

No. 82 May 2019

Iris

The Alberta Native Plant Council Newsletter



In This Issue

Every Plant Tells a Story –
32nd ANPC Workshop 1

Power of Native Planting in
a Municipal Park 2

Impact of Rose Stem Girdler
on Prairie Rose Communities..... 3

Figworts? What Figworts? 6

Illustrated Keys to Alberta
Vascular Plants – Update 9

News and Events 12

Look for more information
on the ANPC's website.
www.anpc.ab.ca



ALBERTA
Native Plant
COUNCIL

Cover photo: Marsha Hayward
Prairie crocus (*Pulsatilla nuttalliana*) growing in open
jack pine (*Pinus banksiana*) forest near Cold Lake, AB.

Every Plant Tells a Story: Documenting Native Plants in Alberta at the 32nd ANPC Workshop

Coleen Mahoney

The 2019 ANPC workshop and AGM took place in Lethbridge on March 16. This year's theme was Every Plant Tells a Story: Documenting Native Plants in Alberta.

In the morning, our speakers provided us with information on monitoring in the Milk River Natural Area and the Kennedy Coulee Ecological Reserve, a ten-year update on the management of *Yucca glauca* at the Pinhorn Grazing Reserve, and using rangeland management in xeriscape designs. We also had an overview from the Alberta Biodiversity Monitoring Institute on monitoring and reporting from their 1656 permanent sites, a discussion of the importance of data gathering in relation to development and climate

change in Alberta, and the development of the Kainai Traditional Plant database that is used to document Western and Traditional plant knowledge.

In the afternoon, we received an update on the Second Edition of the Rare Vascular Plants of Alberta Book Project, an update on rare plant surveys and ACIMS, and information on a new element occurrence of rough blazing star (*Liatris aspera*) in Alberta. To close out the afternoon, we heard about monitoring and assessing of SARA species in southern Alberta, the fight against invasive aquatic species in Alberta, and assigning wetland indicator status to wetland and upland plant species.

See **Workshop**, page 8

Workshop participants toured the display of soil monoliths at Lethbridge College. The collection was donated by Agriculture and Agri-Food Canada and provides a valuable resource for instructors and students.

Monica Bartha



Power of Native Planting in a Municipal Park

Kristen Andersen

A project to establish native plants in a small park in Devon, AB, was completed in June 2018. The project was inspired by a group of local residents that had taken initiative to remove weeds and debris from the site over the past several years. There was a growing concern that the common landscape management practices around the small wetland area were contributing to habitat degradation, as amphibians, bats and garter snakes once present were no longer around.

ANPC member Kristen Andersen joined a few motivated community members, and together they created a plan for ecological restoration of the degraded area while creating an opportunity for local stewardship and education. Restoration is assisting recovery of ecosystems that are damaged or degraded. In addition to environmental benefits, there are also spiritual benefits of community projects where restoration reconnects humans to nature and to each other.

The work took place in a small wetland that is part of the stormwater drainage network in Highwood Park, located within a residential area, which includes a paved multi-use trail, a playground and green space that are widely used by residents. The small wetland is about 200 m². Devon's parks, ravines and river valley are home to wetlands and watercourses that have surface and groundwater connections to the North Saskatchewan River and provide important ecosystem services.

The majority of the site is covered by rock and landscape fabric installed for erosion protection. These conditions limit the ability for desirable plants to grow. Much of the vegetation is growing between openings in the geotextile and on sediment that accumulated on top of the geotextile. Weeds comprised the majority of vegetation including perennial sow-thistle (*Sonchus arvensis*), creeping thistle (*Cirsium arvense*), scentless



Kristen Andersen



Kristen Andersen



Kristen Andersen



Kristen Andersen



Kristen Andersen



Kristen Andersen

Top Row: Left – Site along park trail before work. Right – Volunteer crew working on June 26, 2018.

Middle Row: Left – Preparing erosion control filter sock. Right – Beneficial use of erosion control filter sock along top of slope.

Bottom Row: Left – Transplanting young native sunflowers. Right – After clearing and native planting work (June 27, 2018).

chamomile (*Tripleurospermum inodorum*) and quackgrass (*Elymus repens*).

Establishing native species was a great opportunity to increase aesthetic value and provide important ecosystem services such as habitat for birds and pollinator species, water quality improvement and erosion protection. An international coalition of scientists produced the Millennium Ecosystem Assessment Report (MEA) that defined ecosystem services as “the benefits people obtain from ecosystems” and

generally placed them in the following categories: 1) provisioning services (food, fuel and medicine), 2) regulating services (purifying water or mitigating floods, 3) habitat and supporting services (habitat and food for migratory birds, pollination and nutrient cycling), and 4) cultural services (aesthetic, spiritual and intellectual needs) (MEA 2005). Ecosystem services are on the rise at the Highwood Park wetland through the power of establishing native plants.

See **Municipal Park Planting**, page 8

The Impact of the Rose Stem Girdler (*Agrilus cuprescens* Ménétériés) (Coleoptera: Buprestidae) on Prairie Rose Communities: A Call to Action

David J. Larson

(Note: First printed in *Entomological Society of Saskatchewan Newsletter*, 2013, Vol. 32 (2): 1-3.)

David Larson



Figure 1. Adult rose stem girdler.

A massive die-off of prairie roses (*Rosa acicularis* and *R. woodsii*) has continued unabated across southwestern Saskatchewan and southern Alberta since 2000 (Larson 2003, 2009). The causative agent of this die-off is a buprestid beetle, the rose stem girdler (RSG) (*Agrilus cuprescens* Ménétériés) (Coleoptera: Buprestidae, also commonly called Jewel Beetles). The RSG is an invasive species, first introduced into North America in New Jersey in 1923 (Bright 1987). Since that time the species has expanded its North American range to now occur from at least Virginia to southern Ontario and Quebec, and west to Utah and Idaho. The first record of RSG from the Canadian Prairies was 2001 based on adult and larval collections in the Maple Creek, SK, area, although damage to roses was first noted in 2000 (Larson 2003).

The RSG is generally regarded as a minor pest of roses and to a lesser extent raspberry (*Rubus*) and currant (*Ribes*). Damage is done by the larvae, which tunnel in the cambium layer of the stems. The adult lays an egg into a hole in the bark and on hatching the larva tunnels beneath the bark, moving up the stem in a tight spiral. This tunnelling girdles the stem and severs the phloem, killing the stem beyond the point of attack. The stem may become enlarged and gall-like in

the area of a tunnel but most often the only indication that a stem is infested is when it dies. Girdling may cause stem death only distal to the point of attack, but in the two prairie rose species the most usual situation is for the entire stem to die back to ground level. Adult beetles are present on roses in June and early July, which is presumably the period of egg laying. However,



David Larson

Figure 2. Rose stem with bark peeled away to show spiral larval tunnel and larva at end of tunnel.

the effect of the larvae is usually only noticed in mid- to late August and September when the leaves of infested, dying stems turn prematurely coppery or red. Infected roses are easily identified before the healthy roses develop their fall colours as well as during winter for the prematurely killed leaves become brown and are held on the stem over winter. The presence of a RSG larva in a stem can be easily confirmed by stripping a narrow slice of bark from the length of the stem. A tunnel is dark in colour and contrasts with the pale exposed wood

or if the slice is so deep that it cuts into the sapwood below the tunnel, at least the tunnel ends are visible as series of parallel dark spots on either side of the cut. One larva will kill a stem, but in the current infestation stems with multiple larvae are frequently observed. Figures 1 to 4 show the adult beetle, a larva and its tunnels, prematurely red infested rose, and larval tunnels exposed by whittling a strip of bark off the stem.

It is also possible to determine if a dead stem was killed by RSG. If the bark is still on the stem, gently stripping it off will reveal the tunnel. Even if the bark has flaked off, tunnels are usually lightly engraved into the sapwood so remain recognizable. Dead rose stems break down quickly, but generally evidence of stem mortality caused by the RSG is evident as long as the stem is intact.



David Larson

Figure 3. Rose plants showing the premature reddening of leaves characteristic of stems killed by the rose stem girdler.

There are many internet references to the RSG, generally in the area of horticulture and its effect on cultivated roses and other canes. There is little written on its effect on native plants, and in fact over much of its range, both native as well as historically invaded areas, the beetle may have little effect. However, in at least southwestern Saskatchewan and adjacent Alberta,

Rose Stem Girdler, from page 3

the presence of the RSG has been a catastrophe to the two principal rose species (the stems of the third native species of the area, *R. arkansana*, are probably too small to support larvae). The impact has not been quantified nor is there baseline data on rose abundance and growth forms to allow a quantitative assessment of the impact. Larson (2003, 2009) presented some anecdotal observations and speculation on the impact of the RSG to regional roses. Recent illustrations of infested and prematurely coloured roses (Glen 2013, Massiah 2013) show landscapes in which almost all the roses are dying (Figure 5).

This process of massive die-off has been going on year after year for over a decade. What has been the effect? Roses are still present on the Prairies. Stem death does not kill a rose plant. They have persistent roots that continue to send up new shoots. The RSG larva seems to require a stem of a certain minimum diameter in which to develop, and new shoots of the year are probably too small and appear too late in the season to be attacked. It is two-year and older shoots that are killed. Thus, the older stems are killed off leaving younger and smaller stems in patches in which stem density is also reduced. The net result is roses are now found in stands that are lower and more open, and the young stems are less strongly armed with spines.

Roses are essentially absent from cultivated land, but in waste areas or areas with natural vegetation, they form an integral part of the plant community and are a principal species (usually in association with snowberry (*Symphoricarpos occidentalis*)) providing a perennial height dimension in the vegetation. In this respect they provide shelter to animals, trap snow and probably help retain soil moisture through shading effect. The dense stands and prickly stems prevent or at least slow ingress of larger animals into stands so that these stands can act as refuges to small prey species, safe nesting and breeding sites for various birds as well as refuges from grazing



David Larson

Figure 4. A rose stem from which a strip of bark has been removed. The ends of a tunnel of a rose stem girdler larvae are exposed as dark spots just under the bark (at end of arrows).

for various plants. With RSG attack the stands become lower, more open and more succulent so that cattle, which exert a very heavy grazing pressure on almost all-natural prairie, can graze these patches. Cattle also consume tender, new rose stems so they in turn contribute to the further demise of the roses. The combined attack, first by the beetle, then grazing pressure against regeneration, produce a situation where patches and banks of roses are converted to grassland with attendant change in plant community structure and composition. This is a double whammy that is further homogenizing the prairie and reducing its diversity and biota.

It is a commonly held maxim that grazing is a natural part of the prairie ecosystem and that grazing of livestock is compatible with prairie conservation. This is probably true up to certain grazing intensity under natural prairie conditions. However, when grazing pressure is maximal (as is generally the case) and a foreign element such as the RSG is added to the mix, rapid and severe change to the prairie environment can occur. Within the Great Sand Hills, the impenetrable banks of roses of a decade ago are gone. The roses in the draws and coulees of the Cypress Hills uplands as

well as along drainage systems of the southwest are in steep decline and will probably soon disappear as a significant component of the ecosystem. As long as the RSG remains a common species in the region, it will have to be taken into account in management plans for natural and conservation areas especially if these also serve as grazing lands.

This paper was prepared in order to:

- A. Advise as wide an audience as possible of the existence of the RSG in the dry prairie region and to point out the ecological impact of the species, especially in concert with current livestock management; and
- B. Develop a plan to at least monitor the distribution of the RSG, along with its abundance and impact on roses and the associated communities. The prairie distribution of the RSG is not known. I have seen infestations from Moose Jaw, SK, west to Lethbridge, AB, and north to the Bow and South Saskatchewan Rivers. Does it occur outside this area, and if so, is it at densities that have the impacts described above?

See *Rose Stem Girdler*, page 5

Rose Stem Girdler, from page 4

The concerns expressed above regarding the impact of the RSG on prairie environments need to be tested against the observations of others, and ideally quantified either by setting up monitoring stations for rose density or finding sites in which vegetation had been previously studied and against which current observations could be compared. Dr. Chet Neufeld, director Invasive Species program, has suggested that the website be used for compilation of observations on distribution and density as a step towards assessing the extent of the problem.

References

Bright, D.E. 1987. The insects and arachnids of Canada. Part 15. The metallic wood-boring beetles of Canada and Alaska (Coleoptera: Buprestidae). Research Branch, Agriculture Canada, Publication 1810.

Glen, B. 2013. Beetle threatens iconic symbol: decline continues. Rose stem girdler is killing wild roses in Alberta and Saskatchewan. Western Producer. May 2, 2013, pp. 19-20.

Larson, D.J. 2003. The rose stem girdler (*Agrilus aurichalceus* Redtenbacher) (Insecta: Coleoptera: Buprestidae), a new threat to prairie roses. Blue Jay 61 (3): 176-178.

Larson, D.J. 2009. Notes and observations on the rose stem girdler (*Agrilus cuprescens* Ménétériés) (Insecta: Coleoptera: Buprestidae) in southern Alberta and Saskatchewan. Blue Jay 67 (2): 82-85.

Massiah, M. 2013. Beetle killing wild roses on prairies. Maple Creek News. Oct. 3, 2013, p. 12.

Postscript, March 2019

A monograph on the Jewel Beetles of Northeastern North America indicates the North American range of the rose stem girdler as being eastern Canada from Nova Scotia to Ontario and the northeastern United States (Paiero et al. 2012). A recent checklist of the Beetles of Canada (Bousquet et al. 2013) follows Larson (2003) in including Saskatchewan within the range but did not give records for the other western provinces, namely Manitoba, Alberta and British Columbia. Recently, the

species has been recognized as a pest of berry crops and domestic roses in the Pacific Northwest states of Washington, Oregon and Idaho (state agriculture extension websites). It is almost certain that the species occurs from coast to coast in southern Canada and in the northern tier of US states.

The original note called for a survey of the geographical distribution of the RSG in the Canadian Prairies. An organized survey has not been carried out, but



Figure 5. A Cypress Hills landscape showing extent of rose die-off. This site shows the effects of intensive grazing in which roses are the main woody shrub, and almost all of these are dying.

I have observations that indicate the species occurs throughout at least the grassland and parkland ecoregions of Alberta and Saskatchewan. In the west, the species has been observed in Waterton Park and Kananaskis Valley (J.D. Shorthouse, pers. comm.), and Longview and Canmore. I have seen larvae in the stems of cultivated shrub roses in northwest Calgary, so the regional host range can also be extended. To the north, infested roses have been seen along the Red Deer River in Alberta, and in Saskatchewan they have been seen north to Melfort and Choiceland. The insect probably occupies the entire area south of the North Saskatchewan River. No records from Manitoba have been seen, but the species occurs in the Qu'Appelle Valley and south of Regina. It is almost certain to be in at least southwestern Manitoba. What have been the environmental effects? Again these have not been measured. As described above, thick patches of roses have largely

See **Rose Stem Girdler**, page 8

Alberta Native Plant Council

Garneau P.O. 52099
Edmonton, AB T6G 2T5

website: www.anpc.ab.ca
email: info@anpc.ab.ca

President

Eri Hiraga
president@anpc.ab.ca

Vice-President

Laurie Hamilton
laurie@zanshinenvironmental.com

Secretary

Jennifer Muir
secretary@anpc.ab.ca

Treasurer

Julie Figures
treasurer@anpc.ab.ca

Directors

Marsha Hayward (**Northern**)
wildloonart@mcsnet.ca
Kristen Andersen (**Central**)
bluestems@hotmail.com
Christina Metke (**Southern**)
christina.metke@gmail.com
Kim MacKenzie (**Nature Alberta**)
kim.mack@goldpaw.ca
Trish Hiley (**Communications**)
communications@anpc.ab.ca

Membership Secretary

Kelly Ostermann
membership@anpc.ab.ca

Conservation Action

Laurie Hamilton
laurie@zanshinenvironmental.com

Information and Education/Outreach

Kristen Andersen
bluestems@hotmail.com

Rare Plants

Vacant

Reclamation and Restoration

Vacant

Webmaster

Carole Dodd
webmaster@anpc.ab.ca

Social Media

Cam Johnson
cam@makoj.com

Newsletter Committee

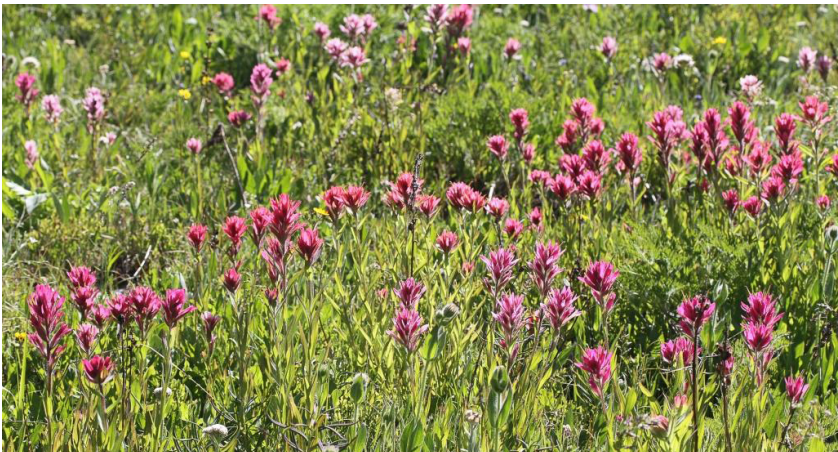
Dana Bush
Patsy Cotterill
Alfred Falk
Eri Hiraga
Coleen Mahoney
Patricia McIsaac
Jen Muir
Kelly Ostermann
Mélanie Violette
And many volunteer writers . . .

Figworts? What Figworts?

Lorna Allen and Linda Kershaw

Look at any but the very newest of floras and you will likely find a moderately large plant family, the Figworts (Scrophulariaceae), made up of numerous genera and species. In Alberta, we have (whoops, had) 19 genera (Table 1) and 74 species, including some of the cutest (think monkeyflower), oddest (elephant’s-head) and prettiest. A field of paintbrush is stunning!

Plant classification has been developed to reflect evolutionary relationships, with the goal that “all of the species assigned to a given group share a more recent common ancestor with each other than with any species outside the group” (Olmstead 2002). DNA research has lead to the conclusion that many of the members of the classic Figwort Family are, in reality, only distantly related. So, sadly, this intriguing family has now been, well, dismembered.



Field of paintbrush (*Castilleja* sp.)

Table 1: Genera traditionally included in the Figwort Family (Scrophulariaceae) in Alberta		
<i>Bacopa</i> (water-hyssop)	<i>Linaria</i> (toadflax)	<i>Penstemon</i> (beardtongue)
<i>Castilleja</i> (paintbrush)	<i>Melampyrum</i> (cow-wheat)	<i>Rhinanthus</i> (yellowrattle)
<i>Chaenorhinum</i> (dwarf-snapdragon)	<i>Mimulus</i> (monkeyflower)	<i>Scrophularia</i> (figwort)
<i>Collinsia</i> (blue-eyed-Mary)	<i>Nuttallanthus</i> (field-toadflax)	<i>Verbascum</i> (mullein)
<i>Euphrasia</i> (eyebright)	<i>Odontites</i> (bartsia)	<i>Veronica</i> (speedwell)
<i>Gratiola</i> (hedge-hyssop)	<i>Orthocarpus</i> (owlclover)	
<i>Limosella</i> (mudwort)	<i>Pedicularis</i> (lousewort)	



Square-stem monkeyflower (*Mimulus ringens*)



Elephant’s-head (*Pedicularis groenlandica*)



Clustered broomrape (*Aphyllon fasciculatum*, *Orobanche fasciculata*)

Of the Alberta genera once included in the Figwort Family, only mudwort (*Limosella*), mullein (*Verbascum*) and figwort (*Scrophularia*) remain. The rest have been reassigned to other families. To add to this indignity, no record has been found of any figworts (*Scrophularia* spp.) actually occurring here, so it has been dropped from the list of Alberta species. From 19 genera, 74 species, the Figwort Family in Alberta now includes only two genera and a total of four species; the rest have been reassigned to other families.

The Orobanchaceae or Broomrape Family is one that has had ex-figworts added to it. In the *Flora of Alberta* (Moss 1983), there are two genera and four species in the Broomrape Family, all lacking chlorophyll and all parasitic — using haustoria (parasitic connections to the roots of other plants) they have no need to produce their own food through photosynthesis. A number of the genera of the old Figwort Family are hemiparasites — capable of both photosynthesis and of developing haustoria to become partially parasitic. The genera that have the ability to develop haustoria (parasites or hemiparasites) are now all included in the Broomrape Family (Table 2).

See Figworts, page 7

Figworts, from page 6

Table 2: Genera in Alberta now included in the Broomrape Family (Orobanchaceae)

Genera traditionally in the Broomrape Family	<i>Boschniakia</i> (groundcone)
	<i>Orobanche</i> (now <i>Aphyllon</i>) (broomrape)
Genera added from the Figwort Family	<i>Castilleja</i> (paintbrush)
	<i>Euphrasia</i> (eyebright)
	<i>Melampyrum</i> (cow-wheat)
	<i>Odontites</i> (bartsia)
	<i>Orthocarpus</i> (owlclover)
	<i>Pedicularis</i> (lousewort)
	<i>Rhinanthus</i> (yellowrattle)

Another family that wins big in the Figwort Family dismemberment is the Plantain Family (Plantaginaceae). Blame this one on DNA, because the reasons these plants have been grouped together are less obvious. From a single genus, *Plantago*, the Plantain Family in Alberta now includes 11 genera (Table 3), eight from the figworts, plus two from small families that are no longer recognized.

Table 3: Genera in Alberta now included in the Plantain Family (Plantaginaceae)

Genera traditionally in the Plantain Family	<i>Plantago</i> (plantain)
Genera added from the Figwort Family	<i>Bacopa</i> (water-hyssop)
	<i>Chaenorhinum</i> (dwarf-snapdragon)
	<i>Collinsia</i> (blue-eyed-Mary)
	<i>Gratiola</i> (hedge-hyssop)
	<i>Linaria</i> (toadflax)
	<i>Nuttallanthus</i> (field-toadflax)
	<i>Penstemon</i> (beardtongue)
	<i>Veronica</i> (speedwell)
Genera added from the Water-starwort Family (Callitrichaceae)	<i>Callitriche</i> (water-starwort)
Genera added from the Mare's-tail Family (Hippuridaceae)	<i>Hippuris</i> (mare's-tail)



Hoary plantain
(*Plantago media*)



Pink monkeyflower
(*Erythranthe lewisii*)

If you've been paying attention, you will know that this leaves only those cute little monkeyflowers (*Mimulus*) unaccounted for. They have been added to a small family, the Phrymaceae or Lopseed Family. In the *Flora of Alberta* (Moss 1983) there is a single genus of monkeyflowers, *Mimulus*, and three species. Several more species have been found in Alberta since the flora was written, but with all the taxonomic changes, the only remaining *Mimulus* in Alberta is now *Mimulus ringens*. *Erythranthe* is the accepted genus for the others (and there are eight of them), including the three monkeyflowers in the 1983 flora.

With the mixing of genera between families, and with the addition of new species (let alone new families), the development of illustrated keys for this set proved to be a challenge. A new version for the illustrated key to this group, the Figworts and Allies (Allen and Kershaw 2019), will be posted soon on the ANPC website, to help with sorting through all of these changes. At a session of the Central Alberta Plant Study Group (Edmonton), participants worked through the rough draft key and had many helpful suggestions. Thanks to V. Crisfield and D. Fabijan for organizing the session and to the group for their assistance.

References Cited

Allen and Kershaw. 2019. Key to the Alberta Figworts and Allies (Orobanchaceae, Phrymaceae, Plantaginaceae, Scrophulariaceae). Compiled and written by Lorna Allen and Linda Kershaw, <https://anpc.ab.ca/>

Moss, E.H. 1983. The Flora of Alberta. Second Edition, Revised by John G. Packer. University of Toronto Press, Toronto, Ontario.

Olmstead, Richard G. 2002. Whatever happened to the Scrophulariaceae? *Fremontia* 13, Volume 30:2, April 2002. ♦



ALBERTA
Native Plant
COUNCIL

Rose Stem Girdler, from page 5

disappeared from the dry grasslands and sandhills areas of Saskatchewan and Alberta. Roses in open, sun-exposed sites were the first to go followed by roses in more shaded sites (e.g., within bluffs and riparian zones) and cooler areas (e.g., Cypress Hills uplands, east slope foothills of Rocky Mountains). It is not known if this is a microhabitat effect or due to some host preference because it follows the pattern of distribution of *R. woodsii* (open, drier sites) whereas *R. acicularis* is in riverine and forest habitats. Within the last five years, the extremely dense stands of roses in and adjacent to the riverine woodlands along the South Saskatchewan River in western Saskatchewan have largely died off.

Initial rose die-off has been observed to be followed by a burst of growth of some opportunistic plant species (e.g., nettles along Lyons Creek, near Claydon, SK; downy brome in Little Sand Hills, west of Piapot, SK).

However, in these cases perennial grasses overtook the sites, assisted by grazing pressure that inhibited rose and other forb regrowth. Roses are almost always associated with snowberry, which remains after the roses have died off. However with the roses gone, cattle push into the snowberry, and even if they do not browse the plants down, they break the stems resulting in increasingly thinned stands and hastening reversion of these areas to grassland.

There is still no quantitative assessment of the effect of rose stem girdlers on rose populations in any part of the Prairie provinces. I recently asked six ranchers in southwestern Saskatchewan about the status of roses on their land (2018/19). Two said roses were increasing in numbers, but both of these had recently broken prairie to plant exotic grasses, and roses sprouting from root stock were a prominent weed. However, once regular mowing begins the roses will

be eliminated. One rancher said he had noticed that the roses were blooming closer to the ground than previously, either indicating he was seeing *R. arkansana* flowers (a low-growing dry prairie species not attacked by the rose stem girdler) or that only newer, small stems of other roses were left to flower. The other three ranchers said they really hadn't noticed what they had in the way of roses. This pretty much summarizes our current state of knowledge of what is happening to prairie roses — we haven't noticed.

Bousquet, Y., P. Bouchard, A.E. Davies and D.S. Sikes. 2013. Checklist of beetles (Coleoptera) of Canada and Alaska, second edition. Pensoft, Sofia-Moscow. 402 pp.

Paiero, S.M., M.D. Jackson, A. Jewiss-Gaines, T. Kimoto, B.D. Gill and S.M. Marshall. 2012. Field guide to the Jewel Beetles (Coleoptera: Buprestidae) of Northeastern North America. Canadian Food Inspection Agency Publication P0764-11E. 411 pp.

Contact David J. Larson at Box 56, Maple Creek, SK S0N 1N0 dmlarson@sasktel.net ♦

Workshop, from page 1

At the end of the workshop, it was announced that Carole Dodd was this year's recipient of the Emerald Award. Congratulations Carole and big thanks for your dedication and hard work!

Following the AGM, banquet attendees had the pleasure of listening to Caitlin Willier speak about monitoring in Waterton Lakes National Park following the Kenow Fire. Many thanks to all our presenters for providing such interesting and informative presentations!

On Sunday, a Monoliths Tour of the new display of soil pedons at Lethbridge College was offered. Of the 10 soil orders found in Canada, eight are on display in the collection of 110 soil monoliths.

Thank you to the workshop committee for arranging these two days of fabulous events! The committee this year included Trish Hiley, Monica Bartha, Carole Dodd, Jacqueline Redburn, Robyn Gamer, Charlotte Thomasson and Eri Hiraga.

A big thank you to David Walker, Charley Bird and Eileen Ford for donating books to sell. The book sale raised \$400 for Alberta PlantWatch. Thanks also to all workshop attendees who purchased books. Your support is greatly appreciated. ♦



Members and presenters met at the University of Lethbridge for ANPC's 2019 workshop.

Municipal Park Planting, from page 2

Since the trail borders the wetland, the project presents a tremendous educational opportunity for the community. It is hard to miss native wildflowers in bloom along the trail (labelled with common names). The town is also able to enjoy lower maintenance by operations staff. Stewards have an incredible sense of pride as they get to enjoy the view each time they pass through the park.

The work included pulling weeds, adding compost, removing sections of landscape fabric and installing a variety of native shrubs, wildflowers and graminoids. Signs were put up notifying maintenance crews that the site is a restoration area and is a no-spray zone for herbicides.

Planting included wetland species and upland species in the buffer zone immediately adjacent to the wetland. Poor vegetation cover was a cause of

See **Municipal Park Planting**, page 12

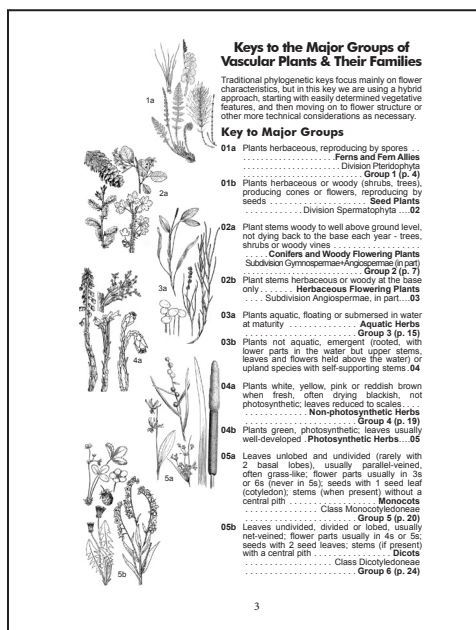
Update on the Illustrated Keys to Alberta Vascular Plants

Linda Kershaw and Lorna Allen

Over the winter, we have continued working on the illustrated keys to Alberta's vascular plants, updating species status to agree with the ACIMS listing from last March (ACIMS 2018) and updating taxonomy to agree with the VasCan database in October 2018 (Brouillet et al. 2018). We have also been working on new keys for many families and family groups. Once this bout of work is complete, the new keys will be available on the ANPC website. Look for them in the near future.

So far, illustrated keys for 122 families have been completed. On the website, the keys are organized in four major groups, starting with the Dicots (seed plants with two cotyledons), then the Monocots (seed plants with one cotyledon), Gymnosperms (coniferous trees and shrubs) and Pteridophytes (ferns and fern allies). Large families have their own keys. In 2018 there were 18 single-family keys, and with the addition of Lamiaceae in 2019, this becomes 19. Small families (i.e., those with 2 to 10 or so species) and a few families in recently revised groups have been grouped together in common files to simplify the website and/or to facilitate naming and identification. These groups include Figworts and Allies (4 families), Lilies and Allies (5 families), Miscellaneous Dicots (15 families in 2018 + 26 families added in 2019 = 41 families), Miscellaneous Monocots (6 families), Gymnosperms (3 families) and Pteridophytes (16 families).

A major addition over the past winter has been the creation of a series of Keys to Family. These are large, complex keys that often rely on technical floral characteristics to distinguish groups. We have tried to include readily observable, vegetative features (e.g., woody versus herbaceous; aquatic



versus emergent or terrestrial) where possible, in an effort to narrow the number of choices the reader needs to consider in each group. The illustrations should also help users to navigate their way through these complex keys. There are quite a few vascular plant families that have just one species in Alberta. If there is only one species to consider, it's impossible to create a key for that family. These families (28 altogether) are now included in the illustrated keys within the Keys to Family series. Table 1 provides a list of the families in the new and revised keys, and the file where each can be found on the ANPC website.

There are still four large families remaining to complete — Apiaceae, Boraginaceae, Fabaceae and Onagraceae. We had hoped to see the final versions of the Flora of North America treatments before we tackled these. Unfortunately, none of them appear to be close to publication, so we may have to go ahead without that resource. We plan to produce first drafts of these keys next winter, in order to complete all of the keys by the spring of 2020.

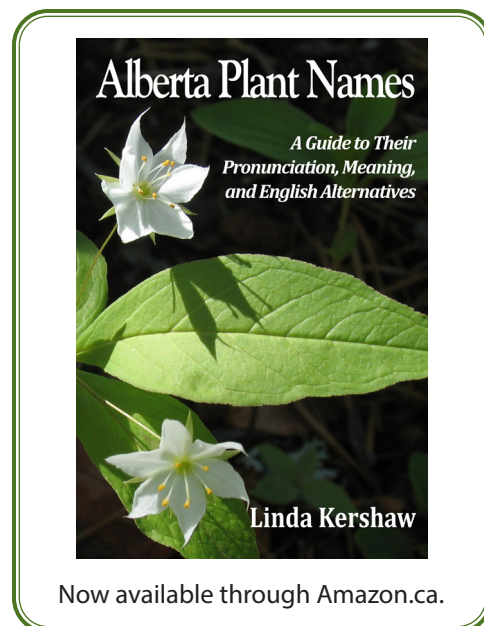
The keys on the ANPC website (anpc.ab.ca) are 'works in progress'. We hope that people will use them and let us know if there are any errors or omissions. Suggestions for ways to improve the keys are always welcome. Please send feedback to Linda at linda.kershaw1@gmail.com or Lorna at lornaj.allen@gmail.com.

The copyright to these keys is held by Linda J. Kershaw and Lorna Allen (2019). If you are citing the keys, please note the ANPC website as your source. Many thanks go out to our patient and organized webmaster, Carole Dodd, who has used her skills to make the site so attractive and easy to use.

References

- Alberta Conservation Information Management System (ACIMS). 2018. List of all Vascular Plant Taxa Confirmed for Alberta as recorded in the ACIMS database - March 2018. in A. Parks, editor. ACIMS, Government of Alberta, Edmonton, AB.
- Brouillet, L., F. Coursol, S.J. Meades, M. A. M. Favreau, P. Bélisle, and P. Desmet. 2018. VASCAN, the Database of Vascular Plants of Canada. Accessed October 2018. <http://data.canadensys.net/vscan/>.

See **Illustrated Keys**, page 10



Illustrated Keys, from page 9

Table 1. List of vascular plant families with illustrated keys on the ANPC website

Family	File Name	Group
Acoraceae	Key to Families	Monocots
Adoxaceae	Misc Dicots	Dicots
Alismataceae	Misc Monocots	Monocots
Amaranthaceae	Amaranthaceae	Dicots
Amaryllidaceae	Liliaceae and Allies	Monocots
Anacardiaceae	Misc Dicots	Dicots
Apocynaceae	Misc Dicots	Dicots
Araceae	Misc Monocots	Monocots
Araliaceae	Misc Dicots	Dicots
Aristolochiaceae	Key to Families	Dicots
Asparagaceae	Liliaceae and Allies	Monocots
Aspleniaceae	Pteridophytes	Pteridophytes
Aspleniaceae	Key to Families	Pteridophytes
Asteraceae	Asteraceae	Dicots
Athyriaceae	Pteridophytes	Pteridophytes
Balsaminaceae	Misc Dicots	Dicots
Berberidaceae	Misc Dicots	Dicots
Betulaceae	Misc Dicots	Dicots
Brassicaceae	Brassicaceae	Dicots
Butomaceae	Key to Families	Monocots
Cabombaceae	Key to Families	Dicots
Cactaceae	Misc Dicots	Dicots
Campanulaceae	Misc Dicots	Dicots
Cannabaceae	Misc Dicots	Dicots
Caprifoliaceae	Misc Dicots	Dicots
Caryophyllaceae	Caryophyllaceae	Dicots
Celastraceae	Misc Dicots	Dicots
Ceratophyllaceae	Key to Families	Dicots
Cistaceae	Misc Dicots	Dicots
Cleomaceae	Misc Dicots	Dicots
Commelinaceae	Key to Families	Monocots
Convolvulaceae	Misc Dicots	Dicots
Cornaceae	Misc Dicots	Dicots
Crassulaceae	Misc Dicots	Dicots
Cucurbitaceae	Key to Families	Dicots
Cupressaceae	Gymnosperms	Gymnosperms
Cyperaceae	Cyperaceae	Monocots
Cystopteridaceae	Pteridophytes	Pteridophytes
Dennstaedtiaceae	Key to Families	Pteridophytes
Dennstaedtiaceae	Pteridophytes	Pteridophytes
Droseraceae	Misc Dicots	Dicots

Family	File Name	Group
Dryopteridaceae	Pteridophytes	Pteridophytes
Elaeagnaceae	Misc Dicots	Dicots
Elatinaceae	Key to Families	Dicots
Equisetaceae	Pteridophytes	Pteridophytes
Ericaceae	Ericaceae	Dicots
Euphorbiaceae	Misc Dicots	Dicots
Fagaceae	Key to Families	Dicots
Gentianaceae	Misc Dicots	Dicots
Geraniaceae	Misc Dicots	Dicots
Grossulariaceae	Grossulariaceae	Dicots
Haloragaceae	Misc Dicots	Dicots
Hydrangeaceae	Key to Families	Dicots
Hydrocharitaceae	Misc Monocots	Monocots
Hypericaceae	Misc Dicots	Dicots
Iridaceae	Misc Monocots	Monocots
Isoetaceae	Pteridophytes	Pteridophytes
Juncaceae	Juncaceae	Monocots
Juncaginaceae	Misc Monocots	Monocots
Lamiaceae	Lamiaceae	Dicots
Lentibulariaceae	Misc Dicots	Dicots
Liliaceae	Liliaceae and Allies	Monocots
Linaceae	Misc Dicots	Dicots
Loasaceae	Key to Families	Dicots
Loranthaceae	Key to Families	Dicots
Lycopodiaceae	Pteridophytes	Pteridophytes
Lythraceae	Key to Families	Dicots
Malvaceae	Misc Dicots	Dicots
Marsileaceae	Key to Families	Pteridophytes
Marsileaceae	Pteridophytes	Pteridophytes
Melanthiaceae	Liliaceae and Allies	Monocots
Menyanthaceae	Key to Families	Dicots
Molluginaceae	Key to Families	Dicots
Montiaceae	Misc Dicots	Dicots
Myricaceae	Key to Families	Dicots
Nyctaginaceae	Misc Dicots	Dicots
Nymphaeaceae	Misc Dicots	Dicots
Oleaceae	Misc Dicots	Dicots
Onocleaceae	Key to Families	Pteridophytes
Onocleaceae	Pteridophytes	Pteridophytes
Ophioglossaceae	Pteridophytes	Pteridophytes

See **Illustrated Keys**, page 11

Illustrated Keys, from page 10

Family	File Name	Group
Orchidaceae	Orchidaceae	Monocots
Orobanchaceae	Figworts and Allies	Dicots
Oxalidaceae	Key to Families	Dicots
Papaveraceae	Misc Dicots	Dicots
Phrymaceae	Figworts and Allies	Dicots
Pinaceae	Gymnosperms	Gymnosperms
Plantaginaceae	Figworts and Allies	Dicots
Poaceae	Poaceae	Monocots
Polemoniaceae	Misc Dicots	Dicots
Polygalaceae	Misc Dicots	Dicots
Polygonaceae	Polygonaceae	Dicots
Polypodiaceae	Pteridophytes	Pteridophytes
Portulacaceae	Key to Families	Dicots
Potamogetonaceae	Potamogetonaceae	Monocots
Primulaceae	Primulaceae	Dicots
Pteridaceae	Pteridophytes	Pteridophytes
Ranunculaceae	Ranunculaceae	Dicots
Rhamnaceae	Misc Dicots	Dicots
Rosaceae	Rosaceae	Dicots
Rubiaceae	Misc Dicots	Dicots
Ruppiaceae	Key to Families	Monocots
Salicaceae	Salicaceae	Dicots
Santalaceae	Misc Dicots	Dicots
Sapindaceae	Misc Dicots	Dicots
Sarraceniaceae	Key to Families	Dicots
Saxifragaceae	Saxifragaceae	Dicots
Scheuchzeriaceae	Key to Families	Monocots
Scrophulariaceae	Figworts and Allies	Dicots
Selaginellaceae	Pteridophytes	Pteridophytes
Solanaceae	Misc Dicots	Dicots
Tamaricaceae	Key to Families	Dicots
Taxaceae	Gymnosperms	Gymnosperms
Thelypteridaceae	Key to Families	Pteridophytes
Thelypteridaceae	Pteridophytes	Pteridophytes
Tofieldiaceae	Liliaceae and Allies	Monocots
Typhaceae	Misc Monocots	Monocots
Ulmaceae	Misc Dicots	Dicots
Urticaceae	Misc Dicots	Dicots
Verbenaceae	Key to Families	Dicots
Violaceae	Violaceae	Dicots
Woodsiaceae	Pteridophytes	Pteridophytes



Linda Kershaw

Conifer – *Abies balsamea*

Linda Kershaw

Fern – *Gymnocarpium dryopteris*Monocot,
graminoid –
Leymus innovatus

Marsha Hayward



Linda Kershaw

Dicot with petal-like sepals –
*Pulsatilla nuttalliana*Dicot with a one-species
Family –
Menyanthes trifoliata

Linda Kershaw



Linda Kershaw

Dicot with asymmetric
flowers – *Aconitum
delphiniifolium*

Linda Kershaw

Dicot with head-like cluster of tiny flowers
– *Grindelia squarrosa* ♦

News and Events

Creekfest

Saturday, July 20, 2019 • 11 am – 4 pm
Bow Valley Ranch, Fish Creek Provincial
Park (South end of Bow Bottom Tr. SE,
Calgary)

The Friends of Fish Creek invite you to experience the 9th annual Creekfest, which began in 2011 as a fun way to engage community members around Fish Creek Provincial Park and to increase awareness about this park, Alberta's beautiful provincial parks, and water conservation issues.

Learn about environmental stewardship, conservation and biodiversity through educational games and activities hosted by local non-profit groups and community-focused businesses, including Rocky Mountain Adaptive, Alberta

Institute for Wildlife Conservation, Alberta Native Plant Council, Green Calgary, Glenbow Ranch Park Foundation and many more!

Stay tuned to www.friendsoffishcreek.org/event/creekfest for more information.

May Plant Count

May 25-31, 2019

The May Plant Count is an annual event where volunteers survey their favourite natural area to provide valuable information on the distribution and phenology of flowering plants in Alberta. This Nature Alberta citizen science initiative is supported by ANPC, and it's a great opportunity to shake the winter's rust off our plant identification skills and conduct a fun "trek and check" through our favourite natural space.

All are welcome to participate and provide their plant lists, but **we REALLY need behind-the-scenes volunteers** to continue this event. Please contact Kim MacKenzie at kim.mack@goldpaw.ca to volunteer!

May Species Count at Clyde Fen Candidate Natural Area

Sunday, May 26, 2019

Join stewards Derek Johnson and Joelyn Kozar to count plant species in flower in an aspen stand, a shrubby fen and a pine stand. Bring rubber boots, pack a lunch, and be prepared to spend a better part of the day there.

Meet at 9 am at the Percy Page Centre in Edmonton. Carpooling is an option. Please RVSP to info@anpc.ab.ca (last-minute deciders are welcome).

Municipal Park Planting, from page 8

much erosion especially along the trail shoulder.

An erosion control filter sock was installed along the trail edge to protect the steep trail shoulder that receives stormwater runoff from the trail and is subject to soil erosion until vegetation is established. The erosion control filter sock was a great example of beneficial reuse. One of the neighbours and project volunteers spins yarn in her free time. The wool is sometimes of low quality and cannot be used and was donated to the cause. The socks were made with burlap rolled up with wool inside and sewn shut with cotton string. The socks were staked into the ground and are now ready to be removed as the steep trail shoulder is well vegetated with native shrubs and wildflowers installed as potted plants and with Rocky Mountain fescue (*Festuca saximontana*) that was established by seeding.

Some of the native forbs installed in and around the wetland included giant hyssop (*Agastache foeniculum*), smooth aster (*Symphyotrichum laeve*), smooth fleabane (*Erigeron glabellus*), rhombic-leaved sunflower (*Helianthus subrhomboideus*) and prairie cinquefoil

(*Potentilla pensylvanica*). Shrubs included red-osier dogwood (*Cornus stolonifera*), silverberry (*Elaeagnus commutata*), snowberry (*Symphoricarpos albus*) and prickly rose (*Rosa acicularis*). Planted graminoids included Crawford's sedge (*Carex crawfordii*), tufted hair grass (*Deschampsia caespitosa*), slough grass (*Beckmannia syzigachne*) and green needle grass (*Stipa viridula*).

Initial planting was completed by the end of June. This included approximately 40 native shrubs, about 60 potted grasses and forbs, and seeding with Rocky Mountain fescue. We also completed sign installation, added a few yards of compost, and hand pulled many weeds. It's now a spray-free zone, and the increased use by amphibian and avian species was noticeable last summer.

The project was completed with major contributions from the Alberta Native Plant Council, Edmonton Native Plant Society, Devon Nature Club, and the Town of Devon. Several plants were grown and donated by Patsy Cotterill and Manna Parseyan.

The volunteers had a lot of fun, did an amazing job, and are looking forward

to this year's activities. There are plans to continue pulling weeds and adding more native plants that attract butterflies, bees and wildlife. Other ideas being shared include habitat features such as bird houses, native bee and bat boxes. It would seem this project has only just begun. ♦

Iris is published three times a year by ANPC. The Council aims to increase knowledge of Alberta's wild flora and to preserve this diverse resource for the enjoyment of present and future generations.

If you have an announcement, article or other item, you are invited to submit it to the editor for publication. Items concerning native plants will be given highest priority.

The editors reserve the right to edit submissions, but will review changes with the authors whenever possible. Disputes will be resolved in favour of the audience.

Copyright remains with the authors except where noted. Permission to reprint is generally granted, but please contact the editors for details.

Submission deadline for the next issue:
September 15, 2019

A subscription to *Iris* is included with membership in the ANPC. To join, contact the secretary, or check our website, www.anpc.ab.ca.