexus Arts Centre in Regina. This year's theme is "A Prairie Patchwork: Selected Topics on Native Prairie" and is packed with interesting topics and speakers. Our keynote speakers will be the team of acclaimed author and naturalist Trevor Herriot, and biologist and award-winning environmental photographer Branimir Gjetvaj. The two have recently joined forces to create a book entitled "Islands of Grass".

2018 will retain the two-day format of our annual general meeting as we host a workshop on Sunday. We will deliver the Prairie Ecosystems learning module of our Saskatchewan Master Naturalist program, which forms part of the core competencies of the program, so anyone wanting to attain their Saskatchewan Master Naturalist designation must take it. The Prairie Ecosystems module will introduce participants to various types of grasslands, how they evolved and continue to adapt, and the species and processes that make them. We will also discuss threats to native prairie ecosystems and how local conservation efforts are trying to address these.

Saturday will look much the same as it has in past years, beginning with breakfast and the business portion of our meeting, and then transitioning to a set of great presentations. In addition to our wonderful keynote speakers, we will have presentations from Dr. Jon Bennett from the University of Saskatchewan, Meewasin Valley Authority's Resource Management Officer Renny Grilz, and many others. Throughout the day we will also be hosting a silent auction featuring a portion of Dr. Vernon Harms' personal book collection.

We are keeping our costs extremely low for this two-day event in the hope that as many people as possible will be able to attend. You will not find a better deal anywhere! As you'll notice in the registration form, there is an option to attend only one of the two days but attending both days gives you a discount, as does being an NPSS member. Memberships purchased at the time of registration will allow you to register for the NPSS member rate. You can either fill in the registration form included in this newsletter or do it all online on our website at <https://www.npss.sk.ca/store/events/2018-npss-annual-general-meeting-and-conference> *



NPSS AGM and Conference Registration Form

Registration deadline is January 20, 2018

Mail this form with payment by cheque to:
Native Plant Society of Saskatchewan
P.O. Box 21099
Saskatoon SK S7N 5N9

Name _____

Organization _____

Address _____

City/Town _____ Province _____ Postal Code _____

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Please Note: You can register for the AGM and/or renew your membership with your credit card through our store on our website at www.npss.sk.ca

Registration Fees:

NPSS Member..... \$70
(Saturday only = \$50, Sunday only = \$30)

Non NPSS Member \$80
(Saturday only = \$60, Sunday only = \$30)

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TOTAL ENCLOSED: \$ _____

Please note that the member rate is applicable only to PAID members. Memberships purchased at the time of registration entitle you to membership rates.

For more information, please contact:

Chet Neufeld, Executive Director
Phone: 306-668-3940
Email: info@npss.sk.ca
Website: www.npss.sk.ca

As a reminder, the board decided at a meeting in the Spring of 2006 that resolutions that are time sensitive and pertaining to complex issues, including any directive not strictly that of the NPSS or pertaining to its activities, must be submitted in writing to the NPSS Board of Directors a minimum of two weeks prior to the AGM. The resolution must include adequate background information for Board review and a clear indication of why the proposed resolution should come from the NPSS.

Renew Your Membership on Time and Win a Prize

Well, it's that time of the year again. For those of you paying by the year, your NPSS membership fee is now due.

Go to our online store at our website (www.npss.sk.ca) and pay with any major credit card. It's fast, easy and secure. However, if you still want to mail a cheque you can do that, too. Do you want to avoid having to remember to pay altogether? Why not buy a lifetime membership. It's cheaper, in the long run, and you can pay in installments if you can't afford, or don't wish to pay, a lump sum. All those who renew their memberships online by December 31, 2017 will be entered to win back their membership dues.

Thank you for supporting the NPSS in 2017 with your membership dues and donations of time, labour and money! We are extremely grateful that we are your charity of choice.

NOTE - As we are a registered charity, your donations to the NPSS are tax deductible. *

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- _____ \$500 for Lifetime Membership (can be paid by installments – contact the office for more information)
- _____ Donations (All donations are fully tax deductible and the money will be directed toward our education and conservation programs)

IMPORTANT: Even if you wish to receive a paper copy of the *Native Plant News*, please provide an email address if possible so that we can contact you at short notice with event announcements.

- _____ I would prefer to receive an electronic copy of the *Native Plant News* (don't forget your email address!)
- _____ I am interested in volunteering with the NPSS

Send this completed form and your payment to:
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