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# Iris

The Alberta Native Plant Council Newsletter



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Cover photo: Marsha Hayward  
Bunchberry (*Cornus canadensis*) in boreal forest, Alberta.

## Botany Alberta 2020 at Bunchberry Meadows

*Patsy Cotterill*

Eight people took part in the ANPC annual Botany Alberta field trip to Bunchberry Meadows Conservation Area, led by president Kristen Andersen, on August 1, 2020.

Bunchberry Meadows is a 260-hectare property located some dozen kilometres from Edmonton's southwest boundary, and is owned and managed jointly by the Edmonton and Area Land Trust and the Nature Conservancy of Canada. It is part of the Devon Dune area of glacially deposited sand dunes, and consists of rolling hills, variously covered by open pastureland (formerly grazed), woods and wetlands, many of the latter peaty and surrounded by tamarack.

We took advantage of Bunchberry's excellent network of about 9 km of trails to walk about 4 km of the Aspen Parkland Trail, which showcases many of Bunchberry's varied plant communities. (During surveys in 2018 and 2019, over 260 species of vascular plants were recorded for the site.)

Kristen invited us to choose our favourite plant from the field trip. Here are some responses.

Prickly tree-clubmoss, *Dendrolycopodium dendroideum*, was Beth Cornish's choice. She says: "This little plant with the big name is in the Lycopodiaceae or Clubmoss family, and it reproduces by spores. It was formerly lumped with *Lycopodium obscurum* (as in Moss 1984). We found it in an area of moist woods, but it can also be found in drier, sandy forested areas. It looks



Patsy Cotterill

Prickly tree-clubmoss  
(*Dendrolycopodium dendroideum*)

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like a little conifer tree, and another common name is tree ground-pine. I suppose to an ant, it's a big tree!"

**Blue giant hyssop (*Agastache foeniculum*)** was Manna Parseyan's choice of the day. Her pictures taken in the area south of the parking lot during the botany walk show it hosting butterflies. Besides nectaring butterflies, the flowers attract pollinating bees, and goldfinches eat the seeds. Manna grows this perennial and sells it along with a variety of other native species to people establishing native plant gardens. She notes that the flowers and leaves smell sweetly of licorice and can be used in salads and to make teas.



Manna Parseyan

Blue giant hyssop (*Agastache foeniculum*) with common wood-nymph (above) and fritillaries (below).



Manna Parseyan

Elisabeth Beaubien chose one of her PlantWatch species, the eponymous **bunchberry (*Cornus canadensis*)**, which is a woodland and not a meadow plant. She is intrigued by bunchberry's pollination mechanism. When a flower (those tiny things in the centre surrounded by the four showy bracts) is ripe and an insect brushes against a trigger hair on one of the petals, the anthers open explosively, showering the insect with pollen. Open flowers (important for phenology records) show black from the exposed stigmas.



Elisabeth Beaubien

Bunchberry (*Cornus canadensis*) in flower in July (above) and with berries (below) in mid-August. The name "bunch" refers to the clusters of fruits (drupes) at the top of the stems.



Elisabeth Beaubien

**Silvery cinquefoil, *Potentilla argentea***, a native of Eurasia, was Patsy Cotterill's choice, as being restricted to disturbed areas in sandy soils and hence rather characteristic of Bunchberry Meadows and some other sand dune natural areas. This perennial weed has a branched, spreading or sprawling habit and, especially later in the season, a greyish appearance, the five, deeply

toothed leaflets being white-woolly below. Numerous yellow, *Potentilla*-type flowers are borne in open cymes from May to August. Reproduction is by seeds (strictly fruits, achenes) which are mostly produced by apomixis (i.e., without a sexual process). Silvery cinquefoil is largely confined to dry, sandy trails in Bunchberry, and the plant may play a role in stabilizing them.



Patsy Cotterill

Silvery cinquefoil (*Potentilla argentea*) has a long flowering period. Photos taken 22 July (above) and 8 August (below).



Patsy Cotterill

**Marsh skullcap, *Scutellaria galericulata***, was highlighted by Kristen. It was observed growing in saturated soil at the edge of a large fen system that covers much of the property. This common wetland plant is in the mint family. Its distribution is circumboreal meaning that it is found throughout the northern temperate

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region. It can be hard to spot because it often becomes intertwined with other wetland vegetation, but the irregular trumpet-shaped flowers borne in pairs from opposite leaf axils make it easy to identify. It was found growing along with northern grass-of-Parnassus (*Parnassia palustris*) at the edge of the fen.



Kristen Andersen

Marsh skullcap (*Scutellaria galericulata*) growing at the edge of a large fen system (below).



Kristen Andersen

## A Note on Restoration at Bunchberry Meadows

As a side note, Kristen, a restoration specialist, was awarded a contract in 2019 to undertake restoration of sandy, disturbed areas around the parking lot and driveway as well as the more organic soils of a previously existing dugout. Wetland was created around the dugout by creating shallow bays and peninsulas. Kristen used the “rough-and-loose” soil mounding technique to create a series of hummocks and hollows to decompact the soil and better promote natural regeneration in the disturbed uplands. Jack pine saplings have been planted on a sandy slope. Live staking with balsam poplar by volunteers occurred in a

small section near the parking lot and will continue throughout the disturbed area where weeds established. Natural regeneration of pioneers like balsam poplar has not happened, and there has been the expected explosion of annual weeds around the dugout since the parking lot and access road were constructed. This has increased the need for live staking to shade out weeds and kick start the successional process for native forest. Watching the restoration trajectory will prove interesting. The Edmonton Native Plant Society has established several plots in the disturbed sandy areas and on the dugout slopes and has planted them with suitable native species. Over 50 different native species have been planted by volunteers of the Edmonton Native Plant Society providing habitat for pollinators such as butterflies, moths and bees.



Elisabeth Beaubien

The Bunchberry Bunch enjoying their Botany Alberta field outing. ♦

## May Plant Count 2021

Join Nature Alberta and ANPC for the May Plant Count 2021! Get outdoors in your backyard or favourite local natural space to collect data on the plants you see from **May 25 to 31, 2021**.

The data is important and supports conservation efforts across Alberta. There will be COVID-19 protocols to follow, but do join the count if you can! To volunteer, check out our May Plant Count Facebook event page or contact us at [mayplantcount@outlook.com](mailto:mayplantcount@outlook.com) to receive this year's information package.

We welcome all new and returning volunteers to join the May Plant Count!

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# By Golly, Galls Are Subversive

C. Dana Bush

We can fly to the moon, but we do not understand how insects subvert plants to make galls. Physical descriptions of gall development abound, but the biochemistry of how the insect triggers and maintains gall formation is complex, difficult to understand, and much of it is still unknown. The following describes the physical development of a spiny rose stem gall by *Diplolepis spinosa*.

The first step, for a gall wasp, is to lay her eggs at the correct time, on the right species, in the right location. Gall wasps are the second most common galling insect group (about 1,400 species), but they are restricted to only eight plant families and occur mostly on oaks and roses. Gall wasps are so specific that we can identify plants by which galls occur on them (Table 1). Only rose blister gall (*Diplolepis rosae*) occurs on all three of our native roses, while 9 of the 13 gall wasps are specialists on one species (Shorthouse 2010).

The spiny rose stem gall wasp induces galls on Wood's rose (*Rosa woodsia*) (as well as *Rosa blanda*, an Eastern species, and *Rosa rugosa*, an introduced rose). The adult wasps emerge from their galls from early May to late June, and lay their eggs in slits between the primordial leaves near the tip of terminal and lateral buds. Each egg is carefully deposited so that they encircle the bud, with one end embedded within the cortical tissue (undifferentiated cells lying between the epidermis and the vascular tissue) and the other touching the procambium (cells that eventually differentiate into either the vascular cylinder or a leaf trace and which will supply nutrients to the gall tissue) (Sliva and Shorthouse 2006).

At the same time, she injects venom or deposits ovary secretions, which begin to kill the plant cells surrounding the egg (Cornell 1983; Cambier et al. 2019). By day 5, the cells surrounding the

eggs proliferate and change, increasing the lipid and protein concentrations and lowering the concentrations of starch. The larvae begin hatching by day 10, and both stimulate and eat the cells surrounding them. By days 10-16, the larvae move into the open space and curl up, and the gall tissue grows to fully enclose them. You can see the swelling of the galled buds by about day 20. The growing gall is green, succulent, and densely covered with long, soft spines, although the larvae and larval chambers remain small.

Galls reach their maximum size (around 2.5 cm) by day 55. The larval chambers enlarge as the larvae feed, forming a ring of chambers around the centre of the gall. By mid-August, at 90 days, the galls are mature. The larvae have consumed all the nutrient tissue surrounding them, there is a barrier of woody cells between the larval chambers, and the cells on the outside of the gall become hard and woody. The larvae overwinter in the galls, emerging in the spring.

If the larvae perish prematurely, the cynipid galls will not develop, suggesting that larval salivary secretions are essential. In addition to altering the plant, the gall larvae produce antimicrobial compounds that protect them from bacteria and fungi (Cambier et al. 2019; Cornell 1983; Barrett, Clarke and Richardson



Spiny rose stem gall wasp on Wood's rose (Illustration by C. Dana Bush)

1998), and the outside of the gall is rich with tannins and phenolic compounds, which protect the galls from herbivorous insects (Schönrogge, Harper, Brooks, Shorthouse and Lichtenstein 1998).

Each species of galler (gall-forming insect), such as gall wasps, aphids, midges, mites and more, produces a specific gall, on a specific plant, and each of them subverts the plant's biochemical and physical processes to do so.

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Table 1: Gall Wasps (*Diplolepis*) on Roses

Scientific name - <i>Diplolepis</i> spp.	Common name	Plant part	Description	Number of chambers	Rose species
<i>D. basettii</i>		leaves, back side	soft filamentous hairs, in dense clusters, (each gall 4-5 mm in dia.)	single	<i>R. woodsii</i>
<i>D. bicolor</i>	spiny rose gall wasp	leaves, upper side	globular (7-11 mm in dia.), with sharp, stiff spines, in clusters	single	<i>R. woodsii</i> , <i>R. arkansana</i>
<i>D. fusiformans</i>		stems	fusiform, small, smooth	multi	<i>R. woodsii</i>
<i>D. gracilis</i>		leaves, back side	ellipsoid (4-6 mm in dia.), usually in rows, often white, with blunt protuberances	single	<i>R. arkansana</i>
<i>D. ignota</i>	mealy rose gall wasp	leaves, back side	globular (6-9 mm in dia.) but joining into irregularly rounded masses (15-20 mm long), without spines, hard and woody when dry but soft and spongy when wet	single and multi	<i>R. arkansana</i>
<i>D. nebulosa</i>		leaves, back side	globular (5-7 mm in dia.) spineless, singly or in a row	single	<i>R. woodsii</i>
<i>D. nodulosa</i>		stems, commonly surrounded by stunted leaflets	tiny fusiform swellings (3.1 mm in dia.) at the tips of stems, barely perceptible, spineless	single	<i>R. woodsii</i>
<i>D. polita</i>	spiny leaf gall wasp	leaves, upper side	clusters of globular (3.5-4.5 mm in dia.) with weak spines, not soft	single	<i>R. acicularis</i>
<i>D. radicum</i>	rose root gall wasp	adventitious shoots, on tips, just below ground level	irregularly rounded (2.5-6.0 (10) cm)	multi	<i>R. acicularis</i> , <i>R. woodsii</i>
<i>D. rosae</i>	mossy rose gall wasp, Robin's pincushion, rose bedeguar gall	twigs	irregularly rounded with dense filaments, 5-10 cm in diameter		introduced roses
<i>D. rosaefolii</i>	rose blister gall	leaves, visible on both sides	lentil-shaped (2.0-2.5 mm thick and 3.0-5.5 mm in dia.), smooth	single	<i>R. woodsii</i> , <i>R. acicularis</i> , <i>R. arkansana</i>
<i>D. spinosa</i>	spiny rose stem gall wasp	stems	irregularly rounded, (23 mm in dia.), weakly spined to smooth	multi	<i>R. woodsii</i>
<i>D. triforma</i>		stems	conspicuous, woody, pear-shaped, smooth	multi	<i>R. acicularis</i> , <i>R. woodsii</i>
<i>D. variabilis</i>		leaves, back side	spherical, (8 mm in dia.) but in irregularly rounded clusters (2 cm in dia.), smooth	single, multi	<i>R. woodsii</i>

(Shorthouse 2010; Wong, Melvin and Harper 1997)

**References:**

- Barrett, J. David, Paula V. Clarke, and David H.S. Richardson. 1998. The in vitro Culture of Rose-Gall Tissue Induced by the Cynipid Wasp *Diplolepis spinosa* (Ashmead) Symbiosis, Vol 25(1-3) pp.229.
- Cambier Sébastien, Ginis Olivia, Moreau Sébastien J. M., Gayral Philippe, Hearn Jack, Stone Graham N., Giron David, Huguet Elisabeth, Drezen Jean-Michel. 2019. Gall Wasp Transcriptomes Unravel Potential Effectors Involved in Molecular Dialogues With Oak and Rose. *Frontiers in Physiology* 10:926.
- Cornell, Howard V. 1983. The secondary chemistry and complex morphology of galls

formed by the Cynipinae (Hymenoptera): Why and How? *The American Midland Naturalist* Vol 110:2, pp. 225-234.

- Schönrogge, K, LJ Harper, SE Brooks, JD Shorthouse, and CP Lichtenstein. 1998. Reprogramming Plant Development: Two Approaches to Study the Molecular Mechanism of Gall Formation. UNITED STATES DEPARTMENT OF AGRICULTURE FOREST SERVICE GENERAL TECHNICAL REPORT NC. US Department of Agriculture. pp. 153-160.

Shorthouse, J. D. 2010. Galls Induced by Cynipid Wasps of the Genus *Diplolepis* (Hymenoptera: Cynipidae) on the Roses of Canada's Grasslands. In *Arthropods of*

Canadian Grasslands (Volume 1): Ecology and Interactions in Grassland Habitats. Edited by J. D. Shorthouse and K. D. Floate. Biological Survey of Canada. pp. 251-279.

- Sliva, Monica D. and Joseph D. Shorthouse. 2006. Comparison of the development of stem galls induced by Aulacidea hieracii (Hymenoptera: Cynipidae) on hawkweed and by *Diplolepis spinosa* (Hymenoptera: Cynipidae) on rose. *Can. J. Bot.* 84: 1052-1074.

Wong, H.R., J.C.E. Melvin, and A.M. Harper. 1977. Common insect and mite galls of the Canadian Prairies. *Fish. Environ. Can., Can. For. Serv., North. For. Res. Cent. Inf. Rep.* NOR-X-196. ♦

# Book Review

## Vascular Flora of Alberta: An Illustrated Guide by Linda Kershaw and Lorna Allen (2020)

Patsy Cotterill

The guide is an impressive accomplishment that fills a gap by providing a much-needed, updated work of reference for Alberta's botanical community. The *Flora of Alberta* (FAB), first published in 1959 and revised in 1983, has served us well over the years, and continues to serve, but it is now very much out of date. The flora of a region is dynamic, and taxonomy is an active, progressive science. Some 400 additional species are now recognized to occur in the province since the last edition of FAB. This guide is timely and has been produced in a commendably short period of time. It is a mere five years since the vascular plant species list was revised and family keys to these species began to be serially published on the Alberta Native Plant Council's website, culminating in their present compilation and publication in book form.

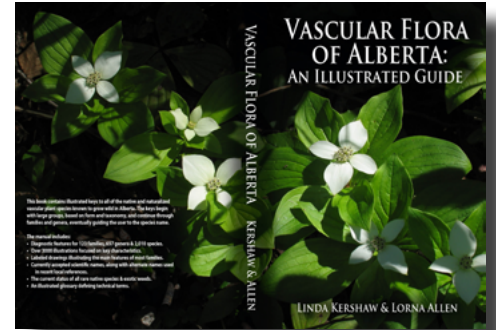
The guide owes much to Linda Kershaw's talents and long experience with manipulating large amounts of complex botanical data within short time frames. She has published many popular books on native plants, the majority under the Lone Pine Press imprint, which no doubt accounts for her familiarity also with layout and illustration. Lorna Allen's serendipitous collaboration on the keys accelerated completion of the guide. A long-time botanist with Alberta Parks (now retired), Lorna has extensive field knowledge of the provincial flora; as a manager of ACIMS, the Alberta Conservation Information Management System database, she unwittingly kick-started the keys project by awarding Linda a contract to update the ACIMS vascular plant species list for Alberta in 2015.

As you can imagine, when dealing with

some 2,011 species for the province the authors relied mostly on adapting existing keys rather than creating them *de novo* from specimens. Even so, it is a complex and confounding task of no mean proportions, especially for the larger groups of related species. FAB was a main source of keys, as was the *Flora of North America* (FNA), and other manuals of nearby regions were consulted. The authors note that the Flora ID website (Flora ID 2017) was helpful in testing the keys. The line illustrations are of high quality and add great value to the keys, many coming from Hitchcock and Cronquist's *Flora of the Pacific Northwest*, although Linda drew some herself.

Keys to families of Ferns and Fern Allies, Woody Plants, Aquatic Herbs and Non-photosynthetic Herbs are provided separately to those of the Dicots and Monocots, making it easier to get past the first hurdle of identifying to family. End material consists of a list of abbreviations, a glossary and additional illustrations, extensive references, a list of illustration sources and, of course, an index. A nice feature is that the larger families are prefaced by a page showing typical familial floral characters as well as illustrations of significant genera and species within them. Recent synonyms are included below the currently accepted name. Common names are omitted — an omission I agree with — and readers can pencil in common names if they wish. The general layout of this compact book is excellent, although I have caviled about the amount of space devoted to the illustration credits in their tabular format.

My guess is that the guide will prove especially useful to botanists working for environmental consultancy firms.



It is light enough to be carried in a backpack, and because the status of rare and uncommon plants is given, it provides a quick reference to prompt further field investigation and enable distinction between the latter and the more common look-alikes. All taxonomy and nomenclature are current at the time of publication (even the new family Viburnaceae is recognized!), which makes for easy compilation of species lists in reports. More generally though, the guide is useful to anyone who needs a handy and comprehensive reference to Alberta's flora.

Adapting and developing keys for some 2,000 species is obviously a huge project in itself, but so also is testing to see how well they work for our species. The authors have worked through many of the keys with specimens themselves, and some were tested by participants (mostly botany students) attending sessions of the Alberta Native Plant Council's Central Alberta Rare Plant Study Group in the University of Alberta herbarium.

Given that neither a provincial flora nor its taxonomy is static, the digital publishing system is ideally suited to works that need periodic updating. The authors advise that a second printing is already in progress, including some adjustments to keys and minor edits and improvements. Larger changes, such as the addition of species new

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to the province, will await a second edition. The authors continue to welcome further feedback and can be reached by email: linda.kershaw1@gmail.com and lornaj.allen@gmail.com. My suggestions for possible changes in the future are as follows.

**The title:** The subtitle, “An Illustrated Guide” could be replaced by “Illustrated Keys to Species” to avoid confusing readers who might think they are purchasing a popular guide with descriptions and colour photos. (In their defence, the authors might note that Scoggan’s 1978 *Flora of Canada* contains no plant descriptions apart from information in the keys, and still calls itself a flora!)

**The introduction:** I felt the authors could have devoted a little more space to advice on the use of the keys, and given the fact that, depending upon the taxonomic group, some of them are quite difficult, could have offered readers more encouragement to persist. (Keys become easier to use the more familiar you become with them.) The authors do recommend consulting other literature and online sources to confirm identification, but even so it is not always possible to be confident of an identification. This is especially true of groups where new species have been split off from common ones and are very similar morphologically. More commentary on distinctive features, and on some of the salient characters themselves (e.g., use of ripe fruits for measurements in Cyperaceae), such as is provided in some floras, could prove helpful.

Readers may find that examination of annotated herbarium specimens may be necessary in some cases. (I cannot emphasize enough here how institutional herbaria, properly annotated by specialists and maintained by trained curators, are crucial to the advancement of botanical science.) Specimens are of course needed for keys, and the authors do not mention that for non-professional botanists access to specimens will often be in parks, nature reserves and other

protected areas, for which a permit for collection is needed, although some field identification will be feasible. Photos are only adequate if the user knows exactly which key characters need to be photographed. To assist less-experienced botanists, the authors could have advised that use of magnification, either a x10 hand lens or, preferably, a dissecting scope to leave hands free for dissection, is pretty much mandatory for many groups.

Slightly more than a page is devoted to a description of the Natural Regions of Alberta, to provide a rationale for the diversity of species found in the province. However, this information is not linked to the individual species, for which habitat and distribution are not given. Perhaps, instead, landscape diversity could be covered in a single paragraph with a link to detailed information on natural regions online. This would free up more space for commentary, and for inclusion of infraspecific taxa which I’ll refer to below.

**Family order:** I could not find an explanation of how the families were ordered in the guide. Adopting the Angiosperm Phylogeny Group III linear order of families could have been a progressive move.

**Rationalization of technical terms:**

I agree there is no point in using a technical term when an ordinary word will do (e.g., isn’t a “hair” better than a “trichome”?), but readers with access to a glossary can surely master “ovate” and “lanceolate” rather than “egg-shaped” and “lance-shaped” as well as “obovate” and “oblanceolate,” which are really clumsy to describe otherwise. And does “smooth” mean without teeth (i.e., entire) or the opposite of rough?

**Infraspecific taxonomy:** The authors decided to provide keys to subspecies and varieties in some important instances, but not routinely. Both subspecies of *Phragmites*, subsp. *americanus* and subsp. *australis*, are recognized, a significant distinction ecologically, because the former is native while the latter is non-native

and aggressive. The three varieties of *Oxytropis campestris*, var. *cusickii*, var. *davisii* and var. *spicata* are also recognized as are the varieties of *Petasites frigidus*; their distinctive leaf morphology would make it extremely confusing if they were not. I very much appreciated the note about the native and exotic populations of *Phalaris arundinacea*, and the distinction between the native and exotic subspecies of *Poa pratensis*: such distinctions are important ecologically and for restoration. However, some other significant instances of infraspecific variation were omitted. For example, the two subspecies of *Elymus trachycaulus* that occur in Alberta, subsp. *trachycaulus* and subsp. *subsecundus*, also distinct morphologically, at least in flower, are not distinguished. Likewise, *Helianthus pauciflorus* is not separated into its two Alberta subspecies (according to the Canadensys Vascan database), the typical variety, subsp. *pauciflorus*, and subsp. *subrhomboideus*. The latter is very common in prairie grassland as far as we know, but should we also be looking for subsp. *pauciflorus*?

Problems also arise in applying common names. For example, our wild raspberry is *Rubus idaeus* subsp. *strigosus*. If you identify only to species level (*R. idaeus*), its common name according to Canadensys Vascan is red raspberry or wild red raspberry, but the accepted name for our native variety (subsp. *strigosus*) is North American red raspberry, to distinguish it from subsp. *idaeus*, the European red raspberry introduced elsewhere in Canada. Hence, while the keys allow accurate identification to species level, our local information is not always complete. After making an identification with the guide, the reader might be encouraged not only to look for a species description and images but also to check Canadensys Vascan for further information on infraspecific taxonomy and distribution. I personally would like to see an expanded key with all varieties and subspecies present in Alberta included. Incidentally, a note on the “microspecies” of *Crataegus*

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and their distribution might have been helpful; many of us have only been able to recognize two species at the most!

**Keys:** I have tested a few, and the majority have worked for me, sometimes with a little going back and forth, and sometimes using FAB for backup. One of the keys I eagerly tried was Group III of the Brassicaceae. There are a number of taxonomic changes within that group: the former genus *Arabis* has been split into four genera, *Arabis*, *Arabidopsis*, *Boechera* and *Turritis*, with additional species now being recognized in *Boechera*. I immediately encountered a snag. The authors used the FNA character which states that members of *Arabis* have star-shaped (stellate) hairs, but none of the specimens I had previously identified as *Arabis* using FAB has such hairs. (Presumably the FNA key is wrong, in that it doesn't work for our species.) However, since the FAB key readily separates off all four genera even though they are recognized as *Arabis* species in it, it can be used instead for the relevant portion of Group III, with a little adjustment to include the rare *Crucihimalaya virgata*. Once a plant keys to *Boechera*, the user can then tackle the guide's key to this genus. If it's any consolation, FNA has this to say: "A rare confluence of hybridization, apomixis and polyploidy makes this [*Boechera*] one of the most difficult genera in the North American flora." Any postgraduate student up for the challenge of sorting out our *Boechera*? (The authors now advise that they have fixed the Group III key in the second printing.)

I recommend that not only botanists but naturalists in general get a copy of this guide and practice using it (some keys are much easier than others, and it may not be a bad idea to start by keying out plants whose identity you already know). Using a key to identify a plant provides a more certain identification than looking at pictures, not only because it demands a close inspection of the plant (and therefore a richer botanical experience) but also because it indicates the scope and the

limits of the biodiversity (that is, the number of possible options) from which to choose. And in making those fine distinctions that separate a species from its relatives lies both the challenge and the fun of botanical identification!

**References:**

- Alberta Conservation Information Management System (ACIMS). 2019. ACIMS database. Alberta Parks, Government of Alberta, Edmonton, Alberta. 2015-2019.
- Alberta Native Plant Council website. <https://anpc.ab.ca/>
- Database of Vascular Plants of Canada (VASCAN). <https://data.canadensys.net/vascan/about>
- Flora ID. 2017. Interactive plant keys for all native and naturalized vascular plants in the Pacific Northwest. Flora-id.org. Pendleton, Oregon. <http://flora-id.org>
- Flora of North America Editorial Committee, editor 2010. Flora of North America North of Mexico. Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, New York, NY.
- Scoggan, H.J. 1978-1979. The flora of Canada. National Museum of Natural Sciences, National Museums of Canada, Ottawa, Ontario.

*Patsy specialized in taxonomy for her botany degree from a British university, but has done most of her practical botanizing in the Prairie Provinces. A member of several naturalist and environmental organizations, she is also interested in stewardship, conservation and restoration.*

**Editor's note:** A revised second printing of this vascular plant guide is now available for purchase from Amazon. A list of errata and enhancements has been published on the ANPC website.

*The views and opinions expressed in this article are those of the author and do not necessarily reflect the official policy or position of the Alberta Native Plant Council. ♦*

## Rare Vascular Plants of Alberta, 2nd Edition: Winter 2021 Update

Gina Fryer

We have finished with the species description write ups and reviews! Last year we focused on reviewing the species descriptions and preparing for our editors to review the text, photographs, illustrations and maps. This is the last step before getting the manuscript ready for printing!

The complete set of North American distribution maps have been compiled as well as the Alberta distribution maps. We have received permission to use select illustrations from the Flora of North America, the University of Washington Press, Government of BC and the Royal BC Museum.

If you are interested in volunteering to help in the preparation of the rare plant book or if you have questions, please contact us at [ABRarePlantBook@gmail.com](mailto:ABRarePlantBook@gmail.com).

We are excited about the progress of the project and are looking forward to the year ahead!

We would like to thank all of our wonderful supporters including a grant from the Alberta Culture and Tourism Community Initiatives Program, two Community grants from the Alberta Ecotrust Foundation (2017 and 2019), and \$25,000 from the ANPC, in addition to contributions from 40 volunteer writers, 19 expert reviewers, and numerous photographers.

We still need several more photographs. This is your opportunity to get your botanical photographs in print! If you would like to submit photographs of identified rare plants that are on the list for this book, please (1) check out the Excel file ([here](#)) that lists the species that still require photographs, (2) see instructions detailing the

See *Rare Vascular Plants Book Update*, page 10



# Calgary, Naturally: Habitat Restoration and Pollinators

Barbara Kowalzik

As native plant enthusiasts, we all know how much time we invest in our own gardens, but have you ever wondered what municipalities are doing to naturalize city-owned land? As a biodiversity target, the City of Calgary is in the process of restoring 20% of Calgary's open space by 2025; over 250 projects aimed at naturalizing municipal land have already been completed. Naturalization is a type of habitat restoration that involves the purposeful reintroduction of native plant species to an area. There are environmental, social and economic benefits involved in naturalization, including reduced maintenance costs, opportunities for increased awareness and stewardship, as well as enhanced biodiversity.

In 2019, Calgary was named Canada's 36th Bee City. This designation highlights the city's commitment to providing habitat and resources for local pollinators. Alberta is home to over 300 species of native bees, many of which are facing population declines. Several factors have been identified as contributing to decreases in pollinator populations, including habitat fragmentation, removal of native vegetation, agricultural practices and the use of pesticides and herbicides. Just as many local bees rely on native vegetation to obtain pollen and nectar, native plants rely on local pollinators to successfully reproduce. Although we know where Alberta bees occur locally and geographically, we are only beginning to learn about their foraging and landscape preferences.

Knowledge about how native bees interact with their environment is valuable for many stakeholders, and municipal naturalization projects have the capacity for generating and communicating this type of



Naturalization area at Ralph Klein Park in southeast Calgary

City of Calgary

information. One such project along Canyon Meadows Drive in Calgary has become locally known as the Bee Boulevard. Through a collaboration with Mount Royal University, the University of Calgary, the Alberta Native Bee Council and the David Suzuki Foundation, the City of Calgary Roads and Parks departments transformed a turf-dominated site bordering a busy roadway into an oasis for pollinators.

Medians along Canyon Meadows Drive were planted with salt- and drought-tolerant vegetation, and five sandstone flowerbeds were added on adjacent Parks land. Over 35 species of native plants can now be found at the site, including prairie coneflower, smooth aster, showy milkweed and northern gooseberry. The area also contains interpretive signage, interactive displays, specialized areas for ground-nesting bees, and nesting structures for cavity-nesting bees. Many of the nesting structures were made from recycled materials, including logs from pathway clearing and sandstone removed for development. In 2019, researchers from

the University of Calgary identified two Schedule I Endangered gypsy cuckoo bumble bees at this site.

Projects such as the Bee Boulevard are a great example of how Calgary is working to reimagine open spaces that function to improve the health and resiliency of our urban environment. Municipal naturalization projects not only provide habitat for pollinators and other wildlife, but also increase learning opportunities for the community, and demonstrate how citizens can incorporate elements of naturalization into their own yards. For more information about local pollinators, native plants, and habitat restoration in the City of Calgary, please visit [calgary.ca/habitatrestoration](http://calgary.ca/habitatrestoration) or [calgary.ca/pollinators](http://calgary.ca/pollinators). ♦



Bee pollinator on prairie coneflower

Lincoln Best

# Update on the ANPC Small Grants Program

Trish Hiley

It's that time of year again... the snow has fallen, the botanists are hibernating, and the Grant Committee is anxiously awaiting your grant applications! Every year, the Alberta Native Plant Council awards small grants up to \$1,000 for projects by Alberta residents, not-for-profit organizations, or registered charities that operate in Alberta for projects that support one or more of the ANPC's objectives. Applications are accepted from January 1 to February 28, 2021. Forms are available on our website under the 'About Us' tab.

Projects that qualify for funding include those that support conservation of natural habitats or promote education and/or awareness of native plants. Maybe you have a research project that further develops understanding of native plants or want to develop guidelines or strategies for the use of native plants. That qualifies, too! Additional details are provided in the grant application documents.

Throughout the years, the ANPC has provided funding to many diverse projects that share knowledge and promote native plant education across Alberta. Recently, the Grant Committee has started to see more variety in the types of projects that have been proposed. For example, there is a lot of

interest from community groups that want to develop native plant gardens to create an opportunity to engage community members with the natural environment and provide opportunities for education.

Recently, the ANPC awarded a grant to partially fund the development of an outdoor learning environment at an elementary school in southern Alberta. Once completed, the outdoor learning environment will contain a pollinator garden, shelterbelt of native trees, and representations of several ecosystems in the region, including montane, foothills, prairie, and wetland ecosystems. The area is envisioned to become a place where students and community members can interact and play in nature and learn about the natural environment.

Another project funded was the development of original full-colour paintings of plants native to the boreal forest region in Alberta. The paintings are drawn and painted from real specimens and depict fine details that can't always be captured by photograph. Paintings have also been created for some rare plant species, including some species associated with the Adopt-A-Plant Alberta program (an ANPC cooperative project with the Alberta Species at Risk program). To date, ANPC's grant awarded to this project has supported the completion of 283 paintings of vascular plants, non-vascular plants (mosses and liverworts), lichens, and fungi. The artwork is available for use by the ANPC for educational and publication purposes.

The year-to-year increase in volume and diversity of applications suggests that many Albertans are realizing the importance of native plants and the benefits they provide to the natural environment and to our society. Please consider a donation to the ANPC and share the word about our small grants program to help us fund more great projects! ♦



Rock polypody (*Polypodium virginianum*)  
(Illustration by Marsha Hayward)

## March 20, 2021 Annual Workshop by Webinar

Check [anpc.ab.ca](http://anpc.ab.ca) for  
details and registration

Marsha Hayward

### Rare Vascular Plants Book Update, from page 8

submission of photographs ([here – instructions revised November 23, 2017](#)), and (3) submit a photo release form ([here](#)). Images will be selected by the book committee from those submitted. Thank you to those who have submitted, and we look forward to your contributions! ♦

*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.

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Submission deadline for the next issue:  
**April 30, 2021**

A subscription to *Iris* is included with membership in the ANPC. To join, contact the secretary, or check our website, [www.anpc.ab.ca](http://www.anpc.ab.ca).