



menziesia

Fall 2010 NPSBC Native Plant Society of British Columbia www.npsbc.org Volume 15, Issue 4

NPSBC members help BioBlitz Whistler

Members of the Native Plant Society of BC participated in the Whistler BioBlitz in late July. For a 24-hour period, they scoured valley bottoms, mountaintops and everywhere in between. More than 700 species overall were recorded during the event, including 197 species of native vascular plants and 135 bryophyte species.

Of those 197 species, one native vascular plant – *Minuartia biflora* (mountain sandwort) had not been previously recorded in the area. It was found by NPSBC past president Virginia Skilton in the high subalpine of Blackcomb Mountain.

Since the first BioBlitz in 2007, scientists and citizen scientists have uncovered almost 500 species previously undocumented in the Whistler area. Their work has helped increase the total number of known species in the region to almost 2,500 different forms of life.

Special thanks go to Bob Brett and Kristina Swerhun who did a magnificent job of organizing the Whistler BioBlitz. And many thanks to the NPSBC members who attended! Stay tuned for details of Whistler BioBlitz 2011.



Minuartia biflora (mountain sandwort) Photo: Virginia Skilton



BioBlitzed: NPSBC member Doug Skilton (left) takes a well-deserved break after hours spent botanizing on Blackcomb and Whistler mountains; while members Kristen Harrison (above) and Terry McIntosh (above right) discuss their findings at the end of the 24-hour bioBlitz. Photos: Dawn Hanna

Native Plant Society of BC member survey

We want to know what you think!

It's been 10 years since the last member survey, so help us out and tell us what you like about the NPSBC and what you'd like to see more of.

It's a simple nine questions and you'll be eligible for four \$25 Chapters gift card prizes.

To do the survey online, go to
www.surveymonkey.com/s/7XYX5KR

To get a paper copy of the survey mailed to you,
send an email to dawnhanna@telus.net

In This Issue:

Feature articles are the sole responsibility of their authors. Opinions expressed therein are not necessarily those of the Native Plant Society of BC.

Features:

Whistler BioBlitz	1
Smooth sumac shines in autumn	3
Field trip reports	4
Tips for photo-botanical trips	5
Survey on native plant materials	6
Taxonomic changes to plant families..	7
BC natives in official emblems	9
NPSBC director honoured	11
Mimulus guttatus evolution	11
Book review	12
Petals more than just pretty	14
Wildflowers a popular trend	15

Departments:

Coming events	13
---------------------	----

Regular columns:

Canning's crossword	15
---------------------------	----



Listserv

Subscribe to the NPSBC electronic list for information and discussion on native plants and habitats, current projects and upcoming events.

TO SUBSCRIBE: Send an email message containing "subscribe NPSBC-L" (without apostrophes) to Majordomo@victoria.tc.ca
TO SEND MAIL to the list, address your message to NPSBC-L@victoria.tc.ca
Send enquiries to the administrator at NPSBC-L-owner@victoria.tc.ca

NPSBC

Native Plant Society of British Columbia

Our Mission

The purpose of the Native Plant Society of British Columbia is to encourage knowledge, appreciation, responsible use and conservation of BC's native plants and habitats.

Board of Directors

Dawn Hanna, President

dawnhanna@telus.net 604-831-5069

Ron Long, Vice President

rlphoto@shaw.ca 604-469-1651

Nadine Robinson, Secretary

nadinelrobinson@gmail.com

Marian Daubeny, Treasurer

mariandaubeny@hotmail.com
604-731-8537

Virginia Skilton, Past President

dvsilton@shaw.ca 604-536-3529

Hugh Daubeny

hdaubeny@shaw.ca 604-731-8537

Nathalie Dechaine

nathaliedechaine@hotmail.com

Laura Duncan

gardenlaura@shaw.ca 250-427-2600

Moralea Milne

moralea@telus.net 250-478-3838

Randal Mindell

randal.mindell@ubc.ca

Patrick Wilson

edgewater_fortune@hotmail.com

Rossalynn Woodgate

rwoodgate@shaw.ca

NPSBC inquiries:

Randal Mindell, Membership Coordinator
randal.mindell@ubc.ca

Ross Waddell, Information Coordinator,
604-255-5719 information@npsbc.org

menziesia

Dawn Hanna, Editor and Layout

Erin Skelton, Proofreading

Randal Mindell, Distribution

Menziesia submissions and queries:
dawnhanna@telus.net

Menziesia is published four times a year.
Subscription is included with
NPSBC membership.

Smooth sumac shines in autumn

By Eva Durance

I confess I'm an expatriate Ontarian. I also confess that, living in the south Okanagan, I miss the incandescent glory of the eastern deciduous trees – particularly the sugar maples – in fall dress. So, in the tradition of expatriates everywhere, I've decided that the BC native smooth sumac (*Rhus glabra*) should be an honorary sugar maple for its brilliant fall colour. As with the American and English species of robins, any resemblance beyond colour is purely coincidental.

Sumac is no poor cousin in size though; the shrub can reach a height of three metres and spread to form a good-sized thicket. Its chief claim for attention, however, is its fall transformation. The deep green leaves turn clear scarlet and, like the rabbitbrush (*Ericameria nauseosa*), lend our muted autumnal hillsides a brief final display of glory. My favorite rock wall along Green Mountain Road west of Penticton – notable for shrubby penstemon (*Penstemon fruticosus*) and arrowleaf balsamroot (*Balsamorhiza sagittata*) too – lights up in fall with numerous fiery clumps of this hardy shrub which one barely notices the rest of the year.

Later, in the drear of mid-winter, the sumac's thick, dark tan branches have a sculptural form that is pleasing. The rocky places that it frequently inhabits also add to its dramatic appearance in the winter landscape especially when snow provides a perfect backdrop.

In early April, the flower buds push out in conspicuous dark purple cones. The large elliptical-shaped leaves, composed of anywhere from seven to 29 leaflets, follow a month later.



Photo: Doug Skilton

Autumn palette: Known for its brilliant fall colour, *Rhus glabra* is found in south central and southeast parts of the province.

The flowers are small and greenish-yellow, but are quite noticeable in the large tight clusters. In fall, the blood-red fruits are even more attractive, especially among the deep red leaves.

The botanical name, *Rhus glabra*, is thought to come from *rhous*, a Greek word for sumac and *glabra*, from the Latin *glaber*, meaning smooth or hairless, referring to the bark. Sumac was originally *summaq*, a Syrian word for red. The fall colours clearly impressed much earlier observers.

The genus *Rhus* is closely related

to poison ivy (*Toxicodendron radicans*) and poison oak (*Toxicodendron diversilobum*), which humans consider less desirable, but in general, *Rhus* spp. are quite benign. Indeed, the juice of the fruit from the eastern North

American species, staghorn sumac (*Rhus typhina*), is used commercially in making pink lemonade.

In our area, the fruit is a useful food for wildlife mainly in late winter when its berries are highest in sugar and other food sources are scarce. The milky sap in the stems is acidic, but few people react to it.

Sumac is a tough shrub surviving nicely in poor quality soil, dry conditions and extremes of temperature and can be very attractive in informal landscapes. Its habit of spreading by running roots, however, make it best for larger, semi-natural places or on slopes to control erosion. On a small property, you'll end up with a wonderful fall display, but little else in your garden! If you have a rocky outcropping on your property, this could be an ideal place.

I may still pine for the overwhelming beauty of the hardwood forests in fall, but smooth sumac in its autumn dress is a very satisfactory alternative and beautiful in its own right. ✱



Rhus glabra Photo: Virginia Skilton

Field trip reports

Cypress yields late season specialties

By Terry Taylor and Katharine Steig

The NPSBC field trip to Cypress Provincial Park on September 11 was comprised of 10 of us. We looked first at the slope above the Hollyburn cross-country parking lot. Despite the fact that this is a disturbed site, it still contained a number of interesting native species. We then visited First Lake and Fourth Lake, higher on the ridge.

The disturbed site has a number of grape ferns (*Botrychium multifidum*), ladies' tresses orchids (*Spiranthes romanzoffiana*), and a few king gentians (*Gentiana sceptrum*), as well as healthy populations of western teaberry (*Gaultheria ovatifolia*). Three species of lycopods were also found here – *Lycopodium clavatum*, *Diphasiastrum sitchense* and *D. complanatum*. The gentians have only recently begun to colonize this area, and have spread extensively on Hollyburn Ridge over the last few decades. The orchid, unlike most members of this family does well in disturbed areas. Is it a native orchid that lends itself well to cultivation? Its spiraling flower spikes are quite attractive and striking.

A fair number of gentians now grow at both the lakes, and there were none at either of these locations 20 years ago. A small lake lower on the ridge is named Blue Gentian Lake, for the occurrence of this species there. They seem to have spread from here to the higher elevation wetland sites.

Although Cypress is not generally sword-fern (*Polystichum munitum*) territory, we noted one on the 10-minute trail to Hollyburn Lodge; Kent Brothers showed us two more near the Fourth Lake warming hut.

The trip also provided an opportunity for having an on-site discussion on how to protect Fourth Lake's increasing gentian population. Suggestions will be passed on to BC Parks staff. *



Photo: Rosemary Taylor

Floral insights: Field trip participants found this broken king gentian on the ground. Whether plucked by animal or human, it provided a unique view of *Gentiana sceptrum*.

Special thanks to Terry and Katharine for leading this hike!



Moss mania: Participants Daryl Thompson (left) and Laura Dilley (centre) learn more about bryophytes from trip leader Terry McIntosh (with hat). (Photo: Dawn Hanna)

Capilano field trip explores the marvels of mosses

A cool but sunny day provided the perfect conditions to explore the many mosses of Capilano River Regional Park in North Vancouver with bryologist Terry McIntosh on October 2. The 10 or so participants learned about the ecology of mosses, the diversity of mosses, rare mosses and more.

The trip also provided an opportunity to take a closer look at slime molds, mushrooms and other forms of fungi (with expert commentary provided by trip participant Daryl Thompson).

Special thanks to Terry McIntosh for leading this most enlightening outing. *

Additional photographs from the trip can be seen on the NPSBC's Facebook page.

Mosquin's tips for photo-botanical trips

Article and photographs by Daniel Mosquin

These days when I travel, it's almost always a photo-botanical journey. Whether it's a nearby day trip, a weeklong getaway or an adventure to an exotic location, I find myself always thinking about the plants I'll see – and photograph – there.

When researching locations for my trips, I have a mental checklist of environmental and personal factors to help me determine where I should spend my time and effort. Putting thoughts to paper ...

Environmental considerations

- **Biodiversity:** Simply, the more species that are present in a given location, the more the photographic opportunities!
- **Abundance:** Abundance can be broken down in a few ways. An abundance of individuals of the same species is helpful photographically, as it gives more options; one can photograph groups of plants, or one has the opportunity to find individual plants with optimal backgrounds or lighting, or in optimal condition). Secondly, an abundance of abundance, that is to say a number of different species present in great numbers, is both creatively inspiring but provides the opportunity for creative photography with colour blending or textures. Lastly, an abundance of individuals of the same species helps assuage the guilt of photographing plants (particularly small and rare ones) – it's not inevitable, but it is common for a photographer to have an impact on the microenvironment surrounding the plant: soil compaction, soil disturbance, trampling of other plants. "Leave No Trace" is almost impossible, but it's a goal to strive toward.
- **Season and Timing:** I don't want to admit the number of times I've traveled to a destination hoping to see a particular species in flower and arriving to find I'm early or late. The longer the season of being able to find plants with whatever quality I'm hoping for (in flower, in fruit, just emerging from the soil), the better. Biodiversity and abundance also help offset this factor by providing other photographic opportunities.

- **Possibility of Observing a New Species (to me):** It's almost always a pleasure to be in the presence of a species I don't recall encountering before. I could do with a few less rashes, though, from the times when I was ignorant of the local "painful" flora.

- **Presence of Bears:** Apparently, when someone posts those "Warning – Active Bear in Area" signs, they mean it. A photographic stop along the southern edge of Vancouver Island had a number of these signs posted. Deciding the likelihood of a bear encounter was still small (it's a big island, right?), I proceeded down the trail with camera gear in hand. Within the first 50 metres of the trail, I could have had all the images I needed for a new photographic project: "The Decompositional Processes of Bear Scat Over a Period of 14 Days". Needless to say, that was it for that venture.



Shooting pains: Though this was the first and only time I recall encountering *Parnassia kotzebuei* (Kotzebue's grass-of-Parnassus, photographed in Cathedral Provincial Park), I didn't feel I got the photograph I wanted. Exercising caution not to disturb the wet, steep slope and the organic blanket on which the *Parnassia* grew, I awkwardly stood and knelt on rocks for my photographs until body pain declared I was done.

- **Fauna and Geological Interest:** It can be mentally taxing to creatively photograph plants all day, so the presence of wild animals or interesting geological features (and landscapes) helps provide other possibilities. These can also help "extend" the day, perhaps by photographing abstract reflections in mid-day when the light is harsh or seeking out the obligate sunset images to conclude presentations.

Personal considerations

- **Safety:** If I can live to photograph another day, then that is some small measure of success no matter what photographs were made that day. Being hit by a vehicle while photographing beside a highway has little appeal to

Continued on page 6

Mosquin, cont. from page 5

me, so I will only take that risk in few circumstances (a new species of orchid!). But those roadside cliffs with seeps are always so tempting ...

- **Accessibility:** Accessibility considerations include cost to arrive and be at the site, time to arrive and leave the location, physical and mental capacity once at the site (an exhausted photographer is a careless photographer).

- **Comfort:** or, "Dress for the weather / environment" – cold and wet feet are a mental distraction that takes my mind off photography. Funnily enough, discomfort can also be helpful (when sleeping in the vehicle, one rarely misses an early morning start). Comfort also includes finding ways to deter or repel insects.

- **Solitude:** When photographing along back roads or hiking in the wilderness, I prefer places where it is likely someone will travel past me within a day. That said, I tend to prefer places where it is likely someone will travel past me only a few times a day.

- **Novelty / Familiarity:** Over the span of a season, I try to balance visiting novel and familiar locations. Novelty helps provide photographic interest (and ensures I'm always open to the experience of the "new"), while familiarity helps me to revisit places and make the small adjustments I need to do to perhaps improve upon photographs from previous visits.

- **Time Pressure:** Would I rather have two minutes or one hour to photograph a flower? Group hikes are great for being introduced to new locations for wildflower photography, but not as good for providing the time needed to experiment creatively or ensure great technique.



Timing is everything: Fortunately, Mt. Kobau in late May has a lot more to offer than these past-peak *Balsamorhiza sagittata* (arrow-leaf balsamroot). Its biodiversity, elevational gradient and easy access provide many photographic opportunities throughout the year.

- **Private Property:** It's really tempting, but it is to be respected at all times.

In future issues of *Menziesia*, I will be writing about some of my favourite British Columbian photographic locations for plants and evaluating them for you with reference to the above considerations. As an inveterate collector of photographic and plant locations, I'd happily receive your suggestions, too! (Send to d.mosquin@gmail.com) *

Daniel Mosquin is the education and technology manager at the University of BC Botanical Garden and Centre for Plant Research. He is an inveterate photographer and moderator of the internationally popular web feature Botany Photo of the Day (www.ubcbotanicalgarden.org/potd/)

Survey seeks input on native plant materials for sale

Do you buy or sell native plant materials in western Canada? Then your thoughts are wanted in a survey being conducted by the Native Plant Society of Saskatchewan.

"The survey is incredibly important as it is only done once every 10 years," notes NPSS executive director Chet Neufeld. "The information gathered will help guide the industry in the near future."

The hope is that the survey will help both users and producers of native plant materials, and might identify gaps such as missed opportunities or areas of underperformance.



You can fill out the 30-question survey online and be entered in a draw to win \$200 cash.

If you are a provider of native seeds or plants (e.g. nursery owners), go to www.surveymonkey.com/s/npssproviders

If you are a user of native seeds or plants, go to www.surveymonkey.com/s/npssusers

The links can also be found on the Native Plant Society of Saskatchewan's website at www.npss.sk.ca

For more information, contact Chet at (306) 668-3940 or email info@npss.sk.ca *

Bye-bye maples and milkweeds, hello soapberries and dogbanes

By Walter Fertig

Reprinted with permission from *Sego Lily*, the newsletter of the Utah Native Plant Society

The maple family is dead. For sure there are still plenty of species of maples (*Acer*) across North America and Asia, but the maple family (*Aceraceae*) is gone – cut down by a new generation of taxonomists wielding DNA datasets and modern phylogenetic theory. The maples and their close cousins the horse-chestnuts (*Hippocastanaceae*) are now part of an expanded soapberry family (*Sapindaceae*).

The milkweed family (*Asclepiadaceae*) is also no more – absorbed by the dogbanes (*Apocynaceae*). Gone too are the goosefoots (*Chenopodiaceae*), duckweeds (*Lemnaceae*), pyrolas (*Pyrolaceae*), and waterleaves (*Hydrophyllaceae*). Some familiar groups like the lilies (*Liliaceae*) and figworts (*Scrophulariaceae*) have received extreme makeovers and while still alive, are barely recognizable. Meanwhile, several formerly obscure families, like the broomrapes (*Orobanchaceae*), and plantains (*Plantaginaceae*) have attained prominence thanks to an influx of new species transferred from elsewhere.

So what is going on?

These changes are the result of studies by the Angiosperm Phylogeny Group (APG), an international consortium of research institutes and professional taxonomists. The APG has been at work for nearly two decades applying modern research methods and theory to several centuries-old riddles. What is the most primitive group of angiosperms? How natural are existing orders and families? What does the family tree (phylogeny) of flowering plants look like? Through sharing datasets and findings, the APG is attempting to forge an elusive consensus among taxonomists. The work of APG, (originally published in 1999, updated in 2003 and most recently revised in 2009) has corroborated many hypotheses of species relationships among the angiosperms but has also challenged long-held assumptions, much to the consternation of some botanists.

Taxonomy has two main purposes: to provide standardized names for distinct species and sub-species/ varieties and to organize these taxa into a logical sequence. The rules for naming species were largely developed by Carolus Linnaeus in the mid 1700s, and since formalized and periodically updated in the International Code of Botanical Nomenclature. Hundreds of classification systems have been proposed over the last three millennia, beginning with the simple growth-form approach (tree, shrub, perennial herb) of Theophrastus in ancient Greece. Linnaeus's own "sexual system", based



Acer circinatum (vine maple) Photo: Dawn Hanna

primarily on the number and degree of fusion of stamens per flower, was an early attempt to apply repeatable criteria to the problem of organizing the chaotic jumble of plant species.

Since Linnaeus's time, plant taxonomists have been striving to create ever more natural combinations of species by including information from many sources, such as floral and fruit morphology, embryology, wood anatomy, leaf architecture, cytology, genetics and the fossil record. Starting in the 1860s with the acceptance of Darwin's theory of evolution, the primary emphasis of taxonomy has shifted from creating mere order to identifying the underlying genealogical relationships among species and families.

Over the last 40 years the dominant angiosperm classification system has been that of the late Arthur Cronquist of the New York Botanical Garden*. Cronquist split the flowering plants into six sub-classes of dicots and five sub-classes of monocots, with each subunit representing

Continued on page 8

*Russian botanist Armen Takhtajan and American Robert Thorne independently derived comparable, though somewhat more complex, systems at about the same time as Cronquist, but their works have not been as widely used in North America.

Taxonomy, continued from page 7

a major evolutionary line. Of these, the magnolia group (*Magnoliidae*) is thought to be the most primitive and closest to the putative ancestral flowering plant. Typical magnolids, such as the magnolias (*Magnoliaceae*), buttercups (*Ranunculaceae*), and water-lilies (*Nymphaeaceae*) have numerous, separate sepals and petals, numerous stamens, many unfused pistils, and pollen opening by a single germination pore. Other dicot lines include the mostly wind-pollinated and petal-less *Hamameliidae* (oaks, elms, birches, and sycamores), chemically-unique *Caryophyllidae* (carnations, buckwheats, and cacti), the large and somewhat amorphous *Rosidae* (roses, peas, maples, euphorbs, and parsleys) and *Dilleniidae* (mustards, heaths, violets, and willows), and the *Asteridae* (asters, mints, phloxes, gentians) considered to be the most advanced group because of the pronounced reduction and fusion of floral parts.

The monocots are believed to derive from the magnolids through the primitive *Alismatidae* (mostly aquatic species with numerous stamens and separate pistils such as the arrowheads and pondweeds). Additional monocot lines include the *Arecidae* (palms and arums), *Commelinidae* (bromeliads, sedges, and grasses), *Zingiberidae* (bananas and gingers), and *Liliidae* (lilies, iris, and orchids). Like the *Asteridae*, the *Liliidae* are considered the most evolutionarily advanced group within their class.

The systems advocated by Cronquist, Takhtajan and Thorne were derived from their authors' encyclopedic knowledge of flowering plant diversity and the taxonomic literature. By contrast, the Angiosperm Phylogeny Group's taxonomy is derived from pooling datasets and experiences of numerous individual researchers, augmented by breakthroughs in analyzing DNA that were unavailable even two decades ago. In addition, the APG has applied

formal cladistic methodology to the problem of family relationship. The basic premise of cladistics is that species and families can be organized based on deviations from an original set of shared characteristics. These changes can be depicted visually as branches of a tree (each branch is a "clade") and the distance between branches is analogous to the degree of similarity between taxonomic groups. To be legitimate under the rules of cladistics, families and higher taxonomic groups must include all species above a given fork in the tree (the decision of what fork to choose is left to the taxonomist). Families that are nested within forks comprising another, related family cannot stand alone, regardless of how distinct they



All in the family: *Camassia quamash* (common camas) is no longer part of *Liliaceae* and instead joins *Agave parryi* (Parry's agave) as part of the *Agavaceae*.

might appear otherwise. Thus, the maple and horse-chestnut branches nest within that of the soapberries and must be included within an expanded family concept of *Sapindaceae*. Likewise, the milkweed clade falls within the dogbanes, duckweeds within the arums, and so forth.

Other situations are more complex, such as the old *Scrophulariaceae* where genera once included in the figwort family were scattered among numerous branches and intertwined with *Orobanchaceae*, *Phrymaceae* and *Plantaginaceae*. Either all of these families had to be merged into one very amorphous family, or they had to be reconstituted into more evolutionarily coherent subgroups. Unfortunately, due to the naming rules set down under the International Code, the family names *Orobanchaceae*, *Phrymaceae* and *Plantaginaceae* had to be retained, even though they are named for relatively unfamiliar genera.

Another family that has been split up considerably is the *Liliaceae*. For years, specialists have recognized that the group was unnatural and served as a catch-all for a diverse assemblage of monocots with six tepals and six stamens. Based on recent genetic and morphological studies, several lily genera have been relocated to other monocot families and orders. The false asphodels (*Tofieldia*) turn out to be more closely related to the arrowheads and are now placed in their own family (*Tofieldiaceae*). Likewise, camas (*Camassia*) is better placed with the yuccas and agaves (*Agavaceae*). Other lily genera have been split into two main clades based on seed and nectary features. One, the asparagus line, includes the onions

(*Allium*), funnel-lilies (*Androstaphium*), and false Solomon's seal (*Maianthemum*), which turn out to be more related to the irises, orchids and agaves than the true lilies. While the lily family remains, it is much reduced and retains mostly the true lilies (*Lilium*), tulips

(*Tulipa*), checker-lilies (*Fritillaria*) and trout lilies (*Erythronium*). There is still disagreement as to whether the sego lilies and mariposas (*Calochortus*) belong here or in their own family, *Calochortaceae*. Other former lily family members have been segregated, including the catbriers (*Smilacaceae*), trilliums (*Trilliaceae*) and death-camas (*Melanthiaceae*).

Some of the changes proposed by the APG remain controversial. The borages (*Boraginaceae*) traditionally have been allied with the mints (*Lamiaceae*) on the basis of similar fruit structures: four 1-seeded nutlets. DNA evidence suggests these two groups are only distantly related within the asterid clade and that the borages should contain the waterleafs (*Hydrophyllaceae*), despite the latter group (*Phacelia*, *Hydrophyllum* and relatives) having capsule fruits with numerous seeds.

Continued on page 10

BC natives found in other official emblems

By Gordon Neish

The summer 2010 issue of *Menziesia* presented a note on some of the floral emblems of BC. This note and some other reading I had done recently sparked my curiosity about which floral and arboreal emblems chosen for other provinces, territories and states are plants that are also native to BC.

Each province and territory in Canada and each state in the United States has floral and arboreal emblems, with the exception of Nunavut, which has no arboreal emblem. As shown in the list below, four provinces, all three territories, and eight states have botanical emblems that are also plants that are native to BC. These comprise a total of 24 taxa when duplicates (Manitoba and South Dakota have chosen the same floral emblem, and Saskatchewan and New Hampshire the same arboreal emblem) and demoted emblems (the Northwest Territories has replaced the jack pine with the tamarack) are subtracted. This relatively long list, with its very broad geographic reach, serves to emphasize British Columbia's high degree of biogeoclimatic diversity and the desirability of protecting the province's rich heritage of native plant genetic resources.

Not included in this list are non-native plant species that have been introduced into BC. Also excluded are botanical emblems that have been named only at the generic level, such as the New York rose (genus *Rosa*), the Texas bluebonnet (genus *Lupinus*) or the Missouri hawthorn (genus *Crataegus*) as none of the species generally associated with these generic designations in these states are native to BC.

My thanks go to Dawn Hanna and Laure Wilson Neish for their assistance with preparing this note.

Province, territory or state	common name	scientific name	year designated
Canada			
Alberta	wild rose	<i>Rosa acicularis</i>	1930
	lodgepole pine	<i>Pinus contorta</i> var. <i>latifolia</i>	1984
Manitoba	prairie crocus	<i>Anemone patens</i> subsp. <i>multifida</i>	1906
	white spruce	<i>Picea glauca</i>	1991
Newfoundland and Labrador	pitcher plant ¹	<i>Sarracenia purpurea</i> subsp. <i>gibbosa</i>	1954
	black spruce	<i>Picea mariana</i>	1993
Northwest Territories	mountain avens	<i>Dryas octopetala</i>	1957
	jack pine	<i>Pinus banksiana</i>	1989
	tamarack ²	<i>Larix laricina</i>	1999
Nunavut	purple saxifrage	<i>Saxifraga oppositifolia</i>	2000
Saskatchewan	western red lily	<i>Lilium philadelphicum</i> var. <i>andinum</i>	1941
	white birch	<i>Betula papyrifera</i>	1988
Yukon	fireweed	<i>Epilobium angustifolium</i>	1957
	subalpine fir	<i>Abies lasiocarpa</i> var. <i>lasiocarpa</i>	2001
United States			
Alaska	forget-me-not	<i>Myosotis asiatica</i>	1917
	Sitka spruce	<i>Picea sitchensis</i>	1962
Idaho	syringa (mock-orange)	<i>Philadelphus lewisii</i>	1931
	western white pine	<i>Pinus monticola</i>	1935
Montana	bitterroot	<i>Lewisia rediviva</i>	1895
	ponderosa pine	<i>Pinus ponderosa</i>	1949
Nevada	sagebrush	<i>Artemisia tridentata</i>	1917
New Hampshire	paper birch	<i>Betula papyrifera</i>	1947
Oregon	Oregon grape	<i>Mahonia aquifolium</i>	1899
	Douglas-fir	<i>Pseudotsuga menziesii</i>	1939
South Dakota	pasque flower	<i>Anemone patens</i> subsp. <i>multifida</i>	1903
Washington	coast rhododendron	<i>Rhododendron macrophyllum</i>	1892/1959 ³
	western hemlock	<i>Tsuga heterophylla</i>	1947

1. This would need to be verified, but presumably what occurs in BC is closely related, if not identical, to the floral emblem of Newfoundland and Labrador.

2. The tamarack replaced the jack pine in 1999.

3. Named unofficially in 1892, officially in 1959.

References

A number of references were consulted for individual provinces, territories and states. The references below are some of the more generic ones consulted.

- Canada's Arboreal Emblems: official trees and their wood. TreeCanada (www.treecanada.ca)

- Flowers Canada: The territorial and provincial flowers of Canada (<http://flowers-canada-flowers.com/provincial-flowers/the-territorial-and-provincial-flowers-of-canada>)

- State Symbols USA (www.statesymbolsusa.org/Lists/state_flowers.html)

- United States National Arboretum: State Trees and State Flowers (www.usna.usda.gov/Gardens/collections/statetreeflower.html) *

Besides rearranging plant families, the APG has altered Cronquist's long-standing family tree. The most primitive flowering plants are now thought to be a group of herbs and shrubs that includes the water-lilies and several small orders found mostly in the south Pacific and Australia. From this basal group, the angiosperms split into the magnolid line (analogous to Cronquist's concept with a few of the most primitive forms and the buttercups removed), the monocots, and the "true dicots" or eudicots. Among the eudicots, the buttercups diverged early, as did the *Caryophyllidae*. Two main branches later arose: the *Rosids* (which include most of Cronquist's *Rosidae*, *Hamameliidae* and *Dilleniidae*) and the asterids (expanded from the original *Asteridae* to include the umbels (*Apiaceae*), hollies (*Aquifoliales*), dogwoods (*Cornales*) and heaths (*Ericales*).

Of course no classification is ever complete or universally accepted. Numerous refinements were made in the third edition of the APG system published in 2009 and more changes will likely arise and be posted on the APG website in the future (www.mobot.org/mobot/research/apweb/). Taxonomists are still free to use systems of their choosing in technical manuals, floras and species checklists. Users of these products will still need to be fluent in multiple family synonyms and concepts.

We live in an era of unstable taxonomy, and this is not likely to change any time soon. Efforts to create more natural taxonomic systems, like that proposed by APG, are worthwhile, even though they may be upsetting when they impact our favourite families or world view. Taxonomy is, after all, a legitimate science and not merely pasting and rearranging stamps in a binder. Some of the changes proposed by APG will prove to be wrong in light of new discoveries and changes in theory (cladistics is not without its logical shortcomings, particularly the problems of hybridization and reticulate evolution). The goal of the perfect, natural classification will remain elusive, just as it has since Linnaeus's time nearly 250 years ago. *
Walter Fertig is the editor of Segoe Lily, the newsletter of the Utah Native Plant Society as well as the author of the Wyoming Rare Plant Field Guide.

References

- Angiosperm Phylogeny Group. 2003. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG II. *Botanical Journal of the Linnean Society* 141:399-436.
- Spears, P. 2006. *A Tour of the Flowering Plants Based on the Classification System of the Angiosperm Phylogeny Group*. Missouri Botanical Garden Press, St. Louis, MO. 308 pp.



Biological Consulting Services

Avian & wildlife ecology, inventory & research

Shona L. Lawson, M.Sc., RPBio.

Shona is a wildlife biologist with over 12 years experience.

"Working to conserve wildlife & wild spaces"

- ❖ *Developing and preparing funding applications*
- ❖ *Designing and implementing wildlife projects*
- ❖ *Wildlife and wildlife habitat conservation and management*
- ❖ *Interpretation of legislation, policies and regulations*
- ❖ *Developing & preparing public education material*
- ❖ *Report preparation*

Shona works cooperatively with Management Committees, First Nations, Non-Profit Organizations, & Governments.

Contact: Lawson.shona@gmail.com 250.508.4021

Field trip leaders wanted!



The Native Plant Society of BC is a completely volunteer endeavour, from the directors who sit on the board, to the speakers who share their knowledge, to the field trip leaders who get us out and about. If you're interested in leading or co-leading a field trip anywhere in the province, please let us know.

Send an email to dawnhanna@telus.net or call (604) 831-5069.

Hugh Daubeny honoured for work with *Rubus* species

Native Plant Society of BC director Hugh Daubeny recently received an award from the International Society for Horticultural Science. Hugh, an emeritus geneticist with Agriculture Canada, was recognized because of his work in cooperative studies on raspberry breeding between Agriculture Canada and the Scottish Crop Research Institute.

Starting in the early 1960s, Dr. Derek Jennings of SCRI and Hugh exchanged germplasm and information resulting in a series of raspberry cultivars that have increased the adaptation range of the crop. They combined genes originating from the European and North American native red raspberries (*Rubus idaeus* and *R. strigosus*, respectively) with genes from the northeastern North American black raspberry (*R. occidentalis*). "Tulameen" is an outstanding example of a cultivar developed from this cooperation; it is the most widely grown fresh-market cultivar in the world and has become the world standard by which other cultivars are judged.

The studies are being promoted as an example of international cooperation, the type of which is now endangered by the increasing degrees of privatization in fruit breeding programs. Hugh and Derek were honoured at a special dinner held in August in Lisbon, Portugal, the site of 28th International Horticulture Congress.

Hugh and Derek are also the subject of a dedication in the latest issue of *Plant Breeding Reviews*. In that dedication, Hugh's work, both professional and



Photo: Ron Long

Hugh Daubeny

volunteer, is reviewed and his many awards recounted. The last paragraph in that dedication sums up the high esteem in which he is held.

"Hugh Daubeny, berry geneticist and breeder, collaborator, and friend, has had a distinguished career. He continues to motivate and educate the scientific community. His compassion for the environment and acute awareness of the need to conserve wild genetic resources provides a direct lesson for our time. He has brought us great riches in the form of his cultivars, which have become classic standards for raspberries and strawberries. His life and work is an inspiration for us now and for the future."

The Native Plant Society of BC is very fortunate to have Hugh as a director. ✱

Mimulus guttatus provides a clue to evolution

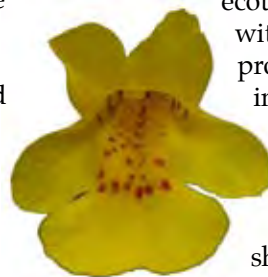
Researchers at Duke University have discovered that *Mimulus guttatus* (yellow monkeyflower), which lives as both a perennial on the foggy coasts of the Pacific Northwest and a dry-land annual hundreds of kilometres inland, harbours a significant clue about evolution.

Duke graduate student David Lowry had become interested in how a single species could live such different lifestyles. He set out to find a gene or genes that would account for *Mimulus guttatus* being a lush, moisture-loving, salt-tolerant perennial on the coast, but a shorter, faster-flowering, drought-tolerant annual inland.

What he found instead was that a large chunk of the plant's genome – 2.2 million letters of DNA and 350 genes – are working differently in each ecotype of the plant. The difference is called a genetic inversion, a long piece of DNA that has been clipped out of a chromosome at both ends and then reinserted essentially upside down.

A single species with a broad range of habitats like yellow monkeyflower can be expected to have a suite of

genes to help it adapt to the various conditions within its range. But depending on where an individual plant finds itself, some of those genes aren't being used.



In the case of the monkeyflower, Lowry found that each ecotype has a large suite of adaptive genes carried within the inversion. The inland plants set about producing flowers and getting their reproduction done in the spring, before hot, dry weather arrives. The coastal plants grow a lot more foliage and flower much later without the threat of drought, leaving them better suited to overwinter and to compete for space in a riotous plant environment. Lowry showed that those adaptations lie within the inverted section: transplanted to the other environment, neither variety does well.

Not only will these hardiness differences help drive the two ecotypes apart, their different flowering times will help prevent pollen-swapping that would mingle their genes. With time, they should become separate species, "depending on which definition of species you want to use," Lowry quickly added. "They're not full species, but they're going in that direction." ✱

Review

Trees and Shrubs in Winter An Identification Guide for Northern British Columbia

Rosamund Pojar

Softcover, \$20

Creekstone Press, 2010

Many native plant enthusiasts fall under the spell of wildflowers with their showy petals, perfumed fragrances and bewitching ways. But some of us have a soft spot for plant life that is often overlooked – and there is no form of plant life that is more often overlooked in winter than deciduous trees and shrubs.

For most people, trees and shrubs only start to get some attention when the year's new leaves emerge, and then again in fall, when the same leaves go out in a blaze of autumnal glory. But for those months when deciduous trees and shrubs go naked and leafless, they seem, for most, only stark reminders of winter's dark, cold duration.

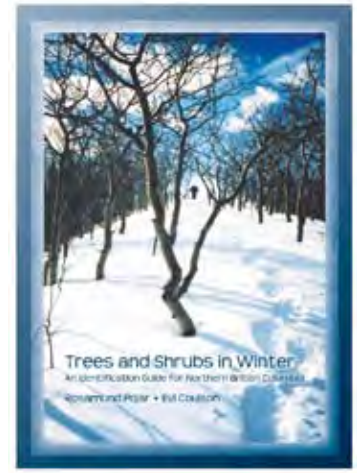
But really, isn't this the best time to get to know your neighbours? When they've shed their fancy clothes and look-at-me ways, when you can get to see them in all their beautiful simplicity?

Last winter, I took the time to get to know many of the native deciduous trees and shrubs in my neighbourhood. I became intimate with the sweet-smelling buds of *Populus balsamifera* ssp. *trichocarpa* (black cottonwood); I figured out which of the shrubs in a nearby meadow were *Corylus cornuta* (beaked hazelnut) and which were *Amelanchier alnifolia* (Saskatoon) and I tried to sort out the different *Ribes* species, using prickles – or the lack thereof – as a guide.

How I wished I had had a field guide – and not the usual field guides that focus on leaves, flowers and fruits, but one that focused on twigs, buds and bark. There are some out there, but they tend to be for eastern North America or are expensive and unwieldy tomes.

This winter, however, I will have a new guide to help me: *Trees and Shrubs in Winter* by Rosamund Pojar. Although the book is subtitled "An identification guide for northern British Columbia", you'll find many species of coniferous trees and shrubs, and deciduous trees and shrubs that are found throughout much of the province.

The book, conceived originally as a study aid for natural resources classes taught by Rosamund, is a terrific resource for anyone with an interest in native trees. There are simple keys using characteristics seen in winter (foliage and cones for the conifers, bark, buds and twigs for the deciduous species) to help steer you in the right directions. Each species gets a detailed write-up with specific descriptions as well as notes on similar species and how to tell them apart, geographical ranges and interesting



tidbits of information.

Take for example, this comment on *Pseudotsuga menziesii* (Douglas fir): "Surely this tree must suffer an identity crisis! Its common name suggests that it is a fir when it is not, whereas its Latin name means 'false hemlock' – all because European explorers who first discovered it had never seen a tree like it before as it is endemic to the west coast of North America and they were confused as to what to call it."

The illustrations by Evi Coulson are terrific and are the perfect complement to the text. All in all, *Trees and Shrubs in Winter* is a book that you need on your shelf or in your backpack. I can't wait for all the leaves to fall. *

Trees and Shrubs in Winter is published by Creekstone Press. To find bookstores that sell the book, go to <http://creekstonepress.com/index.php/ordering/>



“This book is a significant addition to the native plant and xeriscaping canon.”
Don Gayton,
ecologist

To order, email edurance@vip.net \$22.95 Cdn + postage (no GST)
or call (250) 492-0158 \$20.95 US + postage

Native Plant Society of BC now on Facebook

If you're a non-profit organization, you need a Facebook page, or so we've been told. Now we do.

So what will you find?

- regular updates including society news
 - photos from recent field trips
 - event listings
- random notes on new books, cool links, etc.

To check it out, click on the link on our home page: www.npsbc.org or sign in to Facebook and search for Native Plant Society of BC.

Coming events

NATIVE PLANT SOCIETY OF BC

SOUTH COAST NATIVE PLANT STUDY GROUP

(A subgroup of the Native Plant Society of BC)

Evening presentations

November 4

Seeds of Inspiration: The basics of native plant seeds

Patrick Wilson, Linnaea Nurseries

From the tiny seeds of *Mimulus guttatus* (yellow monkeyflower) to the fruit-covered achenes of *Rosa nutkana* (Nootka rose) and the winged samaras of *Acer macrophyllum* (bigleaf maple), seeds are a source of wonder – and mystery. Join Patrick Wilson for a primer on native plant seeds, including their structure, diversity, dispersal mechanisms and more. Patrick will also talk about harvesting and storing native seeds.

December 2

Ranunculaceae: From the pretty to the poisonous

Daniel Mosquin

Deadly toxins.

Garden
ornamentals.

Common
weeds. Rare
species. The
Ranunculaceae.

Join Daniel for a photographic and narrative account of this morphologically diverse family

of mostly temperate species. The presentation will emphasize native plants of BC and elsewhere in western North America, with a few cultivated gems from around the world thrown in for good measure.

January 6

Macrofungi of Haida Gwaii

Paul Kroeger

Haida Gwaii has been the focus of studies that have established the archipelago as having several endemic and interesting disjunct taxa. But while mammals, vascular

plants, mosses and insects have all been studied, little was known until very recently about the archipelago's macrofungi, which are a conspicuous and ecologically important component of the biota. Paul will talk about the almost 500 species of macrofungi found on Haida Gwaii during a five-year survey, as well as the critical importance of fungi to native plants.



Amanita muscaria

All meetings are held at 7 p.m. in the Cedar Room at VanDusen Botanical Garden, 5251 Oak Street (37th & Oak St.), Vancouver. Admission is free for members, \$2 for drop-ins.

For more information, please check the NPSBC website at www.npsbc.org or email dawnhanna@telus.net or call (604) 831-5069.

VICTORIA NATIVE PLANT STUDY GROUP

The speakers series has resumed, with sessions being held at 7 p.m. at the University of Victoria's MacLaurin Building, Room D-116. Non-member drop-in fee is \$3. Please check the NPSG website at www.npsg.ca for information as it becomes available.

NATURE VANCOUVER BOTANY SECTION

Evening presentations

October 21

The Vegetation and Flora of Mount Kinabalu, Sabah

Dr. Keith Wade

An illustrated lecture on the vegetation, altitudinal zonation and the extraordinary species-diverse flora of Mount Kinabalu, the highest peak between the Himalayas and the island of New Guinea. This magnificent peak is a botanical crossroads, where plant families of Asian and Australian origins combine in spectacular diversity.

November 18

Wind as a natural disturbance agent in coastal British Columbia forests Dr. Stephen Mitchell

The December 2006 windstorm that damaged Stanley Park was a surprise to many Lower Mainland residents, but was in fact a typical event in the life of a coastal BC rainforest. Wind is a significant natural disturbance agent in Coastal Western Hemlock zone forests and we recognize three broad disturbance regimes that produce distinctive vegetation structure and species composition and differing soil properties. These are small gap dynamics, cohort replacement, and whole stand replacement. Dr. Mitchell will discuss the storm climatology of coastal BC, illustrate the resulting vegetation communities and soil conditions and comment on the implications for forest conservation and management.

The evening programs are held at 7:30 p.m. at the Unity Church, 5840 Oak St., Vancouver.

For more information, contact David at cokeco2@yahoo.com or (604) 924-0147.

VANDUSEN BOTANICAL GARDEN

Cedar Series Lectures

November 11

Poppies and Plant Hunting on the Roof of the World

Bill Terry

During a 2700 km plant-hunting road trip through Sichuan and Tibet, Mr. Terry encountered many beautiful alpine species, including *Meconopsis*. Enjoy the botanical stories from this expedition, combined with an account of the cultures and country they met. Bill's book, *Blue Heaven, Encounters with the Blue Poppy* will be available.

December 9

Alpine plants of Nuk Tessli

Chris Czajkowski

Ms. Czajkowski will regale attendees with stories of life in the mountains, cabin-building and the logistics of living in the remote reaches of BC's Coast Range mountains, where very

continued on page 14

Events, continued from page 13

little can be grown, almost nothing can be harvested from the wild, and the nearest supermarket is hundreds of kilometres away.

The Cedar Series Lectures are held at 7:30 p.m. in the Floral Hall. Tickets are \$10 for members, \$15 for non-members and are available in advance from the administration office as well as the door.

Other events

October 24

Vancouver Mycological Society Mushroom Show

11 a.m. to 4 p.m.

Admission \$3. For information, call Brian at (604) 619-5060.

UBC BOTANICAL GARDEN

All events take place at the UBC Botanical Garden, 6804 SW Marine Dr.

Events

October 31, 12 noon to 3 p.m.

Annual Boootiful Botany Haunted Halloween

An educational trick-or-treat garden scavenger hunt, a favourite for local children and their families. There will be crafts, games and prizes, spooktacular treats and more. Costumes are encouraged! Admission by donation.

Monday Noon Lectures

November 8, 12 noon

A History of Plant-based Medicine

Daniel Mosquin

From prehistoric times, through the Greek Empire, into the Middle Ages and modern day, plants have played a vital role in the development of medicine and thus are deeply entwined in the history and survival of humankind, both past and present. Following the lecture, Daniel will lead interested participants on a brief walk to the Physic Garden, a 16th century medicinal herb garden that historically would have been used for the education of physicians and apothecaries.

December 13, 12 noon

Plants Inspiring Technology

Daniel Mosquin

In the last lecture in the 2010 International Year of Biodiversity series, Daniel explores how plants have inspired and contributed to technological advances, particularly the development of novel materials.

January 24, 12 noon

Plants of Southern Interior BC

Daniel Mosquin
Join Daniel for a photographic tour of the plants of southern interior BC, from the mountains of Manning to the rangelands near Merritt, from the shrub-steppes of the south Okanagan to some of the proposed sites for a potential South Okanagan-Lower Similkameen National Park.



Astragalus canadensis

Monday noon lectures cost: \$5; bring a bag lunch, coffee provided. Call (604) 822-3928 or email botg@interchange.ubc.ca to book a seat.

VOLUNTEER OPPORTUNITIES

Jericho Park, Vancouver

Second Sunday each month

(August 8, September 12)

9 a.m. to 1 p.m.

Help remove invasive plants and replant native plant species to restore and enhance habitat at Jericho Park in Vancouver. Tools and gloves provided. Meet at the wooden bridge over the pond. For more info, go to www.jerichostewardship.ca

Iona Beach Regional Park, Richmond

Third Sunday each month

(August 15, September 19)

10 a.m. to 1 p.m.

Help remove invasive plants and restore rare sand dune habitat at Iona Beach Regional Park in Richmond. Tools and gloves provided. Meet at the washroom building. For more info, go to www.parkpartners.ca/partners/IonaBeach/iona.htm *

Petals present more than just a pretty face

The withering action of flowers may have evolved to protect their seeds notes research by ecologist Dr. Carlos Herrera, a professor of Research at the Consejo Superior de Investigaciones Científicas in Seville, Spain.

"No one has paid much attention to the corollas, collections of petals on a flower, when they shrivel. Their job is done, so it's no surprise they die. But if their job is done, why don't the petals simply drop off the plant?" noted Herrera. "I thought there might be an advantage that kept the old corollas on the plant."

To test his idea, Herrera conducted a simple experiment. He removed dead petals from some lavender, then observed what happened to the seeds.

"The results for the lavender were striking," said Herrera. "Normally you'd expect around 60 percent of the lavender fruits to ripen. Without the withered petals around the fruit, only 40 percent ripened. The dead petals seem to have formed a protective barrier around the fruit. In this case the barrier helps prevent attack by gnat larvae who like to feed on lavender seeds."

He also tried the same experiment with some violas, but got a different result.

"For violas I found that the petals helped increase the number of seeds per fruit, but had no effect on ripening. It's clear that the petals are doing something important for the plant after they decay, but it is a complex relationship that needs more study. Still, it shows there is a major role for petals to play on a plant, even after the bloom of youth has gone."

The study is published in the October 2010 issue of the *Annals of Botany*.

~ ScienceDaily

Students want to know more about native plant species

A new trend shows native wildflowers are becoming more popular with consumers. In Florida, for example, a 2005 survey estimated sales of native plants in the state totaled almost US\$316 million.

College students do not fit the traditional demographic profile of gardening and landscaping consumers, but today's horticulture students will determine how and if native wildflowers will be used in educational programs, gardening, landscaping and revegetation projects. A research team from the University of Florida designed a web-based survey that investigated the awareness, perceptions and interest in native wildflowers among Florida college students enrolled in plant-related disciplines.

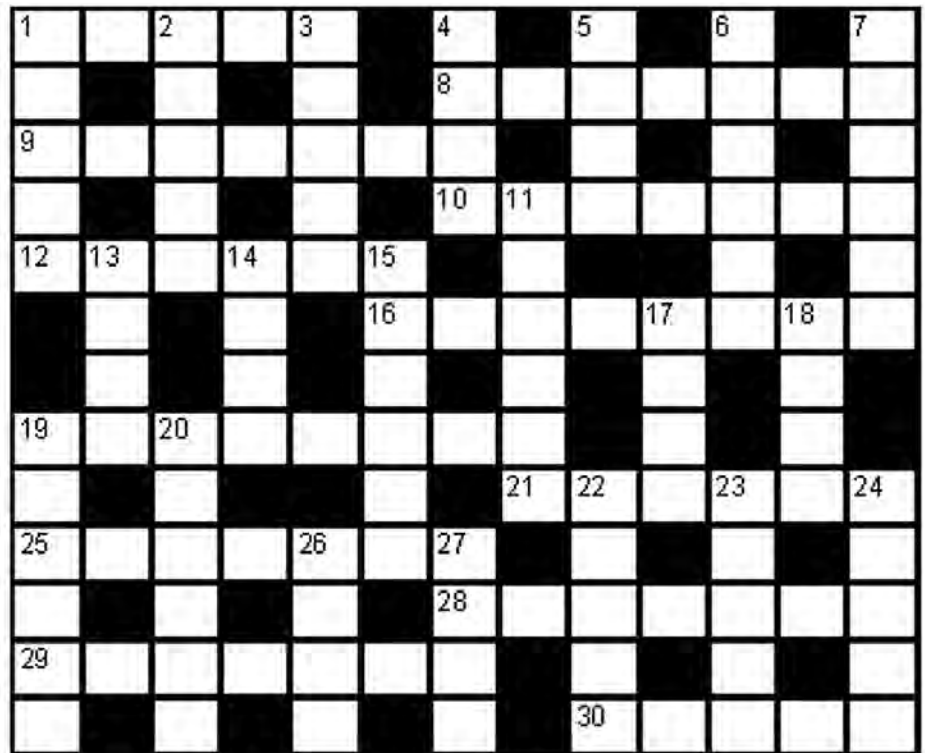
The study, published in *HortTechnology*, asked Florida college students to rate their level of awareness of the herbaceous annual or perennial species that were growing in Florida before the arrival of Columbus to the new world.

Respondents were also asked to estimate the number of native species they could identify by name and sight, what season(s) they expected those species to be in bloom, and in what areas or ecosystems the species were found.

While the survey results showed that students had a generally low awareness of native wildflowers, they expressed high levels of interest in learning more about the identification or cultivation of these species, seeing wildflowers (particularly on college campuses), and using wildflowers in different settings. Students also noted a preference for purchasing native wildflower seeds or finished plants from local retailers.

~ *Science Daily*

Cannings' Cryptic Crossword



By Richard Cannings



ACROSS

1. Loads deals gone astray (5)
8. On Scottish island I added a major grassland foodplant (7)
9. Hundred put into actual chopped lettuce (7)
10. Insect a surprise in BC mountain (7)
12. Pet took a little bit of mint plant (6)
16. Um, ignore confusing daisy (8)
19. Biting insect stuck on mashed bean daisy (8)
21. Dish takes in an elegant pastry (6)
25. Oriental regions are in fast (3, 4)
28. Sexless, a gender turn takes a learner (7)
29. Hail pod could be like moss gametophyte (7)
30. Dilapidated Scottish potato (5)

DOWN

1. Little kind of electricity flower (5)
2. Like some plants, unconscious self goes back to bed (5)
3. Audis crash into one of the Arabs (5)

4. Labs produce large flat stone (4)
 5. Small branch in fast wigeon (4)
 6. Is circle, piece of soap, seen on weather maps? (6)
 7. Leave dark red (6)
 11. Untied, could be together (6)
 13. Plant part heard as car part (4)
 14. North, a Pennsylvania wine valley (4)
 15. Staple makes flower parts (6)
 17. Ireland found in boiler inferno (4)
 18. Ask around after zero trees (4)
 19. Loud shift produces quantities of liquor (6)
 20. Incontinent? Our pee can be continent as well (6)
 22. Northern native beer university time (5)
 23. Northern native in unemployment insurance time (5)
 24. Left in holy, sacred plant (5)
 26. Basic bit a big cat (4)
 27. Little bits of time, promotional spots (4)
- Answers on page 16*

How it works

Every clue contains the definition of the answer plus a cryptic clue to the word or the letters that form it. Some examples:

1. Back an Oz IRA for snowbird destination? (7) Answer: ARIZONA (an Oz IRA backwards)
2. Echo loses hot, lethargic feeling for environmental study. (7) Answer: ECOLOGY (echo loses H (hot) + logy (lethargic feeling))
3. Mashed pea seed for fishing or diving (4,3) Answer: DEEP SEA (anagram of pea seed; watch for words like confused jumbled, crazy, mashed -- they often signal an anagram.)

Cryptic crossword answers explained

from puzzle on page 15



ACROSS

1. lades (deals anagram); 8. Lewisia (Lewis + I + a); 9. Lactuca (anagram of actual with C inserted); 10. bugaboo (bug + a + boo); 12. catnip (cat + nip); 16. Erigeron (er + ignore anagram); 19. fleabane (flea + bean anagram); 21. danish (dANish); 25. Far East (fAREast); 28. asexual (a + sex + U + a + L); 29. haploid (hail pod anagram); 30. tatty (double meaning).

DOWN

1. lilac (lil + AC); 2. dicot (Id backwards + cot); 3. Saudi (Audis anagram); 4. slab (labs anagram); 5. twig (hidden if fast WIGeon); 6. isobar (is + O + bar); 7. maroon (double meaning); 11. united (untied anagram); 13. axil (axle homonym); 14. Napa (N + a + PA); 15. petals (staple anagram); 17. Erin (hidden in boiler INferno); 18. oaks (O + ask anagram); 19. fifths (F + shift anagram); 20. Europe (our pee anagram); 22. Aleut (ale + U + T); 23. Inuit (in + UI + T); 24. holly (holLY); 26. atom (a +tom); 27. tads (T + ads).

Join the Native Plant Society of British Columbia

You'll receive **menziesia** four times a year and receive first notice of our presentations, workshops and field trips.

Annual Membership fees

- Individual \$25
- Household \$30
- Student \$20
- Sustaining member \$75
- Support NPSBC's work with a donation \$_____



Name _____
 Address _____
 City _____ Prov _____
 Postal Code _____ Phone _____
 Email _____

Mail to: NPSBC Memberships,
 Suite 195, 1917 West 4th Avenue, Vancouver BC V6J 1M7

Please make cheques payable to Native Plant Society of BC.

menziesia is published four times a year by the Native Plant Society of BC, Suite 195, 1917 West 4th Avenue, Vancouver BC V6J 1M7