

Contents Table des matières

President's message
Page 25

Association News
Page 26

Botany 2008 Photos
Page 28

News from the sections
Page 29

Association awards
Page 30

Tribute to Doug Larson
Page 34

Organization of Botany
Students
Page 36

What's new in Botany?
Page 37



Native Plant Emblems of
Canada
7. Ontario
E. Small and P.M. Catling
Page 39

CBA/ABC Board for 2008-9
Page 52

The Canadian Botanical Association Bulletin



Bulletin de l'Association Botanique du Canada

September/Septembre 2008. Volume 41 No.2/ N°2

President's Message

Dear Members of CBA,

This is certainly an exciting time to be a botanist in North America. Thanks to the forward thinking and passion of my American counterpart Karl Niklas (President, BSA), discussions aimed at organizing a North American Botanical Consortium were initiated at 'Botany 2008.' While this will be a multi-year, multi-stage endeavour our initial goals are to facilitate the interaction between botany students

and all North American Botanical Associations. As a first step, I would like to extend a warm welcome to the University of Alberta Organization of Botany Students. I look forward to a fulfilling relationship between our societies, and hope that this is the first of many such endeavors from Canadian University Botany student groups. Also, you will see motions and votes regarding the sharing of ideas and resources for North America wide initiatives. Please express your support by taking part when called upon for input and votes. Also, feel free to contact the Board of Directors if you have ideas to help strengthen CBA's presence in Canada and beyond. I would also like to take this opportunity to acknowledge some past and present CBA board members. Thank you to Vipen Sawhney (retired Past-President) and Christian Lacroix (Past-President) for their mentor-ship over the past two years. Their boundless enthusiasm, insights, and collective CBA knowledge have resulted in a strong CBA and a smooth transition to Presidency. Congratulations to Vipen for his well deserved Lawson Medal. I'm sure it was a very proud moment to receive this prestigious award surrounded by members of his family, as well as his many friends and colleagues. Thank you to Santokh Singh and his group of organizers and volunteers for making the joint meeting in Vancouver with BSA, ASPT and AFS a successful and memorable 'Botany 2008.' I would particularly like to acknowledge Santokh's fund raising for student-focused venues, as well as those departments and organizations that contributed to Santokh's efforts. And last, but not least, thank you to Hughes Massicotte for six years service as CBA Treasurer, and agreeing to serve as President-Elect for the next two years. I'm sure Hughes' financial wisdom and wizardry will be most appreciated by our new Treasurer Jane Young. Finally, with the help of all CBA's membership, I look forward to the challenge of continuing to solidify our position as a preeminent North American Botanical Association.

Sincerely,

Rodger Evans



Dr Rodger Evans

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(3), must be received before **November 12th 2008**

La date de tombée des textes du prochain numéro, le no 41(3), est le **12 novembre 2008**

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Message du président

Chers membres du CBA/ABC,

Nous vivons présentement une période très excitante en tant que botanistes nord-américains. Grâce à la vision et à la passion de mon collègue américain Karl Niklas (président du BSA), des discussions visant l'organisation d'un Consortium botanique nord-américain ont été entamées pendant la semaine Botanique 2008. Bien que cela s'annonce comme étant un événement pluriannuel et multidisciplinaire, nos objectifs initiaux sont de faciliter l'interaction entre les étudiants du département de botanique et toutes les associations de botanique nord-américaines. Comme premier pas vers cet objectif, nous voulons souhaiter la bienvenue à l'association des étudiants de botanique du *University of Alberta*. Je suis enthousiaste à l'idée d'une relation prospère entre nos associations et j'espère que c'est la première de nombreuses autres associations d'étudiants de botaniques d'universités canadiennes qui se joindront à nous. De plus, des votes auront lieu concernant le partage des idées et des ressources pour les initiatives à l'échelle de l'Amérique du Nord. Veuillez montrer votre appui en participant lors de l'appel de votes et de rétroaction. De plus, n'hésitez pas à communiquer avec le comité de direction si vous avez des idées sur comment consolider la présence du CBA/ABC au Canada et au-delà de ses frontières.

J'aimerais également prendre un moment pour remercier d'anciens membres et des membres actuels du comité CBA/ABC. Un grand merci à Vipen Sawhney (ancien président à la retraite) et Christian Lacroix (ancien président) pour leur mentorat lors des deux dernières années. Leur enthousiasme sans limites et leurs idées et visions ainsi que leur connaissance globale du CBA/ABC ont permis au CBA/ABC de se fortifier et a permis une transition tout en douceur pour le nouveau président. Félicitations à Vipen pour sa médaille Lawson bien méritée. Je suis certain que ce fut un très grand moment pour lui de recevoir cette récompense prestigieuse entouré de sa famille ainsi que de ses collègues et amis. Merci à Santokh Singh et à son groupe d'organiseurs et bénévoles pour avoir rendu l'assemblée conjointe à Vancouver du BSA, ASPT et AFS un événement « Botanique 2008 » mémorable et réussi. J'aimerais reconnaître tout particulièrement la campagne de financement organisée par Santokh pour les événements des étudiants ainsi que remercier les départements et associations qui ont contribué aux efforts de Santokh. Et finalement, je tiens à remercier Hughes Massicotte pour six ans de loyaux services en tant que trésorier du CBA/ABC et d'avoir accepté de prendre le poste de Président pour les deux prochaines années. Je suis convaincu que la sagesse et l'intelligence financières de Hughes seront très appréciées par notre nouvelle trésorière Jane Young.

En dernier lieu, avec l'aide de tous les membres du CBA/ABC, je m'engage à relever le défi de continuer à solidifier notre position en tant qu'association de botanique nord-américaine reconnue.

Cordialement,

Rodger Evans

Association News / Nouvelles de l'association

ANNUAL REPORT FOR CANADIAN JOURNAL OF BOTANY (July, 2007-June, 2008)

1. Changes to Editorial Board:

Completion of term as Associate Editor: Tia-Lynn Ashman, Alex Mosseler, Jim Traquair, Mark Johnston
Associate Editors Appointed: Robert Latta, Dan Riggs, Luigi Sanità di Toppi, Alison Sherwood, Julian Starr, Vigdis Vandvik

2. Theme Papers Published:

Papers from *Vitis* symposium held at the International Botanical Congress (2005), Guest Editors: Jean Gerrath and Usher Posluszny August 2007
Papers from Ethnobotany symposium, Canadian Botanical Association meeting (June, 2006), Guest Editors: John Arnason and Alain Cuerrier February 2008

3. Special Issues Published:

Populus research, Guest Editors: Janice Cooke and Stewart Rood November, December 2007

4. Special Issues In Progress:

Systematics research in Canada, Guest editors: Anne Bruneau, Sean Graham July, August 2008
PBI (NRC), Guest Editors: Faouzi Bekkaoui, Raju Datla, Joan Krochko
CSPP 2008. Guest Editors: John T. Arnason, A. Johnson, Christiane Charest, Susan Aitken, Tim Xing, Leonid Savitch, Brian Miki

5. Theme Papers In Progress:

Stem and shoot fungal pathogens and parasitic plants: The values of biological diversity - From the XXII International Union of Forestry Research Organization World Congress, 2005, Brisbane,

Australia (Organized by Simon Shamoun).

6. Reviews/Minireviews/Commentaries Published: = 4

7. Reviews/Minireviews in progress = 3

8. General Information:

- Name change to *Botany/Botanique* with byline "An International Journal for Plant Biology": January 2008
- First prize awarded in 2008 for most cited paper: "*Cephalanthera longifolia* (Neottieae, Orchidaceae) is mixotrophic: a comparative study between green and nonphotosynthetic individuals" by Jean-Claude Abadie, Ülle Püttsepp, Gerhard Gebauer, Antonella Faccio, Paola Bonfante, and Marc-André Selosse. Vol 84 (9)

TABLE 1. GENERAL INFORMATION ON MANUSCRIPTS SUBMITTED

Category	Calendar year				
	2003	2004	2005	2006	2007
No. manuscripts handled	326	372	424	405	424
No. manuscripts accepted	162	172	173	149	124
No. manuscripts rejected or withdrawn	164	202	251	256	300
% rejected or withdrawn	50	54	59	63	71
Impact factor	0.948	1.194	1.058	1.193	-

TABLE 2. MANUSCRIPTS PUBLISHED BY CATEGORY (JulyJune)

Category	Number of manuscripts			% Distribution		
	2005-06	2006-07	2007-08	2005-06	2006-07	2007-08
Cell & Molecular Biology	25	4	6	12	3	5
Ecology	55	45	47	27	32	38
Mycology and plant-microbe interactions	29	30	17	14	21	14
Paleobotany	5	4	0	2.5	3	0
Physiology & Biochemistry	42	17	10	21	12	8
Structure & Development	16	18	20	8	13	16
Genetics	13	8	13	6	6	10
Systematics	18	13	10	9	9	8
Phycology	1	2	1	.5	1	1
TOTAL	204	141	124	-	-	-



Barry J. Shelp, Co-Editor

R. Larry Peterson FRSC, Co-Editor



The auctioneer will be in action at Acadia!

Bring your botanical items, knick-knacks, and other paraphernalia to the conference next May!
All proceeds go to a worthy cause...to help bring more students to the conferences through the Macoun Travel Bursary!



Kate Frego visits a tree. Photo: C Maxwell



Plenary session. (Left to right) Santokh Singh, Paul Stamets, Karen Renzagalia, and Pam Soltis.



Nancy Turner leads field trip. Photo: U Posluszny



The reception. (L to R) Iain and Sylvia Taylor, the editor, Roy Taylor, unknown and Janet Taylor. Photo: K Frego.



Ethnobotany Field trip. Photo U.Posluszny



Banquet tent. Photo: C. Maxwell



Vipen Sawhney (Centre) celebrates with Art Davis, (left) and Santokh Singh.



Larry Peterson launches his book. Photo: C.Maxwell



Dave Giblin(centre) and Mt Baker field trip group

Christian Lacroix(right) hands over the CBA/ABC seal to Roger Evans. Photo: M Coleman



News from the Sections



Photo: C. Maxwell

Mycology section

Report of the Mycology Section meeting July 28 2008

(Botany 2008, Vancouver)

In attendance: Larry Peterson (U. Guelph), Irene Mckechnie (UNBC),

Michael Keefer (consultant), Linda Tackaberry (recording) (UNBC), Sue Robertson (UNBC), Hugues Massicotte (UNBC, co-chair).

This meeting was rescheduled by the Meeting organizers and we had only a few attendees over the lunch hour. No minutes from last year were provided. Linda T. was appointed the recording person.

1. Hugues provided an update on mycology-sponsored events at the meeting. These included the sponsored symposium (Plants and Fungi growing together) organized by Dr. Darlene Southworth and Dr. Hugues Massicotte. Six speakers, 3 from the USA and 3 from Canada, will explore the theme. In addition, Dr. Mary Berbee, UBC, has agreed to deliver the Weresub memorial lecture at the meeting.
2. Hugues indicated that in spite of email and Bulletin reminders, we had no submissions for the Weresub award this year (we had 2 co-winners last year). We will continue to entice people to submit applications for this prestigious award.
3. Shannon Berch communicated to us (pers. comm.) that she was unsuccessful in getting a response from Mycologia to obtain permission to use the official biography of L.K. Weresub. She will keep on trying.
4. Judges (for next year 2009) suggested were Hugues, possibly Shannon. We will need to confirm these, and possibly others.
5. We had a brief discussion about Weresub lecturers for next year. Hugues will contact and brainstorm with Shannon Berch for possibilities.
6. We discuss themes for symposia for 2009. A theme of mycorrhizal fungi/decomposing fungi interface was suggested. Possible contributors might be Bill Chapman, Shannon Berch, Richard Winder.
7. Hugues and Shannon will continue to co-chair the Mycology Section for another year.

Respectfully submitted (acting note taker)
Linda Tackaberry

Plant Development Section

We are pleased to announce Julia Nowak as this year's winner of the Taylor Steeves Award. The title of Julia's paper is "The role of abscission during leaflet separation in *Chamaedorea elegans* (Arecaceae)" and is published in the International Journal of Plant Science (168(5):533-545). Congratulations, Julia!

We are strongly urging students of structure and development and their professors to submit applications or

nominations for this award before April 18, 2009. It would be wonderful to receive applications to honour Taylor Steeves for his numerous contributions to botany and to the CBA. For more information or to submit applications or nominations, please contact Dr. Usher Posluszny, College of Biological Science, University of Guelph, 50 Stone Rd. E., Guelph, Ont. N1G 2W1 or at uposluszn@uguelph.ca.

Jane Young

Systematics and Phylogeography section

The CBA/ABC Systematics and Phylogeography Section co-sponsored (with ASPT and BSA) the symposium, "Phylogeography of North America with insights from paleontological, geological, and molecular data," organized by Anne Bruneau.

Jeff Saarela, of the Canadian Museum of Nature, won the Section's 2008 Alf Erling Porsild Memorial Award for his paper, "Molecular phylogenetics of *Bromus* (Poaceae) based on chloroplast and nuclear DNA sequence data" (Aliso 23:450-467 and pages 450-467 in Monocots: Comparative Biology and Evolution (Poales)).

Volunteers are sought to represent the Section in judging the 2009 Cinq-Mars Award for best student contributed paper at the CBA/ABC meeting at Acadia University. Suzanne Warwick, Marian Munro, and Mihai Costea have volunteered to judge the 2009 Porsild Award. Section members will be polled by e-mail for their suggestions for invited speakers at the Acadia meeting next year.

Tim Dickinson

Teaching section

A small group met for the Sectional meeting in Vancouver and discussed plans for the CBA meeting next year at Acadia. We are hoping that Kate Frego, a winner of the 3M teaching fellowship this year, will be invited to give a talk, maybe a plenary lecture at Acadia. In addition, a session of contributed papers on teaching is planned.

Karl Niklas, the new President of the Botanical Society of America, as his inaugural address and gift to all plant societies, produced the multi-media event, "**Botany without Borders**." The short clip (10 minutes) outlines the importance plants and those who study them. It explores the magic and wonders plants represent and the people who unlock their secrets. The video was very well received, and is available free of charge. See the website below.

<http://www.botany.org/botany-without-borders.php>

Carl Wieman, a Nobel Prize winner, gave an excellent presentation, which unfortunately was missed by many because of scheduling changes and conflicts. The presentation "**Science Education for the 21st Century. Using the tools of Science to teach science**" is available on the CBA/ABC website under the Teaching Section.

Christine Maxwell and Cynthia Ross-Friedman.

Association awards for 2008

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

(A) Recognition of a single outstanding contribution to botanical knowledge

(B) Recognition of cumulative, lifetime contributions to Canadian botany

This year, the Lawson medal is awarded to Dr. Vipen K. Sawhney in recognition of lifetime contributions to Canadian botany. Vipen received his PhD from the University of Western Ontario in 1972 and was a post-doctoral fellow at Simon Fraser University in British Columbia from 1972 to 1975. He was hired as an Assistant Professor at the University of Saskatchewan in 1975 and has been developing his career at that institution since then.

A record number of letters of support were submitted to support Vipen's nomination and all of them were consistent on one theme, his tremendous list of accomplishments

I would like to share with you some of the comments I had the privilege of receiving: "Vipen has had a very productive scientific career, focusing on plant hormones (particularly cytokinins) and their roles in plant development and reproduction, and stress response, as well as 'everything' tomato, having published over 100 refereed articles in well recognized National and International journals, a number of book chapters and he has also co-edited a book entitled 'Pollen Biotechnology for Crop Production and Improvement'... Vipen's excitement for research continues to this day with his 'new' area of research, pollen and seed proteomics - again with some emphasis in tomato. He continues to participate at National and International meetings and takes his role in both the National and International research communities very seriously, having previously been both the vice-president and president of the Canadian Botanical Association and the president of the International Association of Sexual Reproduction Research."

"Vipen is a first-rate teacher, having been involved in sole- and team-teaching of a myriad of courses ranging from first-year general biology to his third-year course and graduate-level courses in plant development. He takes university teaching seriously, and it is no surprise that he has been nominated several times by undergraduate students for teaching excellence awards of the University of Saskatchewan Students' Union. In 2007, his effectiveness as a teacher was recognized when he became the University's recipient of the Master Teacher Award, a competitive award presented at the regular convocation ceremonies that several Department faculty attended. Vipen is humbled but very proud and pleased to have been such a recipient. It marks the second time that a Department of Biology faculty member has been so recognized at the University level, the other individual being Prof. Emeritus Taylor A. Steeves. This event alone puts Vipen in very select company as a teacher, indeed!"

Dr. Sawhney, On behalf of the Canadian Botanical Association / L'association botanique du Canada, congratulations on your award !

Christian Lacroix



Vipen Sawhney receives his award from Christian Lacroix. Photo: S. Singh

Mary 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. Before her death in 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.

This year, the award goes to Douglas Larson (U of Guelph). Doug was active in the CBA in the 1990s, particularly in the Ecology section. In addition, he served as Vice president in 1994-95, when he was the organizer of a successful conference held at Guelph. Doug is very well known by members of the association, however, for his hand-crafting of personalized Mary

Elliott awards, which he has been making since the first one, awarded to Iain Taylor in 1989. Between 1989 and 2007, Doug made the individual awards for a total of 15 people.

The letters of support that were submitted were consistent on one theme, Doug's ability to link our Elliott award recipients' background to a truly personalized plaque or trophy design. I would like to share with you some of the comments I had the privilege of receiving:

"With his creative talents, Doug managed to design awards which effectively formed a link to the winner's background and, according to Iain Taylor, very often links to one or more of their quirks! All of us who have received these personalized awards will most certainly treasure them because they are more than just a plaque. They are the personal expression of a truly remarkable individual. Doug has always been keen to have whatever he crafts tell a story. ... Doug represents many people in CBA who quietly work behind the scenes. They're not looking for credit or recognition, they just want to help out."

Doug was not able to attend the meeting but his award was presented to him in Guelph by Usher Posluszny, along with a small photo album containing the photos of the awards and their recipients. These are also shown as a tribute to Doug on pages 34 and 35 of this issue.



Usher Posluszny (left) presenting the Mary Elliott award to Doug Larson.
Photo: Larry Peterson

Student awards and travel bursaries

Awards for papers published by students.

J. Stan Rowe Award and Luella K. Weresub Award. There were no awards for 2008.

Alf Erling Porsild Award

This award was established to honor the memory of the eminent Arctic botanist Alf Erling Porsild. It is awarded in recognition of the best paper published in the field of systematics and phytogeography by a graduate student.

This year, the award goes to: Jeffery M. Saarela for a paper co-authored with Paul Peterson, Ryan Kean, Jacques Cayouette and Sean Graham entitled 'Molecular phylogenetics of *Bromus* (Poaceae: Pooideae) based on chloroplast and nuclear DNA sequence data published in *Aliso*.

Taylor Steeves Award

This award was established to honour Taylor Steeves who has made numerous contributions to the CBA/ABC and to botany. It is awarded in recognition of the best paper published in the field of plant development by a graduate student.

This year, the award goes to Julia Nowak for a paper co-authored with Nancy Dengler and Usher Posluszny entitled 'The role of abscission during leaflet separation in *Chamaedorea elegans* (Arecaceae)' published in the *International Journal of Plant Sciences*



Julie Nowak receiving the Taylor Steeves award from Christian Lacroix. Photo: C Maxwell

Student Awards for Oral and Poster presentations

Iain and Sylvia Taylor award

The Canadian Botanical Association gives an award for the best student poster presented at the Annual Meeting. The award is made in honor of Iain and Sylvia Taylor, two members who have for many years actively contributed to the development of the CBA.

Posters are evaluated by a panel of judges, chaired this year by Christine Maxwell. The judges were Jean Gerrath, Marian Munro, Iain Taylor and Rob Guy.

The judges noted the high standard of the posters, and were very pleased to see that a number of the posters were done by students at the Undergraduate level.

Continued

This years winner was Martha Coleman for her poster, co-authored with Ania M. Wiczorek, .
 "Developing a molecular diagnostic tool for invasive alien species utilizing a RAPD-SCAR approach in *Leptostemonum* (Dunal) Bitter (*Solanum* L.; Solanaceae)."



Ryan Pettersson

Martha Coleman (right) receiving her award from Iain and Sylvia Taylor.



Honourable Mention was given to Ryan Pettersson for his poster co-authored with Atsuko Tsukamoto, Jarnail Mehroke and Santokh Singh.
 "Senescence-related changes in climbing hydrangea (*Hydrangea anomala*) leaves during development"

Lionel Cinq Mars Award

This award was established in 1976 "for the best oral presentation by a student of his or her own research, as a contributed paper at the Annual Meeting". In 1978 the award was named in memory of Lionel Cinq-Mars, a charter member of CBA/ABC and a member of the first Executive (1965-66).

Cinq-Mars (1919-1973) was an expert field botanist, amassing a personal herbarium of about 10,000 sheets. He was considered an expert on the genera *Viola* and *Amelanchier*.

Oral presentation were evaluated by a panel of judges chaired by the President-Elect, and the award was presented by President-elect Rodger Evans.

There were two winners. 1) Krystal Mathieson (University of New Brunswick, St John) for her presentation "Bryophyte-substrate associations in the Acadian Forest of southern New Brunswick", and 2) Quinn Mason (Thompson Rivers University) for his presentation, "Extraction, Partial Purification and Susceptibility Testing of a Potentially Novel Antibiotic from Lodgepole Pine Dwarf Mistletoe (*Arceuthobium americanum*)."



Rodger Evans (left) presented the award to Krystal Mathieson and Quinn Mason. Photo: M. Coleman

Student Travel Awards

The Keith Winterhalder Undergraduate Travel Award

This award was established in 2006 and is in honor of 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.

The very first recipients of this award are:
 Quinn Mason - Thompson Rivers University
 Charles Vaudry - Thompson Rivers University

Christian Lacroix(left) presented the awards to Quinn Mason (centre) and Charles Vaudry.
 Photo: M Coleman.



John Macoun Travel Bursary

This cash award, name in Honour of John Macoun in 1988 provides 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.

John Macoun (1831-1920) was official botanist on five major Canadian expeditions and was, in 1881, appointed Botanist to the Geological and Natural History Survey of Canada. He was also a member of the Botanical Society of Canada (1860-62) and was a founding fellow of the Royal Society of Canada. This year, travel bursaries were awarded to 7 students

Mariannick Archambault - Université de Montréal (IRBV)

Laura Bourque - University of Prince Edward Island

Monika Gorzelak - University of Northern BC

Carole Sinou - Université de Montréal (IRBV)

Royce Steeves - University of Guelph

Xiaofeng Yin - University of Prince Edward Island

Erin Zimmerman - Université de Montréal (IRBV)



Macoun Travel award winners

From left to right, Erin Zimmerman, Carole Sinou, Mariannick Archambault, Monika Gorzelak, Christian Lacroix, Laura Bourque, Xiaofeng Yin, Royce Steeves. Photo: M Coleman.

Regional Undergraduate Awards

The Regional Undergraduate Research Poster Showcase at Thompson Rivers University (TRU) in Kamloops on April 4th 2008 was a big success! Students from The University College of the Fraser Valley and University of British Columbia-Okanagan also participated. Just over 50 students presented their posters, and 12 were deemed to have a Botanical component.

The winner of the CBA/ABC Regional Undergraduate award was:

Natalie Jones, 4th year student (B.Sc.), TRU, for her poster "Isolated Aspen Stands: Testing the Theory of Island Biogeography"

Supervisor: Dr. Lyn Baldwin



Natalie Jones with her certificate. Photo: Kevin Mehr

A Tribute to Doug Larson. Mary Elliott awards 1989-2007. The awards and their recipients.



Rear view

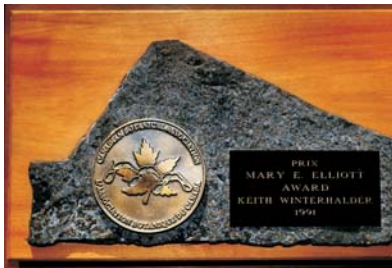
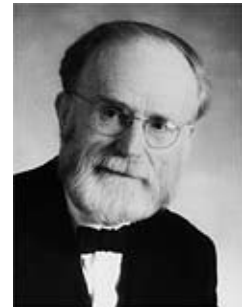


Front view

1989 Iain Taylor



1990 Taylor Steeves



1991 Keith Winterhalder



1993 Irwin Brodo *With Doug's background in lichenology and my on-going interest in lichens, the trophy's meaning is fairly obvious. The base plate and plaque are set on a piece of slate, a good lichen substrate. Everything is supported on a beautifully crafted little "fence" covered with the bright yellow wolf lichen (Letharia vulpina), visible from the front and even more, from the rear.*



1995 Luc Brouillet *I do not know what inspired Doug in my case, to be truthful. I know that the material he used was from an apple tree in his yard. I was very touched to receive the award, and very touched at the simplicity and beauty of the woodwork.*



1996 Joe Gerrath *The Award is mounted on a piece of rock which is meant to represent a cliff of the Niagara Escarpment, and refers to my collaborative research with Doug on the endolithic algae of the cliffs.*



1997 Jean Gerrath *The award was supposed to be an egg because I'm a "good egg", and inside there's a tendril, because that's what I studied.*



No Award was given in 1992 or 1994. The 2001 award was not made by Doug. Editor's note..



1998 Christian Lacroix The plaque itself opens up to reveal hand painted grapevines inside. I did my PhD work on leaf development in the grape family.



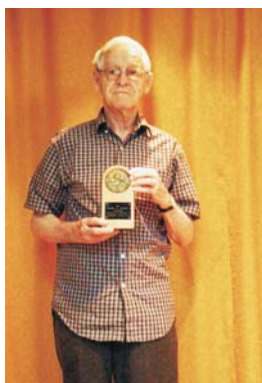
1999 Vipen Sawhney



2000 Paul Cavers "The black walnut is for the hard-core southern Ontario Cavers family. The shapes are to represent a landscape (albeit mountainous) in side profile, and a histogram (=hard-core data) when viewed from the end. The mounting of the two brass things was on two different faces because you have always looked at things from so many points of view."



2002 Hugues Massicotte. I seem to recall Doug mentioning that as a forester-biologist, I would like the shape of the cone representing a stylized tree... it is obviously made of wood, but also that it represents me trying to get to the point of an issue (!). In 2001, it was also a time of great Harry Potter frenzy, and I kept thinking that it represented my "wizard hat"! A fabulous gift to be sure!



2004 Albert Legault



2005 Paul Catling



2007 Christine Maxwell



2006 Usher Posluszny

At the Annual General Meeting in Vancouver, we considered a request by the Organization of Biology Students at the University of Alberta, to become affiliates of our Association. This was greeted with enthusiasm by the membership, and here is an article which gives some background to the group and what they do.

The Organization Of Biology Students

By John Taggart



It is easy to get lost traveling through the bicycle paths of the ravine and forested areas in Edmonton, Alberta. One could wander for days among deer and chipmunks looking at the flora and fauna of various angiosperms and bryophytes. You will, however, want to leave the woods when you come across the University of Alberta, located directly beside this sprawling urban forest. For this is the end point of many of these bike paths but only the beginning of the plant paradise that is Edmonton, Alberta. Within the walls of the university scientists tirelessly and ambitiously test the limits of human knowledge against the endless grassland that is the study of botany.

If you can get lost in the woods, you will not stand a chance of finding your way as you wander through the Universities biological sciences building! Legend has it that this building was created by three different genius architects who all hated each other. While you may be lost, great treasures await those who are brave enough to explore its twisting corridors. Perhaps you will have the pleasure of witnessing the manipulation of a plants genome by Dr. Michael Deyholos. You could also be to see Dr. Nat Kav's lab working on characterizing the proteins locked within the elusive cell wall. You may come across entire floors dedicated to many high powered lights fueling seemingly endless growth chambers.

If you were curious about the plants you saw in the ravine you could identify them armed with a dichotomous key and verify your observations among the many thousands of dried specimens collected in the herbarium. Once you know what species you are dealing with Dr. Jocelyn Hall, in her lab across the hall, could help you understand its phylogeny and closest relatives. Later you could observe some of the living relatives growing in greenhouses located atop the building and see some truly fascinating collections. If your thirst for knowledge was still not satisfied, Dr. Ruth Stockey could guide you to determine the extant relatives of the plant you question. These examples are merely the tip of the meristem of the plant research going on at the University. However, one of the greatest secrets kept by the halls of the biological sciences building is told to all those who seek its existence and this secret is the Organization of Botany Students.

The organization lies waiting for all those who can consciously identify their love of plants. Plant love is non-discriminating and the organization accepts all those who are willing to explore the cellulose within the tree of life. Membership costs only the time you are willing to spend and this time may be spent on any of and all of the Organization's sometimes aggressive projects. All members are encouraged to bring forth projects for the group to work on, financed with money from the annual plant sale. Every workshop we offer is available to each member to participate or observe. We communicate via email and as such our ranks number approximately 75 contacts. We also work closely with grad students and the faculty helping match employers to workers as well as to elicit advice for our projects. These people are all considered to be members as well. Members have opportunities to grow fungi, go to botanical gardens together, make sports teams and these are just a few of the many ideas generated within the usual discourse of the club.

The new semester is just beginning and the club's executive already has put into motion the steps necessary to do some amazing and informative workshops. While president Jason Gardiner is not going to be jet setting the globe showcasing his already impressive work with GMO's, he Will be showing members how to build binary vectors and manipulate a plant's genome. When vice president, Mattlock Bolton, is not in the lab he will be teaching other members how to propagate our favorite plant varieties and grow them in terrestrial aquarium environments. Social convener, Kailli Pigott, works to throw the greatest plant party the university has ever seen atop the students' union building. She has a lot on her hands because the guests already include every other science group campus has to offer. I, (John Taggart, treasurer) juggle the check book and figure out how we will afford all our activities. I am not worried, however, because our self-sufficient club will have no problem paying for our endeavors and awarding our annual scholarship. The scholarship and continued projects are traditions that stretch back to the early seventies. As of now, we are not sure exactly when the club was founded. From meeting minutes it seems that the club was formed in the early seventies. The one thing we all know is the Organization of Botany students is one of the University of Alberta's oldest science groups. We are proud to carry on its traditions and provide a much needed service where plant "nerds" can congregate and show their true green loving ways.

One of the greatest and longest due accomplishments of last year was the clubs recent affiliation with the Canadian Botanical Association. We are excited about the endless potential work we can do together.

Plants were the past, they are the present and there is no doubt that plants will be the future. Botany and plant science are some of greatest tools mankind keeps in its shed. Our organization is ecstatic to be able to use them on garden Earth.



The Herbarium, University of Alberta

What's New in Botany? Graduate Student Research

"Graduate Student Research" 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.

Irene McKechnie



My name is Irene McKechnie and I am a Masters of Science candidate in the Natural Resources and Environmental Studies-Biology Program at the University of Northern British Columbia. I am working under the co-supervision of Dr. Hugues Massicotte and Dr. Philip Burton. My project looks at the propagation requirements and mycorrhizal associations of two northern *Vaccinium* species, *V. membranaceum* Douglas ex Torr. and *V. myrtilloides* Michx. These species are difficult to propagate with regular success under nursery settings. When seedlings do thrive in the nursery, they often have very low survival rates when transplanted to outdoor conditions. Much of the research conducted in this discipline is performed with the commercially important highbush blueberry (*V. corymbosum* L.) and cranberry (*V. macrocarpon* Ait.) plants, whereas the behaviour of species native to B.C. is less well understood. My propagation research has compared the success of propagating *V. membranaceum* and *V. myrtilloides* using seed, hardwood cuttings, and rhizome cuttings. Currently, I am investigating the influences of inoculation with ericoid mycorrhizal fungi and soil amendment on the survival and growth of seedlings of these two species in outdoor conditions. There is great demand for the inclusion of berry-producing plants such as *Vaccinium* spp. in forest restoration and post-industrial reclamation efforts, due to their value to wildlife and traditional users of the land, and the results of my study have the potential to help make this a reality.



Irene McKechnie

Stacey Bruce



I am a Masters in Science Candidate in the Environmental and Life Science Graduate Program under the co-supervision of Dr. Neil Emery and Dr. Barry Saville at Trent University, Peterborough, Ontario. My thesis project is examining hormone production during the infection of corn (*Zea mays*) with *Ustilago maydis*. *U. maydis* is a biotrophic fungal pathogen of corn and induces smut disease in host plants, characterized most notably by the production of unorganized tumor tissue growths in above ground plant parts. Other plant disease agents such as *agrobacteria* in crown gall disease are known to induce the over production of hormones which are involved in the physiology of tumor growth; however, this has not yet been thoroughly examined in corn smut disease. To examine whether hormones are involved in the *U. maydis* corn infection process, profiles of 18 different cytokinins, as well as auxin and abscisic acid are being generated for infected and control plants during a time-course following infection and corresponding to symptoms at different infection stages. We are also examining whether the fungus itself is capable of producing these hormones by profiling axenic cultures of the haploid and dikaryon forms of *U. maydis*. All of these profiles are being analyzed with liquid chromatography - tandem mass spectrometry (LC-MS/MS). Our preliminary evidence shows Elevated cytokinins and abscisic acid in corn shortly after infection. We have also demonstrated that *U. maydis* is capable producing all three hormones studied and significant quantities of cytokinins.



Stacey Bruce

Erin Zimmerman



My name is Erin Zimmerman and I am a Master's student at the Institut de Recherche en Biologie Végétale in Montréal. I am co-advised by Mohamed Hijri and Marc St-Arnaud, and my research concerns the genetic diversity of arbuscular mycorrhizal fungi (AMF). These fungi are ubiquitous in terrestrial ecosystems and symbiotically colonize the roots of most higher plant species. AMF reproduce asexually via spores and are unique in that they possess multiple, distinct genomes within a single individual. What's more, the fungi lack a uninuclear stage in their lifecycle- at sporulation, hundreds of nuclei simply migrate from the coenocytic mother hypha into the newly formed spore. It is unclear whether the distribution of the various different genomes is homogeneous across the fungal mycelium. If it is not, we expect to see genetic variation amongst "clonal" sister spores due to differences in the complements of nuclei they receive at the time of sporulation. To test this hypothesis, I will be



Erin Zimmerman

Continued

sequencing all the variants of a particular marker gene in multiple sets of sister spores to determine whether this variation exists from one spore to another. We are also interested in how many different genomes may be present in a given individual. To this end, I have cloned the marker gene, which has two copies in my AMF species, from a gDNA sample made up of many spores from a single isolate. After sequencing nearly 200 of these clones, I found 89 different variants of my marker gene, indicating a much larger number of genomes than we had suspected. This research will help to further our knowledge of a novel and poorly-understood genetic structure.



CBA-ABC 2009



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NATIVE PLANT EMBLEMS OF CANADA - 7. Ontario

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: WHITE TRILLIUM



Fig. 1. White trillium (*Trillium grandiflorum*). Source: Canadian Heritage. 2002 (revised edition). Symbols of Canada. Canadian Heritage, Ottawa, ON. Reproduced with permission.

SYMBOLISM

In 1934, a committee was established by the Ontario Horticultural Association to study the issue of a provincial flower for Ontario. The 1935 report recommended the white trillium, stating (as cited in Pringle 1984): "We have every right to be glad this flower occupies the place of honour in the minds of so many people. It possesses most of the qualities which should mark a floral emblem. It is democratic, blooming freely throughout a great part of Ontario, and known by its correct name to nearly everyone. It is of good size and graceful appearance. It is of simple structure, lending itself to decorative design, and is still so distinctive that it is unlikely to be mistaken for any other flower. The trillium is associated with the gladness, beauty and fresh hope of spring, and so is eminently

suitable for our young country. Finally, while the plant and animal emblems of many other countries carry beaks, fangs, claws, spines and thorns, suggestive of the need of defence, the emblem selected for Ontario might well be entirely a blossom of peace, suggesting only healing and fruitfulness."

Christianity has sometimes employed the trillium as a religious symbol of the Trinity's three-in-oneness. The three leaves and three petals have been said to reflect the divine mystery of God as Creator, Son, and Spirit. The white trillium is occasionally called the "trinity lily." [Similarly, other plants that have been considered as bearing Trinity symbolism because of their three-petaled flowers include shamrock (*Oxalis acetosella*) and Virginia spiderwort (*Tradescantia virginiana*). In Europe the wild pansy (*Viola tricolor*) was once widely known as trinity flower for the three colours of the petals.]

LATIN NAMES

Trillium grandiflorum (Michx.) Salisb.

The genus name *Trillium* is based on the Greek root *tris*, meaning "thrice," reflecting the arrangement of leaves and floral parts, borne in threes. The epithet *grandiflorum* in the scientific name is Latin for "large-flowered."

ENGLISH NAMES

White trillium. Also: bath flower, big white trillium, eastern white trillium, great white trillium, large-flowered trillium, large-flowered wakerobin, snow trillium (a name better reserved for *T. nivale*, and also applied to jack-in-the pulpit, *Arisaema triphyllum*), white wake-robin. The name "wake-robin" appears to reflect an 18th century belief that northern birds hibernated, and were awakened in the spring by the appearance of the flowers. The names "big white trillium" and "great white trillium" stand in contrast to "dwarf white trillium" (*T. nivale*). "Snow trillium" reflects the early appearance in the spring, when snow may still be present. The name "bath flower" is a corruption of "birth flower" or "beth flower," discussed below in relation to gynecological use.

FRENCH NAMES

Trille blanc. Also: trille à grande fleur, trille grandiflore, trillie à grande fleur. The name pâquerette (usually translated as "daisy") is sometimes mistakenly applied.

HISTORY

a. Canada

The white trillium was adopted as the floral emblem of Ontario in 1937. Tracing back at least to 1915, the species had been among several considered for the status of a "national flower" for Canada. The proposal that the trillium be chosen as a national emblem has been credited to James Burns Spencer (1866-1950), Chief of the Publications Branch, Dominion Department of Agriculture. However, it appears that increasing recognition of the maple leaf as a national emblem limited interest in the idea. In 1934, at the 28th convention of the Ontario Horticultural Association, referred to above, a committee that included Spencer was



Fig. 2. Painting of the official flower of Ontario, the white trillium (*Trillium grandiflorum*), 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.

established to study the issue of a floral emblem for Ontario. Opinions were obtained from most of the high schools and collegiate institutes of Ontario, and this led to the association's backing of the white trillium, and eventually its adoption as Ontario's floral emblem. (For more detailed information, see Pringle 1984 and Dodds and Markel 1973.)

b. Foreign

Trillium grandiflorum was declared to be the "official wildflower" of Ohio in 1987. The deciding factor in this choice was the fact that it grows in every one of the state's 88 counties.

APPEARANCE

The white trillium tends to grow in colonies, and in some localities in Ontario the species forms extensive, dense stands that are spectacular in bloom. White trillium forms the largest populations of its genus in eastern North America, sometimes producing stands of over 10,000 individuals. As noted in Case and Case (1997), the species can reproduce clonally, i.e. vegetatively, despite statements in the literature that white trillium does not do so. The plants are 15-45 cm (6-18 inches) high, usually with a single flowering stem arising from a short, tuberlike rhizome that bears long, contractile roots. (These roots pull the rhizome downwards into the soil to compensate for the rhizomes tendency to grow up and out of the soil.) Generally one flower is developed annually per rootstock, and this is positioned at the top of the stem. Just beneath the flower, the stem bears a whorl of three "leaves" (the leaflike structures subtending the flowers are technically bracts, not leaves, but this distinction is academic since these structures are photosynthetic, like true leaves). The leaves lack petioles, and are 12-20 cm (5-8 inches) long. Trilliums usually require a minimum of 7 years to produce their first flower. White trillium often does not become reproductive for

15 years; the plants can survive for more than 30 years. The flowers are single, 8-10 cm (3-4 inches) in diameter, with three white petals 3-5 cm (1½-2 inches) long and three green sepals up to 5 cm (2 inches) long. Each flower has two whorls of three stamens, one whorl opposite the petals, the other whorl opposite the sepals. White trillium blooms from late spring to early summer from late April to late May or early June in Ontario (individual flowers are in bloom for 2-3 weeks). As the petals fade, they change to various shades of pink. Occasionally, flowers striped with varying degrees of green or completely double flowers (i.e. with extra petals) may be found (see next page). Plants with flowers that are initially salmon-pink, called forma *roseum*, are also occasionally encountered. The fruit has been reported to be green, red, or blue-black, possibly depending on age and local variation. It is a more or less globose, 6-angled, berry-like, fleshy capsule about 1.2-1.6 cm (about ½ inch) long, and matures in the summer. Typically a fruit will develop about 16 small, brown seeds. Leaves completely deteriorate by mid-summer, and the plants are dormant until the next spring.

CLASSIFICATION

Family: Traditionally and still generally placed in the Liliaceae (lily family), and sometimes placed in its own segregate family, the Trilliaceae; more recently allocated to the Melanthiaceae on the basis of molecular evidence.

The genus *Trillium* has 43 species of perennial herbs, which occur primarily in North America, with a few in Asia. Of the six species native to Canada, five are found in Ontario, one in British Columbia.

Forms in White Trillium

In the past taxonomists frequently used the category of "forma" to describe minor variants. For example, white trilliums with green and white petals were named forma *striatum*. Today these are more often simply referred to as

Characteristics¹ of the common Ontario species of *Trillium*

* Denotes a character that generally serves by itself to distinguish the species.

	White trillium (<i>T. grandiflorum</i>)	Nodding trillium (<i>T. cernuum</i>)	Painted trillium (<i>T. undulatum</i>)	Red trillium (<i>T. erectum</i>)
Petioles	absent	absent	present*	absent
Typical flower colour	white, fading to pink	white	white, with reddish-purple streaks at the base*	dark red ²
Petal margin	not wavy	not wavy	wavy (undulate)*	not wavy
Flower position	erect	nodding and hidden beneath the leaves*	erect	Erect
Anther colour	yellow	pink	white or pink	maroon to yellow

¹ The drooping trillium (*T. flexipes*) is represented in Canada only by two localized populations in southwestern Ontario (http://www.rom.on.ca/ontario/risk.php?doc_type=fact&lang=&id=9). Closely related to *T. cernuum*, it has drooping white or maroon flowers on long peduncles, and relatively broad leaves without petioles.

² A common misconception is that the red trillium is merely the white trillium with aging flowers. These species are often confused because there is a white-flowered form of the red trillium.

"green-striped forms." This is only one of numerous striking variants of trilliums. Indeed, the famous Harvard botanist Merritt Lyndon Fernald, who accepted eight formae in his revised edition of Gray's Manual in 1950, described white trillium as: "our handsomest, most fickle ... species, with many scores of aberrant forms."

The green-striped forms, and some of the other variations in white trillium, are now known to be caused by infection by the bacterial genus *Mycoplasma*. Some of the anomalous forms reappear each year for at least several years. In some cases development of anomalous flowers in a population has been followed by gradual decline as would be expected from a pathological condition.

Although the Latin names of variants of white trillium are not widely used today, they are of interest as a record of what keen observers have documented. One of the best summaries that we have seen is that produced by Dr. Jim Pringle who has provided some of the most authoritative information on trilliums in Ontario. Here we reproduce some of his text from the second (1976) edition of his "Trilliums of Ontario."

"Some plants are exceptional only in that their leaves and floral cycles are in two's [f. *dimerum* Louis-Marie] or in four's or more [f. *polymerum* Vict.]. Other plants have leaves and floral organs which are modified in their structure, sometimes extremely so. Among the more frequently encountered aberrations are those in which the leaves are definitely petioled and often borne lower on the stem [f. *lirioides* (Raf.) Vict.]; the leaves are lacking, their function being performed by greatly enlarged sepals [f. *chandleri* (Farw.) Vict.]; the petals are narrowly or broadly green-striped at the centre [f. *striatum* Louis-Marie]; or the petals are completely green and leaflike in texture [f. *viride* Farw.]. A remarkable extreme of the "lirioides" type of variation was reported in which the stem was completely suppressed, the

peduncle and the long leaf petioles arising from below ground level. Small (1934) has reported a form with spiralled, overlapping petals. Forms with corollas which are pink when they emerge have also been reported for Ontario. One of these has been selected as the cultivar 'Rose Queen' f. *rhodanthum*, described as having petals which were pink when they first appeared, later turning white." [This may be the same as forma *roseum* Farw. that is frequent on the Blue Ridge Mountains of Virginia.]

Double Trilliums

Forms of *Trillium grandiflorum* with flowers that have the stamens and pistil replaced by additional petals (f. *polymerum*) are very attractive and prized by collectors. Since these relatively stable, double-flowered plants are not sterile and must be propagated by asexual division, they are generally expensive. Some "double forms" have up to 40 petals.

GEOGRAPHY

Trillium grandiflorum is native in Canada in Nova Scotia (where it is represented by an isolated population), Quebec, and Ontario. It grows around the Great Lakes, extending southward along the Appalachian mountain region through North Carolina and Tennessee, reaching to Georgia. The white trillium is a common wildflower across southern Ontario as far north as Lake Nipissing and extends into southwestern Quebec. It soon disappears from the woodlands as one travels north of Ottawa into the Gatineau hills, and has always been rare or absent through much of the New England states. Its centre of abundance is the southern Great Lakes region and the Appalachian Mountains.

Continued



Fig. 3. White trillium (*Trillium grandiflorum*), showing a white-flowered plant (top), pinkish, older-flowered plant (bottom right), and a plant with a bluish-black fruit (bottom left). Also notice the short, tuberlike rhizomes. Source: a set of drawings of Canada's floral emblems by Lavonia R. Stockelbach (née Bonnie Hunter, 1874-1966), housed in the Saunders Building, Central Experimental Farm, Ottawa

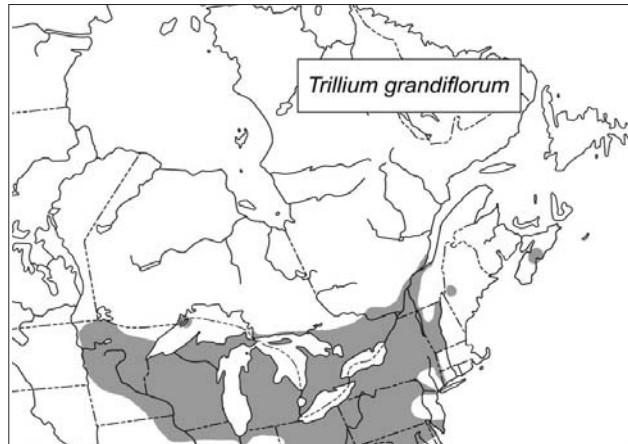


Fig. 4. Canadian and adjacent American distribution of white trillium (*Trillium grandiflorum*).

ECOLOGY

Habitat

The white trillium grows mostly as an understory herb in shady, rich, deciduous woods and mixed coniferous-deciduous upland woods and thickets, sometimes in floodplains and roadsides, on deep or rocky soils. The species prefers neutral to slightly acidic soils. In Ontario, it is common in deciduous woodlands (particularly maple and oak) of the southern part of the province, especially on non-

granitic soils. By contrast, it is sporadic in much of the Canadian Shield.

Inter-species Relationships

Trilliums are spring ephemerals, developing rapidly after snow melt in the light available before overtopping deciduous trees produce a shady canopy. Deer are extremely fond of white trillium, and will feed voraciously on it, especially in early spring. Long-term management of deer populations (now without natural predators over much of Ontario) may be necessary for conservation of trillium and other understory herbs. Populations where 6-12% of the plants are browsed annually have been observed to decline by 3.6% per year. It has been shown that in areas where white-tailed deer feed extensively on white trillium, the plants are shorter.

Pollination & Dispersal

Insects are attracted to the flowers of white trillium by nectar secreted from sepal glands located between the ovary and stamen filaments. Unlike some other species of trillium that attract pollinators by smell, the flowers of white trillium have no discernible odour. Hymenoptera (particularly bumblebees of the genus *Bombus*, occasionally also honey bees) and (to a much lesser extent) Diptera (flies) have been recorded on the flowers, and have been observed collecting not just the nectar but also the pollen. The flowers are outcrossing, but self pollination is known in some populations.

The fruits drop from the plants at maturity in late summer. Trilliums generally have a weak region at the base of the fruit, that deteriorates at maturity, so that the seeds are released from the fallen fruit, much like a sack of apples that bursts at its bottom when dropped, to scatter the fruit. Many of the seeds remain close to the parent plants. Birds, mice, deer, chipmunks, wasps, and harvestmen (which are arachnids, i.e. related to spiders) are all thought to distribute the seeds of *T. grandiflorum*. However, the chief dispersal agents are ants. Ant dispersal of seeds is quite common, and is termed "myrmecochory." Each seed has an attached elaisomean edible, usually oil-rich, structure known to attract a variety of ant species and induce them to carry the seeds to their nests. Ants are so attracted by the elaisomes that they have sometimes been observed cutting holes in immature capsules still on the plants, in order to extract the seeds. Ants generally carry the seeds only short distances (up to 10 m or 33 feet), but birds and mammals (by eating and defecating the seeds) can distribute them over much longer distances. It has been demonstrated that even short distance dispersal by ants is advantageous in promoting genetic differences among nearby plants.

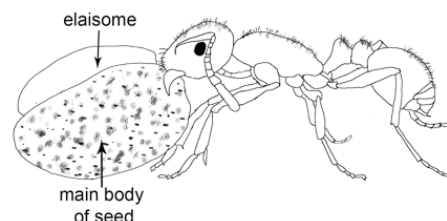


Fig. 5. An ant dragging away a white trillium seed. Drawn by B. Brookes.

USES

The principal value of the trillium is as an extraordinarily attractive component of natural landscapes used for recreation. Millions of Ontarians love trilliums, and the pleasure and comfort of viewing them and photographing them in the spring woodlands reminds us of the importance of our natural landscapes for psychological well-being.

White trillium is grown as a cultivated, garden ornamental, particularly popular in native plant gardens, and indeed the species is the most widely cultivated *Trillium*. There are several cultivars, including *Floro Pleno* (with doubled flowers) and *Roseum* (with flowers pink from the time they open). Dwarf forms and forms with variegated leaves are also available.

Leaves of the white trillium have been used as food by Native People and occasionally by wild food collectors. The name “much-hunger” has been employed for trilliums in Maine, a reflection of their use primarily as an emergency food.

There are several, obsolete medicinal uses of white trillium. Chemicals called steroidal saponins in some species of *Trillium*, including *T. grandiflorum*, are uterine stimulants. These species are known as beth root and birth root because Native Americans used them to aid in birth, not just as a stimulant but also to stop excessive uterine bleeding. North American Indians applied decoctions of the root externally to treat sore eyes, joint pains, and external sores, and also used these preparations internally for menstrual irregularities, cramps, and to increase urination.

TOXICITY

The fruits, seeds, and rhizomes of trilliums are generally considered to be poisonous (especially acting as an emetic). Although the plants are potentially harmful to livestock, deer are extremely fond of the above-ground parts.

CULTIVATION

Detailed instructions on how to grow white trillium, from former Central Experimental Farm horticulturalist and co-worker Larry Sherk, are reproduced below from his popular but out-of-print (1967) guide to growing Canada's floral emblems (note also the comments below in the section Conservation Status).

'With a little preparation and care, the trillium is rather easy to maintain in the garden and is long-lived. The root is a thick tuber-like rhizome. The trillium can be transplanted [but not from protected areas] to the garden at any time of the year if a large enough ball of soil is taken and the roots are not disturbed. But it is best to mark the clumps in the spring and then move them in the late summer or early fall when the plants are dormant. At this time of year they can be transplanted with bare roots, but results are always better if a clump of earth is kept around the roots. Choose a location that has good drainage and shade from the hot afternoon sun in summer. Plant them in a neutral to slightly acid soil with some well-rotted leaf mold and peat moss added. Avoid heavy clay or sandy soils. If you plant bare-root material, set the roots 3 to 4 inches below the surface of the soil. To obtain seedlings, sow the seed as soon as it is ripe in a

mixture of sand and leaf mold; choose a protected spot outdoors or a shaded location in the greenhouse. Seedlings appear the next year and take 3 to 5 years to flower. If you don't sow the seed as soon as it is ripe and if you let it dry out, germination will take at least 2 years."

As suggested above, seed that is not sown promptly becomes dormant. The seeds of white trillium are noted for their "double dormancy" a requirement for two cold periods but this can be circumvented by sowing seeds that are freshly harvested from the fruits, without being allowed to dry out. For additional excellent information on cultivation, see Case and Case (1997).



Fig. 6. White trillium (*Trillium grandiflorum*). Source: Department of the Secretary of State of Canada. 1967. The arms, flags and floral emblems of Canada. Reproduced with permission.

CONSERVATION STATUS

Urbanization and picking of wildflowers has resulted in the white trillium becoming rare in many of the heavily populated areas of Ontario. Although picking the above-ground part may not be fatal, it results in weakening the plant, and it may not flower again for 7 or 8 years. Harvesting the rhizomes for commercial, horticultural sale occurs very widely, and indeed some conservationists recommend not purchasing white trillium from nurseries, in case they were taken directly from the wild. However, habitat destruction and browsing by white-tailed deer, not picking of flowering stalks or harvesting of rhizomes, are considered to be the chief threats to the white trillium in Ontario. Trilliums are protected species in many US states, including Michigan, Minnesota, New York, Oregon, and Washington. The white trillium is ranked as endangered in Maine. In British Columbia, it is illegal to pick the western trillium (*T. ovatum*). In Ontario the very rare drooping trillium (*Trillium flexipes*) is protected. However, the popular belief that there is a specific law preventing the picking of white trillium in Ontario is incorrect (although various legislation protects wildflowers in general). The white trillium is ranked as Vulnerable in Quebec. Fortunately white trilliums are protected in a number of

natural areas. One of the best known is Trillium Woods Provincial Nature Reserve, [http://www.ontarioparks.com/ENGLISH/tril.html] near the village of Sweaburg, protected specifically for its magnificent displays of white trillium.

MYTHS, LEGENDS, TALES, FOLKLORE, AND INTERESTING FACTS

- The Iroquois Indians had several curious uses for trilliums. The dried root was carried for luck and for protection of teeth, and the root was also used to detect bewitchment.
- As noted above, white trillium flowers become pink with age, but occasionally are initially or permanently quite red. North American Indians sometimes interpreted red-flowered plants as most suitable for treating male illnesses, and white-flowered plants as best for female complaints.
- According to superstition, if you pick a trillium it will rain (it will also rain if you kill a snake, step on a beetle and, if you kill a spider in the morning, it will rain before noon).
- The chromosomes of *Trillium* are extraordinarily large, and the number of them is quite small only five pairs in most species. Consequently, they are easy to observe and slides of *Trillium* chromosomes are frequently used in biology classes.
- The "Victorian language of flowers" was a secret, coded language in Victorian times in England, with flowers and plants symbolic of certain messages, so when the flower or plant was mentioned in a letter those who knew the code could understand the hidden information. The trillium represented "modest beauty."



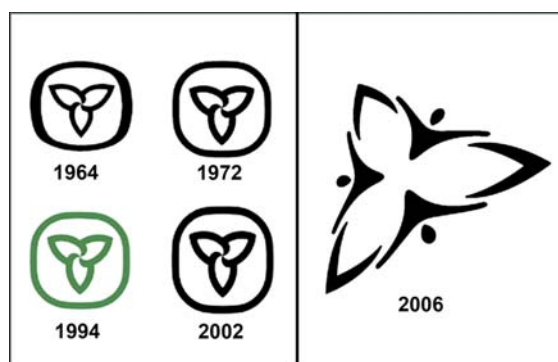
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Fig. 7. The Franco-Ontarian flag (left) The stylized trillium (right) is the floral symbol of Ontario, while the fleur-de-lis (left) represents French-Canadian heritage. The flag was officially recognized as an emblem in the Franco-Ontarian Emblem Act of 2001.

Fig. 8. Evolution of Ontario's trillium symbol.

In 2006 the Ontario liberal government redesigned the original trillium logo (at a cost of several hundred thousand dollars). Since its introduction in 1964, the logo received minor modifications in 1972, 1994 (when it was coloured green), and 2002, but in 2006 there was a markedly new version that eliminated the surrounding box and added three abstract human figures. The new logo was thought by some to resemble poison ivy or holly more than a trillium (especially when reproduced at a small size), but expert botanists pointed out that it resembled neither. The modern trillium logo has been said to represent three people holding hands symbolizing unity and togetherness (as well as the trillium), but many have expressed the thought that it looks like three people in a triangular whirlpool bath.



TREE: EASTERN WHITE PINE



Fig. 9. Silhouette of eastern white pine (*Pinus strobus*). Source: Farrar, J.L. 1995. Trees in Canada. Canadian Forest Service and Fitzhenry and Whiteside, Markham, ON, Canada. Reproduced with permission.

SYMBOLISM

EASTERN WHITE PINE

Eastern white pine is a reminder of the importance of natural resources in commerce and trade since the days of the early pioneers when it was so important in shipbuilding. It is also a reminder of the rugged beauty of the rocky region of the Canadian Shield which is characteristic of so much of Ontario. To many its wind-formed growth on the rocky shores of northern lakes evokes strength and endurance. The eastern white pine was considered to be a symbol of peace by eastern American Indians, because the needles grow in clusters of five and, after centuries of warfare, a peace treaty united five tribes (Cayuga, Mohawk, Oneida, Onondaga, and Seneca).

Other pines

In the Old World, pine species have played extraordinary symbolic roles. In ancient Egypt, an image of Osiris, the god of agriculture, was ritually imprisoned each year in a hollow pine log, to be resurrected in order to ensure good crops. The stone pine (*P. pinea*) was sacred to the ancient Greek god Neptune, and pines were associated with the Greek goddess of the pine, Pitthea, the god of pine, Pittheus, and with the gods Dionysus and Bacchus. Dionysus was the most interesting of these. He was accompanied by the Maenads, wild women, inebriated with wine, shoulders draped with a fawn skin, carrying rods tipped with pine cones as a fertility symbol. The image of the pine cone has also been found as a symbol of fertility on ancient Greek amulets. Worshipers of Dionysus often wore foliage from pine trees (ouch!). In early Greece, wreaths of victory in athletic competitions were made out of pine branches. Ancient Romans regarded opened pine cones as symbols of virginity.

In China and Japan, the pine tree symbolizes longevity and immortality. The Chinese god of longevity is often shown sitting under a pine tree, with the crane, another symbol of long life, in the branches. Druids (ancient Celtic priests of

Wales and Ireland) used to light large bonfires of Scots pine (*P. sylvestris*) at the winter solstice to celebrate the passing of the seasons and to draw back the sun, a practice that eventually gave rise to the Yule log. The trees were also decorated with lights and shiny objects, foreshadowing latter day Christmas tree customs. Groves of Scots pine in eastern Siberia were called "shaman forests," and were considered sacred by the Buriats, a Mongolian people living around the southern end of Lake Baikal. The groves had to be approached and entered in silence and reverence, respectful of the gods and spirits residing there.

Pines were also of great spiritual significance to North American Indians. The Santa Clara Tewa Indians of New Mexico interpret a very old pine as the oldest tree on earth, and indeed the one that produced the first food consumed by humans. The piñon pine (*P. edulis*) was an important part of the spiritual life of many Native Americans of the southwestern United States. The Navaho smeared pitch from the trees on corpses before burial. In December, before going outside, the Hopi applied a dab of piñon pitch to their foreheads as protection against sorcerers. Piñon gum was burned as incense in Navaho ceremonies, and selected branches from the piñon were used as ritual wands.

LATIN NAMES

Pinus strobus L.

The genus name *Pinus* is based on the Latin word for pine, *pinus*, which in turn comes from the Greek *pitys*, pine or fir tree. *Strobus* in the scientific name is the Latin word for pine cone, and originated from the Greek *strobilos*, meaning pine cone, and *strobos*, meaning whirling around, a reference to the cone scale arrangement.

ENGLISH NAMES

Eastern white pine. Also: cork pine, majestic pine, northern pine, northern white pine, pattern pine, Quebec pine, soft pine, Weymouth pine, white pine, yellow pine. The "white" in the name white pine refers to the typically creamy-white wood. The name "Weymouth pine" is widely attributed to a Lord Weymouth who planted the eastern white pine on his estate at Longleat in England in the early 1700s, but the name could be based on Captain George Weymouth, who brought the species to Britain from Maine in 1605. The yellowish colour often exhibited by the heartwood is responsible for the name "yellow pine."

True pines belong to the genus *Pinus*, in the family Pinaceae, but the name pine is often applied to other plants. For example, the "Wollemi pine" is *Wollemia nobilis*, considered extinct for 65 million years before being discovered in 1994 growing in New South Wales, Australia. The Norfolk Island pine, *Araucaria heterophylla*, is a popular house plant, but is not a pine (the preceding two species are in the Araucariaceae, another family of conifers). Screw pines (so named because the long, flat leaves are spirally arranged) are members of the tropical family Pandanaceae, which is not coniferous.

FRENCH NAMES

Pin blanc. Also: pin blanc de l'est, pin blanc du nord, pin jaune, pin strobus, pin de Weymouth, pin du Weymouth, pin

Weymouth, pin du Lord (the latter four names have been used in France; the "Lord" in "pin du Lord" is Lord Weymouth).

HISTORY

a. Canada

The eastern white pine is the provincial tree of Ontario, designated in 1984. The lodgepole pine (*P. contorta*) was adopted as the provincial tree of Alberta in 1984. The jack pine (*P. banksiana*) was the official tree of the Northwest Territories of Canada, but was replaced by the Tamarack (*Larix laricina*) in 1999.

b. Foreign

Pine species are official trees of 12 US states. The eastern white pine (*P. strobus*) is the state tree of Michigan, so designated in 1955. The tree was the basis of lumbering in the state and, from 1870 to the early 1900s, Michigan led the US in lumber production. Maine calls itself "the pine state" (or "pine-tree state") and also has adopted the eastern white pine as a state emblem. In 1895 it chose the white pine cone and tassel as its state flower, and in 1945 it designated the white pine as its state tree. The Western white pine (*P. monticola*) is the state tree of Idaho, adopted in 1935. The piñon pine (*P. edulis*) was declared to be the official state tree of New Mexico in 1948. The single-leaf piñon (*P. monophylla*) and bristlecone pine (*P. aristata*) are the state trees of Nevada, respectively designated in 1953 and 1987. The longleaf pine (*P. palustris*) was declared to be the state tree of North Carolina in 1963. The red pine (*P. resinosa*) was made the state tree of Minnesota in 1953. The southern longleaf pine (*P. palustris*) was adopted as the state tree of Alabama in 1997. The loblolly pine (*P. taeda*) was adopted as the state tree of Arkansas in 1939. The ponderosa pine (*P. ponderosa*) was designated the state tree of Montana in 1949. The Scots pine is the national tree of Scotland. The Bahama Pine (*Pinus caribaea* var. *bahamensis*) is the national tree of the Turks & Caicos islands, and is thought to be threatened with extinction (<http://www.timespub.tc/index.php?id=443>).

APPEARANCE

The eastern white pine is the tallest evergreen tree in eastern Canada and the northeastern US. Before most large trees were cut down in past centuries, there were often specimens in virgin forests that reached 46 m (150 feet) in height and 100 cm (40 inches) in diameter at breast height, with rare trees claimed to have reached heights of 67 m (220 feet). Maximum (US) records for eastern white pine trees that are still living are 2 m (5.4 feet) for trunk diameter at breast height and 56.7 m (185.9 feet) in height. Eastern white pine often reaches 200 years of age, sometimes exceeding 450 years. Most large trees seen in Canada today are less than 100 years old.

In the open, the trees have straight, uniform trunks with wide branches along the middle portion, and branches near the top curving upwards, producing an overall oval silhouette. In forests, the trunks are usually straight and free of branches for two-thirds or more of their height. The bark on younger trees is grey-brown or grey-green, becoming dark grey-brown or reddish-brown with age. On older trees

the bark is deeply furrowed with vertical ridges and furrows. The roots spread widely and grow moderately deep, and the trees are not easily toppled by wind. The needles (leaves) are dark blue-green, straight, flexible, soft to the touch, 6-13 cm (2.5-5 inches) long, and clustered in fascicles of five leaves. Eastern white pine is the only five-needled pine native to eastern North America. The needles remain on the trees for 2 or 3 (sometime 4) years before turning brown and falling off. The pollen cones are yellow, ellipsoid, 10-15 cm (0.4-0.6 inches) long, and occur near branch tips. The seed cones are more or less cylindrical when closed, 6-20 cm (2.4-7.9 inches) long, about 2.5 cm (1 inch) wide, and often curved. They hang singly or in groups from branches near the tops of the trees. The brownish seeds are made up of a body portion 5-6 mm (about 0.2 inch) long, with a wing 1.8-2.5 cm (0.7-1 inch) long.



Fig. 10. Two large native eastern white pine trees, by Daicey Pond in Baxter State Park, Maine. Photo courtesy of C.J. Earle and The Gymnosperm Database (<http://www.conifers.org/pi/pin/strobus.htm>).



Fig. 11. Eastern white pine (*Pinus strobus*). Left, branch with male (staminate) cones. Right, branch with young female (pistillate) cone. Source: Sargent, C.S. 1897. The silva of North America. Houghton, Mifflin and Company, Boston, MA. Vol. 11, plate 538.

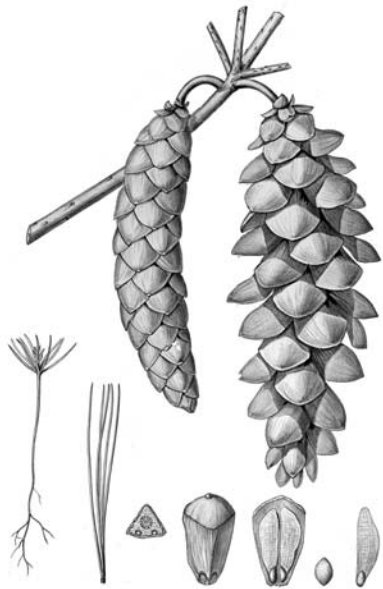


Fig. 12. Eastern white pine (*Pinus strobus*). Top: mature female (pistillate) cones. Bottom, left to right: seedling, fascicle of leaves, cross section of leaf, lower side of cone scale, upper side of cone scale with two seeds, seed, seed with wing. Source: Sargent, C.S. 1897. The silva of North America. Houghton, Mifflin and Company, Boston, MA. Vol. 11, plate 539.

CLASSIFICATION

Family: Pinaceae (pine family).

There are about 100 pine species, almost all in north temperate areas of the world. Thirty-seven species are native to North America north of Mexico, and nine are native to Canada. Plants related to *P. strobus* that occur in the mountains of southern Mexico and neighbouring Guatemala are recognized as *P. strobus* var. *chiapensis*, *P. strobus* subsp. *chiapensis*, or *P. chiapensis*. The differences between this southern pine and *P. strobus* in its northern range are small (see Farjon and Styles 1997, and Gernandt et al. 2005), and its taxonomic rank is debatable.

GEOGRAPHY

Pinus strobus is native from Newfoundland west to southeastern Manitoba, south to the Great Lake States, down the Atlantic seaboard to New Jersey, and in the Appalachian Mountains to northern Georgia. Populations are also found in Iowa, Kentucky, Tennessee, and Delaware. In Canada eastern white pine occurs particularly in the Great Lakes/St. Lawrence Forest region, extending into the Boreal,

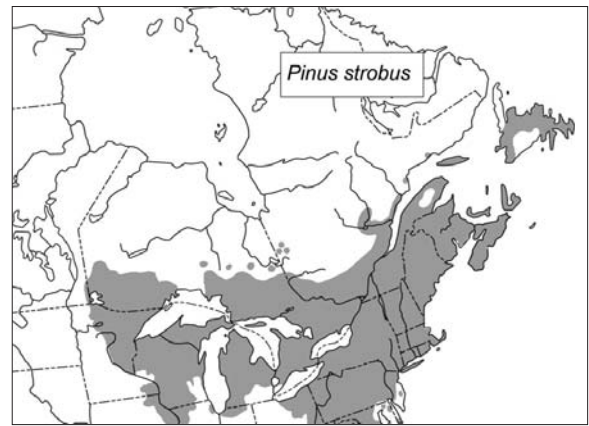


Fig. 14. Canadian and adjacent American distribution of eastern white pine (*Pinus strobus*).

Acadian, and Deciduous Forest regions. White pine has been introduced to many parts of Europe and in some cases it has spread naturally onto the landscape. It is now naturalizing in the mountains of southern Poland and the Czech Republic.

A Pine Line

Currently eastern white pines reach a rather definite northern geographical line. However, it appears that they were more common well north of this line in Ontario a few thousand years ago, based on the discovery of pollen and macrofossils in the older sediments of lake beds. Both the Great Lakes-St. Lawrence forest and white pines occurred at least 140 km north of their present position 3,000 years ago. The climate was warmer at the time. Subsequently it cooled, remaining more or less stable until about 1500, and from then to about 1850 there was another cooling episode, referred to as the Little Ice Age. Disjunct, isolated occurrences that exist today north of the boundary of continuous distribution are considered to be a result of the colder temperatures eliminating pines from all but the most optimal sites. With continued global warming we may (or may not) see white pine again crossing the northern pine line.

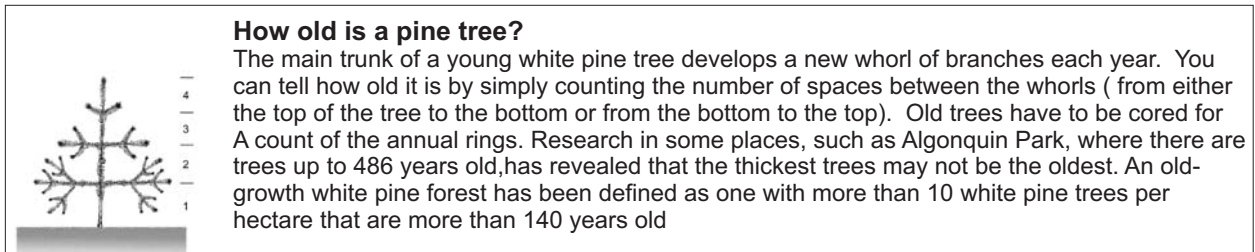


Fig. 13. Determining the age of a young pine tree. The four segments between the base and the tip of the central stem indicate that this tree is 4 years old. Diagrammatic view prepared by B. Brookes.

ECOLOGY

Eastern white pine is a dominant or co-dominant tree of northern, dryland pine forests. In mixed hardwood-conifer forests, occasional trees are found that tower above the rest of the canopy. While the tree grows in association with many other trees, in pure stands of eastern white pine understory species may be scarce. Occasionally eastern white pine grows in bogs and swamps. It is a pioneer species in disturbed sites (especially in post-fire mineral soils), and may persist for many years in climax mixed forests.

Habitat

The eastern white pine grows in many types of soil, tolerates moderate shade, and survives in a wide range of moisture availability. It is most competitive on fairly infertile, dry, sandy soils, but grows best on moist, loamy soils.

Inter-species Relationships

Several unusual vascular plants lacking chlorophyll grow well in the needle litter under white pine. Especially notable are pinesap (*Monotropa hypopithys*), pine-drops (*Pterospora andromeda*), and coral-root orchids (species of *Corallorhiza*). Birds and small mammals consume the seeds (a large seed crop is produced once every 35 years). Rabbits and white-tailed deer browse the foliage, and beaver and porcupines consume the bark. A variety of breeding birds nest among the branches, or occasionally in cavities in the trunk or larger branches (eagles are known to nest in particularly tall trees). The trees provide shelter for moose, bear, grouse, woodcock, and small mammals. The caterpillars of the eastern pine elfin butterfly (*Collophrys niphon*) feed on pine needles. The white pine weevil (*Pissodes strobi*) is the major insect pest, deforming trees by killing the terminal shoots. White pine blister rust (*Cronartium ribicola*) is a very damaging fungal disease, which relies on wild currants and gooseberries (of the genus *Ribes*) for part of its reproductive cycle. Accordingly, white pines are best grown away from most species of currants and gooseberries.

Pollination & Dispersal

Pinus strobus is wind-pollinated, the trees shedding pollen in the spring. While the pollen grains must enter the ovules within a short period or they will die, fertilization occurs more than a year after pollination, and seeds are dispersed in late summer and fall, more than 2 years following pollination. The seeds are mostly scattered by the wind, typically travelling up to 60 m (200 feet) within a stand and more than

200 m (700 feet) in the open. Squirrels, mice, and voles cache the seeds, thereby also serving to distribute them to a limited extent.



Fig. 15. The eastern pine elfin butterfly, discussed in the text as one of the regular associates of the eastern white pine. Photographed May 2008 in the Burnt Lands Provincial Park, Ontario.

USES

The eastern white pine is the most valuable softwood timber species in eastern Canada and the northeastern US. The wood is of moderate strength, finishes well, and stains easily, and is employed for furniture, cabinets, panels, doors, mouldings, siding, and trim. In colonial times, large eastern white pines with a trunk diameter greater than 24 inches were reserved for Royal Navy ship masts (as a consequence, it is difficult to find old pine boards wider than 23 inches). The species has been widely used in reforestation. It is used as a landscape tree, but since it can grow as tall as a 15 story building, full-sized trees are not suitable for small properties. Nevertheless, there are several horticultural varieties, including Contorta (with twisted branches and needles), developed in Rochester, New York in 1932; Fastigiata (an erect, columnar clone), which traces to Germany in 1884; and Radiata (one of many semi-dwarf forms, which usually grows wider than it is tall), which originated in England in 1923. Eastern white pine is occasionally used as a Christmas tree.

There are also a number of minor uses for eastern white pine. It has been employed in the eastern US to stabilize strip-mine spoils. About a dozen pine species, not including the white pine, produce seeds that are sufficiently large, common, and tasty to be collected and sold commercially as "pine nuts," but for the most part these are marketed and



Pine warblers. Pine warblers breed in open pine forests. In the northern part of their range the warblers most often build their nests and forage in white pines. There are dozens of warbler species in North America, most of which feed on insects. Pine warblers are one of the few species of warblers that eat large quantities of seeds, mostly pine seeds. Although the first warblers seen by most people in the spring are the yellow-rumped and the black and white, the pine warblers also arrive very early, but perhaps because they favour isolated pine groves with full foliage they are often overlooked, despite their very distinctive song.

Fig. 16. Male pine warbler. Source: Audubon, J.J. 1827–1838. Birds of America. Havell, London, UK.

consumed locally. Some Native Americans once consumed the inner bark (cambium) of eastern white pine as a famine food, and colonists used the inner bark as a component of cough remedies (extracts from the bark are still sometimes used for this purpose). Eastern white pine has occasionally been employed as a source of turpentine and rosin (the substance left after turpentine is removed from the resin, and used by violinists on their bows and by baseball players to get a better grip on their bats). However, turpentine, rosin, and indeed other resin extracts are mostly obtained from other pine species today.

TOXICITY

Pine wood, sawdust and resin may cause dermatitis, allergic bronchial asthma, or rhinitis in some individuals. Pine pollen has sometimes caused hay fever and asthma. When used as a Christmas tree, the relatively limited aroma results in fewer allergic reactions than the more aromatic species. Consumption of pine nuts results in anaphylaxis in some people, but white pine nuts are so small they are rarely eaten.

CULTIVATION

As a principal forestry tree, there is an extensive literature on management of eastern white pine for timber production. White pine is also often grown for windbreaks and for landscaping. Heavy clay soils and poorly drained bottom lands are best avoided. Seeds should be planted in moderately dry places and in sandy soils without competition or shading from other plants. Young trees prefer similar conditions.

CONSERVATION STATUS

Eastern white pine is less frequent today than in early colonial times. The early pioneers found it to be one of the most abundant trees. The species was heavily logged in the 18th and 19th centuries. It has been estimated that only 0.4% of presettlement white pine stands remain. Compared to other trees, white pine appears to be relatively sensitive to air pollutants such as ozone, fluorides, and sulfur dioxide. Over large parts of eastern Ontario where large white pine trees grow in older woodlots, there is little or no recruitment of young trees in either the woodlands or nearby old fields. The pines there today may not be there a century from now. However, *P. strobus* is widespread and there is not concern about its survival over most of its natural range. The southern relative of *P. strobus*, *P. chiapensis*, has been extensively logged in Mexico and Guatemala, and has been assigned a conservation status of Vulnerable.

Possibly the largest pristine white and red pine landscape left in the world is in Ontario's Algoma Highlands, where in 1999 a portion was protected in Spanish River Provincial Park. Another place to see 300 year-old pines is the "Old Growth White Pine Trail" south of Temagami (trailhead at 46.71672 N, -79.81650 W)

www.ontariotrails.on.ca/trails-a-z/old-growth-white-pine-trail/.



Fig. 17. "The White Pine" painted in 1957 by A.J. Casson (1898-1992), the youngest member of the "Group of Seven" Canadian artists (a group that originally had seven members, but went on to add three more; they were active as a group from 1919 to 1931). Paintings of the Canadian wilderness by these artists greatly influenced Canadian art, negating the viewpoint common up to World War II that the Canadian landscape was not a worthy subject for artists.

MYTHS, LEGENDS, TALES, FOLKLORE, AND INTERESTING FACTS

- In ancient China, accumulations of resin that were in the shape of dragons, formed at the bottom of large, old pine trees, were thought to give rise to dragons. Such resin was considered to have great medicinal value, enabling people to live for hundreds of years.
- Leonardo da Vinci (1452-1519) painted the Mona Lisa on a piece of pinewood measuring 77 x 53 cm (30 x 21 inches) in 1506.
- It was once said that eating a pine kernel from the very top of a pine tree would result in immunity from being shot. In Bohemia (an ancient kingdom, now in the Czech

White pine at the centre of Canadian commerce

During the 1800s a huge industry developed around the exploitation of white pine for use in shipbuilding. The upper Ottawa River Valley was a major lumbering region. The pines were cut during the winter, and then pulled across lakes by boat, and floated on spring-flooded rivers to the Ottawa River. Here they were collected and squared, and then formed into large rafts that were steered down the Ottawa and St. Lawrence rivers to Montreal and Quebec City. Water transport was possible because softwood floats well. The industry was controlled by famous lumber barons such as J.R. Booth whose company supplied over a half million board feet in 1874. The thousands of people employed in lumbering required food, which was supplied by expanding, nearby agricultural communities. For a hundred years white pine was at the centre of growth and settlement in Canada.

Republic), gathering cones on St. John's Day (June 24) and eating one kernel daily were thought to make one immune to gunshot a practice that attracted thieves and robbers.

- A Scottish superstition cautioned about not felling pine trees for shipbuilding during the waning of the moon, as the tidal influence of the moon was said to affect the resin content (and hence the water resistance) of the wood. Modern research has established that the flow of sap in plants is to a very minor extent affected by the gravitational influences of the moon's cycles.
- "Pine drape" and "pine overcoat" are obsolete slang American expressions for a coffin (based on how commonly pine is used to make coffins).
- Floor cleaning products in Venezuela are fortified with ten times as much pine fragrance as North American floor cleaners. The much stronger scent is desired to send the message that the house is clean.
- Pine cones are excellent subjects for demonstrating the famous Fibonacci series, a type of arithmetic that describes how many living things develop. If you count the spiral rows of scales on a pine cone, you may find eight spirals winding up to the left and 13 spirals winding up to the right, or 13 left and 21 right spirals, or other pairs of numbers. These pairs of numbers are always adjacent numbers in the Fibonacci series: 1, 1, 2, 3, 5, 8, 13, 21. In this series, each number is the sum of the previous two numbers.
- The capercaillie (*Tetrao urogallus*, also known as capercaillie and cock o' the woods) is the largest game bird of the British Isles, where it became extinct in 1785, but was reintroduced. This member of the grouse family habitually feeds on the tops of young pine trees, giving its flesh a slight flavour of turpentine. Knowledgeable cooks remove the turpentine aroma by eviscerating the bird as soon as possible after it has been shot, stuffing it with potatoes, hanging it for 5 days, then discarding the potatoes.
- Artificial vanilla (vanilline) has been manufactured from

a chemical (coniferine) found in pine lumber waste.

- "Retsina" is a unique Greek wine flavoured with the resin of the Aleppo pine, *P. halepensis* Mill. The association of wine and pine resin seems to trace to Greece of 3,000 years ago, when resin was employed to seal the large amphorae used to store wine. During transportation, the resin would come in contact with the wine and flavour it. It was wrongly believed that resin would help preserve the wine. The resin gives the wine a distinctively sappy, turpentine-like flavoured taste that is acquired.
- "Pumpkin pine" refers to unusually coloured, old eastern white pine boards that are light yellowish-golden or reddish brown. The colour is thought to be associated with slow growth in virgin forests, which resulted in the accumulation of coloured products in the heartwood.

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Fig. 18. Nineteenth century pine logging scenes. Upper left: cutting and sawing pine lumber. Upper right: pair of oxen pulling a skid with pine logs. Lower left: preparing logs for water transport. Lower right: breaking up a log jam. Source: The Minnesota Pineries. Harper's New Monthly Magazine, March, 1868.

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