

THE CANADIAN BOTANICAL ASSOCIATION
BULLETIN
DE L'ASSOCIATION BOTANIQUE DU CANADA

August / août 2000

33(3)

Montréal



Patron / Président d'honneur
Her Excellency the Right Honourable / Son excellence la très honorable
Adrienne Clarkson, C.C., C.M.M., C.D.
Governor General of Canada / Gouverneure générale du Canada



On the inside / À l'intérieur

Page 26

Editors / La rédaction
CBA Section and Committee Chairs

2000 CBA Annual Meeting /
Congrès annuel de l'ABC 2000

Page 27

The Mary E. Elliot Medal
The George Lawson Medal

Page 28

2000 Award Winners

Page 29

2001 CBA Annual Meeting /
Congrès annuel de l'ABC 2001
First announcement

Page 30

Erratum CBA Bulletin 33(2)
William F. Grant honored

Page 31

Poorly Known Economic Plants of Canada
- 26. Labrador Tea, *Ledum palustre sensu lato*
(*Rhododendron tomentosum*)

Page 36

Teaching Section

Page 37

Mycology Section Report

Page 38

Book Reviews

Page 40

CBA Board of Directors /
Bureau de direction de l'ABC
Future Meetings / Prochains congrès

President's Message

My first duty in this report is to thank Denis Barabé for his leadership as President of the Association during the past two years. I can only hope to do as well during my tenure as President of the Association.

Our Annual Meeting this year was held at the Convention Centre in London, Ontario, and was a joint meeting with the Canadian Society of Plant Physiologists. I am sure that those who attended the meeting enjoyed themselves as much as I did. As usual, our student members provided us with an excellent series of both oral and poster presentations. On behalf of the Association, I thank the organizing committee at London, lead by Jim Phipps, for the hard work they put into the organization of the meeting.

We can now look forward to the next Annual Meeting, which will be held in one of the most scenic regions of Canada, the interior of British Columbia around the beautiful setting of the city of Kelowna. We are promised another attractive program by the organizing committee led by Melanie Jones. As a wine enthusiast, I am looking forward to sampling some of the output of some of the fine vineyards in the Kelowna region. I encourage you to visit the meeting website (see the address on page 30 of this Bulletin) for more information about this meeting.

A major raison d'être of the Association is to provide recognition for excellence in botanical research through a number of awards presented by the Association and its Sections. In order to make awards, we must receive nominations of suitable candidates. I am asking you all to consider providing me with nominations for the Lawson Medal and providing your Section Chair with nominations of excellent papers to be considered for the Section awards. I would also like to receive suggestions for a suitable candidate for receiving the Mary Elliott Award for service to the Association.

Finally, on behalf of the Association, I would like to thank Denis Lauzer for continuing to produce our excellent Bulletin. Denis, however, has requested that a new Editor take over this task beginning in 2002. Therefore, I am asking now for expressions of interest from anyone who would like to take on the position of Bulletin Editor. Contact Denis to find out what is involved.

Joe Gerrath, President

Editors / La rédaction

Editor / rédacteur

Denis Lauzer

Assistant editor / rédacteur adjoint

Stuart Hay

Institut de recherche en biologie végétale
(Université de Montréal / Jardin botanique de Montréal)
4101, rue Sherbrooke Est
Montréal, Québec
H1X 2B2
Téléphone : (514) 872-8494
Télécopieur : (514) 872-9406
Courrier électronique : denis.lauzer@umontreal.ca

Information for submitting texts / Soumission des textes

Texts and illustrations for the Bulletin must be sent to the Editor preferably via the electronic mail (attached file) or on a diskette. Texts should be saved under "Word" and illustrations under the "TIFF" format.

If you have any question about text submission please contact the Editor.

Les textes et les illustrations pour le bulletin doivent de préférence être envoyés par courrier électronique (sous forme de fichier attaché) ou encore sur une disquette.

Les textes doivent être enregistrés sous « Word » et les illustrations sous le format « TIFF ».

N'hésitez pas à contacter le rédacteur pour toute information sur l'envoi de documents.

CBA Bulletin / Bulletin de l'ABC

The CBA Bulletin is issued quarterly (February, May, August, November) and sent to all CBA members.

Le Bulletin de l'ABC paraît quatre fois par année (février, mai, août, novembre) et est envoyé à tous les membres de l'ABC.

To ensure continuous delivery of the Bulletin please notify the Treasurer promptly of any change of address.

Veuillez communiquer tout changement d'adresse au trésorier afin de recevoir tous les numéros du bulletin.

If you have any comments or suggestions about the Bulletin, please contact the Editor at the above address.

Si vous avez des commentaires ou suggestions concernant le bulletin, veuillez s'il vous plaît contacter le rédacteur à l'adresse mentionnée plus haut.

Texts for the November issue must be received before October 31, 2000. Les textes pour le bulletin de novembre doivent arriver au plus tard le 31 octobre 2000.

CBA Section and Committee Chairs

Section Chairs (2000-2002)

Ecology

Dianne Fahselt

Department of Plant Sciences
University of Western Ontario
London, ON, N6A 5B7
dfahselt@julian.uwo.ca

Tel. : (519) 679-2111 ext. 6480; fax : (519) 661-3935

Mycology

James Traquair

Agriculture & Agri-Food Canada, Research Centre
1391 Sanford St.
London, ON, N5V 4T3
traquairj@em.agr.ca

Tel. : (519) 457-1470, ext. 224; fax : (519) 457-3997

Structure & Development

Denis Barabé

IRBV-Jardin botanique de Montréal
4101, rue Sherbrooke Est
Montréal, QC, H1X 2B2
denis.barabe@umontreal.ca

Tel. : (514) 872-1436; fax : (514) 872-3765

Systematics & Phytogeography

Luc Brouillet

IRBV-Université de Montréal
4101, rue Sherbrooke Est
Montréal, QC, H1X 2B2
luc.brouillet@umontreal.ca

Tel. : (514) 872-8490; fax : (514) 872-9406

Teaching

Sylvie Laliberté

Dép. des sciences biologiques
Université du Québec à Montréal
C.P. 8888, Succ. Centre-ville
Montréal, QC, H3C 3P8
laliberte.sylvie@uqam.ca

Tel. : (514) 987-3963; fax : (514) 987-4647

Committee Chairs (2000-2002)

Conservation

Pam Krannitz

Pacific Wildlife Research Centre
5421 Robertson Road, R.R. 1
Delta, BC, V4K 3N2
pamk@interchange.ubc.ca

Tel. : (604) 946-4676; fax : (604) 946-7022

Science Policy

Denis Barabé

IRBV-Jardin botanique de Montréal
4101, rue Sherbrooke Est
Montréal, QC, H1X 2B2
denis.barabe@umontreal.ca

Tel. : (514) 872-1436; fax : (514) 872-3765

Development

Dr. Vipen Sawhney

Department of Biology
University of Saskatchewan
Saskatoon, SK, S7N 5E2
sawhney@admin.usask.ca

Tel. : (306) 966-4417; fax : (306) 966-4461

Membership

Dr. Hugues Massicotte

Forestry Program
Faculty of Natural Resources and Environmental Studies
University of Northern British Columbia
Prince George, BC, V2N 4Z9
hugues@unbc.ca

Tel. : (250) 960-5813; fax : (250) 960-5538

**The Mary E. Elliot Medal
to Dr. Paul Cavers**

Dear members of the Canadian Society of Plant Physiologists and of the Canadian Botanical Association, distinguished participants and guests. I am very pleased to present the Mary Elliot Medal to Dr. Paul Cavers who is professor of Plant Ecology at the University of Western Ontario. The Mary Elliot Medal was established in 1978 to recognize meritorious service to the Canadian Botanical Association.

Paul has served the Association in so many ways over so many years. For thirty years he has been an active member and supporter of CBA by participating in the Annual Meetings and encouraging his students to follow his example. In the 1970s he served as our third secretary (1970-71), and after a term as Vice-President in 1972, he became President in 1973. He is currently a Director of the Association, and has agreed to continue in this capacity for another term. Paul has always been a stalwart member of the Ecology Section of CBA, serving in various capacities on its executive over the years.

In addition to his work with the Canadian Botanical Association, an obvious reason to present the Mary Elliot Medal to Paul, is his long history of participation in weed science societies, both Canadian and international. He has worked with the National Weeds Committee of Canada, and has been the Chairmain of the Committee on Biology of Canadian weeds. He has also served on several committees of the Weed Science Society of America. His agronomic interest led to his participation as Secretary-Treasurer with the Ontario Institute of Agrologists.

He also served a term on the NSERC Population Biology Grant Selection Committee, and has been an Associate Editor for some major journals, including the Canadian Journal of Botany. Let us mention that Paul is presently the Editor of the NRC Monograph Publishing Program. Paul was honored with the Outstanding Teacher Award from the Weed Science Society of America, presented in Denver, Colorado, in 1993.

When the Canadian Botanical Association held its annual meeting in London in 86, and of course this year, Paul has always been there, either at the helm of the local committee, or in some other capacity. He has always given advice freely to meeting organizers from other locations so they could benefit from his experience.

I am pleased to present the Mary Elliot Award to Dr. Paul Cavers, an active plant scientist and educator.

Denis Barabé, Past-President

**The George Lawson Medal
to Dr. David Richardson**

It is a real pleasure for me, on behalf of the Canadian Botanical Association, to present the George Lawson Medal. This award is presented to recognize a lifetime contribution by a botanist working in Canada with an exceptional research and academic career. This year the Lawson Medal is presented to Dr. David Richardson, professor at Saint Mary's University, Halifax.

Dr. David Richardson was born in England and studied for his first degree in botany at Nottingham University, intending to become a rose grower. However, he first decided to do a Master's degree in mycology and developed an interest in lichens. As a consequence, he moved to Oxford and completed a Ph.D. on the carbohydrate physiology of these organisms. The results were published in several journals including Nature.

After two years at Exeter University, an opening for a mycologist with a research interest in lichens was advertised at Laurentian University in Ontario. David was offered the position and in 1969 moved to Sudbury which provided an ideal location for studies on the effects of air pollution on lichens both in the laboratory and the field. Teaming up with a chemist, Dr Evert Nieboer and a series of students, he yielded a large number of research papers and book chapters. The accumulated experience lead to the publication of David's first book 'The Vanishing Lichens'.

In 1980, David spent a sabbatical at Oxford and in Perth, Australia, writing a second book 'The Biology of Mosses'. During this year he was offered the '1711 Professorship of Botany' at Trinity College, Dublin, in Ireland, where he spent the next twelve years as Head of Department, continuing research on lichens and editing a book 'Biological Indicators of Pollution'. During a short sabbatical at the Museum of Nature, in Ottawa, David wrote his third book 'Pollution Monitoring with Lichens'.

David returned to Canada in 1992, as Dean of Science at Saint Mary's University in Halifax. He has spent the last eight years fostering the development of science and overseeing the new appointments that have rejuvenated the Faculty of Science. Successful applications to the Canadian Foundation for Innovation have provided equipment for research and training in Environmental Science worth over one million dollars.

David has published over eighty research papers including one on 'Lichens on iron cannon balls' written during a transatlantic voyage in the 32 foot yacht which he owned for eighteen years. He is recognised as an excellent speaker, being

continued on page 28

**The George Lawson Medal
to Dr. David Richardson**

continued from page 27

invited to give keynote addresses to both the 4th and 6th International Mycological Congresses. The Titles 'Lichens and Man' and 'War in the World of Lichens' reflect David's view that one should strive to be both informative and entertaining.

David has continued an amateur interest in roses. Since 1987, he has published a quarterly compendium 'Recent Rose Research' first in The Rose and more recently, since returning to Canada, in American Rose and syndicated in the Canadian Rose Annual.

He retains a keen interest in lichens, being on the editorial board of The Lichenologist and Associate Editor of Symbiosis. He also persuaded the Tuckerman Workshop, to make their first visit to Canada in 1999. This group of some thirty American lichenologists from the eastern USA, so enjoyed the experience that they plan to return to Nova Scotia in 2001 and study the lichens of Cape Breton.

The respect in which David is held by the academic world has been shown by his Fellowship from Trinity College, Dublin, his membership in the Royal Irish Academy, and his Presidency of the British Lichen Society (1990-92).

So my dear friends, I am honored to present this year's George Lawson Medal to Dr. David Richardson.

Denis Barabé, Past-President

2000 Award Winners

John Macoun Travel Bursery

(travel bursery for student presenting an oral paper in the Lionel Cinq-Mars Competition)

Marlies Rise

Center for Forest Biology
University of Victoria

Lionel Cinq-Mars Award

(best student oral paper at the CBA Annual Meeting)

Ryan Geil

Department of Botany
University of Guelph

Geil, R.D., Guinel, F.C. & Peterson, R.L. Exogenous ethylene inhibits the formation of arbuscular mycorrhizae in Pea (*Pisum sativum* L. cv Sparkle)

Iain and Sylvia Taylor Award

(best student poster at the CBA Annual Meeting)

Jennifer Catherall

Northern British Columbia University

Catherall, J.M., Young, B.W., Tackaberry, L.E., Egger, K.N. & Massicotte, H.B. *Pterospora andromedea* : morphological and molecular assessment of mycorrhizae from plants growing in a coniferous forest ecosystem in Central British Columbia

J.S. Rowe Award

(best student paper in ecology)

Jacques Tardif

Dép. des sciences biologiques
Université du Québec à Montréal

Tardif, J. & Y. Bergeron. 1999. Population dynamics of *Fraxinus nigra* in response to flood-level variations, in northwestern Québec. *Ecological Monographs* 69: 107-125

L.K. Weresub Award

(best student paper in mycology)

Cameroon R. Currie

Department of Botany
University of Toronto

Currie, C.R., Scott, J.A., Summerbell, R.C. & Malloch, D. 1999. Fungus-growing ants use antibiotic-producing bacteria to control garden parasites. *Nature* 398: 701-704

Taylor A. Steeves Award

(best student paper in Structure & Development)

Rodger C. Evans

Department of Botany
University of Toronto

Evans, R.C. & Dickinson, T.A. 1999. Floral ontogeny and morphology in subfamily Spiraeoideae Endl. (Rosaceae). *Int. J. Plant. Sc.* 160 : 981-1012

A.E. Porsild Award

(best student paper in taxonomy and biogeography)

Julian R. Starr

(presently at Oxford University)
Department of Botany
University of Manitoba

Starr, J.R., Bayer, R. & Ford, B. 1999. The phylogenetic position of *Carex* section *Phyllostachys* and its implications for phylogeny and subgeneric circumscription in *Carex*. *Amer. J. Bot.* 86: 563-577

The next annual meeting will be held at the new North Kelowna campus of Okanagan University College in the sunny Okanagan Valley. Field trips will include forays into both the south and north Okanagan Valley and will highlight the unique flora of the region. The Okanagan Valley is one of the most ecologically diverse regions of Canada: vegetation varies from arid and desert in the south to rainforest floras in the north. Naturally, we are also offering a tour of several of the valley wineries that will include extensive tastings of the local product (except by the bus driver). Symposia will range from purely academic issues, such as our plenary symposium on plant behavioural ecology, to plant-related industries such as fruit production, forestry and harvesting of wild mushrooms. All-in-all we anticipate a stimulating and enjoyable conference!

Of course, the Okanagan Valley is famous as a summer holiday destination. The cities of Kelowna, Penticton and Vernon are all within an easy drive and offer sandy, warm beaches, a multitude of hiking and camping opportunities, some world-class golf courses and of course the famous orchards (the first of the cherries should be available for sampling at conference time). You may want to stay after the conference for a holiday with your family.

Scientific Program

Plenary symposium – Plant Behavioural Ecology, R.G. Lalonde, Chair

Invited Speakers (tentative): John Addicott, University of Alberta; Fred Adler, University of California at Davis; Elizabeth Elle, Simon Fraser University; Bernie Roitberg, Simon Fraser University

Ecology Section Symposium - Forest Management and Plant Biodiversity; E. Reekie, M. Roberts, L. Vasseur, Chairs

Invited Speakers (confirmed): Andre Arsenault, BC Forest Service; Richard Reader, University of Guelph; Mark Roberts, University of New Brunswick; Sean Thomas, University of Toronto; Liette Vasseur, St. Mary's University

Mycology Section Symposium – Macrofungi and Lichens – their use and abuse by humans; S. Berch, Chair

Topics will include commercial mushroom harvesting and its effects on sporocarp production, ethnomycology, use of mycorrhizal inoculum in nurseries, forestry impacts on arboreal lichens.

Systematics and Phytogeography Section Symposium - Phytogeography of Glaciated Landscapes; G. Allen, L. Brouillet, Chairs

Structure and Development Section Symposium - Fruit Development; U. Pozlusny, P. Wiersma, Chairs

Field trips

The unique and threatened South Okanagan

The hot, arid climate of the South Okanagan makes it ecologically unique in Canada. The same climate encourages human immigration and cultivation. The tour will visit some of the special habitats of the area; marshes, grasslands, cliffs and talus, where local experts will explain how incursions by human activity and invasive species has reduced many local species to near-extirpation. Be prepared for some hiking and, since this is also a renowned birding area, bring binoculars. Time: 7 hours.

Kalamalka Lake Provincial Park

All participants will be able to visit Kalamalka Lake Provincial Park on Monday afternoon. Kalamalka Lake has been rated as one of the most beautiful in North America. You can check out the approximately 432 species of vascular plants or go for a swim in the lake before the BBQ. Other biological aspects of interest include 120 species of birds, and rattlesnake dens at close to their northern limits.

Winery Tour

The wine industry has become a major component of the Okanagan agricultural and tourist industries. The quality of wines produced has steadily increased and the area is now known throughout the world. Okanagan wines have won major awards at prestigious wine festivals. This tour will give you the chance to see some of the Central Okanagan, see the production facilities of a number of the area wineries, and to sample their wares. Time: 4 hours.

Forest Practices and Forest Ecology

Forestry is a major activity in the southern interior of British Columbia. Forestry practices have been modified due to public pressure, which resulted in BC's Forest Practices Code. This tour will head north of Kelowna to the highly diverse forests of the 'interior wet belt' where we will visit research projects studying the response of plant and lichen communities to various silvicultural treatments. Major tree species in these forests include western redcedar, western larch, paper birch, Douglas-fir, lodgepole pine, and western white pine. Time: 8 hours.

Miocene Fossils

This trip will travel to the north Okanagan to a plateau above the west side of Okanagan Lake (the Southern Thompson Upland). A road-cut through what turned out to be a Miocene lake bed. Numerous plant macro-fossils are preserved in finely laminated sediments. The fossils are compression fossils and preserve remarkable detail. Time: 6 hours.

A mushroom foray and visit to the Kalamalka Research Station of the BC Ministry of Forests are other trips under consideration.

Accommodation

Accommodation is available in our new residences, with beautiful views across the valley. There are several types of

Continued on page 30

CBA 2001, Kelowna (continued)

continued from page 29

rooms available: single suites, single bedrooms with private bathroom, quad rooms where a bathroom and kitchen is shared with three other people, or single dorm-style rooms with a bathroom down the hall. Check our web-page for links to accommodation.

Registration

Regular registration - \$160 (tentative)

Student registration - \$90 (tentative)

Travel to Kelowna

Air travel to Kelowna is easy. West Jet, Canadian Regional and Air BC offer frequent direct flights from Calgary, Edmonton and Vancouver. Air Canada offers direct flights from Toronto to Kelowna.

Watch the webpage for updates and further details:

<http://www.sci.ouc.bc.ca/biol/cba2001.html>

Melanie Jones, mjones@okanagan.bc.ca

Erratum CBA Bulletin 33(2)

James C. Ritchie honored / James C. Ritchie honoré p. 21

James C. Ritchie used to work at the Scarborough Campus and not at the Erindale College of the University of Toronto. Thanks to Ron Dengler, a colleague of Jim Ritchie, for this precision.

Book Reviews The Flora of Manitoulin Island p. 22

The title of the first book on the list of books to review should be : The Flora of Manitoulin (and not Manitoulan) Island. In addition, J.K. Morton and J.M. Venn are the authors (and not the Editors) of this book. Thanks to Joan Venn for these precisions (the book is still available to review, see page 38)

William F. Grant honored

Bill Grant, Emeritus Professor of Plant Science at McGill University, was awarded an Honorary Doctor of Science degree by McMaster University at the Spring 2000 convocation. He has been recognized for his cumulative and distinguished research, teaching and administrative contributions to the advancement of Canadian and International Botany and Genetics.

With students and colleagues he has carried out pioneering biosystematic and cytogenetic studies in a number of plant genera (*Amaranthus*, *Avena*, *Brassica*, *Eupatorium*, *Celosia*, *Impatiens*, *Muhlenbergia*, *Trillium* and *Vaccinium*) and is an authority on the genus *Lotus*. For all the species of *Lotus* in Canada, chromosome numbers, karyotypes and idiograms have been determined and illustrated. From an analysis of the presence of hydrogen cyanide content in the leaves of 51 species of *Lotus* from around the world, he showed that n=7 species have a greater concentration of HCN than n=6 species in both the Old and New World. None of the n=6 species in the New World reacted positively. This showed for the first time there was a reduction of HCN with evolutionary development. From chromatographic evidence he has supported the view that the New World species of *Hosackia* should be incorporated with the Old World species of *Lotus* into a single genus *Lotus*.

A major contribution has been in the discovery of special techniques to transfer genes from wild *Lotus* species into the economic forage species *Lotus corniculatus*. His studies on birch (*Betula*), with the late Dr. W. H. Brittain, have clarified phylogenetic relationships of the birches in Canada. For the International Development Research Centre, Ottawa, he showed by chromatographic techniques that mosaic virus resistant plants of cassava (*Manihot esculentum*) from Columbia were distinguishable from those that are virus susceptible and in a collection of 3000 accessions of cassava by chromatographic techniques determined duplicate accessions.

His expertise in plant cytogenetics led him to the use of plants for monitoring and testing for environmental mutagens. He has shown that plant test assays for mutagenicity, can replace animal tests and reduce the high cost of animal testing. He has participated in the U.S. Environmental Protection Agency Gene-Tox Program and a project using plant bioassays to test for mutagens in water effluents for the Ontario Ministry of the Environment. He is currently Co-Director of the International Program on Plant Bioassays using higher plants to test for environmental mutagens in the global environment.

Among his honours include: Participation in a Nobel Symposium in Sweden; two Senior Fellowships by the Japan Society for the Promotion of Science; the George Lawson Medal by the Canadian Botanical Association in "recognition of the cumulative, distinguished contributions of a senior investigator

continued on page 36

Poorly Known Economic Plants of Canada - 26. Labrador Tea, *Ledum palustre sensu lato* (*Rhododendron tomentosum*)

E. Small and P.M. Catling, Eastern Cereal and Oilseed Research Centre, Research Branch, Agriculture and Agri-Food Canada, Saunders Bldg., Central Experimental Farm, Ottawa K1A 0C6

Latin Names

Labrador tea plants are almost universally understood to be in the genus *Ledum*, but recent studies suggest they should be in *Rhododendron*. Although a number of publications have adopted the appropriate names under *Rhododendron*, and we expect that this will be the future consensus, we have retained the Labrador teas under the familiar *Ledum*, pending further evidence.

Ledum is from the Greek *ledon*, referring to a species of *Cistus* from which an aromatic resin was obtained (presumably *C. ladaniferus* L.), so named because of the similar odour. *Rhododendron* is from the Greek *rhodos*, rose (for the showy flowers), and *dendron*, tree (some species of the genus are trees).

North American *Ledum* includes three main taxa:

L. palustre **L. ssp. *groenlandicum* (Oeder) Hultén** (*L. groenlandicum* Oeder, *R. groenlandicum* (Oeder) Kron & Judd)

L. palustre **ssp. *decumbens* (Ait.) Hultén** (*L. decumbens* (Ait.) Lodd. ex Steud., *R. subarcticum* Harmaja, *R. tomentosum* Harmaja ssp. *subarcticum* (Harmaja) G. Wallace).

L. glandulosum **Nutt.** (*R. neoglandulosum* Harmaja; the Canadian plants have been separated as *L. glandulosum* ssp. *glandulosum* var. *glandulosum*, and up to six taxa have been recognized in the species, although some of these may simply be hybrids).

In addition, there is the European *L. palustre* ssp. *palustre* (*R. tomentosum* ssp. *tomentosum*).

English Names

L. palustre **ssp. *groenlandicum***: Labrador tea (a name reflecting the northern distribution and the common use as tea by native North Americans), common Labrador tea, bog Labrador tea, bog tea, Hudson's Bay tea, James tea, St. James tea, Indian tea, wooly tea.

L. palustre **ssp. *decumbens***: dwarf Labrador tea, northern Labrador tea.

L. palustre **ssp. *palustre*** (European plants): Labrador tea, wild rosemary (not to be confused with the true rosemary genus, *Rosmarinus*, or bog rosemary, *Andromeda*), swamp rosemary, swamp tea, marsh cistus, crystal tea [in the illicit drug trade, crystal tea denotes LSD (d-lysergic acid diethylamide), and "crystal T" is PCP (phencyclidine)].

L. glandulosum: trapper's tea, glandular Labrador tea.

French Names

Lédon du groenland, bois de savane, lède, lédier, lédon ou lédum à feuilles larges, thé-de-james, thé-du-labrador, thé-velouté.

Morphology

The most common Labrador tea, *L. palustre* ssp. *groenlandicum*, is an evergreen erect shrub, generally 0.5 - 1 m in height, with a sweet, spicy aroma. The leaves are 2.5-7.5 cm long, leathery in appearance, conspicuously rolled under at the margins, and densely wooly underneath, this fuzz becoming a deep rust colour as the leaves mature. The underground system is rhizomatous, and the roots can penetrate organic layers to 50 cm, although soil and moisture greatly influence the extent of the root system. Dense, round-topped clusters of white flowers (ca. 1 cm long) are on the ends of some of the upper branches, and ripen into brown, oval, many-seeded capsules (ca. 0.5 cm long). The empty capsules often persist for years. Flowering occurs from late May to early June, and fruit ripening from late August to late fall. Glandular hairs, especially on the leaves and younger branches, synthesize essential oil responsible for the aroma and medicinal qualities of the plants. *Ledum palustre* ssp. *decumbens* is typically decumbent and smaller than ssp. *groenlandicum*, and *L. glandulosum* lacks revolute leaves (see key).



Ledum palustre
ssp. *groenlandicum*

Classification and Geography

Ledum has been a well established classical Linnean genus, but on the basis of reasonable evidence in 1990 it was submergered in the genus *Rhododendron* (as subg. *Rhododendron* sect. *Rhododendron* subsect. *Ledum* (L.) Kron & Judd). *Ledum* has been classified into as many as eight species (and as few as one). Most of these are shrubs of the northern hemisphere. *Rhododendron*, has 700-800 species, most of which are evergreen shrubs with showy flowers, but the genus includes tall trees and



prostrate creepers. Most rhododendrons are in north temperate regions, some extending into the southern hemisphere in SE Asia, and to northern Australia. Over 300 species of *Rhododendron* have been recorded in cultivation, although hybridization often makes identification difficult. Hybridization among many of the taxa of *Ledum* has also been reported. Hybrids between *Ledum palustre* ssp. *decumbens* and *Rhododendron* suggest a close relationship, lending credence to the amalgamation of these genera.

North American Labrador teas have been classified in different ways. *Ledum glandulosum* occurs in southern British Columbia and Alberta and northwestern US, and has been reported to hybridize with *L. palustre* ssp. *groenlandicum* (the hybrids have been called *L. columbianum* Piper and *L. glandulosum* ssp. *columbianum* (Piper) Hitchc.). All remaining North American plants are frequently lumped into the polymorphic, circumpolar species *L. palustre*. Native European plants are placed in ssp. *palustre*, while most North American plants are placed in



ssp. *groenlandicum* (these subspecies are often considered to be separate species). As can be seen from the illustrations, ssp. *palustre* has much narrower leaves than ssp. *groenlandicum*. The North American plants are also separated by denser pubescence on the leaf undersurfaces. Arctic and subarctic plants of north-eastern Asia and North America have been distinguished as *L. palustre* ssp. *decumbens* (dwarf Labrador tea), often also considered to be a separate species. The defining characters of this subspecies, including small size, prostrate habit and strongly revolute leaves, reflect adaptation to the very short harsh northern cli-



mate and to alpine situations. In Eurasia, a number of taxa of the *L. palustre* complex have been recognized, notably *L. palustre* ssp. *diversipilosum* Hara of southeasternmost Asia, including Japan (this taxon was recently recognized as a species of *Rhododendron*). Whether the subspecies recognized here deserve full species status is debatable, since a modern intensive taxonomic analysis of *Ledum* is unavailable. It has been pointed out that the geographical ranges of ssp. *groenlandicum* and ssp. *decumbens* overlap very extensively in Canada, with relatively limited evidence of hybridization, so that species status might be appropriate. However chromosome races (diploids with $2n = 26$, tetraploids with $2n = 52$) are known in ssp. *decumbens*, and it is unclear what the taxonomic implications of this are in terms of maintaining separation from ssp. *groenlandicum* ($2n = 26$ recorded).

Ledum palustre ssp. *groenlandicum* has a northern transcontinental distribution in North America, occurring from coast to coast in Canada, and occasionally north of the tree line. It has been locally naturalized in Germany and Great Britain. *Ledum palustre* ssp. *decumbens* is found in the arctic tundra from western Greenland and Labrador to Alaska, and in eastern Eurasia. Dwarf northern plants have been recorded in Europe, but

it is unclear whether or not these should be assigned to ssp. *decumbens*, or to ssp. *palustre*. *Ledum glandulosum* extends northward from California to northern Wyoming, just reaching southern British Columbia and southwestern Alberta.

Key to North American *Ledum*

1a. Leaves oval to elliptic, margins not or scarcely revolute, petioles to over 1 cm, lower surfaces greenish or grayish, with many small shining resin-granules

L. glandulosum

1b. Leaves linear-oblong to linear, margins strongly revolute, sessile or short-petioled, lower surface densely rusty-tomentose

2a. Leaves elliptic or oblong to linear-oblong, mostly 2-6 cm long; plants usually higher than 30 cm, more or less erect; stamens mostly 5-7; capsule length usually more than twice width

L. palustre ssp. *groenlandicum*

2b. Leaves linear-oblong to linear, mostly 0.6-2 cm long; plants usually less than 40 cm, usually decumbent; stamens mostly 8-10; capsule length usually less than twice width

L. palustre ssp. *decumbens*

Kalmia polifolia Wang. (swamp laurel) and *K. angustifolia* (sheep laurel) very commonly grow in association with *Ledum*, and look rather similar. These shrubs are poisonous, and indeed have killed browsing livestock, so that collectors should know how to distinguish them from Labrador tea. The laurels normally have pink flowers and lack the characteristic lower leaf fuzz of Labrador tea. The swamp laurel, illustrated here, has narrow strongly inrolled leaves and is more likely to be confused with *Ledum*.



Ecology

Ledum palustre ssp. *groenlandicum* occurs in the mixed temperate and boreal vegetation zones of North America. It is found mostly in open areas of sphagnum bogs across Canada, but also in swamps, acid mountain meadows, and moist to wet forests. It develops into thick patches, and is often dominant or codominant. The plants reproduce vegetatively by rhizome sprouting, and to a much lesser extent by seeds. Typically the substrates occupied are very acidic and have limited nutrient availability. *Ledum palustre* ssp. *decumbens* mostly inhabits mesic tundra and muskeg in Canada, but is also found in the drier areas of bogs. It may dominate or codominate dwarf shrub associations in bogs, muskegs and open tundra. The sesquiterpene germacrone, often a major component of the essential oil of *Ledum palustre*, is extremely unpalatable to snowshoe hares. Although the chemicals in the foliage repel most mammalian foragers, nevertheless the leaves and twigs are frequently browsed by caribou and moose.

Ledum glandulosum is found in moist to wet meadows and forests, in the western American Cordillera, from subalpine to montane zones. It often occurs in mesic to moderately dry coniferous forest, occasionally in moist, somewhat boggy forest. Except near the tree line, it is rarely in fully open areas.

Use as Food

Labrador tea has been the most popular indigenous beverage tea in North America for centuries, used not only by native peoples but also by explorers, settlers, traders and trappers. Today, it is occasionally found as a specialty commercial tea preparation, and continues to be utilized by indigenous groups. There isn't universal agreement on the best time to harvest Labrador tea. Some authorities recommend collecting the leaves in the spring, before flowering, others in late fall. Some collectors have claimed that the flowers, if gathered at the proper time and carefully dried, make a far more pleasant beverage than the leaves. Native peoples of North America have used the tea as a spice for meat. It is often recommended that because of poisonous constituents in the leaves of Labrador tea, the tea should not be too concentrated, or ingested in large amounts, or too often. Also, it is suggested that to limit extraction of toxins, the leaves should be steeped rather than maintained in boiling water (although some recommend boiling the leaves for up to 10 minutes). It has been claimed that ssp. *decumbens* produces a superior tea to ssp. *groenlandicum*, but given the extraordinary chemical variation known to occur, this conclusion seems premature. Trapper's tea (*L. glandulosum*) has been said to produce a bitter drink of inferior quality to that of Labrador tea..

Chemistry

The plants typically produce volatile oil (0.3 - 3.2%), usually dominated by sesquiterpenes. There are considerable qualitative differences depending on geographical location and taxonomic group, and quantitative variation has been found to be related to season and nutritional status of the soil. Large amounts

of ledol (ledum camphor, porst camphor), palustrol, and ascaridol may be present. There are also catechin tannins, and flavonoids. Ledol content of the oil may vary from nil to over 40%. Chemotypes (chemical races) rich in ascaridol, myrcene, limonene, sabinene, or p-cymene have been described from Europe. Some North American Labrador tea has essential oil dominated by germacrome.

Toxicity

European medicinal use (of *L. palustre* ssp. *palustre*) cannot be assumed to be a guide to the North American taxa, because of the probably different chemistry of the European plants, but nevertheless some of the adverse reactions recorded should be noted. Overdoses of European medicinal *Ledum* have caused violent headache and symptoms of intoxication. Consumption of essential oil has caused severe irritation of the gastrointestinal tract, vomiting, diarrhea, irritation and damage to the kidneys and lower urinary tract, heavy perspiration, pain in muscle and joints, excitation of the central nervous system, narcotic intoxication, and paralysis. Because the plant is considered to have abortifacient chemicals, it should be avoided during pregnancy. Both the medicinal and poisonous properties of *Ledum* have been ascribed particularly to ledol. It has been shown that at least some plants of North American ssp. *groenlandicum* lacks ledol, which is typically present in the European ssp. *palustre*, and that therefore only the latter is poisonous, but too few samples have been analysed to accept this conclusion. It is probable that ledol is not the only significantly poisonous constituent. (One Russian review claimed that ledol is not toxic, but this is contrary to most literature.)

Toxicity is also often attributed to grayanotoxins, formerly known as andromedotoxin. These toxic chemicals are diterpenes, polyhydroxylated cyclic hydrocarbons that do not contain nitrogen. The compounds are present in the leaves and flowers of certain species of the heath (Ericaceae) family, notably *Rhododendron* and *Kalmia*, and have proved lethal at times to grazing livestock. Grayanotoxins are responsible for "honey intoxication" or "mad honey disease," which has been recorded since the 4th century B.C. It is caused by the consumption of honey produced from the nectar of some heaths. Honey intoxication has rarely been fatal to humans, generally inducing dizziness, weakness, perspiration, nausea, vomiting, and often low blood pressure and heart irregularities. We haven't found reliable literature documenting poisonous concentrations of grayanotoxins in *Ledum*.

Tannin content varies considerably in *Ledum palustre* (in European studies, from 3->12%). Tannins are also present in our most common hot beverages, tea, coffee, and cocoa. They have been experimentally shown to interfere with digestibility of proteins and to have carcinogenic potential, but there is little evidence of adverse effect in humans. Concern has been expressed that long-term consumption of tannins may be harmful, and the recommendation has been made to reduce intake during preg-

nancy because of interference with iron absorption. Tannins are precipitated in beverages by the addition of milk, removing the potential for harm.

There is extraordinary chemical variation in the *L. palustre* complex of the world, and a great need to undertake extensive studies of chemical variation in relation to geography and taxonomy, with particular reference to the potentially poisonous constituents.

Non-Food Uses

Native peoples of North America made very extensive use of Labrador tea for medicinal purposes, often as a general tonic. Illnesses and conditions treated included kidney problems, weak blood, colds, coughs, tuberculosis, arthritis, heartburn, and headache. Externally, preparations were used to treat sores, burns, wounds and skin problems (the plant has use as a vulnerary since the tannin content would constrict bleeding areas). Similarly, *Ledum palustre* of Europe was used in folk medicine to treat a very wide variety of problems, including bronchitis, bugbites, fever, cold, cough, gout, inflammations, leprosy, malignancies, rheumatism, and sore throat. *Ledum* preparations are generally considered obsolete in Western medicine, but there is still some use in Europe and Asia.

A variety of other uses have been recorded. The leaves of *L. palustre* have been employed in Russia for tanning leather. The leaves have also served as a repellent, among clothes to keep away moths, and (in Lapland) in grain to keep away mice. A strong decoction has been used to kill lice. Labrador teas have been used to revegetate disturbed sites, including powerline alleys in the subarctic bogs of northern and central Manitoba, and mined peatlands in the northeastern US. The plant is cultivated as an ornamental, especially useful in cold climates and acidic soils.

Agricultural and Commercial Aspects

Extensive studies have been conducted in Europe on the sustainable management and harvest of natural stands of *Ledum palustre* for medicinal purposes (although very little has been published in English). By contrast, there does not appear to have been scientific research on *Ledum* for food purposes, i.e. as a commercial tea. There is a need for basic scientific and management studies, including harvest, drying and preservation methods. Taiga Herbs of Darwell, Alberta advertises itself as the only current Canadian producer and marketer of Labrador tea, which it calls the "king of taiga herbs." (<http://www.farm-online.com/taiga/lab-tea.htm>)

Cultivars & Germplasm

There are some ornamental cultivars, including the dwarf cultivars 'Compactus' (assigned to ssp. *groenlandicum*) and 'Minus' (assigned to ssp. *palustre*). Considerable knowledge of chemotypes useful for developing medicinal cultivars is available, but there is very limited information on plants suitable simply as a flavourful tea. Wild plants are very widespread, and con-

stitute a vast reservoir of potentially useful germplasm.

Prospects

The reputation of Labrador tea as somewhat poisonous doubtlessly has limited its development. There seems to be widespread misunderstanding of the extent to which the plant is toxic. The most significant toxic compound, ledol, seems to be absent in Canadian plants, and there is limited evidence that poisonous concentrations of any other compounds are present.

Herbal teas are very popular today, so there would seem to be market opportunities for Labrador tea, without doubt the leading native tea plant of Canada. However, *Ledum palustre* is so widely available from wild stands that at present market prospects are poor, and are likely to remain so unless some agronomic development is undertaken. The somewhat limited taste of Labrador tea is a critical consideration, but systematic study of variation of the flavour constituents (presumably including the essential oils) could result in the identification of particularly desirable populations. There is a market niche to be developed, based on finding a variant with proven negligible toxicity and improved flavour. Herbal teas offered in the trade today are very frequently blends of different species, and there may well be attractive blends with Labrador tea waiting to be developed. The commercial web site "Caffeine-Free Herbal Coffee & Tea Lovers Treasure Box" offers many blends, including "a favourite traditional tea of the North" made up of Labrador tea, sweetgrass and lemon grass (*Cymbopogon*, which in fact is tropical).

(<http://www.abundantearth.com/store/caffeegift.html>)

"Wild Coffee and Tea Substitutes of Canada" by N.J. Turner and A.F. Szczawinski describes over two dozen species, and these could be incorporated in truly Canadian tea blends.

Myths, Legends, Tales, Folklore, and Interesting Facts

! The Berserkers were ancient Viking warriors, reputedly invulnerable, enormously strong, and wildly frenzied in battle. In the Scandinavian sagas, Berserkers are often described as being fantastically ugly, and guilty of monstrously depraved behaviour, and their reputation terrified their opponents. The Danish historian Saxo Grammaticus (ca. 1150 - ca. 1220) recorded the activities of a band of Berserkers in his *Gesta Danorum*: "The young warriors would harry and pillage the neighbourhood, and frequently spilled great quantities of blood. They considered it manly and proper to devastate homes, cut down cattle, rifle everything and take away vast hauls of booty, burn to the ground houses they had sacked, and butcher men and women indiscriminately.... they ravished other men's wives and daughters... scarcely any place in the land was free from the imprints of their lust." It has been suggested that intoxication from *L. palustre* contributed to the deranged but effective wildness of the Berserkers.

! Because of its alleged narcotic properties, *L. palustre* leaves were used in Germany to make beer more intoxicating. The Kwakiutl people of Vancouver Island and adjacent British Columbia also considered the leaves to be narcotic. Women of

some indigenous peoples used Labrador tea as a mild narcotic to reduce the pain of childbirth. Ledol, often present in *L. palustre*, has been characterized as a narcotic toxin.

! *Ledum palustre* is regarded as an aphrodisiac in Finland, where it is popularly used to flavour liqueurs. (Ogden Nash (1902-1971) wrote "Candy is dandy, but liquor is quicker." Such Finnish beverages might be much quicker.)

! Labrador tea was often consumed during the American War of Independence, when common (Chinese) tea was unavailable.

! When the Labrador Innu people traditionally followed the caribou, their children contributed to transporting the load by carrying dolls, each stuffed with approximately 1 kg of Labrador tea. Labrador tea dolls are sold today as craft items.

! The English explorer Sir John Franklin (1786-1847) set out for the Canadian arctic coast in 1845 with two ships, one pessimistically named the *Terror*. In 1846 the ships became icebound in Victoria Strait, and all 105 men died of starvation and scurvy, although the mission had in fact succeeded in discovering the Northwest Passage. The crew tried to survive by eating boiled leather flavoured with dwarf Labrador tea, which Franklin recorded in his journal tasted like rhubarb. Unknown to the expedition but well known to the native inhabitants was the fact that Labrador tea, which is rich in vitamin C, counteracts scurvy, and is more than a flavouring.

! *Ledum palustre* has been featured on postage stamps issued by Germany and Russia.

! For more than a century, ecologists were puzzled over the fact that *Ledum* and other woody plants found in sphagnum bogs have xeromorphic leaves (i.e. with features retarding water loss, such as thick waxy cuticle, inrolled margins, and dense hairs), despite the fact that the bog substrate is soaked with water. The vague concept of "physiological drought" was in vogue for many years, until it was demonstrated that in fact there isn't any kind of lack of water availability, the bog plants transpiring at rates comparable to most other plants. The current explanation for xeromorphic leaves in bog woody plants is that because the leaves are perennial the water-retaining features are necessary to prevent desiccation in winter, when water is unavailable. And why should the leaves be perennial? It has been shown that in substrates that have very limited nutrient availability (especially nitrogen), such as sphagnum bogs, retention of nutrients in leaves for several years is an effective strategy for outcompeting deciduous plants that must re-obtain the scarce nutrients every year for new leaves.

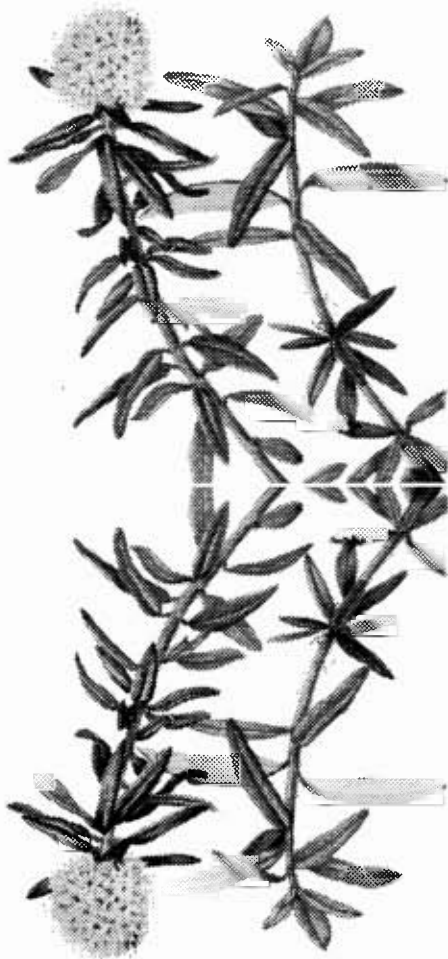
! Many evolutionary taxonomists today insist that taxonomic groupings be monophyletic, not paraphyletic. A paraphyletic group originates from a single common ancestor, which is included in the group, while excluding at least one descendant of

Poorly Known Economic Plants of Canada - 26

the ancestor. By contrast, a monophyletic group has a unique origin in a single ancestral species, and includes the ancestor and all of its descendants. *Ledum* has been alleged to be paraphyletic when considered to be a separate genus from *Rhododendron*. However, the necessity of taxonomic groups being monophyletic is the subject of debate. Birds are widely thought to be derived from dinosaurs, so in theory birds and crocodiles (descendants from dinosaur stock) should be grouped together, an arguable conclusion.

! The names of the genera *Ledum* and *Rhododendron* were published simultaneously, and either could have been adopted as the name of the combined genus. Since *Rhododendron* has almost a thousand species while *Ledum* has less than ten, far fewer name changes were necessary by submerging *Ledum* in *Rhododendron*, not vice-versa.

Acknowledgments: W.J. Cody (review), H. Harmaja (information), B. Brookes (artwork).



William F. Grant honored

continued from page 30

whose influence has contributed notably to the advancement of Canadian botany"; presentation of the 1980 Distinguished Alumni Lectures at McMaster University; first Life Membership in the International Organization of Plant Biosystematists; life Membership in the Genetics Society of Canada; recipient of the McMaster University Distinguished Alumni/Alumnae Scholar Award; recipient of the Presidential Citation for service to the Genetics Society of Canada; Fellowship in the Linnean Society of London and Fellowship in the Royal Society of Canada.

He is a Past President of the Genetics Society of Canada; Past Treasurer of the Biological Council of Canada; Past President of the McGill University Branch of Sigma Xi; and a Past President of the International Organization of Plant Biosystematists. He edited the book "Plant Biosystematics" from the proceedings of an international symposium that he held at McGill University. He is Honorary Editor of the Journal Plant Species Biology and a Past Editor of the Lotus Newsletter and the Canadian Journal of Genetics and Cytology (now Genome).

Luc Brouillet, Institut de recherche en biologie végétale, Université de Montréal

Teaching Section

Members of the newly-formed teaching section will be setting up a teaching section page on the CBA website. The plan is to include useful teaching resources for Botany teachers at all levels, including university and college, in addition to elementary and high school levels. We will include links to sites dealing with lab exercises in plant ecology, plant physiology and plant anatomy, links to the fast plant and fast fern sites as well as to the Plantwatch site.

We also hope to set up links to some of the plant image sites which have become very useful teaching tools, as well as to some sites dealing with pedagogy.

If you have ideas of other information or favorite sites that you would like to see included please contact me.

Christine Maxwell, cmaxwell@trentu.ca

Mycology Section Report

Canadian Botanical Association,
Annual Meeting June 24-28, 2000 jointly with the
Canadian Society of Plant Physiologists,
Convention Centre, London Ontario

Fungal research figured prominently in the programme of the CBA/CSPP 2000 meeting this year.

Dr. John Klironomos from the Department of Botany at the University of Guelph delighted botanists and mycologists (including mycorrhizasts) with his keynote talk in the Plenary Session entitled 'The effects of elevated atmospheric CO₂ on mycorrhizal diversity and functioning'. Study of *Bromus inermis* and arbuscular mycorrhizal fungi at twelve of fourteen sites subjected to elevated CO₂ below ground showed a negative impact on mycorrhizal fungus biodiversity and mycorrhizal functioning based on phosphorus uptake.

Dr. Larry Peterson, also from the Department of Botany at U. of Guelph wowed the audience with his informative overview entitled 'Mycorrhizal fungi and their relationship to the rhizoplane and rhizosphere' in the Mycology Symposium organized by CSPP. Using ectomycorrhizal and endomycorrhizal fungi as his examples, he described and illustrated complex and mysterious below-ground interactions such as soil aggregations containing fungal-bacterial sheaths, extensive rhizomorphs and extraradical hyphae with associated helper-bacteria, elaborate chelation by oxalate hyphal exudates, etc. His talk was followed by excellent contributed papers presented by students describing the activities of a wide range of mycorrhizal, phytopathogenic, endophytic and saprophytic fungi.

The Lionel Cinq-Mars Award for the best student paper was won by Ryan Geil in Dr. Peterson's lab. Ryan's talk was entitled 'Exogenous ethylene inhibits the formation of arbuscular mycorrhizae in pea (*Pisum sativum* L. cv. Sparkle)'. Research on fungi was also well-represented in the poster sessions.

The Sylvia and Iain Taylor Award for the best CBA student poster was presented to a budding mycologist-mycorrhizast, Jennifer Catherall. She is an undergraduate in the lab of Dr. Hugues Massicotte at the University of Northern British Columbia in Prince George. Jennifer's visually outstanding poster was entitled '*Pterospora andromedea*: a picky partner in a complex plant-fungus relationship'. Using microscopy and molecular analysis she was able to show that the fungal symbiont for roots of this Monotropoid achlorophyllous plant associated with pine, spruce and poplar was the same **Rhizopogon** species.

The Luella Weresub Award for the best published paper by a mycology student was presented to Cameron Currie from Dr. David Malloch's lab in the Department of Botany at the University of Toronto. His paper published in *Nature* 398:701-704 (1999) is entitled 'Fungus-growing ants use antibiotic-pro-

ducing bacteria to control garden parasites'. In this paper he shows that the ants carry a special *Streptomyces* bacterium which selectively inhibits the fungal parasite, *Escovopsis* (Hypocreales) in Basidiomycete (Agaricales) fungus gardens cultivated by ants in Panama.

The Luella Weresub Memorial Lecture at the meeting was given by Dr. Scott Redhead from the fungal biosystematics group at Agriculture and Agri-Food Canada, Eastern Corn and Oil Seeds Research Centre in Ottawa. Scott gave an excellent biographical presentation on John Dearness, an educator in London who gained international recognition as an amateur mycologist and collector of more than 27,000 beautifully catalogued and annotated fungal specimens now curated in Ottawa. At 85 years of age, he was the first Canadian president of the Mycological Society of America.

Recognition of fungal research appeared again in the citation of Dr. David Richardson, Dean of Science at Saint Mary's University in Halifax as winner of the CBA Lawson Medal for his longstanding research on the lichens. Further details will be available in other reports.

Finally, at the meeting of the Mycology Section, the need for an update of the Directory of Mycologists in Canada was expressed. The topic of mycorrhizal interactions for a Mycology Symposium at the CBA meeting in Kelowna next year was discussed along with the suggestion of fungal and plant pathological components for a workshop directed at amateur botanists and mycologists and the selection of Jim Ginns as the Weresub lecturer. Subsequent discussions have resulted in a more general and inclusive symposium touching on additional topics of fungal conservation, biodiversity, and ethnomycology. Stay tuned for CBA 2001 in Kelowna !

Jim Traquair, Chair, Mycology Section, traquairj@em.agr.ca



Book Reviews

The following publications have not yet been spoken for. If you are willing to review one of these books please contact the Editor at the address indicated at the beginning of the bulletin (page 26).

On request, the book you wish to review will be sent to you.

Les publications suivantes n'ont pas encore été réclamées. Si vous voulez faire la critique d'un de ces ouvrages, veuillez contacter le rédacteur du bulletin à l'adresse indiquée à la page 26.

The Flora of Manitoulin Island

by J.K. Morton and J.M. Venn
University of Waterloo Biology Series
Number Forty, 2000

Canadian Medicinal Crops

by E. Small and P.M. Catling

NRC Research Press

Ottawa, 1999

(Cdn \$ 29.95, softcover)

This well-written and thoroughly researched book offers far more information and inspiration beyond what is suggested by the title. The main focus of Canadian Medicinal Crops is an account of twenty-five native plants that have historically been used as medicine and that have varying degrees of potential for economic exploitation. The authors go above and beyond the call of duty by also including such value-added sections as 'Herbal remedies and Canadian law', 'The business of medicinal plants' (which includes advice on marketplace timing, and risks to the grower) a summary of the research of the major medicinal plant players in Canada (including contact information) and a glossary of medical, botanical and chemical terms.

The introduction to Canadian Medicinal Crops covers a brief history of the use of medicinal plants and notes that they have currently become popular (to both the layperson and the scientist) due to the use of herbs as part of alternative medical therapies, the interest in 'functional foods' and because of the ongoing search for new drugs. The introduction concludes by promoting the idea that new economic opportunities exist through the growing of unused or under-utilized plants as medicinal crops.

The plant descriptions are beautifully illustrated with colour plates from various sources and include a map of the geographical range. A wealth of information is provided on several aspects of the species in sub-sections on morphology, classification and geography, ecology, medicinal uses, toxicity, chemistry, non-medicinal uses, and agricultural and economic aspects. Each species is completed with a quirky list of folklore and inter-

esting facts followed by references including worldwide web links. The inclusion of plants like *Taraxacum* spp. (dandelion crop anyone?) and kelp (*Laminaria* spp., *Macrocystis integrifolia*, *Nereocystis luetkeana* and members of the Fucales) may raise some eyebrows, but an explanation of the uses and economic potential is always included. I was intrigued when I read that not only is hops (Cannabaceae) a medicinal plant, but in commercial plantations the male plant is 'weeded' out of the crop to prevent the pollination of females, a technique used elsewhere to promote the desired characteristics in another famous member of this family.

The authors are advocates for the botanical diversification of the Canadian medicinal crop industry and promote their case by giving each of the species an extensive treatment. This treatment includes references to internet addresses both at the end of each plant description and again in a general section at the end of the book. Although the web links are useful to gain knowledge of certain hard to research species, there are always problems of the credibility of the source (an issue brought up by the authors) and of the ephemeral nature of the links. In fact, two of the roughly dozen addresses I investigated came up as '404'. Keeping these caveats in mind, the readers of this work will still find the web links to be a rich resource in this area.

The authors are convincing in their attempt to demonstrate that there are lucrative alternatives for farmers growing traditional crops, and intend for this book to be used as a comprehensive guide in this endeavour. However, Canadian Medicinal Crops is an excellent resource for people outside of the primary audience, such as teachers of courses in economic botany as well as anyone generally interested in the history, use and phytochemistry of medicinal plants. Personally, I bought a copy at the CBA auction in London for my friend who is a southern Ontario ginseng farmer.

Roberto Nicol, University of Western Ontario,
rwnicol@julian.uwo.ca

North American Boreal and Western Temperate Forest Vegetation (Syntaxonomical Synopsis of the Potential Natural Plant Communities of North America, II) By Salvador Rivas-Martinez, Daniel Sanchez-Mata, and Manuel Costa. 1999. Itinera Geobotanica 12: 5-316

Vegetation classification is a difficult enterprise, both conceptually and practically. On one hand, ecologists, resource managers, planners, and educators require a common language for describing and communicating about ecosystems. On the other hand, the development of a classification system that

Book Reviews

breaks a continuum into discrete classes is fraught with challenges.

Several approaches to vegetation classification exist, differing in the details of data collection, analysis, assumptions, and naming conventions. Most of these approaches are strictly hierarchical, although the lower levels in some "bottom up" approaches tend not to nest well within upper levels of the hierarchies of which they are supposed to be a part (e.g., some of Ontario's forest ecosystem classifications). The vegetation classification system presented in this book is hierarchical. However, hierarchies based on several different sets of parameters are discussed here. The linkages among them are not always obvious, although tables are included in an attempt to clarify these relationships.

This book presents a summary of data collected by the authors from numerous relevés in terrestrial ecosystems across the continental boreal and Rocky Mountain macroclimatic regions of North America. The methodology and conceptual framework used in the development of the classification system and in the presentation of results are based on Braun-Blanquet's phytosociological approach. This approach is not widely used in North America (although some vegetation scientists in, for example, Newfoundland, Quebec, and British Columbia, have used it). Thus, it will appear unusual and unfamiliar to many North American readers. The book contains an introductory section on the conceptual basis for this approach to classification, including bioclimatic zonation at coarse and finer scales. This is followed by sections on materials and methods, descriptions of plant communities, summaries of these communities along transects in climatic, topographic, and geographic contexts, and a checklist of characteristic species cross-referenced to the vegetation classification scheme.

The descriptions of vegetation types occupy the bulk of the book (179 pages). This section of the book is organized hierarchically, beginning with the newly proposed phytosociological class, *Linnaeo americanae-Piceetea marianae*, followed by eight orders, and within each order, its component alliances and associations. Each description contains synonyms from the phytosociological literature, designation of the type relevé, summary of characteristic climatic features, disturbance regimes, and soils, characteristic species, and relevé summaries. Several dichotomous keys are included in the text. These utilize characteristic species, climatic parameters, and geographic locations to differentiate among associations. Coarse-scale distribution maps are provided for vegetation alliances.

There is a very strong underlying emphasis on phytogeography that permeates the text. Climatic, topographic, and edaphic variables that influence the distribution of species and vegetation communities are discussed. Another strong emphasis is on a taxonomic approach to vegetation classification. As noted above, the recognition of discrete classes is necessary in vegetation classification, but the classification presented here is very

prescriptive and static, and implies that deterministic processes lead to consistent associations of species at some climax or steady state (referred to as "potential natural vegetation"). Although patterns and tendencies clearly exist in vegetation, the relationship between overstory and understory is not always predictable, and it has become well known that successional pathways are probabilistic, and that multiple pathways are possible. These notions make a prescriptive and taxonomic approach to vegetation classification less tenable.

Considering the heavy emphasis on taxonomic structure, nomenclature, and typology in the vegetation classification system presented here, it is surprising to see how loosely taxonomic principles are applied to the taxa making up the vegetation associations. Undoubtedly, this was done to save space, at least in part. However, the use of varietal names at specific rank (e.g., *Juniperus depressa* for *Juniperus communis* var. *depressa*) is disconcerting.

Another peculiar aspect of this book is that the authors deal only with their own relevé data. They do not discuss alternative classification systems for North American boreal forests, nor do they place their own results into a broader context. There is no discussion of other recent continental or national vegetation classifications (except for passing mention of an old version of Bailey's classification). This results in a very parochial treatment of the vegetation, and does nothing to assist North American readers in understanding how the Braun-Blanquet approach to vegetation classification relates to more familiar North American approaches. An opportunity has been missed, especially since some of the modern analytical tools used to differentiate vegetation types in North America (e.g., TWINSPAN) yield results that could have been compared directly to the characteristic species noted in the descriptions, and especially those used in the dichotomous keys to differentiate vegetation associations. This is only one example of the possible comparisons that could have been made.

In conclusion, this book contains a useful summary of the authors' own data on coniferous boreal and montane forests and associated ecosystems in North America, links these data to climatic attributes, and integrates these data into a phytosociological classification scheme using the Braun-Blanquet system. Unfortunately, there is no attempt to compare this scheme with more familiar North American classification schemes, let alone to argue for its precedence over other schemes. Given the large amount of effort that has been expended on vegetation classification in North America over the past three or four decades, such a comparison should have been made. This book will be useful to vegetation ecologists studying the boreal and montane forests of this continent, but it may not garner wider readership, because of its lack of synthesis of the broader literature and its rather unfamiliar (to most North Americans) approach to the subject.

William J. Crins, Ontario Ministry of Natural Resources, Peterborough

CBA BOARD OF DIRECTORS / BUREAU DE DIRECTION DE L'ABC (2000 - 2002)

President / président :

Joe Gerrath, Dept. of Botany, University of Guelph, Guelph, ON N1G 2W1.
Tel. : (519) 824-4120; fax : (519) 767-1991; e-mail : jfgerratt@uoguelph.ca

Past-President / président sortant :

Denis Barabé, IRBV-Jardin botanique de Montréal, 4101 rue Sherbrooke Est, Montréal, QC, H1X 2B2.
Tel. : (514) 872-1436; fax : (514) 872-3765; e-mail : barabed@ere.umontreal.ca

President-Elect / président désigné :

Liette Vasseur, Dept. of Biology, Saint Mary's University, Halifax, NS, B3H 3C3.
Tel. : (902) 496-8234; fax : (902) 420-5261; e-mail : liette.vasseur@stmarys.ca

Vice-President / vice-président :

Melanie Jones, Okanagan University College, 3333 College Way, Kelowna, BC, V1V 1V7.
Tel. : (250) 862-5464 ext. 7553; fax : (250) 470-6005; e-mail : mjones@okanagan.bc.ca

Secretary / secrétaire :

Christine D Maxwell, Biology Department, Trent University, Peterborough, ON, K9J 7B8.
Tel. : (705) 748-1357; fax : (705) 748-1205; e-mail : cmaxwell@trentu.ca

Treasurer / trésorière :

Geraldine A. Allen, Dept. of Biology, University of Victoria, Victoria, BC, V8W 2Y2.
Tel. : (250) 721-7110; fax : (250) 721-7120; e-mail : allenr@uvvm.uvic.ca

Directors / directeurs (1999-2001)

Sylvie Laliberté, Dép. des sciences biologiques, Université du Québec à Montréal,
C.P. 8888, Succ. Centre-ville, Montréal, QC, H3C 3P8.
Tel. : (514) 987-3963; fax : (514) 987-4647; e-mail : laliberte.sylvie@uqam.ca

Ed Reekie, Biology Department, Acadia University, Wolfville, NS, B0P 1X0
Tel. : (902) 585-1162; fax : (902) 542-3466; e-mail : ereekie@ace.acadiau.ca

Ed Yeung, Dept. of Biological Sciences, University of Calgary, Calgary, AB, T2N 1N4
Tel. : (403) 220-7186; fax : (403) 289-9311; e-mail : yeung@acs.ucalgary.ca

Directors / directeurs (2000-2002)

Paul Cavers, Dept. of Plant Science, University of Western Ontario, London, ON, N6A5B7.
Tel. : (519) 679-2111; fax : (250) 661-3935; e-mail : pcavers@julian.uwo.ca

Michel Labrecque, IRBV-Jardin botanique de Montréal, 4101 rue Sherbrooke Est, Montréal, QC, H1X 2B2.
Tel. : (514) 872-1862; fax : (514) 872-3765; e-mail : michel_labrecque@ville.montreal.qc.ca

Shannon M. Berch, BC Ministry of Forests Glyn Road Research station,
P.O.Box 9536, Stn Prov.Govt., Victoria, BC, V8W 9C4.
Tel. : (250) 952-4122; fax : (250) 952-4119; shannon.berch@gems7.gov.bc.ca

Future Annual Meetings / Prochains congrès annuels

2001

Okanagan University College, Kelowna, BC, June 23-27

2002

Meeting with the Botanical Society of America