Edmonton Native Plant Society

WILDFLOWER NEWS

'Growing Nature's Garden'

MARCH 2020

A brand new crop of meadow blazingstar, *Liatris ligulistylis*, seedlings!

From Your Editor:

Welcome to the March Wildflower News. There's a bit of a blizzard going on outside as I write this, so I hope you enjoy our seedling photos - signs of new life - as much as I do. There are three Seedy Days this month for you to get your own seedlings started.

Please note: The opinions expressed by the authors in this publication do not necessarily reflect those of the editor and the Edmonton Native Plant Society.

In This Issue:

LETTERS:

Thank you very much for continued reception of this month's article. It is always amazing to read of all the teaching and learning shared with receptors. This February it was especially appreciated after such erratic weather conditions.
Sincerely,
M. Pilek

Thank you for your appreciation and kind compliments. So glad you are enjoying the Wildflower News, and yes, it was a treat to see some blooming flowers.

Cherry Dodd and crew! Thank you for this informative news letter!
I particularly like your closing sentence of wit and humour!
May spring bring you hope and beauty!
With appreciation,
Shirley

Yes, we got quite a chuckle from those lines too: "One has to conclude that, what with their ingenious mechanisms to ensure a fair share of sex and a proper diet, plants are not the innocent, passive beauties they appear. Rather they are scheming survivors in the constant battle for life!" Thanks Shirley for your appreciation - always nice to hear!

EVENTS - if you would like us to list your event that involves native flowers, please email us at engedmonton@gmail.com by the 20th of the previous month.

Monday, March 9 - Edmonton Nature Club Plant Study Group - *Our Green Edmonton: An Update on City Initiatives with respect to Green Spaces, Natural Areas and urban wildlife.* Catherine Shier and Angela Hobson, City of Edmonton planners, will be the presenters. We will hear the latest information on progress with the Ribbon of Green plan, new City initiatives such as the City Plan, and lessons learned from the wildlife monitoring program.
Time: Doors at 7:00, presentation at 7:30 pm
Location: Room L116, The King's University, 9125 50 Street.
Admission: Free, although membership in the Edmonton Nature Club is encouraged

Saturday, March 21 - Wagner Natural Area Society *Annual General Meeting* - Guest speaker, Dr. Margo Pybus, Provincial Wildlife Disease Specialist, Species at Risk, Non-Game and Wildlife Disease Policy, Alberta Environment and Parks, will talk about ***Alberta Bats,*** which has been a popular topic for visitors to Wagner over the past couple years when we've had field tours put on by the Alberta Community Bat Program, a program of the Wildlife Conservation Society Canada.
Time: 2:00 to 4:00 pm - a brief business meeting and elections, followed by the guest presentation, networking, and snacks. The doors will be open at 1:30 so members can arrive early to update their memberships.
Location: Room 8, third floor, Percy Page Centre, 11759 Groat Rd NW, Edmonton. Attendees can access the building through the back door (south side). Parking is right there.
Admission: Free to both members and the public. If you plan to attend, please email: info@wagnerfen.ca

Seedy Days:

Sunday, March 22 - Edmonton Seedy Sunday - Free presentations and demonstrations about gardening, seed vendors, children's crafts and much, much more. ENPS will have a table with local native wildflower seeds and more. For more info: http://www.edmontonseedysunday.org
Time: 11:00 a.m. to 4:00 p.m.
Location: South entrance, Central Lions Seniors' Recreation Centre, 11113-113 Street. Wheelchair accessible.
Admission: By donation at the door to cover the costs of the event.

Saturday, March 28 - Stony Plain Seedy Saturday - Come out to buy locally grown seeds and plants, swap seeds with other gardeners, and learn more about local related non-profits. There will also be local experts teaching about their gardening obsessions. Concession will be available, along with free kids' activities.
ENPS will be there with a large variety of local wildflower seeds and more.
Time: 10:00 a.m. to 3:00 p.m.
Location: PERC Building Gym, 5413 51 St, Stony Plain
Admission: Free, but food bank donation is requested.

Saturday, March 29 - Sherwood Park Seedy Sunday - A day of gardening, learning and fun! With information talks and a variety of vendors to gather information, purchase seeds and other items for the 2020 gardening season!
Strathcona County Library is sponsoring the talks and requires registrations: https://www.sclibrary.ca/calendar?month=2020-03
Edmonton Native Plant Society will be there with loads of native wildflower species seeds for you to choose from! Entrance by cash donation to help cover costs
Time: 11:00 a.m. to 4:00 p.m.
Location: Strathcona County Community Centre, Agora Room, 401 Festival Lane, Sherwood Park
Admission: By cash donation to help cover costs.

Saturday March 28, ANPC Annual Workshop *Northern Native Plants and Ecosystems*
Topics will include boreal forest reclamation, peatland restoration, boreal forest health and northern rangeland ecosystems as well as updates on the newest native seed consortium initiative in the province.
Chateau Nova, 10010 - 74 Street, Peace River, AB

For more information, and to register: https://anpc.ab.ca/?page_id=5289

NEWS... If you have a news item involving native plants that you would like posted, please email us at engedmonton@gmail.com

Gibbons Badlands Prairie under Siege.

The snowmobilers and OHVers are at it again. The damage at the Gibbons Badlands Environmental Reserve is even worse than last year. The fence at the top of the bank has been cut, right next to the sign saying “Environmental Reserve. Please Treat with Respect”. So much for treating the area with respect. It's unfortunate that people don't realize the true gem of an area on their doorstep. A prairie badlands area like this is normally not found this far north. People may think that they are just on the snow, that their trails will never be seen in the spring. But it's wrong. The sleds compress the vegetation underneath, and deepen ruts. They also deteriorate the river bank, as they are accessing the hills from the river in many places.
ENPS has protested to the town council and concerned citizens are meeting to see what action can be taken.



The fence has been illegally cut to allow OHV access; vehicles have compressed vegetation, created ruts killing existing native vegetation and exposing soil to random non-native seeds; snowmobile tracks.

One of the many signs along the fence that is ignored and disrespected.

All photos by Kathleen Mpulubusi.

A little historical background: since 2013, ENPS together with many concerned citizens of Gibbons, have worked to get this unique landscape protected from OHV use and consequent enormous damage to the native badlands vegetation. We succeeded to a point with the town installing new fences and the above signs. However, it requires ongoing stewardship.

* * * * *

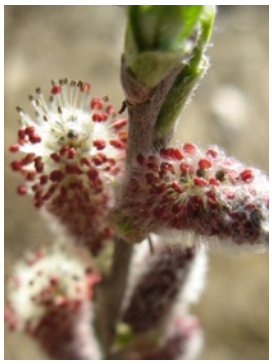
Teck announces withdrawal of Frontier Oil Sands Mine project proposal
- from a CPAWS News Bulletin February 24.

This is BIG! Teck has withdrawn their proposal for the massive Frontier Oil Sands mine, citing the need for Canadian governments to develop better plans to address climate change. Read Teck CEO Don Lindsay’s letter to Canada’s Minister of Environment and Climate Change Canada here. CPAWS Northern Alberta released a statement welcoming the announcement!
This is good news for nature and for all of us that benefit from a healthy, intact, boreal forest. CPAWS Northern Alberta has worked on this file for 3 years, including as official intervenors in the public hearings. At these hearings and in our submissions to the Joint Review Panel, we expressed our concerns over the negative impacts the mine would have on

Wood Buffalo National Park and the Peace-Athabasca Delta, the nearly 1 million migratory birds that pass over the area (including endangered whooping cranes), Ronald Lake Wood bison, the irreversible loss of wetlands, and its significant greenhouse gas emissions.

Seeing Red in Spring and Fall: how plants use anthocyanins as sunscreen by Patsy Cotterill

Spring is approaching, and we will soon start seeing red. By which I mean that we will suddenly begin noticing how brilliant red the basket willows are in low-lying fields as we drive by, how crimson are the canopy branches of the beautiful birches in southwest Edmonton, how the red-osier dogwoods along the ravine creeks and in our yards, always red, now shine with an extra radiance. Put it all down to anthocyanin, a type of plant pigment that is widespread in the plant world and is responsible for pink, purple and blue colours in flowers, leaves, fruits and stems.



L: Red-osier dogwood (*Cornus sericea*) shrubs at Astotin Lake, Elk Island National Park,10 March 2019.
C: Hoary willow (*Salix candida*) in Whitemud Creek North, 25 April 2010, showing red stems and red stigmas on flowering female catkins.
R: Hoary willow (*Salix candida*) in Whitemud Creek North, 25 April 2010, showing red anthers on male catkins.

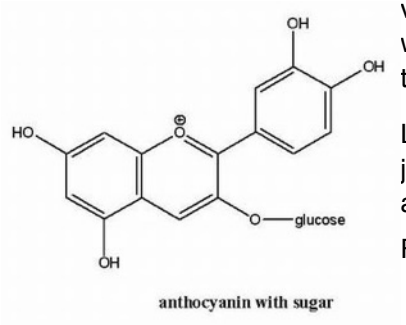
Why do these fulgent crimson-reds in stems and shoots become so obvious in the spring? The question, which I hoped would yield a simple answer, led to my fascinating if only partly understood dip into some complex biochemistry and physics, the literature of plant physiology.

Secondary plant metabolites

Anthocyanins are members of a group of plant molecules called flavonoids, which in turn belong to a larger group called phenolics. These compounds, along with others, are known as secondary metabolites because they do not appear to play a direct role in processes leading to growth and development (e.g., photosynthesis, respiration, reproduction) but are thought to help the plant deal with environmental stresses. They may also reduce damage to cells by acting as antioxidants (more on this later). They may be involved in healing when plants are attacked by herbivores and microbes, and in plant signaling. The phenomenon of allelopathy, whereby some plants secrete substances into the soil to prevent other plants from growing nearby and thus arrogating more resources for themselves, is also achieved through secondary plant metabolites.

Quite incidentally to the plants, but no doubt of considerable interest to readers, is the fact that secondary plant metabolites are much used by humans, as medicine, and for recreation. They are the basis of many pharmaceuticals, and furnish recreational drugs such as nicotine, cocaine and cannabinol. They have recently received a much higher profile in the “healthy foods” movement as antioxidants.

Anthocyanins, of which there are many kinds although only about half a dozen common ones, are molecules consisting of carbon, hydrogen and oxygen, with the hydrogen and some of the oxygen present as hydroxyl (-OH) ions and with one or more sugar molecules attached. They are water soluble and present mostly as solution in the cell vacuole. Anthocyanins absorb blue-green wavelengths and reflect the red wavelengths that we see, although the pH of the cell sap influences the exact colour that is visible, e.g., red or purple.



anthocyanin with sugar

L: The anthocyanin molecule. Benzene rings have six carbon atoms at their corners, joined by alternating single and double bonds. The core of the molecule is designated as C6-C3-C6. Note the attached hydroxyl (OH) groups and the sugar molecule.

From: https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1751-1097.1999.tb01944.x

Scientists have linked increased anthocyanin production to high light intensity, cold, drought, low nutrients, herbivory (although some insects may have learned that young red leaves are a good source of food!), infection and pollution. Now doesn't this describe some of the conditions that prevail in spring, for example, much higher light intensity and chilling temperatures?

Anthocyanin as sunscreen

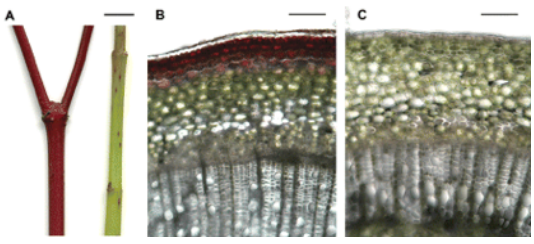
But why should light place stress on plants? It turns out that photosynthesis, turning light energy into the chemical energy that the plant can use, is a complicated and dangerous business. Imagine it as playing with fire, if you like, with excess packets of light energy and loose electrons flying about. It generates "active oxygen species" (highly reactive ions, molecules and (free) radicals containing oxygen) that can damage molecules such as DNA and proteins and so disrupt metabolism. This harmful phenomenon is known as photooxidation, and results in reduced photosynthetic capacity (photoinhibition). One theory is that anthocyanins function as a protectant against light by scavenging these active oxygen species using the hydroxyl ions, and thus act as an antioxidant. The latest research does indeed indicate that anthocyanins absorb excess visible and UV light and so ameliorate photoinhibition. Put simply, they serve as a sunscreen. Even a casual observer can see that in anthocyanin-producing species the side of a leaf that faces the sun produces more pigment than one in shade, and that the undersides of such leaves have less anthocyanin than the upper surfaces.

Other suggested roles for anthocyanins are that, as a solute in solution in the cell sap, they lower the water potential of the cell, increasing the freezing point of the cell solution and thus reducing the tendency to form damaging ice crystals. A negative water potential also means there is less tendency for the cell to lose water via osmosis, which would reduce evapotranspiration, important in drought conditions. This would be especially significant for young leaves which lack thick cell walls and a protective waxy covering. However, recent research has not provided conclusive evidence for these roles. (https://harvardforest.fas.harvard.edu/sites/harvardforest.fas.harvard.edu/files/leaves/Leaf_physiology_anthocyanin.pdf

Tender young leaves on new shoots of false mountain willow (*Salix pseudomonticola*) receive protection against high light intensities from anthocyanin, before they develop waxy cuticles that help to reflect light.

Anthocyanins in stems

So what has this to do with the anthocyanins in the branches and boughs of our dogwoods, willows and birches, which become especially conspicuous at this time of year?



The photographs show red and green stems of red-osier dogwood (*Cornus stolonifera*) (left, A) and transverse sections through part of the stems as visualized by light microscopy (B,C).

From https://academic.oup.com/jxb/article/61/10/2707/433810

Most research has been done on leaves, but I did find a 2010 study on red-osier dogwood done in New Zealand that shed some light (excuse the pun) on anthocyanins in stems. The stems of many plants, both woody and herbaceous, contain photosynthetic tissue that is similar to that of leaves and so contributes to the work largely carried on by leaves. Hence it makes sense that plants would use anthocyanins to protect this tissue from excess light. The New Zealand researchers compared photosynthesis in red and green stems of dogwood exposed to full light and found that the former had a distinct advantage over the latter, the conclusion being that the anthocyanin-containing bark protected against light damage to the photosynthetic apparatus (that is, combatted photooxidation and photoinhibition). The same effect was noted in five other species investigated.

I must admit I have a bit of difficulty imagining how water-soluble anthocyanin persists in stems exposed throughout

our winters, or even in some evergreen leaves that show anthocyanin colouring when they emerge from snow after winter (e.g., Canada bunchberry). Perhaps the pigment is attached to other more durable molecules such as lignin?

L: Red-osier dogwood, *Cornus sericea,* in a suburban garden in fall.

R: Canada bunchberry, *Cornus canadensis,* in the Edmonton river valley in spring. Photo by Judith Golub.

Anthocyanins in the fall

Of course, it isn't spring but rather fall when the presence of anthocyanin in plants intrudes most on our consciousness. Reds or purples colour many leaves of deciduous plants as they age, or senesce, before falling off. I was under the impression that anthocyanins, like the carotenoids that give the orange-yellow colouring to autumn leaves in some species (and are also significant photoprotectors and photoabsorbers), were always present but became unmasked as chlorophyll was breaking down. However, research has shown that there is active production and accumulation of anthocyanin prior to chlorophyll breakdown, and this synthesis is increased (as previously noted) by high light intensity, cool but not freezing temperatures, and mild drought.

Blueberries are promoted as a great food source of antioxidants. Velvet-leaf blueberry, *Vaccinium myrtilloides*, Halfmoon Lake Natural Area 15 August 2015.

Nutrient translocation in aging leaves

One might not expect that plants would have a problem with high light intensity in the fall, but researchers TS Feild et al. in North America suggest a possible reason in their 2001 paper in *Plant Physiology* entitled "Why leaves turn red in autumn: the role of anthocyanins in the senescing leaves of red-osier dogwood." (http://www.plantphysiol.org/content/127/2/566). In aging leaves it is important that the products of chlorophyll and chloroplast breakdown get translocated away into the stems and roots of the plant for storage and later use in growth as valuable nutrients. The authors postulate that chlorophyll in the process of degradation may in the presence of light and oxygen be a significant source of dangerous reactive oxygen species, and these may interfere with the plant's ability to translocate nutrients. By offering photoprotection, then, anthocyanin may be performing a useful role in assisting the translocation of nutrients.

What happens in plants that don't produce anthocyanins? How do they protect themselves against light, and also ensure that nutrients are safely retrieved for future use? Could these plants be using carotenoids instead, as sunscreen? But that is a question for investigation another day!

Isn't nature wonderful? But perhaps just as wonderful are the plant physiologists who work painstakingly to decode complex biochemistry and physics to give us some insight into these selfsame wonders!

All photos by Patsy Cotterill unless otherwise indicated.

Growing Native Flowers from Seed. How to do it, and which species are best for you. by Cherry Dodd

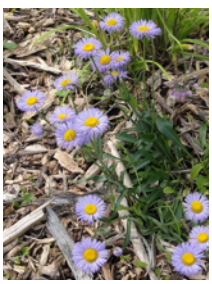
At this time of the year gardeners thoughts turn to seeds - what plants to grow, can they be grown easily, and how to do it. The number of local of native species is huge and it can be a daunting task to figure out which plants to grow. So in this article I will stick with the easy to grow native species that don't need to be stratified - just sow and grow. Because native plants are all perennials they are usually quite small the first year and can easily get lost unless started in pots. With the species listed here you can use regular potting soil and lightly cover the seeds. If you are in a hurry to start growing you can start the seeds indoors under grow lights or in a sunny window. Make sure the pots don't dry out in the sun. Gemination rates can vary a lot depending on the species. Sometimes a seed will germinate in a few days while other species can take up to 3 weeks. Once the seedlings have about 2 to 4 true leaves it's time to pot them up into individual pots. When it is warmer during the day, harden them off outside in a shady spot until they are used to the brighter outdoors light conditions. Plant them outside the beginning of May; a late snowstorm or heavy frost won't harm them.
If you prefer less work, wait until the ground is dry in spring and then plant the seeds in pots as usual. Choose a semi-shaded spot in your garden and bury the pots up to the rim in the soil. Make sure the seeds/seedlings have enough water and leave them be until it is time to pot them up into individual pots. Once they are sturdy seedlings they can be planted out into their permanent location. Remember they will be very small, but if roots are coming out of the bottom of the pot it's time to put the young plants in the ground.

Here is the list of "sow and grow" species in no particular order. All grasses except Blue Gramma Grass are sow and grow so I haven't included them.

Giant Hyssop, *Agastache foeniculum* - It's fairly tall, bushy and has masses of blue/purple flower spikes in midsummer. Bees love this plant. It also has edible flowers and leaves. Giant Hyssop looks beautiful as a backdrop for Gaillardia. It self-seeds, so you will have lots of seedlings to give away. It will grow in sun or semi-shade.

Gaillardia, *Gaillardia aristata* - This is a very showy species with large colourful flowers in midsummer. They are yellow splashed with red and have red centres. Gaillardia has a long bloom period. It's a bushy plant that tends to spread out, so it is usually as wide as it is tall. Bees love the flowers. Sun or semi-shade.

Meadow Blazingstar, *Liatris ligulistylis* - This flower is my favourite, and it's the favourite flower of butterflies too. Blooms are a vivid pink and appear in midsummer. This is a stunning plant that looks gorgeous when designed as a large sweep of 5 or 7 or even 9 plants. The seed heads are very attractive too and provide winter interest. Fortunately Meadow Blazingstar tends to self-seed, so with luck you will have more plants popping up. The seedlings look like blades of grass so don't weed them out. Sun.



Smooth Fleabane, *Erigeron glabellus* - This is a short neat plant with lots of small, blue or purple, daisy-like flowers in midsummer. It has a long bloom period and the flowers attract our tiny native bees.
Sun or semi-shade.

Wild Blue Flax, *Linum lewisii* - This is a great plant for a hot dry area. Wild Blue Flax is an airy, lacy plant that is studded with masses of sky blue flowers. It self-seeds abundantly, but the surplus seedlings are easy to weed out. Sun.

Golden-aster, *Heterotheca villosa* - Try planting this species in front of Wild Blue Flax. The golden daisy-like flowers make a lovely contrast to the blue flax. Golden-aster is an attractive ground cover and it also prefers a hot, dry location. Both of these species are adaptable and will do well in regular garden conditions. Sun.

Wild Bergamot, Monarda fistulosa is another bushy plant, medium in height and covered in flamboyant rose pink flowers in midsummer. These flowers attract humming birds as well as bumblebees. Its only drawback is that it can be susceptible to powdery mildew. Sun or semi-shade.

Low Milkweed, Asclepias ovalifolia, is our local, well-behaved species of milkweed. It is medium hight and will spread into a larger patch, but it's not an aggressive spreader like Showy Milkweed which is native to Southern Alberta. It is worth growing just for the large seed pods that burst open in a cloud of iridescent fluff. Interestingly, Low Milkweed doesn't self-seed abundantly, but a few new seedlings may appear each year. All milkweeds attract Monarch butterflies. Unfortunately monarchs are rarely seen here as Edmonton is not on any of the regular flight paths, but fortunately all butterflies love milkweed flowers. Low Milkweed is interesting in another way. When you grow it you will wonder what you are doing wrong because the seedlings are tiny and spindly the first year. This is because the plants spend all of the first year developing a strong root system, so the main growth is hidden below ground. Don't give up, they will grow and flower the next year!

All photos by ENPS volunteers.

Website of the Month:

Edmonton Nature blog done by Edmonton Master Naturalists: https://natureedmonton.wordpress.com/category/invasive-plants/
Mostly done by Master Naturalist Jason Teare in 2013 but still worthy of a read, and having a look at his wonderful photos.

Lifetime ENPS Membership
You can now become an Edmonton Native Plant Society member for life. Memberships are $20 and can be purchased by emailing enpgmembership@gmail.com or visit one of our booths at plant events in your area.

Aims of the Edmonton Native Plant Society:

Promote knowledge of the Edmonton area native plants.
Conserve our native plant species and their habitats.
Preserve native plant species and habitat for the enjoyment of present and future generations.
Educate individuals, business and local governments about native plants.

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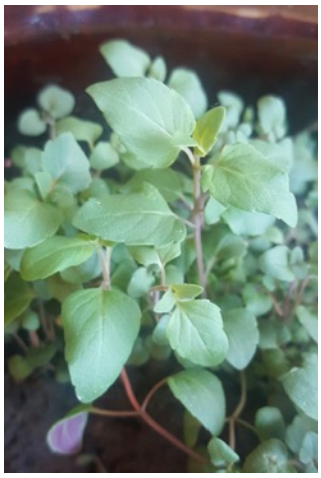
Judith Golub, publisher
www.edmontonnativeplantgroup.org




Baby seedlings: wild bergamot, *Monarda fistulosa*; heart-leaved Alexanders, *Zizia aptera*; wild blue flax, *Linum lewisii*; meadow blazingstar, *Liatris ligulistylis*. Grown and photographed by Manna Parseyan.