

Contents Table des Matières

President's Message
Page 29

The New Corporate Act
Page 33

Association News
Page 36

Tribute
Roy Lewis Taylor
Page 41

News from the Sections
Page 43

Graduate Student Profiles
Page 45

Book Review
Page 46

CBA/ABC Awards for 2013
Page 51

Major Invasive Alien Plants
of Natural Habitats in
Canada
7. Knotweeds
Paul M. Catling and
Gisèle Mitrow
Page 53



Top Ornamental Plants
5. Lilies
Ernest Small
Page 61

Scenes From Kamloops
2013
Page 71

CBA/ABC Board for 2013-2014
Page 72

The Canadian Botanical Association Bulletin



Bulletin de l'Association Botanique du Canada

September/Septembre 2013. Volume 46 No.2/N°2

Dear CBA members:

The summer is well underway and it is time again to give everyone some updates from the President's desk. The spring months have been busy, what with theses to mark, graduations to attend, presentations to prepare, meetings not to miss, and field experiments to perform. Our annual CBA meeting, held in Kamloops for the first time ever, had as its theme "Thinking Plants" and was a great success. There were approximately 100 members attending: older members who we

had not seen for a while, young members eager to be active in the Association, new members who had been invited to participate in a symposium, and also non-members who I hope will join our Society soon. The venue for the meeting was absolutely amazing! Thompson Rivers University gave us a very warm welcome and made us feel at home (down to the delicious and healthy snacks). There were many highlights for me: the Botany Art show, the Lac du Bois field trip (how beautiful is a wild *Delphinium*?), the Teaching symposium, the New Frontiers in Tree Biology symposium (co-sponsored by the Canadian Science Publishing), and the Banquet. I also would like to mention the Barber Centre which houses the House of Learning, an amazing circular room where most talks were given, and where we all felt in harmony.

At this point, I would like to thank Cindy Ross Friedman, our now past Vice-President, and Christine Petersen, who must have spent hours (likely days and nights) organizing this wonderful meeting. I would like to acknowledge also the other people who helped them: the crew at the front desk, the students helping out with the field-trips and the presentations, the electronics team, and the people behind the Art show. To all of you, a heartfelt thank-you.

As President, I could not attend as many talks as I would have liked as I was busy working on administrative items for the Association. However, I was pleased to attend some excellent talks given by students. Also, not being a tree biologist, I was very much interested by the CSP/CBA symposium. I was astounded by the diversity and vibrancy of the fields centered around Tree Biology, by the complexity of the questions raised in these fields, and by the need of integrative answers to these questions. Such a symposium was therefore timely and justified as it promoted an effective communication between researchers. Rob Guy opened the event by stating that Dendrology should be taught before Plant Anatomy and he



Frédérique Guinel

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, **46(3)**, must be received **before November 8th 2013**

La date de tombée des textes du prochain numéro, le no **46(3)**, est le **8 novembre 2013**

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gave us many examples to share with our students to back up this statement. Uwe Hacke described the intricacy of xylem functioning and demonstrated how trees are capable of adapting their xylem anatomy to environmental conditions. Marty Kranabetter looked into the complexity of nitrogen economy in a boreal forest, and revealed that trees must be in tune with the ectomycorrhizal fungal community to get the most out of the ecosystem. Justine Karst built on this knowledge and exemplified beautifully the complexity of biological systems in linking mountain pine beetle attack and ectomycorrhizal fungi in the soils. Finally, Nicolas Feau wrapped up the symposium by showing the usefulness of the genomics toolbox in studies addressing global questions linking genotype, phenotype, population, and community.

I will also remember "Thinking Plants" for the renewed participation of the membership. The AGM in Kamloops was amazing for its liveliness. Some of the discussions were animated which is great as this is a sign of good health. At 49, our Association is still sprightly, and this is mirrored by the number of volunteers who stepped forward in Kamloops to fill several positions. I would like to mention Cindy Ross-Friedman and André Arsenault who are new Directors (West and East, respectively); André Arsenault, Christine Petersen, and Julian Starr who will be chairing sections (Ecology, Teaching, and Systematics and Phytogeography Sections, respectively); Kirsten Kilde and James Jones who are our Students' representatives (West and East, respectively); Erich Haber, Yolande Dalpé, and Kevin Stevens who volunteered for the subcommittee on Archives; Daya Dayanandan, Mihai Costea, James Jones, and Michael Wright who are updating the CBA website. I also would like to thank those Executive members who are continuing their terms, and finally all those who have completed their term. There is one more change which will occur this year in our Association: after having worked on the Bulletin for 8 years, Christine Maxwell is going to pass the torch to Tyler Smith for the December issue. Christine, we owe you so much and words are not enough to describe our gratitude! Thank you for having made this publication so fun to read. I, for one, am always looking forward to a new issue to see what is happening on the Canadian botanical scene.

Anne Bruneau (our current CBA Vice-President) and Denis Barabé are already planning for our next meeting. The 2014 CBA annual meeting, which will celebrate "50 Years of Botany in Canada", will be held from June 15 to June 18 2014 at the Botanical Garden in Montreal. In addition to the normal proceedings, there will be a general day-long symposium on the history of botany in Canada. This symposium will comprise of presentations dealing with the history of different botanical disciplines (Mycology, Taxonomy, Systematics, Ecology, Morphology-development, Bryology, Lichenology) in Canada, and the history of the CBA and botanical gardens. This is a meeting one does not want to miss – begin preparing for it! After Montreal 2014 comes Plant Canada 2015! This event, where we will meet with our Botanical Society of America friends, will take place in Edmonton on July 25-29, 2015. We are currently looking for a theme for this conference; once it is chosen, we will have to discuss ideas for symposia and workshops. Begin the conversation with colleagues and suggest your own ideas! You can send these to your Section Chair, to the Secretary, or to me. Think outside the box and be creative!

Before closing, I would like to congratulate four CBA members who have received awards in the last few months. Ernie Brodo was awarded the degree of Doctor of Science, *Honoris causa*, from Carleton University at the 2013 June Convocation. Arunika Gunawardena received the 2013 Alumni Association Award of Excellence for Teaching at Dalhousie University. Hugues Massicotte received the 2013 Award for Exceptional Research and Scholarship from the University of Northern British Columbia. Vipen Sawhney received the 2013 Award of Innovation from the University of Saskatchewan, Industry Liaison Office and Innovation Place.

These congratulatory remarks lead me to my last point. I would like you to think about nominations for next year's meeting in Montreal. Have a good look around you and be certain that no one is overlooked. Discuss names with colleagues and think about outstanding student's publications. There are many excellent botanists, students and researchers in Canada (as seen above) and it takes only a second to recognize one of them. Begin the nomination process early so that you are not rushed at the end. Recognizing the best will keep our Association young and dynamic.

Frédérique

Chers membres de l'ABC :

L'été est déjà bien entamé et il est temps de partager avec vous les nouveaux développements de l'Association. Les mois printaniers nous ont trouvé bien occupés, avec des thèses à corriger, des diplômes à remettre, des présentations à préparer, des réunions auxquelles se rendre, et des expériences sur le terrain à entreprendre. Notre assemblée annuelle de l'ABC, qui s'est déroulé à Kamloops pour la toute première fois, a eu comme thème « Pensons Plantes » et elle fut un grand succès. Environ 100 membres y ont assisté : des vétérans que nous n'avions pas vus depuis un certain temps, des jeunes avec une envie de s'engager dans l'Association, de nouveaux membres invités à participer à un symposium, et des non-membres qui, je l'espère, adhéreront bientôt à notre société. L'endroit choisi était incroyable! L'Université de Thompson Rivers nous a accueillis chaleureusement, nous offrant même des collations délicieuses et bonnes pour la santé. Je me rappellerai de plusieurs points forts: l'exposition d'art botanique, la sortie au Lac du Bois (un *Delphinium* sauvage est tellement beau!), le symposium sur l'enseignement, le symposium « New Frontiers in Tree Biology » (co-financé par les Editions Science Canada), et le banquet. J'aimerais aussi mentionner le Barber Centre qui contient la Maison de l'Apprentissage, une salle circulaire impressionnante où la plupart des présentations ont été données, et dans laquelle nous nous sentions tous en harmonie.

J'aimerais maintenant remercier Cindy Ross Friedman, notre ancienne Vice-Présidente, et Christine Petersen, qui ont dû passer des heures (sans doute des jours et des nuits) à organiser cette réunion réussie. Je tiens aussi à reconnaître ceux et celles qui les ont aidés: les personnes à la réception, les bénévoles pour les sorties, l'équipe audio-visuelle, et les responsables de l'exposition artistique. À vous tous, des remerciements sincères.

En tant que Présidente, je n'ai pas pu assister à autant de présentations que j'aurais aimées à cause de tâches administratives concernant l'Association. Cependant, j'ai été heureuse d'écouter plusieurs excellents exposés donnés par des étudiant(e)s. De plus, mon expertise ne se portant pas sur les arbres, le symposium organisé par la CSP/l'ABC m'a beaucoup intéressée. J'ai été stupéfaite par la diversité et le dynamisme des domaines ayant trait à la biologie des arbres, par la complexité des questions abordées dans ces domaines, et par le besoin de réponses intégratives à ces questions. Un tel symposium était donc opportun et justifié, car il a encouragé une communication véritable entre les chercheurs. Rob Guy a commencé le symposium en déclarant que la dendrologie devrait être enseignée avant l'anatomie des plantes et nous a offert pour supporter sa proposition plusieurs exemples à partager avec nos étudiants. Uwe Hacke a décrit la complexité des fonctions du xylème et a montré comment les arbres sont capables d'adapter l'anatomie de leur xylème aux conditions environnementales. Marty Kranabetter a étudié l'économie de l'azote dans une forêt boréale, et a révélé que les arbres doivent travailler avec la communauté fongique ectomycorhizale pour bénéficier au maximum de l'écosystème. Justine Karst a élaboré sur ces connaissances et a joliment exemplifié la complexité des systèmes biologiques en liant l'attaque de la dendroctone du pin ponderosa aux champignons ectomycorhiziens. Finalement, Nicolas Feau nous a prouvé l'utilité de la trousse d'outils génomiques dans les études abordant des questions globales liant génotype, phénotype, population, et communauté.

Je me souviendrai de « Pensons Plantes » également pour la

participation renouvelée des adhérents. L'AGA à Kamloops a été bien animée. Quelques discussions ont même été assez vivantes, un signe sûr de bonne santé. A 49 ans, notre Association est toujours aussi dynamique, et ceci se reflète dans le nombre de bénévoles qui se sont proposés pour remplir des positions vacantes. J'aimerais mentionner Cindy Ross-Friedman et André Arsenault qui sont des nouveaux directeurs de l'Ouest et de l'Est, respectivement; André Arsenault, Christine Petersen, et Julian Starr qui tiendront les chaires d'Écologie, d'Enseignement et de Systématique et Phytogéographie, respectivement; Kirsten Kilde et James Jones qui sont nos représentants étudiants de l'Ouest et de l'Est, respectivement; Erick Haber, Yolande Dalpé et Kevin Stevens qui se sont portés volontaires pour le sous-comité des Archives; Daya Dayanandan, Mihai Costea, James Jones et Michael Wright qui se sont promis de mettre à jour le site web de l'ABC. Je tiens aussi à remercier les membres du Conseil d'Administration qui continuent de travailler pour l'ABC cette année, et finalement tous ceux qui ont fini leurs termes de travail. Il y a encore un changement qui se produira cet automne dans notre Association: ayant travaillé sur le Bulletin depuis plusieurs années maintenant, Christine Maxwell passera le flambeau à Tyler Smith pour le numéro de décembre. Christine, nous vous devons tant et les mots ne suffisent pas pour décrire notre reconnaissance! Merci d'avoir fait de cette publication quelque chose de très plaisant à lire. Personnellement, j'ai toujours hâte d'ouvrir un nouveau numéro pour être au courant de ce qui se passe sur la scène botanique nationale.

Anne Bruneau (notre Vice-Présidente actuelle) et Denis Barabé planifient déjà notre prochaine réunion. L'assemblée annuelle de 2014 de l'ABC, qui célébrera « 50 ans de Botanique au Canada », se tiendra du 15 au 18 juin au Jardin Botanique à Montréal. En plus des procédures habituelles, il y aura un symposium général sur l'histoire de la botanique au Canada qui durera toute la journée. Ce symposium comprendra des présentations ayant trait aux différentes disciplines botaniques (mycologie, taxonomie, systématique, écologie, le développement de la morphologie, bryologie, lichenologie) au Canada, et à l'histoire de l'ABC et les jardins botaniques. C'est une réunion qu'il ne faudra pas manquer – commencez à vous préparer!

Après Montréal 2014 viendra Plant Canada 2015! Cet événement, pendant laquelle nous rencontrerons nos amis de la Botanical Society of America, se tiendra à Edmonton du 25 au 29 juillet. Nous recherchons actuellement un thème pour cette conférence; une fois le thème choisi, nous devons discuter d'idées pour les symposia et les ateliers. Initiez une conversation avec vos collègues et suggérez-nous vos idées! Celles-ci peuvent être envoyées à votre Président de Section, au Secrétaire, ou à moi. Ne craignez pas d'avoir recours à votre imagination et soyez créatifs! Avant d'achever, j'aimerais féliciter quatre membres de l'ABC qui ont reçu des prix au cours de ces derniers mois : Ernie Brodo a reçu le diplôme de Doctorat en Science, Honoris Causa, de l'Université de Carleton lors de la Convocation de juin 2013.

Arunika Gunawardena a reçu le 2013 Alumni Association Award of Excellence for Teaching de l'Université Dalhousie. Hugues Massicotte a reçu le 2013 Award for Exceptional Research and Scholarship de l'Université de Northern British Columbia. Vipen Sawhney a reçu le 2013 Award of Innovation de l'Université du Saskatchewan, Industry Liaison Office and Innovation Place. Ces félicitations m'amènent à mon dernier point. Je vous demanderai de considérer les nominations pour la réunion de l'année prochaine à

Montréal. Prenez le temps de regarder autour de vous et soyez certains de n'ignorer personne. Discutez avec vos collègues et tenez en compte les excellentes publications de nos étudiants. Il y a de nombreux botanistes, étudiants et chercheurs exceptionnels au Canada (comme on a pu le voir ci-dessus) et il suffit d'une seconde pour reconnaître l'un d'eux. Commencez le processus de nomination maintenant afin de ne pas être pressé vers la fin. En reconnaissant les meilleurs, nous préservons la jeunesse et l'énergie de notre Association.
Passez un bel automne!
Frédérique

Laurie Consaul's Legacy to the Canadian Botanical Association

A letter written by Mark Armstrong, Laurie's husband, and read by Frédérique Guinel at the Tribute given to Laurie by Lynn Gillespie at the CBA Annual Meeting in Kamloops - June 2013.

One of these empty seats here today should not be empty – it is the seat with a rose. It should be occupied by Laurie who joined the CBA as a student at the University of Western Ontario in the early 1980s and attended many of these CBA meetings. We really do not want to be remembering Laurie today but rather talking to her about all things botanical, listening to her presentation, or reading her poster and enjoying her company throughout the days here in Kamloops.

Laurie left our natural world – the world she lived in and lived for - all too soon. After a very courageous effort in battling with her illness, she departed on December 18, 2012. She was, sadly, just 52 years of age.

After graduating with her B.Sc., Laurie went on to obtain her M.Sc. from the University of Ottawa in 1988. Laurie then began her career at the Canadian Museum of Nature in April 1990. She decided to return to school and work towards her Ph.D. at McGill University at the Macdonald campus in Sainte-Anne-de-Bellevue, Québec. Laurie's dream became reality when on June 2, 2008, she convoked. A new career in teaching and research was to begin at Memorial University, St. John's Newfoundland, in the autumn of 2011. Laurie's diagnosis in July of that year forever changed her life.

Laurie left a legacy to the CBA. This legacy is given to the CBA in Laurie's memory. It was one of her wishes. Its specific use is to be determined. In remembering Laurie, I, her husband Mark, will be giving an annual contribution to the CBA. Laurie supported the endeavours of the CBA in various ways. I am very proud of her achievements and accomplishments as a botanist and naturalist. She was a very caring, intelligent and thoughtful person who enriched many of our lives. Today we remember her in Dr. Gillespie's words and in our own hearts and memories. Everything we are is in our spirit. The spirit of Laurie will live through her legacy and for her many contributions and friendships. I wish you all a successful meeting.

Mark Armstrong

Note: At the AGM of the meeting, it was proposed and accepted that Laurie's bequest be placed in the Charitable fund of the Alf Porsild Award and that the Alf Erling Porsild Award be renamed the Porsild/Consaul Award. This award will continue to go to the student writing the best paper in Systematics and Phytogeography as Laurie had been active in that Section of the CBA.



Mark Armstrong visited Frédérique Guinel at Wilfrid Laurier University in May 2013 and presented Laurie's bequest to the CBA/ABC. Photo taken by Dr. Mihai Costea.



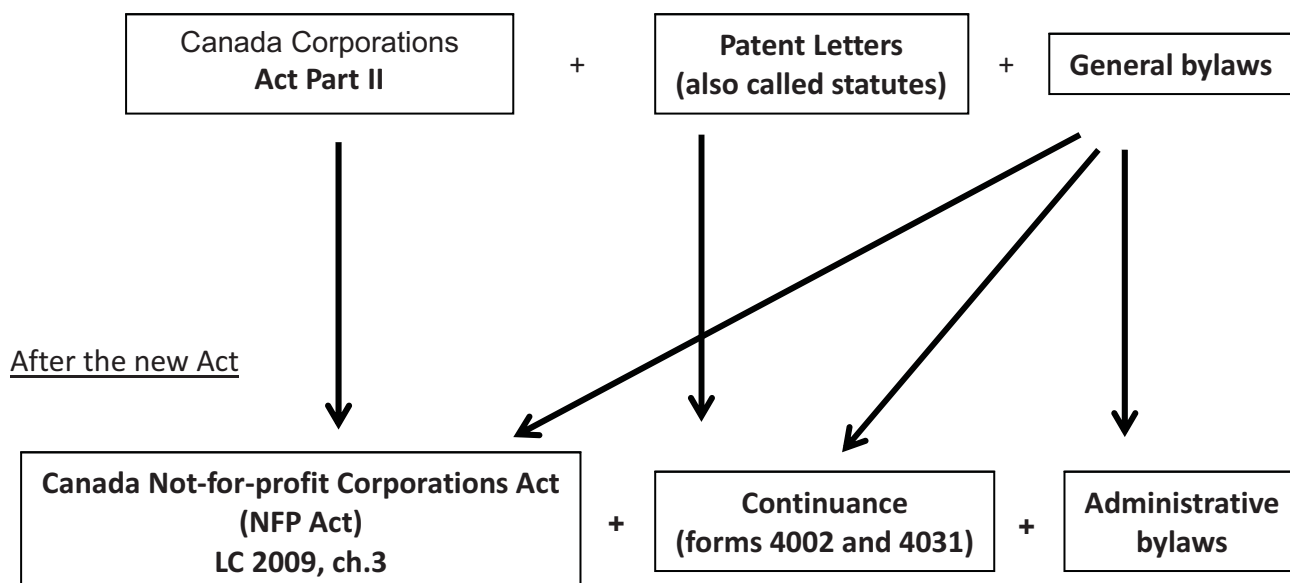
A single rose was placed at the seat that Laurie should have occupied at the AGM in Kamloops. Photo: H. Massicotte.

Of Great Importance to CBA/ ABC Members

Transition towards the new Corporate Act: Act adopted by the federal government on October 17, 2011
Continuance required by October 17, 2014

In October 2011, the new Corporate Act was enacted requiring all not-for-profit and charitable organizations to file a continuance of their organization under the new Act. The main reason for the change of the Act was to make it more straightforward and uniform among organizations, especially in some components such as fiscal accountability. Previously, an organization had to deal with the Act, the patent letters and the general bylaws. Some organizations also had a Policies and Procedures manual, some didn't, adding to the bylaws and making them quite complex. The new Act took parts of what was supposed to be in the patent letters and the bylaws and explicitly states them in the Act. Beside the Act, organizations will have to file continuance forms to maintain their organization as well as provide administrative bylaws. These bylaws are simplified and this requires organizations to have a detailed Policies and Procedures manual. The changes are summarized in the figure below:

Before the Act



Main points and timeline

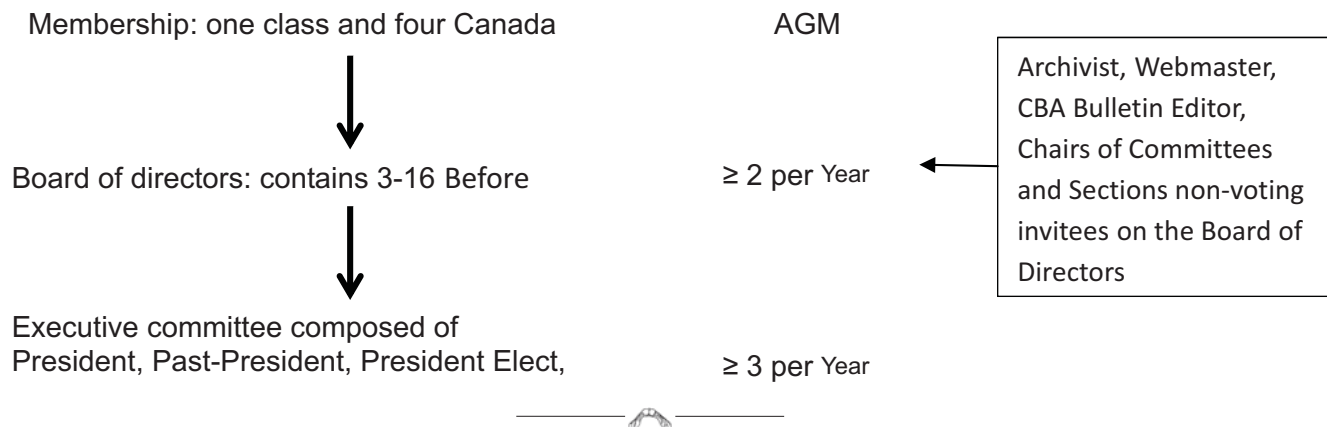
- Since **July 2012** (at the Columbus OH meeting), a sub-committee of the CBA has worked to update the bylaws and fill the two continuance forms.
- At the AGM of **June 2013**, an update on the process was explained to the members.
- In **August 2013**, the documents were sent to a lawyer to ensure that everything is complete and satisfies the new Act.
- **October 1st 2013**: an e-mail message will be sent to all members in good standing for comments (i.e. members who have paid their membership for this year). Members will have three weeks to review the bylaws and send their comments to Frédérique Guinel, President of the Association.
- The sub-committee will complete the revisions so that the revised version is sent for a vote to all the membership.
- **October 23rd 2013**: A message with a special resolution of the members will be sent from a third party (in our case, the accountant of the association) to all members in good standing. It will then be possible to conduct an electronic voting for a month.
- **It is important to note that as this process has to be a special resolution; according to the act, we need 2/3 of membership to approve the new continuance to be valid.**
- Ballots must be signed and sent to our third party as one of the following: 1) a *pdf* or *jpg* file (after scanning) by e-mail attachment, 2) a fax or 3) a paper copy sent by mail.
- Once the vote is completed, and if 2/3 of the membership has voted, the documents will be sent to the federal government for approval. If either the resolution does not pass by a 2/3 majority, or we cannot reach 2/3 as a quorum, there will be a need for a second special resolution and vote. This will delay the filing of the papers.

(continued)

- If by October 2014, the Association has not been able to file the documents, under the new act, it will be automatically dissolved.

NB. The above dates are tentative at this time!

To get more precision on the organization and its administrative structure, please see the following diagram which shows the components of the association, the membership of each component and the frequency of the meetings of these components:



Transition vers la loi BNL

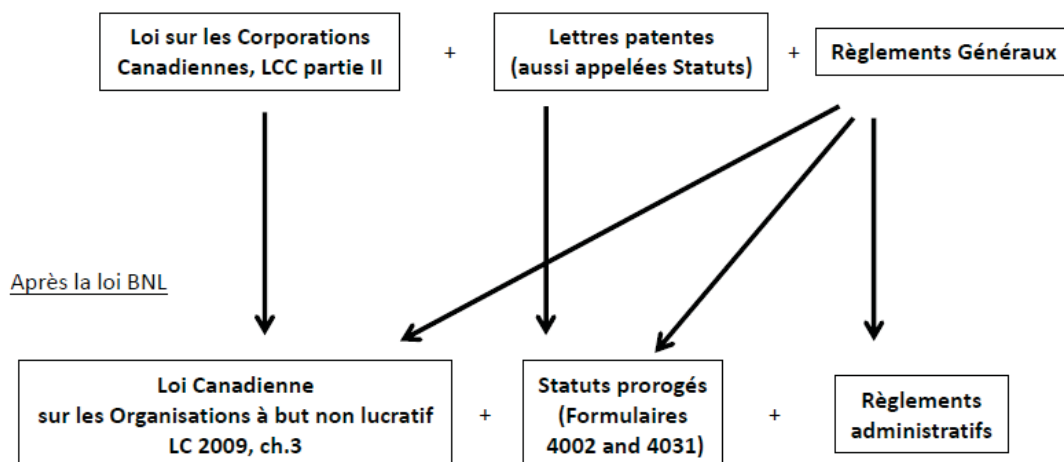
Loi adoptée par le gouvernement fédéral le 17 octobre 2011

Conformité est requise au plus tard le 17 octobre 2014

En octobre 2011, la nouvelle loi sur les corporations est entrée en vigueur demandant à toutes les organisations à but non lucratif et de charités de remplir les articles de continuité sous la nouvelle loi. La raison principale pour le changement de la loi est de rendre les règles plus claires et uniformes pour toutes les organisations, surtout en ce qui est de la comptabilité fiscale. Avant, une organisation avait à s'assujettir à la loi; elle avait des statuts et des règlements généraux. Certaines avaient aussi un manuel de politiques et procédures mais plusieurs de celles-ci s'ajoutaient directement aux règlements rendant le document complexe.

La nouvelle loi utilise des sections qui se trouvaient originellement dans les statuts et les règlements et les rend explicites dans la loi. Cela signifie qu'en plus de la loi, les organisations doivent remplir les formules de continuité pour maintenir l'organisation enregistrée et élaborer des règlements administratifs. Ces règlements sont simplifiés mais demande aux organisations de développer un manuel de politiques et de procédures plus détaillé. Les changements sont illustrés dans la figure qui suit:

Avant la loi BNL

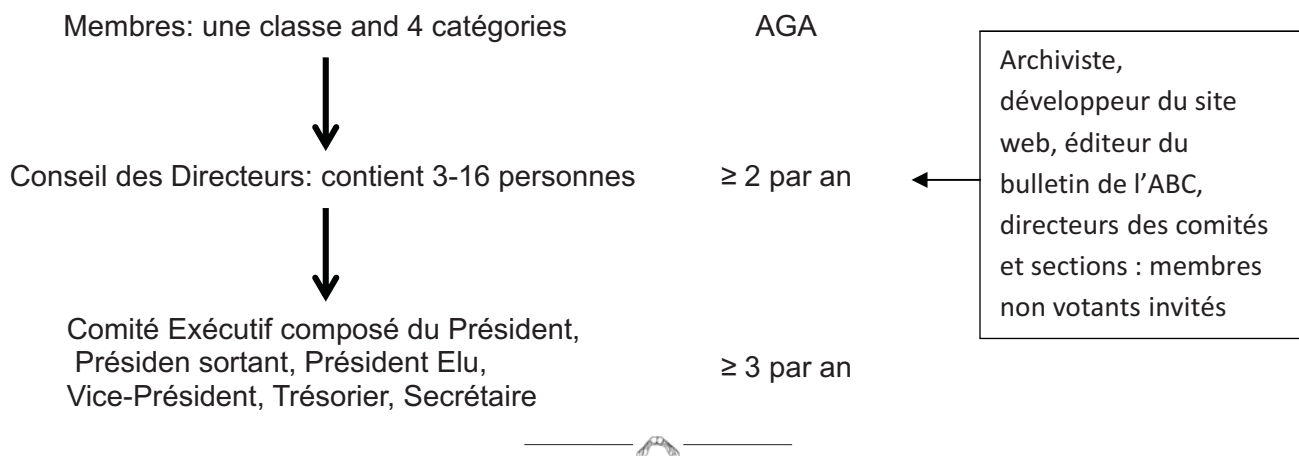


Points principaux et dates butoirs

- En **Juillet 2012** (à la réunion de Columbus, OH), un groupe de travail de l'ABC a été mis sur pieds pour préparer les changements des règlements et remplir les formules de continuité.
- À l'AGA de **Juin 2013**, une mise à jour du processus a été présentée aux membres.
- En **Août 2013**, les documents étaient envoyés à un avocat pour vérifier que tout est complet.
- **Le 1er Octobre 2013**, les documents seront envoyés aux membres en règle (i.e. ayant payés comme membre pour cette année) pour qu'ils puissent faire des commentaires. Les Membres auront deux semaines pour lire les règles et envoyer leurs commentaires à Frédérique Guinel, Présidente de l'Association.
- Le groupe de travail complètera les révisions afin d'envoyer les documents finaux pour un vote à tous les membres.
- **Le 23 Octobre 2013**, un message avec une résolution spéciale sera envoyé par tierce personne (la comptable de l'organisation) à tous les membres en règle. Il sera possible de voter électroniquement pour une période d'un mois.
- **Il est important de noter que ceci est une résolution spéciale; selon la loi, pour être valide, nos règles dans le certificat de prorogation ont besoin d'être approuvées par 2/3 des membres de l'Association.**
- Les scrutins doivent être signés et renvoyés à notre comptable par une des façons suivantes: 1) un document *pdf* ou *jpg* (après numérisation) par courriel, 2) un fax, ou 3) une copie par la poste.
- Une fois le vote complété, si 2/3 des membres ont approuvé, les documents seront alors envoyés au gouvernement fédéral pour approbation. Si nous ne pouvons pas recevoir 2/3 des votes ou si les documents ne sont pas approuvés, il sera nécessaire de refaire une autre résolution spéciale avec vote. Cela aura pour conséquence de retarder le dépôt des documents.
- **Si par octobre 2014 l'association n'a pas été capable de soumettre les articles de continuité, sous la nouvelle loi, l'association sera automatiquement dissoute.**

NB. Les dates sont pour le moment tentatives.

Pour obtenir plus de précisions sur l'organisation et sa structure administrative, voyez le tableau ci-dessous qui détaille 1). qui fait partie des différentes composantes de l'association, 2). qui en est membres et 3). quand ces composantes se rencontrent:



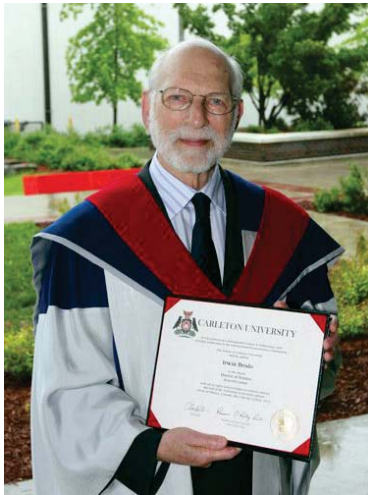
Thank you!

To the team that organized a great conference in Kamloops this year. From left: Cindy Ross Friedman, Christine Peterson, Katie DeGroot, Mandy Ross, Lyn Baldwin, and Santokh Singh

Photo: Hugues Massicotte.

Association News/ Nouvelles de L'association

Ernie (Irwin) Brodo awarded an Honorary Doctorate of Science at Carleton University's 2013 Convocation ceremony.



Many CBA/ABC members will know Ernie well from his attendance at Association meetings over the years and his service to the Association, and will be delighted to learn of this award. The award was made "in recognition of a distinguished career in lichenology and scientific leadership in the international biosystematics community." Ernie's career and many accomplishments are very well summarized in a YouTube video of his award which also includes his Convocation Address to the graduates. <http://www.youtube.com/watch?v=tCrZiRgRUw4> Ernie's address includes an insightful account of the services that taxonomists provide to society and the need for continuing research support for taxonomy. His address also gives a brief account of how "a kid from Bronx" gained his love of nature and ended up as a Research Scientist at the Canadian Museum of Nature in Ottawa, where he remains a very active Emeritus Research Associate, a story of both his dedication to science and serendipity. There is no need to repeat Ernie's accomplishments outlined in the video but newer members may wish to know that he has been a recipient of both the Association's Mary E. Elliott Award for meritorious service to the CBA/ABC (1993), and Lawson Medal in recognition of cumulative, lifetime contributions to Canadian botany (2003). Ernie's field of research, of course, has been the taxonomy of lichenized fungi in which he has published some 72 papers and 10 books and monographs, at last count. He is a past president of the American Bryological and Lichenological Society (1977-79) which publishes *The Bryologist*, one of the oldest North American botanical journals (established in 1898), and where he has published many papers. Ernie has also been very active in the International Association of Lichenology serving as Associate Editor of its Newsletter from 1967 and then as Editor from 1975 to 1981. In 1994 he was the recipient of the Association's prestigious award, the Acharius Medal. "The Lichens of North America" authored by Ernie and the photographic team of Sylvia and Stephen Sharnoff has brought the attention of lichens to many members of the North American public for the first time. This magnificent

book published by Yale University Press in 2001 is as much a work of art as it is of science. It has deservedly received many awards including the Henry Allan Gleason Award from the New York Botanical Garden. The book includes accounts of 805 lichen species, the majority stunningly illustrated, with a further 700 species mentioned in the keys and species notes.

Our congratulations to Ernie on the award of his Honorary Doctorate. Ernie now joins his wife, Fenja, as an Alumnus of Carleton University. May they continue to enjoy their active retirement.

John Sheard, Professor Emeritus, Department of Biology, University of Saskatchewan, Saskatoon.

Vipen Sawhney wins Award of Innovation for hybrid tomato seed technology



Vipen Sawhney has been awarded the 2013 Award of Innovation for developing a commercially viable male-sterile line of tomato, a breakthrough that promises to reduce the cost of hybrid seed production by at least 40 per cent for one of the world's most valuable crops.

Co-sponsored by Innovation Race and the ILO, the Award of Innovation honours U of Saskatchewan researchers who have brought new and commercially viable technology to the Industry Liaison Office for development into marketable products. The winner was announced at the SABEX "Celebrate Success!" gala in Saskatoon on May 9th.

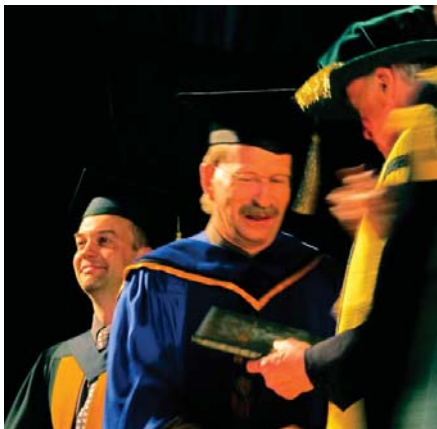
Tomatoes are grown in nearly every part of the world and sold either fresh, or as ingredients in an enormous range of products. According to the United States Department of Agriculture, tomatoes are second only to corn in value among vegetable crops.

Since tomato flowers contain both male and female parts, they can self-pollinate. This is a barrier to producing hybrid seed, where the flowers of one variety must be fertilized by pollen from another variety. The traditional approach for plant breeders is to physically remove the male parts of the flowers, an extremely labour-intensive process involving a steady hand and tweezers. The male-sterile system developed by Sawhney eliminates the need of this process thereby reducing the cost of seed production.

Sawhney's innovation, the 78-1 tomato line, is the product of more than 30 years of research. The line is photoperiod-sensitive, which means it remains male-sterile during longer days in the field, where it can be easily fertilized by other varieties to produce 100 per cent hybrid seed. To produce more of the 78-1 line, the plants are simply grown under a shorter photoperiod, which restores male fertility and allows the plants to reproduce as usual and maintain the male-sterile line. This line also offers superior tolerance to both low temperatures and salty soils. (continued)

The 78-1 line has been field-proven in California, Florida, Chile, Italy, China, India and Holland. It has been licensed to four seed companies in Italy, India, and Holland. It has also been shared, through agreements, with agricultural universities in Mongolia, China and India.

Hugues Massicotte receives award at UNBC Convocation



Hugues Massicotte was awarded the University Of Northern British Columbia's Achievement in Research Award, for exceptional research and scholarly activity at the Convocation ceremony in May 2013.

Arunika Gunawardena and her student win Teaching awards



Christina Lord(left) and Arunika Gunawardena, with their teaching awards.

Dr. Gunawardena is the 2013 recipient of the Alumni Association Award of Excellence for Teaching at Dalhousie University. Established in 1979, it is presented annually to the professor who, in the eyes of his or her students and peers, has displayed the qualities of superior teaching, enthusiasm for the subject, and interest in the needs of students.

Dr. Gunawardena's research focuses on programmed cell death in plant development. She is no stranger to acclaim: in addition to a Faculty of Science Killam Prize for her research in 2011/12, she received a DSU Teaching Excellence Award in 2011 and, earlier this year, an Outstanding Graduate Advisor Award.

Dr. Gunawardena's secret? The love and kindness she shows her students, treating them as equal partners in their education. Using grassroots methods of communication and implementing an open-door/open-house policy, Dr. Gunawardena puts her students at ease, something she says results in "higher productivity" and more smiles in the classroom.

Dr. Gunawardena teaches two plant biology classes: a larger second-year class and a more intensive fourth-year plant cell biology class that is cross-listed with a graduate level class. She takes the time to try and put herself in her students' shoes in order for them to succeed and to understand what they're learning.

So how does Dr. Gunawardena make plants interesting to her students? She is realistic about the probability of interest in the subject itself. "If you asked my second-year class, less than one per cent would like to pursue careers in botany. If you ask if they want to be doctors, over 70 per cent will say 'yes!'"

Dr. Gunawardena empathizes with her students, admitting that she wanted to be a doctor herself. "That didn't work out, but my father pointed out to me that I could be a different kind of doctor." While working on her undergraduate degree, she also met an inspiring professor that was engaged in plant biology research, and this piqued her interest. She wants to excite her students in a similar fashion.

"I have to make my lectures interesting so students can get excited. I speak about my own work, show video clips and lots of images. I also show them work that my students have done. I try to present a lot of practical implications too."

At the same ceremony, Christina Lord, a former student representative on the CBA/ABC executive was presented with the President's Graduate Teaching Assistant Award

Congratulations to both!

A successful auction!

The auction held at the conference BBQ and also at the banquet raised a total of \$1323.00 which will be added to the Macoun Travel Bursary Fund.

Many thanks to all those who contributed items and a special thanks to our hilarious auctioneer, Hugues Massicotte, his assistants, Christian Lacroix, Linda Tackaberry and others who helped to make this auction so successful!

Regional Undergraduate Conference

The Fraser Valley Regional Undergraduate Science Research Conference was held on April 5, 2013 at Trinity Western University.

The CBA/ABC presented two awards at the conference:

The Best Botany Poster Winner was **Katie Wigmore DeGroot**, of Thompson Rivers University.

Her supervisors were Lauchlan Fraser & Cynthia Ross Friedman. The title of her poster, "The effect of temperature, planting density, and intercropping upon oats (*Avena sativa*) and field peas (*Pisum sativum*)".



The Best Botany Oral Winner was **Elizabeth Zwamborn** of Trinity Western University. Her supervisor was Karen Steensma. The title of her presentation was, "Investigation of the viability of falconry as an alternative bird management practice in blueberry crops".



Dr. Cynthia Ross Friedman (VP CBA/ABC, left) presenting the CBA/ABC Oral Presentation Award to Elizabeth.

Photo(left)

Dr. Eve Stringham (conference organizer and Professor of Biology, Trinity Western University, left) presenting the CBA/ABC Poster Award to Katie.

50th Meeting of the Canadian Botanical Association Montreal, June 15-18th, 2014



50ième Congrès de l'Association Botanique du Canada

Jardin botanique de Montréal
4101 Sherbrooke Est, Montréal

Report from the Editor of Botany 2013

Christian Lacroix

NRC Research Press News

Many new initiatives have been undertaken at the Press over the past year or are forthcoming. A summary follows:

Just-IN

NRC Research Press launched a new feature in October 2012: Just-IN. Just-IN gives authors the option to have their manuscripts posted on the journal website within 5 days of acceptance! Just-IN manuscripts are citable and considered published. They are replaced by the version of record once the copy editing, layout, and corrections have been completed. So far, there has been significant uptake by authors for this new service.

Video abstracts

The option to submit video abstracts along with manuscripts is now available to our authors. A video abstract is a multi-media author-created summary of the research article. It serves to further highlight the research and improve understanding. More information and examples are available on this web page:

<http://www.nrcresearchpress.com/page/authors/services/videos>.

Translations of Instructions to Authors

A pilot project was launched in October 2012 to provide instructions to authors in Chinese, Spanish, and Portuguese for some journals, with the goal of eventually offering this to all journals. These instructions are not a direct translation of the existing instructions to authors, but rather the translation of a more focused document that deals with problems specific to foreign authors. With this project we hope to:

- Attract papers capturing the quality research being produced in nations where science output is increasing and where authors do not have a good command of English
- Increase the likelihood that journals' submission criteria are met for these papers and the English is clear enough to be easily understood during the review process
- Reduce the number of papers that do not match the scope of the journal to which they have been submitted

Toolkit for editors and their boards

CSP has many tools available to its journal editorial teams, from verifying the authenticity of submitted manuscripts to promoting noteworthy papers that have been accepted for publication, to communicating with our journal communities via social media. A summary of these follow:

iThenticate

iThenticate, a well-known plagiarism detection and prevention technology, is now available for your use. iThenticate compares manuscripts against its database, which includes more than 20 billion web pages and more than 116 million content items. A budget has been set up for each journal that allows half the submitted manuscripts to be checked for plagiarism using this software. Editors and their Boards are encouraged to use this tool. If you have any questions, contact Louis Lafleur.

Editors' Choice

Editors can now choose to highlight a paper at the top of the journal home page using the Editors' Choice option (maximum of one per month)

2013:

- ☐ Editors Choice: Symbiosis matters: Frankia in action! (May 24)
- ☐ Editors Choice: Light energy and cold stress! (March 15)
- ☐ Editors Choice: Bacteria, Plants, and Fungi working together! (Feb. 22)

Botany Cover photo contest:

Thanks to everyone who submitted entries to the 2013 Botany cover photo contest that took place October 2012! Congratulations go out to Scott Wilson, Professor, Department of Biology, University of Regina for submitting the winning image: "Cedars growing near Crawford Lake, Ontario, where sedimentary pollen and charcoal reveals human influences on vegetation over hundreds of years".

Social Media

CSP is currently active on Facebook with a community page for NRC Research Press and one for each of the journals. Links to published articles, news, and other items of interest to our readers are posted on a regular basis. Similar items are shared on Twitter. Editors and their Boards are encouraged to "participate in the discussion".

If you are active on social networks (Facebook or Twitter) please visit

<http://www.facebook.com/NRCResearchPress> or follow @cdnsiencepub.

Botany article mentioned in *New Scientist* last June:

<http://www.newscientist.com/article/mg21428683.300-plants-may-be-able-to-hear-others.html>

Botany is a popular journal on Facebook:

<https://www.facebook.com/pages/Botany/137483856353091>

Journal Statistics

Page allotment

The page allotment for 2013 is 1500 (see table below).

2008		2009		2010		2011		2012		2013
Allotment	Published	Allotment	Published	Allotment	Published	Allotment	Published	Allotment	Published	Allotment
1700	1502	1700	1254	1500	1083	1500	887	1500	1328	1500

Rejection rates 2009-2011

No. of manuscripts accepted			No. of manuscripts rejected (R) or withdrawn (W)							Rejection rates (including RWR) (%)			Total (Rejection and withdrawn) rates (%)		
2009	2010	2011	2009		2010		2011			2009	2010	2011	2009	2010	2011
			Rej	WD	Rej	WD	Rej	WD	RWR						
113	109	100	207	12	210	7	206	1	132	62.3	64.4	67.1	66.0	66.6	67.4

Time to publication

Year	Volume	Average time (days) to publish in Botany						
		Editorial office	Journal office			Total time for publication		
			e-first	Paper	Electronic Pub alert	e-first	Paper	Electronic Pub alert
2007	85	146		142	112		287	258
2008	86	161		120	99		285	260
2009	87	145		132	102		282	247
2010	88	138		83	64		220	201
2011	89	128		77	58		205	186
2012	90	148	99	126	118	247	274	266

Publication by source (number of manuscripts published and percent)

Canada						USA						Other					
2009		2010		2011		2009		2010		2011		2009		2010		2011	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
59	47.2	52.0	47.7	46.0	46.0	25.0	20.0	21.0	19.3	16.0	16.0	41.0	32.8	36.0	33.0	38.0	38.0

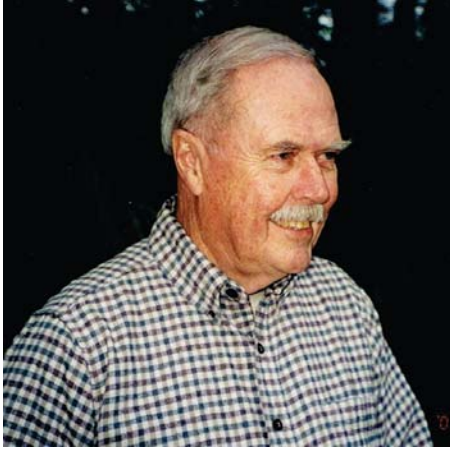
Impact factor and other metrics

A comparison of impact factors from 2007 to 2011

Impact Factor (2-year)				
2007	2008	2009	2010	2011
0.985	1.078	1.397	1.098	1.251

2012 IF has not been released yet.





Roy Lewis Taylor

A Tribute to Roy Lewis Taylor

Founding member and past President of the Association

*Compiled by Iain and Sylvia Taylor, Janet R. Taylor
and David Tarrant.*

Born in Olds, Alberta, April 12th 1932, died in Nanaimo, British Columbia, May 2nd 2013.

Roy always wanted to teach and did teach in a one-room school in rural Alberta and in Calgary, prior to obtaining a bachelor's degree. While in Calgary, he was involved with the YMCA which sent him to Montreal, where he obtained his B.Sc. at Sir George Williams (now Concordia University). He studied for one year at McGill, then went to the University of California, Berkeley, where he received his Ph.D. in Botany. In the summers between academic years, he was an assistant on botanical surveys for Canada Agricultural field studies in western Canada, primarily in British Columbia.

After completing his graduate studies in 1962, he returned to Canada to work as a Research Officer in the Taxonomy and Economic Botany Section of Canada Agriculture, ultimately becoming Chief of the Section (1965-1968). During this time, he co-authored the first major floristic study of the Queen Charlotte Islands (now Haida Gwaii) culminating in the two volume *Flora of the Queen Charlotte Islands* (1968).

In 1968 Roy was appointed Director of the University of British Columbia Botanical Garden. This provided the opportunity to establish a new garden for University and to serve as both a Professor of Botany, and of Plant Science (1968-1985). His research interest was in developing B.C.'s cytological flora. During his time he authored, co-authored, or edited over 150 publications.

Roy had the ability to surround himself with the right staff for the job. He recognized their strongest attributes, and with a new idea for a project, encouraged that particular staff member to run with it, then provided support all the way; and, of course, the project flourished. He was a great advocate for public outreach to the community and in particular to the horticultural community. He established the Friends of the Garden (FOGs) whose efforts have raised the caliber and expertise expected of garden volunteer groups worldwide. He pioneered horticulture therapy in collaboration with the GF Strong Centre in Vancouver. He and the FOGs presented two major art exhibitions, both of which traveled across the U.S. and Canada. The first, *Plantae Occidentalis: Reflecting 200 years of Botanical Art in British Columbia* (1979), opened at the UBC The Museum of Anthropology. The second exhibition was *Cloud Flowers: East and West* (1981). During his time at UBC, he was instrumental in establishing the Plant Introduction Program (PSIBG) to

acquaint and widen the palette of plants available to amateur and professional gardeners.

Roy was a member of the original Flora North America Project based in the U.S. This initiated a comprehensive inventory of the vascular plants of British Columbia, resulting in publication one of first computer based database studies of plants, *Vascular Plants of British Columbia: A descriptive resource inventory* (1977).

His first PhD student at UBC, Nancy Turner, is well known as one of the world's finest ethnobotanists, and she has continued Roy's commitment to the native flora and to BC's First Nations.

In 1985 Roy was appointed as President of the Chicago Horticultural Society and Director of the Chicago Botanic Garden, where he again introduced a plant introduction program similar to PSIBG (termed Chicagoland Grows). During this period, the CBG opened 10 new Garden elements, created a Research Center and added 60 more acres to the garden (1985-1994).

In 1994 he became Director of the Rancho Santa Ana Botanical Garden, Claremont, California (1994-1999). He also served as Professor and Chair of the Botany Graduate Program at Claremont Graduate University. As he had at UBC, Roy continued his efforts to strengthen the volunteer support through organizations that have become so effective in the support of botanic gardens and are now an important part of the American Public Garden Association (previously the American Association of Arboreta & Botanic Gardens), of which he was President and an Honorary Life Member. He was a founding member of the Canadian Botanical Association/Association Botanique du Canada (1964), Secretary 1965-67; V-P 1967-68; President 1968-69; Past-President 1969-70, member of the Association of Professional Biologists of British Columbia. He served on the Accreditation Commission of the American Association of Museums (1980-1991), serving as Chair for six years, and helped establish the guidelines for the Ethics Commission. He maintained his interest in botanical art as a collector and a member and Board Director of the American Society of Botanical Artists.

Over his career, Roy built an internationally-renowned reputation for directing botanical gardens. This was recognized in 1987 when he was appointed as a founding

director of Botanic Gardens Conservation International, an organization working to ensure the worldwide conservation of threatened plants. He received many awards and honours, membership *honoris causa* in the Linnean Society of London (1978), and two Honorary D.Sc. degrees, from UBC (1997) and Vancouver Island University, Nanaimo (2009).

He retired to Lantzville in 1999, and was active with Milner Gardens and Woodland (Qualicum Beach) as a Director and Chairman of the MGW Society (2000-2012); the Elizabeth Carey Miller Botanic Garden Board (Seattle, WA); and the Bloedel Reserve (Bainbridge Island, WA) as a Director and President of the Board. During this retirement time, Roy served as an Associate Editor for *Pacific Horticulture*, contributed to the present *Flora North America* and the *Flora of the San Juan Basin of the Four Corners* (Arizona, Utah, Colorado, New Mexico), currently in press. He was unable to complete publication of the flora of the Ilgachuz Mountains in central British Columbia.

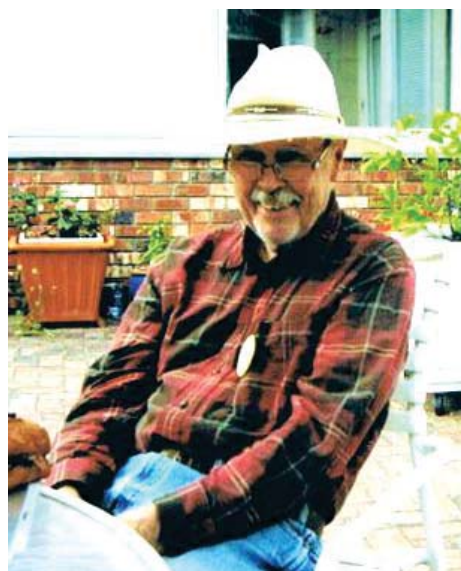
In addition to his other activities, Roy was both a curler and a golfer. He was a member of the Governor General's Curling Club from 1965 until his death, making him until that time, "the longest serving member"!

The garden that Roy and Janet built at their home in Lantzville is yet another example of his love and appreciation of plants and concern for native flora. There was a private celebration of Roy's spirit and life in the garden he created.

Further tributes to Roy can be found at:

<http://www.ou.edu/cas/botany-micro/ben/ben471.html>

including one from his first graduate student, Nancy Turner, who described him as, "The best graduate supervisor anyone could ask for"!



Roy Taylor, wearing one of the many hats from his large collection.

Editor's personal note:

I was privileged to meet Roy and Janet shortly after I started editing this Bulletin! They invited my husband and myself to dinner when we were house-hunting in Nanaimo, and subsequently invited us to stay in their cottage while our furniture was being transported across the country. We have valued their friendship and hospitality enormously in the years since then. We miss Roy, but we are so glad that we were able to share so many laughs and good times with him and Janet during that time. CDM.

William Alan Charlton

It's with great sadness that we note the death of W. Alan Charlton on July 8, 2013. Although he spent his career at the University of Manchester in the UK Alan was a great friend and member of the CBA/ABC and a prolific publisher in the Canadian Journal of Botany (today known as Botany). After an undergraduate degree at the University of Manchester Alan did his Masters degree with Taylor Steeves at the University of Saskatchewan in Saskatoon, then returned to Manchester for his PhD. Alan developed an international reputation for his work on the developmental morphogenesis of roots and leaves as well as innovative techniques involving epi-illumination microscopy.

A longer and more detailed obituary will appear in the December issue of the Bulletin. Also, plans are underway for a memorial tribute to Alan Charlton at the CBA/ABC meeting in Montreal next June.

A new editor has been found!

I am delighted to announce that Dr. Tyler Smith has agreed to become the Editor of the CBA/ABC Bulletin as of December 2013. His address is AAFC, Central Experimental Farm, 960 Carling Avenue, K.W. Neatby Building, Room 4017C Ottawa K1A 0C6 Tel : (613)694-2446 Fax: (613)759-1970

The same E-mail address will be used. cba.abc.bulletin@gmail.com

Many thanks to all those who have contributed articles over the past few years. You have made my job so much easier than it could have been! My apologies to those who have been hassled over deadlines! I wish the new editor every success with the Bulletin. Christine.

News from the Sections/ Nouvelles des Sections

Ecology Section and Conservation Committee

Kamloops was a great place to have a meeting! We had several ecologists at the conference and at the section meeting (over 25!). First of all I would like to welcome André Arsenault as the new co-chair of the section. It is great to be able to share the position!

The Ecology and Conservation section will continue over the next year to complete the review of the position paper on transplantation of rare species. We had a great round table discussion in Kamloops and I believe that we will be able to bring something for the membership before the next meeting in Montréal. We had a few suggestions for the next meeting, mainly looking at long term research. We will certainly keep you informed in the next few months of ideas and activities for the section.

The symposium of the Section entitled "Seeing the Forests for the Bryophytes: Bryophyte Diversity and Ecosystem Function within Managed Forests", organized by Nicole Fenton and Lyn Baldwin was a great success. You should hear more from Nicole regarding possible monitoring of bryophytes. Great opportunities for us and our students!

For the designation of areas of special conservation concerns, there have been a few suggestions, but I am still waiting for anyone interested to start. It would be good to have one every couple of years.

Have a great autumn,
Liette

Kamloops était une très belle place pour notre rencontre annuelle ! Nous étions plusieurs écologistes à cette conférence et à la réunion de la section (plus de 25 participant(e)s !). Premièrement j'aimerais souhaiter la bienvenue à André Arsenault comme co-président de la section. C'est bien de pouvoir partager le poste!

La section Écologie et Conservation continuera dans la prochaine année à compléter la révision du document de position que nous avons sur la transplantation des espèces en péril. Nous avons eu une très bonne discussion en table ronde à ce sujet à Kamloops et je crois que nous sommes en bonne position pour amener quelque chose pour la prochaine conférence à Montréal. Nous avons eu aussi quelques suggestions pour cette prochaine rencontre annuelle, notamment au niveau de la recherche à long terme. Nous allons vous garder informés dans les prochains mois des activités et des idées de la section.

Le symposium de la section intitulé « Lever le voile sur les bryophytes forestiers: diversité et fonction des bryophytes dans les forêts aménagées », organisé par Nicole Fenton and Lyn Baldwin a eu un grand succès. Vous devriez recevoir des nouvelles de Nicole pour une idée de suivi des bryophytes. Des nouvelles occasions pour nous et nos étudiant(e)s !

Pour la désignation des aires de conservation préoccupante, nous avons reçu quelques suggestions mais nous attendons toujours à savoir qui va se mettre à la tâche. Il serait bien d'avoir une désignation à tous les deux ans.

Bel automne,

Liette

Plant Development

Thirteen attended the 7 am breakfast meeting of the CBA/ABC Plant Development section on Tuesday June 4 at Thompson

Rivers University. While that's several more than attended the section meeting last year in Columbus, Ohio, twenty-seven had actually registered for this meal, so there was plenty of food for all, served in the spacious Alpine Room. The breakfast meeting was an experiment, to allow section members to attend other sections at lunchtime. However, we will revert to a lunchtime meeting in 2014 due to catering constraints at the Institut de Recherche en Biologie Végétale. For the 2014 CBA/ABC meeting, C. Ross Friedman agreed to serve as the Lionel Cinq-Mars judge from the Development Section, with R. Evans agreeing to serve as the alternate. In honour of the 50th anniversary of the CBA-ABC, a symposium theme of "Plant Development Past, Present and Future" was proposed to general agreement. Each invited speaker will represent one of the three eras in plant development. Section members proposed a number of candidate speakers. Following this meeting, on Wednesday June 5, members contributed four papers on plant development, one of whom was Erin Zimmerman, this year's winner of the Taylor A. Steeves Award. The Section Symposium then followed, for which three speakers (all at early, but differing stages in their research careers) were invited to present their research on New Frontiers in Cell and Developmental Botany. This ended in an all-too-brief panel discussion addressing questions such as the scope of research covered by the term "plant development": what is it, and what is it not? and, how can plant development research survive and thrive in Canada today? – Questions which we hope will be pursued further at next year's Plant Development Section Symposium.

Moira Galway.

Systematics and Phytogeography

I would like to begin by thanking all those that came to our lunch at Kamloops to discuss matters related to our section. I think we had a rather frank and interesting discussion about the state of our section and how to improve things.

Unfortunately, we were unable to award the Porsild Award this year due to a lack of applicants and this highlighted the need to improve our communication network; not only among section members, but also with any other colleagues and students with an interest in systematics and phytogeography. With this in mind, I have begun a Phytogeography and Systematics email database starting with those members that showed up to our sectional lunch in Kamloops. I encourage all sectional members and interested parties in receiving news from the Section, such as the notification of an upcoming Porsild Award, to send me their email address so it can be added to the database. This database could then be used in other ways than simply sending news. For instance, requests for plants could be made, or help with a protocol or technique. The more we invest in our section, the more it can benefit us all. Keep sending me news and have a great summer!

Julian

Teaching

1. New Chair of the Teaching Section:

As most of you know that I have decided to step down as Chair of the Teaching section. At this time, I would like to welcome Christine Petersen who has agreed to take over as the new Chair.

2. Annual CBA/ABC meeting and conference in Kamloops:

The CBA/ABC Teaching section has successfully organized a

Teaching Section Symposium at the annual CBA/ABC meeting and conference in Kamloops during June 1-5, 2013. The title of the symposium was "Distilling Plant Science: Botanical Education and Outreach in the 21st Century". Four invited speakers presented at the symposium, which was followed by a panel discussion (see below):

Jean Becker (Wilfrid Laurier University), Title: "Indigenous Education: Critical Issues"

George Haughn (University of British Columbia), Title: "What does it take to be a successful teacher?"

Michael Runtz (Carleton University), Title: "Why Plants are Animals: Making Botany Come Alive"

David Pearson (Laurentian University), Title: "Communicating Science – Your Science – in a Noisy World"

In addition, contributed papers and posters were presented at the Teaching Section Contributed Paper session, and the Poster Session respectively.

3. New CBA/ABC Teaching award:

I would like to thank the subcommittee members, Arunika Gunawardena, Kate Frego, and Christine Maxwell for working on the criteria for the Teaching award. The first award will be given at the 2014 meeting in Montreal.

4. Teaching Symposium for the 2014 Meeting in Montreal: The CBA/ABC Teaching section is planning to organize a Teaching symposium at the 2014 meeting in Montreal.

Please contact Christine Petersen or myself if you have any suggestions for the symposium title or the speakers.

Santokh Singh

Mycology Section

With respect to the mycology section, for those of you who could join us in Kamloops, the highlight was, undoubtedly, the admirable Weresub lecture, "Mycofloristics is an uphill battle", delivered in tandem by Oluna and Adolf Ceska.

Oluna provided the fascinating narrative and Adolf complemented it with astounding pictures and additional anecdotes. For anyone interested in macrofungi surveys, this close-to-decadal effort to regularly sample the same

ecosystem in Saanich, B.C. (Observatory Hill!), was a delight. The survey has revealed an astounding diversity of macrofungal species, some new to science, all the while giving insights into seasonal and yearly changes, proving extra *omne dubium* that perseverance is still a quality to be nurtured for mycologists! I heard Dr. Bryce Kendrick say (sorry if I am misquoting) that, "this survey is unique worldwide in terms of duration and scientific excellence". We will anxiously wait for the definitive book summarizing their key findings! Until then, a great thank you to Oluna and Adolf for sharing their findings with us!

The winner of the Weresub Award for Best Student Publication in fungal biology was Nicole Robbins, for her paper "Lysine deacetylases Hda1 and Rpd3 regulate Hsp90 function thereby governing fungal drug resistance", co-published with Michelle Leach and Leah Cowen, in Cell Reports. Congratulations to Nicole and thank you to all Weresub contenders for their submissions. At our section meeting, we discussed themes and ideas that could be used for symposia in Montreal (2014) and in Edmonton (2015), and for potential Weresub lecturers. If anyone has further suggestions regarding any of these topics, please do not hesitate to contact either Shannon Berch or me, as we will be discussing all ideas and any submissions during the coming months.

Respectfully submitted,
Hugues Massicotte and Shannon Berch
Co-Chairs of the Mycology Section



Photo: Hugues Massicotte

In need of research expertise?

Canadian botanical science companies in need of the latest research expertise need look no further than Mitacs-Accelerate. This national program connects companies with graduate students and university faculty members through short or long-term research projects aimed at addressing a company's need.

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For each four-month internship unit, the company must contribute \$7,500. But not to be missed is that Mitacs-Accelerate matches a company's contribution dollar-for-dollar; a \$7,500 investment instantly becomes \$15,000.

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Accelerate is administered by Mitacs, a national, not-for-profit research corporation which connects academia and industry through collaborative research projects. For more information, visit www.mitacs.ca.

Graduate Student Profiles

We are interested in hearing about the research that Canadian graduate students are involved in! Please send your profiles to the Editor of this newsletter at cba.abc.bulletin@gmail.com. Profiles should be no longer than 250 words, and you should include a photo.

James Jones, 1st year M.Sc., CBA Student Representative. University of Northern BC and Wilfrid Laurier University.

Born and raised in Prince George, B.C., Canada, I graduated from the University of Northern British Columbia in 2013 with a B.Sc. in Biochemistry/Molecular Biology and a minor in Biology (botany focus). During my undergraduate career, I undertook two thesis projects, co-supervised by Drs. Art Fredeen and Hugues Massicotte, both focused on the ecology of the carnivorous plant genus *Drosera*. Having grown carnivorous plants for several years as a hobby, I was perplexed by the lack of information regarding the sensitivity of most carnivorous plants to dissolved mineral salts. Using greenhouse-grown specimens of the commonly cultivated cape sundew *Drosera capensis* L., I discovered that this sensitivity is independent of soil pH, and appears due to a physiological intolerance of calcium. With this under my belt, I then took this question into the field to determine the impact this phenomenon has on the distribution of our native British Columbian sundews *D. anglica* (Huds.) and *D. rotundifolia* (L.). We are expecting to publish the results of this study soon.

Presently, I am undertaking a M.Sc. under the tutelage of Dr. Frédérique Guinel of Wilfrid Laurier University (Waterloo, ON), aimed at examining the molecular control of the symbiotic root phenotypes in the common pea *Pisum sativum* L. With this research, I hope to expand upon my personal interests in molecular biology and ecophysiological adaptations in plants.



James Jones

Irene McKechnie University of Ottawa

I am a PhD candidate in the biology department at the University of Ottawa, working under the supervision of Dr. Risa Sargent. My research looks at multi-species interactions in pollination biology. I use managed lowbush blueberry (*Vaccinium angustifolium*) fields in New Brunswick to study the impact of habitat alteration and the loss of native forest patches on the local pollinator community and the reproductive success of the blueberries. At the field level, blueberry plants against forest edges tend to have fewer flowers, lower fruit weights, and lower seed numbers, likely due to lower light levels. When examining 1 km radius zones around each field, no impact of forest cover can be detected, although areas with more blueberries in production are associated with lower fruit set values. Additionally, I am assessing the relationship between mycorrhizal fungi and blueberry reproduction, and the impacts of foliar fungicide spraying on this relationship. Recent studies have indicated that above-ground fungicide application can significantly alter pollinator visitation in natural settings, but these relationships have not yet been examined in an agro-ecosystem crop species like lowbush blueberry. In addition to our field and greenhouse trials, we have recently published a meta-analysis examining the impacts of habitat disturbance on the reproductive success of animal-pollinated plants. We hope that results from our research will help guide management practices for blueberry growers as well as advance our understanding of multi-species interactions in pollination biology.



Irene McKechnie

Kirsten Kilde University of Northern British Columbia. CBA Student Representative for the West.

I am a 23 year old (almost) second year graduate student working towards my Master's degree at the University of Northern British Columbia in Prince George. While my bachelor's degree is more biochemistry based, my main interest lies in mycology (non-vascular plants and microbiology are also of interest to me, but mycology has, at least temporarily, won the majority of my attention). My study is on the ectomycorrhizal fungi found on extreme bedrock derived soils in Central British Columbia. My specific focus is on the ectomycorrhizae found on both serpentine and calcareous soils, serpentine notable for the levels of heavy metals present and the low Ca: Mg ratio and calcareous for the high levels of calcium present, with a high Ca: Mg ratio. Dr. Hugues B. Massicotte, past President of the CBA, is my supervisor, the keeper of all wisdom and knowledge of fungal matters. My co-supervisor is Dr. Paul T. Sanborn who is invaluable for his insight into the mosaic of bedrock found in my study area. Thus far, I have collected soils from the Fort. St. James area and have grown interior Douglas fir from seed collected from trees found in the area. I am in the preliminary stage of harvesting roots and performing morphology analysis with Linda Tackaberry's assistance and will move into DNA analysis in the coming months. Hopefully my work will provide a detailed picture of the local fungal populations and clarify the differences found between the ectomycorrhizae that live on serpentine and calcareous soils.



Kirsten on the Skyline

(continued)

Denver Falconer (M.Sc. candidate, University of Saskatchewan, Saskatoon – supervisor Dr. J. Hugo Cota-Sánchez)

Denver's thesis project involves the study of three populations of *Opuntia polyacantha* (Plains Prickly Pear cactus) located south of Saskatoon. His project is focused on the pollination biology of *O. polyacantha*, namely its floral diversity, pollination syndrome, and stamen movement (see paper Cota-Sánchez et al. 2013. *Flora* 208: 381-389), and how these characteristics are related to seed set. The major objectives of his research are the investigation of: 1) the floral phenology and morphology of *O. polyacantha* and 2) the relative success of outcrossing and self-pollination in the species.

Pollination in these Canadian cacti populations has not been previously documented. Already during his summer fieldwork, he has observed several pollinators that visit the flowers, but only a small percentage of them have had the mass to trigger staminal movement within flowers. Along with staminal movement, these populations have a range of style lengths that can limit stigma exposure to the anthers of the flower. By studying the cooperation between pollinators and the staminal movement of the flower, Denver hopes to better understand the role that this plays in the propagation and spread of this species throughout the Saskatchewan landscape. Denver's study will also cover the seed set of *O. polyacantha*, as it is often very low to non-existent, and how this relates to the method of pollination a particular flower has experienced. In addition to the interesting reproductive features of this species, his project is relevant to increasing our knowledge on pollination biology and pollinator diversity in Canadian native species and to learning more about pollinator ecosystem services.

Last September Denver attended the International Pollination Course in Chapada, Brazil, an intensive two-week hands-on training course on all aspects of pollination biology.



Denver in the field

Book Review

Official Plant Emblems of Canada. A Biodiversity Treasure.

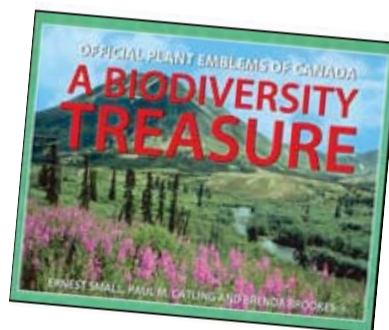
Small, Ernest, Paul M. Catling, and Brenda Brookes. 2012.

Government of Canada Publications, Ottawa ON K1A 0S5;

<http://publications.gc.ca/site/eng/393571/publication.html>.

428 pp. (hardcover). CAD 49.95.

ISBN 978-0-660-20057-6.



During mid-January 2013 a wave of criticism rippled through the Canadian media prompted by the depiction of the national emblem, the maple leaf, on a new \$20 bill. The controversial leaf resembles that of a Norway maple tree (*Acer platanoides*), an introduced species that is currently invasive in Eastern Canada. Although various maple leaf renditions have been used on the Canadian flag, heraldry, official logos and numerous commercial products, history and common sense dictate that the national leaf must belong — even when stylised — to a native maple tree(s). The public outcry ensued shows that plant symbols can be more than simple conventions. However, it was not remarked that on the same troublemaker bill, some of the poppy flowers symbolising Remembrance Day, are depicted as having 5 petals, which indicates that the desire for botanical accuracy may not be absolute when it comes to plant symbols. *Official Plant Emblems of Canada* is a wonderful exploration of the plant species recognised by the Canadian legislation as national, provincial and territorial emblems. After an overview and synopsis of the symbol plants — flowers, trees, two additional grasses and one berry for the 10 provinces and three territories — the book provides detailed information about the 28 plant emblems of the Canadian regions, and it ends with 10 native maple species. The book is essentially a collection of most unusual plant species monographs. No stone has been left unturned by the authors: names, symbolism, history, botanical description, systematics, identification key of varieties or closely related species, geographical distribution, ecology and biology, pests, traditional and modern uses, cultivation, toxicity, conservation status, myths, legends, tales, folklore, art, literature, and other interesting facts are all brought together to generate a multifaceted portrait of each plant emblem. Although written by some of the best Canadian botanists, and thus authoritative and comprehensive in its content, the book is far more attractive than a botany manual. The language is accessible and the text peppered with anecdotes and funny facts that connect plants and people, making the reading not only informative but also entertaining. The book is beautifully illustrated. As eclectic in nature as the text, the illustrations range from botanical art, details of taxonomic characters, depictions of the plants in the nature and daily life, to art photography and paintings by various artists. As indicated by the authors, and perhaps their core motivation for putting together this volume, the plant symbols are a great opportunity to put botany in the spot light, raise awareness to biodiversity issues, and educate the public about the significance of plants. This book is addressed to everyone who cares about nature, not only to botanists and educators. Although Canadian plant emblems, the species portrayed are native to North America more broadly (or even with a circumpolar distribution, e.g., *Saxifraga oppositifolia*, the flower symbol of Nunavut), which makes them relevant to readers outside the borders of Canada. But first and foremost, I would recommend this book as an example of reflection on what plants mean to us.

Mihai Costea

Wilfrid Laurier University,

Waterloo, Ontario

[Reproduced with permission of Economic Botany]

Association Awards for 2013

MAJOR ASSOCIATION AWARDS

Most years, The Canadian Botanical Association-L'Association Botanique du Canada recognizes individuals in the form of two major awards, the Lawson medal to recognize the laudable contributions of a single individual to Canadian botany, and the Mary Elliott Award for meritorious service to the Association.

The task of crafting these awards and medals has been undertaken for many years by Dr Iain Taylor, Professor emeritus at UBC, and by David Sweet, an artist from Vancouver, BC, to whom we owe a great deal of gratitude again this year.

Photos in this section labelled "HM" were taken by Hugues Massicotte, those labelled "CM" were taken by Christine Maxwell.

The Lawson Medal

First awarded at the 1969 Annual Meeting, the Lawson Medal, the most prestigious award of the CBA/ABC, was established to provide a collective, formal expression of the admiration and respect of botanists in Canada for excellence in the contribution of individuals to Canadian botany. It is named in honor 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

Cette année, j'ai l'immense plaisir de vous annoncer que la Médaille Lawson Catégorie B est décernée à Yolande Dalpé pour le travail considérable qu'elle a accompli en tant que chercheuse en Mycologie au niveau national et international au sein d'Agriculture et Agro-alimentaire Canada.

This year, the CBA/ABC is immensely pleased to award the Lawson medal Category B to Dr. Yolande Dalpé, a Research Scientist at Agriculture and Agri-Food Canada, for the research she has performed nationally and internationally in Mycology. Throughout her career, Dr. Dalpé has demonstrated a great intellectual ability and far-reaching interests in an uncountable number of plant and mycorrhizal research areas. For one of her supporters, Yolande is the genuine role model of a true, passionate and dedicated researcher. I would add to this that she is also a great model of a dedicated teacher. Finally, her services to the scientific community are quite astonishing. In a letter of support, I read that Yolande was one of the most dedicated volunteers around. I will quickly review her feats under the three pillars of academic life: Research, Teaching, and Service.

RESEARCH - Her range of scientific interests and activities is remarkable in its breadth, cutting across the fields of taxonomy of arbuscular mycorrhizal fungi and other fungi, plant and crop biology, and soil remediation from organic contaminants. I will focus here on her amazing work with arbuscular fungi; she has enriched our knowledge and understanding of the biological processes of this weird group of organisms (I may say so because I am studying the plant side of things). In the early 80's, researchers working on the fungi responsible for the formation of arbuscular mycorrhizae were either considered like naïves or like heroes. The identification of these fungi was extremely difficult because they were lacking characteristic morpho-anatomical traits and because they were recalcitrant to axenic growth. Yolande quickly embraced the problem and, using the root-organ culture technique developed in the lab of André Fortin, she was able to obtain and maintain many cultures of different mycorrhizal fungal species. Her great asset is that over the years, she mastered molecular techniques that she was able to integrate into her study of fungal identification. Thus, she covered a great distance from fungal soil sampling to fungal genomic identification. Furthermore, Yolande was instrumental in the development and management of the Canadian AM fungal collection (GINCO), a collection which is known the world over and on which many researchers, including myself, rely. This collection is unique; it has been the result of a successful collaboration between two institutes located in two different continents (North America and Europe). Yolande's other international collaborations are as impressive; she has collaborators in Belgium, Cuba, Kenya, Sénégal, France and Germany. Her list of publications is a witness for her leadership and collaborative spirit. Dr. Dalpé est une personne qui a été très active dans sa carrière de 33 ans; elle a participé à plus de 130 manuscrits scientifiques. She has written many book chapters and has participated to many workshops, symposia, and conferences.

TEACHING - Many Canadian and international students and researchers have been trained and taught by Yolande and her imprint can be felt far and beyond Canada. She has welcomed in her lab many persons who came to learn the identification and taxonomy of AM fungi. Her lab has been even considered as a subsidiary of the United Nations because trainees were coming from Africa, China, South America, and Europe. Yolande has also travelled far to extend her mycological knowledge. She has sat on many thesis juries, and has worked in several labs outside Canada.

SERVICES - Dr. Dalpé is enthusiastic about fungi and she easily infects you with her enthusiasm. Again, her range of interests is wide. She is an active member of the Mycologues Amateurs de l'Outaouais. J'ai souri quand j'ai lu qu'elle était membre du comité de francisation des noms de champignons; quel beau nom pour un comité! She was a full participant to the organization of the 4th International Conference on Mycorrhizae held in Montreal in 2004. This meeting must have been exceptional because each of the 5 supporters of Yolande's nomination has written about it. Moreover, she has been a key-



Yolande Dalpé (left) receiving her Lawson medal from president, Frédérique Guinel. Photo HM

figure in the International Mycorrhiza Society. She was one of its founding members, and she served as its Secretary and Bulletin Editor for several years. Her many contributions have played a large role in the initial success of this Society. Yolande has also been an Associate-Editor of the Canadian Journal of Botany from 1994 to 2008. She served as a committee member of the NSERC GSC03 (Plant Biology and Food Sciences) from 1995-1998. In both of these positions, she was greatly appreciated for handling manuscript and grant applications in a professional and critical manner. Je veux finir en mentionnant que Yolande a réussi cette très belle carrière tout en gardant sa personnalité si agréable et attachante, son sens de l'humour, et en démontrant un pouvoir de conviction calme et serein mais redoutablement efficace. She represents Canada very well throughout the world. As one supporter wrote, she is an outstanding scientist without borders. This is why the Canadian Botanical Association is extremely pleased to offer Dr. Dalpé the prestigious Lawson Medal.

Mary E. Elliott Service Award

The Mary Elliott Service Award is given to an individual for meritorious service to CBA/ABC. It was first awarded in 1978 in memory of Mary E. Elliott. Before her untimely 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 beginning her term as Past President. 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 Canadian Botanical Association is delighted to present the Mary Elliott award to Dr. Rodger Evans, Professor and Director of the EC Smith Herbarium, in the Department of Biology at Acadia University, for his numerous contributions to the Association in many different roles (Member, Director, President-Elect, President, and Past-President).

Il est donc mon privilège de vous annoncer que le lauréat 2013 du prix Elliott est Docteur Rodger Evans, Professeur et Directeur de l'Herbarium EC Smith, dans le Département de Biologie de l'Université Acadia en Nouvelle-Ecosse, pour ses nombreuses contributions à l'Association où il a porté plusieurs chapeaux, celui de membre, de Directeur et de Président. Rodger has made significant contributions to our Association on many fronts. He became a member in 1993, took the role of a director in 2003, and agreed to become President-Elect in 2006. In his term as a President, he organized a memorable meeting in Acadia on the theme "Plants on the Periphery". This was an amazing feat as he had to be President and Vice-President at the same time. In all the letters I receive from his supporters, it was noted that his dedication to students is admirable. In the 2009 meeting in Acadia, the students represented more than 50% of the total attendees. He has advocated for lower student fees at the annual meetings, has placed important emphasis on student participation within the association, has promoted our students' awards to the membership, and has been a tireless judge for the Lionel Cinq-Mars best oral presentation. Another one of his achievements is seen in our renewed strong link with the Botanical Society of America. As one of his supporters mentioned, Rodger has helped facilitating a more seamless relationship with our sister organization. The meeting in Ohio last year was a direct result of Rodger's effort. It was noted that during his term as President-Elect and President, the Canadian science landscape changed, so during his tenure he had to face challenging issues. He rose to the occasion and left the CBA as a vibrant association. Félicitations Rodger and thank you for what you have done!



Rodger Evans receiving his award from Frédérique Guinel. Photo CM

STUDENT TRAVEL AWARDS

Travel awards: John Macoun Travel Bursary

This award was named to honor John Macoun (born in Ireland, 1831-1920), an official botanist on five major Canadian expeditions and, 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 a founding fellow of the Royal Society of Canada in 1882. He had an outstanding career as a traveling scientist. The award was established in 1988 to provide partial financial assistance for travel to the Annual Meeting to students presenting a paper in the Lionel Cinq-Mars competition or a poster in the Taylor competition. Under the impetus of Dr. Jean Gerrath (U. Northern Iowa, now retired), the CBA/ABC 'Auction' was initiated (first in Calgary, 1994); the Macoun fund continues to be replenished by fundraising during the many subsequent botanical auctions, plus additional generous donations.

This year the judges were John Markham, Michele Piercey-Normore and Lynn Gillespie
The winners were:

Erin Zimmerman (from Québec)

Courtney Clayson (from Ontario)

See next page for photo.



Macoun award winners Erin Zimmerman, (left) and Courtney Clayson (right) receiving their awards from Frédérique Guinel. Photo: HM



Keith Winterhalder Undergraduate Travel Award (\$500)

This award was established in 2006 in honor of the late Keith Winterhalder, a long time member and former president of the CBA/ABC, for his outstanding contributions to the Association and for his never-failing interest and encouragement of student members of the CBA/ABC. Keith's area of expertise was in land reclamation. The award provides partial financial assistance for travel to the Annual Meeting to undergraduate students. Sadly there were no applications for this award this year!

STUDENT AWARDS FOR ORAL AND POSTER PRESENTATIONS

Iain and Sylvia Taylor Poster Award (\$500)

The CBA/ABC gives an award for the best student poster presented at the Annual Meeting. The award is in honor of Iain and Sylvia Taylor, members who, for many years, have actively contributed to the development of the CBA, and continue to be involved to this day. Thank you to the judges this year: Janet Taylor, Erica Wheeler, Jane Young, Irene McKechnie, Geoff Wasteneys and Kevin Stevens.

There were two honourable mentions: James M.C. Jones, for his poster, titled, "A small scale ecological study of British Columbian *Drosera*" co-authored with Hugues B. Massicotte, and Arthur L. Fredeen. and Charlotte Walinga for her poster, "Morphometric analysis of the small-fruited cranberry, *Vaccinium oxycoccos* L., in eastern Canada", co-authored with Tyler W. Smith.

The winner was Kirsten M. Kilde, for her poster, "Thriving in adversity: Exploring the Douglas-fir ectomycorrhizal fungi populations of extreme bedrock-derived soils of central British Columbia" co authored with Hugues B. Massicotte, and Paul T. Sanborn.



Iain and Sylvia Taylor Poster Awards. From left: Iain Taylor, Charlotte Walinga, James Jones, Kirsten Kilde, and Sylvia Taylor. In front, Christine Maxwell, who organized the judges. Photo: HM

Lionel Cinq-Mars Award (\$500)

This award was established in 1976 for the best oral presentation by a student on 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 CBA Executive (1965-66). Cinq-Mars (1919-1973) was an expert field botanist, amassing a considerable personal herbarium and considered an expert on the genera *Viola* and *Amelanchier*. Oral presentations were evaluated by: Christian Lacroix, Marian Munro, Hughes Massicotte, and Julian Starr.

(continued)



Lionel Cinq Mars winners.

Irene M. McKechnie, (far right) co-authored with Risa D. Sargent, for her paper, "Pollen limitation and reproductive success in lowbush blueberry (*Vaccinium angustifolium*): Influences of local habitat and pollinator community".

Two honourable mentions:

Katie DeGroot, (second from left).co-authors Cynthia Ross Friedman, Eric Little and Lauchlan Fraser, for her paper, "The effect of temperature, planting density and intercropping upon oats (*Avena sativa*) and field peas (*Pisum sativum*)".

and
Erin Zimmerman,(third from left) co-authors Gerhard Prenner and Anne Bruneau, for her paper, "Floral evolution in the Dialiinae clade (Caesalpinioideae), a study in organ loss and instability".

John Markham presented the awards.

Photo: HM

AWARDS FOR PAPERS PUBLISHED BY STUDENTS

J. Stan Rowe Award (\$500)

This award was established to celebrate the life and work of an outstanding Canadian Plant Ecologist, Stan Rowe (1918 to 2004).

Judges: John Markham; Luise Hermanutz; Liette Vasseur

The winner this year is

Lucas C.R. Silva for his paper: Lucas C. R. Silva and Madhur Anand. 2012. "Probing for the influence of atmospheric CO₂ and climate change on forest ecosystems across biomes". *Global Ecology and Biogeography* 22: 83–92.



Photo: Lucas C. R. Silva

Taylor Steeves Award (\$500)

This award was established to honour renowned botanist Taylor Steeves (1926-2011) who made numerous contributions to the CBA/ABC as well as to the botanical sciences in the discipline of plant morphology and development. It is awarded in recognition of the best paper published in the field of plant development by a graduate student.

Judges: Vipen Sawhney; David Garbary; Moira Galway

The winner this year is

Erin Zimmerman for her paper Zimmerman E, Prenner G and Bruneau A. 2013.

"Floral morphology of *Apuleia leiocarpa* (Dialiinae: Leguminosae), an unusual andromonoecious legume", published in 2013 in *Int J Plant Sci* 174: 154-160.

Photo: Erin Zimmerman receiving her award from Moira Galway



Luella K. Weresub Award (\$1000)

This award was established in the memory of Dr. Luella Kayla Weresub (1918-1979), a well-known Canadian mycologist who worked at the Biosystematics Research Institute of Agriculture Canada since 1957. Dr. Weresub was a very active member of CBA/ABC, serving as a Director from 1971 to 1973.

Judges: Greg Thorn, Faye Murrin, Hugues Massicotte.

The winner this year is

Nicole Robbins for her paper "Lysine deacetylases Hda1 and Rpd3 regulate Hsp90 function thereby governing fungal drug resistance", 2012, published in *Cell Reports* 2: 878-888.

Photo: Nicole Robbins



Botanical Research at the University of Prince Edward Island

Laboratory of Christian Lacroix

Christian Lacroix is a Faculty member in the Department of Biology at the University of Prince Edward Island. He has been there since 1990. He is currently Interim Vice-President Academic.

Christian's research program focuses on plant structures from a developmental perspective. His work highlights relationships between morphologically different structures that share similar developmental pathways. His current research interests include leaf complexity in seed-bearing plants, developmental aspects of floral organ identity, and the biology of the Gulf of St. Lawrence Aster.

Here are some of the current projects that a variety of students in his lab are working on:

Mike Ogden. Bachelor of Science program, Honours in Environmental Biology and Minor in Environmental Studies.

Project: Leaf development in *Cecropia*

This research project involves a comparative study of the structure and development of the leaves of two closely related plant species, *Cecropia obtusa* and *Cecropia sciadophylla*, found in the Neotropic ecozone. Both species have leaves that look alike superficially but differ in complexity; one species produces palmately lobed simple leaves and the other produces palmately compound leaves. The study objective is to compare the initiation and development of both leaf forms on the shoot apical meristem to determine if they share similar ontogenies during early stages of development. A combination of qualitative and quantitative methodologies will be used to identify differences in leaf primordia of each species.

Photos: Mike Ogden and below, *Cecropia obtusa*



Jesse Jenkins. Bachelor of Wildlife Conservation.

Project: Does nutrient availability affects coloration and morphology of *Sarracenia purpurea* leaves?

Jesse will study the response of purple pitcher plants (*Sarracenia purpurea*) to nutrient deprivation. We are especially curious to see if the production of red pigments in pitchers is a response to low nutrient levels. Pitcher plants receive the majority of their nutrients from insects that they capture in their specialized leaves. The insects are attracted to the pitcher opening by nectar secreted by the plant and possibly from the red venation patterns on their hoods. Research on the role of red anthocyanin pigments in prey capture is still inconclusive. If red pigments truly do attract insects to the pitcher, we hypothesize that starved plants will produce pitchers that have more red pigment to attract prey.

Photo: Jesse working in the greenhouse



Becca Striman. PhD student in Environmental Sciences (co-supervision with Dr. Donna Giberson).

Project: Intraguild Interactions of the Pitcher Plant (*Sarracenia purpurea*) and its Inquiline Community.

Sarracenia purpurea and the insects living inside its pitcher (inquilines) share a similar role as predators of the insect prey that fall into the plant's pitcher-shaped leaves. Becca wants to determine the degree to which the plant participates in the guild. To do this, she will use an interdisciplinary approach to look at the ability of the plant to affect the micro-limnology of the pitcher fluid, breakdown and digestion of the prey, and overall fitness and stress of the inquilines.

Photo: Becca at one of her field sites



Adrian Dauphinee. PhD student in Biology at Dalhousie University (co-supervision with Arunika Gunawardena).

Project: Investigating developmental morphologies and novel transformation in the Aponogetonaceae.

The early developmental morphologies of the lace plant (*Aponogeton madagascariensis*) and sister species *A. boivinianus* are not well understood, and therefore the current study aims to describe them for the first time using scanning electron microscopy, and confocal laser scanning microscopy. This comparative study will provide the groundwork for future developmental research utilizing the lace plant model system and *A. boivinianus*. Adrian will also attempt the novel transformation of both species using an *Agrobacterium tumefaciens* vector. The goal of this work is to manipulate the expression of genes linked to either leaf development or PCD. This will aid in the elucidation of the temporal and spatial regulation of these genes during leaf development.



Photo: A lace plant and Adrian at the microscope

The Global Plant Council

Plant Canada, of which we are a member, is part of the Global Plant Council (GPC). In November 2012, the Board of Plant Canada voted in favour of a raise in the GPC membership dues to support an Executive Director. In May 2013, Dr. Ruth Bastow, previously the coordinator of the UK Network for Arabidopsis Researchers (GARNet), took up this position. Her role in the GPC will be to serve as a facilitator for disseminating information relevant to all plant scientists. She sent the Bulletin this short document which explains the objectives and goals of GPC. In the future, she will send links to different things (events, funding, and reports) which could be of interest to some of you. Santokh Singh, the Secretary of the Association, will pass along via email this type of information.
Frédérique

The Global Plant Council - An International Voice for Plant Science

The world is facing a number of major challenges including feeding a growing population, mitigating the effects of climate change, identifying alternative energy sources and minimising biodiversity and habitat loss. To effectively solve or mitigate these current global problems will require plant science. However to effectively achieve these solutions will require an increase in the understanding of how plant research can contribute to global issues, such as food security, amongst our policy makers and funders. In 2009 several national plant and crop science organizations around the world met for the first time to discuss world problems and how their scientists and organizations could help by increasing the impact of plant research and raising awareness about opportunities for crop improvement and sustainable agriculture. This was the birth of the Global Plant Council (GPC), which is now a coalition of over 20 plant and crop science societies from across the globe. The central focus of the GPC is to define and engage in coordinated strategies that impact the most critical global issues; world hunger, energy, climate change, health and well-being, sustainability and environmental protection. By working together to formulate a shared vision, and allowing distribution of effort the GPC aims to:

- Increase awareness of the central importance of plant science
- Accelerate progress in solving pressing global problems via plant science based approaches
- Facilitate new research programs to address global challenges
- Enable more effective use of knowledge and resources
- Provide a focus and contact point for plant science across the globe

Since 2009 the GPC has established itself as non-profit organization and held annual meetings in Montréal Canada (2010), Qingdao China (2011), Jeju S.Korea (2012). These annual meetings have allowed the council to identify a number of strategic initiatives that will help provide plant based solution to the global challenges we currently face including:

- Biofortification of Crops - Improving the nutritional quality of current and new crops
- Digital Seed Bank - Maintaining, understanding and preserving the wealth of crop diversity for future generations
- Diversity and Yield Stability - Identifying strategies for sustainable agriculture such as perennial crops
- Sustainable adaptation to changing environments - Identifying strategies for crop improvement to deal with a changing climate

The GPC has also been working hard to establish a formal organisational structure within council. In May this year Dr Ruth Bastow was appointed as the new Executive Director of the GPC and she joins a recently elected executive board consisting of: Prof. Wilhelm Gruissem (European Plant Science Organisation) - Acting President, Prof. Henry Nguyen (American Society of Agronomy and Crop Science Society of America) - Vice President, Prof. Gustavo Habermann (Brazilian Society of Plant Physiology) - Treasurer, Prof. Kasem Ahmed (African Crop Science Society) and Prof. Zhihong Xu (Chinese Society of Plant Biologists).

By exploiting the expertise of this new management structure and working together with other key organisations in the global arena, the GPC is looking forward to fulfilling its role as a strong advocate of plant science at the international level.



CBA/ABC Executive members 2013-2014. Back row, (left to right) Santokh Singh, Shannon Berch, Cindy Ross Friedman, Julian Starr, Daya Dayanandan, André Arsenault, James Jones, Jane Young and Hugues Massicotte. Front row (left to right) John Markham, Christine Maxwell, Frédérique Guinel, Moira Galway, and Liette Vasseur. Several members were missing. Photo: Iain Taylor.

MAJOR INVASIVE ALIEN PLANTS OF NATURAL HABITATS IN CANADA

Paul M. Catling and Gisèle Mitrow

7a. Japanese Knotweed, Mexican Bamboo, renouée du Japon

Fallopia japonica (Houttuyn) Ronse Decraene var. *japonica*
Synonyms: *Polygonum cuspidatum* Siebold & Zuccarini, *Pleuropterus cuspidatus* (Sieb. & Zucc.) Moldenke, *Pleuropterus zuccarinii* (Small) Small, *Polygonum cuspidatum* Sieb. & Zucc., *Polygonum cuspidatum* Sieb. & Zucc. var. *compactum* (Hook f.) Bailey, *Polygonum zuccarinii* Small, *Reynoutria japonica* Houtt.

7b. Giant Knotweed, Sachalin Knotweed, renouée de Sakhaline

Fallopia sachalinensis (F. Schmidt) Ronse Decraene
Synonyms: *Polygonum sachalinense* F. Schmidt, *Reynoutria sachalinensis* (F. Schmidt) Nakai, *Tiniaria sachalinensis* (F. Schmidt) Janchen.

7c. Bohemian Knotweed, renouée de Bohème

Fallopia ×bohemica (Chrtek & Chrtková) J.P. Bailey
(*japonica* × *sachalinensis*)

Reynoutria ×bohemica Chrtek & Chrtková, *Polygonum ×bohemicum* (Chrtek & Chrtková) Zika & Jacobson.

7d. Himalayan Knotweed, Giant Fleecflower, renouée polymorphe

Persicaria wallichii Greuter & Burdet

Synonym: *Polygonum polystachyum* Wallich ex Meisner

Japanese Knotweed has become a serious invasive in some parts of North America, particularly as a result of displacing native vegetation in river valleys. The other large Knotweeds are less often encountered, and all are most often found in ruderal habitats in their Canadian range. Japanese Knotweed was listed as number 60 in the prioritized list of 81 invasive aliens of natural habitats across Canada. However, it attracts public publication attention as a result of its Bamboo-like appearance, large size and reputation for dominating valley bottoms in parts of the US and Europe. It deserves to be higher on the list as a result of potential impact. Bohemian Knotweed has been listed as a "species of concern" in natural habitats in Canada. As Japanese Knotweed increases on the landscape the rate of spread and dominance increases. In some parts of its introduced range it has dominated very large areas and is now regarded as one of the most serious invasive plants affecting temperate ecosystems in Europe and North America. It is also considered to be one of the world's 100 most serious invasive aliens in general (including animals). The two related taxa and one similar species are also discussed here but in less detail. The large Knotweeds are generally considered to have originated as escapees from ornamental plantings and they are still available in some nurseries.

Identification

These large perennials with Bamboo-like stems are easily recognized as a group. They can be identified most easily by the size and shape of the leaves, but the most accurate identification is made through examination of the surface of tertiary or lower level veins on the undersurface of the leaf

and it requires a 10× magnifier or a microscope. The separation of *F. ×bohemica* with broad-based single-celled hairs on the veins beneath and *F. japonica* with blunt scabers and knobs is not always easy. Some plants with mostly knobs have a few blunt or even pointed hairs. These may be placed with either *F. ×bohemica* or *F. japonica*. Here we placed such plants with *F. japonica* so have employed a narrow concept of *F. ×bohemica* for the mapping.



Figure 1. Flowering branch of Japanese Knotweed. Photo by Jan Samanek. Used with permission, USDA.

Himalayan knotweed is included in the key below because of its superficial resemblance to the others. This latter species, known from British Columbia and Saint Pierre et Miquelon, is not common and appears not yet to have become a serious invasive in Canada.



Figure 2. Himalayan Knotweed. Kingsbrae Garden. Used with permission.

(Continued)

Key to the erect False Buckwheats (genus *Fallopia*) and Himalayan Knotweed (*Persicaria wallichii*) in Canada.

- 1a. Leaves with long pointed tips; flowers pinkish white
outer tepals keeled; ocreae 2-lobed
.....Himalayan
Knotweed, *Persicaria wallichii*
- 1b. Leaves oval with rounded to abrupt tips; flowers
greenish white or creamy white; outer tepals winged; ocreae
not 2-lobed 2
- 2a. Leaf base heart-shaped; veins on underside of leaf
smooth or with multicellular hairs 0.2-0.6 mm long
.....Giant Knotweed, *Fallopia sachalinensis*
- 2b. Leaf base flat to heart-shaped; veins on underside of
leaf with knobs or hairs less than 0.1 mm long 3
- 3a. Veins of underside of leaf with minute, narrow and
pointed hairs; leaf base flat to heart-shaped
.....Bohemian Knotweed, *Fallopia xbohemica*
- 3b. Veins of underside of leaf rough with knobs and minute
broad-based and blunt hairs; leaf bases flat or tapering
Japanese Knotweed, *Fallopia japonica* 4
- 4a. Plants less than 70 cm tall; leaf margins undulate;
flowers often reddish Dwarf Japanese Knotweed,
Fallopia japonica var. *compacta*
- 4b. Plants more than 70 cm tall; leaf margins flat; flowers
whitish Japanese Knotweed, *Fallopia japonica*
var. *japonica*

Description

The four invasive taxa considered in the key above are all perennials, 1.5 to 6 m high. *Fallopia japonica* var. *compacta* (Houtt.) Bailey has not been recorded as an escape, but it is cultivated as a ground cover and may be recorded outside of cultivation in the future. The bamboo-like stems of these plants are usually clustered, those of the *Fallopia* species being smooth and green with purple-brown mottling. There are excellent photos of the the Canadian *Fallopia* taxa on the digital flora of Newfoundland website, see http://www.digitalnaturalhistory.com/flora_polygonaceae_inde.htm#fallopiajaponica.

Japanese Knotweed - Leaves 5-15 cm long, ovate, more or less truncate at the base; flowers 3-15 per fascicle, in a panicle-like or raceme-like inflorescence 4-12 cm long, bisexual or pistillate, tepals 4-6 mm, continuing growth in fruit, the outer with wings, stamens 8, styles 3; Fruit an achene 2.6-3.6 mm long. Chromosome number $2n=44, 66,$ or 88 .

Giant Knotweed - Leaves 15-30(40) cm long, ovate-oblong, cordate at the base; flowers 4-7 per fascicle, in a panicle-like inflorescence 3-8 cm long, bisexual or pistillate, tepals 4.5-6.5 mm, continuing growth in fruit, the outer with wings, stamens 6-8, styles 3; fruit an achene 2.8-4.5 mm long. Chromosome number $2n=44, 66, 102,$ or 132 .

Bohemian Knotweed - Leaves 5-25(30) cm long, ovate, truncate to cordate at the base; flowers 3-8(15) per fascicle, in a panicle-like or raceme-like inflorescence 4-12 cm long, bisexual or pistillate, tepals 4-6 mm, continuing growth in fruit, the outer with wings, stamens 8, styles 3; fruit an achene 2.6-3.6 mm long. Chromosome number $2n=44, 66,$ or 88 .

Himalayan Knotweed - Leaves (7.5)7-22(27) cm long, lanceolate to elliptic-lanceolate, cordate to truncate at the base; flowers 3-9 per fascicle, in a panicle-like inflorescence 4-11 cm long, bisexual and heterostylous, tepals 2.2-3.8 mm, not continuing growth in fruit, nor with wings, stamens 8, styles 3; fruit an achene 2.6-3.2 mm long. Chromosome number $2n=22$.



Figure 3. Leaves of *Fallopia sachalinensis*. Photographed in NW Poland. Wikimedia Commons.



Figure 4. Multicellular hairs on the underside of a leaf of a herbarium specimen of *Fallopia sachalinensis*. Photo by G. Mitrow.



Figure 5. Flowers of *Fallopia sachalinensis* with bee. Photographed by Maja Dumat, Creative Commons.



Figure 6. Fruit of *Fallopia japonica*. Photographed in Holland by U. Schmidt.



Figure 7. Stem of *Fallopia japonica*. Photographed in Ottawa, Ontario by P.M. Catling, August 2013.

Classification and Distribution

Fallopia and *Persicaria* belong in the Buckeheat Family; Polygonaceae. Any search for information about the species of *Fallopia* should include their former latin names in the genus *Polygonum*, since the change to *Fallopia* is relatively recent.

The native ranges are: Japanese Knotweed – China, Japan, Korea, Taiwan, introduced to Europe, North America and elsewhere; Giant Knotweed – Asia, introduced to Europe, North America and elsewhere; Bohemian Knotweed – Asia, parents and possibly hybrid introduced to Europe, North America and elsewhere, but novel hybrids also in parts of the introduced range; Himalayan Knotweed – Bhutan, China, India, Nepal, Tibet, introduced in Europe and North America.

The maps illustrate where Knotweeds are growing (outside) in Canada. In some of these locations they may have been

planted, but most of them were not (based on clear label data). The *Fallopia japonica* map is only missing ROM collections and includes ACAD, ALTA, CAN, DAO, LKHD, MMMN, MT, MTMG, NFLD, NSPM, OAC, QFA, QK, QUE, SASK, TRT, TRTE, UBC, UNB, UWO, V, WAT and WIN. The other maps include CAN and DAO but are incomplete for the other herbaria.

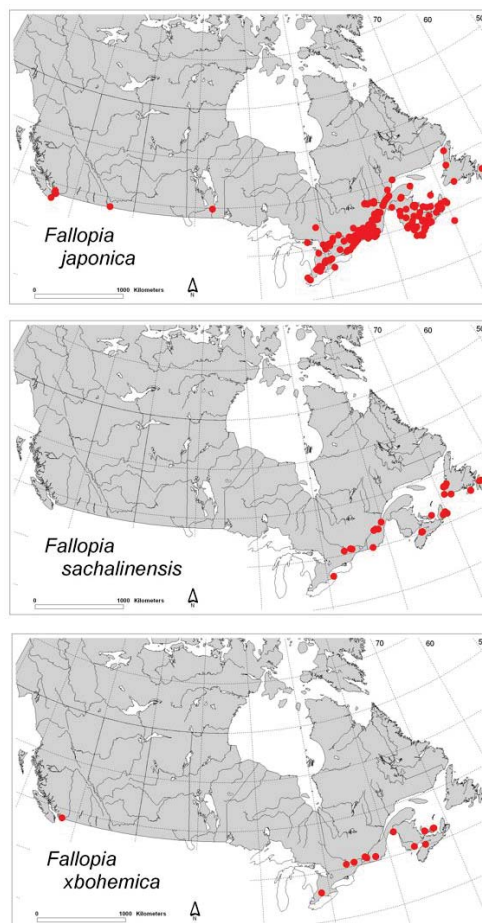


Figure 8. Distributions in Canada of three taxa of *Fallopia*.

Japanese Knotweed occurs in SW Alberta, British Columbia, Manitoba, Newfoundland, New Brunswick, Nova Scotia, Prince Edward Island, and Quebec. The oldest Canadian material is at DAO and was collected at Kingston by J.K. McMorine in 1900. In 1901 it was found at Niagara Falls in Ontario, Chilliwack in British Columbia and Longueuil in Quebec. In 1903 it was collected in London, Ontario and in 1905 again in Kingston. These widely separate early locations suggest multiple introductions. A few other maps of Japanese Knotweed have been produced for parts of Canada. Although very useful, they have not been based on examination of specimens in all major herbaria. One of these includes an invitation to participate in a reporting program that will test a climatic model (see <http://pinicola.ca/ontarioknotweed.htm>). Japanese Knotweed has only recently become a concern in British Columbia, but is now documented from many more sites (see <http://www.for.gov.bc.ca/hra/Plants/applications.htm>) than shown in our herbarium-based map. It occurs north to the central interior and is frequent in parts of the southern interior. This current information illustrates the value of local

alien plant programs. In 2010 it was shown to occupy only part of its potential range in British Columbia. Warmer temperatures in southern Ontario over the last decade have increased the suitable habitat there.

In parts of North America Japanese Knotweed had a 50-year lag time prior to exponential growth. In the state of Washington, it was established in one county in 1960, but by 2000 it was established in more than 50 counties. Four years after a single rootstock of Bohemian Knotweed became established on a river in Washington there were 9,600 stems along 20 miles of that river. These plants are capable of rapid spread.

Giant Knotweed is shown on our map from Newfoundland, Nova Scotia, Prince Edward Island, and Quebec but it is also reported from SW British Columbia. It was first reported from Newfoundland in 1989, but it must have been established much earlier based on its presence at that time in many places on the Burin and Port au Port Peninsulas. Although the hybrid Bohemian Knotweed is less common and less widespread than Japanese Knotweed in Canada, that may change as a consequence of hybrid vigour. Bohemian Knotweed has become the most abundant of these large Knotweeds in parts of Europe. Currently it is known in Canada from British Columbia, New Brunswick, Nova Scotia, Prince Edward Island, and Quebec.

Ecology

The shoots emerge in April and May. The flowers may be produced over a long period with Japanese Knotweed flowering from June to August and Giant Knotweed from July to October. The flowers are pollinated by bees, ants, butterflies and beetles. Within defined geographic areas plants of Japanese Knotweed may have the same breeding systems but over more extensive regions there is much variation. Sometimes the flowers on a plant are all both male and female (hermaphrodite or perfect, the plants being monoecious) or they are either male or female (plants dioecious) or they are female or perfect (gynodioecious) or they may be mostly male or female but retain vestigial parts of the other sex (subdioecious). The mechanism whereby male flowers give rise to fruit requires more study.

Unlike Europe, the situation with *Fallopia* in North America apparently includes all three taxa and several possible backcrosses spreading by both seed and root material. Seeds are dispersed by wind, water or adhere to animals or vehicles. Roots are spread by water, particularly as a result of being dislodged by wave action or fast water during floods or on vehicles, especially those involved with construction and especially those which move soil. Another method of spread that is poorly documented involves the dumping of garden waste. Movement by people has been thought to be the principal means of dispersal, but recent studies have suggested that seed dispersal may also be very important. It has been noted that different climatic thresholds in different

parts of Canada may lead to selection for different invasive genotypes.

In their native range, Knotweeds are eaten by many groups of insects and by a variety of mammals including deer, boars and hares. In North America they may be eaten by rabbits, deer and groundhogs. A number of authors have noted that, apart from the introduced Japanese Beetle, Japanese Knotweed was essentially herbivore-free in North America. About 2/3 of the plant biomass is underground. This allows early emergence as well as rapid and extensive growth. It also enables the Japanese Knotweed plants to survive multiple losses of aboveground parts. The plants can regenerate from root crowns and roots as well as rhizomes. Habitats of all of these large Knotweeds include any kind of open weedy and disturbed areas as well as a variety of woodlands, especially mesic riparian areas (bottomlands). They are also capable of growing in a variety of soils.

Damage (significance is suggested by the number of asterisks to 5 for highly significant)

(1) Negative effects on biodiversity *****

The most serious impacts occur along rivers and lake margins, but reduction in biodiversity will occur at any sites where the plants are established. The dense stands of these Knotweeds exclude all other plant species. The specific mechanisms include light reduction by dense litter and foliage, nutrient limitation by competition with dense roots, and production of chemicals limiting growth of other species (allelopathy). Not only are native plants completely displaced, substantial declines in the diversity and abundance of animals (both vertebrates and invertebrates) occur. There is also good evidence that Knotweeds alter the structure and function of riparian ecosystems.

(2) Increases flooding**

In riparian areas, plants displaced in spring floods become lodged with other material to prevent water flow and cause floods.

(3) Reduced visibility along roads*

(4) Damage to asphalt, pavement, foundations and drainage works*

(5) Weed in agricultural crops*

Beneficial Aspects

Honey Production***

Often flowers when other plants are not available and produces high oxidant honey.

Medicinal properties – Resveratrol**

It is a highly medicinal plant that is currently being used as treatment for Lyme disease and one of the main compounds of Japanese Knotweed is resveratrol, also found in red grape skins and red wine. Resveratrol is said to modulate multiple molecular pathways associated with the development and progression of cardiovascular disease and

LAST KID IN THE BAMBOO

In the past and in many places, people, and particularly kids, called these Knotweeds "Bamboo" and many really thought that is what it was. It was a popular place to play or have a fort. I was exotic. It offered good hiding from adults and bad gangs. The stems could be fashioned into bean shooters, or canoes. The old stems could be burned to try to get a can of beans at least lukewarm. They could be sharpened and used as a spear. They were also used as pipes with which to test new tobacco substitutes. Now kids are watching TV or playing computer games and we think they are safer!

cancer. It is antioxidant, antimutagenic and inhibits platelet aggregation. The root/rhizome is gathered in the Spring or Fall and contains a variety of medicinal constituents used traditionally to treat everything from eczema to bronchitis and stalled labor.

Young shoots can be eaten like Asparagus**

Caution is appropriate for its use as a food because the plants accumulate heavy metals.

Soil stabilization**

Revegetation of mine sites**

Food and cover for wildlife*

Firewood and matches*

Garden ornamental*

Antibiotic in aquaculture*

Management

An ecosystem-wide management strategy is suggested for areas of special concern. Integrated approaches are likely to be the most effective.

Chemical Methods: Although these methods are generally considered to be the most effective at this time, there are limitations as a result of the riparian habitats of major infestations. Water in bottomlands limits access and drift from spraying may affect the aquatic ecosystem. As with other methods, several successive treatments are necessary and larger patches are not likely to be completely destroyed. Permits are required in many jurisdictions. Among the herbicides used, Glyphosate has been employed most frequently and has reduced biomass substantially after successive applications. Information on chemicals, treatments, and costs is available online.

Manual and Mechanical Methods: Cutting, pulling and mowing may be useful but will be necessary over a number of years. This is one of the most difficult invasives to remove by manual methods alone because plants continuously regrow from a very extensive system of underground roots. Covering with black plastic, which works well for some perennial weeds, has usually been reported to be ineffective for large Knotweeds which push through the plastic and survive below ground.

Biological Methods: Herbivorous insects are abundant in the native ranges of these large Knotweeds providing a valuable potential resource. Biological control methods are being actively pursued in the UK and the US. The leaf feeding Chrysomelid beetle, *Gallerucella nigromaculata*, is under consideration as an effective agent.

Other Chrysomelid beetles have also been studied but have required more more host specificity research. The Japanese

Knotweed Psyllid (*Aphalara itadori*) has recently been released in southern England. This release was the first of a classical biological control agent in the European union, and is testimony to the difficulty of managing Japanese Knotweed using some of the usual methods. The Psyllid is currently a candidate for release in North America. Root-feeding invertebrates also deserve consideration and may be more host specific. Establishment of multiple introductions and selection for different genotypes across Canada may influence the success of biocontrol.

Prospects

More so than with other invasives, the difficulty of control results in a focus of management of existing stands and attempts to limit spread rather than eradication. In Canada it will likely spread further to the north and into the prairie provinces, especially in riparian areas. However, it has some potential, based on studies, to adapt to climate change and thus simple models assuming a static genotype may not represent the actual rate and extent of expansion. The rate of spread is likely to increase regardless of these considerations based on simple exponential growth models. As in many cases, but particularly in this one, the best hope for effective management is with biological control. It has been suggested that the kind of management through public outreach and education used in the UK might be effectively applied in Canada.



Figure 9. Female Japanese Beetle (*Popillia japonica*) feeds on leaf of *Fallopia japonica*. Male otherwise occupied. Photographed in Ottawa, Ontario by P.M. Catling, August 2013.

Knotweed is a Weed so do not grow it

"Since horticultural varieties of Knotweed produce viable seed and can have viable pollen, alternatives should be found in the landscaping and nursery industries so that these plants are no longer introduced in areas where they could outcross with wild populations." Forman and Kesseli (2003)

In fact there are many alternatives available and some have been suggested; Goat's-beard (*Aruncus dioicus*), Culver's root (*Veronicastrum virginicum*), White Snakeroot (*Ageratina altissima*), Black Cohosh (*Cimicifuga racemosa*), Coastal Sweetpepperbush (*Clethra alnifolia*), and Virginia Sweetspire (*Itea virginica*), Maleberry (*Lyonia ligustrina*), Silky Dogwood (*Cornus amomum*), Fragrant Sumac (*Rhus aromatica*), and Flameleaf Sumac (*R. copallina*). At least some of these are hardy in Canada, but we add Clumping Bamboo (*Fargesia robusta*), Fothergilla (*Fothergilla major*) and Pacific Ninebark (*Physocarpus capitatus*) for the west, and for the east various native species of Juneberry (*Amelanchier*), and Steeplebush (*Spiraea*). There are booklets featuring non-invasive garden plants; for example see <http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds/weed-identification/invasive-knotweeds/japanese-knotweed.aspx>.

It may be that what is needed most with regard to the nursery trade is education and enforcement.



Figure 10. Leaves of *Fallopia japonica*. Photographed in Ottawa, Ontario by P.M. Catling, August 2013.



Figure 11. *Fallopia japonica*. Photographed in Ottawa, Ontario by P.M. Catling, August 2013.



Figure 12. Early growth of *Fallopia japonica*. Creative Commons.



Figure 13. The spectacular Victorian perennial called Black Snakeroot or Black Cohosh (*Cimicifuga racemosa*, previously *Actaea racemosa*) is an alternative for cultivation of large Knotweeds. Like them, It reaches 3 m tall in one season, blooms late, and has attractive white inflorescences. Photographed in Yancey Co., North Carolina by BlueRidge Kitties, Creative Commons.

Believe it or not

- Shoots of Japanese Knotweed can push through 7.5 cm (3 inches) of asphalt.
- There is published evidence that all of the plants of *Fallopia japonica* in the UK are a single clone making it one of the largest vascular plants in the world.
- Plants of Japanese Knotweed can have bisexual flowers, like many plants, or all the flowers on a plant can be female. In parts of its introduced range, including the UK, all of the plants are female. This led to an article in The London Daily Telegraph entitled "the largest female on earth could strangle Britain."
- A Chinese farmer dug up roots of Giant Fleeceflower and found many that had a human form. Most notably there were both girls and boys! We have resisted the urge to use a photo, but see for yourself at <http://thecomingcrisis.blogspot.ca/2011/01/chinese-fleeceflower-root-taking-human.html>

- The UK government has spent 1.5 billion pounds (approx. 2.4 billion dollars CDN) on control of large Knotweeds and Germany spends 30 million euros (approx. 41 million dollars CDN) in a year.
- Large numbers of seeds may be produced. A study in Pennsylvania found that a single stem of Japanese Knotweed can produce 50,000 to 150,000 seeds annually. A patch 10 m² in extent can produce millions of seeds. Seedlings can produce seeds within 3 months of emergence.

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Scenes from the Barbeque

Thanks to Hugues Massicotte for the photos



TOP CANADIAN ORNAMENTAL PLANTS

5. Lilies

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Figure 1. Canadian *Lilium* cultivars in the Canadian Heritage Garden, VanDusen Botanical Garden, Vancouver. Credits: Photographer: Roy Forster. Copyright: City of Vancouver Archives Item CVA 1502-3334.

Lilies are among the most beautiful, regal, enchanting, popular, and important ornamental plants. They exhibit an astonishing range of variation, providing for flexibility of applications. The plants differ greatly in habit and height, and the flowers range widely in size, form, colour, flowering time, and fragrance. Lilies are easily propagated by bulbs, so that spectacular but sterile hybrids among the 100 or so species can be easily perpetuated, sold, and established. Indeed, in the last half century, breeders have created thousands of extraordinarily attractive cultivars. Lilies are important as outdoor plants in gardens and borders but their economic value is due primarily to their appeal in the hugely profitable cut flower, bouquet, and short-lived potted plant industries.

Names

The “true lilies” are species of *Lilium*. Some species formerly included within this genus have now been placed in other genera. These segregated genera include *Cardiocrinum*, *Notholirion*, *Nomocharis*, and *Fritillaria*. Species in dozens of unrelated genera have “lily” in their names, for examples: African lily (*Agapanthus*), arum or calla lily (*Zantedeschia*), belladonna lily (*Amaryllis*), day lily (*Heimerocallis*), glory lily (*Gloriosa*), lily-of-the-valley (*Convallaria*), Mariposa lily

(*Calochortus*), plantain lily (*Hosta*), peace lily (*Spathiphyllum*), Peruvian lily (*Alstroemeria*), spider lily (*Crinum*, *Hymenocallis*, *Lycoris*), St. Bernard's lily (*Anthericum*), St. Bruno's lily (*Paradisica*), torch lily (*Kniphofia*), water lily (*Nymphaea* and *Nuphar*), and wood lily (*Trillium*). The phrase “tree lily” has been used in various ways (e.g., for species of the Velloziaceae and *Dracaena*), most recently to refer to new, robust, true lily hybrids with stems up to 5 cm (2 inches) in diameter and up to 2.4 m (8 feet) in height. Lilly pillies (lillypillies) are native trees of Australia and Southeast Asia, of the genus *Syzygium*, used as evergreen hedges and ornamentals. “Sea lilies” are marine animals that resemble plants but are related to starfish.

Scientific name: The genus name *Lilium* is derived from the Greek *leirion*, thought to be based on white lilies.

English name: The vernacular name “lily” traces to the Latin *Lilium*, explained above.

French name: lis.



Figure 2. The “Prince of the Lilies” or the “Lily Prince,” a famous wall fresco showing a young man (possibly a priest king) with lilies, in the Minoan palace of King Minos at Knossos on the Greek island of Crete, painted about 1550 B.C. and excavated in the early 20th century. The lilies depicted have been interpreted as the Madonna lily, *Lilium candidum*.

History

Lilies have been significant ornamentals for thousands of years. Drawings of Madonna lilies (*L. candidum*) on Cretan vases and frescoes have been dated to 3600 years ago. Lilies were also grown in the gardens of ancient Mesopotamia and Rome. It has been claimed that Madonna lily may be the oldest domesticated ornamental plant, although it is uncertain when sterile plants of the species, that can only be propagated vegetatively, arose. Until the middle of the 15th century, the Madonna lily was the only lily grown in European gardens. Madonna lilies were immortalized as religious icons in paintings by some of the finest artists of renaissance Europe. *Lilium lancifolium* (*L. tigrinum*), the species most commonly labelled “tiger lily,” has been grown since ancient times in China, and may also have been domesticated thousands of years ago. Several



Figure 3. The Annunciation (the announcement by the angel Gabriel to the Virgin Mary of her conception of Christ), an oil painting in the Musée du Louvre, Paris, France. At left, the Angel holds a Madonna lily; at right, the Virgin Mary. The work was initiated in the workshop of Andrea del Verrocchio in 1469, perhaps by an apprentice painter, and completed by Leonardo da Vinci (also an apprentice at the time) about 1480.

Asian and North American lilies were introduced to Europe in the 17th and 18th century, but very few species were cultivated until the very early 20th century. Then, several more Asian lilies were introduced to the West, and their use in generating hybrids substantially increased the popularity of the flower.

A very large majority of modern garden lilies are artificial hybrids that were generated during the 20th century. Most of the species cross easily with only a few others. In-vitro techniques have been applied to lilies by plant breeders to overcome difficulties in generating hybrids. As is common among distantly related species, hybrid zygotes are often inviable, but sometimes can be saved by embryo-rescue culture. Indeed, lilies were among the first floricultural crops employing tissue-culture methods. Both haploid and polyploid plants have been produced using tissue culture, and hybrids have been made by fusion of cultured protoplasts. Many new hybrids are sterile triploids, but polyploidization has been used to restore fertility, as well as to create plants with larger flower and more robust stems. Micropropagation (using very small amounts of tissue rather than seeds or bulbs) is now often employed to produce large numbers of plants of hybrid cultivars. Meristem-tip cultures have also been employed to eliminate viruses from clones. Genetic engineering of lilies is under experimental development, but the future of transgenic ornamentals faces public opposition. Nevertheless, genetic engineering is being used today to create disease-resistant Easter lilies for the marketplace.

Wild Species

There are about 100 species of *Lilium*, which is centered in Eastern Asia (with about 60 species) and North America (with 21 native species). *Lilium* has been subdivided into seven sections by Comber (1949), somewhat altered by De Jong (1974).

Lilies are herbaceous perennials, typically 60–180 cm (2–6 feet) in height. The above-ground portions are usually annual, the plants overwintering from scaly bulbs that are usually deeply buried. The bulbs are annual or perennial (sending up a shoot in the spring for several years), depending on species. The bulbs are composed of fleshy scales (which are leaves modified for storage of starch), and lack an external protective coating (like the membranous

tunic of an onion). Some species reproduce from new bulbs (often called “bulblets”) generated on the sides of the old bulb, or above the old bulb, sometimes above ground. So-called “rhizomes” bearing many small bulbs develop from the base of the bulb in some North American lilies. Several species develop so-called “stolons.” [Stolons are above-ground trailing stems (runners) or laterally spreading stems at or just below ground level; rhizomes, which overlap definitionally with stolons, are stems that also grow horizontally, either underground or at ground level; the lily literature mostly uses the term stolon (or “underground stolon”) for spreading underground stems; and refers to bulbs proliferating off but attached to the base of the main bulb as “rhizomatous bulbs.”] Basal roots develop at the bottom of the main bulb; these are often contractile, pulling the bulb down so that it doesn’t reach the soil surface (bulbs of some species, such as *L. polyphyllum*, can be more than 60 cm or 2 feet underground). Many species also produce “stem-roots” – adventitious roots that emerge from the growing stem above the bulb, but under the soil. The flowering stem is leafy, and basal leaves are usually absent. However, some species growing in relatively mild areas, after the leaves senesce, develop a rosette in early winter, and this grows into a new stem with the resumption of warm weather.

Flowering occurs in late spring or summer, the flowers developing singly or in racemes or umbels at the top of unbranched stems. The flowers are large – those of *L. auratum*, perhaps the largest in the genus, can be 30 cm (12 inches) across. The three sepals are usually different from the three petals. The six tepals are free from each other, and are spreading or reflexed. The flowers are attractive, often fragrant, in all colours except blue, notably white, red, orange, pink, purple, and yellow, sometimes marked with spots and streaks. A nectar gland occurs at the base of each tepal. The three-celled fruit capsule contains 60 to over 300 seeds, depending on the species. The seed pod opens at the top and splits down the middle of each compartment, releasing the flattened, very light, papery seeds to be scattered gradually by the wind.



Figure 4. Mature fruit and seeds of Madonna lily (*Lilium candidum*). Photo by Roger Culos (CC BY 3.0).

Most lilies are native to the temperate northern hemisphere, although some reach the northern subtropics. The species are frequent in woodlands, often in montane habitats, sometimes in grasslands, and rarely in marshy or boggy areas. A few are epiphytes in tropical Southeast Asia. Most lilies grow in acidic soil, but a few prefer somewhat alkaline

conditions (notably Turk's cap lily, *L. martagon*, and Easter lily, *L. longiflorum*). Lilies have suffered from excessive removal from the wild. Transplanting wild lilies is inadvisable, because most are adapted to their natural ecological conditions, and tend to grow poorly in cultivation. Modern hybrid garden cultivars, by contrast, have a greater range of tolerance to soils, climates, and diseases.



Figure 5. Examples of lily paintings by Belgian painter and botanist Pierre-Joseph Redouté (1759 -1840). Redouté is best known for his outstanding portraits of roses, but he also specialized on plants of the lily family (these paintings are from *Les liliacées*; see Redouté 2000). (a). *Lilium bulbiferum* (a parental species of Horticultural Division I). (b). *Lilium superbum* (parental species of Div. IV). (c). *Lilium canadense* (as "*L. penduliflorum*"; parental species of Div. IX).

Classification of Lily Cultivars

Modern lily cultivars are of principal interest because of the spectacular beauty of the flowers. The genus *Lilium* presents an extraordinary variety of floral forms. As noted in the following presentation, horticultural classification is very heavily based on flower characteristics. The flowers may face upward, flare horizontally, or hang in inverted tiers. A flaring trumpet shape is particularly popular, exemplified by the cultivar 'Sentinel' and the Easter lily. The flowers of many cultivars are shaped like saucers, facing either upward or outward. Cultivars with semi-doubled (often with two sets of six tepals) or fully doubled flowers have recently become available.

The Royal Horticultural Society in London maintains an international register for lily cultivar names, and records descriptive information for over 13,000 entries (Matthews 2007). To manage the huge number of cultivars of *Lilium*, in 1963 the Royal Horticultural Society Lily Committee created a horticultural classification of lilies recognizing nine "divisions" of cultivars. Almost all lily cultivars are hybrids, and the first eight divisions include only hybrids. The divisions are quite independent of the "natural" taxonomy of *Lilium*. This "artificial" system, described in the following,

remains in general use by the floral industry, although many recent hybrids have obscured the distinctions between the divisions. Comparative acreage of lily bulbs in 2010 in the Netherlands (after Van Tuyl and Arens 2010), the world's leading producer, is shown in the following for the predominantly cultivated divisions, and reflects the current domination of the marketplace by divisions VII and VIII:

I. ASIATIC HYBRIDS. Flowers usually small to medium-sized. Flower colour often uniform, or with contrasting tepal tips and/or throat. Spots absent, or when present, well-defined and often rounded. Conspicuous brushmarks sometimes present. Tepal margins usually smooth or slightly ruffled. Flowers usually with little or no scent (most of the unscented lilies). Derived from *L. amabile*, *L. bulbiferum*, *L. callosum*, *L. cernuum*, *L. concolor*, *L. dauricum*, *L. davidii*, *L.*

×hollandicum, *L. lancifolium*, *L. lankongense*, *L. leichtlinii*, *L. maculatum*, *L. pensylvanicum* (*L. wilsonii*), *L. pumilum*, *L. ×scottiae*, and *L. wardii*. Until recently this group was very important, but has largely been replaced by Division VIII.

II. MARTAGON HYBRIDS. Flowers usually small, often numerous, mostly down-facing (nodding), typically with rather thick, recurved tepals and often of "Turk's cap" form. Spots usually present, numerous, often on at least three-quarters of each tepal. Flowers with little or an unpleasant scent. Buds often hairy. Bulbs often mauve or orange-yellow. Early flowering. Derived from *L. ×dahlansonii*, *L. hansonii*, *L. martagon*, *L. medeoloides*, and *L. tsingtauense*.

III. EURO-CAUCASIAN (CANDIDUM) HYBRIDS. Flowers mostly small to medium-sized, often bell-shaped to Turk's cap-shaped, often downfacing. Flower colour often in rather pale muted shades. Spots absent to numerous. Tepal-margins smooth, often gently reflexed. Flowers often scented. Many are lime-tolerant. Infrequently marketed. Derived from *L. candidum*, *L. chalcedonicum*, *L. kesselringianum*, *L. monadelphum*, *L. pomponium*, *L. pyrenaicum* and *L. ×testaceum*.

IV. AMERICAN HYBRIDS. Mostly tall. Rootstocks mostly rhizomatous. Flowers small to medium-sized, mostly down-facing. Flower colour often strong yellow to orange or orange-red, often with contrasting centre and tepal tips. Spots often very conspicuous over at least half of each tepal, often surrounded by a paler halo. Tepals rather narrow, margins smooth, usually gently to strongly reflexed. Flowers with little scent. Derived from native North American species, including *L. bolanderi*, *L. ×burbankii*, *L. canadense*, *L. columbianum*, *L. grayi*, *L. humboldtii*, *L. kelleyanum*, *L. kelloggii*, *L. maritimum*, *L. michauxii*, *L. michiganense*, *L. occidentale*, *L. ×pardaboldtii*, *L. pardalinum* sensu lato, *L. parryi*, *L. parvum*, *L. philadelphicum*, *L. pitkinense*, *L. superbum*, and *L. washingtonianum*.

V. LONGIFLORUM HYBRIDS. Flowers medium-sized to large, often few, trumpet-shaped. Flower colour typically uniform. Spots, papillae and brushmarks absent. Tepal margins smooth. Flowers usually scented. Flowers usually white, trumpet-shaped. Mostly grown for cut flowers. Derived from *L. formosanum*, *L. longiflorum*, *L. philippinense* and *L. wallichianum*.

Division	Subdivision	Acreage (ha)
Oriental (VII)		1799
Interdivisional hybrids (VIII)	Longiflorum × Asiatic (LA hybrids; 886 ha) Oriental × Trumpets (OT hybrids; 349 ha) Longiflorum × Oriental (LO hybrids; 53 ha)	1288
Asiatic (I)		436
Longiflorum (V)		46

VI. TRUMPET AND AURELIAN (*L. ×AURELIANSE*) HYBRIDS. Flowers medium-sized to large. Flower colour white, cream, yellow to orange or pink, often with a contrasting star-shaped throat and/or strong bands of colour outside. Trumpet-shape common, usually scented, without markings; other types often with spotting as small streaks in two bands at the base. Tepal margins smooth or twisted with irregular ruffling, tips often reflexed. Derived from *L. ×aurelianense*, *L. brownii*, *L. ×centigale*, *L. henryi*, *L. ×imperiale*, *L. ×kewense*, *L. leucanthum*, *L. regale*, *L. rosthornii*, *L. sargentiae*, *L. sulphureum*, and *L. ×sulphurgale* (but excluding hybrids of *L. henryi* with all species listed in Division VII). Aurelian hybrids are derived from a combination of *L. henryi* and trumpet lilies.

VII. ORIENTAL HYBRIDS. Flowers usually medium-sized to very large. Inner tepals often very broad and overlapping at the base producing a “closed” centre. Flower colour mostly white to pink to purplish red, some golden yellow; ground colour often white, with a contrasting central ray. Spots absent to numerous, sometimes over half of each tepal. Papillae and nectaries often conspicuous. Flowers usually scented. Often late-flowering. Derived from *L. auratum*, *L. japonicum*, *L. nobilissimum*, *L. ×parkmanii*, *L. rubellum* and *L. speciosum* (excluding all hybrids of these with *L. henryi*). (Upward appearance of flowers has led to the name “stargazers.”)

VIII. INTERDIVISIONAL HYBRIDS. Any other hybrids, mostly derived as crosses of species between two or more of the above groups. Interdivisional hybrids between Asiatic and Trumpet are “Asiapets” or AT hybrids; Longiflorum/Asiatic crosses are LA hybrids; Longiflorum/Oriental crosses are LO hybrids; Longiflorum/Trumpet crosses are “Longipet” or LT hybrids; Oriental/Asiatic crosses are OA hybrids; and Oriental/Trumpet crosses are “Orienpets” or OT hybrids. Hybrids of *L. henryi* with *L. auratum*, *L. japonicum*, *L. nobilissimum*, *L. ×parkmanii*, *L. rubellum* and *L. speciosum* (excluded from Divisions VI and VII) are placed here. Most commercial lily cultivars belong to this group.

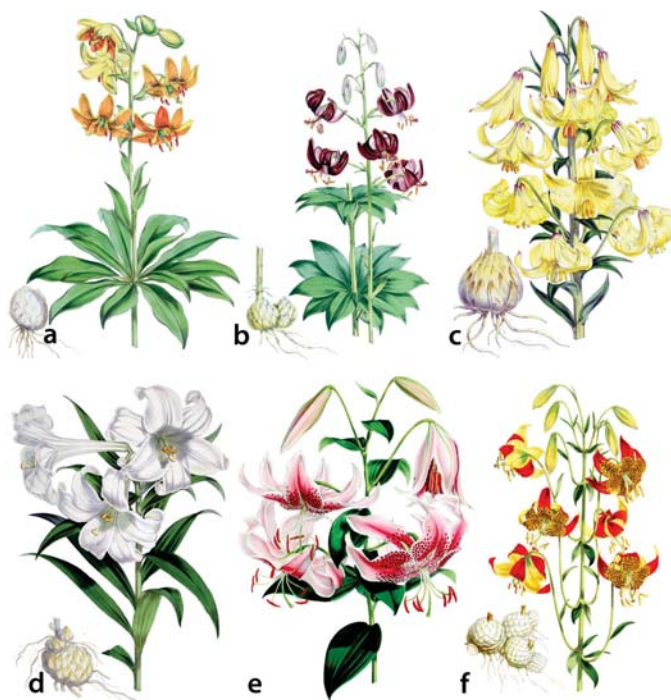
IX. WILD SPECIES. Wild species and cultivars of them (but excluding those derived exclusively from *L. formosanum*, *L. longiflorum*, *L. philippinense* and *L. wallichianum*, which are placed in Division V). The “species lilies” tend to be susceptible to diseases and are usually difficult to maintain in gardens. However, the tiger lily (*L. lancifolium*) from China is widely grown, and several North American natives are occasionally grown, including *L. pardalinum*, *L. canadense*, and *L. superbum*.

Cultivation

Most lilies are grown from well-developed bulbs, although small offshoot bulbs (“bulblets”) are also employed. Sometimes bulbs are simply split. Seeds can be planted, but of course require more time to develop plants, and will not reproduce hybrids accurately. Some hybrids are triploids, and will not produce viable seed. Commercial growers often use individual bulb scales to grow plants. A few species produce tiny aerial bulbs (“bulbils”) resembling peas, which develop in the axils of the leaves, and these can be used to propagate the plants. Some species can be reproduced easily using stem cuttings. Growers today often employ micropropagation (tissue culture based on growing small amounts of tissue in nutrient media).

Bulbs are usually planted in late fall (but often also in early spring). For most species, a slightly acidic soil is best (note that mushroom compost may have a high lime content). A depth of 2½ times the height of the bulb is recommended (but Madonna lilies, *L. candidum*, should have no more than 2.5 cm (1 inch) of settled soil over the tops of the bulbs.) Lilies prefer sun or part shade, especially a south-facing exposure. The most essential requirement for lilies is good drainage, which can be encouraged by growing on a slight slope or in a raised bed. Regular moisture is needed during the growing season. Some cultivars with heavy inflorescences should be staked (taking care not to damage the bulb). Wilted flowers should be removed. In the fall, remove senesced leaves (taking care to not pull up the

Figure 6. Examples of lily paintings by Scottish botanical illustrator Walter Hood Fitch (1817–1892), published in Elwes (1877–1880). Fitch prepared some 10,000 drawings for various publications, and those of lilies were among his best (see Synge 1980). (a). *Lilium hansonii* (parental species of Horticultural division II). (b). *Lilium martagon* (parent of Div. II). (c). *Lilium monodelphum* (parent of Div. III). (d). *Lilium longiflorum* (parent of Div. V). (e). *Lilium speciosum* (parent of Div. VII). (f). *Lilium pardalinum* (parent of Div. IX).



bulb). Overwinter, a protective mulching is recommended in cold areas. After several years, should crowding be evident by the appearance of spindly plants, the clumps should be lifted, divided, and re-planted, preferably in a different location.

Outdoor layout

Some ornamentals such as tulips are best planted in large formal beds, or set out in regular rows or geometrical patterns, but lilies are not one of these, because they are not particularly attractive when out of bloom. Lilies are best planted in association with other ornamentals (it is said that "lilies love mixed company"). Lilies are sometimes laid out in large blocks, but show at their best in small isolated groups of five or more plants, each clump of a uniform colour of a given cultivar. It is wise to grow lilies in association with companion species that do not compete seriously with their roots. Lilies have been described as the aristocrats of the summer border, a role they serve well because many are tall, with impressively large, colourful flowers. Provided they are not crowded, they display well in a mixed border with low-growing or medium-sized evergreens and deciduous shrubs, producing a needed colour accent. The lilies show to advantage between or in front of shrubs, their colourful flowers complementing the green foliage of their companions. Few lilies flower in the spring, so it is advantageous to intermix them with spring-blooming perennials. Established clumps of lilies can provide colour over an extended period lasting into late summer. Low-growing plants and ground covers combine well with lilies. Clumps of lilies interspersed with short annuals can also be very attractive.



Figure 7. Lily leaf beetle (*Lilioceris lili*). Photo by davepemcoastphotos.com (CC BY 2.0).

Lily leaf beetle

The lily leaf beetle (*Lilioceris lili*), a native of Europe and Asia, seems to have first emigrated to North America in Montreal, in 1943, and subsequently spread to eastern Canada and northeastern U.S. It is a devastating defoliator of all lilies, but affects some other plants. The insect is 6–8 mm (0.2–0.3 inch) long, red above except for the black head, and often produces distinct chirping sounds when picked up. The larvae cover themselves with a "fecal shield" (their own excrement) which seems to repels predators, including gardeners (although simply picking them off is recommended). The beetle is well-controlled by natural predatory insects in Europe, and several of these have been released in North America in an effort to reduce the impact of

the pest.

Non-ornamental Uses

FOOD: For more than a thousand years, lily bulbs have been consumed in China. Today, large acreages are also cultivated for food in Japan, Korea, and Vietnam. Although the bulbs of some species are very bitter, those of several are tasty. In China, species that are eaten include *L. candidum*, *L. lancifolium*, *L. pumilum*, and especially *L. brownii* and *L. davidii* var. *unicolor*. The Chinese usually consume dried bulbs which are stir-fried, grated, and employed to thicken soup. The bulbs are starchy, and are sometimes a source of starch. In Japan, lily bulbs are a common ingredient of chawan-mushi (savory egg custard). Flower buds from the daylily, *Hemerocallis fulva*, not from true lilies, are consumed in Chinese cuisine. North American Indians used the bulbs of many species of *Lilium* for food. The Cherokee employed the bulbs of *L. canadense* as a famine source of flour for bread. The Thompson Indians in British Columbia combined the bulbs of *L. columbianum* and salmon roe. The Cree of Saskatchewan, ate the bulb scales of *L. philadelphicum* as a snack. Indigenous North Americans also steamed the bulbs, dried them into cakes for winter use, baked them in an earth oven, or used them in soup.

MEDICINE: In Asia, species of *Lilium* have been used medicinally for at least 2000 years, to treat a variety of conditions. The Persian physician Avicenna (980–1037) recommended bulbs, leaves, and oil from the flowers for injuries, burns, and inflammation. In China, lilies have been used to treat cough, blood disorders, and insomnia. North American Indians also used the bulbs of many species of *Lilium* to treat illnesses. Mashed bulbs were applied to spider bites, cuts and bruises, and consumed for fever, coughs, tuberculosis, stomach ailments, and rheumatism. Today, *Lilium* is used to some degree as a source of medicinal steroids, and the medical value of a variety of constituents is under investigation.



Figure 8. An incompatible pair. Photo of cat by Fleshgrinder (public domain), photo of lily by Christine Majul (CC BY 2.0). Photoshopped by B. Brookes.

Toxicity to cats

Although humans eat the bulbs of true lilies, cats are easily poisoned by the plants. As little as two leaves or part of a flower have resulted in death. Toxicity is generally attributed to a water-soluble toxin producing renal failure (but see Xia et al. 2013 for a different interpretation).

Symptoms include salivation, vomiting, anorexia, and depression. The toxin acts rapidly, and treatment needs to be administered quickly. It is recommended that lilies (notably Easter lilies) and cats should not be kept indoors together. Day lilies (*Hemerocallis*) also cause nephrotoxicity in cats. Several other “lilies” can be toxic to cats (and other mammals). Bulbs of the Peruvian lily (*Alstroemeria*) contain tulipalin A, which can cause diarrhea, mouth irritation, vomiting, salivation and digestive irritation in cats. Lily of the valley (*Convallaria*) is toxic because it possesses potent cardiac glycosides similar to those of *Digitalis*. “Lilies” of the arum family (peace lily – *Spathiphyllum*, calla lily – *Zantedeschia*) possess insoluble oxalate crystals that can irritate tissues of the mouth, tongue, pharynx, and esophagus.

Economic status

Lilies are prominent in horticulture as a cut flower, potted plant, and garden ornamental. They are a mainstay of the world's bulb trade. They are also standard garden plants, very widely marketed in the form of bulbs to be used as planting stock. Lilies are also one of the most important plants grown as temporary potted house plants and as cut flowers. They are 4th in world importance of cut flowers, after roses, chrysanthemums, and tulips. Both cut and potted lilies are widely used in floral arrangements for holiday celebrations, weddings, and funerals.

The Netherlands is the leading grower of lily bulbs, with an acreage exceeding 5,000 ha (12,400 acres), producing over 2 billion lily bulbs annually, three-quarters of which are exported. Much smaller amounts (usually less than 100 ha or 250 acres) are grown in other countries, including Australia, China, France, Japan, Israel, Netherlands, South Africa, and the U.S. Very recently several hundred hectares have been grown in each of Chile and New Zealand.

Madonna lily

Lilium candidum, Madonna lily (often also referred to as the white lily, although other lilies are white), is the most famous species of *Lilium*. It is thought to originate from the Balkans and western Asia, but has been cultivated for so long its native area is difficult to establish. It was painted on the walls of the tombs of the Egyptian pharaohs, and the Egyptians used the plant as a source of perfume. The classical Romans consumed the bulbs and used them as a medicinal ointment. At least since the 7th century A.D., the species has been associated with the Virgin Mary, and medieval depictions of the Blessed Virgin frequently show her holding the flower.



Figure 9. Easter lily (*Lilium longiflorum*). Photo by Arturo Yee (CC BY 2.0).



Figure 10. Bulbs of Easter lily (*Lilium longiflorum*). Photo by Maja Dumat (CC BY 2.0).

Easter lily

The “Easter lily,” *L. longiflorum* Thunb., is native to the southern islands of Japan, Korea, and Taiwan. During the late 1800s, most production was in Bermuda, and the name “Bermuda lily” is still sometimes encountered. The tradition of marketing lily species for Easter first developed some time before 1930 in North America, and remains predominantly a North American phenomenon. *Lilium longiflorum* became symbolic of Jesus' resurrection at Easter, a curious parallel to *L. candidum*'s symbolic association with Mary, mother of Jesus. Prior to the Second World War, the Easter lily was usually imported to North America from Japan. However, when this source was halted during the Second World War, production began in the California-Oregon border area, which today produces about 95% of all bulbs grown in the world for the potted Easter lily market. In the U.S. potted plant market, the Easter lily is the fourth largest crop, after poinsettia, chrysanthemum, and azalea. However, the sales period for Easter lily lasts only about 2 weeks, whereas poinsettias are sold for 6 weeks and chrysanthemums and azaleas are sold year-round. Although the demand for Easter lilies collapses after Easter, there is still a market for flowering, potted lilies at other times of the year. The “florist's lily” is usually a hybrid with *L. longiflorum* as one of the parents.

Lilies do not bloom naturally during the spring, so marketing flowering plants for Easter requires greenhouse forcing technology. The vernalization required to induce flowering is a period of cold, moist treatment, sometimes sped up by a photoperiodic treatment (long days). The cultivar 'Nellie White' accounts for most production. Ideally, the first blooms should open on Easter Saturday to maximize the display on Sunday, but for sale in stores flowering is often scheduled sooner. Because Easter can vary from March 22 to April 25, flowering time needs to be scheduled accordingly. To compensate for plants that are coming into flower too quickly or too slowly, growers have sometimes used wheelbarrows to move plants between hot and cold greenhouses, leading to the expression “wheelbarrow crop.”

ADVICE REGARDING EASTER LILIES

Purchasing: Ideal plants should have flowers in various stages of bloom (from buds to open or partially opened flowers), the foliage should be dense, and dark green, the plant should be well-proportioned (about twice as high as the pot) and should be free of yellowing, insects, or signs of disease. Avoid waterlogged plants, and plants displayed in shipping sleeves.

Maintainance: Place plant in indirect light (or light filtered through a curtain), with daytime temperatures of 15–18 C (60–65 F) and night temperatures of 5–10 C (40–50 F); keep away from drafts and drying heat sources such as heating ducts; water soil well when dry, but do not overwater (aluminum foil wrapping can hide waterlogged soil); remove flowers when they wither (allegedly, flowers can be prolonged by removing anthers). Turning the pot every few days can prevent the stalk from leaning toward light. Do not fertilize.

After Easter: Attempting to grow an Easter lily indoors as a regular house plant, or to get it to re-bloom indoors, is unlikely to be successful. However, it can often be transplanted outdoors. If the plant needs to be maintained indoors because of possible frost outside, place it in bright light, remove flowers and browning or yellowed leaves, and add a slow-release fertilizer. After danger of frost, Easter lilies can be planted outside, setting the bulb 15 cm (6 inches) below the soil surface. Loosen clumped and matted roots and spread the root ball. Leave the stem and leaves but cut off remaining flowers. Blooming might occur in mid- or late summer, but probably not until next season. In cold areas (the species has been rated as capable of surviving USDA climate zone 3, although it is generally evaluated as semi-hardy), consider planting near the house foundation, and mulch well over winter.

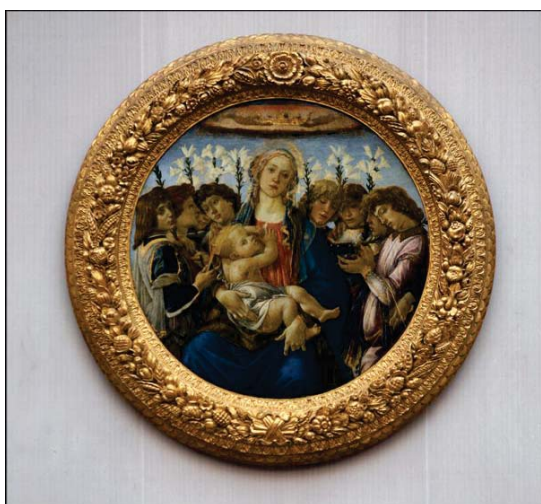


Figure 11. Renaissance Italian painter Sandro Botticelli (ca. 1445–1510) prepared numerous religious works showing the Virgin Mary with the Christ child. In this painting (the so-called Raczynski Tondo, completed in 1478), housed at Berlin Gemäldegalerie, eight angels in the background are holding Madonna lilies, symbolic of innocence, purity, chastity, and humility.

Symbolism

In ancient times, lilies were frequently considered to be signs of fertility and a pure life, and were used as offerings to appease the gods. However, as noted in the following, they also became symbolic of sexuality and eroticism. Lilies have also been associated with death, perhaps because the dead are no longer capable of sin, and so regain lost innocence and purity. At one time, lilies were placed on the graves of the young (assumed to be innocent).

- *Lilium candidum* (Madonna lily, white lily) is especially significant as a Christian symbol. It is commonly

associated with St. John the Baptist, St. Joseph, St. Dominic, St. Francis of Assisi, and St. Anthony of Padua. Most of all, as the “Madonna lily” it is the symbol of the Virgin Mary, symbolizing purity and chastity. This is ironic, as the Church adopted the lily from the pagan Greek goddess Aphrodite (later adopted by the Romans as Venus), who symbolized love, beauty, pleasure, and procreation, and had many lovers. The ancient Greeks also associated *L. candidum* with Hera (later adopted by the Romans as Juno), a competitor of Aphrodite and goddess of women and marriage, who might at first blush seem to be a superior figure since she was worshipped as a virgin, but she spent most of her time in a jealous rage plotting vengeance against people who innocently crossed her path.

- The “white lily” was associated with slavery in the American South in the early 1850s, before the Civil War. Slaves were sometimes branded with a lily symbol. In the early 1880s the white lily was adopted as a symbol by racist groups in the Deep South, especially Georgia. The emblem was placed on buildings to indicate sympathy for racism. The Stem of the White Lily, an organization parallel to the Ku Klux Klan, was responsible for over 200 lynchings. The white lily is still considered a racist emblem in the southern U.S.
- Dating to the 1916 uprising by Irish republicans, the Easter lily has been used as a badge worn at Easter by Irish republicans as a symbol of remembrance for Irish combatants who died during the hostilities with the British.
- A trend (promoted by the flower industry) is to use a gift of lilies as symbolic of a 30th wedding anniversary.

Literary Gems

- When you have only two pennies left in the world, buy a loaf of bread with one, and a lily with the other.
—Chinese proverb
- And why take ye thought for raiment? Consider the lilies of the field, how they grow; they toil not, neither do they spin: And yet I say unto you, That even Solomon in all his glory was not arrayed like one of these.
—Bible (Matthew Ch. VII, V. 28–29; note that many biblical “lilies” may have been irises or other flowers.)
- Like the lily,
That once was mistress of the field and flourish'd,
I'll hang my head and perish.
—William Shakespeare (Henry VIII, 1613)
- The modest Rose puts forth a thorn,
The humble sheep a threat'ning horn:
While the Lily white shall in love delight,
Nor a thorn nor a threat stain her beauty bright.
—William Blake (Songs of Experience, 1794)
- Remember that the most beautiful things in the world are the most useless; peacocks and lilies for instance.
—John Ruskin (The Stones of Venice, Vol. 1, 1851)
- I took a day to search for God,
And found Him not; but as I trod,
By rocky ledge, through woods untamed,
Just where one scarlet lily flamed,
I saw His footprint in the sod.
—William Bliss Carman (Vestigia, 1920)



Figure 12. A display of lilies at a flower show. Photo by Darorcilmir (CC BY 3.0).

Curiosities of Science and Technology

- According to an old wives tale, approaching an expectant mother with a lily in one hand and a rose in the other could be used to tell the sex of the child. If the mother chooses the rose, it will be a girl, but picking the lily indicated that it will be a boy (because of the phallic appearance of the long pistil).
- In the Victorian era, “floriography” or the language of flowers was the basis of sending messages by careful choice of the composition and colour of the flowers included. A white lily conveyed the sentiment that the receiver was pure and sweet; a yellow lily could mean gratitude or jubilation; an orange lily, however, indicated hatred.
- The rose is the leading flower for the names of people (Rose, Rosie, Rosalyn, etc.). The lily is the second most popular basis for floral names (Lily, Lil, Lilliane, etc.).
- Reflecting the importance of the plants, the word lily appears in several idiomatic phrases. “Lily-white” can mean (1) white as a lily (especially pertaining to skin); (2) above reproach, untouched by corruption or imperfection; or (3) excluding blacks (especially in the southern U.S.). “Lily-livered” means cowardly. “To gild the lily” means to give an often deceptively attractive or improved appearance to something.
- The English plant collector E.H. Wilson (1876–1930) discovered the regal lily (*L. regale* E.H. Wilson) in 1903 in western Szechuan, China. In 1910 he returned to the site to obtain more bulbs, and while being carried in a sedan chair an avalanche of boulders crushed his leg. He set his broken leg with the tripod of his camera, and endured a three-day forced march, along with his collected bulbs which subsequently were used to introduce the species into commercial cultivation in much of the world. After his trip, Wilson walked with what he called his “lily limp.”
- *Lilium candidum* (called the white garden lily) was designated as the floral emblem of the province of Quebec on January 23, 1963, the result of interpreting the fleur-de-lis emblem, symbolic of France and consequently of Quebec, as a lily. However, this came to be appreciated as an erroneous interpretation (the fleur-de-lis is probably not based on a flower), and on Nov. 5, 1999 the blue flag (*Iris versicolor*) was substituted as the official provincial flower of Quebec.
- The western red lily (*L. philadelphicum*) was chosen as

the official floral emblem of Saskatchewan in 1941. Aside from Saskatchewan, no species of *Lilium* appears to have official designation as representative of a political region. *Lilium bosniacum* has been claimed to be the national flower of Bosnia and Herzegovina, but this seems to be based on a tradition of it being a national emblem among the Bosniacs. Several so-called “lilies” are emblems of regions, but not species of *Lilium* (e.g., the flame lily, *Gloriosa rothschildiana*, is the national flower of Zimbabwe).



Figure 13. *Lilium auratum* (Horticultural Division VII). Photo by TANAKA Juuyoh (CC BY 2.0).

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Figure 14. Artistically photoshopped lily flower, by Kristymp (CC BY 3.0).

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- Royal Horticultural Society Lily Group – <http://www.rhslilygroup.org/> [A source of considerable information on various aspects of *Lilium* and related “lilies.”]
- The genus *Lilium* – <http://www.the-genus-lilium.com/main.htm> [A European-based source of information.]
- The North American Lily Society – <http://www.lilies.org/> [Another large source of information.]

(continued)

CANADIAN WEBSITES

Alberta Regional Lily Society – <http://www.arls-lilies.org/>

Canadian Prairie Lily society – <http://www.prairielily.ca/>

Manitoba Regional Lily Society –
<http://www.manitobalilies.ca/>

Ontario Regional Lily Society – <http://www.orlds.ca/>

South Saskatchewan Lily Society –

<http://www.sasklilysociety.org/>

The Joseph Smith Lily Garden (St. George, Ont.) –

<http://www.josephsmithlilygarden.org/>

Victoria Lily Society – <http://members.shaw.ca/lilynet/vicliil/>

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Field trip scenes June 2013

Lac du Bois



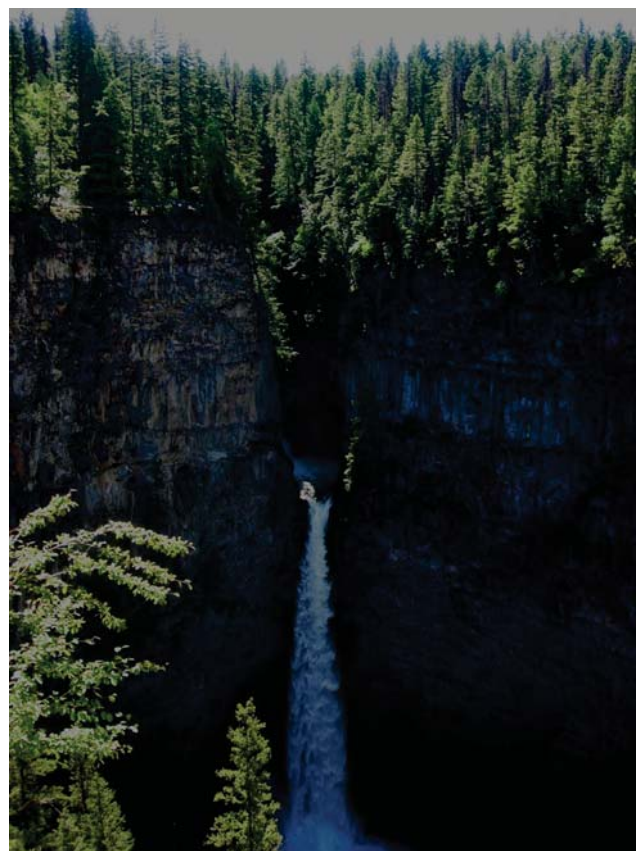
Above. An area grazed by livestock that included a livestock exclosure to allow for the study of graze and ungrazed lands.

Below: sunflowers in a forest glade

Both photos by Moira Galway



Wells Gray Park



Above right: One of many spectacular waterfalls.

Below right: Woodland botanizing.

Photos by C Maxwell



Scenes from the Annual Meeting at Kamloops



Opening ceremony. Photo: H. Massicotte



The art show. Photo: M. Galway



The poster session. Photo: C. Maxwell



Weresub lecture speakers, Oluna and Adolf Ceska, with Shannon Berch.. Photo: H Massicotte



Enjoying the banquet. Irene McKechnie, Linda Tackaberry and Jean Gerrath. Photo: H Massicotte



At the banquet. From left to right. Erica Wheeler, Lynn Gillespie, Lyn Baldwin and Tyler Smith. Photo: H. Massicotte

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