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The Canadian Botanical Association Bulletin



Bulletin de l'Association Botanique du Canada

December/Décembre 2007 • Volume 40 No.3 / N° 3



1. The Canadian Botanical Association/L'Association Botanique du Canada (CBA/ABC), and the Botanical Society of America (BSA), and the American Fern Society (AFS), and American Society of Plant Taxonomists (ASPT) are jointly organizing the Botany 2008 meeting on the campus of University of British Columbia (UBC) from July 26 to July 30, 2008. The theme for BOTANY 2008 is Botany Without Borders. We would like to remind our members to keep these dates (July 26-30) free for the BOTANY 2008 meeting.
2. Botany 2008 Call for Field Trips: The Call document can be found at: <http://www.2008.botanyconference.org/2008Calls/index.php>
Please note: Submission of Field Trip Proposals closed November 15, 2007.
3. For more information about the BOTANY 2008 meeting, please visit the conference website (<http://www.2008.botanyconference.org/>). More information will be posted on the conference website soon.
4. For any questions/comments/suggestions regarding BOTANY 2008, please contact Santokh Singh (santokh@interchange.ubc.ca) or Christian Lacroix (lacroix@upei.ca).

1. L'Association Botanique du Canada/ Canadian Botanical Association/ (ABC/CBA), le Botanical Society of America (BSA), le American Fern Society (AFS), et American Society of Plant Taxonomists (ASPT) organisent conjointement la rencontre Botanique 2008 sur le campus du University of British Columbia (UBC) du 26 juillet au 30 juillet 2008. Le thème de la rencontre BOTANIQUE 2008 est la botanique sans frontières. Nous aimerions rappeler à nos membres de prendre note de ces dates (26 au 30 juillet) pour se libérer pour la rencontre BOTANIQUE 2008.
2. Appel pour les visites sur le terrain de Botanique 2008 : le document d'appel se trouve à l'adresse suivante: <http://www.2008.botanyconference.org/2008Calls/index.php>
Veuillez noter : le dépôt des propositions de visites sur le terrain s'est terminé le 15 novembre 2007.
3. Pour de plus amples renseignements sur la rencontre BOTANIQUE 2008,

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 the CBA, go to the web site: <http://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 nature concernant 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, 41(1), must be received before **February 15th 2008**

La date de tombée des textes du prochain numéro, le no 41(1), est le **15 février 2008**

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veuillez visiter le site web de la conférence :

<http://www.2008.botanyconference.org/>. Plus de détails seront affichés sur le site Web de la conférence bientôt.

4. Pour toute question/commentaire/suggestion concernant la conférence BOTANIQUE 2008, veuillez communiquer avec Santokh Singh (santokh@interchange.ubc.ca) ou Christian Lacroix (lacroix@upei.ca).



Editor's Note Those planning to fly to Vancouver for the conference should make sure that they book flights early. This is the peak time for travel to Vancouver for holidays and Alaska cruises, so flights are often fully booked.

Association News / Nouvelles de l'association

The new CBA website is available and currently being updated. Visit the CBA/ABC Website <http://www.cba-abc.ca>

Please send information that you want posted on the site to Daya Dayanandan at daya@alcor.concordia.ca

CBA awards

Act now! Nominate a deserving Colleague

Dear members,

The CBA/ABC prides itself in being able to offer awards that recognize excellence in Plant Science in Canada. I urge you to consider nominating a deserving colleague or student for one of the awards listed below at your earliest convenience. If you think you don't have the time, contact your section Chair or ask a colleague in your department to assist you. The nomination process for any of the awards we offer is not onerous. Please don't hesitate to contact the members of the Executive if you need clarification on any of the eligibility criteria. Christian Lacroix.

Agissez maintenant! Nommer un collègue méritant

Chers membres,

L'ABC/CBA est fière de pouvoir reconnaître le succès des botanistes canadiens avec une variété de prix. Je vous encourage donc fortement de nommer un collègue ou un étudiant pour un des prix décrit ci-dessous dans les plus brefs délais. Si vous pensez ne pas avoir le temps de le faire vous-même, contactez le(la) responsable de votre section ou demandez à un(e) collègue de vous aider. Dans la plupart des cas, la préparation d'une nomination ne demande pas trop de votre temps. N'hésitez surtout pas à contacter un membre du comité exécutif si vous avez besoin de plus amples renseignements sur les critères d'éligibilité. Christian Lacroix

The Lawson Medal. First awarded at the 1969 Annual Meeting, the Lawson Medal, the most prestigious award of the CBA/ABC, was established "to provide a collective, formal expression of the admiration and respect of botanists in Canada for excellence in the contribution of an individual to Canadian botany". It is named in honour of Dr. George Lawson, who is generally regarded as Canada's first professional botanist. Lawson was born in 1827 in Scotland and attended the University of Edinburgh. He obtained his Ph.D. from the University of

Giessen in Germany in 1857, and accepted an appointment as Professor of Chemistry and Natural History at Queen's College (now University) in Kingston, Ontario. He was instrumental in establishing Canada's first botanical garden (1861) and the Botanical Society of Canada, which met from 1860 until 1862. In 1863 Lawson abruptly left Queen's for Dalhousie (we do not know precisely why). At Dalhousie he was active in the Nova Scotia Institute of Science and was a founding fellow of the Royal Society of Canada. From 1885-1895 he was Secretary of Agriculture for Nova Scotia (equivalent to a modern Deputy Minister). In 1891 he helped to establish the short-lived (1891-1910) Botanical Club of Canada, and was its President until his death in 1895.

Lawson Medals may be awarded each year in two categories of eligibility:

(A) Recognition of a single outstanding contribution to botanical knowledge (monograph, book or series of papers) by a Canadian botanist at any stage of his career, and

(B) Recognition of cumulative, lifetime contributions to Canadian botany by a senior researcher, teacher or administrator.

Nominations should include the Curriculum Vitae of the nominee, a statement by the nominator concerning the nominee's contribution's to Canadian Botany, and at least three supporting letters from botanists who are familiar with the achievements of the nominee. Nominations for the Lawson Medal to be awarded at the next Annual Meeting, should be submitted to Christian Lacroix **before the end of January 2008**

Mary E. Elliott Service Award

The Mary Elliott Service Award is given to an individual for meritorious service to CBA/ABC. It was first awarded in 1978 in memory of Mary E. Elliott, who was a victim of homicide in September, 1976. She had just completed four consecutive years of service on the Board of Directors (as Secretary, Vice President and President), and was just at the beginning her term as Past President at the time of her death.

Mary Elliott was a plant pathologist and mycologist who spent 28 years with Agriculture Canada at the Central Experimental Farm in Ottawa. She was well known for her work on the taxonomy and biology of the Sclerotiniaceae. In 1975 she became Curator of the National Mycological Herbarium. Mary was also very active in identifying fungi for the public and in contributing to and editing (1970-71) a publication of the Biosystematics Research Institute for public information called Greenhouse-Garden-Grass.

Nominations: nominations should give an account of the contributions which the nominee has made to the Association in any capacity (e.g. Board of Directors, Executive Member, Editor, Committee member, etc.) which would make him/her a suitable candidate for receiving the Elliott Award. Nominations should be sent to Christian Lacroix **before the end of January 2008**.

For student awards see page 60 and 61.

Pour les bourses d'études veuillez consulter la page 62 et 63.

Undergraduate Student Regional Awards

This program offers annually one award of \$200.00 for one of the undergraduate conferences/meetings in Biology for each of the five (5) regions of Canada: Atlantic region, Québec, Ontario, Prairies and Territories, and British Columbia. The awards will be presented for the best presentation by an undergraduate student in the discipline of Botany at one of the major regional undergraduate conferences. The purpose of this recognition is to encourage undergraduate students to pursue graduate research in botany and to enhance the visibility of the Association. If no presentation in Botany is scheduled, the money returns to the Association. Students cannot apply directly to the CBA/ABC for these awards.

This past year the awards were given at two undergraduate conferences, the APICS (The Atlantic Provinces Council on the Sciences) held at the University of New Brunswick, St John, at which the winners were for the best poster, Caroline Tucker from Mount Saint Vincent University for her poster entitled, "Tolerance to herbivory in resistant and susceptible ecotypes of *Arabidopsis thaliana*." The CBA winner for the oral presentation was Erin Mycroft of Acadia University for her presentation entitled: "Genotypic variation in growth response of white spruce (*Picea glauca*) to elevated carbon dioxide". We are sorry that we do not have photos of the winners. The 2008 conference will be held on March 7-9th at Memorial University. The Ontario Honours Biology Conference was held at McMaster and organized by Patricia Chow Fraser. The conference was very well attended, with 31 papers eligible for the CBA award. Seven faculty members were recruited to judge them, and each student was judged by a minimum of 2 judges. There was a rather unusual circumstance where two individuals emerged as being worthy recipients of the award, but the judges did not wish to "dilute" the award by splitting it, so they put together \$200 of their own money and gave it to the student as a "Judge's Award". The student who won the Judge's Award was Sean Delanghe from Wilfred Laurier University. His talk was entitled: Investigation of the nodule development in the low-nodulating pea mutant E151 (sym 15). His supervisor was Frédérique Guinel. As for the winner of the CBA Award, it was one of Patricia's students, Jon Midwood, and the title of his talk was: Use of IKONOS imagery and depth to classify wetland macrophytes in Georgian Bay coastal wetlands. The 2008 conference will be held at Guelph University on March 29-30th. For a photo of the Ontario winners see page 67.

Help bring a deserving undergraduate student to the meeting in Vancouver!

For the first time last year the Keith Winterhalder Undergraduate Travel award was available. As yet it has not been awarded, however, we would like to see it given to a deserving undergraduate student this year.

The Keith Winterhalder undergraduate travel award.

This award could be made for the first time, having been voted on by members of the Association in the fall of 2006. The award is named after Keith Winterhalder, a long time member and former president of the Association, for his outstanding contributions to the Association and for his never-failing interest and encouragement of the student members of the CBA/ABC. Donations may be made to the award fund, by sending a cheque, or using a credit card. See membership renewal form.

Eligibility

1. The competition for the Keith Winterhalder Undergraduate Travel Award is open to student members of the CBA, who are in their fourth year of an undergraduate degree or who have completed an undergraduate degree in the past 6 months.
2. Students must present a paper in the Lionel Cinq-Mars Award competition or a poster in the Taylor Award competition at the Annual Meeting of CBA/ABC.
3. No student may receive more than one bursary while registered for the same degree

Procedures

1. Students applying for the Keith Winterhalder Undergraduate Travel Award must do so no later than the submission deadline for abstracts to the Annual Meeting

The date will be published on the conference website

2. The application must contain the following documents:
 - a. A copy of the abstract of the paper to be given at the Annual Meeting in the Cinq-Mars Competition or in the Iain and Sylvia Taylor Poster competition.
 - b. A supporting letter from the student's Honours thesis supervisor.
 - c. The student's curriculum vitae (one page);
 - d. A letter of recommendation from a member of the Biology/ Botany department of the University where the student is, or was, an undergraduate.
3. Applications should be sent to the President of CBA/ABC, Dr. Christian Lacroix, Dean of Science, University of P.E.I., Charlottetown PEI. C1A 4P3
Tel: 902-566-0320 Fax: 902-628-4303, Email: lacroix@upe.ca.



Name Change announcement

We are pleased to announce that as of January 2008 (Volume 86) the name of the *Canadian Journal of Botany* will be changed to *Botany*, with the continued byline "An International Journal for plant biology". This change has been made after considerable consultation with various members of the Botanical Community and with members of NRC Research press. We appreciate the support that we received during the consultation process. We believe this name change will better reflect the international scope of the Journal and that it will encourage the submission of more excellent manuscripts from international researchers. The *Canadian Journal of Botany* has a long history of excellence in publishing a broad spectrum of botanical manuscripts; we are confident that this will continue. There will be no changes in journal format, publication frequency, or ISSN for both electronic and print formats, and the volume numbers will continue on from 2007.

Barry J. Shelp R. Larry Peterson

Co-Editor Co-editor

COMMUNIQUÉ

Nous sommes heureux d'annoncer qu'à compter de janvier 2008 (volume 86), la *Revue canadienne de botanique* s'appellera simplement *Botanique*. Nous conserverons toutefois la mention « Une revue internationale de biologie végétale ». Le changement découle de vastes consultations auprès de nombreux intervenants du milieu de la botanique et des Presses scientifiques du CNRC. Nous sommes reconnaissants de l'appui manifesté durant le processus de consultation. Nous croyons que ce changement de nom se traduira par un meilleur reflet de l'envergure internationale de la revue et qu'il encouragera la soumission d'un nombre accru d'excellents manuscrits par des chercheurs de partout dans le monde. La *Revue canadienne de botanique* est associée à une longue tradition d'excellence en ce qui touche la publication d'un large éventail de sujets en botanique; nous sommes persuadés que cette tradition se poursuivra. Le format de la revue, la fréquence de parution et les ISSN de la version électronique et de la version imprimée demeurent inchangés; le numéro de volume fera suite à celui de 2007.

Barry J. Shelp R. Larry Peterson
Codirecteur scientifique Codirecteur scientifique



The CBA/ABC needs you!

Two positions are open, 1. for President Elect and 2. for Treasurer. Please consider nominating a colleague or offering to let your name stand!

Professional service does carry some weight on a CV!

**Contact: Vipen Sawhney, Department of Biology,
University of Saskatchewan, Saskatoon, SK S7N 5E2 or
Email: Sawhney@admin.usask.ca**

What's New in Botany? - Graduate Student Research

A new item is coming to the CBA/ABC Bulletin! This is called "What's New in Botany?- Graduate Student Research" and will profile a graduate student and his/her research. If you would like to submit a profile, please send a photo of yourself, the name of your supervisor, where you are studying, and a summary of your research. Please keep within 250 words. It will be wonderful to hear from students and their exciting research! Please forward your profile to Dr. Jane Young (Ecosystem Science and Management, University of Northern British Columbia, 3333 University Way, Prince George, BC, V2N 4Z9) at youngj@unbc.ca .

Quoi de neuf en Botanique? Travaux de recherche des étudiants de cycles supérieurs

Une nouvelle section sera bientôt ajoutée au bulletin CBA/ABC! Elle aura pour titre « Quoi de neuf en Botanique? Travaux de recherche des étudiants de cycles supérieurs » et affichera le profil d'un étudiant qui décrit ses travaux de recherche. Si vous voulez soumettre votre profil, veuillez envoyer une photo de vous, le nom de votre superviseur, l'endroit où vous étudiez et un résumé de votre recherche. Le texte doit être d'une longueur maximale de 250 mots. Il nous fera grand plaisir d'en apprendre plus sur les étudiants et leurs travaux de recherche! Veuillez transmettre votre profil à Jane Young, PhD (Ecosystem Science and Management, University of Northern British Columbia, 3333 University Way, Prince George, BC, V2N 4Z9) ou au youngj@unbc.ca.

News From the Sections/Nouvelles des sections Mycology Section news:

Students of mycology and their professors are reminded to submit nominations for the Luella K. Weresub Memorial Award. This award was established in the memory of Dr. Luella Kayla Weresub (1919-1979), a well-known Canadian mycologist who had worked at the Biosystematics Research Institute of Agriculture Canada since 1957. Dr Weresub was a very active member of CBA/ABC, serving as a Director from 1971 to 1973. The award is open to all undergraduate or graduate students working with fungi. For more information or to submit nominations by the April 11, 2008 deadline, contact Dr. Hugues Massicotte, Ecosystem Science and Management Program, College of Science and Management, University of Northern British Columbia, Prince George, at hugues@unbc.ca.



Photo: M Coleman

Hugues Massicotte and Larry Peterson have collaborated with Darlene Southworth, Emeritus Professor, Department of Biology, Southern Oregon University to submit a proposal for a joint symposium on plant-fungal interactions as part of the Joint Annual Meeting of BSA, CBA/ABC, American Fern Society, and the American Society of Plant Taxonomists to be held July 26-30, 2008, at University of British Columbia in Vancouver, BC. The proposal has been accepted. Stay tuned.

Nouvelles du département de Mycologie :

Nous rappelons les étudiants en mycologie et leurs professeurs de soumettre les candidatures pour le prix Luella K. Weresub Memorial Award. Cette récompense a été créée à la mémoire de Luella Kayla Weresub, PhD (1919-1979), une mycologue canadienne bien connue qui a travaillé au Biosystematics Research Institute of Agriculture Canada depuis 1957. Luella Weresub, PhD était une participante active du CBA/ABC, en tant que Directrice de 1971 à 1973. Le prix est ouvert à tous les étudiants qui étudient la mycologie. Pour de plus amples renseignements ou pour soumettre des candidatures avant la date butoir du 11 avril 2008, communiquez avec Hugues Massicotte, PhD du programme Ecosystem Science and Management Program, du College of Science and Management, du University of Northern British Columbia, Prince George, au hugues@unbc.ca.

Hugues Massicotte et Larry Peterson ont travaillé de concert avec Darlene Southworth, professeure émérite, du département de Biologie du Southern Oregon University pour soumettre une proposition d'un symposium conjoint sur les interactions entre les plantes et les champignons dans le cadre de la Rencontre annuelle conjointe du BSA, CBA/ABC, de l'American Fern Society, et du American Society of Plant Taxonomists qui aura lieu du 26 juillet au 30 juillet 2008, à l'University of British Columbia in Vancouver, BC. La proposition a été acceptée. Restez à l'écoute.

Ecology section

Botany 2008 Lichens and Bryophytes Symposium



The Ecology Sections of CBA and BSA are bringing the event “**Lichens and Bryophytes of North America: Diversity, Function and Importance**”, for Botany 2008 in Vancouver. Planning is underway and symposium planners, Art Fredeen (fredeena@unbc.ca) and Kate Frego (frego@unbsj.ca) are currently identifying speakers and organizing the program. Cryptogams - plants that reproduce by spores, and particularly bryophytes and lichens - are increasingly recognized as important contributors to biodiversity and ecosystem function. Impacts of anthropogenic disturbances have been noted in forests, peatlands, and other systems, yet there are great gaps in our knowledge of their distribution, diversity and ecology. This symposium will pull together cryptogam researchers from across the continent and provide a unique forum and synthesis for this important but often over-looked group of organisms.

Symposium de Botanique 2008 sur les lichens et les bryophytes

Les départements de l'Écologie du CBA/ABC et du BSA organisent l'événement « **Lichens and Bryophytes of North America: Diversity, Function and Importance (Lichens et bryophytes de l'Amérique du Nord : diversité, fonction et importance)** », à la conférence Botanique 2008. La planification de l'événement est en cours et les planificateurs du symposium, Art Fredeen (fredeena@unbc.ca) et Kate Frego (frego@unbsj.ca) dénichent actuellement les éminents conférenciers et mettent sur pied un programme remarquable.

Les cryptogames - des plantes qui se reproduisent à l'aide de spores, et plus particulièrement les bryophytes et les lichens - sont d'importants participants à la biodiversité et au fonctionnement des écosystèmes. On peut observer les impacts des perturbations anthropiques sur les forêts, tourbières et autres écosystèmes, pourtant nous connaissons toujours très peu de choses sur leur répartition géographique et écologie.

Malgré les grands efforts déployés, par exemple dans le nord de l'Europe, on s'attaque à diverses questions de recherche actuellement en Amérique du Nord. Ce symposium rassemblera un grand nombre de chercheurs provenant des quatre coins du pays et offrira un forum de synthèse sur l'état des recherches sur les cryptogames.

Plant Development Section News

Students of structure and development and their professors are reminded to submit applications or nominations for the Taylor A. Steeves Award before April 11, 2008. This award was established to honour Taylor Steeves for his numerous contributions to the CBA and to botany. For more information or to submit applications or nominations, please contact Dr. Jane Young, Ecosystem Science and Management Program, University of Northern British Columbia, 3333 University Way, Prince George, BC, V2N 4Z9 or at youngj@unbc.ca.

Nouvelles du section du Développement des Plantes

Nous rappelons aux étudiants du domaine de la structure et du développement ainsi que leurs professeurs qu'ils doivent soumettre les candidatures pour le prix Taylor A. Steeves Award avant le 11 avril 2008. Ce prix a été créé afin d'honorer Taylor Steeves pour ses nombreuses contributions au CBA/ABC et au domaine de la botanique en général. Pour de plus amples informations ou pour soumettre les candidatures, veuillez communiquer avec Jane Young PhD, du programme Ecosystem Science and Management Program, du University of Northern British Columbia, 3333 University Way, Prince George, BC, V2N 4Z9 ou au youngj@unbc.ca.

News from the Teaching Section.

The joint meeting in Vancouver in 2008 will provide an opportunity for people to submit papers on innovative teaching ideas. We are hoping to have a joint session with the BSA of such papers. More details will appear in the next issue of the Bulletin. We would also like to congratulate Dr. Vipen Sawhney who was awarded the Master Teaching Award in the spring of 2007 at the University of Saskatchewan. In the award citation, Vipen was said to provide a perfect example of the teacher-scholar envisaged in the mission statement of the University of Saskatchewan. He has established a reputation as an outstanding teacher, all the while despatching administrative tasks with ease and maintaining a first rate research program, with a co-edited book and over 100 refereed papers to his credit. Also in the citation, Vipen is described as an amazing teacher by his students. His lectures, which combine overhead transparencies, videos, stories, humorous anecdotes and colourful power point presentations capture the imagination of his students and make biology come alive. His impact on undergraduate students is captured in the following quotation from a first year student. "Indeed, we all knew that he loved biology and that though his specialty was plants, he too had a favourite animal: the elephant. We also saw that he was quite a dancer, as he tried to show us how the living cell was not static, but rather dynamic. It was this passion for his work that first caught my attention." And later in the same letter, "So how has this affected my life as a student? It gave me a new sense of confidence. Dr. Sawhney turned me on to learning and really thinking rather than simply studying to ace an exam". Vipen Sawhney is a truly gifted teacher. But perhaps more importantly, he is a fine human being. He is kind and thoughtful, and always strives to improve the lives of those around him.

The full citation can be seen at <http://awards.usask.ca/faculty/sawhney.php>

Des nouvelles du Section de l'Enseignement

La conférence conjointe à Vancouver en 2008 sera l'occasion pour les gens de soumettre des articles sur de nouvelles théories d'enseignement novatrices. Nous espérons tenir une session conjointe avec le BSA pour discuter de ces articles. Nous publierons plus de détails à ce sujet dans la prochaine édition du Bulletin. Nous voulons également féliciter Vipen Sawhney, PhD qui a été récompensé du prix Master Teaching Award au printemps 2007 au University of Saskatchewan. Lors de la citation de son prix, Vipen a été nommé comme donnant le parfait exemple de la relation professeur étudiant, tel que décrit dans l'énoncé

De mission du University of Saskatchewan. Il a bâti une réputation de professeur remarquable, tout en s'acquittant de ses tâches administratives avec aisance et en maintenant un programme de recherche de premier ordre, en plus de la co-rédaction d'un livre et plus de

100 supervisions de travaux à son actif. Dans cette même citation, Vipen est décrit comme un enseignant formidable par ses étudiants. Ses exposés magistraux, qui combinent la présentation de transparents, de vidéos, d'histoires, d'anecdotes amusantes et de présentations Power Point colorées, capturent l'imagination de ses étudiants et rend la biologie aussi vivante qu'elle l'est en réalité. Son impact sur les étudiants de premier cycle se résume dans le témoignage suivant d'un de ses étudiants de première année. « En effet, nous savions qu'il se passionne pour la biologie et quoique sa spécialité demeure véritablement les plantes, il a également un animal favori : l'éléphant. Nous avons également découvert qu'il est un excellent danseur et il a tenté sans relâche de nous démontrer que la cellule vivante n'est pas statique mais plutôt, dynamique. C'est sa passion pour son travail qui a d'abord capté mon attention. » Et plus loin dans la même lettre : « et comment a-t-il influencé ma vie en tant qu'étudiant? Il m'a donné un nouveau sentiment de confiance en moi. Le professeur Sawhney m'a donné le goût d'apprendre et de réfléchir vraiment au lieu de simplement étudier pour réussir un examen ». Vipen Sawhney est un professeur réellement doué. Mais, plus important, il est un être humain remarquable. Il est gentil et attentionné, et désire toujours améliorer les vies de ceux qui l'entourent. Vous pouvez lire la citation intégrale au <http://awards.usask.ca/faculty/sawhney.php>



Dr. Vipen Sawhney

CBA/ABC Student Awards 2007/2008

~Awards for Papers published by Students~

Alf Erling Porsild Memorial Prize

Award honoring the memory of the eminent Arctic botanist Alf Erling Porsild. Applications/nominations for students who published a paper in plant systematics and/or phytogeography (as senior author) during the previous year should be sent to the current Chair of the Systematics and Phytogeography Section of the CBA/ABC (Dr. Tim Dickinson, Dept. of Natural History, Royal Ontario Museum, 100 Queen's Park, Toronto ON M5S 2C6) *before April 11th 2008.*

J. Stan Rowe Award

Award established to celebrate the life and work of Stan Rowe, eminent Canadian Plant Ecologist. Applications/nominations for students who published a paper in plant ecology in 2007 should be sent to the current Chair of the *Ecology* Section of the CBA/ABC (Dr Paul Catling, Eastern Cereal and Oilseed Research Centre, Biological Resources Program, Agriculture and Agri-food Canada, Ottawa, Ontario K1A 0C6) *before April 11th 2008.*

Taylor A. Steeves Award

Award established to honour Taylor Steeves' numerous contributions to the CBA/ABC and botany. Applications/nominations for students who published a paper in plant development in 2007, structure or morphology should be sent to the current chair of the *Plant Development* Section of the CBA/ABC (Dr. Usher Posluszny, Department of Molecular and Cellular Biology, University of Guelph, Guelph, ON N1G 2W1) *before April 11th 2008.*

Luella K. Weresub Memorial Award

Award established in memory of Dr. Luella Kayla Weresub, a well-known Canadian mycologist who worked at the Biosystematics Research Institute of Agriculture Canada. The award is open to all undergraduate or graduate students working on fungi. Applications/nominations for students who published a paper in fungal biology in 2007 should be sent to the current chair of the *Mycology* Section (Dr. Hugues Massicotte, Ecosystem Science and Management Program College of Science and Management, University of Northern British Columbia, Prince George, BC V2N 4Z9) *before April 11th 2008.*

Please refer to CBA/ABC website (cba-abc.ca) for eligibility details

CBA/ABC 2008 Conference Awards

John Macoun Travel Bursary

Award established to provide partial financial assistance for travel to the Annual Meeting to a student (or students) presenting a paper in the Lionel Cinq-Mars competition or a poster in the Taylor competition.

Eligibility:

1. Open to all student members of CBA/ABC.
2. Students must present a paper (Lionel Cinq-Mars competition) or a poster (Taylor competition) at the Annual CBA/ABC Meeting.
3. No student may receive more than one travel bursary while registered for the same degree.
4. Students must apply no later than the submission deadline for abstracts to the Annual Meeting.
5. The application must contain the following documents:
 - a. A copy of the abstract of the paper to be given at the Annual Meeting in the Cinq-Mars Competition;
 - b. A supporting letter from the student's Supervisor of research that also includes a statement that the student is engaged in a MSc. or Ph.D. program;
 - c. The student's curriculum vitae (one page);
 - d. A letter of recommendation from a member of the student's research committee (not the Supervisor)
6. Applications should be sent the President of CBA/ABC (Dr Christian Lacroix, Dean of Science, University of P.E.I., Charlottetown PEI, C1A 4P3, Email: lacroix@upe.ca)

Lionel Cinq-Mars Award

Award for the best oral presentation by a student of his or her own research, as a contributed paper at the Annual Meeting.

Eligibility:

Any bona fide (under-)graduate Canadian student enrolled at a Canadian institution of higher learning, as well as Canadian students at foreign institutions, are eligible. Every effort will be made to ensure that each student in the competition has a fair evaluation and an equal chance of winning the award.

Oral presentation will be evaluated by a panel of judges (at least one from each CBA/ABC section) chaired by the President-Elect. The merit of each paper will be judged on the basis of content (60%) and presentation (40%). All students who wish to compete for this award must indicate this by checking the appropriate box on the abstract form. Abstracts must be submitted for the Annual Meeting at which the student will compete for the Award.

Iain and Sylvia Taylor Award

Award for the best student research poster presented at the CBA Annual Meeting.

Eligibility:

Any bona fide (under-)graduate Canadian student enrolled at a Canadian institution of higher learning, as well as Canadian students at foreign institutions, are eligible. Every effort will be made to ensure that each student in the competition has a fair evaluation and an equal chance of winning the award.

Posters will be evaluated by a panel of judges chaired by the Vice-President of CBA/ABC. All students who wish to compete for this award must indicate this by checking the appropriate box on the abstract form. Abstracts must be submitted for the Annual Meeting at which the student will compete for the Award.

Please refer to the Botany 2008 website (<http://www.botanyconference.org/>)
for abstract submission details and deadlines

ABC/CBA Prix Étudiants 2007/2008

~Prix pour les articles publiés par les étudiants~

Le Prix Commémoratif Alf Erling Porsild

Prix honorant la mémoire de l'éminent botaniste de l'arctique Alf Erling Porsild. La mise en candidature d'étudiants ayant publié un article en phytogéographie ou systématique végétale (comme auteur principal) durant l'année précédente devrait être envoyée au président de la section systématique et phytogéographie des plantes de l'ABC/CBA (Dr. Tim Dickinson, Dept. of Natural History, Royal Ontario Museum, 100 Queen's Park, Toronto ON M5S 2C6) *avant le 11 avril 2008.*

Le prix J. Stan Rowe

Prix établi pour célébrer la vie et le travail de Stan Rowe, éminent écologiste canadien des plantes. La mise en candidature d'étudiants ayant publié un article en écologie végétale durant l'année précédente devrait être envoyée au président de la section écologie de l'ABC/CBA (Dr Paul Catling, Eastern Cereal and Oilseed Research Centre, Biological Resources Program, Agriculture and Agri-food Canada, Ottawa, ON K1A 0C6) *avant le 11 avril 2008.*

Le prix Taylor A. Steeves

Prix établi pour honorer les nombreuses contributions de Taylor Steeves à la botanique et à l'ABC/CBA. La mise en candidature d'étudiants ayant publié un article en développement, structure ou morphologie végétales devrait être envoyée au président de la section développement végétal de l'ABC/CBA (Dr. Usher Posluszny, Department of Molecular and Cellular Biology, University of Guelph, Guelph, ON N1G 2W1) *avant le 11 avril 2008.*

Le prix commémoratif Luella K. Weresub

Prix établi en mémoire du Dr. Luella Kayla Weresub, une mycologue canadienne reconnue qui travailla à l'Institut de recherche en biosystématique d'Agriculture Canada. Cette compétition est ouverte à tous les étudiants de premier cycle ou diplômés qui travaillent sur les champignons. La mise en candidature d'étudiants ayant publié un article en mycologie devrait être envoyée au président de la section mycologie (Dr. Hugues Massicotte, Ecosystem Science and Management Program College of Science and Management, University of Northern British Columbia, Prince George, BC V2N 4Z9) *avant le 11 avril 2008.*

S'il vous plaît visiter le site web de l'ABC/CBA (cba-abc.ca) pour les détails d'éligibilité

ABC/CBA 2008

Prix de conférence

Bourse de Voyage John Macoun

La bourse a été établie pour aider à défrayer une partie des coûts de déplacement à la réunion annuelle pour un(e) étudiant(e) (ou des étudiants) qui présentent une communication orale dans la compétition Cinq-Mars ou une affiche dans la compétition Taylor.

Eligibilité:

1. Ouvert à tous les membres étudiants de l'ABC/CBA.
2. Les étudiants doivent présenter une communication orale (compétition Cinq-Mars) ou une affiche (compétition Taylor) à la réunion annuelle de l'ABC/CBA.
3. Aucun étudiant ne peut recevoir plus d'une bourse de voyage pendant qu'ils (elles) sont inscrits(es) au même programme d'étude.
4. Les étudiants doivent soumettre leur candidature avant la date limite de soumission des résumés à la réunion annuelle.
5. L'application doit contenir les documents suivants:
 - a. Une copie du résumé de la communication prévue à la réunion annuelle pour la compétition Cinq-Mars;
 - b. Une lettre de support du directeur de thèse de l'étudiant(e) qui inclue aussi une déclaration que l'étudiant est inscrit à un programme de maîtrise ou de doctorat;
 - c. Le curriculum vitae de l'étudiant (une page);
 - d. UNE lettre de support d'un membre du comité de direction de l'étudiant (autre que le directeur)
6. Les demandes devraient être envoyées au président de l'ABC/CBA (Dr Christian Lacroix, Dean of Science, University of PEI, Charlottetown PEI, C1A 4P3, E-mail : lacroix@upe.ca

Le prix Lionel Cinq-Mars

Décerné à un(e) étudiant(e) pour la meilleure présentation orale de son propre projet de recherche, présenté à la réunion annuelle.

Eligibilité:

Tout membre étudiant(e) de premier cycle ou diplômé inscrit(e) dans une institution canadienne d'études supérieures, ou membre étudiant(e) canadien(ne) d'une institutions étrangères, est éligible. Tous les moyens nécessaires seront employés afin d'assurer que chaque étudiant(e) participant à la compétition reçoive une évaluation juste et une chance égale de gagner la compétition.

La présentation orale sera évaluée par un comité de juges (au moins un représentant de chaque section de l'ABC/CBA) sous la direction du président élu. Le mérite de chaque communication sera jugé sur le contenu (60%) et la présentation (40%). Tous les étudiants qui souhaitent participer à cette compétition doivent indiquer leur intention en cochant la case appropriée sur le formulaire de soumission du résumé. Les résumés doivent être soumis pour la réunion annuelle à laquelle l'étudiant participera à la compétition.

Le prix Iain et Sylvia Taylor

Décerné à un(e) étudiant(e) pour la meilleure affiche présentée à la réunion annuelle.

Eligibilité:

Tout membre étudiant(e) canadien(ne) de premier cycle ou diplômé inscrit(e) dans une institution canadienne d'études supérieures, ou membre étudiant(e) canadien(ne) d'institutions étrangères, est éligible. Tous les moyens nécessaires seront employés afin d'assurer que chaque étudiant(e) participant à la compétition reçoive une évaluation juste et une chance égale de gagner la compétition.

Les affiches seront évaluées par un comité de juges sous la direction du vice-président de l'ABC/CBA. Tous les étudiants qui souhaitent participer à cette compétition doivent indiquer leur intention en cochant la case appropriée sur le formulaire de soumission du résumé. Les résumés doivent être soumis pour la réunion annuelle à laquelle l'étudiant participera à la compétition.

S'il vous plaît visiter le site web Botany 2008 (<http://www.botanyconference.org/>) pour les détails de soumission de résumés et les dates limites

Obituary

Anwar Maun 1935-2007

By Dianne Fahselt

We are sorry to say that Dr. Anwar Maun, Professor Emeritus at the University of Western Ontario, died on September 24, 2007. He had quietly and good-naturedly suffered Lyme disease for many years, and complications arising from that malaise proved his undoing. Although particularly weakened in his last months he was still engaged in writing his book on sand dunes of the world, reviewing manuscripts, directing home improvement projects and dune-walking. He was taken to hospital at the end of July, with acute ascites, and never really emerged into normal life again. Anwar was born January 1, 1935 into a farming family in Pakistan. He spent his childhood and youth in an agricultural setting and was familiar with field crops as well as the workings of buffalo and camels. He was also exposed in early life to the atrocities that accompanied partitioning of India and Pakistan. Scholarship was encouraged and he was an excellent student, and enrolled in Punjab University in Lahore, where he received a Merit Scholarship as well as both B.Sc. and his first M.Sc. His Masters research focused on the effects of the time of sowing and various cultural factors on the yield of maize, and as a result of his work the overall yield of maize was improved in the Canal Colony of that province. He was a "distinguished member" of the college basketball team and granted the privilege of wearing "the colors". He graduated from PU in 1958. His next masters program was undertaken at the American University of Beirut during a time when Lebanon was green and beautiful, and Moslems and Jews intermarried and lived together in peace. Here at AUB he received one of the few available Open Scholarships and was described by his supervisors as an outstanding graduate student. In 1963 he earned a second M.Sc., this in Agriculture- Plant Pathology, which was based on his research on improving the yield and quality of four annual forage plants.

Following his years in Lebanon he returned for a short time to Pakistan before temporarily leaving his young daughters and heading for Washington State University on an exchange scholarship, won in Pakistan. There he enrolled in a Ph.D program in an Agronomy Department, but his course work included several ecology offerings by the renowned R.L. Daubenmire. Clearly the Daubenmire field trips in the mountains and prairies of the Pacific Northwest heightened Anwar's fascination with natural systems. His research at WSU concerned the influence of temperature on floral induction, pollen viability and seed set of cool-season grasses, and his results were described in five papers published in *Agronomy Journal* and in *Crop Science*. He graduated with his Ph.D in Crop Ecology in early 1968 and then moved to the University of Western Ontario, London, Canada, where he taught and researched for 35 years.

At UWO he contributed significantly to undergraduate and graduate teaching in ecology, and launched a large important second-year population biology course for undergraduates as well as an innovative interdisciplinary Environmental Science Graduate program, bringing together faculty from six departments and five faculties (Science, Social Science, Engineering, Law and Medicine). He was the Director of this program for seven years until his retirement in 2000. When first at UWO he was a post-doctoral fellow and worked on weeds, but later as he moved through the professorial ranks abandoned the agricultural side of life and started to research dune ecosystems. His first published papers were mostly applied, but after launching an extensive program of dune ecology on the shores of Lake Huron his dune contributions began to appear. The first five were published in 1981, and mainly concerned ecology of the grasses, *Ammophila breviligulata* and *Calamovilfa longifolia*.

In his career at UWO, Anwar supervised the work of 27 graduate students and two postdoctoral Fellows. One of his students was awarded the **J.S. Rowe Award in 1997** for the best student paper published in 1996 in the *Journal of Ecology*, 84 1-7.

For his extensive achievements related to dune systems he was awarded the prestigious George Lawson Medal by the Canadian Botanical Association in 1997. Other awards include a **Certificate of Recognition by the Ontario Government in 1993** for 20 years of Dedicated assistance in the development of Resource Management Programs in the Pinery and Ipperwash Provincial Parks, an **Award of Teaching Excellence in Plant Ecology** by the University Students Council at UWO in 1995-6, and in 2003 Anwar was awarded **Recognition of 25 years of Excellence in Research** by the president, Natural Sciences and Engineering Research Council of Canada

Anwar was the author of more than 100 scientific papers and articles, with the majority focused on sand dune ecology, a field in which he became recognized as a world expert. Among the many topics addressed by him and his students in the course



Anwar Maun in his office. Photo: D Fahselt



Anwar, the botanist. Photo: D Fahselt

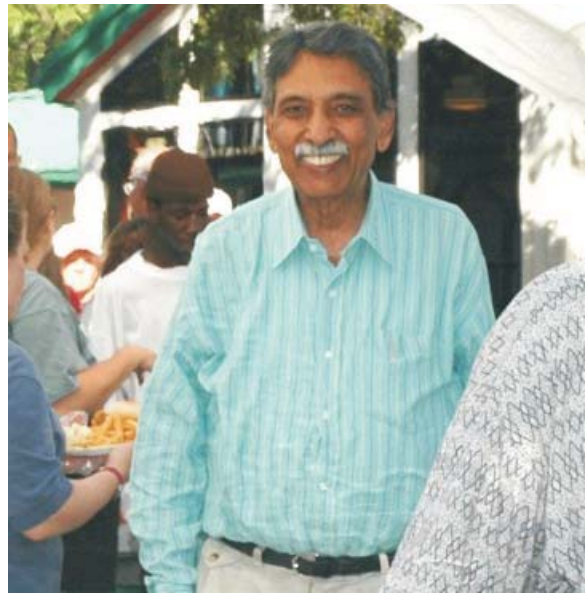
of dune research were burial and emergence from sand (e.g., Zhang & Maun 1990), dune stabilization through planting (e.g., Maun & Krajnyk 1989), browsing and predation (e.g., Gedge and Maun 1994), intrapopulation variation (e.g., Hawke & Maun 1988) and allelopathy (Yun & Maun 1997). Other facets of his dune work explored interactions involving mycorrhizae (e.g., Little & Maun 1996), white-tailed deer (Phillips & Maun 1997) and threatened or rare species (e.g., Maun 1997). His opus magnum on sand dune ecology is nearly finished and will be published by Oxford University Press. He traveled widely to present his work, consult and examine student theses involving dune vegetation. He spent one sabbatical at the University of California, Davis (1981) and another at the Institute for Ecological Research in Oostvoorne, Holland (1988-1989) and was for many years an Associate Editor of the Canadian Journal of Botany, in addition to being on the editorial board of the Journal of Coastal Research. He also reviewed papers submitted for publication to more than ten other international journals.

Anwar was a member of many academic and professional societies: British Ecological Society, Botanical Society of America, Canadian Botanical Association, Federation of Ontario Naturalists, McIlwraith Field Naturalists Club, Ecoscience, Environmental Reviews, Canadian Water Resources Association Scholarship Committee, Lake Huron Centre for Coastal Conservation and he served on the Board of Directors for Friends of the Pinery.

Although he only acted as departmental chair for one year he was a bright light among administrators, distinguishing himself by kindness, fairness, far-sightedness and a dogged determination to make things better. He co-ordinated the departmental graduate education committee for many years, and also served as chair of the undergraduate teaching committee, as well as of many other major committees, both in the department and the Faculty of Science.

He was interested in and collected art, particularly Inuit lithographs and Pakistani carpets, and skilled in photography and woodworking. He kept a close eye on the wildlife in his chemical-free backyard, and had a weakness for birds, along with, strangely enough, whales. He participated in the Islamic Society of North America and was one of its highly respected officers.

Anwar's love and passion for the dunes was unwavering. During the last few years, in spite of his health, Anwar went to the dunes several times each year and it gave him tremendous pleasure and happiness to visit his beloved dunes. He left many projects undone and many pleasures still anticipated. He will be missed greatly all across Canada, in Pakistan and in the numerous other parts of the world where his insight, abilities, and spectacular smile earned him enthusiastic followings.



Anwar volunteering at a Friends of the Pinery BBQ, July 2006; Photo: I. Krajnyk

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Anwar was well known by his fellow CBA/ABC members and many have expressed sadness at this loss to the Association. This message was received from Jennifer Shay

It was with sadness that I read of the death of Dr. Anwar Maun. He was a quiet, unassuming gentleman with a profound knowledge of sand dunes.

Despite suffering from Lyme disease, Dr. Maun generously accepted the role of External Examiner for my last PhD student. He was most generous in his comments about the candidate and her thesis. There are few in his area of expertise. He will be greatly missed.

Jennifer Shay



Engelmann's Quillwort

Paul Heydon

Paul Heydon is a contract botanist working with Parks Canada in Peterborough, Ontario.

One might ask what is an Engelmann's quillwort (*Isoetes engelmannii*)? Engelmann's quillwort is an aquatic fern ally (pteridophyte) that is a member of the family Isoetaceae (Figure 1). It is listed as an endangered species in Canada and has had the COSEWIC status of endangered in Canada since 1992. Plans are underway to also have it designated as endangered provincially in Ontario. Quillworts have a long fossil record dating back to the early Triassic Period, which occurred 248-206 million years ago when dinosaurs and mammals first appeared on the time line. Quillworts are easily recognized as a genus but species are hard to identify based on their appearance. Quillworts have relatively few physical features as they consist of grass-like leaves that arise from a two- or three-lobed corm that is buried in the soil (Figure 2). Identification is done through examination of the ornamentation of the megaspores, which in Ontario are mature at the end of August and remain on the plants until the leaves bearing megasporangia are sloughed off in November.

Engelmann's quillwort (*Isoetes engelmannii*) is usually found in shallow water (less than 134 cm deep) near the shoreline in areas with minimal competition from other plant species, although sometimes they are found on wet ground on the shoreline. The aquatic substrate most commonly associated with quillwort is a sandy clay loam. Currently this species is only known to exist in two Canadian locations, both of which are in Ontario (Figure 3). These populations are found at the Big Chute Muskoka District and Simcoe County and at the Gull River, West Guilford, in Haliburton County areas (Figure 3). Both Ontario populations contain approximately 1450-1500 individuals.

In the two Ontario populations Engelmann's quillwort occur in mixed populations with other quillworts, including the common spiny-spored quillwort (*I. echinospora*). The association between the two species leads to the production of the sterile hybrid, Eaton's Quillwort (*Isoetes* × *eatonii*) (Figure 4). The presence of the more robust sterile hybrid is usually confirmation of the presence of the Engelmann's quillwort. The first collection of Eaton's quillwort in the Trent-Severn River was in 1974 by R. Bobbette and 1989 in the Gull River by D. F. Brunton.

These populations are thought to be remnants from the last glaciation. The popular theory is that the Canadian populations of Engelmann's quillwort are disjunct from the North American range of the species. It is postulated that the distribution of the Engelmann's quillwort in the Great Lakes Region of North America is related to dramatically different drainage patterns that existed following the end of the Wisconsin glaciation (Engelmann's Quillwort Recovery Team, 2005). This pattern of distribution is shared by an array of shoreline and aquatic species which are disjunct from their primarily Atlantic Coastal Plain range. Finally, there is no documentation of Engelmann's quillwort (or any quillwort species) being inadvertently transported in the wild in North America.

Engelmann's quillwort is most abundant in the eastern United States along the Atlantic coastal plain. The U.S.

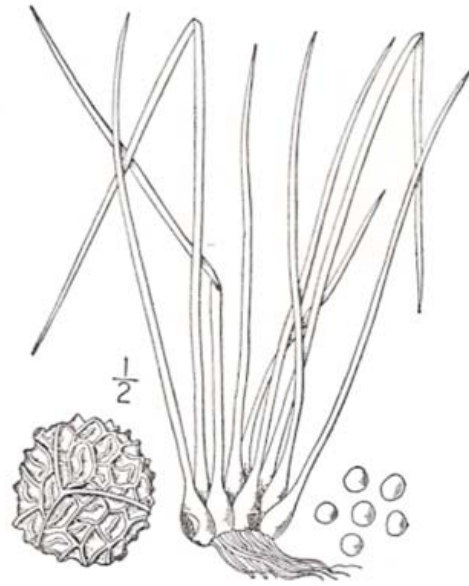


Figure 1. Engelmann's quillwort (*Isoetes engelmannii*) from Britton and Brown (1970)



Figure 2. Mixed population of spiny-spored (*Isoetes echinospora*), Eaton's (*I. x eatonii*) and Engelmann's quillwort (*I. engelmannii*) at Big Chute Muskoka. Photo by Paul Heydon.

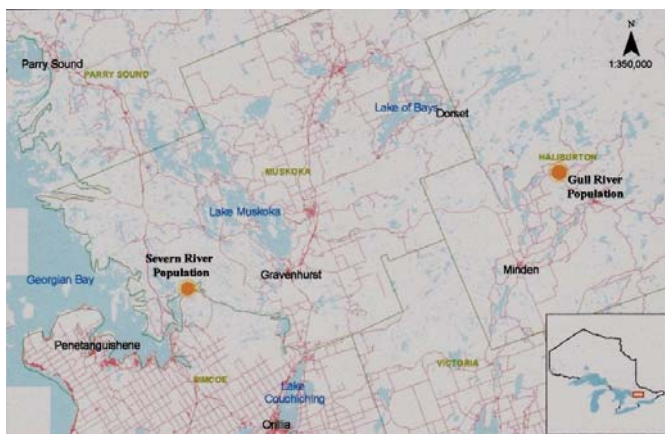


Figure 3 The two locations for Engelmann's Quillwort in Ontario.



Figure 4. Megaspores, from left to right, of Eaton's, spiny-spored and Engelmann's quillwort.

populations are in decline, however, and the species has become extirpated in a number of states (Brunton, 2003). According to Taylor et al. (1993) Engelmann's quillwort populations have declined throughout the northern portion and western portions of its North American range. Threats to these remaining quillwort populations include increased nutrient levels and habitat degradation. Both Ontario populations have been studied for the last three years through a joint effort between Parks Canada and Trent University. There have been extensive ecological and genetic studies performed by a contracted ecologist and geneticist. This was the first ever North American ecological study of quillwort. The ecological study looked at a number of water quality parameters, population estimates, associated plants and soil textures to determine which factors affect the distribution and abundance of the Engelmann's quillwort. It is thought that low phosphorus levels, low competition, ice scour, and fresh (not stagnant) flowing water could be the most important factors. In the Ontario populations they are generally found in high quality (oligotrophic) water bodies and are considered to be an indicator of high species diversity. The genetic analysis by Martha Coleman has supported the theory that Engelmann's quillwort is a survivor from the last glaciation as the genetic make-up was unique compared to the US populations. The LEAFY homolog genes of the Canadian populations are different from their American counterparts.

Funds for this project were provided (in part) by the Parks Canada Species at Risk Recovery Action education fund, a program supported by the national strategy for the protection of species at risk

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2007 Ontario Honours Biology Conference winners



From Left to right. Lucy Lee, Sean Delanghe from Wilfred Laurier University, Jon Midwood, McMaster and Pat Chow Fraser, conference organiser. For details see page 55

NATIVE PLANT EMBLEMS OF CANADA

5. NEW BRUNSWICK

E. Small and P.M. Catling, National Environmental Program, Biodiversity Section, Agriculture and Agri-Food Canada, Saunders Bldg., Central Experimental Farm, Ottawa ON K1A 0C6



FLORAL EMBLEM: PURPLE VIOLET (MARSH BLUE VIOLET)



Fig. 1. Purple violet (*Viola cucullata*), by Lavonia R. Stockelbach (1874-1966). A collection of her paintings of Canadian provincial official flowers is associated with the herbarium of Agriculture and Agri-Food Canada in Ottawa.

SYMBOLISM

With the violet as the official provincial flower, New Brunswick has become associated with the finest of human sentiments. The violet is a prevailing symbol of love. The

symbolism of violet flowers includes: blue = faithfulness, fidelity, and love; white = purity of sentiment; small white = candour and innocence; sweet violet (*V. odorata*) = modesty and humility (in general violets were considered a symbol of humility because they grew close to the ground). By the Victorian era violets represented the qualities of an ideal wife: humility, faithfulness, and modesty.

The famous romance of Queen Victoria (1819-1901) and Prince Albert (1819-1861) was associated with violets. She wore a posy of violets on her dresses. He never walked through the gardens at Windsor Castle without picking a bunch of violets.

An even more celebrated love story that was intimately associated with violets concerns Napoleon Bonaparte (1769-1821) and Josephine (1763-1814). Napoleon's favourite flower was the violet, perhaps because it reminded him of his childhood in the woods of Corsica. He met Josephine at a ball, where she wore a coronet of violets and carried a bouquet of violets, which she threw to him from her carriage while departing. In memory of this, she wore a wedding gown embroidered with violets, and he gave her violets on each anniversary of their wedding. When he was sentenced to live out his days on the island of Elba, he told his followers that he would return in the spring, with violets. Napoleon's supporters sometimes determined people's political views by asking "Do you like violets?" In 1815, Napoleon returned to the royal palace in Paris, showered by violets. Accordingly, he was called by his followers *Caporal Violette* ("Corporal Violet") and *Papa-Père la Violette* ("Daddy Violet"), and the violet was adopted as the emblem of the Imperial Napoleonic party. After Josephine's death, Napoleon had her grave covered with violets. He kept some of them along with a lock of Josephine's hair in a locket near his breast until he died. Napoleon's life-long grief over the loss of Josephine, however, did not prevent his remarriage to Eugenie, who he first saw at a ball, wearing a violet gown and violets in her hair. Like Josephine, she carried violets at her wedding and received bouquets of them at her anniversaries. When the French monarchy was restored, the wearing of violets was banned, and until 1874 French governments forbade any reproduction showing a violet, the symbol of Bonaparte supporters. Nevertheless, the violet flourished in the early days of the French Republic. France was flooded with postcards picturing innocent-looking violets with Napoleon's portrait cleverly hidden among the flowers.

In southern Germany during the Middle Ages, the violet was a symbol of spring. The discovery of the first violet to emerge triggered rejoicing. It was tied to a stake and a festival was held in its honour.

LATIN NAMES

Viola cucullata Ait.

The genus name *Viola* traces to the old Latin word for the plant, *viola*, which is based on the Greek word for violet, *ion* or *vion*. Io or Ione was a nymph in Greek mythology, a mistress of Zeus who, to protect her from the jealousy of his wife, turned Io into a white cow. To console her and sweeten her diet, he turned her tears into violets for her to graze on. The epithet *cucullata* in the scientific name is Latin for hooded, descriptive of the young leaves, which take the shape of a hood with inrolled basal lobes.

ENGLISH NAMES

The purple violet is also known as blue marsh violet, hooded blue violet, long-stemmed marsh violet, marsh blue violet, marsh violet, and meadow violet. Although the most widely used name is marsh blue violet, we use the name purple violet because this name is used in provincial legislation and it is the name used in discussions of the floral emblem.

FRENCH NAMES

Violette cucullée.



Fig. 2. Coat of Arms of New Brunswick. The floral base is made up of purple violets and fiddleheads (*Matteuccia struthiopteris*, a fern with edible young leaves, common in New Brunswick). At the summit, a crowned Atlantic salmon leaps from a coronet of gold maple leaves. The golden lion is symbolic of ties to England. The white-tailed deer at the left carries the Union Jack, the deer at the right has fleurs de lis, respectively indicating the province's British and French backgrounds.



b. Foreign

The violet is the national symbol of Poland, and the regional symbol of North Portugal. The state flower of Wisconsin is the wood violet (*V. papilionacea*; "wood violet" is more commonly applied to an Old World species of violet). This species is native to a large area of North America, including of course Wisconsin. The wood violet was nominated for state flower by school children in 1908, and in 1909 was named Wisconsin's unofficial state flower. In 1948 during Wisconsin's Centennial celebration it was adopted as the official Wisconsin flower (taking effect in 1949). The state flower of New Jersey is the common meadow violet (*V. sororia*), a native species widespread in North America. This violet was first unofficially designated as such by a resolution of the Legislature in 1913, but was not officially recognized until 1972. The native American violet, *V. palmata*, was adopted in 1968 as the state flower of Rhode Island. Illinois adopted the "blue violet" as its state flower in 1908. As there are at least eight native blue-flowered violet species in the state, no particular species can be identified. The most common of these is the dooryard violet (*V. sororia*), but then Rhode Island and New Jersey would have the same emblem.

APPEARANCE

The purple violet is a perennial herb that grows from a fleshy, branching rhizome (underground stem). The plants spread vegetatively to some extent, the rhizomes often splitting and developing several crowns. *Viola cucullata* lacks an above-ground branching stem, and the flowers are produced on long stalks arising from the ground. The plants develop a clump of basal leaves, and are usually 12-25 cm (5-10 inches) tall. The petioles (leaf stalks) tend to be longer than the leaf blades, which are up to 10 cm (4 inches) long. The leaf blades are usually more or less acutely pointed at the tip, and often heart-shaped at the base, while the edges have round teeth or are almost smooth. The slender flowering stalks are produced from early spring to late summer, each bearing one usually deep blue-violet flower about 2 cm (3/4 inch) wide. The flowers may also be white, pale lilac, or rosy pink, and they lack fragrance. After fertilization they develop into cylindrical-ovoid, green, fruiting capsules 10-15 mm (about 1/2 inch) long, containing black, spherical seeds.

Fig. 3. Painting of purple violet (*Viola cucullata*) in its natural setting, from the Walter Coucill Canadian Centennial official flowers of Canada series (see Coucill 1966 cited in #1 of this series). Reproduced with the permission of the copyright holders, the Coucill family.

CLASSIFICATION

Family: Violaceae (violet family).

Violets are species of the genus *Viola*, of which there are 400 to 500 in the world, including about 80 native to North America, about 40 of these in Canada. With so many species, many of which hybridize, identification can be difficult. *Viola cucullata* can usually be recognized by the following combination of characteristics: heart-shaped, unlobed leaf blades as broad or broader than long; smooth leaf surfaces with fine hair only on the upper side of the basal lobes; lack of an aerial stem (flowers and leaves arising directly from the rootstock at ground level); blue flowers carried above the leaves; pointed sepals; and club-shaped hairs on the inside of the lateral petals. Similar species are moderately or densely pubescent or have flowers at the same level as the leaves and tend to have the sepals blunt or obtuse instead of sharply pointed. The similar *V. nephrophylla* has hairs on the spur petal, unlike *V. cucullata*, and its first leaves are kidney-shaped.

Viola cucullata var. *microtitis* has sepals with basal auricles ("ears") that are relatively short (ca. 2 mm long), in contrast to var. *cucullata* in which the auricles measure up to 6 mm in length. Plants with white flowers have been called forma *albiflora*, while plants with blue and white mottled petals have been called forma *thurstoni*. The purple violet hybridizes with the wooly blue violet (*V. sororia*), the hybrids having hairy leaves and sepals with cilia (hairs), unlike purple violet (which may have leaves that are slightly pubescent). *Viola cucullata* also hybridizes with 10 other species of violets based on literature reports.

Hybrids involving *Viola cucullata*; followed by the meanings of the hybrid names.

V. H bissellii House (*cucullata* H *papilionacea*); after Charles Humphrey Bissell 1857-1925.

V. H insessa House (*cucullata* H *nephrophylla*); meaning "fixed."

V. H consocia House (*cucullata* H *affinis*); meaning "interrelated."

V. H conturbata House (*cucullata* H *sororia*); meaning "confused."

V. H melissaefolia Greene (*cucullata* H *septentrionalis*); meaning "Melissa-leaved."

V. H porteriana Pollard (*cucullata* H *fimbriatula*); after Thomas Conrad Porter, 1822-1901.

V. H festata House (*cucullata* H *saggitata*); referring to festal attire.

V. H greenmani House (*cucullata* H *triloba*); after Jesse Moore Greenman, 1867-1950.

V. H ryoniae House (*cucullata* H *palmata*); after Angie M. Ryon, 1867-1948.

V. H notabilis Bicknell (*cucullata* H *brittoniana*); meaning "notable."

V. cucullata H *viarum* (not a named hybrid)

GEOGRAPHY

Viola cucullata is native in Canada from Newfoundland to northwestern Ontario. It also occurs in the eastern US, from Minnesota and Nebraska south to North Carolina, Georgia, Tennessee, Missouri, and Arkansas.

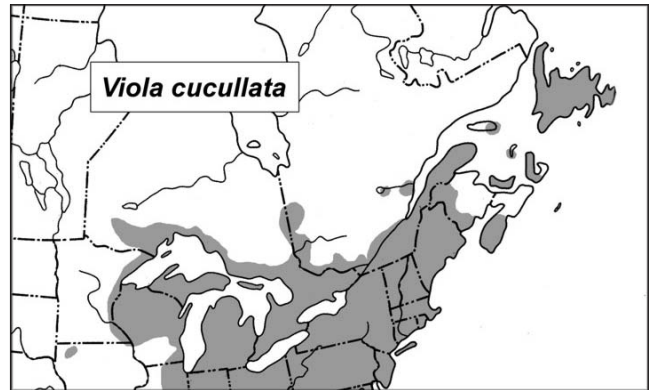


Fig. 4. Canadian distribution of purple violet (*Viola cucullata*).

ECOLOGY

Habitat

The purple violet can occupy dry hillsides but is more often found in wet meadows and woodlands, bogs, marshes, and swampy, shaded woods or forests. It usually roots in muck soils in low, wet areas, the roots generally submerged in water or in saturated humus. The pH of the soil is 4.6-6.6 (strongly acidic to slightly acidic). The plants prefer a cool climate, and do well in partial or deep shade.

Inter-species Relationships

Violets bloom early in the season, furnishing nectar for bees and butterflies. They are often grown in butterfly gardens, not just for the nectar, but also because the foliage is consumed by some caterpillars, notably fritillaries, which are large, attractive orange-and-brown summer butterflies sometimes confused with monarchs and viceroys.

Pollination & Dispersal

Many species of *Viola* produce normal, showy, cross-pollinated (*chasmogamous*) flowers in the early spring, and also closed, self-pollinating (*cleistogamous*) flowers that lack petals throughout the summer. This phenomenon occurs in at least 56 families of plants. In most such species open flowers are large and showy, attracting insects for cross-pollination, whereas the closed flowers are much smaller and produce seeds by self pollination and fertilization within the flower buds as insurance against the possibility that insects will not be available for pollination, with the result that seeds will not be produced. The showy flowers are advantageous in producing variable offspring, some of which will be more adapted than their parents, especially to changing conditions. In some cases the fruits of the purple violet are produced mostly from cleistogamous flowers.

The lower pair of petals in the cross-pollinated flowers are joined and form a spur (a hollow, tubular extension). Nectar is secreted into the base of the spur from the bases of the lowest two stamens. In trying to reach the nectar, insects brush against the stigma, often transferring pollen to it that has been acquired from previous visits to other flowers.

The purple violet, like many other species of *Viola*, has two special methods for distributing its seeds. First, there is a short-distance dispersal method, by which seeds are explosively ejected from the capsules. As the valves of the capsule dry, an elastic tension is produced and they suddenly open lengthwise, catapulting the seeds up to a few metres. The plants also have a long-distance dispersal method, based on a mutually beneficial relationship with ants. The violet seeds have nutritious, pale-colored, oily attachments that attract the ants, which carry the seeds back to their underground nests. Seeds that the ants lose along the way or that become buried in the ants' tunnels, often germinate far away from the parent plants. Violet seeds may also be distributed over great distances by birds.



Fig. 5. Purple violet (*Viola cucullata*), by Brad Morrison. Reproduced with the permission of Communications New Brunswick.

USES

The common phrase “shrinking violet,” applied to shy people, draws attention to the inconspicuous nature of the plants. Nevertheless their subtle beauty is extremely attractive. They were among the first flowers grown commercially, with nurseries established in Greece about 400 BC. The purple violet is often grown as an ornamental. There are numerous cultivars (e.g. Alba, Bicolor, Priceana, Queen Charlotte, Red Giant, Royal Robe, Rubra, White Czar), including one with the curious name of Freckles, which has blue-flecked white flowers.

North American Indians employed purple violet roots in remedies for senility, urinary disorders, and other ailments; and the leaves as a poultice to treat headaches and as infusions or “teas” for colds and coughs.

The use of violets as food is ancient, although very limited, extending back to early Greek and Roman times, when violets were used to flavour butter, oil, vinegar, and wine. Violet-flavoured sherbet has been a favourite concoction of Asia Minor and other parts of the Middle East since very early times, some considering this the national drink of Syria and Turkey. In the 15th century, violets were often used in sauces and soups, and to make fritters, and some members of the Royalty in Great Britain during the Victorian era were extremely fond of violet preparations.

The young leaves of purple violet are rich in Vitamins A and C, and can be added to salads. The flowers are also edible, raw or cooked. The leaves can be added to soup as a thickener, much like okra (the leaves of wild violets were used as a substitute for okra in the South during the American Civil War). The flowers are sometimes made into a jam reputed to soothe indigestion, and a syrup said to suppress a cough.

The seed pods, rhizomes and roots of *Viola* species can be poisonous in large doses, causing severe gastroenteritis, nervousness, and respiratory and circulatory depression. These parts of the plant are strong laxatives, and can induce nausea and vomiting. Violets should not be used for culinary purposes unless one is certain that they have not been sprayed with insecticides, herbicides, or fungicides.

CULTIVATION

The following comments are from Larry Sherk's out-of-print “Growing Canada's floral emblems” (Canada Dept. Agric. Publication 1288, 1967): “This violet, like many others, is quite easy to grow in the garden provided the soil is not too rich. Plants in well-fertilized soil soon grow luxuriant but flower poorly. A soil rich in humus, kept reasonably moist, and shaded by tall trees or shrubs is best. If the soil is heavy or sandy, work in some leaf mold and peat moss and keep it slightly acid by mulching with well-rotted leaves. Be sure to gather seeds before the capsules split open. Sow seeds, as soon as they are ripe, in a moist shaded seedbed, in a seed pan, or in a shallow pot. Plants will likely self-sow in most gardens so they can become weedy if not controlled. These violets can be transplanted at most times if a good ball of soil is taken with the plants. To be sure of getting the right species, mark the plants when they are in bloom.”

The purple violet is a common species, not in particular need of conservation measures. However, its wetland habitats are subject to numerous threats, particularly draining and infilling for agricultural and urban development.

MYTHS, LEGENDS, TALES, FOLKLORE, AND INTERESTING FACTS

- The Greek dramatist Aristophanes (about 450-388 BC) referred to Athens in one of his plays as the violet-crowned city because the king was named Ion, which meant violet. According to legend, Ion, the founder of Athens, led his people to Attica where they were welcomed by naiads, water nymphs who could inspire men and who gave them violets as signs of their good wishes. The violet has been emblematic of Athens for many years. In the ancient Athenian games the first prize was an award in the shape of a golden violet. Ancient

Athenian houses, alters, statues, and brides were decorated with violets.

- Violets have long been used in love potions. The classical Greeks chose violet as their flower of fertility. In 17th century Europe, candied violets were eaten as an aphrodisiac.
- Although not used in modern medicine, violets have been thought to have curative properties since antiquity. In classical Roman times violets were prescribed for gout and spleen disorders. As well, it was common practice in Roman times to relate herbal treatments to gods, and since Jupiter was the supreme god, and the head is the supreme part of the body, violets were used to treat headaches and memory loss. Violets contain a chemical that is related to salicylic acid, the chief ingredient in aspirin, so that use for headache had some justification. The medieval herbalists used violets as an antiseptic, to soothe pain, and even for malignant tumours.
- In Medieval Europe, it was thought to be unlucky to bring bouquets of less than 13 flowers into a church or house. However, this problem was eliminated if one of the flowers was a violet.
- According to legend, 7 centuries ago in England Robin Hood and Sir Richard dined on stewed violets gathered in the woods.
- Before litmus (which is obtained from lichens) became widely employed to indicate pH, syrup of violets was used (it turns red with acids, green with alkalis).
- Like the rose, the violet has been adopted as a colour because it is so well known. Of course, roses come in other colours than red, and violets come in other colours than blue.
- Ionine, the major chemical found in violet fragrance, is thought to have the ability to dull the sense of smell within a very short time, and this is why the sweet violet (*Viola odorata*) seems to lose its fragrance. The fragrance returns when the nose is rested. Shakespeare was aware of this when he wrote in *Hamlet*: "A violet in the youth of primy nature, Forward, not permanent; sweet, not lasting. The perfume and suppliance of a minute. No more."
- Many species of violet turn their flowers toward the ground at night or when it's cloudy.



Fig. 6. The New Brunswick / Purple violet coin issued in 2007. This is part of the provincial and territorial symbols gold coin series (0.99999% gold), initiated in 1998, and continuing. Earlier coins were shown in the first part of this series. This coin has a face value of \$350.00 but, reflective of its value to collectors, the purchase price is over \$1,500.00. Coin image © courtesy of the Royal Canadian Mint.

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TREE: BALSAM FIR



Fig. 7. Silhouette of balsam fir (*Abies balsamea*). Source: J.L. Farrar 1995. Trees in Canada. Canadian Forest Service and Fitzhenry and Whiteside, Markham, ON, Canada. Reproduced with permission.

SYMBOLISM

Fir trees have been associated with a winter solstice celebration since ancient pagan times in Europe, when the ritual of decorating a conifer represented tribute to the rebirth of the sun god. Gradually the custom was taken up by Christians, and at least since the 16th century in Europe small fir trees have been used to decorate houses at Christmas time. In Europe, the silver fir (*Abies alba*) has long been the fir of choice for Christmas trees. In North America, the balsam fir has been the most desirable Christmas tree for many years. Since New Brunswick is a major producer of Christmas trees, and the balsam fir is also important to the area's forest and tourist industries, the tree is an excellent choice as the official provincial emblem.



Fig. 8. Balsam fir (*Abies balsamea*), by Brad Morrison. Reproduced with the permission of Communications New Brunswick.

LATIN NAMES

Abies balsamea (L.) Mill.

The genus name *Abies* is based on the Latin *abies*, a word used by the classical Romans to refer to the silver fir of Europe. Alternatively, the name is said to be based on the Latin *abire*, to rise up, referring to the great height of some of the species. *Balsamea* in the scientific name is Latin for balsamic, referring to resinous, aromatic, plant substances with a characteristic odour (often from benzoic or cinnamic acid) and frequently used medicinally as a soothing ointment. When crushed, the needles exude the smell of balsam.

ENGLISH NAMES

Balsam fir has also been called American silver fir, balm of

fir, balm of Gilead, balm-of-Gilead fir, balsam, blister fir, blister pine, Canada balsam, Canadian balsam, Canadian fir, eastern fir, fir balsam, fir pine, fir tree, silver pine, and white fir. Variety *phanerolepis* has been called bracted balsam fir. The word "fir" in modern English is restricted to the genera *Abies* and *Pseudotsuga*.

The term "double balsam" is often encountered in the horticultural trade, and has several meanings: a) a form with naturally very crowded leaves; b) a form with abnormally dense branching due to pathology; c) Fraser fir (*A. fraseri*); d) *M. balsamea* var. *phanerolepis*. Both the names "double balsam" and "double fir" are employed in the Christmas tree trade to refer to kinds of older trees with somewhat twisted branches and thick, dense, brushlike needles, and perhaps short internodes. These terms have marketing value, since for "double the fir" one may expect to pay double the price.

FRENCH NAMES

Sapin baumier, sapin blanc, sapin rouge, sapin. Variety *phanerolepis* = sapin phanérolépidé.

HISTORY

a. Canada

The balsam fir was adopted on May 1, 1987 as the provincial tree of New Brunswick. The closely related subalpine fir (*P. lasiocarpa*) was chosen as the official tree of the Yukon in 2001, and will be treated later in this series.

b. Foreign

No species of *Abies* appears to have been adopted as a symbol of any geographical area outside of Canada.

APPEARANCE

Balsam fir trees are usually 12-18 m (40-60 feet) high with a diameter (breast height) of 30-45 cm (12-18 inches). The tree can grow up to 23 m (75 feet) in height, with a trunk diameter up to 86 cm (34 inches). It is considered to be one of the most symmetrical of northeastern conifers, producing a narrow, pyramidal crown often capped by a spirelike tip. The branches tend to develop in whorls of four or five around the trunk. The bark is gray, thin, and smooth except for numerous raised resin blisters. The bark often breaks into irregular brownish scales as the trees mature. The leaves (needles) are usually 1.2-2.5 cm (0.5-1 inches) long (occasionally as long as 3 cm or 1.2 inches), flattish in cross section, shiny dark-green above and silvery-banded below, and lacking stalks. Needles on lower branches sometimes have a slight notch at the apex. The needles are spirally arranged on the twigs, but those on the lateral branches are twisted at the base, giving them a distinctive two-ranked arrangement (a phenomenon called "transverse heliotropism," that results in maximum exposure to sunlight on lower leaves, which usually receive less light). By contrast, the needles on upper shoots are oriented in all directions. Starting between 20 and 30 years of age, the plants bear both male cones (reddish, purplish, bluish, greenish, or orange at pollination, and smaller than the female cones) and female (seed) cones on 1-year-old branches. The seed cones stand erect on the branches. At maturity they are oblong-cylindrical, 3-10 cm (1.2-4 inches)

long and 1.5-3 cm (0.6-1.2 inches) wide, producing winged seeds. The seed scales detach gradually from the cones, leaving bare central axes that often remain attached to the branches for years, and are sometimes called “candles.”

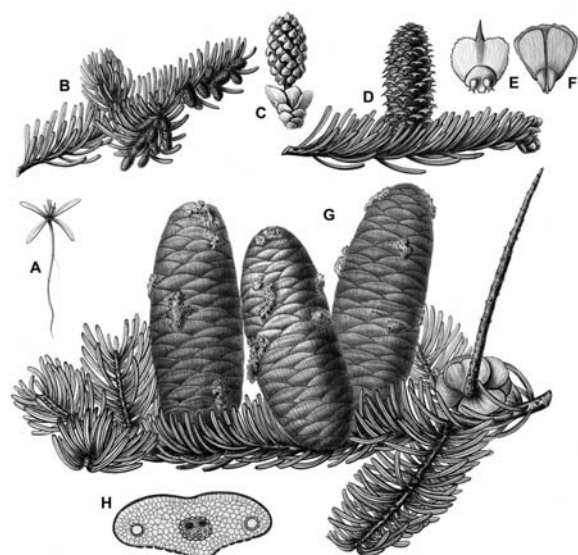


Fig. 9. Balsam fir (*Abies balsamea*). A, seedling; B, branch with male cones; C, a male cone; D, a branch bearing a young female cone with flowers; E, upper side of a young cone scale with female flowers, showing the bract and ovules; F, upper side of a mature cone scale with its winged seeds; G, a branch with fruit (three intact cones are shown, while the one at the right has mostly shed its seed-bearing scales); H, cross-section of a leaf. Source: Sargent, C.S. 1898. The silva of North America. Houghton, Mifflin and Company, Boston, MA. Vol. 12, plate 610

CLASSIFICATION

Family: Pinaceae (pine family).

There are about 40 species of *Abies*, distributed in north temperate regions of the world, as well as in Mexico, Central America, and North Africa. Five species are native to Canada (considering *A. lasiocarpa* and *A. bifolia* as separate species).

Two varieties of balsam fir are often recognized; in var. *balsamea* the seed bracts are included inside the cones; in var. *phanerolepis* Fernald they extend slightly outside of the main body of the cones. Variety *balsamea* occurs across Canada and in the US. Variety *phanerolepis* tends to occur from Newfoundland to Ontario (but not west of Ontario), as well as in the US.

In Alberta, there are hybrids of balsam fir and Rocky Mountain alpine fir (*A. bifolia*, also called Rocky Mountain subalpine fir). It has also been claimed that in the Canadian Rockies, where their ranges overlap, balsam fir hybridizes with subalpine fir (*A. lasiocarpa*, also known as alpine fir). However, there has been some confusion regarding the separation of *A. bifolia* and *A. lasiocarpa*, some authorities treating the former as part of the latter. Some of the most recent taxonomic work has reported that *A. balsamea* and *A. lasiocarpa* are not morphologically distinct over a broad zone of overlap extending from Saskatchewan to British Columbia. It has been suggested that both are best treated as subspecies, but there is still disagreement over their rank, and we follow most recent authors in treating them as species.

Balsam fir is closely related to Fraser fir (*A. fraseri*), a species of North Carolina, Tennessee, and Virginia. There are thought to be hybrids between the two in Virginia. Some authorities have recognized Fraser fir as a variety of balsam fir, *A. balsamea* var. *fraseri*.

The balsam fir can be distinguished from species of spruce (*Picea*) by its flat needles and erect cones (spruce needles are roundish and the cones are pendulous). It can be distinguished from eastern hemlock (*Tsuga canadensis*), the only Canadian species of *Tsuga* that grows in the same locations, by the absence of stalks on the needles (eastern hemlock has small stalks). The leaves of balsam fir are also similar to those of Canada yew (see [http://www.cba-abc.ca/bulletin/39\(1\)_online_C.pdf](http://www.cba-abc.ca/bulletin/39(1)_online_C.pdf)) but are whitened instead of green beneath and not as strongly pointed.

KEY TO NATIVE SPECIES OF *ABIES* IN CANADA

Note: Cone features are usually necessary for identification. Since the cones scatter their seed scales slowly while still attached to the trees, and cones are usually only on upper branches that can not be reached from the ground, it is often necessary to collect seed scales from beneath the trees. Do not confuse cone scales (Fig. 9F) with the smaller bracts under the scales.

1. Leaves with white stomatal lines only on lower surfaces 2
 2. Cone scales 1.0 to 1.5 cm wide; resin canals near margin in leaf cross-section.....*A. balsamea*
 2. Cone scales 2.0 to 3.0 cm wide; resin canals near centre in leaf cross- section 3
 3. Basal bud scales slightly pubescent or glabrous.....*A. grandis*
 3. Basal bud scales densely pubescent*A. amabilis*
1. Leaves with white stomatal lines on upper and lower surfaces 4
 4. Basal bud scales equilaterally triangular, margins crenate or dentate.....*A. lasiocarpa*
 4. Basal bud scales isosceles triangular, margins entire*A. bifolia*

GEOGRAPHY



Fig. 10. Canadian distribution of balsam fir (*Abies balsamea*).

Abies balsamea is native to all provinces of Canada except British Columbia, and it is also not indigenous to the three northern territories. It is most abundant in the Gulf of St. Lawrence region, including parts of Quebec, Newfoundland and Cape Breton; in this area it comprises more than 30% of the forest, thriving in the cool, moist, maritime environment. In the US, the tree ranges from Minnesota to New England, with local stands in Virginia, West Virginia, and northeastern Iowa. The best stands occur in southeastern Canada and the northeastern US. In the western part of its range, from James Bay and Lake Superior to the Athabaska River in Alberta, stands become

increasingly scattered and more restricted to stream valleys and north-facing slopes. Balsam fir is the only native Canadian species of *Abies* growing east of Alberta.

ECOLOGY

Balsam fir occurs extensively in boreal and northern forests, both in pure and mixed stands. It is often a dominant species or forms pure stands in Newfoundland, Ontario, and Quebec, and is also a principal tree of boreal mixed stands in Canada. In the northeastern US, balsam fir more often occurs in mixed stands than as a forest dominant. The trees can survive as long as 200 years, but rarely live longer than 125. The thin bark makes the trees susceptible to damage and tree rots. The generally shallow root system (especially on wet sites) makes the trees susceptible to windstorms and, during periods of drought, to drying out and fire damage. Fire is extremely detrimental, because most trees and seeds are killed.

Although fire kills balsam fir trees and seeds, it is a natural rejuvenating event that contributes to the development of new stands. Indeed, the boreal forest ecosystem is characterized by periodic catastrophic events that destroy large areas of tree cover, and the flora and fauna are adapted to such changes.

The status of balsam fir over large areas of Canada can change very quickly. For example, the volume of balsam fir doubled in the Gaspé peninsula of Quebec around 1950 due to the destruction of white spruce by European spruce sawfly and loss of birch due to birch dieback. While it increased in Gaspé, it was declining over equally large areas elsewhere.



WAS SMOKEY WRONG?

Should balsam fir, and forests generally, be protected from fire? Smokey thought so. It was about 1947 when Smokey the Bear became an icon (almost as well known as Santa Claus) assisting the U.S. Forest Service in their fire prevention campaign. With a shovel in one hand and pointing a finger with the other, he said "only you can prevent forest fires." The impression developed that fires are a very bad thing in all respects. Notice the bears looking after the deer in the poster. There are few well documented observations of this phenomenon! For decades there was extensive fire prevention and tree planting. This had a negative impact on biodiversity. It now seems remarkable that attitudes involving fairy-tale like images were so pervasive and influential only a very short time ago.

In fact fires resulting from lightning strikes are a natural process in forests. Fire is now considered an important management tool. Fires often burn in a mosaic so that the result is a patchwork of unburned forest and patches in various stages returning to forest. The patches increase overall biodiversity, and provide essential and improved habitat for wildlife (including deer). Much flora and fauna is dependent upon fires. Prevention of natural fires increases fuel in forests resulting in fires that are much more dangerous and difficult to control. Fires sometimes need to be controlled but often it is much more beneficial to let them burn.

Fig. 11. USDA Forest Service 1953 poster of Smokey the Bear.

Habitat

The tree grows under a wide range of soil and climate conditions, but is most common on cool, moderately moist sites with acidic soils (pH 5.1-6.0). Well drained but moist, moderately deep sandy soils are preferred. Best growth occurs at about 50% of full sunlight, but the tree can withstand many years of suppression in dense shade, and an understory of balsam fir seedlings is common in many forest types; seedlings will survive for years on only 10% of full sunlight.

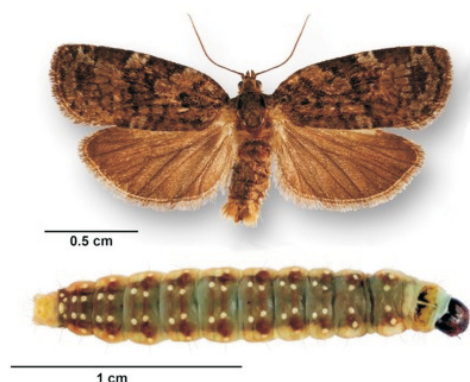


Fig. 12. Adult (moth, above) and larva (caterpillar, below) of the spruce budworm. This insect is the most serious defoliator in North America's boreal forests. It particularly attacks balsam fir, and during uncontrolled outbreaks can kill almost all the trees in mature stands. On the positive side, it is an important food source for many inhabitants of the boreal forest, including birds, mammals, and other insects. Photos by Klaus Bolte.

Inter-species Relationships

The spruce budworm moth (*Choristoneura fumiferana*) is the most damaging agent of balsam fir and the most damaging defoliator in North America's boreal forests. Despite its name, it prefers the balsam fir to spruce (it has been suggested that it should be called balsam fir budworm). The caterpillars feed on the buds and needles. Depending on provincial legislation, control measures sometimes involve aerial spraying of chemical insecticides or the bacterium *Bacillus thuringiensis*, both of which can be injurious to the natural ecosystem. The bacterium is a naturally occurring pathogen that affects budworm larvae, but also a host of other, non-injurious butterflies and moths. The many non-target insects affected play important roles as pollinators and food sources in the forest ecosystem. The responses to spruce budworm infestations have been quite different in New Brunswick and Nova Scotia (see Sandberg and Clancy 2002 for a review). In the former, intense and widespread application of insecticides was advocated, whereas the latter attempted a more varied and localized adoption of control measures. Today, there is less polarization and a growing trend toward a general appreciation of the value of letting nature take its course, where possible. Nevertheless, there will be continuing controversy about the best approaches,

especially because "industrial forests" (i.e. those used by the forest industry) are often adjacent to parks and protected areas. Since the use of insecticides and bacteria to control periodic infestations continues to be controversial, a variety of other practices are increasingly being applied. In New Brunswick, for example, in recent decades jack pine and black spruce have often been planted instead of balsam fir, since these are somewhat less susceptible to the budworm.

An interdependence has evolved between the spruce budworm and balsam fir forests. A cycle seems to exist in which mature fir stands become vulnerable and, every 35 years or so, the insect devastates the forest. Once a budworm outbreak develops, balsam fir trees start to die after 3 to 5 consecutive years of severe defoliation. Budworm outbreaks attract many insect-eating birds, especially warblers and woodpeckers. Woodpeckers in turn produce tree cavities that are employed by various wildlife species as homes. Spruce budworm is one of more than a hundred different insects that feed on balsam fir. Among the other important insects are various aphids (*Cinera* spp., *Minidarus abietinus*, *Adelges piceae*), balsam fir sawfly (*Neodiprion abietis*), balsam gall midge (*Paradiplosis tumifex*), balsam fir seed chalcid (*Megastigmus specularis*), balsam shootboring sawfly (*Pleroneura brunneicornis*), eastern black-headed budworm (*Acleris variana*), hemlock looper (*Lambdina fiscellaria*) and various weevils (*Hylobius* spp.).

Balsam fir provides important habitat for birds and mammals, especially as winter cover. Moose, white-tailed deer, caribou, and snowshoe hares browse on young plants. Mice and voles feed on the bark of saplings. Black bears sometimes strip the bark off mature trees, and have been observed licking the sap and gum from the inner bark. The buds are eaten by birds such as the spruce grouse and by squirrels. The needles are eaten by spruce and ruffed grouse. Mice, voles, and birds eat the seeds. Many animals often use fir stands for protection from weather or predators. For example, fir stands are frequently used by deer and moose with calves and during severe winter months, because the snow is relatively shallow. Young balsam fir plants provide cover for small mammals and birds. With the presence of so many herbivorous animals in balsam fir forests, it is not surprising that several carnivorous mammals also are often found there, some of these rare or threatened. They include the timber wolf, pine marten, fisher, Canada lynx, and bobcat. Balsam fir is considered desirable along trout streams because its shade keeps the water cool, and relatively few trees are felled by beaver for building dams. This in turn reduces beaver dams, that lower the quality of trout streams.

Pollination & Dispersal

Balsam fir is wind-pollinated and wind-distributed. Good seed crops occur every 2 to 4 years, with light crops in intervening years. Seeds begin to drop from the trees in late summer, most falling in autumn, but some continuing to be distributed until early spring. The wings on the seeds act like sails to transport the seeds some distance away. Most seeds fall within 25-60 m (80-200 feet) of the parental tree, but some travel as far away as 160 m (525 feet). Germination occurs mainly from early spring to early summer. Most balsam fir seed germinates in less than a

year, rarely surviving for more than 1 year. The trees reproduce vegetatively to some extent by layering (lower branches becoming buried in the soil and producing new trees), but this is only important in some high-elevation trees in the US where reproduction by seeds is rare.

USES

The unusually long wood fibres of balsam fir contribute to good pulping properties and the tree is a staple of eastern Canada's pulp industry. The wood is very low in decay resistance, so is not well suited for posts. It is low in nail-holding ability, and relatively soft, so it is widely used for applications not requiring structural strength, such as interior knotty panelling, crates, and millwork. Because the wood lacks taste and odour, it is used for fish box construction. The trees are used extensively for cabin logs. Canada, mainly Quebec and the Maritime provinces, produces much more balsam fir lumber than the US: about 180 million board feet annually, or about 3% of total Canadian lumber production. The high production of balsam fir lumber in eastern Canada is due to the larger size, higher quality, and greater abundance of trees than elsewhere in North America.

The balsam fir is an extremely popular Christmas tree, and indeed a major source of income for New Brunswick. Boughs are also harvested for making wreaths. Balsam fir is ideal for these purposes because of its attractive conical shape, deep green colour, dense appearance, pliable branches (this enables the trees to be packed closely together for transportation), pleasant unique balsam fragrance, and especially its prolonged needle retention (needles are usually retained even after several weeks indoors). Still another advantage is that they respond well to shearing, so young trees in plantations can be improved. The balsam wooly aphid (*Adelges piceae*) is an important insect pest of the balsam fir, and a particular concern to growers of Christmas trees as it deforms or kills the trees.

In Canada the most popular Christmas trees in decreasing order are: balsam fir, Fraser fir, Scots pine, and white spruce. Forty million live Christmas trees are sold in North America every year; about six million of these grown in Canada. Canada exports almost 2.5 million trees annually, worth about \$35 million, most of these to the US. The value of farm cash receipts for Christmas trees in Canada is about \$75 million annually. The largest producers are (in decreasing order) Quebec, Nova Scotia, New Brunswick and Ontario. Canadians spend about \$50 million annually on artificial Christmas trees, most of these imported from China.

It has recently been estimated that 98% of the Christmas trees sold commercially in Canada are grown on tree farms. However, it appears that more balsam firs are harvested from the wild than other kinds of Christmas trees. There are two reasons for this. First, the excellent tree quality commands a higher price which makes it makes it worthwhile. Second, the tops of larger trees can be used, so that harvest is not confined to a particular age class.

Although balsam fir is not considered to be a particularly suitable ornamental, it is grown to a small extent. It is probably unmatched for use as a natural outdoor Christmas tree. The ornamental use of balsam fir is more extensive in Europe than in North America, and often dwarf forms are

grown in rock gardens and as foundation plants. Dwarf cultivars include Compacta, Prostrata, and Nana (which has been described as "a nice Christmas tree for Lilliputians"). Cultivar Andover is low, compact and spreading; Columnaris is tall and columnar; Denudata and Nudicaulis produce a single, unbranched trunk. Several cultivars develop particular colours: Coerulea is rather silvery, Coerulescens is silver-blue, and Lutescens is yellow to bronze.

Blisters on the bark of balsam fir yield Canada balsam, a sticky resin used for permanently mounting specimens on microscope slides. This feature of the bark has given rise to the name "blister fir." Canada balsam is also used as a cement for various parts of optical systems, because its refractive index, like that of ordinary glass, results in a minimum dispersion of light. Upon exposure to air balsam becomes thick, yellowish, and dries to a resinous mass, that is, however, completely soluble in ether. In the past, Canada balsam was also used in medicines, soaps, glues, candles, perfumes, and deodorizers.

Most commercial products with "pine" odours are really scented with essential oil distilled from the foliage of fir trees native to Russia. It has been suggested that a similar oil could be obtained from balsam fir. Early pioneers used balsam fir needles to stuff pillows, which retained a pleasant fragrance.

The inner bark of balsam fir can be used to make bread. It can even be chewed raw as an emergency food, but chewing should be thorough to avoid wood slivers being lodged in the throat. Bark was important in the diet of native North Americans and, it is said, that the Adirondack Indians owe their name to the Mohawk term for tree-eaters.

CULTIVATION

Balsam fir is cultivated in nurseries for Christmas trees and for ornamental plants. In North America, the first attempt at such cultivation took place in Ottawa about 1900. For information on growing balsam fir for Christmas trees, see the references below by Estabrooks (1987) and Smith et al. (1983). Over the last century there has been some development of agri-forestry of balsam fir, i.e. growing it in plantations, but today there is limited interest in this. By contrast, there is considerable management of natural stands. This may include "reforestation," i.e. seeding or planting of seedlings in areas that have been harvested or devastated by natural forces such as the spruce budworm; however, often other tree species are preferred to balsam fir for reforestation.

CONSERVATION STATUS

The balsam fir is a common species in Canada and the northeastern US, and not in particular need of conservation measures. In the highlands of West Virginia where it reaches its southern limit, extensive logging has reduced the habitat, and the tree is also threatened by large populations of white-tailed deer and infestations of the balsam wooly aphid. Concerned groups in West Virginia are attempting to conserve the balsam fir there. Some of the isolated stands elsewhere south of the boreal forest in Iowa, New York, Pennsylvania and Virginia are genetically depauperate and threatened by climate change.



Are Artificial Christmas Trees Better for the Environment?

The first artificial tree was manufactured in Germany in the 19th century, to prevent deforestation. Most real Christmas trees sold today are harvested from tree farms. These farms have replaced natural habitats, so that there is still an environmental impact. Artificial trees are typically made of polyvinylchloride or polyethylene. Although they can be used for many years, their production requires non-renewable resources and energy, and they are usually non-recyclable, ending up in landfills. Genuine trees are used only once, but can be mulched and recycled. Further, live trees reduce the amount of carbon dioxide in the atmosphere. Also, trees grown as a crop frequently provide habitat for wildlife. On the other hand, Christmas tree crops usually are grown with heavy applications of pesticides and herbicides, which are not good for the environment. Organically grown Christmas trees are sometimes available. All things considered, real trees are probably environmentally preferable.

Fig. 13. "The Queen's Christmas tree." This famous illustration shows the Christmas celebration of Queen Victoria and Prince Albert at Osborne House, the Royal Family's retreat on the Isle of Wight. The drawing was first published in December 1850 in Godey's Lady's Book. It was widely circulated in Britain and overseas, and served to popularize the use of a decorated fir tree

MYTHS, LEGENDS, TALES, FOLKLORE, AND INTERESTING FACTS

- Christmas trees dry out very rapidly indoors if their cut ends are not placed in water. Experiments with balsam fir showed that when the butts of the tree were placed in water, the trees remained completely resistant to fire after 3 weeks indoors, but when not provided with water, they became extremely flammable in about 2 weeks.
- *Abies guatemalensis* is an endangered Central American endemic found only in dwindling pockets in mountainous regions of Guatemala. Risking 10 years in jail, poachers illegally harvest the lemon-smelling branches, and poor street vendors staple them to poles for sale as Christmas trees. The species is also used for charcoal production and as timber. It is feared that it will become extinct within a few decades.
- A "witches'-broom" is an abnormal tufted growth of small branches on a tree or shrub. A very conspicuous witches'-broom of balsam fir is caused by the rust fungus *Melampsorella caryophyllacearum*. Witches'-brooms on large trees have been observed to be used as homes by fishers, and as nesting sites by long-eared owls. Several dwarf cultivars have originated by propagating young trees discovered to have been dwarfed by the rust fungus.

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ACKNOWLEDGMENTS

B. Brookes prepared the artwork for publication.

Addendum to Native Plant Emblems of Canada 4, regarding red oak

Dr. Peter Ball has advised that red oak (*Quercus rubra*) does not occur in northwestern Ontario, despite numerous reports of its presence. It has been known since the 1970s that northern pin oak (*Q. ellipsoidalis*) occurs in the region, and it is now believed that it is the only species present, having previously been misidentified as red oak. *Quercus ellipsoidalis* can be distinguished by sun-grown leaves, which are deeply divided, but shade-grown leaves are less divided and are easily confused with the leaves of red oak. It appears that the northwestern-most occurrence of *Q. rubra* is the islands off the east coast of Lake Superior north of Sault-Ste.-Marie. As well as being absent from northwestern Ontario, red oak may also be absent from the northernmost tier of counties in Minnesota. We also draw the reader's attention to the omission of all dashes in this article. This resulted in measurement ranges and page number ranges being contracted e.g. "3065 cm" appeared as "3065 cm" and "Good crops of acorns occur once every 25 years" appearing as "25 years."

Canadian Museum of Nature and NRC release new CD on flora of Canada's Arctic Islands

OTTAWA They are hardy survivors of Canada's Arctic. Now, everything you need to know about the 357 flowering plants and ferns of the Canadian Arctic Islands is available on a CD-ROM co-published by the Canadian Museum of Nature (CMN) and the NRC Research Press of the National Research Council Canada (NRC). The *Flora of the Canadian Arctic Archipelago* will be released on December 14, 2007.

This comprehensive scientific guide includes descriptions of each plant, information about their distribution, and more than 3,000 line drawings and colour photographs. It also offers interesting historical references as well as noteworthy tidbits on arctic plant use by indigenous peoples. The CD was written and edited by CMN botanists Dr. Susan Aiken (main author, now retired), Dr. Laurie Consaul, and Dr. Lynn Gillespie, with support from co-authors and assistants.

This guide is the result of many years of research, both in the field and from examining some of the world's top botanical collections," explains Dr. Gillespie. "With issues such as climate change affecting the Arctic, it becomes even more important to have a scientific guide describing the species that exist now, where they are found and how to identify them."

Dr. Susan Aiken, a researcher with the CMN from 1984 to 2005, began working on cataloguing the plants of Canada's Arctic Islands soon after she joined the Museum. Her task was to update the *Flora of the Canadian Arctic Archipelago*, published in 1957 by Alf Erling Porsild. Aiken's use of electronic databases in the 1980s to produce flora (publications that describe the plants of a given area) was visionary. Impressed by the progress of Australian scientists who were using databases to catalogue grasses, she began a 20-year collaboration with Dr. Mike Dallwitz. His DELTA (DEscription Language for TAXonomy) format enables the user to easily identify organisms.

In 2005, the CMN and NRC Press entered into an agreement to publish the *Flora of the Canadian Arctic Archipelago* on CD-ROM, a convenient and necessary format in this electronic age. Users can easily flip to a species, where they will find colour photos, a map, and descriptions of the plant. They can also use the interactive scientific "key" to identify species.

"This is the first Canadian flora that we have published in a CD format," says Dr. Paul B. Cavers, Editor of the NRC Monograph Publishing Program. "Dr. Susan Aiken and her many co-authors are to be congratulated. This monograph will be of great value in a region facing many changes through global warming and increased human activity."

As of December 14, the CD-ROM can be purchased from the Canadian Museum of Nature's online catalogue at <http://nature.ca> as well as from the NRC's online bookstore at <http://pubs.nrc-cnrc.gc.ca/eng/books/index.html>. It retails for \$34.95 CAN (ISBN-13 9780660197272). See over page for special offer.

Le Musée canadien de la nature et le CNRC lancent un CD sur la flore de l'archipel Arctique du Canada

OTTAWA Ce sont de valeureuses survivantes de l'Arctique canadien. Il existe maintenant un CD qui vous renseignera sur les 357 plantes à fleurs et fougères de l'archipel Arctique canadien. Coproduction du Musée canadien de la nature et des Presses scientifiques du CNRC (Conseil national de recherches du Canada), le CD *Flora of the Canadian Arctic Archipelago* paraîtra le 14 décembre 2007.

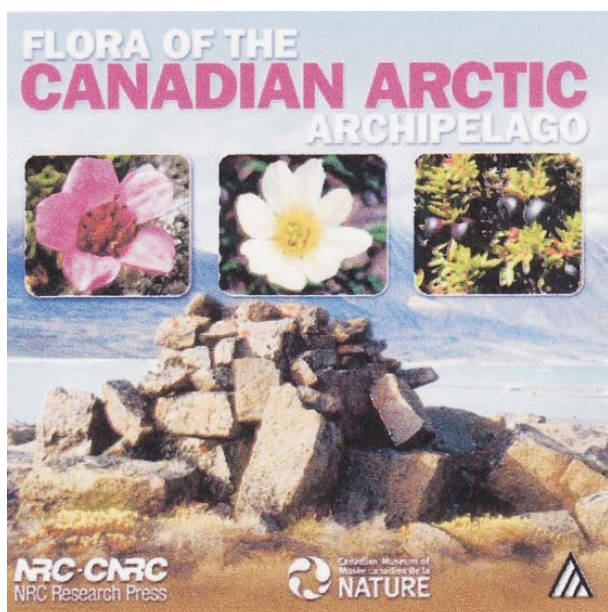
Ce guide scientifique exhaustif comprend les descriptions de chacune des plantes, des renseignements sur leur distribution et plus de 3 000 dessins au trait et photographies couleur. Il présente en outre d'utiles références historiques ainsi que des données dignes d'intérêt sur l'usage que font les Autochtones de certaines plantes. Avec le concours de divers collaborateurs et assistants, les botanistes du Musée Susan Aiken, Ph. D., (auteure principale aujourd'hui à la retraite), Laurie Consaul, Ph. D., et Lynn Gillespie, Ph. D., ont assuré la rédaction des textes et la direction de la publication.

Ce guide est le résultat de nombreuses années de recherche sur le terrain et d'examen de collections botaniques figurant parmi les meilleures du monde, explique Mme Gillespie. Avec l'effet des changements climatiques sur l'Arctique, il importe encore plus de disposer d'un guide scientifique décrivant quelles espèces existent aujourd'hui, où elles se trouvent et comment les identifier. »

Susan Aiken, chercheuse au Musée de 1984 à 2005, a commencé à cataloguer les plantes de l'archipel Arctique du Canada peu après son entrée en fonction. Elle avait pour tâche de mettre à jour la *Flora of the Canadian Arctic Archipelago*, publiée en 1957 par Alf Erling Porsild. Mme Aiken eut l'idée, révolutionnaire dans les années 1980, de recourir à des bases de données électroniques pour produire des flores (publications décrivant les plantes d'une région donnée). Enthousiasmée par les progrès de scientifiques australiens utilisant des bases de données pour cataloguer des graminées, elle entama une collaboration, qui devait durer 20 ans, avec Mike Dallwitz. Le format DELTA (pour DEscription Language for TAXonomy langage de description en taxonomie) qu'utilise ce dernier permet à l'utilisateur d'identifier facilement les organismes. En 2005, le Musée et les Presses scientifiques du CNRC ont conclu une entente pour publier *Flora of the Canadian Arctic Archipelago* sur CD-ROM, un format commode qui s'impose en notre ère de l'électronique. L'utilisateur peut aisément choisir une espèce et trouver des photos couleur, une carte et une description de la plante. Il peut aussi se servir des « clés » scientifiques interactives pour tenter d'identifier l'espèce.

« Il s'agit de la première flore canadienne à paraître sur CD, explique **Paul B. Cavers**, Ph. D., directeur scientifique du Programme d'édition de monographies du CNRC. Susan Aiken et tous ses collaborateurs méritent des félicitations. Cette monographie revêt un grand intérêt dans une région qui connaît de nombreux bouleversements en raison des changements climatiques et des activités humaines accrues. »

On pourra se procurer le CD-ROM à partir du 14 décembre dans le catalogue en ligne du Musée canadien de la nature (<http://nature.ca>) ainsi qu'à la librairie en ligne du CNRC (<http://pubs.nrc-cnrc.gc.ca/fra/livres/index.html>). Le prix s'élève à 34,95 \$ CAN (ISBN-13 9780660197272).



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