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The Canadian Botanical Association Bulletin



Bulletin de l'Association Botanique du Canada

December/Décembre 2010. Volume 43 No.3/N°3

President's Message: ownership and participation

Dear CBA Members:

I think you will agree with me that the autumn seems to have flown by, again! The leaves have fallen and are imprinting in the litter, the mushrooms have sprung up and gone, and we are seeing the magic of frozen water everywhere! It must be time to renew my CBA membership!

More than ever, the CBA needs all of you to continue to be active participants in the future of botanical sciences in Canada! We are a user-friendly society and you will enjoy the fellowship of botanists who are happy to share their knowledge and enthusiasm. Consider sponsoring your students, your post-doctoral fellows and lab team members (research assistants, etc): it is the ultimate (green) gift!

Continuing, I would like to extend thanks to Cindy Ross Friedman for her help with liaison for the very successful Stars of Research competition held mid-August at UBC. By all accounts, it was a superb experience and the CBA provided some support for the event - a worthwhile cause in which to showcase our association. Let your students know about this competition and encourage them to participate in future years. Also, our greatest appreciation to Adrienne Sinclair, who is currently taking a deserved leave of absence from CBA responsibilities and has, therefore, resigned from co-chairing (with Liette Vasseur) the Ecology and Conservation Section. We have been able to recruit Art Fredeen, who will replace Adrienne and assume the co-chair position immediately and help Liette with the Plant Canada symposium organization. Thank you for your willingness to help Art!

It is also time to start seeding the thoughts for nominations for our 2011 awards for the Association. Consult the Bulletin for more details for the different awards, and peruse through the website to familiarize yourselves with the previous winners if you need inspiration. It is the Association's greatest privilege to recognize the accomplishments of our stars!

The preparations for the Plant Canada 2011 meeting in Halifax (Plant adaptation to environmental change, St-Mary's University, Nova Scotia, July 17-21) are on everyone's mind at the moment and our enthusiastic V-P, Marian Munro, is providing us with updates on recent milestones, CBA-sponsored symposia and decisions (see the note elsewhere in the Bulletin). Consult the Plant Canada website (www.plantcanada2011.ca) for a continuously updated program, symposia for all societies, other activities and, of course, mark your calendar to enjoy both this timely scientific program and the legendary wonderful Maritime hospitality.

Sincerely,
Hugues Massicotte



Dr Hugues Massicotte

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, **44(1)**, must be received **before March 15th 2011**

La date de tombée des textes du prochain numéro, le no **44(1)**, est le **15 mars 2011**

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Cher(e)s membres de l'ABC:

Je pense que vous conviendrez avec moi que l'automne s'est envolé, une fois de plus! Les feuilles tombées font impression sur le sol, les champignons ont fait leur *Veni, vedi, vici* (un peu comme Jules César), et la magie de l'eau gelée nous entoure! Déjà, c'est le temps de renouveler notre statut de membre!

Plus que jamais, l'ABC a besoin de vous tous comme participants actifs pour l'avenir des sciences botaniques au Canada! Nous sommes une société où règne la convivialité et vous apprécierez la camaraderie de botanistes enthousiastes, heureux de partager leur connaissance. Si possible, parrainez vos étudiants, stagiaires post-doctoraux et membres de votre équipe: c'est l'ultime cadeau "vert"! Continuons avec des remerciements à Cindy Ross Friedman pour son aide avec la compétition "Étoiles de recherche", tenue mi-août à UBC. Il s'agissait d'une expérience superbe (l'ABC a contribué financièrement) et cela semble être un moyen approprié pour l'ABC d'y avoir une présence. Laissez vos étudiants connaître cette compétition et encouragez les à participer dans les années futures. Aussi, nous devons remercier Adrienne Sinclair, qui prend un congé d'absence bien mérité et doit donc laisser la co-présidence (avec Liette Vasseur) de la Section écologie et conservation. Heureusement, nous avons pu recruter Art Fredeen, qui remplace Adrienne immédiatement pour aider Liette avec le symposium pour Plant Canada. Nous te remercions et apprécions ton enthousiasme Art!

Il est temps de penser aux nominations pour les prix de l'Association 2011.

Consultez le Bulletin pour plus de détails pour les différents prix, et explorez le site web pour voir la liste des gagnants précédents si vous avez besoin d'inspiration.

C'est le plus grand privilège de l'Association que de pouvoir reconnaître publiquement les réalisations des étoiles du firmament botanique!

Les préparatifs pour le Congrès Plant Canada 2011 (Adaptation des plantes aux changements environnementaux, Université St-Mary, Nouvelle-Écosse, le 17-21 juillet) vont bon train et notre excellente Vice-Présidente, Marian Munro, nous fournit une mise à jour sur les activités, symposia et dates importantes (voir la note dans le Bulletin). Consultez le site web de Plant Canada (www.plantcanada2011.ca) pour un programme constamment mis à jour et bien sûr, réservez ces dates dans votre calendrier pour profiter d'un programme scientifique prometteur et de l'hospitalité légendaire des Maritimes.

Sincèrement,
Hugues Massicotte



Update on Plant Canada 2011

The organizers continue to work hard and the Local Organizing Committee (LOC) met at Saint Mary's University mid-October for a full day retreat, at the site of the conference. The Dean of Science showed the LOC the facilities where meeting, symposia, poster sessions, etc. are likely to be held. The CBA is organizing 3 symposia (see the section updates elsewhere in the Bulletin). The LOC Committee is seeking recommendations from each society for one person each to sit on the Publicity Committee. The Fund Raising Committee will be looking for ideas for potential sponsors; please let Marian or Hugues know if you have any suggestions. Please also note the following deadlines. Mail-outs begin **December 10**.

December 15th is the deadline for receiving narratives, titles and biographies, with images of invited speakers. General submission of Plant Canada registration forms and abstracts is set for **February 28th 2011**. The organizers are optimistic for a good turnout, hopefully above 500 participants. Finalized costs are not available yet from Saint Mary's University, so conference fees have not yet been set, but will be done soon. Please watch the Plant Canada website <http://www.plantcanada2011.ca/> for updated scheduling and details. A call for papers is found elsewhere in the Bulletin, with more details on the conference.

Respectfully submitted,

Marian Munro and Hugues Massicotte



CALL FOR PAPERS

**Plant Canada 2011
'Plant Adaptation to Environmental Change'
Halifax, Nova Scotia
July 17 - 21 2011**

Joint Colloquium of
Canadian Society of Agronomy
Canadian Society for Horticultural Science
Canadian Botanical Association
Canadian Society of Plant Physiologists
Canadian Phytopathological Society
Canadian Weed Science Society

We are pleased to announce the Call for Papers for Plant Canada 2011. Plant Canada, the largest gathering of plant scientists in Canada, is the joint meeting of the Canadian Society of Agronomy (CSA), Canadian Society for Horticultural Science (CSHS), Canadian Botanical Association (CBA), Canadian Society of Plant Physiologists (CSPP), Canadian Phytopathological Society (CPS) and Canadian Weed Science Society (CWSS). With the theme "Plant Adaptation to Environmental Change", Plant Canada 2011 colloquium will take place at Saint Mary's University, Halifax and will consist of four days of scientific exchange, including invited symposia speakers, contributed papers (both oral and poster), graduate student presentation competitions as well as offsite tours and society annual meetings. Saint Mary's University is located close to many entertainment options of this city, a site for the historic waterfront, museums, galleries, shopping, dining and nightlife. Highlights of the meeting can be found on our web site www.Plantcanada2011.ca.

Members are encouraged to submit titles and abstracts of papers and posters, for presentation in their respective society sessions. Each society is also hosting a Graduate Student Presentation Competition. All abstracts will be published in the proceeding and posted in Plant Canada web site (www.plantcanada.ca) and in the corresponding society journals. All papers submitted under CSA, CSHS and CWSS are eligible for publication in the Canadian Journal of Plant Science (CJPS) after peer reviewed, and review articles for selected papers and invited talks will be edited in a CJPS special issue.

Instructions for submitting titles and abstracts are available on
<http://plantcanada2011.ca>

The deadline for submission of titles and abstracts is: February 28th 2011.

For any difficulties using the web-based application, please contact Marilyn Roberts, Department Secretary, Plant and Animal Sciences, NSAC at 902-893-6644

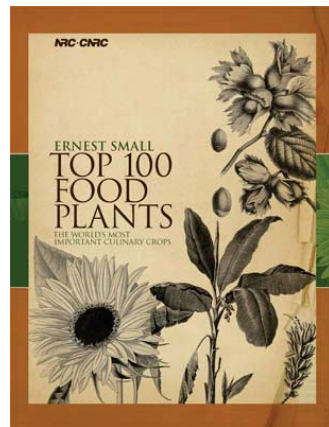
The Program Committee has planned an exciting scientific program interspersed with wonderful leisure options, including a number of events of particular interest/enjoyment of students. So please plan to attend and encourage your students to join as well.

Maritime hospitality is guaranteed!



Association News

Dr. Ernest Small wins prestigious award



Dr Ernest Small and the cover of his award-winning book

Congratulations to Dr. Ernie Small, well known to Canadian botanists for the authorship of many books and articles, including the "Native Plant Emblems of Canada", series co-authored with Paul Catling, which has been running in this newsletter. Dr Small, an Agriculture and Agri-Food Canada (AAFC) research scientist has been awarded the inaugural Lane Anderson Prize, which celebrates the best in Canadian science writing for both adult and young reader categories. Dr Small was awarded a prize of \$10 000 for his book *Top 100 Food Plants: The World's Most Important Culinary Crops*. The \$10,000 award was given out at a ceremony in Toronto on September 21st 2010.

Top 100 Food Plants reviews scientific and technological information about the major food plants and their culinary uses. All categories of food plants are covered and information is provided on scientific and common names, appearance, history, economic and social importance and food uses, including practical information on storage and preparation.

The book, published by NRC press, is intended to be a reference guide for specialists in agricultural areas, but gardeners, cooks, and those interested in human health as it relates to diet will also find this volume appealing because of the user-friendly presentation and the hundreds of attractive illustrations included.

Congratulations Ernie!

Regional Undergraduate Conferences 2011

The next **APICS** (The Atlantic Provinces Council on the Sciences) Atlantic Undergraduate Biology Conference (AUBC) will take place on **March 11-13th 2011** at Dalhousie University in Halifax, NS.

The Ontario Biology day will take place on **March 11th and 12th 2011** at Wilfrid Laurier University. The university celebrates 100 years in 2011!

Thompson Rivers University (TRU) in Kamloops, BC, will be holding its 6th annual **Undergraduate Student Innovation and Research Conference April 1st and 2nd 2011**. As a part of this event, TRU will be hosting the "Annual Regional University Science Undergraduate Research Poster Session" from noon - 9pm on Friday, April 1st. Undergraduate research students from the University of the

Fraser Valley, the University of BC - Okanagan, and Trinity Western University are invited to present posters. For more information, see <http://www.tru.ca/rigs/research/undergrad/conference.html> or e-mail truugc2011@gmail.com.

As you are aware, the CBA/ABC gives awards for the best oral and poster presentations at these conferences. Please attend if you can!



Elizabeth Graham Cutter B.Sc. Ph.D D.Sc FRSE died on October 23, 2010 at the age of 81 in Melrose, Scotland. Elizabeth completed a PhD in Botany in 1954 under the supervision of Professor C. W. Wardlaw, University of Manchester, and held the position of Reader in Botany at Manchester from 1955 until she moved to the Botany Department at the University of California, Davis in 1964. There she established an active research program and developed modern courses in Plant Anatomy and Plant Morphogenesis. She published many research papers, as well as two books, 'Plant Anatomy Part 1. Cells and Tissues' (two editions) and 'Plant Anatomy Part 2. Organs'. She also edited 'Trends in Plant Morphogenesis' a collection of articles dedicated to Professor Wardlaw on his 65th birthday. Elizabeth returned to the University of Manchester in 1972. She was appointed the George Harrison Professor and Chair in Botany in 1979, which she held until her retirement in 1989. At that time, she was given the honour of Emerita Professor of Botany. Elizabeth supervised graduate students in Davis and Manchester a number of whom became faculty members in several countries, including Canada (Patrick von Aderkas, University of Victoria; Larry Peterson, University of Guelph). She was an excellent mentor for undergraduate and graduate students as well as Post-doctoral Fellows. Elizabeth was known for her modesty, for her friendly nature, for her sense of humor, and for her wise advice to students and colleagues. During her career she was a member or an office holder in several societies including the Botanical Society of America, the Linnean Society of London, the International Society of Plant Morphologists, and the Society for Experimental Biology. Upon retirement, she moved to Gattonside, Melrose, Scotland and spent many years traveling and developing her hobby of nature photography. She was an active member of the Royal Photographic Society. She also served as President of the Botanical Society of Scotland after her retirement. Elizabeth will be sadly missed by former students, colleagues, and friends.

Dr. R. Larry Peterson FRSC
Department of Molecular and Cellular Biology
University of Guelph

News From The Sections

News from the Mycology Section!



Under the enthusiastic leadership of Michele Piercey-Normore, the Mycology section is delighted to announce the symposium "Effects of environmental change on fungal diversity in northern ecosystems" as part of Plant Canada 2011. This symposium will include both lichenized and non-lichenized fungi, and range from speculation on changes in diversity based on existing patterns to ecological and experimental studies in northern areas (boreal and arctic). We will have a finalized list for the next Bulletin.

In addition, a reminder to members (faculty and students) to please consider forwarding names and dossiers of those who may be eligible for the Luella K. Weresub Memorial Award in 2011 for best published paper of the year authored by a student.

As always, we welcome all who might be interested in joining the Mycology section, as well as all myco-comments/thoughts for our section and for the Bulletin!

Hugues Massicotte and Shannon Berch

Teaching Section News

CBA/ABC and CSPP Present: "Evaluating Student Learning -- How Can We Tell if Our Assignments Are Making a Difference?"

The session will start with a 40-minute presentation by our guest speaker, Dr. Lyn Baldwin of Thompson Rivers University, who will speak on:

"BOTANY with a dash of SOTL--Improving Undergraduate Botany Curriculum using the Scholarship of Teaching and Learning". She will explore how we can use SOTL to really find out what works and what does not work. This is a topic that envelopes much of the SOTL work that she's done over the last 5 years, and will include a discussion on how scholarly teaching and learning can be used to assess the success of writing assignments. The presentation will incorporate time for breakout session/discussion.

Then, we will have about an hour's worth of invited talks/contributed papers by members of both the CBA/ABC and CSPP on the theme of "Helping Students Write and Communicate in the Biological Science". Dr. Frédérique Guinel (Wilfrid Laurier University) will be one of the presenters, and she will talk about "Using Posters to Assess Critical-thinking Skills in a Large Class". Ideally, we would like those interested in presenting on teaching to address the theme of writing/communicating/critical thinking

/evaluating student learning, although that being said, we will of course try to accommodate anyone who wants to present in Teaching!

Finally, we will have an open discussion Teaching Panel on "Teaching and Evaluating Scientific Writing" led by Dr. John Markham (Thompson Rivers University). John will kick off the panel by presenting the results of his nationwide survey: "Undergraduate Scientific Writing Trends in Biology Programs Across Canada". The CBA/ABC and CSPP will be populating the panel; Dr. Baldwin will be one of the members.

A report of the very successful panel discussion held in Ottawa last June appears on page 58 of this newsletter.

Cindy Ross Friedman

Development Section News

Students are encouraged to submit applications for the Taylor A. Steeves Award. It 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 the current chair of the development section, Dr. Arunika Gunawardena (arunika.gunawardena@dal.ca), Biology Department, Dalhousie University, before March 31st 2011.

Arunika Gunawardena

Systematics and Phytogeography Section

This section has no news at this time

Ecology Section

The Ecology and Conservation section invites you to take part in some of the interesting activities planned for Plant Canada. We will have a symposium on Wednesday July 20th, 2011 at 8:30 am on "Climate change: Canada's plants on the run!" This symposium will explore the issues regarding the distribution and survival of species at risk and on the other side the threat of invasive species in face of climate change. In addition, in collaboration with the Canadian Biodiversity Conservation Network, we are attempting to elaborate a few activities on public speaking and communication... how can scientists send their message?

More information will be available in the New Year! Stay tuned!

Liette Vasseur and Art Fredeen



CBA/ABC Student Awards '10-'11

~Awards for Students Papers published in 2010~

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. Hugo Cota-Sanchez, Dept. of Biology, University of Saskatchewan; e-mail: hugo.cota@usask.ca) before April 1st 2011.

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 should be sent to the current Chair of the Ecology Section of the CBA/ABC (Dr. Liette Vasseur, Brock University; e-mail: lvasseur@brocku.ca) before April 1st, 2011.

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, structure or morphology should be sent to the current chair of the Plant Development Section of the CBA/ABC (Dr. Arunika Gunawardena, Dalhousie University, Halifax NS; e-mail: arunika.gunawardena@dal.ca) before April 1st, 2011.

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 should be sent to the current chair of the Mycology Section (Dr. Hugues Massicotte, University of Northern British Columbia; e-mail: hugues@unbc.ca) before April 1st, 2011.

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

CBA-ABC '11 Conference Awards

John Macoun Graduate Student Travel Bursary & Keith Winterhalder Undergraduate Travel Award

Awards 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)

Applications should be sent the President of CBA/ABC (Dr. Hugues Massicotte, University of Northern British Columbia; e-mail: hugues@unbc.ca) before Feb 28th 2011

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 <http://www.plantcanada2011.ca/Frontpage/index2.htm> for submission details and deadlines

ABC/CBA Prix Étudiants '10-'11

~Prix pour les articles publiés par les étudiants durant 2010~

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. Hugo Cota-Sanchez, Dept. of Biology, University of Saskatchewan; e-mail: hugo.cota@usask.ca) avant le 1 avril 2011.

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. Liette Vasseur, Brock University; e-mail: lvasseur@brocku.ca) avant le 1 avril 2011.

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 2008 en développement, structure ou morphologie végétales devrait être envoyée au président de la section développement végétal de l'ABC/CBA (Dr. Arunika Gunawardena, Dalhousie University, Halifax NS; e-mail: arunika.gunawardena@dal.ca) avant le 1 avril 2011.

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, University of Northern British Columbia; e-mail: hugues@unbc.ca) avant le 1 avril 2011.

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

ABC-CBA '11

Prix de conférence

John Macoun Bourse de Voyage pour étudiant gradués & Keith Winterhalder Bourse de Voyage pour bachelier

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 inscrit(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)
5. Les demandes devraient être envoyées au président de l'ABC/CBA (Dr. Hugues Massicotte, University of Northern British Columbia; e-mail: hugues@unbc.ca) avant le 28 fev 2011

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 <http://www.plantcanada2011.ca/Frontpage/index2.htm> pour les détails de soumission et les dates limites

Teaching Section of the Canadian Botanical Association – L'Association Botanique du Canada
Summary of Teaching Panel held Friday June 4, 2010 at the University of Ottawa

“Best Botanical Teaching Practices: Reaching Students in the Classroom, Lab, and Field”

Moderators: Frédérique Guinel (Wilfrid Laurier University) and Vipen Sawhney (University of Saskatchewan)

Panellists:

Mihai Costea, Wilfrid Laurier University
Art Davis, University of Saskatchewan
Kate Frego, University of New Brunswick
Larry Peterson, University of Guelph
Jane Young, University of Northern British Columbia

Each panellist provided a two-minute commentary on teaching and learning in different settings (classroom, lab, and field).

Larry Peterson launched the session by indicating the importance of hands-on learning in the lab, commenting on the value of self-directed student projects. Such projects enable the students to take ownership of their learning; as a result, these are more committed to the process and do better overall. He cautioned the audience that even though the projects should be student-directed, checkpoints and due dates are required to ensure that the students stay “on track”.

Kate Frego discussed the collective and interactive roles of the teacher, the learner, and the material, describing the pair wise interactions between each set of elements, and stressing the ultimate goal in which the learner and his or her material can interact in the absence of the teacher. She emphasized the importance of demonstrating to the students that Botany is extremely relevant to everyday life.

Mihai Costea extolled the virtues of learning in the field, and suggested that “bringing the student to the plant” will more effectively engage the student than “bringing the plant to the student.” He mentioned three points which for him explain why the field is a better platform than the classroom to teach plants: 1). Nature is compelling; 2). The field is unpredictable and learning there is thus based on surprises; 3). Fieldwork breaks barriers between the instructor and the students but also between the students themselves.

Jane Young brings to the classroom respect, social interaction, and ethics in learning, commenting on the social nature of learning and science. She described herself as a “life-long learner”, and told the audience that she lets her students know she is not an expert, and that together they are on a journey of learning. She likes to celebrate diversity and she encourages her students to become interactive so that their views may be heard. She also described successes she has had with role-playing in the classroom.

Art Davis discussed the complementary roles of the lab and lecture, indicating how one feeds into the other to enhance learning, and that repetition and synchronizing the key topics in different setting reinforces the understanding of concepts. He also commented on the value that students from different backgrounds (agricultural, urban) can add to the classroom dynamic.

After the panellists gave their introductory commentary, the floor was opened to questions.

The first question, directed at Mihai, was, “Do you think field courses should be mandatory for botany students and/or botany Honours students?” He responded that in an ideal world, all biology students would have access to the field, but acknowledged that the number of students and cost can quickly become limiting. Some suggestions on ways to expose more students to the field were made. One suggestion was that class, seminar, or lab time be used to take students to areas just off campus (i.e., in a Scavenger Hunt, Self-Guided Tour, or Sketching Exercise). Such excursions could be informal, and would be more for engagement than for serious field study. Adding a “contest/prize” element helps to awaken the interest of students not enamoured of plants. The winter season would not necessarily curtail such activities, as students could do simple twig identifications, or even visit arboreta, nurseries, and commercial greenhouses. Students in the audience attested that field study was critical in capturing their interest in plants. A take-home message was that field study is critical to the appreciation and understanding of plants, and that Departments should make every effort to subsidize the costs to students.

The panel was also asked how they handle students who are not particularly interested in plants, but want to get the highest marks possible with the least effort, i.e., students who feel “entitled to A+s”. Panellists all seemed to have experienced this dilemma, and suggested that assigning group work and group projects tend to be a useful mechanism to ensure that “entitled” students know the effort they need to make to perform well. In group work, the good students must give clear explanations to the less strong students; thus learning is transferred to a different level, that of communicating knowledge to other students rather than to the instructor.

When asked, “In light of the development of highly-illustrative on-line virtual labs, are hands-on labs really needed?” The response was overwhelmingly positive, all panellists mentioned the high value labs have in learning, and in giving a “rainbow of learners” a different venue in which to learn. Labs essentially serve three large roles: (1) to give students hands-on skills, (2) to provide an opportunity to better understand and learn, and (3) to offer a safe place where students can collaborate and interact. However, it was recognized that the costs of labs can be very high. It was mentioned that the key first step in setting out a course is to think about the learning objectives and deliverables, and being creative in designing inexpensive lab exercises which can address those objectives. It might be possible to adjust the lab so that the students do more in a shorter time, or employ tutorial sessions to accomplish some of the deliverables. As of now, there does not seem to be a database of information about which institutions have labs for which courses.

(Continued)

With respect to online labs and online courses in general, some interesting discussion ensued. Many present suggested that labs appeal to the 3D tactile nature of learning (learning with the sense of touch, which cannot be replicated by a picture). Certainly, several examples were given in which online labs were instated and then retracted due to student revolt. However, web learning can provide other mechanisms of hands-on and real-world learning. For example, a student in the audience related that she needed to talk with a farmer for one of her online courses; this gave her the opportunity to discuss with him/her and to get a better understanding of agricultural practices.

A final question was posed to Art Davis: "How do you employ technology in the classroom; what works and what doesn't?" Art has obviously done a lot of thinking about the best way to employ technology, and described how he uses a combination of "skeleton Powerpoint notes" (i.e., "fill-in-the-blanks": the notes are incomplete and used as an incentive for students to come to lecture), the old-school overhead projector, and an overhead digital visualizer (e.g., "ELMO") to display actual materials (e.g., pine cones on a document projector). He attempts to accommodate the largest number of students by employing the technology in many different ways, recognizing that there exist different types of students with different learning styles. He also

commented that he uses course management tools (e.g., Blackboard, WebCT, Moodle) to provide handouts to the students that they themselves must print out. The panel and audience assented that this is now a fairly common practice, not only cost-effective but likely more environmentally-friendly, as some students will use their computers to view the notes directly.

The overall feeling from those who participated to the Teaching Panel (and the whole Teaching Session) was that it was an immense success, and a very valuable component of the CBA/ABC experience. Audience members and contributors alike felt energized and ready to enter the classroom, lab, and field, armed with fresh enthusiasm and ideas. The Teaching Section would like to build on this success for next year, and plan on having another half day dedicated to teaching, and hope that the turnout and participation in St. Mary's University (Halifax) are even greater than in Ottawa.

Cynthia Ross Friedman, Chair
Teaching Section, Canadian Botanical Association –
L'Association Botanique du Canada with Frédérique Guinel
and Vipen Sawhney



The panellists participating in the discussion. From left to right Larry Petersen, Kate Frego, Mihai Costea, Jane Young, and Art Davis

“Planting” Life in Crisis: the Schad Gallery of Biodiversity – A Community Effort

*Deborah Metsger, Assistant Curator, Botany, Department of Natural History,
Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario, M5S 2C6*



Fig 1. The entrance to the gallery and “Bull” the White Rhinoceros

An Introduction to the Gallery

In January 2007, the Royal Ontario Museum received a generous gift from Robert and Elizabeth Schad with which to build a new gallery of biodiversity. Their charge was not only to create a world-class exhibit showcasing the museum's natural history collections, but to do so in an innovative and provocative manner that broadcasts the perilous state of biodiversity on earth and the need for humans to take responsibility so as to avert its demise. A partnership was struck with the Schad's charitable foundation, the Earth Rangers, to create a state-of-the-art broadcast studio and theatre for live programs and teaching within the 10,000 square foot gallery. Two live exhibits were commissioned – a leaf cutter ant colony and a saltwater aquarium with a coral reef – that would showcase complex interactions between species. Finally, the design firm Reich and Petch International were hired to work with the seven-member curatorial team to develop an intellectual framework for the gallery, design it, and populate it with specimens. The time frame – less than 2 years!

Life in Crisis: The Schad Gallery of Biodiversity opened to the public on May 16, 2009 and contains 2500 specimens organized around three themes – **Life is Diverse** **Life is Interconnected** **Life is at Risk**. These are depicted in stories throughout the gallery. The gallery is physically divided into three experience zones: The Earth Rangers Studio, The Biodiversity Spine and the Ecosystems.

The Biodiversity spine running down the middle of the gallery uses specimens to explore concepts in biodiversity: what we do and do not know; the role of museum collections and research in documenting biodiversity; species at risk; the natural distribution of biodiversity as widespread or endemic species; distribution of domesticated and invasive species at the hands of humans; and areas of conservation concern that may be a biodiversity hot spot like Indo-Burma or a cold spot like the Pacific Northwest Temperate Rain Forests. Seven ecosystems, both aquatic (WA, CR, and GL) and terrestrial (GL, Arctic, TF, and BF) line the perimeter.

A ceiling case of birds, bats, and insects spans from the tropical to the boreal forest ecosystems to simulate their migration, while sharks and a narwhal float along the ceiling adjacent to the ocean ecosystems.



Fig 2. View inside the Gallery

The Process of Gallery Development

The average visitor walking through a Museum gallery may not think about the process of building it: what does go on behind the notices announcing a new or renovated exhibit? An interpretive plan with a concrete message is usually developed first – in this case around the themes mentioned above. The design team then determines how to position the messages within the gallery space so that the spatial flow complements and facilitates the intellectual content. With a floor plan in hand attention turns to the content of each display case. How many stories can be told? How many specimens will fit? Which specimens best tell the stories? What do we have and what can we get? How much room is there for labels?

The Challenge of Plants

As botanists we all know there is a disconnect between the dried pressed plants that we preserve as herbarium specimens and the appearance of the live plant growing in the wild. Photographs or illustrations help to bridge the gap

but in their absence it is often hard for a non-botanist to appreciate the two-dimensional specimen. What to us may be a beautifully prepared specimen to many others is drab, boring and lacking the charisma of an animal mount. Then there is the problem of fading. We learned through previous gallery projects that most pressed plants – even if purpose-collected and well-prepared will lose their colour within six months to a year when exposed to ambient light. They very quickly turn ghost-like in appearance. Finally, there is the problem of displaying plants as specimens in their own right rather than simply as scenery or a backdrop for animal mounts.

An obvious solution to these problems is to produce life-like models of plants. This is indeed an option but a very costly and time-consuming one. Our initial projection of time required to model plant specimens for this gallery was more than 300 days. Since some individual species would take up to 4 weeks on their own there simply was not time to model them all. Given the tight timeline for this gallery we had to scrutinize which plants could be modeled and which could potentially be portrayed in some other way. Numerous sources and techniques were explored. Commercially available silk plants are not scientifically accurate. Freeze-dried plants were too brittle, had poor colour retention and lost their shape over time. Embedding plants in resin was similarly rejected due to the cost and the difficulty in retaining accurate colours – most plants turned brown from the heat of the resins.

Real Plant Solutions

The three techniques that proved successful for preserving the three-dimensional structure of plants were drying: (1) in silica sand; (2) preserving in a solution of glycerine and water and (3) dry-hanging.

Extra-fine silica sand worked particularly well for drying Arctic species with small leaves and flowers including *Saxifraga tricuspidata*, *Empetrum nigrum*, *Vaccinium vitis-idaea*, *Androsace septentrionalis*, *Salix reticulata*, and *Betula glandulosa*, some orchid species including *Spiranthes* spp., *Calopogon tuberosus*, and more robust plants like *Sarracenia purpurea* and *Persicaria amphibia*. Whole clumps or individual pieces of a particular species were placed in a container and buried by slowly drizzling sand over the entire assemblage. This was often a two-person job – one to hold the plant in position and the other to literally spoon the sand on. The bucket was then placed in a standard herbarium drier for a couple of days before the sand was carefully decanted off. Length of treatment and the additional use of heat varied for each species and was really a matter of trial and error. The drier helped to keep the sand from absorbing humidity since this work was done in a non-climate controlled room in mid-summer. Thin flower petals are very fragile and sometimes had to be augmented with wax or replaced all together for display. Care was required when removing the plants from the sand as they are brittle. Although silica sand was not an appropriate drying medium for everything, in the end more than 25 different species were preserved in sand.

Conifers, mosses, and succulent plants like *Suaeda calceoliformis* and *Salicornia rubra* preserved better in a solution of glycerine and water than they did in sand. Plants and branches were placed in large vats of solution and weighted down with metal washers so they would not float. Again the treatment period varied from one to two days for herbaceous plants to more than two months for a five foot



Fig 3. A peatlands plant box from the Boreal Forest display.



Fig 4. *Saxifraga tricuspidata* from the Arctic Ecosystem.

long branch of red cedar. Once removed from solution the conifers were sprayed with poly vinyl acetate (PVA) adhesive as a further means of securing the needles. Thin-leaved grasses were dried using the traditional method for herbs. Fresh clumps were bound tightly with linen tape and then hung upside down in a drier with the shelves removed for three to five days. The broad-leaved *Pennisetum purpureum* posed more of a problem as its leaves shriveled when dried. In the end it was treated like an unruly head of hair - a blast of steam from a hand steamer was used to unfurl the leaves. This was immediately followed by running a hair straightener down them to press them into the desired position. It worked like a charm! Flowering heads were removed, sprayed with adhesive and reattached at the very end.



Fig. 5 Jenny Bull putting the finishing touches on elephant grass, *Pennisetum purpureum*.

While our aim was to replicate whole plants wherever possible there were a few instances where flattened specimens were appropriate. The Great Lakes Ecosystem includes a vignette of a marsh showing underwater aquatic plants. Over-sized pieces (larger than a plant press) of *Utricularia vulgaris* and *Vallisneria americana* were floated, then pressed and mounted on plexi-glass to depict the plant as it would appear under water. Leaves and stems of the invasive plant Kudzu, *Pueraria lobata*, were pressed and mounted in layers over a form to imitate its aggressive habit.



Fig 6 Kudzu vine, *Pueraria lobata*, in the mock-up stage.

Since the aim of the Biodiversity Spine was to show specimens in a more scientific context we chose to use herbarium specimens here, but not the real thing. In the past we had found that photocopies of specimens hold up

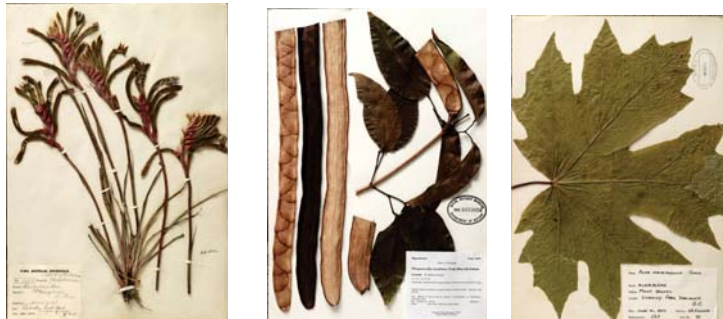


Fig 8. Digital images of herbarium specimens.

well and are thought to be real. This time we have used life-size digital images of herbarium specimens and these too are always assumed to be real.

The Artists Touch

Painting

To avoid the ravages of ambient light mentioned earlier, all of the plant material that was prepared for the gallery, both 2- and 3-dimensional, was painted. This was a collaborative effort between the botanists who researched and supplied reference materials for colour and growth habit, and the artists who had to interpret them in order to bring the plant material to life. Most often the artists had never seen the plants alive. It would seem that web resources would simplify this task, but in many instances it made it more confusing. What colour green is that leaf? – was a common question. A different colour green on every printer and monitor that we had – was often the answer! At the end of the day fresh specimens continue to be the best colour reference there is.



Fig 7. Susannah Scott painting a glycerine preserved Wollemi pine tree.

Model-Making

The team of ROM artists along with artists from Academy Studios in California made more than 50 life-like plant models for this gallery. Some, like the prickly pear *Opuntia polyacantha*, the bronze cast of *Cacao* and the bromeliad *Aechmea bromelifolia* were made from molds or patterns of real plant specimens. Others, including *Rafflesia arnoldii*, were accomplished entirely from photographs and reference to the scientific literature. Still others, like the monkeypot *Lecythis pisonis*, combined real plant material (the fruit) with modeled parts (the seeds). A range of materials from wax to flannel to copper sheeting has been used to recreate these amazing plants in precise scientific detail. It was a privilege to work with these artists.



Fig 9. *Opuntia fragilis* in preparation for the Grasslands ecosystem



Fig 10. Completed model of *Opuntia fragilis*.



Fig 11. *Lecythis pisonis* (monkeypot) fruit, shown with its frugivore, *Phylostomis hastatus*, the Greater spear-nosed bat

Collecting Plants: A Little Help from our Friends

Determining how and where to obtain fresh plant material within a one-year window was as, or more, daunting than figuring out how best to model or preserve it. It was impossible to globe-trot to all of the different ecosystems to collect plants, especially if we wanted to catch them at peak flowering or fruiting. Networking appeared to be the only way to go and Index Herbariorum was where we started. Our inquiries to herbaria world-wide garnered assistance from museum colleagues, university professors, environmental consultants, government agencies, botanic gardens, graduate students, local horticultural suppliers, naturalists and more – not to mention our immediate colleagues, families and friends. Everyone was willing to do what they could to support a display on biodiversity – and particularly to facilitate the display of plants. Scott Mori from the New York Botanical Garden helped us to acquire specimens of Lecythidaceae from Brazil; Alberta botanist Patsy Cotteril collected, and Dorothy Fabijan from the University of Alberta herbarium sent, most of the plant material required for the North American Grasslands cases. Rodger Evans and his students at Acadia University collected salt marsh plants on a botany class field trip. Rangers from Iwokrama Forest in Guyana collected the turu palm cluster. The list goes on and on but special mention goes to the Churchill Northern Studies Centre whose staff collected plants and a 500 pound lichen-covered rock for us – and obviously had fun doing it!

The process of building this gallery and populating it with plants has reinforced my sense of the collegiality of the botanical community. Further, it has highlighted the eagerness of so many scientists from all disciplines world-wide to improve the understanding of biodiversity in the hopes that we will all do a better job of protecting it. The 2,500 specimens on display at the ROM represent a very small fraction of the world's flora, but they are impressive even so. In the coming weeks a 500-year-old Douglas-fir slab and a mature bison will go on display. By next summer every specimen in the Ecosystem cases will have electronic labels so that the vast stories of interaction, threat and conservation success can be told in even more detail. This is a dynamic gallery that will continue to grow.

Fig.12. (below left) Plants displayed in the “ Biodiversity at the Hands of Humans” case.

Fig 13. (below right) Churchill Northern Studies Centre field crew wear custom-made Arctic hats.

All photos Courtesy of the Royal Ontario Museum, © ROM.



Positions Available and An Apology

The University of Western Ontario London, Ontario Canada Assistant Professor in the area of Experimental Climate Change Research

Applications are invited for a probationary (tenure track) faculty position at the rank of Assistant Professor in the area of **Experimental Climate Change Research** in the Department of Biology, Faculty of Science, at The University of Western Ontario (www.uwo.ca/biology) starting July 1, 2011. Candidates must have a Ph.D. in Biology or a related field, and postdoctoral experience (or equivalent). The successful candidate will be expected to develop an independent, externally-funded research program in Experimental Climate Change Research. Priority will be given to applicants with expertise in the areas of community ecology, plant stress biology or invertebrate neurobiology. The successful candidate is expected to contribute to the graduate and undergraduate degree programs in Biology. Experimental Climate Change Research represents an emerging area of interest in the Department of Biology, and bridges existing research strengths in stress biology and ecosystem function, and the successful candidate will complement these. The successful candidate will be housed in, and is expected to be a primary user of, the Biotron, a state-of-the-art research facility purpose built for climate change research (<http://www.thebiotron.ca/>). Consideration of applications will begin **February 01, 2011** and continue until the position is filled. Applications must include a curriculum vita, a statement of research interests, a statement on teaching philosophy, and the names of three references. Applications, submitted electronically as a single pdf file to expccres@uwo.ca should be addressed to the attention of Dr. Mark Bernards, Chair Department of Biology The University of Western Ontario

This position is subject to budgetary approval. Applicants should have fluent written and oral communication skills in English. All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority. The University of Western Ontario is committed to employment equity and welcomes applications from all qualified women and men including visible minorities, aboriginal people and persons with disabilities.

Interested in reforming Science Teaching?

Postdoctoral researchers in any field of biology are invited to participate in Faculty Institutes for Reforming Science Teaching (FIRST IV) for Postdoctoral Scholars, funded by the National Science Foundation and associated with five regional field station networks throughout the United States (locations and dates described on www.firstiv.org). FIRST IV focuses on reform of undergraduate biology education through professional development of postdocs. Participating postdocs will design an inquiry-based, student-centered undergraduate biology course.

Key elements of FIRST IV include active learning, assessment and diversity in teaching. Postdocs will attend two workshops during consecutive summers, a four-day workshop in 2011 followed by a three-day workshop in 2012. During the academic year between the two workshops, postdocs will teach all or part of an introductory biology course (e.g., cell biology, genetics, ecology, organisms, populations, evolution) at their home institution using the course framework they designed during the workshop. A team of scientists who are expert innovators, teachers, and professional developers will conduct the workshops at the field stations and mentor the postdocs during the academic year.

Who should apply? Postdoctoral researchers who have an interest in and commitment to teaching. We encourage individuals or teams of two postdocs from one institution to apply.

Cost? The NSF is sponsoring all expenses for workshop participants at field stations, including room, board, and instructional materials and will provide up to \$400 in travel expenses for each postdoctoral fellow for each workshop attended.

Questions? Contact Diane Ebert-May, Department of Plant Biology, Michigan State University, ebertmay@msu.edu



An Apology

We wish to apologize to Ms Judith Price of the Canadian Museum of Nature. The letter that appeared on page 27 of the September Bulletin should have been sent to the new acting president of the Museum, Ms. Maureen Dougan, and not to Ms Price. Sincere apologies!

Hugues Massicotte, President, Rodger Evans, Past President and Christine D. Maxwell, Bulletin Editor.

NATIVE PLANT EMBLEMS OF CANADA

14. Nunavut

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



FLORAL EMBLEM: Purple Saxifrage



Fig. 1. Purple saxifrage (*Saxifraga oppositifolia*). Photos by P.M. Catling in May 2005, on the western Newfoundland coast.

SYMBOLISM

Purple saxifrage is exceptionally beautiful, brightening the sometimes bleak northern landscape. It is also very hardy and widespread in Nunavut, making it a fitting choice as the territorial floral emblem.

LATIN NAME

Saxifraga oppositifolia L.

The genus name *Saxifraga* is based on the Latin *saxum*, a stone, and *frangere*, to break. This name was coined to apply to European species with granular bulblets, which were supposed to dissolve urinary concretions. By the "Doctrine of Signatures" of ancient medicine, plants were thought to signal their therapeutic value by some feature, and in this case the resemblance of the bulblets to urinary stones suggested that they could cure the condition. The "stone-breaker" in the name has also been ascribed to the fact that saxifrage species often grow on rocky ground, but this appears to be a misinterpretation. *Oppositifolia* in the scientific name is Latin for opposite-leaved.

ENGLISH NAMES

Purple saxifrage. Also: French knot moss, opposite-leaved saxifrage, purple mountain saxifrage.

FRENCH NAME

Saxifrage à feuilles opposées.

INUKTITUT NAME

Aupilaktunnguat. Also transliterated as aupilaktunnguaq. The name translates as "resembling something red", presumably a reference to the floral colour and/or the leaf colour in winter.



Fig. 2. Purple saxifrage (*Saxifraga oppositifolia*), photographed near Upernavik, Greenland, in 22 June 2007. Photos reproduced by courtesy of Kim Hansen (available on Wikimedia Commons,

HISTORY

a. Canada

The Nunavut Legislative Assembly's Floral Emblem Act of Oct 30, 2000 stated "The flower known botanically in Latin as the saxifraga oppositifolia and popularly known as the purple saxifrage is adopted as the floral emblem of Nunavut."

b. Foreign

Saxifraga oppositifolia is the official flower of county Londonderry in Northern Ireland.

APPEARANCE

Purple saxifrage is usually described as a herb, but its branches tend to become semi-woody, producing new growth annually at the tips, and such plants are often called sub-shrubs. Purple saxifrage is very low-growing, typically 3–5 cm (1.2– 2 inches) in height. The plants are long-lived but grow very slowly; a clump only 10 cm (4 inches) wide is probably many decades old. The branches are creeping or



Fig. 3. The Coat of Arms of Nunavut was granted by a warrant of the Governor-General of Canada on March 31, 1999, one day before the territory was created. The legislative description of it refers to the herbs below the caribou as “Arctic poppies, dwarf fireweed, and Arctic heather”. The two patches of yellow-flowered plants appear to be arctic poppy (*Papaver radicatum* s.l., often split into several species). The purple-flowered clump nearest the right rear foot of the caribou appears to be dwarf fireweed (*Epilobium latifolium*). The patch with white flowers near the left rear foot of the caribou appears to be arctic heather (*Cassiope tetragona*). Although many websites state that one of the three wildflowers on the Coat of Arms is purple saxifrage, this is an error.

mats or cushions 20–50 cm (8–20 inches) in diameter. The root system is extensive, made up of a main tap root about 50 cm (20 inches) long and many side branches. The leaves are very small (2.5–4 mm or 0.1– 0.16 inch long), triangular, leathery, fleshy, and gray-green. They overlap, somewhat like scales, and are arranged in opposite pairs, forming four rows along the stem. On the flowering stems, the leaves are more widely spaced and often do not overlap. Bristle-like hairs occur on the leaf edges. The foliage turns red in the fall. Some of the leaves live through the winter and become green again in the spring, others last only one season, hence the term “semi-evergreen” is applied. Each flowering stem bears a solitary flower, 1–1.5 cm (0.4–0.6 inch) across, and since there are often numerous flowering stems close together, a clump of plants appears to be covered with flowers. Although normally purple or lilac, the flowers are sometimes pink, pale red, or rarely white. Flowering begins in spring, and in some localities blooming occurs throughout the summer. The fruit is a brown or purplish-red dry capsule 5–7.5 mm (0.2–0.3 inch) long, which splits apart at the top to release the 50–100 tiny, smooth, brown seeds.

CLASSIFICATION

Family: Saxifrage family (Saxifragaceae).

Purple saxifrage is a very variable species. Two major evolutionary groups have been identified, one in East Asia

and North America and the other in Eurasia. Within North America, some studies (including chloroplast DNA analysis) have supported the recognition of subsp. *glandulipsepala* of much of western Canada and the arctic islands, and subsp. *oppositifolia* of eastern Canada and the southern range limit in the western mountains. However, the single morphological character separating them (glandular hair on the sepals of the former) is variable, and the most recent evaluation has recommended against recognition of subspecies in North America.

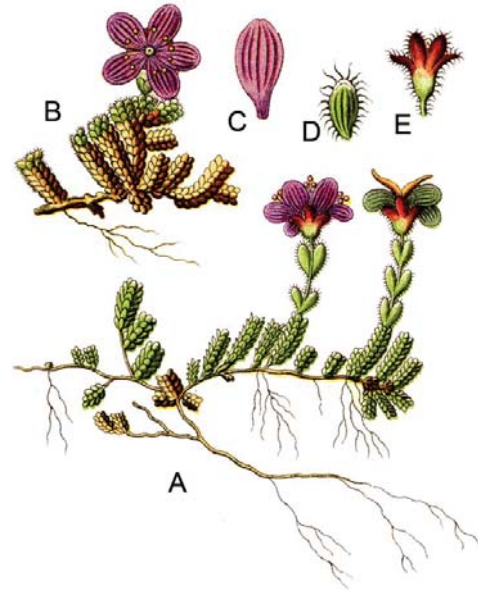


Fig. 4. Purple saxifrage (*Saxifraga oppositifolia*) ; A, B: flowering plants; C: leaf with ciliate margin ; D: petal ; E: calyx. Source: Sturm, J., and Krause, E.H.L. 1902. J. Sturm's Flora von Deutschland. K.G. Lutz, Stuttgart, Germany. Vol. 7, plate 54.

GEOGRAPHY

The distribution of purple saxifrage is circumpolar, with plants in the arctic regions of both North America and Eurasia. The species is also alpine, occurring at altitudes up to 3,800 m (12,500 feet) in high mountains like the Alps and Pyrenees in the Old World, and in high alpine areas in British Columbia and Alberta. Purple saxifrage is found in the northernmost regions accessible to higher plants and is also among the flowering plants reaching the highest elevations in the Alps. In Canada, it grows from the Yukon to Ellesmere Island and from northern Quebec to Newfoundland. The species extends south to Washington, Oregon, Montana, Idaho, and Wyoming. In the southern parts of its range, it has persisted as a postglacial relict in the higher elevations of New England and in the Corney Brook gorge of Cape Breton in Nova Scotia where other arctic relicts are found.

Hybridization between *S. oppositifolia* and *S. biflora* to produce *S. ×kochii* has been reported in Europe but no hybrids are known in North America. Intermediates between the subspecies mentioned above might be interpreted as hybrids but have been treated most recently as continuous variation within the species. *Saxifraga ×nathorstii* from northern Greenland is thought to be a hybrid of *S. oppositifolia* and *S. aizoides*



Fig. 5. North American distribution of purple saxifrage (*Saxifraga oppositifolia*).

ECOLOGY

The arctic environment is extremely harsh and difficult for flowering plants, but purple saxifrage is so well adapted that it experiences very limited competition from other plants. It is abundant throughout much of its distribution area, and is one of the first colonizers after glacial recession. The arctic summer is very short, and temperatures infrequently rise above 10 °C, requiring physiological adaptation to low temperatures and to intermittent freezing of tissues. The intertwined, hairy stems of purple saxifrage tend to act like a tent, providing a protected, relatively warm space that promotes growth. The reddish colour developed by the foliage of the plants in the fall has been observed to increase absorption of heat from the sun. The habit of growing close to the ground protects the plant from abrasion by wind-driven sand and snow, and protects the flower buds over the winter. The subsoil in the Arctic is permanently frozen, the uppermost part thawing annually. On sandy and gravelly soil, on which purple saxifrage occurs, thawing is much deeper than on poorly drained peaty soil, of which only the top few inches may thaw. Soil movement due to thaw-freeze cycles and runoff of meltwater is another major problem for arctic plants. It has been observed that tufted species with moderately developed tap roots, like purple saxifrage, are much more resistant to soil movement than are plants with creeping rhizomes (horizontal underground stems). Because of the cold climate, short summer, and low soil temperatures, arctic soils are relatively sterile. Bacterial decay is very limited, resulting in deficiencies of plant nutrients, especially nitrates. Purple saxifrage is particularly adapted to conditions of low nitrogen, and can grow on very infertile soil.

Habitat

Purple saxifrage grows in a wide array of habitats, including tundra, scree slopes, rock crevices, snow beds, moist calcareous gravels, ledges, cliffs, on the margins of ponds, streams, and lakes, and on seashores.

Inter-species Relationships

The principal pollinators of purple saxifrage include flies, bumble bees, moths, and butterflies. Various herbivorous animals consume the plant, one of relatively few that are common in the north. Seeds and probably flowers and flower buds are eaten by snow buntings, ptarmigan, and lemmings.

Lepidopteran caterpillars also feed on the plants. Cushions of purple saxifrage provide refuge for a variety of insects.

Pollination & Dispersal

In the high arctic, there are two growth forms of purple saxifrage: some plants are prostrate and creeping while others develop cushions. Creeping plants sometimes layer, i.e. branches take root in the soil and produce new plants, a mode of vegetative rather than sexual reproduction. However, the new plants remain very close to the original plants. Creeping plants achieve longer distance vegetative reproduction by shoot fragments. The cushion form has advantages for sexual reproduction (e.g. more concentrated floral display).

Low temperatures in the Arctic limit the number of insect pollinator species, and reduce the activity of the species that occur there. The short summer and uncertain pollination result in quite variable seed set from year to year. However, a few studies have suggested that sexual reproduction is not affected by elevation in purple saxifrage, indicating that scarcity of pollinators is not necessarily a problem at high elevations. *Saxifraga oppositifolia* flowers very early in the spring, as soon as snow-melt exposes the plants. The flowering buds overwinter in an advanced state of development, so that they are ready to expand and open at the beginning of the warm season. Once the snow cover melts, the flowers mature in only 5–16 days, and less than 2 months are required from flower opening to seed maturity. Outcrossing is promoted by flowers that are protogynous, with the female parts appearing first and male parts of the same flower developing later, this reducing the likelihood of self-pollination. The species can self-pollinate, but many plants depend strongly on insect pollination for seed set, and they attract insects by their massive floral display and copious nectar production. Seeds are usually not released from the fruits until snow covers the ground. Wind easily pushes numerous seeds away over the smooth, frozen surface.

USES

The Inuit traditionally consume the sweet flowers of purple saxifrage with seal blubber, especially where berries are not abundant. The flowers are also eaten to relieve gastric problems, but eating too many can cause diarrhea. The stems and leaves are occasionally used to make tea. In the past, purple saxifrage stems and leaves were often added to tobacco. Green, gold, and cream-coloured dyes were sometimes prepared from the plant.

CULTIVATION

Purple saxifrage is a popular plant in alpine and rock gardens, but is relatively difficult to grow in warm climates. The plant requires conditions imitating its usual arctic or alpine environment. The soil should be gravelly and rapidly draining, but kept moist. If grown on a fertile soil like conventional garden plants, purple saxifrage develops many weak stems but does not flower. In rock gardens the plant should be provided with shade from the hottest midday sun, preferably a north-facing exposure. Several cultivars are available, especially from Europe. Recommended cultivated varieties include 'Wetterhorn', with large rose-red flowers; 'Ruth Draper', a vigorous, large-flowered cultivar; 'Theoden', with large rose-purple flowers; and 'Corrie Fee', a



Fig. 6. Purple saxifrage (*Saxifraga oppositifolia*) in Ukkusiksalik National Park, Nunavut. Photo taken on July 27, 1996, courtesy of Ansgar Walk.

CONSERVATION STATUS

Purple saxifrage is a widely distributed plant, not in need of particular conservation measures, although isolated populations at the extremes of the natural range are likely genetically distinctive and so deserving of protection. Concern has been expressed about the possible effects of global warming on the species, since experiments have shown that natural populations do not react well when artificially exposed to warmer temperatures. There is also concern about trampling of clumps of the species by visitors to the north, since the plants are fragile and recover from damage very slowly.



Fig. 7. Hydathode-secreted calcite deposits on the surface of the end of the leaves of *Saxifraga oppositifolia*. Photo credit: ©Gary Steel, Cornwallis Island, Resolute Bay, Nunavut, from the publication Aiken et al. (2007).

MYTHS, LEGENDS, TALES, FOLKLORE, AND INTERESTING FACTS

- Unlike animals, plants do not usually eliminate waste products, but usually store them inside their cells in sacs called vacuoles. However, some plants absorb or accumulate excessive amounts of some compounds (especially salt in saline habitats), and often they have "hydathodes", which are specialized secretory tissues that eliminate waste or absorbed products through a leaf pore. Hydathodes (usually one, sometimes up to three) are present on the leaf apex of purple saxifrage, and a

white ring of calcium carbonate (as noted above, the soils occupied are calcareous) is frequently deposited around the pore, especially when the plants are growing on limestone rock.

- The Inuit associate the full blooming of purple saxifrage with young caribou being born, and this knowledge is useful for determining times for hunting.
- *Saxifraga oppositifolia* is one of four plant species growing on the northernmost site of plant growth on earth, Lockwood Island (83° 05' N) on the north coast of Greenland.



Fig. 8. A sculpture of purple saxifrage, the territorial floral emblem, displayed in a glass case near the entrance to the legislative chamber of Nunavut. This work is about 15 cm (6 inches) wide. Photo courtesy of S. Aiken.

SOURCES OF ADDITIONAL INFORMATION

- Abbott, R.J., and Comes, H.P. 2003. Evolution in the Arctic: a phylogeographic analysis of the circumarctic plant, *Saxifraga oppositifolia* (purple saxifrage). *New Phytol.* 161: 211–224.
- Abbott, R.J., Smith, L.C. Milne, R.I., Crawford, R.M.M., Wolff, K., and Balfour, J. 2000. Molecular analysis of plant migration and refugia in the Arctic. *Science* 289: 1343–1346.
- Aiken, S.G., LeBlanc, M.C., and Boles, R.L. 2005. Growth forms and sepal hairs of the purple saxifrage (*Saxifraga oppositifolia*: Saxifragaceae) in North America related to chromosome records and DNA information. *Can J. Bot.* 83: 1088–1095.
- Aiken, S.G., M.J. Dallwitz, L.L. Consaul, C.L. McJannet, R.L. Boles, G.W. Argus, J.M. Gillett, P.J. Scott, R. Elven, M.C. LeBlanc, L.J. Gillespie, A.K. Brysting, H. Solstad, and J.G. Harris. 2007. Flora of the Canadian Arctic Archipelago: descriptions, illustrations, identification, and information retrieval. [CD-ROM] NRC Research Press, National Research Council of Canada, Ottawa.
- Belland, R.J., and Schofield, W.B. 1993. *Salix vestita* Pursh and *Saxifraga oppositifolia* L.: arctic alpine species new to Nova Scotia. *Rhodora* 95: 76–78.
- Gabrielsen, T.M., Bachmann, K., Jakobsen, K.S., and Brochmann, C. 1997. Glacial survival does not matter: RAPD phylogeography of Nordic *Saxifraga oppositifolia*. *Molec. Ecol.* 6: 831–842.
- Guglerli, F. 1997. Sexual reproduction in *Saxifraga*

oppositifolia L. and *Saxifraga biflora* All. (Saxifragaceae) in the Alps. *Int. J. Plant Sci.* 158: 274–281.

Holderegger, R., and Abbott, R.J. 2003. Phylogeography of the Arctic-Alpine *Saxifraga oppositifolia* (Saxifagaceae) and some related taxa based on cpDNA and ITS sequence variation. *Am. J. Bot.* 90: 931–936.

Jones, V., and Richards, P.W. 1956. Biological flora of the British Isles: *Saxifraga oppositifolia*. *J. Ecol.* 44: 300–316.

Kume, A., Nakatsubo, T., Bekku, Y., and Masuzawa, T. 1999. Ecological significance of different growth forms of purple saxifrage, *Saxifraga oppositifolia* L., in the high Arctic, Ny-Ålesund, Svalbard. *Arctic, Antarctic, Alpine Res.* 31: 27–33.

Mallory, C., and Aiken, S. 2004. Common plants of Nunavut. Nunavut Dept. Education, Nunavut Wildlife Management Board, Canadian Museum of Nature. National Printers, Nepean, ON. 400 pp. (200 in English, 200 in Inuktitut).

Porsild, A.E. 1957. Illustrated flora of the Canadian Arctic Archipelago. Bulletin No. 146. National Museum of Canada, Ottawa, ON. 209 pp.

Savile, D.B.O. 1972. Arctic adaptations in plants. Research Branch, Canada Dept. Agriculture, Ottawa, ON. 81 pp.

Stenström, M., and Molau, U. 1992. Reproductive ecology of *Saxifraga oppositifolia*: phenology, mating system, and reproductive success. *Arctic Alpine Res.* 24: 337–343.

Stenström, M., Gugerli, F., and Henry, G.H.R. 1997. Response of *Saxifraga oppositifolia* L. to simulated climate change at three contrasting latitudes. *Global Change Biol.* 3(Suppl. 1): 44–54.



Fig. 9. The Nunavut purple saxifrage coin issued in 2008. This is part of the provincial and territorial symbols gold coin series (99.999% 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 was \$1676.95. Only 1400 coins were minted. Coin image © courtesy of the Royal Canadian Mint.



TREE

Nunavut does not have an arboreal emblem, although before it was split off from the Northwest Territories the arboreal emblem of the region was the jack pine (*Pinus banksiana*).

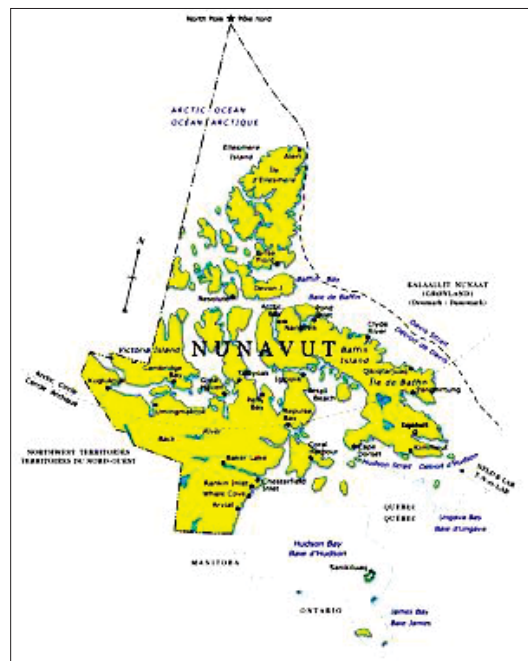


Fig. 10. Map of Nunavut.



Fig. 11. The northern treeline of Canada.

The treeline

Nunavut is largely above the treeline, a critical consideration with respect to the subject of an official tree for the territory. The Canadian Arctic includes all land surfaces north of the tree-line, which approximately includes the area of Canada north of the 10 °C (50 °F) isotherm for the warmest month of the year. To the west, in the delta of the Mackenzie, the tree line extends to 68° 40', almost reaching the shores of the Arctic Ocean. To the east, the tree line is deflected southeasterly. The northern Canadian tree line runs from the northwest in the Yukon Territory southeastward across the southern end of Hudson Bay, northeast across Quebec to Ungava Bay, and then more or less southeastward to the Labrador coast. The tree line is the boundary between the boreal forest to the south and the arctic tundra to the north. However, it is difficult to draw a sharp line where plants recognizable as trees stop growing, because of the irregular, scattered geographical occurrence of woodland patches and individual trees in protected sites where tundra predominates. Because of this, some biogeographers reject

What is a tree?

A “tree” is usually defined as a tall perennial plant with a woody main trunk. Some definitions try to be more precise, for example: “A tree is a woody plant with a single erect perennial trunk at least 3 inches [7.6 cm] in diameter at breast height (DBH). Most trees have definitely formed crowns of foliage and attain heights in excess of 13 feet [4 m]. In contrast, a shrub is a small, low growing woody plant with multiple stems.” Most species that are accepted to be trees when growing in southern parts of their distribution range are much smaller near the tree line or at their altitudinal limits, where they would not be “trees” in the above strict sense (indeed, many develop into shrubs). While the definition of a tree is somewhat arbitrary, all of the arboreal emblems of Canada normally grow into quite tall plants with large trunks, so that they clearly are trees.

Genera with species that are usually trees may have species that are, at best, “dwarf trees” in the arctic. While willows are familiar trees, Arctic willow (*Salix arctica*) is remarkably small in stature. It is typically a low shrub only 1–15 cm (0.4–6 inches) tall, although known to grow to 50 cm (20 inches) in height in the Pacific Northwest. Most birch (*Betula*) species are trees, but the arctic dwarf birch (*B. nana*) similarly is a low shrub, usually not much higher than 1 m (about a yard).

the concept of a tree “line”, emphasizing that there is an “ecotone” (transitional area between vegetation associations) separating the boreal forest and the tundra. As concluded in the following paragraph regarding the definition of a tree, a treeline is somewhat difficult to define, but is nevertheless a well-established and useful concept.

An arboreal emblem for Nunavut?

Balsam poplar (*Populus balsamifera*), perhaps the most northern broad-leaved tree of Canada, is present in Nunavut, and could be the most suitable choice as an arboreal emblem. It has not been adopted elsewhere. Four other cold-hardy trees are present in Nunavut, but have already been adopted as Canadian arboreal emblems: white spruce (*Picea glauca*, the provincial tree of Manitoba), white birch (*Betula papyrifera*, the provincial tree of Saskatchewan), black spruce (*P. mariana*, the provincial tree of Newfoundland and Labrador), and tamarack (*Larix laricina*, the official tree of the Northwest Territories). Jack pine (*Pinus banksiana*), the former official tree of the Northwest Territories, also occurs in southern Nunavut. Two additional species of birch (*B. neoalaskana* and *B. occidentalis*), and trembling aspen (*P. tremuloides*) may also occur in a more limited area of the territory.

As the only one of the 13 provinces and territories of Canada lacking an official tree, the question arises whether or not Nunavut should adopt an official tree and, if so, which species is most suitable.

Trees of normal stature occur only in a small portion of the extensive land mass of Nunavut, much of which is north of the tree line. In the rest of Canada, and indeed in the rest of the world, official arboreal emblems representing political regions have been chosen because the trees have one or more of the following characteristics: 1) large stature; 2) visual impressiveness, especially in flower; 3) widespread presence in the area; 4) unique presence in the area (i.e. not present in other parts of the world); 5) current economic importance (especially for forestry); 6) strong support and lobbying by persuasive groups, such as school children, conservation groups, private industry, forestry organizations, and garden clubs; 7) possession of qualities that reflect well on the people of the region (such as resilience to an

inhospitable climate); 8) a history of use and/or significance to indigenous people; 9) ecological importance (for example, as food and habitat for wildlife); 10) an absence of negative qualities (such as weediness, toxicity, association with negative mythology or historical events, or the subject of current serious attack by diseases); 11) freedom from possible legal complications or litigation problems (e.g. associated with conservation legislation or private industry trademarks); 12) not already adopted as an official symbol in other regions.

Of the above criteria, widespread presence in the area is a notable impediment to recognition of an official tree for Nunavut. Moreover, the very few trees of conventional size are located in a small southern part of the territory, and are not representative of the territory as a whole. Additionally, trees are absent from the most populated regions of the territory. For example, the capital Iqaluit is in the treeless tundra.

The fact that Nunavut has only one official plant emblem while all other provinces and territories have at least two, suggests the desirability of recognizing an additional plant symbol. It should be noted that the official plant symbols of provinces and territories are not limited to trees and flowers. Saskatchewan and Alberta have official grasses and Nova Scotia has an official fruit. Nunavut is a unique region of Canada, and an additional symbol should reflect this uniqueness. We suggest that an “official shrub” rather than a tree would meet the need, and note a particularly interesting species for this role in the following.

Of the shrubs of the Canadian arctic, there are more species of willows (genus *Salix*) than of any other kind. At least 17 species of *Salix* have been recorded in Nunavut. Willows are particularly significant in Nunavut. The arctic willow is an important source of food for muskox, caribou, and other animals. The leaves and bark are commonly used medicinally (they contain aspirin-like chemicals). The wood can be used to make baskets, utensils, and tools, and is the only available fuel in some regions. Willows have even been used to monitor climate change. “Arctic willow” (*Salix arctica* Pall.) might be considered as an especially suitable plant for this role (judged by numbers 3 and 7–12 of the above criteria for an emblem). According to Wikipedia, “it is the northernmost woody plant in the world.”

According to *Vascular Plants of continental Northwest Territories* by A.E. Porsild and W.J. Cody, it is "the most arctic of our willows, and in North America the only one ranging north beyond the 80th parallel, and perhaps also the most adaptable as to habitat".



Fig. 12. Arctic willow (*Salix arctica*), photographed near Upernavik, Greenland, on 22 June 2007. Photo reproduced by courtesy of Kim Hansen (available on Wikimedia Commons, where copyright restrictions are noted).

MYTHS, LEGENDS, TALES, FOLKLORE, AND INTERESTING FACTS

- It has been observed that the warming climate of the north has resulted in some species of willows that

previously grew very close to the ground suddenly became capable of growing more than a metre (about a yard) tall. This has enabled large predators (wolves and bears) to remain concealed and more easily ambush caribou.

- Because of the presence of salicylic acid, willows have therapeutic properties. Salicylic acid was first isolated chemically in the early 19th century. However, since antiquity, willow infusions (teas) have been consumed as a remedy for colds and fevers, and to treat inflammatory conditions such as rheumatism, and young twigs have been chewed to relieve pain. In 1853, salicylic acid became the basis of the synthetic drug, acetylsalicylic acid. This was marketed as Aspirin (the "A" in aspirin is for acetyl, "spirin" is for *Spiraea*, the former genus of the meadowsweet, *Filipendula ulmaria*, in which salicylic acid is also found). Aspirin is one of the most widely used medications in the world.

SOURCES OF ADDITIONAL INFORMATION

Elliott-Fisk, D.L. 1983. The stability of the northern Canadian tree limit. *Annals Assoc. Amer. Geographers* 73: 560–576.



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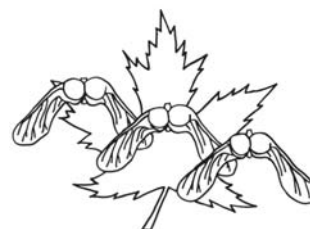
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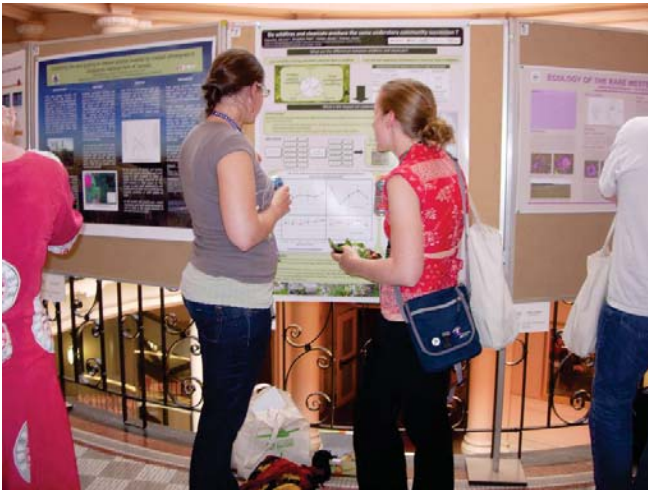
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