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The Canadian Botanical Association Bulletin

Bulletin de l'Association Botanique du Canada

September / Septembre 2006 • Volume 39 No. / N° 2

Message du président



Chers membres de l'ABC,

J'aimerais débuter mon premier message en tant que président de l'ABC avec une série de remerciements. Premièrement, un merci tout spécial à Vipen Sawhney pour avoir servi comme président durant les deux dernières années. Son enthousiasme, son leadership, et son travail ardu avec l'aide des membres du conseil de direction ont assuré le succès de l'association. Je suis très heureux de le compter parmi les membres de notre équipe pour les prochaines deux années dans son nouveau rôle de 'past president'. Félicitations à Daya Dayanandan et son équipe pour avoir organiser un superbe congrès à Montréal. Je n'ai reçu que des commentaires positifs en ce qui concerne l'organisation générale de la rencontre, les rendonnées, les présentations, et les services d'hospitalité. Plusieurs de nos membres ont également apprécié l'opportunité de visiter les deux campus de l'université Concordia. Merci à Martin Dubé qui a servi comme éditeur du bulletin de la société depuis 2002. Il a fait un travail exceptionnel et sa compilation de tous les bulletins de l'ABC sous format électronique est un exploit en soi-même. J'encourage tous les membres à se procurer une copie du CD en vente au prix raisonnable de $5 seulement. Contactez notre nouvelle éditrice, Christine Maxwell dès aujourd'hui pour obtenir votre copie. Veuillez noter que le bulletin existe pour les membres de l'association. N'hésitez pas à nous faire part de n'importe quels développements en botanique dans vos disciplines. Nous encourageons les contributions de courts articles de nouvelles, des commentaires sur des sujets pertinents en botanique, et les annonces de postes ou d'opportunités pour nos membres. Christine se fera un plaisir de publier votre information. Encourageons notre nouvelle éditrice!

Cette année, je vous encourage également: *(continued on next page)*

Canadian Botanical Association Bulletin

The CBA Bulletin is issued three times a year (in theory in March, September and December) and is available to all CBA members in electronic format or for an additional fee, in hard copy.

Information for submitting texts
All members are welcome to submit texts in the form of papers, reviews, comments, essays, requests, or anything related to botany or botanists. Any medium is acceptable for submission but electronic documents are likely to speed up the publication. For detailed directives on text submission please contact the Editor (see below). For general information about theCBA, go to the web site: hftp://www.cba-abc.ca

Association botanique du Canada Bulletin

Le Bulletin de l'ABC paraît trois fois par année, normalement en mars, septembre et décembre. Il est envoyé à tous les membres de l'ABC.

Soumission de textes
Tous les membres de l'Association sont invités à envoyer des textes de toute natureconcernant la botanique et les botanistes (articles, revues de publication, commentaires,requêtes, essais, etc.). Tous les supports de texte sont acceptés. L'utilisation de documents électroniques peut accélérer la publication.Pour des renseignements détaillés sur la soumission de textes, veuillez consulter le rédacteur (voir ci-dessous) . Infos générales sur l'ABC à l'url suivant: http://www.cba-abc.ca

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Next issue / Prochain numéro
Texts for the next issue, 39(3), must be received before **November 13th, 2006.**

La date de tombée des textes du prochain numero, le no 39(3), est le **13 novembre 2006.**

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- à voter pour les changements que nous proposons aux politiques de l'association
-subventionner les frais d'inscription pour un nouveau membre
-renouveler votre adhésion à l'association sans tarder
-nommer vos étudiants et vos collègues pour les prix offerts par l'association

N'hésitez pas à communiquer avec les membres du conseil de direction si vous avez des questions ou si vous avez besoin de plus amples renseignements. Un merci à tous ceux qui ont servi au niveau du conseil de direction durant la dernière année. L'ABC n'existerait pas sans ses volontaires !

Meilleurs voeux.

Christian Lacroix

President's message

Dear members of CBA,

I'd like to begin my first message as President of CBA with some thank yous. First, a special thank you to Vipen Sawhney for his contributions as President for the past two years. His enthusiasm, leadership and his hard work, with the help of the members of the board of directors have ensured the continued success of the Association. I am very happy to still be able to count him in as a member of the team in his new role as Past President. Congratulations to Daya Dayanandan and his team for organizing a great annual meeting in Montreal. I heard nothing but positive comments about the general organization of the meeting, the field trips, presentations, and hospitality services. Many people also appreciated the opportunity to visit both Concordia campuses. Thank you to Martin Dubé who has served as our Bulletin editor since 2002. He did an exceptional job and his compilation of all the Bulletins of CBA in electronic format is quite an accomplishment in itself. I encourage all members to get a copy of the CD on sale at the very reasonable price of $5. Contact our new editor, Christine Maxwell today to order your copy. Please note that the Bulletin exists for the members of the association. Don't hesitate to let us know about any developments in botany in your respective disciplines. We encourage short news articles, commentaries on pertinent issues in botany, and ads for positions or opportunities for our members. Christine will be pleased to publish your information. Lets encourage our new editor!

This year, I also encourage you to:

- vote for changes that we are proposing to the bylaws of the Association
-sponsor a new member
- renew your membership as soon as possible
-nominate your students or colleagues for the various awards of the Association.

Don't hesitate to communicate with any of the members of the Board of Directors if you have any questions or if you need more information. A final thank you to all those who served on the Board this year. CBA would not exist without it volunteers !

Best wishes

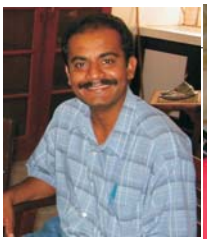
Christian Lacroix

PLANT CANADA 2007

Sunday, June 10 - Thursday, June 14, 2007

This meeting, in which all 6 member societies of Plant Canada will participate, will be held in Saskatoon. The lead society for this meeting is The Canadian Phytopathological Society. The CBA/ABC organizer and this years Vice President is Art Davis. He may be contacted at davisa@usask.ca
More details will appear in future editions

Scenes from the 2006 Annual meeting in Montreal







Those we thanked! Top left Daya Dayanandan, top right Arun Dayanadan, website assistant,. Below Hadi Bandali and Mona Hamzeh at the desk

Dr Brian Alters at the Teaching symposium



Dr K. Bawa gives the keynote address



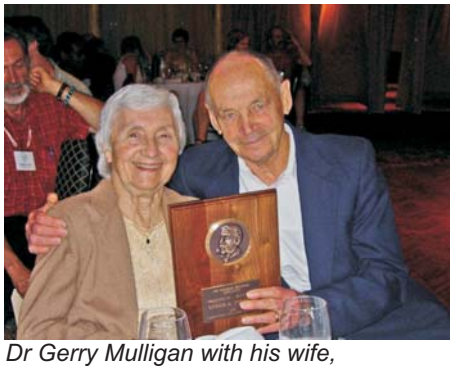
Gault Nature Reserve field trip. Led by Martin Lechowicz (front centre) and Marcia Waterway (front, left).



Dr Joel Shore entertains on the fiddle, accompanied by the feet of Simon Joly



Enjoying the banquet. From the left, Erin Littley, Sabrina Cornish, Mark Pokorski and Krystal Mathieson Photo Editor



Dr Gerry Mulligan with his wife, Margaret, and his Lawson medal Photo: Editor

Photo at right. Hugues and Linda examine articles for the auction ,and below, "What am I bid?" The auctioneer in action.





Photo at right:
The past President, Vipen Sawhney hands the seal to incoming President, Christian Lacroix. Photo: M. Coleman.



Association Awards for 2006

Lawson Medals

The Lawson medal is the most prestigious award of the Canadian Botanical Association/Association Botanique du Canada and was established in 1969 in honor of Prof. George Lawson who is regarded as Canada's earliest distinguished botanist. Prof. Lawson was born in Scotland in 1827 and received his early education there, a Ph.D. from Germany in 1857, and then moved to Canada to join as Professor of Chemistry and Natural History at the Queens College (now Queens University) in Kingston, Ontario. In 1860, he helped form the first Botanical Society of Canada but unfortunately it was short-lived. In 1861, he helped establish the first official Botanical Garden and the following year moved to Dalhousie to join the Nova Scotia Institute of Science. He was a founding member of the Royal Society of Canada, and Secretary for Agriculture for the Nova Scotia government. In 1891, he helped form the Botanical Club of Canada and was its President at the time of his death in 1895.

The Lawson medal is awarded in two categories: A.. Recognition of a single outstanding contribution to botanical knowledge in the form of a monograph, book or series of papers, by a Canadian botanist at any stage of his/her career, and category B, Recognition of cumulative, lifetime contributions to Canadian botany by a senior researcher, teacher or administrator. I am delighted to announce that this year we have a winner for each of these two categories.



Gerry Mulligan(right) receives his award from Vipen Sawhney. Photo Iain Taylor

Gerald A. Mulligan (category A)

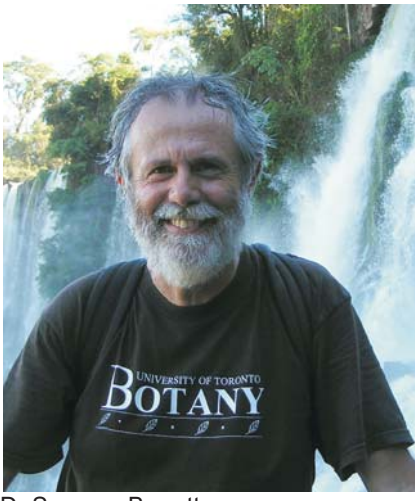
Our first winner is an individual who through his various contributions, i.e., books, monographs and series of papers, has made a significant impact primarily in the area of plant systematics, but also in cytogenetics, reproductive biology, and weed biology. Perhaps the most significant of his contributions are two books; first, "Weeds of Canada" co-authored with Clarence Frankton, which was first published in 1970, but has since been reprinted several times. This book continues to be the single most important guide for identification of Canadian weeds. One of his nominators states that, "It is the most important book on weed identification ever published in Canada". His second book, "Common weeds of Canada" which was first published as a bilingual edition in 1976, was later published separately both in English and French editions, and has been a very popular reference guide not only for botanists but also to farmers and gardeners. His other major contributions include, "Flora of the Queen Charlotte Islands, Part 2, co-authored with Roy Taylor and published in 1968, and "Common and botanical names of weeds in Canada" with J.F. Alex and R. Cayouette, first published in 1980 and then revised by him as single author in 1992. Our winner also has an international reputation for a series of high quality and carefully conducted cytotaxonomic studies on various genera of the family Brassicaceae. Indeed, one of his supporters has called him, "The mustard giant". In addition, his various publications on Poison-ivy and its relatives in Canada have been widely used by physicians, dermatologists, and the general public in N. America.

Our winner has also had a distinguished career as a leader and active member of various scientific organizations. The list of his contributions and accomplishments is extremely long. In brief, starting his career as summer field assistant at the Central Experimental Farm in Ottawa, he moved up the ranks first to be the Assistant Director of Biosystematics Research Institute, Agriculture Canada from 1973 to 1978, and then the Director from 1978 until his retirement in 1987. He was also the Acting Director General of Agriculture Canada's Research Institutes in 1986 and 1987, and since his retirement continues to work actively as Honorary Research Associate at the Agriculture and Agri-Food Canada station in Ottawa. He has served the scientific community in numerous ways including, Director of the International Organization of Systematics and Evolutionary Biology; Chair of the Biology of Weeds Committee, Canadian Expert Committee on weeds; Chair of the Taxonomy of Weeds Committee, Weed Science Society of America; Associate editor of Canadian Journal of Plant Science, member of the Editorial Board of Davidsonia; member of NSERC Grant Selection Committee on Population Biology; a Charter member of the Canadian Botanical Association, Genetics Society of Canada, the Botanical Society of Quebec, and the International Organization of Plant Biosystematics. He has also served the CBA/ABC in various capacities as its Treasurer, Director, Vice-President and the President.

Based on the very high quality of his contributions to Canadian botany in research, and service to the scientific community and general public, the awards committee voted unanimously to award him the Lawson medal in category A. It gives me real pleasure to ask Gerald (Gerry) A. Mulligan of Agriculture and Agri-Food Canada, Ottawa, to come forward and accept the 2006 Lawson Medal.

Lawson Medal (contd.)

Lawson medals(continued)



Dr Spencer Barrett

Spencer Barrett (category B)

The second winner of the Lawson medal this year is known nationally and internationally for his outstanding research in the field of plant evolutionary biology and other areas e.g., ecological and evolutionary genetics, ecology and evolution of plant reproduction, pollination biology and plant mating systems, plants and human affairs and plant exploration. Over the last nearly 30 years, he and his students have published papers in these areas in high impact journals including Nature, Evolution, Proceedings of the Royal Society of London (series B), American Naturalist, Molecular Ecology, Trends in Plant Sciences, and Trends in Ecology and Evolution. He has also written articles for popular scientific periodicals e.g., the Scientific American and Weeds Today. His publications include over 170 referred papers, 36 book chapters, and he has edited and co-edited three books; “The function and evolution of heterostyly” published in 1992, “Floral Biology: Studies on Floral evolution in Animal-pollinated plants” with D. G. Lloyd in 1996, and “The ecology and evolution of flowers” with L. D. Harder which is currently in press. He has been invited to give lectures and seminars at various institutions nationally and overseas, and he has presented invited symposium talks at numerous national and international conferences. He has also been a visiting professor at a number of universities. One of his supporters describes him as, “the spokesperson, the organizer, the mentor, the editor and most importantly, the compass of the entire field of plant evolutionary ecology”.
Our winner has served the scientific community in many capacities including service on the editorial board of many journals, including, Proceedings of the Royal Society of London (Series B), Evolution, Journal of Evolutionary Biology, American Journal of Botany, Trends in Ecology and Evolution, and Molecular Biology. He has also served on the NSERC Grants Selection Committee of Population Biology and was its Chair in 1986-87. For his various contributions he has received several awards including the NSERC Steacie Fellowship, Fellowships in both the Royal Societies of Canada and London, and Merit award by the Botanical Society of America. He currently holds a Canada Research Chair (Tier I) in evolutionary genetics at the University of Toronto.

This individual is also a highly passionate and effective teacher, both at the undergraduate and graduate levels. Throughout his career he has taught first year students and as stated by his nominator, “He has been a tireless promoter of plant biology in Canada. In his first year course of over 1800 students he is renowned for exposing students to the delights of Canadian botany causing many students previously destined for medical school to think of alternatives in biology”. He has also supervised the research of several graduate students and postdoctoral fellows and many of them are now successful plant biologists at various institutions in Canada, USA, UK, and in New Zealand. For his excellence in teaching, he has received several teaching awards including, the Faculty of Arts and Science Outstanding Teaching Award by the University of Toronto, and the Northrop Frye Award, for linking teaching and research.

All of his contributions and accomplishments are summed up by one of his supporters as, “He is one of our most outstanding botanists on an international scale”. It is with great pleasure I announce that the winner of 2006 Lawson medal in category B is Dr. Spencer Barrett of the University of Toronto. Unfortunately, Dr. Barrett could not be with us today to receive this award in person as he had made a prior commitment to speak at an international conference. However, he plans to attend the next year’s meeting in Saskatoon and will receive his award at that time. (Association awards continued overpage)

Editor's Message.

I would like to thank Martin Dubé for the tremendous help that he has given me over the last few months.
His patience is limitless, and without him I would not have been able to venture into the world of desktop publishing! It has been a steep learning curve, but I remain optimistic that it will become easier in the future.
In this issue there is an assortment of articles and photos of the very successful annual conference at Concordia. I am really glad to include at the article on ecology research in Canada, this time featuring Kate Frego's lab at the University of New Brunswick at St John, and hope that it will be the first of many similar articles. Perhaps other sections would also like to consider organizing such a series.I welcome articles, notes, photos, letters and your comments.

Message de l'éditeur

J'aimerais remercier Martin Dubé pour l'aide précieuse qu'il m'a apportée pendant les derniers mois. Sa patience est sans limite et sans lui je n'aurais pu m'aventurer dans le monde de l'éditique! Cette expérience fut un processus d'apprentissage long et complexe mais je suis convaincu que cela ira en s'améliorant. Dans ce numéro, vous trouverez une vaste sélection d'articles et de photos de la conférence annuelle à l'Université Concordia qui fut un franc succès. Je suis très heureux d'inclure également l'article sur les recherches écologiques au Canada, mettant en vedette le laboratoire de Kate Frego à l'Université du Nouveau-Brunswick à St John, et j'espère qu'il sera le premier d'une série d'articles semblables. Il serait peut-être intéressant que les autres sections mettent sur pied une telle série d'articles.
Vos articles, notes, photos, lettres et commentaires sont la bienvenue.
Christine Maxwell

Mary E Elliott Service Award



Vipen Sawhney presenting Usher Posluszny (right)with his award. Photo Iain Taylor.

The Mary E. Elliott award was established by the Canadian Botanical Association/Association Botanique du Canada in the memory of Dr. Mary Elliott who died tragically in 1978. This award is intended to recognize an individual who has performed a meritorious service to the CBA/ABC. Dr. Elliott was a plant pathologist and mycologist who worked for several years with Agriculture Canada at the Central Experimental Farm in Ottawa. She was widely known for her work on the Sclerotiniaceae and was the curator of the National Mycological Herbarium. Dr. Elliott served the CBA/ABC in various capacities including, the Secretary, Vice president and then the President, and was the Past President of the Association at the time of her death.

This year's winner has performed an exemplary service to the Canadian Botanical Association. He has served the CBA in numerous capacities including, the Editor of the CBA Bulletin, Chair of the Plant Development section, President-Elect and then the President of the Association from 1992 to 1994, and as a member of the Board of Directors for many years, including the current year. He has also helped the Association by serving on various Awards committees, e.g., the Lionel Cinq-Mars award, the Steeves award, the Rowe award, the Weresub award and the Mary E. Elliott award. In the words of his nominator, "He has done it all".

Many of us who have known him for some time, are aware of his long dedicated service to the Association, and that he generally works behind the scene, avoiding the limelight, to ensure the smooth running of the Association. One of his supporters described him most fittingly, "He exemplifies the spirit of CBA". It gives me a great pleasure to invite Dr. Usher Posluszny of the University of Guelph to come forward and accept the 2006 Mary E. Elliott Award.

Student Awards and travel bursaries (2006)

Lionel Cinq-Mars Award



Lionel Cinq Mars Award. From left to right, Christian Lacroix, Chair of the judging committee, Rémy Pouliot, Erica Oberndorfer, Erin Zimmerman and Tim Johns receiving the award for Tyler Smith. Photo: M. Coleman.

Graduate winner

Tyler Smith. McGill University, for his presentation "Systematic evaluation of the *Carex complanata* complex: combining morphological and AFLP data", co-authored with Marcia Waterway.

Undergraduate winner

Erin Zimmerman. University of Guelph, for her presentation, "Differing effects of a dark septate fungal endophyte on epiphytic and terrestrial orchids," co-authored with Larry Peterson.

Honourable mentions:

Rémy Pouliot Université Laval, for his presentation, " Moss layer constrains the fertilizing effects of Greater snow Geese in polygon fens in Bylot Island, Nunavut, Canada", co-authored with Line Rochefort and Gilles Gauthier.

Erica Oberndorfer, Saint Mary's University, for her Presentation "Plant communities in the coastal barrens of Nova Scotia," co-authored with Jeremy Lundholm.

(Student awards continue overpage)

Another successful auction

Another successful CBA/ ABC auction was held after the banquet at the recent meeting in Montreal. As usual, the auctioneer was Hugues Massicotte, ably assisted by Linda Tackaberry and the accountant, Christian Lacroix. For those who have joined the Association recently, the auctions have become a mainstay of the meetings, particularly when the CBA meets without other organizations. The funds raised at the auction go to the Macoun Travel Bursary, the fund that is used to help bring students to our meetings. A total of $877.50 was added to the fund through the auction.

Student awards (continued).

John Macoun Travel Bursaries

This year there were five awards:

Victoria MacPhail	University of Guelph
Susan Timmons	University of Guelph
Krystal Mathieson	University of New Brunswick
Amy Witkowski	University of New Brunswick
Martha Coleman	Trent University



Macoun Travel Bursary winners. Left to right.Vipen Sawhney, Victoria MacPhail, Martha Coleman, Susan Timmons, Krystal Mathieson, and Amy Witkowski.

Iain and Sylvia Taylor Poster Prize

The winner was **Amy Witkowski**, University of New Brunswick for her poster "'Phyte club': Endophytic compositions of bryophytes and overstory spruce needles"**,** co-authored with Krystal Mathieson, Ryan O'Neill, John Johnson and Kate Frego

Honourable mention was given to both of the following:

Isabel Barriault, Université de Montréal for her poster "Flowering and thermogenesis cycles in *Arisaema triphyllum* L. (Schott)." co-authored with Denis Barabé and M Gibernau.

Sabrina Cornish, Thompson Rivers University, for her poster "The effect of endomycorrhizae on the production of antimicrobial agents by spotted and diffuse knapweed". co-authored with Cindy Ross.



Iain and Sylvia Taylor Poster Awards. From left to right, Sylvia Taylor, Iain Taylor, Amy Witkowski, Sabrina Cornish and Isabel Barriault. Photo: Martha Coleman.

Stan Rowe Award (Ecology)

Andrew S. MacDougal of the University of British Columbia, for his paper entitled: "Are invasive species the drivers or passengers of change in degraded ecosystems?" published in Ecology 86(1): 42-55 (2005), and co-authored with his supervisor Dr. Roy Turkington.

No Photo available.

Taylor A. Steeves Award (Plant Development)

Donna Lindsay of the University of Saskatchewan for her paper, "Cytokinin-induced changes in *CLAVATA1* and *WUSCHEL* expression temporally coincide with altered floral development in *Arabidopsis*" co-authored with Vipen Sawhney and Peta C.Bonham-Smith, published in Plant Science in 2006. *Photo at right: Donna receives her award from Vipen Sawhney. Photo: M Coleman..*



Luella Weresub Memorial award (Mycology): No award this year as there were no applications.

(Student awards continued overpage)

Student awards (continued)

Erling Porsild Memorial prize (Systematics and Phytogeography)

Simon Joly of the Institut de Recherche en biologie végétale, Université de Montréal, for his paper, “Evolution of triploidy in *Apios americana* (Leguminosae) revealed by genealogical analysis of the histone H3-D gene”, co-authored with Anne Bruneau, and published in Evolution 58: 284-29 (2004).



Simon Joly receives his award from Vipen Sawhney. Photo M. Coleman

Ecology in Canada: What’s New and Who’s Doing It?

1. University of New Brunswick (Saint John Campus)

The Lab

Dr. Kate Frego, Biology, University of New Brunswick, P.O. Box 5050, Saint John, NB E2L 4L5; Email: frego@unbsj.ca; Phone: (506) 648-5566

M.Sc Candidates: Zheng Fang, Krystal Mathieson, Joe Mudge, Mark Pokorski and Amy Witkowski.

Our research focuses on plant community ecology, including questions of biodiversity and spatial pattern, mainly of bryophytes (mosses and liverworts). Most of our projects examine influences of human activities on forest floor communities: (a) the role of regeneration in structuring forest floor bryophyte communities after catastrophic disturbance such as clear cutting, (b) bryophyte species diversity of plantations in relation to "natural" forest stands, and (c) effects of herbicides on bryophytes. One immediate application of this work is in forest management plans that conserve plant biodiversity. However, we also seek to contribute basic information on the ecology of bryophytes.

The Research

Project 1: Bryophyte substrate specificity and Bryophyte community assembly following clearcut and plantation forestry, Krystal Mathieson

The first part of this project quantifies associations between species and substrates, to clarify the degree of specificity. The second part documents community reassembly following disturbance. Permanent plots were set up and sampled in a mixed forest in 1995, after which parts of the landscape were clearcut, and other parts were clearcut, scarified and planted. The plots were re-sampled at 4 and 9 years post harvest. The two parts of this project will be connected by identifying whether the bryophytes that are declining in harvested areas are those that typically grow on substrates that are also declining in harvested areas.



Figure 1 Frego lab, sampling bryophyte community (c) K. Mathieson 2005

Lead Researcher: Krystal Mathieson graduated from UNB Saint John with an Honours degree in Biology in 2002. She loves working with plants, has many non-botanical interests as well, and is currently deeply involved with the Graduate Student Association at UNB Saint John. Email: kmathies@unbsj.ca; Phone (506) 648-5566

Future Plans: Krystal hopes to have the chance to travel to see (and possibly work in) many other ecosystems.

Project 2: Tree Islands-Conservation potential, Mark Pokorski

Although clear cutting affects a large amount of New Brunswick's forests each year, forest plant biodiversity may be retained at the site level by maintaining standing patches of living trees—termed 'tree islands'—within cutblocks. To assess how well tree islands can conserve forest plant biodiversity, the proportion of species housed by these islands must first be known. Through cooperation with industry, four 1.0 ha experimental tree islands were delineated in areas of similar forest characteristics scheduled for harvest. Permanent sampling plots were used to determine bryophyte and vascular plant species inventories for each tree island and its surrounding area.

Lead Researcher: Mark Pokorski, motivated by a love and respect for nature, takes every chance available to vacate the lab and explore the forest. His research interests include plant-community responses to disturbance, peatland rehabilitation and ecological effects of extirpated seed dispersers. Email: mark.pokorski@unb.ca; Phone (506) 648-5566

Future Plans : Mark plans to continue exploring and communicating the intricate relationships of plants and animals to people through work in our national parks.

Project 3: Tree islands-Conservation effectiveness, Joe Mudge

Given the conservation potential of tree islands, expressed as the proportion of regional species initially contained within tree islands, the conservation effectiveness of tree islands is their ability to sustain populations of enclosed species over time. Abundances of bryophyte species were measured at different aspects and distances from edges within permanent sampling plots at four 1.0 ha experimental tree islands during each of three years post-harvest. Changes occurring within experimental islands will be compared to natural changes occurring within two 1.0 ha uncut reference islands to determine the size and location of areas that escape edge effects within tree islands.

Lead Researcher: Joe Mudge has always been fascinated by nature. His academic interests involve the interactions occurring within natural systems at different scales, with specific interests in creating sustainable relationships between humans and ecosystems, examining the linkages between the disciplines of ecology and economics, and investigating ecosystems as complex networks. Email: joe.mudge@unb.ca; Phone (506) 648-5566

Future Plans: Joe plans to continue to pursue his academic interests, while gaining experience in the education, government, industry, and non-profit sectors.

Project 4: Impacts of selection harvest on bryophytes. Zheng Fang

Given evidence that clear-cuts result in loss of biodiversity, forest managers are considering alternatives which take both the demand for wood and sustainability of biodiversity into account. One such alternative is single-tree selection harvest. Using a Before-After-Control-Impact design in two Acadian forest stands, this project evaluates change in the bryophyte community and environmental features. The findings will contribute to understanding the relative impacts of different forest operations on biodiversity and to developing a sustainable forest management strategy.



Figure 2. *Pleurozium schreberi* (c) Zheng

Lead Researcher: Zheng Fang is currently working on her Masters thesis entitled: Responses of forest floor bryophyte community to selection harvest in an Acadian forest.
She has broad interests in plant ecology, with specific interests in forest modeling, use of indicator species, and prevention of plant invasion. Email: zheng.fang@unb.ca; Phone (506) 648-5566

Future Plans: With both passion and concern about nature, Zheng's ultimate goal is to protect natural communities by making contributions to environmental assessment, sustainable development strategies and related areas.

Project 5: Pre-commercial thinning: responses of Acadian forest floor bryophytes, Amy Witkowski

The project focuses on quantifying the response of bryophyte communities to pre-commercial thinning (PCT), a forestry management practice that selectively cuts non-target trees. The bryophyte communities will be compared to those in non-PCT stands in 3 different age classes to capture any potential trends over time. Another element of this project is to interpret patterns of response in terms of environmental characteristics such as microtopography, tree community, canopy cover, and disturbance intensity. Patterns of response, in relation to bryophyte biological characteristics or functional groups (such as colonizers and perennial stayers) may also be examined.

Lead Researcher: Amy Witkowski, graduate of the University of Guelph Plant Biology program, worked on vascular plants, as well as bryophytes and fungi, conducting forest inventories for OMNR in the summers. She is now working towards a Masters degree. Email: amy.witkowski@unb.ca; Phone (506) 648-5566

Future Plans: Caught between the pleasure of teaching and enthusiasm for learning more about plants, Amy hopes to incorporate both in her future endeavours.

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HOW TO CONTRIBUTE TO THE SERIES:

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Are living plant collections underexploited for scientific research?

Denis Barabé

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Living plant collections in botanical gardens play an educational role while serving as attraction for visitors. However, they also represent a scientific potential that is not always fully exploited. Since the first botanical gardens were established, they have provided exceptionally useful resource material for studies in systematics and taxonomic monographs. Studies by Boyce (1993) and Mayo et al. (1997) on Araceae, for example, are based in part on observations conducted on plants cultivated at Kew Gardens in England. The development of molecular systematics has certainly created renewed interest in living plant collections, since the use of fresh samples is often indispensable for ensuring the quality of genetic material in this discipline. Botanical gardens receive increasing numbers of requests for such samples for molecular research. The proximity of living collections constitutes a definite advantage in the realisation of molecular studies. In this context, samples from 170 families of flowering plants growing at the Montreal Botanical Garden were used to build a classification of flowering plants based on the gene Intron coxII.i3 (Joly et al. 2001). Fortunately, numerous samples can often be taken from a single leaf or part of a leaf, depending on the material required, and this does not harm plant specimens.

Living plant collections can also be used profitably in various spheres of plant biology where comparative studies are required, particularly in morphology, physiology and ecology. Recently, Hallé and Escoubeyrou (2002) formulated original hypotheses on the development, architecture and ecology of plants, primarily based on observations performed on plants at the botanical garden Les Cèdres in France. In fact, collection-based studies can complement observations made in the field. They make it possible to compare plants gathered from different environments and to make observations that are often difficult to perform in nature.

Collection-based studies can focus on particular specimens, as in the case for studies of floral development, or on a genus or an entire family of plants, as in comparative anatomy. Specimens from the collections at the Montreal Botanical Garden have long been used by the Canadian botanical community for developmental studies or systematics, and include for example families such as Cactaceae (H. Cota-Sanchez, University of Saskatchewan), Caprifoliaceae (J. Vieth, Université de Montréal), Gesneriaceae (N. Dengler, University of Toronto; J. Vieth Université de Montréal), and Rosaceae (A. Bruneau, Université de Montréal; T. Dickinson, Royal Ontario Museum). Although it is impossible to provide a comprehensive list of all studies which have used samples from plants cultivated at the Montréal Botanical Garden, I will focus on several examples of works in comparative biology that would have been difficult to produce without the Garden's collections, and which in my view illustrate the importance of these collections for research.

The production of extracellular oxalate calcium crystals is an uncommon phenomenon in vascular plants, although it has been reported in several plant groups. In Araceae growing at the Montreal Botanical Garden, but originating from diverse geographical regions and flowering at different periods, we have observed that extracellular calcium oxalate crystals of two types (prismatic crystals and raphids) can be found mixed with pollen (Barabé et al. 2004). Although this characteristic is not present in all species, some genera (e.g. *Philodendron*) can have the two types simultaneously (prismatic and raphid), while others (e.g. *Anthurium*) have only one type (raphid).(Fig.1, 2 and 3) A survey of 65 species shows that the more primitive subfamilies of Araceae only contain raphids, while evolved subfamilies may contain both raphids and prismatic crystals (Barabé et al. 2004).

In certain families of Angiosperms (e.g. Annonaceae, Araceae, Cyclantaceae,) as well as Gymnosperms (Zamiaceae), the temperature of the inflorescence or cone, as the case may be, rises well above ambient temperature during "flowering". In *Philodendron solimoesense*,for example, temperature can rise 14^{0}C above ambient temperature. This phenomenon, called thermogenesis, can be studied easily using living plant collections (Gibernau et al. 2005). In the case of plants with a thermogenetic cycle lasting only a few days, such as *Philodendron*, for example, it is possible, if one knows the flowering period, to observe several specimens during a short field study. However, in plants like *Anthurium*, which have a flowering cycle lasting two to three weeks, it is difficult to follow the complete cycle without a planned commitment of several weeks. Living plant collections have also allowed us to compare, in a single species, the thermogenetic cycles of plants growing in their natural environment, and others cultivated in greenhouses. For example, specimens of *Philodendron melinonii,* collected in French Guiana and cultivated in the greenhouses of the Montréal Botanical Garden since 1987, exhibit the same thermogenetic cycle as those growing in their natural environment (Fig.4). This indicates that the thermogenetic cycle is an endogenous rhythm that can be analysed using plants cultivated outside of their natural environment.

Collections are also extremely useful for development studies, although in such cases the survival of specimens after various parts have been removed, is a factor limiting the number of samples collected. Let us consider the example of Begoniaceae, whose inferior ovary has always been at the center of morphological and phylogenetic questions (Barabé, 1981; Clement et al., 2004). In 1957, Henry Teuscher, the first curator of the Montréal Botanical Garden brought back specimens of the species *Hillibrandia sandwicensis* which is endemic to Hawaii. Contrary to other Begoniaceae, this plant has a semi-inferior ovary. This material made it possible for Gauthier (1959) to perform a complete anatomical study of the pistillate flower of this rare species. Thirty years later, there were still enough living specimens at the Garden to conduct a comparative study of the development of *Begonia* and *Hillebrandia* flowers to contribute new data and hypotheses about floral evolution in Begoniaceae (Charpentier et al. 1989).

These examples show the importance of collections for anatomical, morpho-physiological and developmental studies. Often these collections make it possible to undertake studies that could not have been conducted otherwise. They are especially useful in cases where observations must be performed during the flowering period. However, there are some constraints on the use of collections, particularly for developmental studies. Such studies often require large quantities of material that cannot always be obtained from collections. For example, in the case of monocarpic (e.g. *Agave*), rhizomatous (e.g. *Anchomanes*) or caudiciform (*Cyphostoma*) plants, few botanical gardens would agree to sacrifice their specimens in order to provide samples to document a full serve stages of development. Complementary sampling must also be conducted in the field in such cases. For this reason, the use of specimens for research must take into account the value of the collection for education as well as conservation (Barabé and Brouillet, 1996).



Fig 1. *Anthurium jenmanii* growing in the Montréal Botanic Garden. Bar 10cm.(top)

Fig 2. *Anthurium crystallinum.* Linden & Andre. A raphide mixed with pollen. Bar 80µm.(Bottom left)

Fig 3. *Xanthosoma sagittifolium* (L) Schott. Prismatic crystals and raphides mixed with pollen. Bar 50µm.(bottom right) Photos I. Barriault.

Although there are convincing examples illustrating the importance of living plant collections for research, I wonder if living collections are truly used as they should be for research in plant biology? Should we not find a way to encourage research based on living plant collections? On the other hand, even if collections are extremely useful for studies in

(Continued overpage)

comparative biology, should we orient our research toward problems linked to collections available in the Canada? Without restricting research topics to available material, I believe we must nonetheless take into account the collections that are maintained in proximity of research institutions. An analogous situation is often the case in ecology. For example, institutions located in boreal regions tend rightly to focus ecological studies on boreal forests. Why should botanical collections not follow suit? At Kew Gardens, for example, the development of collections focuses on, among others groups, Monocotyledons, while Jodrell Laboratory (Anatomy) has developed a parallel large-scale research program on this taxonomic group.

The maintenance of collections represents a significant financial investment by private or government organizations, particularly in the case of botanical gardens, in the scientific development of a region. Unfortunately, this investment is insufficiently recognized in grant programs. Yet, collections have more than an educational or ornamental value, they also represent a reservoir of uncommon phenomena, genetic material and rare specimens. Highlighting the value of living plant collections for research certainly constitutes an important aspect of a country's scientific development.

Recently, several grant programs have been established to facilitate research using scientific collections. In the United States, MORPH (Molecular Organismic Research in Plant History) botanical grants support research on plant development that includes botanical gardens. In Europe, SYNTHESYS (Synthesis of Systematics Resources) allows European researchers to access collections (including those at botanical gardens) related to life and earth sciences in various European countries. Could we not consider creating a similar program in Canada, to stimulate the use of our collections for research?

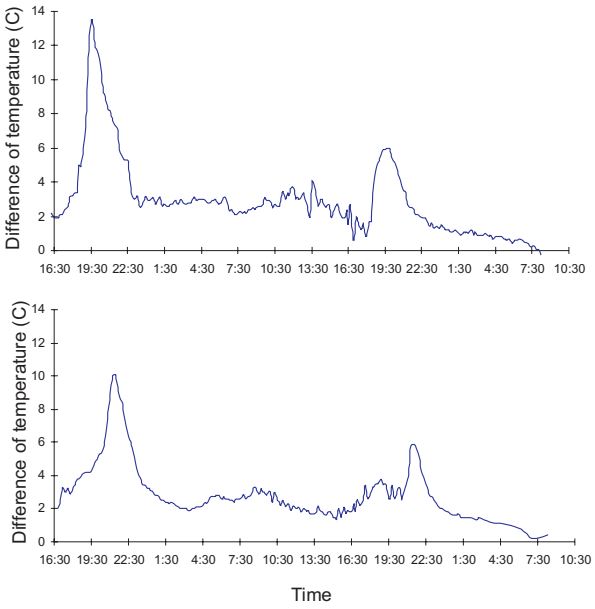


Figure 4 Difference in temperature between the spadix and ambient air of inflorescences of *P. melinonii* from French Guiana (upper graph) and from the Montreal Botanical Garden (lower graph) (From Gibernau and Barabé, 2000)

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Interesting Website for those in British Columbia

E-Flora BC

Edited by B Klinkenberg, R. Klinkenberg and A. Ceska



Letter to the Editor

I have followed with great interest Drs. Small & Catling series on possible economical use of our wild fruits. Their research is of special interest to me, because they often examine plants that I have perused and often with a resulting success in my kitchen (see Harvest without Planting & Reap without Sowing). I was a bit surprised at their treatment of *Viburnum*. While they examine closely the taxonomy and horticultural achievements in text and references, their report on the edibility is anecdotal and not documented.

I beg to differ that *Viburnum opulus* and *edule* are the only "palatable" species with a possibly edible fruit. Fernald and Kinsey. as revised by R.C. Rollins (1958) quote *V. alnifolium*, *V. lentago*, *V. cassinoides* and *V. prunifolium* (not in Canada) as a nibble or masticatory. These species are also mentioned by O.P. Medsger in 1954. MarieVictorin (1964) prefers *V.lentago* to that of *V.cassinoides*. Euell Gibbons, in Stalking the Healthful Herb (1966) describes both *V. prunifolium* and *V. lentago* as very variable- with fruit that can be large and very sweet, and again to be without any preferable qualities. Finally I like to mention my own experience (E.E. Gaertner, Reap without sowing) where I developed a pleasant condiment using the fruit of V. cassinoides.
I shall assure you that the difference between the native *V. opulus v. americanum* and the European variety is evident the moment the berries start to cook. The skunky odour should deter all but the most adventurous. In my experience it never goes away.
Compared to the established cultivation and general use of cranberries and their relatively easy harvest and preparation, I am afraid that a mass production of *Viburnum* fruit for human consumption is not on the books. Nevertheless 1 do believe that it could become an important horticultural plant for anybody who enjoys interesting nibbles in a decorative garden.

Just as I had ready the above note, the new Bulletin arrived. I thought therefore to add a little note about the *Taxus fruit*. As far as I am aware, all the poison of the fruit is concentrated in the seed. This can pass harmlessly through the digestive track, provided its outside coat has not been ruptured, i.e. it was not bitten into.
I was told that it used to be one of the test fruits in India; if you survived eating it, you were innocent; if you died, guilty...
I trust that these comments are of some interest to you and your readers. Erika E. Gaertner, Ottawa

NATIVE PLANT EMBLEMS OF CANADA - 1. OVERVIEW OF CANADIAN PLANT SYMBOLS

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Introduction

Although floral emblems are among the best known of Canadian plants, botanists still receive a remarkable number of questions about them. To provide answers and to foster a better understanding of Canadian biodiversity, we have initiated this series. We hope that at least in some small way the information included here will contribute to pride in our country and respect for our natural resources.

In this introductory article we provide general information on the symbolic use of plants with particular reference to prominent Canadian examples, and we also present an overview of Canada's 30 official native plant emblems. These will be featured in 13 future articles, one for each of the ten provinces and three territories, and a final article will be devoted to national plant emblems.

Some Familiar Plant Symbols

We depend on plants for food, shelter, medicines, and other essentials. It is not surprising that plant species are among the most prominent of important symbols. The olive branch signifies peace; the violet symbolized the anti-monarchist movement of France led by Napoleon; marijuana leaves on shirts conveyed a strong anti-establishment attitude in the 1960s; each spring, millions of tulips demonstrate the gratitude of the Dutch for Canada's help in sheltering their Princesses during the Second World War and for liberating their country; poppies were adopted by the Great War Veterans' Association in 1921 and represent the enormous sacrifice of Canadian soldiers(Fig 1); and daffodils are the Canadian Cancer Society's symbol of hope(Fig 2). There are many more plant symbols, but the favourites of most people are their own regional symbols.



WAR AND TULIPS

Over 3,000,000 tulips are displayed in the spectacular Canadian Tulip Festival in Canada's capital each year. It all began in 1945, following World War II, when Canada planted a few thousand Dutch tulips on Parliament Hill in Ottawa. They were a gift that acknowledged the role of Canadian soldiers in liberating the Netherlands from Nazi control, and to thank Canada for providing a safe home for the Dutch Royal Family during the war. The gift of tulips became a tradition, and in 1953 the world's largest annual tulip festival became established in Ottawa. The tulip is one of the most prominent flowers of spring and as such it is a natural symbol of renewal. A “50 cent” ($24.95 issue price) selectively gold-plated coin was issued in 2002 to commemorate the 50th anniversary of the Canadian Tulip Festival (coin image© courtesy of the Royal Canadian Mint.). Similarly in 2005 a $1.05 stamp© was issued (image courtesy of Canada Post Corporation).



Figure 1

Plants as Regional Symbols

A very large proportion of the emblems of political regions originate in the natural world, including plants, animals, minerals, etc., but plants predominate. As noted above, plants sustain human life. People have a natural love and respect for plants that is mirrored in their choice of plant emblems. However, less than 1% of the flora of countries achieves the status of official emblems, and of course such plants need to be very special. What does it take to become a regional symbol? These plants are extremely important economically or exceptionally impressive visually, and often have particular adaptation to the region they represent. Today virtually every country of the world is represented by a native plant emblem, as are numerous geographical subdivisions of countries

DAFFODILS: DEFEATING CANCER

There is no more cheerful harbinger of spring than the golden sunshine of daffodils. They are said to say, “the sun is always shining when I'm with you.” There is no better symbol of the inspired hope of the human spirit. An exceptional gala, the “Daffodil Ball,” is one of the most successful cancer-related fundraisers in Canada. A black-tie dinner dance in Montreal's historic Windsor Station, it has netted $ 9 million in the last 6 years. For the event, the marbled interior of the station is decorated with 65,000 daffodils. Daffodils



(*Narcissus*, especially *N. Pseudo-narcissus*) are probably native to a small part of Europe but were introduced elsewhere, initially by the Romans. They are now cultivated around the world and hundreds of daffodil societies host shows and share information on how to grow them. A“50 cent” ($34.95 issue price) selectively gold-plated “golden daffodil” coin was issued in 2003 to honour the Canadian Cancer Society's symbol of hope, the daffodil



(Coin image© courtesy of the Royal Canadian Mint). Similarly, two 50 cent daffodil stamps were issued in 2005 (one of these is shown here, the image© courtesy of Canada Post Corporation).

Figure 2

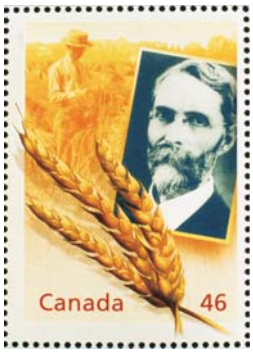
Indigenous or Introduced?

Many plants are not native to a region but have become so well established that few realize that they originally came from other countries. One-fifth of the plant species that grow wild on the Canadian landscape have been introduced from other countries. The botanical emblems featured in this series are genuinely native (indigenous) species, but it is worth noting that sometimes well-established immigrants deserve consideration.

All of Canada's major crops are of foreign origin. Not surprisingly then, wheat (*Triticum* species), the leading crop of the Canadian Prairies, is encountered as a symbol there. Sheaves of wheat are found on the coat of arms, shield of arms, and flag of both Saskatchewan and Alberta (shields of arms are shown in the Centennial Canadian stamps, shown below), as well as the Coat of Arms of Manitoba, and in 1977 Manitoba adopted a stylized wheat sheaf as a general symbol for the province.*(Fig 3)*

MARQUIS WHEAT: BORN IN CANADA

Wheat is not native to Canada, but one of the most famous varieties was born in Canada. Bred at Ottawa's Central Experimental Farm by Sir Charles E. Saunders, it became a major contribution to the Canadian economy. Marquis matured early, avoiding frost damage and making possible a vast increase in wheat production on the Canadian prairies. One of the world's greatest feats in crop breeding, by 1911 it had produced the first 200 million bushel crop in the West's



history. In 1915, during the first World War, it made up 90% of the wheat shipped by Canada to France, an essential source of food at that time since U-boats had cut off supplies from Australia and Argentina. A 46 cent stamp entitled “Sir Charles Saunders: The Marquis of Wheat” was printed in 2000 (image© Canada Post Corporation). A $100.00 coin was issued in 2003 to mark the 100th anniversary of the selection of Marquis wheat (coin image© courtesy of the Royal Canadian Mint.)



Figure 3

Influence of Politics & Business

In the United States, numerous plant species have been adopted as state symbols because politicians were pressured by organizations, schoolchildren (often persuaded by a teacher to take on a cause), and commercial interests. For example, the Bear Road Elementary School children in North Syracuse, New York, convinced the governor to sign a bill in 1987 making the apple muffin the official New York State muffin. Also, a fifth-grade class adopted the cause of making the cranberry (*Vaccinium macrocarpon*) the official berry of the state. Their 2 years of lobbying, petitions, and hearings were finally rewarded in 1994. In 2000, the huckleberry (*Vaccinium* species) was declared to the “official fruit” of Idaho, a measure that was initiated by a group of fourth graders. Manitoba's official floral emblem was substantially determined by a poll of schoolchildren. British Columbia's choice of floral emblem was heavily influenced by the Women's Institutean organization that in post 2nd World War times was quite influential.

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{The business world has sometimes adopted plants as corporate symbols. Examples representing the products sold include Mr. Peanut (Planters Nuts), Chiquita Banana (Chiquita Banana Company), and the California Dancing Raisins (State of California Department of Food and Agriculture). Of all corporate logos, the apple is perhaps most relevant to Canada. An apple with a bite out of the right side is the symbol of Apple Computer Inc. Jef Raskin (1943-2005), the man most often credited with the creation of the Macintosh computer (released in 1984), named it after his favourite fruit, the McIntosh apple, Canada's most famous contribution to the world of fruits. Raskin noted that he changed the spelling to “Macintosh” to avoid potential copyright conflicts with McIntosh, the audio equipment manufacturer. (Fig 4)

CANADA'S APPLE



Over 3 million McIntosh apple trees flourish in North America and produce one of the world's most popular apples, but where did they come from? John McIntosh (17771846) moved to Canada from New York's Mohawk Valley and settled in Dundela, Ontario. In 1811 he found several apple seedlings in the woods around his new home. He transplanted these to his garden, and the one seedling that survived was



The original McIntosh tree, and a mother of millions. A fire swept through the McIntosh farm in 1895, but the badly singed tree continued to bear fruit until 1906 and died shortly after. The original dead tree, shown here (amid some of its offspring) was left standing for some time, and a commemorative headstone was placed on the site. An uncirculated, collector silver dollar coin was issued in 1996 to mark the 200th anniversary of John McIntosh's arrival in 1796. (Coin image © courtesy of the Royal Canadian Mint.)



Figure 4

Symbols Can Change

The choice of given species as botanical symbols is sometimes not permanent, and in fact is sometimes subject to the strong influence of special interest groups. For example, the passion flower (*Passiflora incarnata*) was adopted as Tennessee's state flower in 1919. However, Nashville's Iris Association succeeded in having the iris adopted as the Tennessee state flower in 1933 (the passion flower wasn't forgotten; it was declared to be the “state wildflower” in 1973, while the iris is Tennessee's official *cultivated* flower).

Changes of emblem are sometimes dictated by change in circumstances or gradual realization that a better choice is available. Some changes of official emblem in Canada provide examples. The white (Madonna) lily (*Lilium candidum*), a native of Greece, was officially designated as the floral emblem of Quebec in 1963, but there was confusion and debate as to whether it was the appropriate floral emblem. In 1999 the blue flag (*Iris versicolor*) was officially adopted as Quebec's new floral emblem. The change was considered by most to be desirable because the blue flag is native rather than introduced and is a characteristic element of the flora of the most inhabited part of the province. (The white fleur-de-lys that is used on Quebec's provincial flag and coat of arms is widely considered to be a floral symbol, but its identity is problematical, and there is even some doubt that it actually represents a plant.)

The Northwest Territories named the jack pine (*Pinus banksiana*) as its official tree in 1989. At that time, residents (mostly students) were polled. Trembling aspen (*Populus tremuloides*) received 369 votes, tamarack (*Larix laricina*) 593 votes, and jack pine 679 votes, resulting in the jack pine being proclaimed as the official tree of the Northwest Territories. However, in 1999, the new territory of Nunavut was carved away from the Northwest Territories, and that year, based on the recommendation of a Special Committee established in 1998, the newly delineated Northwest Territories replaced the jack pine with the tamarack.
Prince Edward Island chose the “lady's slipper” as its floral emblem in 1947, but did not stipulate the species. Of the three found in the province, the showy lady's slipper (*Cypripedium reginae*) was generally accepted as the floral emblem. However, in the early 1960s not enough plants of this very rare species could be found on the island to prepare a display for the Fathers of Confederation Building in Charlottetown. With concern that the showy lady's slipper was too rare in the province to represent it, the stemless lady's slipper (*C. acaule*) was chosen, and recognized in legislation in 1965. This latter species is a well known and widespread element of the island's flora.

Collectibles

During Canada's Centennial in 1968, the provincial and territorial official floral symbols (along with the maple leaf representing all of Canada) were placed on sets of commemorative coins and stamps (some of these will be shown in this series). A similar set of medallions was distributed by Shell gas stations in Canada in the 1960s. The Canadian plant emblems also decorated plates and other objects. The coins, stamps, medallions, and similar items are still available as collector's memorabilia,(Fig 5,6 and 7) as a search on the Web will reveal. See Coucill (1966), cited below, for reference to an outstanding set of paintings of the floral emblems. The floral symbols of the Centennial period differ from the present symbols in that Quebec changed its floral emblem as noted above, and Nunavut had not yet been recognized as a territory.

(Continued)



Figure 5 $100 coin

Uncirculated, collector 100 dollar coin (92% gold, 8% silver) issued in 1977 to mark the 50th ("silver Jubilee") commemoration of Queen Elizabeth II. The coin shows a bouquet of the official flowers of the and territories. Coin image © courtesy of the Royal Canadian Mint.



Figure 6 Stamps

1967 Centennial floral emblem stamps (© Canada Post Corporation). Shields of arms are shown on the left of most of the stamps. As noted in the text, Quebec's emblem has changed, and Nunavut became a territory after 1967.



Figure 7 - Provincial coins

Canadian gold $350.00 coin series (0.99999% gold; 19992005, continuing) based on provincial and territorial symbols. Coin images © courtesy of the Royal Canadian Mint.

How Many Symbols Are Enough?

Canada is far behind many of the American states in providing official recognition of plants as symbols. The 50 U.S. states have spawned a seemingly endless variety of official symbols, including people, foods, beverages, tartans, etc. Tomato juice (from *Lycopersicon esculentum*) was made the official beverage of the state of Ohio in 1965. In 1986, Massachusetts declared the corn muffin (corn is *Zea mays*) to be its official state muffin. The blueberry muffin (based on *Vaccinium angustifolium*) was made Minnesota's "State Muffin" in 1988. In 1995, South Carolina declared tea (*Camellia sinensis*) to be its official state "Hospitality Beverage." The chocolate chip cookie (chocolate comes from *Theobroma cacao*) was declared to be the official state cookie of Massachusetts in 1997. Texas declared cotton (*Gossypium* species) to be its official State Fiber/Fabric in 1997. In 2001, Texas chose the pecan (*Carya illinoinensis*) to be its official state "Health Nut." While it seems unlikely that Canada will develop such enthusiasm for symbols, nevertheless the future will likely result in recognition of more plant species as Canadian emblems.

Unanticipated Problems

Choosing a new botanical emblem requires careful consideration to avoid problems, as exemplified by the downy hawthorn (*Crataegus mollis*). Its blossom was declared to be the state floral emblem of Missouri in 1923. The legislature further asserted that the state department of agriculture should encourage hawthorn cultivation because of the beauty of the flower, fruit, and foliage. There are many in the state of Missouri,

(Continued)

however, who think that hawthorn was a bad choice as an emblem. This is because in Britain hawthorns have an extraordinary reputation for being inhabited by fairies, which cause disasters should the trees be damaged. As late as 1968 a road had to be realigned to pass a hawthorn that was on a new road being built from Ballintra to Rossnowlaugh. In 1982, workers in the De Lorean car plant in Northern Ireland protested that the site was cursed because a hawthorn had been destroyed during construction of the plant. To calm everyone, management ceremoniously planted another “fairy tree” on the property. On the grounds of Belfast University people refused to trim a hawthorn for fear of offending the fairies, and it is said that when new buildings were planned, they had to be placed so that they would not disturb the tree.

How symbols are interpreted can change dramatically over time. Australia's national flower is the golden wattle (*Acacia pycnantha*), which was once popular. During the First World War, Australians wore sprigs to demonstrate patriotism and raise funds for the war effort. In more recent times, the golden wattle has often been mocked, and has become embroiled in the movement to change the country from a constitutional monarchy to a republic (the flower has become associated with the republican movement).

A zoological example of the conservation implications of conferring official status on species was provided by the state fishes of Alaska (the king salmon) and Nebraska (channel catfish). People for the Ethical Treatment of Animals, a well known animal rights group, recently petitioned the governors of the two states to ban fishing of the state fishes.

This series will point out examples of choices that were made without either the guidance of botanists or adequate consideration of the potential problems, resulting in confusion about the identity of the species concerned.

The Special Significance of Botanical Symbols

Plant emblem species are ambassadors from the regions of the nation, calling attention to the importance of preserving the country's natural biological heritage.

There is a subtle but very important significance to native plant emblems: they bridge the interests of professional botanists and society at large. Everyone is exposed to these indigenous plant emblem species on flags, signs, stamps, coins, and letterheads, and so these species are extremely memorable. Plant emblem species, therefore, are like ambassadors from the regions of the nation, calling attention to the importance of preserving the country's natural biological heritagefor practical sustainable harvesting in many casesor simply in order to prevent the beauty of these species from disappearing from the natural world. Professional botanists now recognize their obligation to educate the public about the importance of plants to society and the natural world.

Overview of Canada's Indigenous Plant Symbols

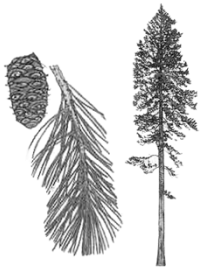
So far as we have been able to determine, at the federal, provincial, and territorial levels, Canada has 30 “official” indigenous plant symbols (i.e. recognized as such in legislation) at present. The ten provinces and three territories each have a floral emblem, and all but Nunavut have an official tree. Also, Saskatchewan and Alberta have official grasses, and Nova Scotia has an official berry. In 1977, Alberta recognized “petrified wood” as its “official stone” (numerous fossil taxa could constitute petrified wood found in the province). Despite the botanical nature of this emblem, we are not interpreting it as a plant symbol. One taxon (*Acer* or maple in a generic sense) represents Canada collectively and 29 taxa represent the 13 geographical regions (provinces and territories) individually. An illustrated synopsis follows.

(Continued overpage)

The Board



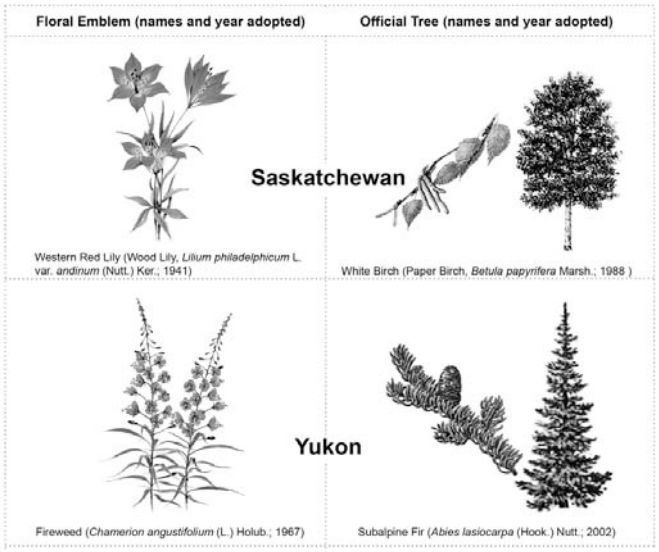
From left to right: Art Davis, Hugues Massicotte,Christian Lacroix,Christine Maxwell, Vipen Sawhney, Rodger Evans,Marian Munro, Usher Posluszny, Mona Hamzeh and Daya Dayanandan. Photo Daya Dayanandan. Note: Not all board members were present. For a full list see Page 44.

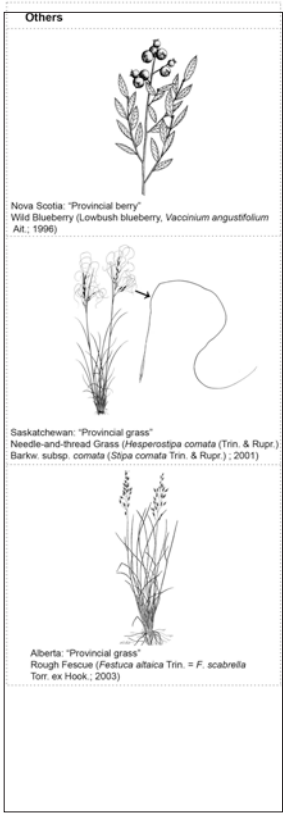
Floral Emblem (names and year adopted)	Official Tree (names and year adopted)
Canada	
 “Maple” and “maple leaf” have been unofficially recognized as an “emblem” dating back to early 1800s. The sugar maple (*Acer saccharum* Marsh.) is the most frequently used non-generic symbol.	 “Maple” (*Acer*; 1996; no particular species, although legislatic notes there are 10 indigenous species; sugar maple, *A. saccharum*, is most often mentioned)
Alberta	
 Wild Rose (Prickly Rose, *Rosa acicularis* Lindl.; 1930)	 Lodgepole Pine (*Pinus contorta* Dougl.; 1984)
British Columbia	
 Pacific Dogwood (Western Flowering Dogwood, *Cornus nuttallii* Audub.; 1956)	 Western Red Cedar (Western Arborvitae, *Thuja plicata* Donn; 1987)

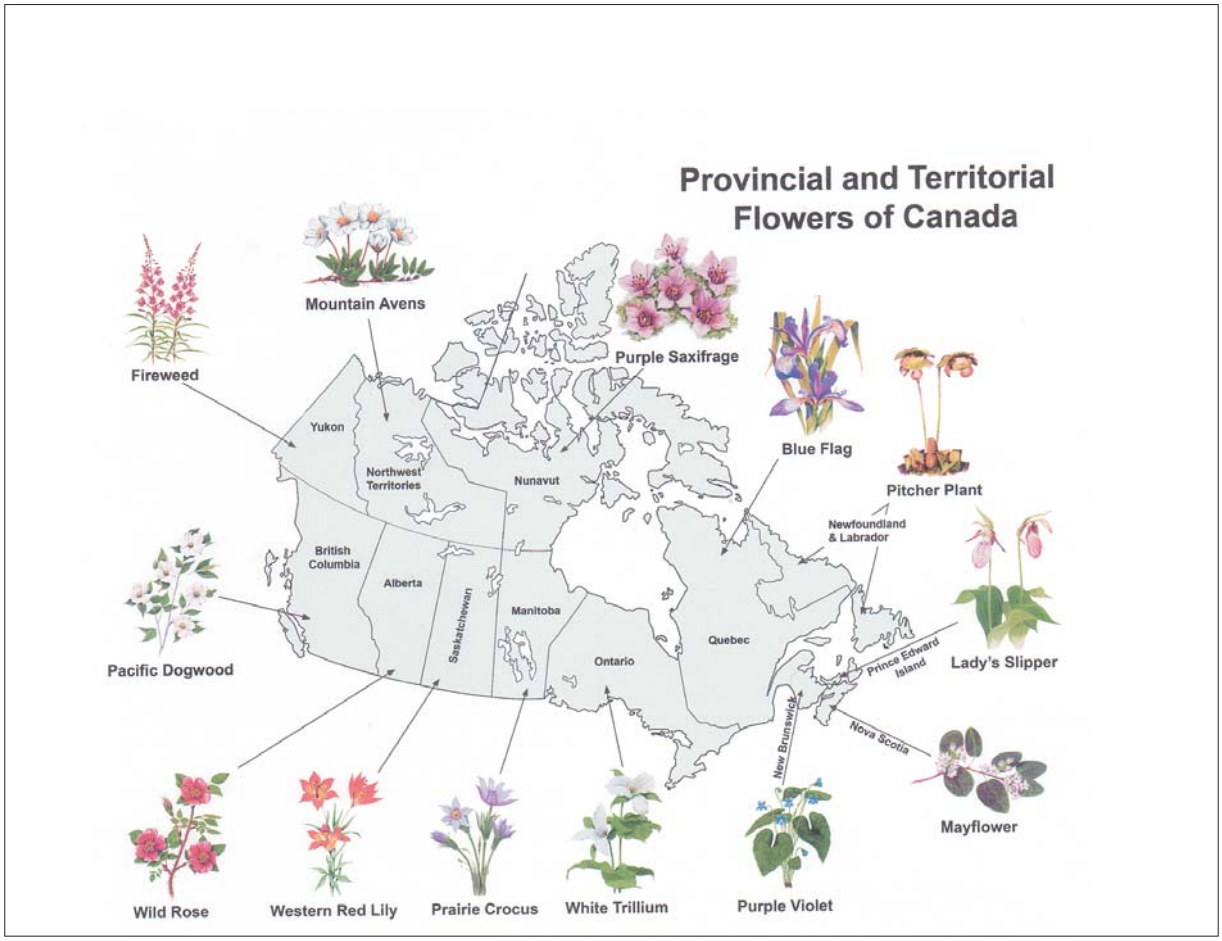
Floral Emblem (names and year adopted)	Official Tree (names and year adopted)
Northwest Territories	
 Mountain Avens (White Dryad, *Dryas integrifolia* M. Vahl; 1957)	 Tamarack (American Larch, *Larix laricina* (DuRoi) K. Koch; 1999)
Nova Scotia	
 Mayflower (Trailing Arbutus, *Epigaea repens* L.; 1901)	 Red Spruce (*Picea rubens* Sarg.; 1987)
Nunavut	
 Purple Saxifrage (Purple Mountain Saxifrage, *Saxifraga oppositifolia* L.; 2000)	Not yet chosen.

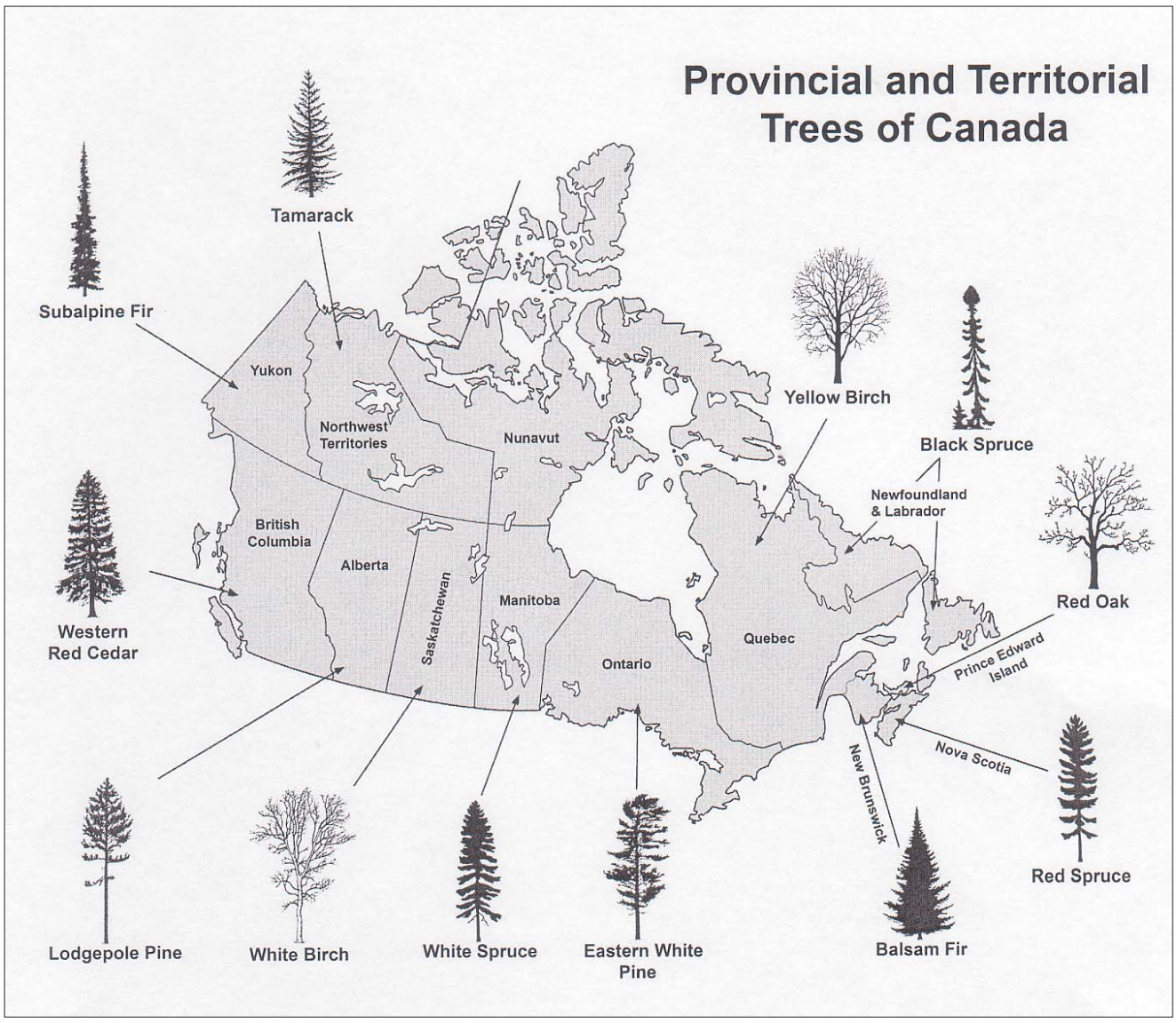
Manitoba	
 Prairie Crocus (Pasque Flower, *Pulsatilla patens* (L.) Mill.; 1906)	 White Spruce (*Picea glauca* (Moench) Voss; 1991)
New Brunswick	
 Purple Violet (assumed to be Bog Violet, also called Marsh Blue Violet), *Viola cucullata* Ait.; 1936)	 Balsam Fir (*Abies balsamea* (L.) Mill.; 1987)
Newfoundland & Labrador	
 Pitcher Plant (Purple Pitcher Plant, *Sarracenia purpurea* L.; 1954)	 Black Spruce (*Picea mariana* (P. Mill.) BSP.; 1993)

Ontario	
 White Trillium (Eastern White Trillium, Large-flower Wakerobin, *Trillium grandiflorum* (Michx.) Salisb.; 1937)	 Eastern White Pine (*Pinus strobus* L.; 1984)
Prince Edward Island	
 Lady's Slipper (Pink Lady's Slipper, Stemless Lady's Slipper, *Cypripedium acaule* Ait.; 1947)	 Red Oak (Northern Red Oak, *Quercus rubra* L.; 1987)
Quebec	
 Blue Flag (Harlequin Blue Flag, *Iris versicolor* L.; 1999)	 Yellow Birch (*Betula alleghaniensis* Britton; 1993)


Floral Emblem (names and year adopted)
Official Tree (names and year adopted)
Saskatchewan
Western Red Lily (Wood Lily, *Lilium philadelphicum* L. var. *andinum* (Nutt.) Ker.; 1941)
White Birch (Paper Birch, *Betula papyrifera* Marsh.; 1988)
Yukon
Fireweed (*Chamerion angustifolium* (L.) Holub.; 1967)
Subalpine Fir (*Abies lasiocarpa* (Hook.) Nutt.; 2002)


Others
Nova Scotia: "Provincial berry"
Wild Blueberry (Lowbush blueberry, *Vaccinium angustifolium* Ait.; 1996)
Saskatchewan: "Provincial grass"
Needle-and-thread Grass (*Hesperostipa comata* (Trin. & Rupr.) Barkw. subsp. *comata* (*Stipa comata* Trin. & Rupr.) ; 2001)
Alberta: "Provincial grass"
Rough Fescue (*Festuca altaica* Trin. = *F. scabrella* Torr. ex Hook.; 2003)


Provincial and Territorial Flowers of Canada
Mountain Avens
Fireweed
Purple Saxifrage
Blue Flag
Pitcher Plant
Yukon
Northwest Territories
Nunavut
Newfoundland & Labrador
British Columbia
Alberta
Saskatchewan
Manitoba
Ontario
Quebec
Prince Edward Island
Lady's Slipper
Pacific Dogwood
New Brunswick
Nova Scotia
Mayflower
Wild Rose
Western Red Lily
Prairie Crocus
White Trillium
Purple Violet



Key references on plant symbols of Canada
(n.b. the older references listed below do not report more recent changes in official emblems)

Breitung, A.J. 1954. Canadian floral emblems. Canadian Nature 16(2): 42–47. [Written for a general audience. Canadian Nature was published by the Audubon Society of Canada. It should not be confused with the Canadian Field-Naturalist.]

Canadian Heritage. 2002 (revised edition). Symbols of Canada. Canadian Heritage, Ottawa, ON. 57 pp. [Presentation is often elementary. Accompanied by a large poster. Very attractive colour drawings. Issued in French as: Les symboles du Canada.]

Coucill, W. 1966. Untitled [Official flowers of Canada's ten provinces and two territories]. National Trust, Ottawa, ON. [Bilingual format."To commemorate Canada's Centennary, National Trust Company commissioned Canadian artist Walter Coucill to paint in their natural settings, the official flowers of Canada's ten provinces and two territories."

This publication is a set of 12 superb colored plates, based on the original paintings. The Bank of Nova Scotia acquired National Trust Company in 1997.

The Coucill family deposited the paintings, while retaining copyright, with Library and Archives Canada.]

Department of the Secretary of State of Canada. 1967. The arms, flags and floral emblems of Canada. Department of the Secretary of State of Canada, Ottawa, ON. 80 pp. [Bilingual format, alternatively titled: Les armoiries, drapeaux et embl mes floraux du Canada. The 1967 edition was issued with attractive drawings of plants in colour. Modified and co-published as a 3rd edition with Deneau Publishers, in unilingual formats, as The arms, flags, and emblems of Canada, in 1984, with 112 pp. and (less attractive) colour photographs. The Department of the Secretary of State of Canada ceased to exist in 1996.]

(Continued overpage)

The International Wood Collectors Society. 32 ppof. [A slightly altered version appears at (find “Arboreal Emblems”), authored by C. Holder. Revised & reprinted in 2004, bringing up to date the official trees of the Yukon and NWT
Sherk, L.C. 1967. Growing Canada’s floral emblems. Canada Department of Agriculture, (Publication 1288E) Ottawa, ON. 28 pp. [Issued in French as: Sherk, L.C. 1968 (“1967”). La culture des plantes emblèmes du Canada. Ministère de l’Agriculture du Canada (Publication 1288F), Ottawa, ON. 28 pp. Photographs in colour.]
Wayland, B. 2005. Symbolic blooms: a look at Canada’s floral emblems. Wildlife (Canadian Wildlife Federation, Kanata, ON) 11(4): 38–41. [Has colour paintings of the flowers.]

Websites

(n.b. most of these sites do not include recent changes in official emblems)

Canadian symbols at Parliament. http://www.parl.gc.ca/information/about/education/CanSymbols/about-e.asp [To celebrate Canada’s 1967 Centennial, huge stained glass windows (each about 9 m high and containing around 2,000 pieces of cut glass) were installed in the House of Commons Chamber of the Parliament Buildings, with completion in 1973. This website provides detailed illustrations and background and (for the younger set) a floral emblem colouring book.]
Canadian Museum of Civilization. The Canada Garden: a tribute to Canada’s indigenous flora. [presents copies of a set of drawings of Canada’s floral emblems by Lavonia R. Stockelbach (née Bonnie Hunter, 1874–1966). The original paintings are the property of Agriculture & Agri-Food Canada and are in the Saunders Building, Central Experimental Farm, Ottawa. Ms. Stockelbach, best known for illustrating birds, produced more than one copy of her set of paintings of the Canadian flora emblems, and had Chinaware engraved with the same paintings (the disposition of these is uncertain). The paintings were exhibited at the International Botanical Congress, Montreal in 1959.]
Fletcher, M. 1998. Our fabulous flora. Legion Magazine May/June. Reproduced at: [An article on Canada’s floral emblems, written for a general audience.]
Flower bios of the month/Flower emblems of Canadian provinces and territories http://www.nhs.usethis.com/flowerbio/archives/flowerbio2001/flowerbiointro.html [A brief review of information.]
GeoSymbols/Plants. [The largest website dealing with the symbolic use of plants of the world. Has a common sense explanation of the vernacular vs. technical use of terms like fruit, vegetable, tree, shrub, nut, berry, etc., which is important to the designation of representatives of these categories as official emblems.]
Heritage flowers by Lynn Gregson. [A commercial source of greeting cards and a poster based on paintings of Canada’s floral symbols. Several mistakes, but good art. Greeting cards are also available from the Canadian Symbols at Parliament website (above)]
Stained glass floral emblems [A commercial source for floral emblems of Canada on stained glass.]

General Information on Plant Symbols

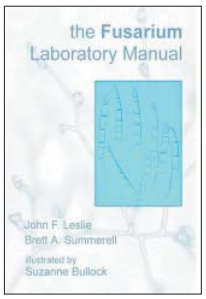
Rosenow, J. 2001. What role for national trees in promoting biodiversity conservation? Oryx 35(1): 1–2.
Vu, P. Can states ever have too many symbols? [Discusses some absurd proposals.]

Acknowledgments

We thank A. Leighton for a very comprehensive review and W.J. Cody for additional constructive comments.

Figure Sources (all illustrations have been enhanced electronically by B. Brookes):
Illustrated synopsis. The maple tree is from: Harter, J. (*Editor*). 1988. The plant kingdom compendium. A definitive volume of more than 2,400 copyright-free engravings. Bonanza Books, New York, NY. The remaining illustrations of trees are from Canada’s arboreal emblems (cited above), reproduced with permission of C. Holder (author) and J. Monty (president) of the Canada Tree Foundation. The maple leaf is from: Sargent, C.S. 1891. The silva of North America. Houghton, Mifflin and Company, Boston, MA. vol. 2. Western flowering dogwood is from: Sargent, C.S. 1893. The silva of North America. Houghton, Mifflin and Company, Boston, MA. vol. 5. Lowbush blueberry is from: Vander Kloet, S.P. 1988. The genus *Vaccinium* in North America. Agriculture Canada Research Branch Publication 1828. Needle-and-thread grass is by A. Haynes (prepared for Agriculture and Agri-Food Canada). Rough fescue is from: Best, K.F., Looman, J., and Campbell, J.B. 1971 (prepared for Agriculture and Agri-Food Canada). Prairie grasses identified and described by vegetative characters. Canada Department of Agriculture, Ottawa, Publication 1413. The remaining floral emblems are from Canadian Heritage 2002 (cited above), with permission of Canadian Heritage, as well as Public Works and Government Services Canada.
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Map with provincial and territorial flowers. The illustrations are from Canadian Heritage 2002 (cited above), with permission of Canadian Heritage, as well as Public Works and Government Services Canada.
Map with provincial and territorial trees. The tree silhouettes are reproduced with permission from Trees in Canada by J.L. Farrar, published by the Canadian Forest Service and Fitzhenry and Whiteside (Markham, ON, Canada), 1995.

Book Reviews
Revues de livres



Fusarium Laboratory Manual

By: John Leslie. Professor of plant pathology and genetics at Kansas State University, and Brett Summerell. Senior Research Scientist/Plant Pathologist at the Royal Botanic Gardens in Sydney, Australia.

Blackwell Publishing, 2006

400pages.88 illustrations

ISBN 0813819199

Price: Canada $124.99

Canadian plant pathologists and seed testers have been waiting for this book. *Fusarium* is one of the most critical genera of plant pathogens, with species causing diseases of just about every crop. The combination of yield losses and associated contamination with potent mycotoxins is a major issue for plant breeders all over the world. Previous identification manuals (especially the well-known "*Fusarium* species: An illustrated manual for identification" by Nelson *et al*. 1983, and the less-known but more comprehensive "The genus *Fusarium*: A pictorial atlas" by Gerlach & Nirenberg 1982) are now out of print and difficult to obtain.

The present book was originally a laboratory manual for an annual identification course taught by the authors, and an extension from several editions of a laboratory manual for Australian species of *Fusarium* coauthored by Summerell. The book includes the information and protocols necessary for a laboratory to start working with *Fusarium*, i.e. what media are used, how the species can be isolated, and how cultures can be preserved. The genetic information and protocols reflect the expertise of the senior author, who has extensive experience with using vegetative compatibility groups for studying population biology (a topic that seems peripheral to the question of species identification). Protocols reflecting his experience with crossing cultures to discover teleomorphs (sexual states) are also included, and are quite relevant for identification in some groups of *Fusarium*. The chapter on nucleic acid analysis includes detailed protocols for DNA extraction and purification and for running AFLPs. There is a helpful table listing GenBank accession numbers for gene sequences that might be helpful for the identification of species, but the primer sequences and protocols necessary to obtain these sequences are not included. The chapter concludes with genetic maps for two species that will be helpful for anyone trying to wade into the murky waters of *Fusarium* genomics. The breadth of review and literature covered in the first part of the book is impressive.

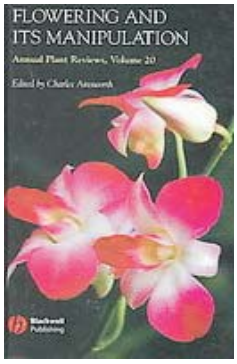
The main body of this book deals with the identification of 70 species of *Fusarium* (roughly twice the number of species included in Nelson et al. 1983, but about 20 fewer than in Gerlach & Nirenberg 1982). This section includes historical background, a review of species concepts employed in *Fusarium* by different scientists, and advice on identification. Each species is illustrated by good quality black and white, differential interference microphotographs, along with notes on cultural characters and micromorphological features, hosts, distribution, pathology, toxicology and ecology. In common with the Nelson et al. book, and the Australian manuals, there are no dimensions for the sizes of the microscopic structures, the photographs employ a similar, minimalist style and unfortunately are not attributed to specific strains or specimens. There are no keys to facilitate identification. The selection of species reflects the publications of the authors and their collaborators. Several species recognized or described by European taxonomists are not included. *Fusarium* taxonomy has always been controversial, and this situation remains. However, there is broad acceptance for the majority of species included in this book among *Fusarium* taxonomists. The glaring exception would be the phylogenetic lineages within *F. graminearum,* the economically important cause of head blight of wheat and ear rot of corn, which the authors do not recognize as separate species. This single fact reflects a general weakness in the book, a failure to recognize that for most laboratories in the developed world, DNA sequencing is already the gold standard for the identification of these fungi. From that point of view, the absence of a diagnostic, morphology-based key in this book may end up being prescient. The process of the keying a fungus out is left to the BLAST searches and phylogenetic trees, and the morphological information is then a confirmation.

This book has many strengths and belongs in any laboratory concerned with identifying *Fusarium*. I would like to believe that as the authors continue to teach their course (which I confess I sometimes help them with), that subsequent editions will be enhanced according to the experience and needs of their students. For a laboratory manual with wire loop binding, the price is excessive, and I hope that the possibility of print-on-demand (hopefully with colour photographs) will allow future editions to be more affordable.

Keith A. Seifert, Biodiversity (Mycology & Botany), Agriculture & Agri-Food Canada, Ottawa. Seifertk@agr.gc.ca

(Reviews continued overpage)

Flowering and its Manipulation



Edited by: Charles Ainsworth Plant Molecular Biology Laboratory, Imperial College London, Kent

Series: Annual Plant Reviews.

2006, Blackwell Publishing

320 pages, 68 illustrations,

ISBN 1405128089

Price: Canada $199.99

This handy book in the Annual plant reviews series is intended to be a convenient source of topical and up-to-date material on the biology of flowers and flowering for researchers and postgraduates. By and large it succeeds well.

Part 1 covers "Core development and genetics" including floral induction and patterning. Part 2 covers "Specialized components of development" such as monoecy and cytoplasmic male sterility (CMS). Part 3 is curiously called "A developmental genetic model for the origin of the flower". This must be a typographical error as this is the title of a stimulating chapter in the first part by Baum and Hileman. This part has nothing to do with the origin of the flower, but does contain useful chapters on flower colour and scent. A single chapter on flower senescence (appropriately the final chapter) is given a "part" of its own (Part 4).

Baum and Hileman's developmental genetic model for the evolutionary origin of the flower is one of the most interesting and innovative chapters in the book. Baum and Hileman propose a three-stage model for the origin of the flower from a unisexual lax cone. The first step (according to them) is the evolution of a bisexual axis via a gynomonoecious intermediate. They speculate that homeotic conversion of microsporophylls to megasporophylls in a pollen cone is responsible, probably involving changes in the B-class and C-class floral MADS-box genes.

The next step, they posit, is that the axis became compressed and determinate as C-class genes took became negative regulators of the meristem gene, WUSCHEL. Then a petaloid perianth evolved by sterilization of the outer stamens. Baum and Hileman speculate that this arose by WUSCHEL evolving a recoprocal regulatory function for the C-class genes. Finally, a dimorphic perianth evolved (calyx and corolla). This, they suggest, coincides with B-class gene function becoming dependent on the expression of the gene UNUSUAL FLORAL ORGANS (UFO). This model is highly speculative, but as the authors point out, it fits the facts and makes testable predictions.

Kramer (chapter 3) gives a very useful state-of-play review of floral patterning by MADS-box and other genes. The ABC model originally put forward by Coen and Meyerowitz 15 years ago has stood the test of time remarkably well. Elements have been added but the original core model has come through intact. As Kramer points out the more recently discovered E-class genes could not have been
found by the original mutagenesis screens because of their high redundancy. However, our understanding still relies heavily on Arabidopsis and Antirrhinum. Further refinements will almost certainly come from the investigation of a wider range of flowering plants.

Generally, the book is timely with excellent quality and good coverage of the subject. If I have one quibble it is with the references. Mostly these are fine. However three chapters (2, 4 and 5) unaccountably have no titles of articles in the references. This inconsistency makes it hard for the reader to judge the subject matter and relevance of this mysteriously title-less cited literature.

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Notice of Postal Ballot.

In the next couple of months, the membership of the CBA/ABC, will be asked to vote on two motions which were passed at the 2006 Annual General Meeting at Concordia.
The two are as follows:
1. That the CBA/ABC establish an Undergraduate Travel Award, and
2. That the award be named "Keith Winterhalder Undergraduate Student Travel Award".

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Western to be appointed .2006-2007

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