



R O O T S

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Winter 2018



Liatris ligulistylis

Meadow Blazing Star

Photo credit: H Peat Hamm

Native Plant Society of Saskatchewan

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Roots 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.

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Winter Issue: November 1 December 15

Spring Issue: February 1 March 15

Summer Issue: May 1 June 15

Fall Issue: August 1 September 15

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Corporate \$200 Life \$500

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

Get your photo on the cover of... **ROOTS!**

Submit your Saskatchewan native plant photos for future cover consideration to: info@npss.sk.ca

NatureCity Festival Receives 2018 Tourism Award

We have exciting news! NatureCity Festival has been honoured by Tourism Saskatoon.

"I come in contact with over 60 festivals and events annually, and while all of them are jewels in the Saskatoon crown, NatureCity Festival offers visitors and residents something precious and unique and has done so for a number of years. The Festival has successfully made us think and rethink our very surroundings that we so often take for granted," says Tracey Thompson, the Leisure and Recreation Marketing Specialist with Tourism Saskatoon. "Blessed as we are living in this special place, it is essential that we make sustainability, respect and ecology top of mind. NatureCity Festival is a celebration of our environment and the people that are passionate about this place."

As one of the original members of Wild About Saskatoon, the collective that organizes and hosts the festival, the Native Plant Society of Saskatchewan has had the pleasure of seeing this event grow and evolve over the years, providing countless opportunities for people to think about and interact with nature. We couldn't be prouder of the contributions and accomplishments of all who have been involved since the first NatureCity Festival in 2013.

Planning has already begun for the 2019 NatureCity Festival, so keep an eye out for announcements in future newsletters and on our social media feeds. For more details on the NatureCity Festival, or Wild About Saskatoon, please visit the website at: www.wildaboutsaskatoon.org



Above: Members of Wild About Saskatoon, including NPSS Executive Director, Chet Neufeld on back left. Photo: Supplied.

A Case for Important Plant Areas

Chet Neufeld, NPSS Executive Director

Important Plant Areas is a conservation program first developed by Plantlife, a UK-based organization, to provide a platform for identifying and preserving significant wild plant populations. According to Plantlife, an Important Plant Areas program should “inform and underpin existing international, regional and national conservation programmes and legislation”. Ultimately, their hope is “that Important Plant Areas will act as a benchmark for determining whether the strongest protection, under any existing legislation, is being afforded to the most important sites for plants”.

Since the program’s debut in Europe, other jurisdictions have followed suit. In North America, arguably the most well-developed programs are administered by the California Native Plant Society and our nearest neighbours to the south, the Montana Native Plant Society, for use in their respective states.

Using Montana’s program as a template, the Botanical Assessment Working Group (of which the NPSS is a member), aims to adapt the program for Saskatchewan with the hope that the provincial government will use it in its landscape planning approach. Now that the primary goal of reassessing rarity rankings for Saskatchewan’s plant species is complete, the Botanical Assessment Working Group can shift its focus to a habitat level.



Upcoming Events

2019 NatureCity Festival: I Spy with My Wild Eye...

May 21-26, 2019

Saskatoon, SK

www.wildaboutsaskatoon.org

Back to the Field Workshop:
Diversity in the Landscape
Society for Range Management
Prairie Parkland Chapter

May 28-29, 2019

Val Marie, SK

For more information, contact
Rachel Turnquist at:
srm.prairieparkland@gmail.com
or 1-866-457-2377

2019 Nature Saskatchewan Spring Meet

June 14-16, 2019

Eastend, SK

www.naturesask.ca

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.

The hope is that an Important Plant Area designation will provide regulators and decision makers with information and an opportunity to direct development away from these significant sites. Other opportunities may include applying for funding for data collection, monitoring, or management of these sites, and working with land managers to continue to make decisions that are beneficial for the plant species and habitats that occur on these sites.

Work has already begun, with a recent meeting of the Botanical Assessment Working Group discussing how to adapt the program for Saskatchewan, including site selection criteria and drafting a list of potential priority Important Plant Areas. Once the details of the program are finalized, anyone will be able to nominate sites to be considered as Important Plant Areas, which will then be adjudicated by the Botanical Assessment Working Group. The NPSS website will serve as a clearinghouse for the program.

Right: Little Boggy Creek Fen - a potential candidate for an Important Plant Area. Photo: Chet Neufeld



Above: The prairie vista unfolds atop the St. Victor Petroglyphs. Photo: Chet Neufeld.

Prairies and Petroglyphs Tour was a Rocking Good Time

Chet Neufeld, NPSS Executive Director

On Sunday, August 12, a small but keen group of people explored the prairies around St. Victor Petroglyphs. The site, located south of Assiniboia, is a Provincial Historic Site and a sacred place to indigenous people, having been used for thousands of years. David Munro, with the Friends of the St. Victor Petroglyphs, was our guide for the day. Our goal (other than to have a great time) was to develop a comprehensive plant list for the Friends of the St. Victor Petroglyphs to use in their new education and outreach materials. We met at the small visitor centre, a log cabin that David explained was from the former Moose Jaw Wild Animal Park that has been dismantled, moved, and reassembled piece by numbered piece on the site it stands today on the edge of Saint Victor. The centre contains local artifacts, photos, descriptions, and a cast of a portion of the petroglyphs. From there we ventured the short distance to the start of our hike. Starting at a small parking lot, the trail winds down into a diverse mixed wood stand. We explored the forest and immediately began adding dozens of species to our plant list. This part of the province saw drought-like conditions, which was evident across the landscape. Some species which should still have been blooming in a normal year had already finished,

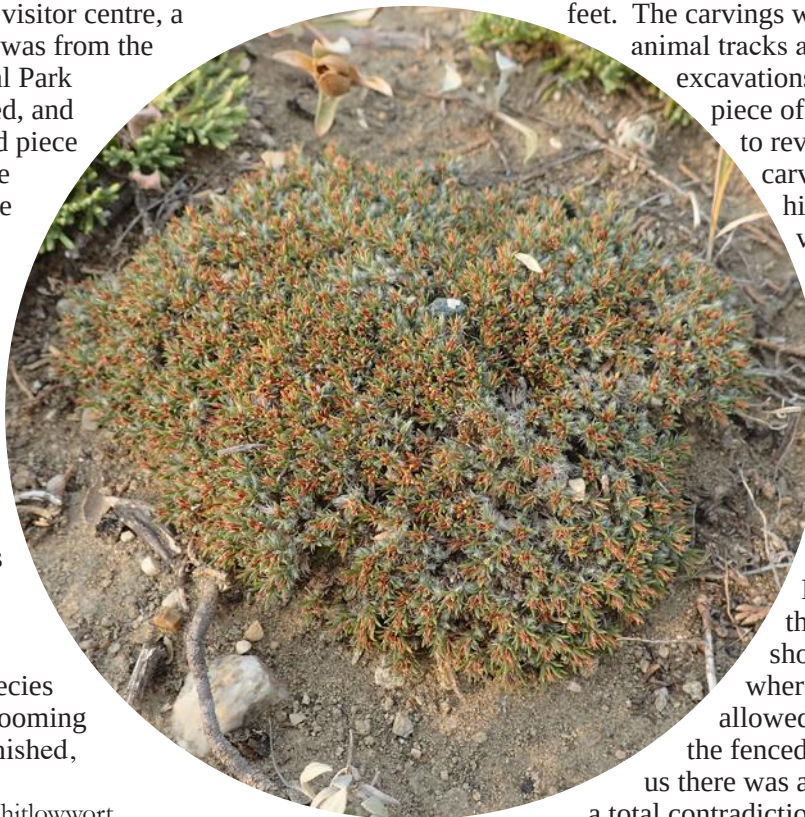
and those that bloom later were fairly advanced as well. Additionally, some species were already in stages of senescence, which made identification a challenge. There was still plenty to see though, with a good diversity of plant species and a range of habitat types.

From the forest, we slowly wound our way up a steep hill, arriving at the top. The hill provided great botanizing opportunities, with a forest/prairie edge, a small seep and many different plant groupings as we worked our way up the slope and the moisture gradient that it represented. Emerging at the top of the hill, we were treated to view of the surrounding countryside including Lake

Montague which is only a few feet deep despite it being a couple of kilometers in diameter. The real attraction at the top of the hill though, was the sandstone escarpment that contains the petroglyphs. Almost flat on top and dropping approximately 5 meters vertically, indigenous people chose to carve figures on the horizontal surface rather than the vertical face, making this site unique. Being with David had its advantages, as he gave us a backstage tour as it were, unlocking the gate and leading us through the perimeter fence that normally keeps tourists out. We were able to venture out to the edge of where the petroglyphs start, being careful not to step on them as they were right at our

feet. The carvings were varied and included animal tracks and human figures. Recent excavations have pulled back a small piece of overlying vegetation to reveal previously unseen carvings, and more are likely hidden under other adjacent vegetated areas. One of the best finds of the day was at one of these interfaces, where a single Low Whitlowwort (*Paronychia sessiliflora*) was growing. This species is rare (S3) in Saskatchewan.

After exploring the top of the cliffs, David lead us around to the bottom of the cliffs, showing us another area where visitors aren't typically allowed to go as it is still within the fenced off area. What greeted us there was a moist forest understory, a total contradiction to the dry prairie just



Right: The provincially-rare Low Whitlowwort (*Paronychia sessiliflora*) (S3). Photo: Chet Neufeld.



Above: A human figure carved into the rock, probably the most striking image on the rock face. Photo: Chet Neufeld.

a few meters up from where we stood. We even found what we have tentatively identified as Brittle Baldfern (*Cystopteris fragilis*) growing at the bottom of the cliff face in a moist crevice. After exploring this area, we once again climbed the hill and fanned out across the drier grassland areas. Once again, David came in handy. Because the Friends of the St. Victor Petroglyphs have struck handshake agreements with local landowners, we were able to cross fence lines with impunity and could wander wherever our eyes lead us. The prairie was dotted with the yellows and blues of late summer, including Stiff Goldenrod (*Solidago rigida*), Velvety Goldenrod (*Solidago mollis*), Silverleaf Psoralea (*Pedimelum argophyllum*), and Breadroot (*Pedimelum esculentum*), and a closer inspection revealed smaller but nonetheless beautiful wildflowers like Spiny Ironplant (*Xanthisma spinulosum*). Other notable plants that occur on the site include Western Red Lily (*Lilium philadelphicum* var. *andinum*) and the rare (S3) Downy Paintbrush (*Castilleja sessiliflora*). Overall it was a great day with way more to see and more areas to explore than we had time for. Though the area is a little off the beaten path, it's well worth the drive. Sylvan Valley Regional Park is adjacent to the petroglyph site and is a recommended side trip or overnight stay. To stay informed on what is going on

in that part of the province, you can follow the Friends of the St. Victor Petroglyphs on their Facebook page at:

<https://www.facebook.com/Friends-of-St-Victor-Petroglyphs-146272314727/>

For a complete list of what can be found at the St. Victor Petroglyphs Provincial Historic Site, go to the plant checklist page on our website at: <https://www.npss.sk.ca/info-resources/plant-checklists>

Thanks to David Munro, the Friends of the St. Victor Petroglyphs and all the participants for a great time!

This issue's COVER PLANT - *Liatris ligulistylus*

Meadow blazing star is a beautiful and common wildflower of moist prairies and a close relative of the dotted blazing star (*Liatris punctatata*), which is found on dry prairie. Blazingstars are easy to grow, bloom in late summer, and are a favourite of pollinators.

COVER PLANT is a feature of our new newsletter format and will present a different native Saskatchewan plant species each issue.

The Trees Beneath Your Feet - A Tale of Graft and Corruption

Kenneth Armson, Registered Professional Forester

Originally published in the Winter 2013 issue of *The Blazing Star*, the newsletter of the North American Native Plant Society

Whether you are interested in the ground vegetation, birds, fungi or wildlife when you go for a walk in a forest, trees are ever present as a macrostructure and backdrop. Except in young forests, you are likely to see larger or older trees that have been wind-thrown, lying on the ground with a part of their root system sticking up in the air, often with soil and stones attached. You might give casual attention to the roots. Depending on when the tree was wind-thrown, and its species, much of the root may have rotted away. The soil has slumped to the surface and created a mound adjacent to the depression the wind-thrown tree left. This is the origin of the “hump and hollow” forest surface characteristic of most woodlands.

When we speak about the ecology of forest communities, we most often focus on the above-ground features but there is a major component which lies beneath the surface associated with the roots of the trees. Above ground the trees are usually viewed as separate individuals, each contributing to the forest community; below ground the roots tell a different story. It's relatively easy to look at and measure trees above ground but if you want to look at their roots in a comprehensive way, a lot of effort is required, as is considerable disturbance and removal of the soil around them. Species have different forms of root systems. Some are relatively plastic or flexible and can adapt to a range of soil conditions and depths. A good example of this is the red maple (*Acer rubrum*): its adaptability may partly account for its wide latitudinal range from Florida to the southern part of the Arctic watershed in eastern North America. Other trees are not so flexible and are usually found with a series of major thick roots, often including a tap root, such as the pines (*Pinus* spp.) and oaks (*Quercus* spp.). Most species have a combination of roots, both vertical and lateral, of many sizes.

Roots comprise 10 to 25% of a tree's mass, depending on species and stage of development. They are the major organs for absorbing the nutrients and water from the soil that are necessary for a tree's growth and well-being. The main roots will provide anchorage for the tree while a tree's fine feeder roots will predominate in the surface soil layers where the mineral and organic matter provide a major source of both nutrients and water. Deeper roots in the mineral soil absorb both water and nutrients. Most interested persons are familiar with – and have expectations about – tree growth above ground, especially if they are involved with establishing a new forest plantation. Apart from competition from other plants above ground there is unlimited space for the development of a tree's stem and crown. But what



Above: Roots of an 85-year-old jack pine growing in outwash sands. Note restriction of vertical root extension at 1.3 metres (4.2 feet) due to change in soil texture.

about the growth of the root systems below? The nature of the geological materials in which the soil develops, and the type of soil development usually restrict root growth. Normally the restriction in root growth has a major effect on water uptake and this is what limits the above ground development of the tree.

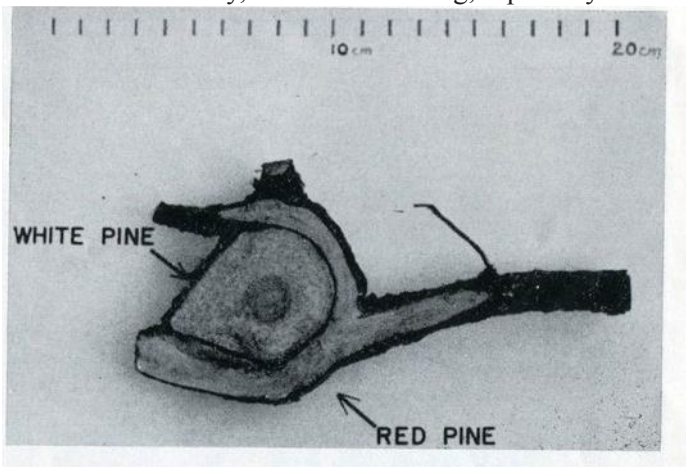
The roots of a young tree normally grow rapidly out and down into the soil until they are limited in extension by some soil feature, usually physical, such as bedrock, a major change in soil texture or groundwater. For our northern trees this commonly occurs within the first 10 or so years of the tree's life. These roots will continue to grow in diameter; normally the growth is greater closer to the tree's stem, but there will be a continuous infilling of the initial rooting volume with age and development of the entire tree. Inevitably then, as each tree in the forest develops above ground so does its roots. Thus, roots from one tree will grow into the rooting volumes of adjacent trees. As they intermingle and grow in diameter, one or more will come into contact with another root and, as their diameter growth increases, there will be an increase in pressure at these points of contact. The roots of trees in the soil are solidly anchored; as the pressure at points of contact increases, the bark of the roots can be broken and the tissues of the two roots come into contact so that there is a living union between them. This is the origin of root grafts. Self-grafts occur between roots of the same tree, intraspecific grafts between the roots of trees of the same species, and interspecific grafts between roots of different species.

Self-grafts are most common and generally occur close to the base of the stem of a tree. Grafts between roots of different individuals of the same species are also common and have received the most attention. Grafts between roots of different species are rare. Where root grafts are observed, the only way to be sure that there is a union of vascular tissues is by physically cutting into the apparent graft; if the bark remains intact around both roots then no union of tissues has occurred. The time for the union to take place in red pine (*Pinus resinosa*) in Ontario was found to be one

to two years. Grafts between trees of different species are most likely to occur when they are of the same genus and can hybridize, as has been reported for certain oak species. “Live” stumps are the most obvious indication that root grafts are present as shown by callus tissue on the stump surface.

This leads to the question of who benefits from the presence of grafts. What are the implications for stand development and what may best be termed “forest hygiene”? One of the most obvious inferences is that where there is extensive occurrence of grafts, for example in a stand of pine, it will impart some extra degree of wind firmness than would otherwise exist. Many scientific investigations have looked at the movement of minerals, water and organic materials between individuals that have grafted roots. It would appear that diversion of minerals and water from one tree to the other is not significant; however, this does not apply to organic materials, which are transported. When this occurs between a dominant and a smaller tree, the latter gains. Between two dominant trees the exchange is most likely neutral. However, if the live tree is keeping a stump alive it is giving up some of its metabolites but probably gains some increase in water and nutrient absorption from the expanded root system. Payoffs are a part of the system! Where a tree takes over the portion of another root system which has died without any residual connection to the stump of the dead tree, there is an immediate enhancement of the surviving tree’s root system: the benefits are water and nutrient absorption.

Another area of major study is the ability of pathogens to move from one tree to another via root grafts. Transfers of *Heterobasidium annosus* in pines, oak wilt and other pathogens have been well-demonstrated, although root grafts are not necessarily the main vector for their transmission in a stand. There are a number of forest management practices which either enhance the formation of root grafting or can be affected by the presence of grafts in a stand. Generally, the act of thinning, especially in



Above: Root grafts (arrows) in adjacent red pines. Photo: Ken Armson



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- University degree in biology/ecology or related studies
- A minimum of one years' field experience in conducting vegetation surveys
- Basic knowledge of plant taxonomy, including the ability to identify species using taxonomic keys
- Proven ability to identify plants to the species level in a field setting
- Working knowledge of the Saskatchewan rare plant detection survey protocols is an asset
- Experience conducting rare plant surveys is preferred
- Able to classify wetlands in a field setting using the Stewart and Kantrud Wetland Classification System and the Canadian Wetland Classification System is an asset

JOB DUTIES

- Conduct vegetation surveys and assessments in accordance with applicable protocols
- Classify and delineate wetlands in a field setting
- Assist in the preparation of technical reports

Please note that some work for this position may be in remote locations for extended periods of time and may require overtime, weekends and variable hours.

Please submit applications at:
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Root grafts (arrows) in adjacent red pines. Photo by Ken Armson

young polewood stands (saplings to small sawlog sizes), results in increased root grafting. In a study of graft occurrence in a 45-year old red pine plantation in Ontario there was a four-fold increase in root grafting in the thinned versus the unthinned stand. Chemicals injected into live trees either to kill them (silvicides) or for other purposes are likely to be readily transported to adjacent individuals via root grafts. Where roots of two or more individual trees are in very close contact without the formation of grafts, the transport of chemicals such as plant auxins between them can still occur.

The entire zone of roots in the soil, the rhizosphere, is a rich, biologically active one deserving of far more attention than we have given it.

Ken Armson is the Chair of the Forest History Society of Ontario and the former Provincial Forester for Ontario.



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