# The Canadian Botanical Association Bulletin

# Bulletin de l'Association Botanique du Canada

Volume 55 Number 2 - September/septembre 2022

Highlights

President's Message Pg. 1

Member News & Notices Pg. 5

Tales from the Field Pg. 8

Scientifiquement Artistique Pg. 11

Section Reports Pg. 19

The Past, Present, & Future of Two Canadian Mycologists Pg. 22

Conference Report Pg. 27

CBA Awards 2022 Pg. 28

A Field Trip with Wild Basket Pg. 38

Book Review: "A Passion for Snowdrops" Pg. 45

The Humble Moravian Monk Turns 200 Pg. 47

Lupins, by Ernie Small Pg. 51

## President's Message



Thank you for electing me your President!

It feels a little strange for me to serve in this position because I have always tried to avoid prominent administrative positions. Then why did I accept? Because CBA/ABC has been good to me and there are people in it that I admire and care about. When I immigrated to Canada in 2001, unemployed and anxious about the future, I looked around for familiar things. Botany ("botanica" in my native language) brought me to CBA/ABC, which I joined that year. Although I could not attend any meetings before I obtained a tenure-track faculty position at Wilfrid Laurier University in 2005, CBA/ABC was for me a professional anchor during times of uncertainty. Subsequently, I brought my students to the meetings and I came to appreciate the Association even more. Now I am happy to give something back to the Association.

I must confess I was largely ignorant about the inner workings of the Association before I became President Elect. There is a LOT going on "inside"! However, the Association is not just its Board of Directors and we need you, our members, in order to keep moving forward and flourish. This is YOUR Association, and we are only as strong as YOU wanting to be involved. One of the aspects I love about CBA/ABC is its small size. The downside is that we are always in need of "bodies" to fill different jobs. Almost every year we must find one or two new Board members, and in 2023 we'll need a Secretary to replace Deb Metsger, who has graciously served two terms and kindly consented to yet an additional year to help the new Treasurer Peter Ryser and myself, as both of us have to learn the ropes. If you are at a time in your career when you can afford to donate some time, please consider a potential Board position.

You will not regret it! It is a great opportunity to meet other people who love plants from across Canada, and to work together to advance botanical knowledge, education and research. We shall advertise new positions in the December Bulletin, and you can contact me directly for more details.

Something much easier but equally important that everyone can do is to promote the Association. If you are happy with CBA/ABC, why not share it with a new colleague in your department or in your professional circles? Many members have retired during the last years, or will do so in the next decade. While retired colleagues will always be a valued part of our membership, we also need young professionals and students to ensure the long-term survival of the Association. Please help us spread the good word about CBA/ABC!

My plans for the next two years are to build on the excellent tradition established by a long chain of predecessors. Time is too short to reinvent the wheel! Nicole Fenton, now Past President, has made my job easier in many respects, and the Association has a lot of good inertia. Thus, all the projects initiated by Nicole and Julian Starr will continue, including those developed by the Inclusion Diversity Equity and Access (IDEA) committee. If you want to be a part of this important committee, please contact me or Nicole.

At the same time, I listened to the ideas put forward during the AGM, and will soon ask for your help in materializing them during the next year. Here are just a few initiatives/ideas:

- Encourage very young students undertaking plant projects at national or provincial science fairs;
- Organize Science Odyssey botany events in different Provinces/Universities;
- Organize an iNaturalist bioblitz during a field trip at the next meeting in Winnipeg;
- Create a visual repository of CBA/ABC (we have so few images in the Archives!).

If you have an idea or would like to do something "for the love of plants" and the people who cherish them, CBA/ABC will support you. Only this way we can be faithful to the CBA/ABC's values.

*CBA/ABC meeting 2022*

After two years of being the prisoners of computer screens, even the most anti-social among us agreed that it was great to congregate again with "real" people at UQAT (Université du Québec en Abitibi-Témiscamingue), in Rouyn-Noranda, Quebec. It is fair to say that the conference was a huge success, and I wanted to say again a heartfelt "thank you!" to the generous Local Organizing Committee, which made this event possible and so agreeable. Please see more details and photos in this issue of the Bulletin. To those of you who could not attend, there is always next year! Preparations for the joint meeting with the CSEE in Winnipeg in June 11-14, 2023 have been underway for over a year. Please contact your Section Chair(s) if you have ideas for symposia. We hope to be able to organize at least 1-2 symposia together with members of the CSEE.

*A short biographical note*

My career has been perhaps more meandering than that of many of you; I received a PhD in Plant Systematics from the University of Bucharest, Romania, and I worked as an Assistant/Associate Professor in the Department of Botany of the University of Agronomical Sciences in the same city. Prior to immigrating to Canada, I was a Tempus visiting professor at the University of Valencia, Spain; a Senior Fulbright Scholar at the University of California, Riverside, U.S.A., and a postdoctoral fellow at the University of Guelph. Currently, I am a Full Professor of Biology at Laurier. My main interests are plant systematics, floristics, comparative morphology and the evolution of form-and-function. I am married, with no children, but with many undergraduate students and plants.

## Message du président

Merci de m'avoir élu président !

Cela me fait un peu bizarre d'occuper ce poste, car j'ai toujours essayé d'éviter les postes administratifs importants. Alors, pourquoi ai-je accepté ? Parce que l'ABC/CBA a été bonne pour moi et qu'il y a des gens en son sein que j'admire et que j'apprécie. Lorsque j'ai immigré au Canada en 2001, sans emploi et anxieux quant à l'avenir, j'ai cherché autour de moi des choses familières. La botanique ("botanica" dans ma langue maternelle) m'a amené à l'ABC/CBA, que j'ai rejoint cette année-là. Bien que je n'aie pu assister à aucune réunion avant d'obtenir un poste de professeur menant à la permanence à l'Université Wilfrid Laurier en 2005, l'ACB/CBA a été pour moi un point d'ancrage professionnel en période d'incertitude. Par la suite, j'ai amené mes étudiants aux réunions et j'en suis venu à apprécier encore plus l'Association. Maintenant, je suis heureux de donner quelque chose en retour.

Je dois avouer que j'étais largement ignorant des rouages de l'association avant de la rejoindre en tant que président élu. Il se passe beaucoup de choses "à l'intérieur" ! L'association ne se résume pas seulement à son conseil d'administration et nous avons besoin de vous, nos membres, pour continuer à avancer et à prospérer. C'est VOTRE association, et nous ne sommes forts que si VOUS vous impliquez. L'un des aspects que j'aime de l'ACB/CBA est sa petite taille. L'inconvénient est que nous avons toujours besoin de "corps" pour remplir différents postes. Presque chaque année, nous devons trouver un ou deux nouveaux membres pour le conseil d'administration, et en 2023, nous aurons besoin d'un secrétaire pour remplacer Deb Metsger, qui a gracieusement servi deux mandats et a consenti généreusement à une année supplémentaire pour aider le nouveau trésorier Peter Ryser et moi qui devont apprendre les ficelles du métier. Si vous êtes à un moment de votre carrière où vous pouvez vous permettre de donner un peu de temps, veuillez envisager un poste au conseil d'administration. Vous ne le regretterez pas ! C'est une excellente occasion de rencontrer d'autres personnes qui aiment les plantes de partout au Canada et de travailler ensemble pour faire progresser les connaissances, l'éducation et la recherche en botanique. Nous annoncerons les postes à pourvoir l'année prochaine dans le Bulletin de décembre, et vous pouvez me contacter directement pour plus de détails.

Une chose beaucoup plus facile mais tout aussi importante que chacun peut faire est de promouvoir l'Association. Si vous êtes satisfait de l'ACA/CBA, pourquoi ne pas en faire part à un nouveau collègue dans votre département ou dans votre entourage professionnel ? De nombreux membres ont pris leur retraite au cours des dernières années ou le feront au cours de la prochaine décennie. Si les collègues retraités sont toujours considérés comme une partie importante de nos membres, nous avons également besoin de jeunes professionnels et d'étudiants pour assurer la survie à long terme de l'Association. Aidez-nous à faire connaître l'ABC/CBA !

Mes projets pour les deux prochaines années consistent à poursuivre l'excellente tradition établie par une longue série de prédécesseurs. Le temps est trop court pour réinventer la roue ! Nicole Fenton, désormais présidente sortante, m'a facilité la tâche à bien des égards, et l'Association dispose d'une bonne inertie. Ainsi, tous les projets initiés par Nicole et Julian Starr vont se poursuivre, y compris ceux développés par le comité Inclusion Diversité Equité and Accès (IDEA). Si vous voulez faire partie de cet important comité, contactez Nicole ou moi-même.

En même temps, j'ai écouté les idées émises lors de l'AGA, et je vous demanderai bientôt de m' aider à les concrétiser. Voici quelques initiatives/idées :

- Encourager les très jeunes élèves à entreprendre des projets sur les plantes lors de foires scientifiques nationales ou provinciales;

- Organiser des événements botaniques de type Science Odyssey dans différentes provinces/universités;

- Organiser un bioblitz iNaturalist lors d'une excursion sur le terrain lors de la prochaine réunion à Winnipeg ;

- Créer un dépôt visuel de l'ACB/CBA (nous avons si peu d'images dans les archives!).

**The Canadian Botanical Association Bulletin**

The CBA Bulletin is issued three times a year (March, September and December) and is freely available on the CBA website. Hardcopy subscriptions are available for a fee.

Information for Contributors

All members are welcome to submit texts in the form of papers, reviews, comments, essays, requests, or anything related to botany or botanists. For detailed directives on text submission please contact the Editor (see below). For general information about the CBA, go to the website: www.cba-abc.ca

Executive Editor

Dr. Erin Zimmerman

cba.abc.bulletin@gmail.com

Published in Dutton, September 8th 2022 ISSN 0008-3046 (paper) ISSN 1718-8164 (electronic)

Next issue

Texts for the next issue, 55(3), must be received by November 1st, 2022.

Unless otherwise stated, all content is released under the Creative Commons Attribution Share-Alike 4.0 license. Copyright remains with the authors.

**Bulletin de l'Association Botanique du Canada**

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

Soumission de textes

Tous les membres de I'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. Pour des renseignements détaillés sur la soumission de textes, veuillez consulter le rédacteur (voir ci-dessous). Infos générales sur I'ABC à l'url suivant: www.cba-abc.ca

Rédactrice en chef

Dr. Erin Zimmerman

cba.abc.bulletin@gmail.com

Publié à Dutton, le 8 septembre 2022 ISSN 0008-3046 (papier) ISSN 1718-8164 (électronic)

Prochain numéro

La date de tombée des textes du prochain numéro, le no 55(3), est le 1er novembre 2022.

Si vous avez une idée ou si vous souhaitez faire quelque chose "pour l'amour des plantes" et des personnes qui les chérissent, l'ACB/CBA vous soutiendra. Ce n'est qu'ainsi que nous pourrons être fidèles aux valeurs de l' CBA/CBA.

*Réunion ABC/CBA 2022*

Après deux années passées à être prisonniers de nos écrans d'ordinateur, même les plus asociaux d'entre nous s'accordent à dire qu'il était formidable de se réunir à nouveau avec de "vraies" personnes à l'UQAT (Université du Québec en Abitibi-Témiscamingue), à Rouyn-Noranda, au Québec. Il est juste de dire que la conférence a été un énorme succès, et je voudrais dire encore une fois un sincère "merci" au généreux comité organisateur local, qui a rendu cet événement possible et si agréable. Vous trouverez plus de détails et de photos dans ce numéro du Bulletin. Pour ceux d'entre vous qui n'ont pas pu participer, il y a toujours l'année prochaine! Les préparatifs de la réunion conjointe avec la SCEE à Winnipeg, du 11 au 14 juin 2023, sont déjà en cours et cela depuis plus d'un an. Veuillez contacter le(s) président(s) de votre section si vous avez des idées de symposiums. Nous espérons pouvoir en organiser au moins un ou deux s avec les membres de la SCEE.

*Une courte note biographique*

Ma carrière a peut-être été plus sinueuse que celle de beaucoup d'entre vous ; j'ai obtenu un doctorat en systématique végétale de l'Université de Bucarest, en Roumanie, et j'ai travaillé comme professeur adjoint/associé au département de botanique de l'Université des sciences agronomiques de la même ville. Avant d'immigrer au Canada, j'ai été professeur invité Tempus à l'Université de Valence, en Espagne, chercheur principal Fulbright à l'Université de Californie, Riverside, aux États-Unis, et boursier postdoctoral à l'Université de Guelph. Actuellement, je suis professeur titulaire de biologie à l'Université Laurier. Mes principaux intérêts sont la systématique des plantes, la floristique, la morphologie comparative et l'évolution de la forme et de la fonction. Je suis marié, sans enfant, mais j'ai de nombreux étudiants de premier cycle et des plantes.

[*Translated into French by Frédérique Guinel*]

# New Member Publications

Cui, H., Ford, B., Starr, J., Reznicek, A., Zhang, L., & Macklin, J.A. (2022) "Authors' attitude toward adopting a new workflow to improve the computability of phenotype publications." Database, 2022: baac001.

García-Moro, P., Otero, A., Benítez-Benítez, C., Costa, L., Martín-Bravo, S., Naczi, R.F.C., Reznicek, A.A., Roalson, E.H., Starr, J.R., & Jiménez-Mejías, P. (2022) Biogeography and systematics of *Carex* subgenus *Uncinia* (Cyperaceae): A unique radiation for the genus *Carex* in the Southern Hemisphere. Taxon 71: 587-607.

---

# New Graduate – Carlos Cerrejón Lozano, Ph.D.



I recently graduated with a Ph.D. in Environmental Sciences at Université du Québec en Abitibi-Témiscamingue under the supervision of Profs. Nicole J. Fenton and Osvaldo Valeria. The thesis was entitled "*Understanding the biodiversity patterns of cryptogams (bryophytes and lichens) in boreal forests through remote sensing.*" This work was focused on the development of novel remote sensing-based modelling approaches to assess, better understand, and spatially predict different biodiversity components of bryophytes and lichens, namely alpha diversity (species richness), beta diversity (species turnover), and the presence of rare species, as well as their richness patterns. With this thesis, we contribute to improving our knowledge of bryophyte and lichen distribution and biodiversity in boreal regions and hope to increase awareness of these often-neglected but ecologically important species. The peer-reviewed papers published during its development were:

- Cerrejón, C., Valeria, O., Muñoz, J., Fenton, N.J. (2022) Small but visible: Predicting rare bryophyte distribution and richness patterns using remote sensing-based ensembles of small models. *PLoS One*, 17: e0260543.
- Martin, M., Cerrejón, C., Valeria, O. (2021) Complementary airborne LiDAR and satellite indices are reliable predictors of disturbance-induced structural diversity in mixed old-growth forest landscapes. *Remote Sensing of Environment*, 267, 112746.
- Cerrejón, C., Valeria, O., Marchand, P., Caners, R.T., Fenton, N.J. (2021) No place to hide: Rare plant detection through remote sensing. *Diversity and Distributions,* 27: 948–961.
- Cerrejón, C., Valeria, O., Mansuy, N., Barbé, M., Fenton, N.J. (2020) Predictive mapping of bryophyte richness patterns in boreal forests using species distribution models and remote sensing data. *Ecological Indicators,* 119: 106826.

# IBC 2024

## XX International Botanical Congress

## Madrid Spain



## July, 21st - 27th, 2024

ibcmadrid2024.com • info@ibcmadrid2024.com

#IBC2024

SEBOT
SOCIEDAD BOTÁNICA ESPAÑOLA

REAL JARDÍN BOTÁNICO

Techinical Secretariat:
Fase20 congresos
C/ Narváez 15 1ºizq
28009 Madrid - Tel. 902 430 960
www.fase20.com - info@fase20.com

# RE3 2023 CONFERENCE

RECLAIM
RESTORE
REWILD

**June 11-15, 2023** • QUEBEC CITY • **CANADA**






A joint conference between the Society for Ecological Restoration – Eastern Canada (SER-EC) and the Canadian Land Reclamation Association (CLRA), from June 11th to 15th, 2023, during the third year of the UN Decade of Ecosystem Restoration (2021-2030).

In cooperation with the Ontario chapter of SER (SER-O), the Canadian chapter of the Society of Wetland Scientists (SWS Canada), the International Society for Horticultural Science (ISHS) and the International Peatland Society (IPS).

The theme of the conference is "**From Reclaiming to Restoring and Rewilding**". It aims to stimulate discussions about the range of environmental management approaches advocated by the hosting societies.

**re3-quebec.org**

# Tales from the Field



## In the footsteps of Fernald

By Julian Starr

When you've been in the field for a very long time, your brain starts to wander as the miles keep rollin' by. Seemingly irrelevant facts suddenly become major unresolved mysteries, like "Was Marie-Victorin really that big, or was Merritt Fernald really that small?" That classic picture of the two great botanists outside the Gray Herbarium (GH) always makes me wonder (Fig. 1), but at least for today, Fernald was going to be a giant in my mind.



**Fig. 1.** Marie-Victorin and Fernald in front of the Gray Herbarium in 1924. They were great friends.

I was but a newly minted Assistant Professor at the University of Ottawa, and I was off to Mt. Logan, Gaspésie with my first two summer students, Carmen Fletcher and Jeff Graham (both M.D.'s now - why do they always become doctors? Fig. 2). We were hunting for two special Fernald finds, *Carex capitata* and *Carex nardina*, arctic-alpine plants that were key to Fernald's nunatak theory for Eastern North America. In Fernald's mind, these plants had never moved – they had simply spent the Glacial Age on the tippy-tops of these great mountains as the mighty ice lumbered by.

If you do not know who Merritt Fernald is, well, I'll tell you he is about as famous a botanist as there ever was. The guy's so famous they even named a *Carex* after him using his full given name, *Carex merritt-fernaldii*! He was a Harvard professor, and he took a strong interest in the flora of Eastern Canada, where in the 1920's he would make a number of stunning discoveries of arctic-alpine plants in the Chic-Choc Mountains over a 32-year period. He also led *Rhodora* through its early years, writing article upon article in his curiously picturesque style. These were delightful, sometimes dotty reports documenting his field seasons – *blow-by-blow* – to the finest of detail. Believe me, not a word was spared. For example, we learn in the 148 pages of "Two summers botanizing in Newfoundland" that on Sunday, July 20th, 1924, Fernald and his colleagues landed at Port aux Basques, and stayed at "Mrs. Ben. Billard's…a kind and motherly landlady and one of the best cooks…in Newfoundland - a place we later looked back to with yearning stomachs." Plenty of plants are documented too, but you get the idea*.

Mt. Logan is near Cap-Chat, Québec, and it is a stunning setting. The Chic-Chocs are near their highest at this point and they rise in a sudden wall about 12 kilometers southeast of the town. The area is a mishmash of National Parks, ZEC's, wildlife sanctuaries, and not surprisingly, an ecology reserve named "Fernald." I had obtained all the requisite permits to collect, but nobody had told me how I was supposed to get to the top, so being ever-resourceful, I had tracked down the topographic map for the area and looked for a way up. Sure enough, the area was criss-crossed by piles of dirt roads, and one seemed to go straight to the summit, so it became our target.



**Fig. 2**. Drs. Carmen Fletcher M.D. and Jeff Graham M.D. in Gaspésie when they were but lowly undergraduates. I am still looking for a family doctor.

If you have ever gone poking around backwoods Gaspésie, you will know that chance had better be on your side. Just because a bridge is on a map that doesn't mean it is still there, and even if it is, it often

looks seriously unsafe to cross. The province helps fund these "dual" purpose roads, but once the trees are cut, they're public…and the neglect begins**. Plus, if you lose your way, good luck finding your way back, because there are no signs. So, as we wound our way ever closer to our target we kept a close eye on the map, counting everything on it as we passed, until it seemed we were right where we needed to be, but nothing could have been more heartbreaking. Before us stood a gate around which was strung the most massive iron chain and lock you could ever imagine.



**Fig. 3.** A view from Mt. Logan towards the St-Laurent.

My future doctors were simply devastated, as they thought the adventure was over before it had even begun, and I must admit, I thought so too. But the more I stared at that mother big lock and chain, the more I doubted their purpose – they were simply too huge to practically secure that gate, so I slowly concluded that their sheer size was not meant to lock, but to intimidate. Once again, as the truth dawned upon me, those most useful and wise words for the field came forth to my lips, "never assume it is locked" (see Can. Bot. Assoc. Bull 54(2): 14 for another example), and I ordered Carmen to have a pull on the bolt. Sure enough, the lock's shank wasn't pushed all the way in. With heaps of park rangers going up and down that road every day, it is simply not practical to lock it every time. Plus, you can't give everybody a key now, can you?

And so, with a hearty "Whoo-Hoo!" we started up the road full speed ahead, but not long after our departure something odd appeared: a sign…a sign with just the number nine on it. Then a few minutes later, another, emblazoned with just an eight. When we got to the next sign and there was only a seven on it, I started to get nervous - this was a count down, and whatever was at the end was probably going to be a mess of trouble. And so it was, after the final sign marked "one" went by, we broke through the trees and there before us stood the massive Auberge de montagne des Chic-Chocs, a four-star hotel with only 18 rooms and a summer package that starts at $472 a night for two. Incidentally, you cannot drive to the hotel - they pick you up in some goofy lookin' monster truck with oversized wheels in Cap Chat as part of the "experience", so let's say that my arrival in a dirty Ford Taurus rental with stinking clothes (we hadn't showered in days) did more than just spoil the view.



**Fig. 4.** Caribou on Mt. Logan.

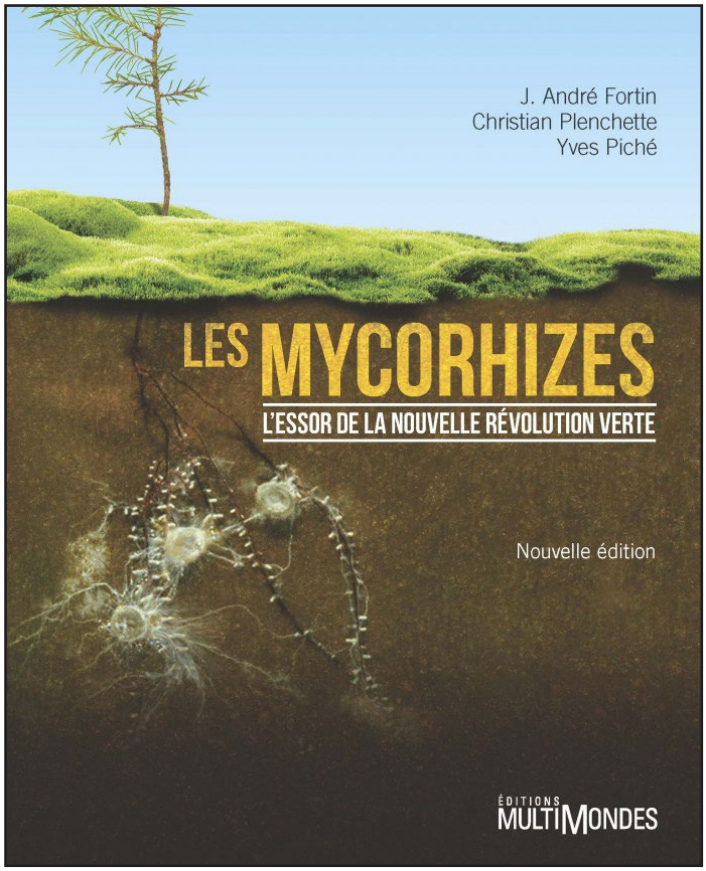
On the porch sat four park rangers with the meanest look of shock and horror you could ever imagine. Before everything went south, I turned to the undergrads and said, "Stay calm and let me do the talking!", but before I had even had the chance to step out of the car and dust myself off, their leader had popped up to the car and snarled, "What are you doing here!?" He was not just annoyed, he was angry, and I'll admit it, I was a mess and the undergrads looked even worse, especially when compared to the shiny clean SÉPAQ uniforms our hosts were wearing. Of course, it wasn't my fault they left the gate open; I mean, didn't your mother ever tell you take care of your own things? Well, enough with the recriminations, I had come here with a purpose, and nobody was going to get between me and my quarry, so I said, "I have come to collect plants. Look, here is my permit." Thankfully, after he'd had a look, things cooled down, but he wondered why I had come this way, and I told him, because they gave me a permit, but they never told me how to get to the summit of Mt. Logan, so I checked a map. He started mumbling

a few names and cursing church hardware, but when he finally looked up, he smiled, and was thereafter as helpful as anyone could ever imagine. Of course, we could not stay at the hotel as it was too $$$, and with a head-to-toe look, we were also told we could not even go into the hotel, but he provided us with a miner's tent for the night and had a hotel mountain guide show us the best way up to the peak. Although we never did find *Carex nardina* or *Carex capitata* (I have my doubts they still exist due to global warming), I will never forget the views (Fig. 3) or the caribou (Fig. 4). The Chic-Chocs are truly among the most beautiful places I have ever travelled, and I hope that one day you will make it there too – minus the drama!

*I was once told a story that when Fernald had finished such hefty manuscripts he would tootle down to the graduate students' office and proceed to read aloud the entire thing from start to finish. The rule was that you had to stay until the end, so let's say that when the word got out that Fernald was nearly finished a manuscript, the grad students' office was bizarrely empty!

**See "Des chemins forestiers négligés et dangereux" (Forestry roads : neglected and dangerous) https://ici.radio-canada.ca/recit-numerique/3783/chemins-forestiers-abandonnes-dangereux-environnement

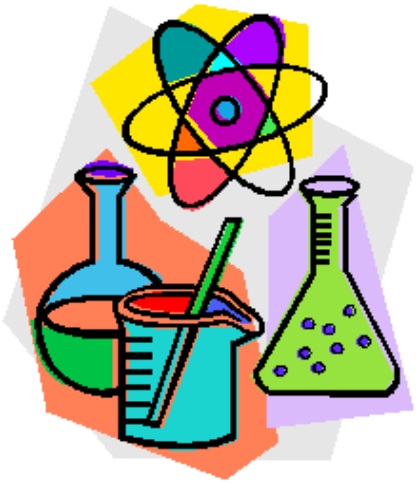
---




Le manuel *Les Mycorhizes*, de Fortin, Plenchette, & Piché a récemment été publié dans sa deuxième édition.

The textbook *Les Mycorhizes*, by Fortin, Plenchette, & Piché has recently been published in its second edition.

# Scientifiquement *Artistique*



## Chronique 1: Retour sur la place des arts dans la science à la conférence de l'ABC 2022

Par *Les Juls*... Julie Arseneault & Julia Morarin

[English version follows. Pour alléger la mise-en-page de l'article suivant, les images de référence se situent entre le texte anglais et le texte français.]

***Un colloque de botanique teinté d'arts***

La conférence annuelle de l'ABC représente un moment privilégié pour ses membres d'échanger avec passion sur les sujets de recherche de pointe. Les participants de l'édition 2022 qui s'est tenu à l'UQAT à Rouyn-Noranda, Qc. en juin dernier ont pu constater qu'une grande place a été faite à l'art et aux artistes locaux. La question qui nous vient est la suivante : *Pourquoi faire place à l'art dans une conférence scientifique ?* Lorsque nous avons posé cette question à Nicole Fenton (organisatrice de la conférence et ex-présidente de l'ABC), voici mots pour mots ce qu'elle nous a répondu "*Parce que pour moi, l'art et la botanique ça va naturellement ensemble. Il n'y a pas plus de raison que ça.*" Il est vrai qu'en matière de botaniques, les planches d'illustrations par exemple, constituent des outils de références incontournables et peuvent être de véritables œuvres d'art. Nous avons donc souhaité stimuler non seulement notre sens critique, mais aussi notre sens artistique afin d'offrir une expérience la plus holistique possible.

C'est ainsi que trois expositions artistiques, dont vous retrouverez la description plus bas, ont pris place au sein de la conférence. Mais il faut savoir que, l'Art (avec un grand A), s'est également invité à de nombreuses autres occasions. Dès la cérémonie d'ouverture, l'Art prit place avec la performance musicale du groupe de percussionnistes de la communauté Anishnabe Algonquine de Lac Simon, les *Screaming Eagles* (photo 1). Les quatres membres de la troupe qui étaient présents ont ponctué l'allocution inspirante de M. Richard Kistabish (photo 2), un aîné de la communauté de Pikogan. Leur musique, ancrée dans les racines traditionnelles, nous a fait vibrer et nous a rappelé l'importance d'être reconnaissant pour les ressources offertes par la nature. D'ailleurs M. Kistabish a terminé son discours en nous invitant à participer à une danse traditionnelle pour remercier la terre.

Vous pouvez voir et entendre les *Screaming Eagles* en suivant cet hyperlien : https://fb.watch/ezBT-1UGs6/ https://youtu.be/sdYAvvIDOzw.

Pour continuer dans la musique, notons que c'est le groupe *Northern Light* qui a assuré l'ambiance lors du banquet de clôture (photo 3). Leur musique a su créer une ambiance propice à la fête et aux échanges entre les convives alors qu'ils se régalaient du menu concocté avec créativité par la réputée Cheffe Jézabel Pilote et mettant en vedettes de nombreux produits régionaux.

En complément au symposium sur les forêts anciennes, un concours photo a été proposé aux membres de l'association (photo 4). Une vingtaine de photos ont été soumises au jury. La photo gagnante est celle intitulée : 7-Forêt acadienne par Mélanie Jean. Un second prix sera décerné à la photo intitulée : 15-Ancient forests in Laojun Mountain de Xiangbo Yin. Visitez le site web de la conférence pour voir l'ensemble des photos soumises au concours : https://abc-cba2022.uqat.ca/art-picture-gallery.php?lang=fr

Enfin, mention spéciale pour la vente aux enchères, qui aura permis de récolter plus de 2000$ qui permettront de financer les bourses étudiantes. Les illustrations vendues lors de cet événement, ont rapporté, à elles seules, plus de 600$. Comme quoi, l'Art est un domaine fort apprécié des scientifiques!

***Les expositions : grandes vedettes***

Trois expositions s'inspirant à la fois des arts et des sciences, mais bel et bien différentes les unes des autres, ont été présentées au cours de la conférence pour le plaisir des yeux et des oreilles, les avez-vous toutes visitées? Si la réponse est non, nous vous proposons un court retour descriptif sur celles-ci. Si la réponse est oui, vous trouverez ci-dessous des informations complémentaires et les impressions des artistes.

***Première exposition : La résilience des végétaux***

Celle-ci, vous n'avez pas pu la manquer puisqu'elle se situait dans la salle des repas. Si toutefois vous dormiez pendant votre pause repas, nous vous rappelons qu'il s'agissait de sculptures réalisées par l'artiste Émilie B Côté, originaire du Témiscamingue (Québec) (photo 5).

"*Profondément enracinée dans sa région rurale et inspirée par ses singularités, la réflexion de l'artiste gravite essentiellement sur l'essence de l'humain en relation avec le territoire qu'il habite.*"

De par la créativité dont a su faire preuve l'artiste, il est évident que ses œuvres nous ont amené à nous questionner. À plusieurs reprises, nous avons surpris des personnes s'accroupir, ou se pencher (avec beaucoup de souplesse assurément) sur ces œuvres intrigantes et inspirantes.

En effet, bien consciente des enjeux socio-climatiques qui nous touchent, Émilie en a profité pour utiliser son art pour nous conscientiser et nous proposer une réflexion libre sur ces sujets.

"*Dans une approche installative, elle tente de créer des pièces poétiques qui témoignent de ses réflexions sur notre condition humaine, ce qui nous lie à notre habitat et les mutations que celui-ci subit. Elle s'intéresse et questionne les systèmes organisationnels qui sont mis en place pour dénaturer l'environnement à des fins pratiques, et met en lumière le combat du règne végétal dans un milieu de plus en plus soumis aux pressions de la présence humaine.*"

Émilie sera en exposition à la galerie d'art Le Rift à Ville-Marie du 30 septembre au 19 novembre 2022, avec une expo intitulée "La mémoire des ruines".

Ce lien vous conduira vers un vidéo de l'exposition enregistré par l'artiste lors de la mise en place des œuvres : https://fb.watch/ezF4Cwj4a_/

***Deuxième exposition : Les symphonies boréales***

L'exposition intitulée *Les Symphonies boréales* nous amène dans un tout autre type de représentation artistique: la musique. Cette exposition représente le travail conjoint d'une équipe d'artistes et de scientifiques et trouve son origine dans une volonté de fusionner arts et sciences, afin de permettre la vulgarisation du sujet de recherche en écologie de Maxence Martin : la dynamique et la diversité des vieilles forêts boréales du Canada.

"*Il s'agit d'un engagement scientifique, pédagogique et humaniste, où nous cherchons à faire ressentir au spectateur la complexité et la vitalité de ces écosystèmes pour qu'il puisse comprendre par lui-même leur importance.*"

L'utilisation inusité de la taille des cernes de croissances des arbres afin de produire des notes (aiguës si la croissance est forte et grave lorsqu'elle est réduite) permet de produire des mélodies aux variations harmoniques qui témoignent de la dynamique de croissance de chacun de ces peuplements (Photo 6).

"*Ce projet consiste à donner une voix propre à ces forêts, leur permettant de chanter par elle-même leur histoire. Symphonies boréales agit alors comme un intermédiaire, proposant une connexion intime et unique avec des forêts multicentenaires.*"

Yannick Plamondon et Benoît Fortier du Conservatoire de musique de Québec ont adapté la symphonie d'une de ces vieilles forêts qui à été jouée par l'Orchestre Symphonique du Saguenay-Lac-Saint-Jean. Vous

pouvez visionner un enregistrement de leur performance en suivant cet hyperlien: https://www.youtube.com/watch?v=XXt4VMj40P0

Un projet de réalité virtuelle amenant directement le spectateur au sein des forêts boréales est en développement par Maxence et ses collaborateurs, nous vous en reparlerons sûrement!

***Troisième exposition : Atlas de biodiversité : les milieux humides – Chapitre 1***

Si vous permettez, pour cette dernière description et analyse d'exposition, je vais écrire au "je". Après tout, je suis aussi l'une des auteures de cet article (le monde est petit n'est-ce pas ?).

S'il y a bien une chose à laquelle je ne m'attendais pas, c'est aux nombres de commentaires positifs et constructifs que j'ai eu la chance de recevoir suite à cette exposition!

Pour rappel, basé sur un principe de vulgarisation de la science, cette exposition vous invitait à découvrir (ou redécouvrir) des espèces végétales phares des tourbières du Québec, à travers des illustrations et un podcast (photo 7).

Ces beaux commentaires, j'ai eu la chance de les recevoir de la part de professionels.lles du milieu, mais aussi de personnes venu.e.s simplement visiter une exposition sur la biodiversité. Tout ceci m'a permis de réaliser à quel point la vulgarisation est indispensable dans nos sociétés, pour éduquer, et pour faire face aux problématiques socio-climatiques actuelles. Selon leurs dires, les professionnels.lles du milieu en sont eux-mêmes friands! Vous me direz, il existe déjà certaines revues qui vulgarisent la science pour le grand public, et vous aurez raison! Mais très peu de personnes (voir aucune) ne vulgarisent la science produite directement dans les universités. Il nous faut souvent attendre des mois, voire des années avant de voir les résultats d'une recherche dans un magazine populaire. Et encore, cela fonctionne seulement pour les articles scientifiques qui ont eu le plus de succès. Mais qu'en est-il de la recherche universitaire au jour le jour , de la recherche « en train de se faire » ? Qu'en est-il de tous ces articles, doctorats, maîtrises, etc. qui n'atteignent jamais le grand public ? Si vous me posez la question, je vous répondrai qu'il s'agit de savoirs bien trop souvent oubliés, auxquels j'espère, à mon échelle, pouvoir redonner un peu de couleurs.

Pour découvrir les premiers épisodes du podcast (en français seulement pour le moment), ça se passe ici : https://open.spotify.com/episode/3vOuGAAmsStowUj9IvcEmD?si=3e80a91a750c480b

ou ici: https://podcasts.apple.com/fr/podcast/les-tourbi%C3%A8res-toute-une-histoire/id1627283062?fbclid=IwAR1Zas8ggmzwCyf8hfsMWFkcsgnt-dyeJPsZzg7cUmKfF1PLriGPiFI7h98

***Tribune de réflexion sur la place des arts dans la science***

Et si on vous demandait, quelle place ont les arts dans la science ? Vous répondriez quoi ?

Sachez que, contrairement à la pensée populaire, l'art à toujours eu sa place dans la science. À l'inverse, la science a toujours été une source d'inspiration inépuisable pour les artistes. Pourtant, c'est un sujet qui, aujourd'hui encore, fait débat.

Déjà, au XVème siècle, le célèbre Léonard DeVinci se servait de son art pour illustrer ses recherches (photo 8). Plus tard, au XIXème siècle c'est le biologiste et philosophe Ernst Haeckel, considéré comme étant le "père de l'écologie" qui choisit d'illustrer les nombreuses nouvelles espèces qu'il décrit (photo 9). Il est évident que, face à la nature, l'artiste et le scientifique se retrouvent autour d'une même curiosité. Toutefois, il ne faut pas réduire la place de l'art dans la science à de l'illustration. L'art est un langage à part entière, dont la place dans la société n'est plus à présenter. Ce qui n'empêche pas de considérer l'art comme un outil, qui pourrait permettre à la science de devenir plus accessible au grand public.

Par le biais de cette chronique, nous souhaitons mettre en lumière les liens forts qui relient la science à l'art, sous

toutes ses formes. Nous vous proposerons dans les prochaines éditions, des articles faisant état des expositions en cours, des illustrateurs phare ou incontournables, des œuvres classiques conjuguant l'art sous ses formes diverses à la science botanique au sens large.

~~~~~~~~~~~



**Photo 1.** Les *Screaming Eagles* autour du tambour



**Photo 2.** Richard Kistabish



**Photo 3.** Les membres du groupe *The Northern Light*



**Photo 4.** Photo candidate au concours photo *Vieux Peuplements*
~~~~~~~~~~~



**Photo 5.** Exposition *La résilience des végétaux*

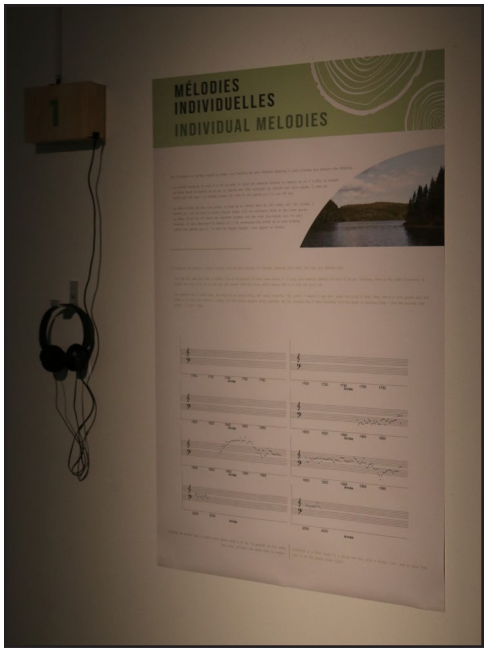



**Photo 6.** Exposition *Les symphonies boréales*

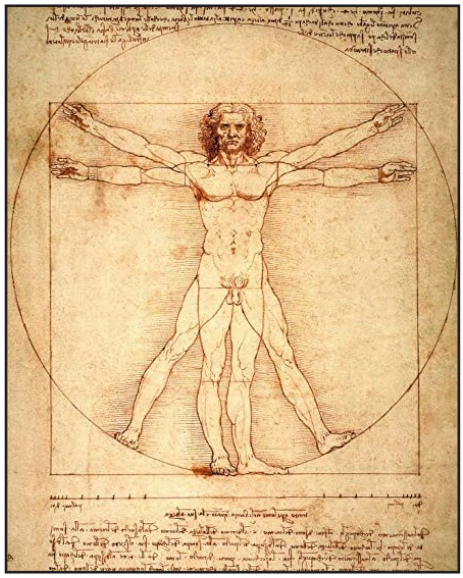


**Photo 8.** *L'Homme de Vitruve* de Léonard De Vinci

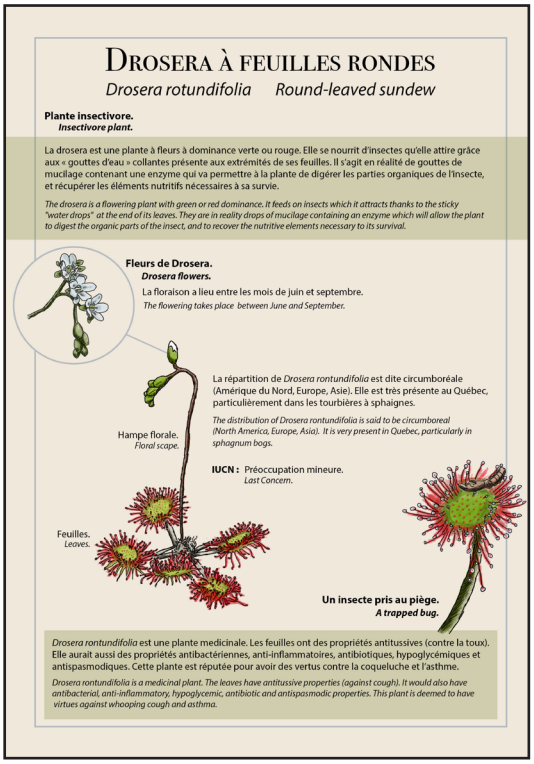



**Photo 7**. (gauche) Planche de vulgarisation pour l'espèce *Drosera rotundifolia*

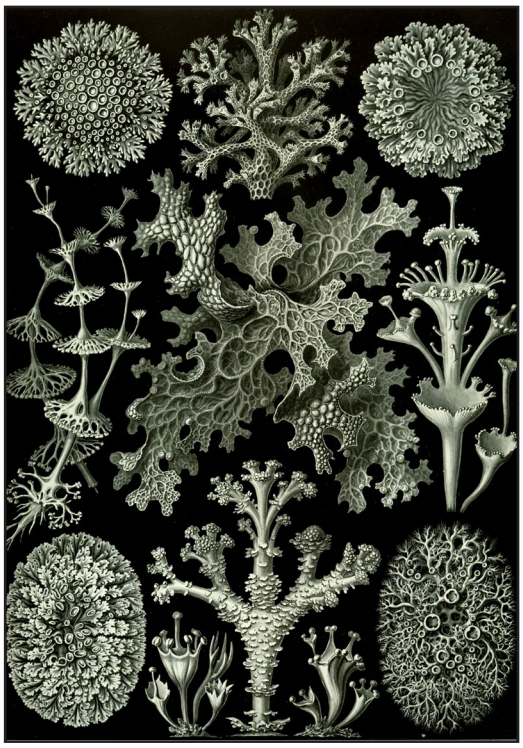
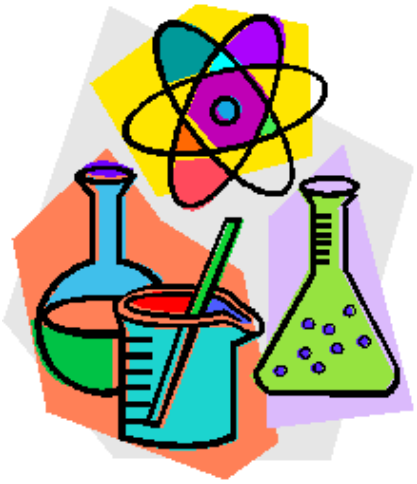


**Photo 9.** (droit) *Lichens* de Ernst Haeckel

# Scientifiquement *Artistique*



## Chronicle 1: A look back at the place of the arts in science at the ABC 2022 conference

By *The Juls*... Julie Arseneault & Julia Morarin

[To conserve space, the images referred to in the text have been placed above, between the French and English versions.]

***A botany conference with an artistic twist***

The CBA annual conference represents a privileged moment for its members to exchange with passion on cutting-edge research topics. The participants of the 2022 edition at UQAT in Rouyn-Noranda, Qc. last June could see that a great deal of space was given to art and to local artists. The question that comes to mind is the following: *Why make room for art in a scientific conference?* When we asked this question to Nicole Fenton (organizer of the conference and past-president of the CBA), here is word-for-word what she said to us: "*Because for me, art and botany go together naturally. There is no more reason than that.*" It is true that in botany, the illustration plates for example, constitute tools of reference impossible to circumvent and can be true works of art. We therefore wanted to stimulate not only our critical sense, but also our artistic sense in order to offer the most holistic experience possible.

Thus, three artistic exhibitions, which you will find described below, took place within the conference. But it should be noted that Art (with a capital A) was also invited on many other occasions. At the opening ceremony, the Art took place with the musical performance of the percussion group from the Algonquin Anishnabe community of Lac Simon, the *Screaming Eagles* (see photo 1: the *Screaming Eagle*s around the drum). The four members of the troupe who were present punctuated the inspiring speech of Mr. Richard Kistabish (see photo 2: Richard Kistabish), an Elder of the Pikogan community. Their music, rooted in tradition, moved us and reminded us of the importance of being grateful for the resources offered by nature. Mr. Kistabish ended his speech by inviting us to participate in a traditional dance to thank the land.

You can see and hear the *Screaming Eagles* by following this link: https://fb.watch/ezBT-1UGs6/ https://youtu.be/sdYAvvIDOzw.

To continue with the music, the band *Northern Light* provided the ambiance for the closing banquet (see photo 3: the members of *Northern Light*). Their music created an atmosphere propitious to celebration and exchange among the guests while they enjoyed the menu creatively concocted by the renowned Chef Jézabel Pilote and featuring many regional products.

As a complement to the symposium on old growth forests, a photo contest was offered to the members of the association (see photo 4: a picture submitted to the contest). About twenty photos were submitted to the jury. Winning picture was submitted by Mélanie Jean and is entitled: 7-forêt acadienne. A second prize will be announced soon for picture 15: Ancient forests in Laojun Mountain by Xiangbo Yin. Visit the conference website to see all the photos submitted to the contest: https://abc-cba2022.uqat.ca/art-picture-gallery.php?lang=fr

Finally, a special mention for the auction, which raised over $2,000 to help finance student scholarships. The illustrations sold during this event alone brought in over $600. This proves that art is a field that is greatly appreciated by scientists!

***Exhibitions: big stars***

Three exhibitions inspired by both the arts and sciences, but very different from each other, were presented during the conference for the pleasure of the eyes and ears. Did you visit them all? If not, we propose you a short descriptive return to them. If the answer is yes, you will find below complementary information and feedback from the artists following the conference.

***First exhibition: The resilience of plants***

You couldn't miss this one because it was located in the dining room. However, if you were sleeping during your meal break, we remind you that these were sculptures made by the artist Émilie B Côté, originally from Témiscamingue (Quebec) (see photo 5: Exhibition: The Resilience of Plants).

"*Deeply rooted in her rural region and inspired by its singularities, the artist's reflection gravitates essentially on the essence of the human being in relation to the territory he inhabits.*"

Because of the artist's creativity, it is obvious that these works made us question ourselves. On several occasions, we caught people crouching, or leaning (with great flexibility certainly) on these intriguing and inspiring works.

Indeed, well-aware of the socio-climatic issues that affect us, Emilie has taken the opportunity to use her art to make us aware and to offer us a loose reflection on these subjects.

"*In an installation approach, she tries to create poetic pieces that reflect on our human condition, what binds us to our habitat and the mutations that it undergoes. She is interested in and questions the organizational systems that are put in place to denature the environment for practical purposes and highlights the struggle of the plant kingdom in an environment increasingly subject to the pressures of human presence.*"

Émilie will be exhibiting at Le Rift art gallery in Ville-Marie from September 30 to November 19, 2022, with an exhibition entitled "La mémoire des ruines."

This link will take you to a video of the exhibition recorded by the artist during the installation of the works https://fb.watch/ezF4Cwj4a_/

***Second exhibition: The Boreal Symphonies***

The exhibition entitled The Boreal Symphonies takes us into a completely different type of artistic representation: music. This exhibition represents the joint work of a team of artists and scientists and originates from a desire to merge arts and sciences, in order to popularize Maxence Martin's research subject in ecology: the dynamics and diversity of Canada's old-growth boreal forests.

"*It is a scientific, pedagogical, and humanistic commitment, where we seek to make the spectator feel the complexity and the vitality of these ecosystems so that he can understand by himself their importance.*"

The original use of the size of the tree rings to produce notes (high pitched when the growth is strong and low pitched when it is reduced) allows the production of melodies of harmonic variations which testify to the dynamics of growth of each of these stands (Photo 6: Installation of the exhibition The Boreal Symphonies)

"***This project consists in giving a voice to these forests, allowing them to sing their history by themselves. Symphonies boréales acts as an intermediary, proposing an intimate and unique connection with multi-centennial forests.***"

Yannick Plamondon and Benoît Fortier of the Conservatoire de musique de Québec have adapted the symphony from one of these old-growth forests, which was performed by the Orchestre Symphonique du Saguenay-Lac-Saint-Jean. You can view a recording of their performance by following this link: https://www.youtube.com/watch?v=XXt4VMj40P0

A virtual reality project bringing the spectator directly into the boreal forests is under development by Maxence and his collaborators, we will surely talk to you about it in the future!

***Third exhibition: Biodiversity Atlas: Wetlands - Chapter 1***

If you don't mind, for this last exhibition description and analysis, I will write in the first person. After all, I am also one of the authors of this exhibit (it's a small world, isn't it?).

If there's one thing I didn't expect, it's the number of positive and constructive comments I was lucky enough to receive following this exhibition!

As a reminder, based on a principle of popularization of science, this exhibition invited you to discover (or rediscover) key plant species of the peat bogs of Quebec, through illustrations and a podcast (see photo 7: Illustration for the species *Drosera rotundifolia*).

I was lucky enough to receive these beautiful comments from professionals in the field, but also from people who came simply to visit an exhibition on biodiversity. All this allowed me to realize how much popularization is essential in our societies, to educate, and to face the current socio-climatic problems. According to them, the professionals of the field are themselves fond of it! You will tell me that there are already some magazines that popularize science for the general public, and you will be right! But very few people (if any) popularize the science produced directly in universities. We often must wait months or even years to see the results of a research in a popular magazine. And even then, this only works for the most successful scientific papers. But what about the day-to-day academic research, the research "in the making"? What about all those papers, PhDs, Masters, etc. that never reach the general public? If you ask me this question, I will answer you that it is a question of knowledge that is too often forgotten, to which I hope, in my own way, to be able to give a little color

To discover the first episodes of the podcast (in French only, for the moment), go here: https://open.spotify.com/episode/3vOuGAAmsStowUj9IvcEmD?si=3e80a91a750c480b

or here: https://podcasts.apple.com/fr/podcast/les-tourbi%C3%A8res-toute-une-histoire/id1627283062?fbclid=IwAR1Zas8ggmzwCyf8hfsMWFkcsgnt-dyeJPsZzg7cUmKfF1PLriGPiFI7h98

***A forum for reflection on the place of the arts in science***

What if someone asked you, what place do the arts have in science? What would you answer?

Contrary to popular belief, art has always had a place in science. On the other hand, science has always been an inexhaustible source of inspiration for artists. However, it is a subject that is still debated today.

Already in the 15th century, the famous Leonardo Da Vinci used his art to illustrate his research (see photo 8: *The Vitruvian Man* by Leonardo da Vinci). Later, in the 19th century, the biologist and philosopher Ernst Haeckel, considered to be the "father of ecology", chose to illustrate the numerous new species he described (see photo 9: *Lichens* by Ernst Haeckel). It is obvious that, in front of nature, the artist and the scientist meet around the same curiosity. However, one should not reduce the place of art in science to illustration. Art is a language in its own right, whose place in society is no longer to be presented. This does not prevent us from considering art as a tool, which could allow science to become more accessible to the general public.

Through this column, we wish to highlight the strong links between science and art, in all its forms. In the next editions, we will present articles reporting on current exhibitions, on leading or essential illustrators, on the classic works combining art in its various forms with botanical science in the broad sense.

# Section Reports

## Ecology & Conservation

The Ecology and Conservation Section has been very active the past few months, mostly in relation to the 2022 CBA meeting. The Section awarded the 2022 J Stan Rowe Award for the best paper in plant ecology to Marie Renaudin. An Honorary Mention was given to Jon Urgoiti. [*Ed: See conference awards section for more details.*] Congratulations, Marie and Jon! Thank you to those Section members who helped to judge the many award submissions this year from a wide range of studies in plant ecology. The award was established to celebrate the life and work of eminent Canadian plant ecologist, Stan Rowe, and provides a $500 prize to the winner.

This year, with the assistance of André Arsenault, the Section held a symposium on old-growth forests titled, "Vanishing old-growth forests in Canada: A symposium on their ecology and value for society". There were five invited speakers from across Canada, including André, who provided their vast experience on the topic. These were, Marianne Ignace (Simon Fraser University), Trevor Goward (University of British Columbia Herbarium, Beaty Museum), Maxence Martin (Université du Québec en Abitibi-Témiscamingue / Université du Québec à Chicoutimi), Darwyn Coxson (University of Northern British Columbia), and André Arsenault (Canadian Forest Service, Natural Resources Canada). The Section extends a sincere thank-you to all symposium participants and also to the technicians who ensured the symposium ran smoothly.

An "old-growth photo contest" was launched to accompany the symposium, and was produced for the meeting website by Daniel Lesieur. Daniel provided exceptional assistance in many aspects of meeting planning. The winning photo was "*Forêt acadienne*", taken by Mélanie Jean, with a second prize for "*Ancient forests in Laojun Mountain*", taken by Xiangbo Yin. The prizes were announced at the meeting banquet. Contest entries can still be viewed on the meeting website here: https://abc-cba2022.uqat.ca/art-picture-gallery.php?lang=en.

An Ecology and Conservation Section meeting was during the meeting, and included preliminary discussion about Section plans for the 2023 meeting to be held in Winnipeg. Thank you to everyone who attended and contributed to the discussion.

~Richard Caners

## Teaching

The teaching section had a meeting at the CBA conference with eight people in attendance. Laura Super chaired the meeting, Jennifer Doubt took notes, and all the participants helped with the meeting. Section report that was prepared by Patrick von Aderkas was read aloud by Laura on Zoom to the other participants who were in person. The website is soon going to be translated into French by Frédérique Guinel. The Kindness Project that has some CBA members was also mentioned. There was a discussion to make sure to promote the Magister award. Arunika Gunawardena reminded the group about the student videos on the website and that a small development grant would help with this. Other topics discussed were more potential workshops or symposia for the next meeting, a mentorship program, better linking IDEA (inclusion, diversity, equity, and accessibility) and having more opportunities to foster and promote Indigenous knowledge in a way that is respectful. Laura Super also mentioned briefly this year's CBA teaching workshop.

At this year's conference, Laura Super, who is Co-Chair of the CBA Teaching Section with Patrick von Aderkas, facilitated a hybrid workshop on Zoom with participants in person. The topic was on Science, Technology, Engineering, Mathematics and the Arts (STEAM) to help plant science teaching and research for K-12 to post-secondary. It was an interactive workshop, with attendance of around 20 people, ranging from students to professors. Participants discussed, as well as did mini activities, such examining a standard slide to think about converting it into a poem. We also watched a video and discussed embodied learning, using song and movement to improve learner understanding and engagement.

~Laura Super & Patrick von Aderkas

## Development

The Development Section presented a successful symposium on The Environmental Responses of Trees on Monday, June 6th as part of the annual meeting in Rouyn-Noranda. Three invited speakers and two presenters selected from submitted abstracts gave excellent talks.

A section meeting was held on Tuesday, June 7th. The meeting was chaired by Elizabeth Schultz (by Zoom at the University of Lethbridge) and attended, in-person and virtually, by students and faculty across Canada. Minutes were kindly recorded by Moira Galway.

The co-chairs reported that two excellent submissions had been received for the Taylor A. Steeves Award for best student paper in plant development, structure, or morphology. This year's winner was Sam Livingston from the University of British Columbia. Here is a link to the winning paper.

The co-chairs are in the process of expanding a nation-wide database of plant developmental biologists initiated by Frederique Guinel in 2021. If there have been new hires in your Department who study any aspect of plant development – please let us know! Our intention is to invite non-members to join the CBA-ABC by raising awareness about our society activities and opportunities for students. A mailing is planned for some time in early 2023.

The broad scope of plant development research our members is not currently reflected in our section name. A poll, circulated in spring 2022, indicated strong support for updating the name of our section. A number of suggestions were made, and a follow-up survey will be sent in the spring of 2023 with the goal of selecting a new name. A vote will take place at the next section meeting.

In 2023, the CBA-ABC will meet in Winnipeg along with CSEE, Canadian Society for Ecology and Evolution. The section plans to host a symposium on the topic of evolution and plant development. If you would like to help organize this symposium or suggest a speaker, please contact the co-chairs.

~Elizabeth Schultz & Shelley Hepworth

## Systematics & Phytogeography

With the retirement of Geraldine Allen from the University of Victoria, we have a new section co-chair, Jeff Saarela from the Canadian Museum of Nature. We want to thank Geraldine for her years of service to the CBA-ABC and the Systematics and Phytogeography section in particular.

We did not offer the Porsild-Consaul award this year due to lack of submissions, despite a deadline extension and wide advertising in social media. We agreed to offer two awards next year. Please consider putting forward a nomination for this award next year, when the call comes.

During the Systematics and Phytogeography section meeting during the annual meeting, we had a vigorous discussion about possibly changing the section's name. Participants proposed several names, including: "Taxonomy, Systematics and Evolution", "Systematics and Floristics", "Plant diversity: Taxonomy, Evolution and Floristics", "Systematics: Taxonomy, Evolution and Floristics", and simply, "Systematics." Although we did not make a decision about the name during the meeting, one thing was clear: most members were not committed to keeping "Phytogeography" as part of the section's name. We aim to continue this discussion and collectively make a decision about the section name in the coming months. To stimulate discussion among members on this or any other subject of interest to the section's membership, we have created a Google group mailing list. Simply use the email address cba_systematics@googlegroups.com to automatically reach all active section members. If you want to be added to the group, please contact Julissa (jroncal@mun.ca).

We are starting to discuss the possibility of a joint symposium with the Canadian Society for Ecology and Evolution

(CSEE), with whom we will be meeting in Winnipeg next year. Ideas? Please use the email addresses above.

During our annual meeting, we also talked about updating the Canadian Herbarium Digitisation Excel sheet created by Anne Bruneau and colleagues that was published in the CBA Bulletin in fall 2020. We need to include information about the curators and their contact information, the threats or concerns each herbarium is facing, and current or past grants to support herbarium activities. If you are a herbarium curator or director in Canada please add your information here:

https://docs.google.com/spreadsheets/d/1WVWJNxC2EiD0FqWnobNk78srZQnY4HZzyKqMzm_3kmc/edit#gid=0

~ Julissa Roncal & Jeff Saarela

[*Editor's Note: The Mycology Section update for this issue takes the form of the article that follows on the next page, interviewing two Canadian mycologists.*]

---





Some of the flora of Rouyn-Noranda.
Photos by Mihai Costea

# The Past, Present, & Future of Two Canadian Mycologists

A career in mycology often begins with passion, continues with hard work, and probably ends with unsolved questions. Throughout the process, the passion evolves, the perspective changes, and the way researchers mycologize changes during their career. What is the difference between an experienced researcher who spreads their knowledge with wisdom and a young creative researcher who demonstrates tenacity? Are they so different? Does passion give way to reason? Are the aspirations and inspirations the same? Here we try to answer these questions by portraying two mycologists, one at the beginning and one at the end of their career. Dr. Melanie Jones is a retired Professor from the University of British Columbia – Okanagan. Jonathan Cazabonne is a Master's student at the Université du Québec en Abitibi-Témiscamingue. Let's see what they have to teach us about the evolution of a mycologist's career!

~Mélissande Nagati & Allison Walker, CBA Mycology Section

## Melanie Jones

*How did you get your start in mycology?*



Melanie Jones

I did my honours thesis research in Dennis Parkinson's soil ecology lab at the University of Calgary. Although my project did not involve mycology, several of the graduate students were studying the fungal communities involved in decomposing plant litter. I was surprised at how beautiful the fungal cultures were on the plates. Then, I had the opportunity to study the role of ectomycorrhizal fungi in metal tolerance of birch trees growing on an abandoned ore roasting bed near Sudbury. As part of my course work, I took my first mycology course at the University of Toronto from Dave Malloch and Michele Heath.

*Who were your mentors?*

Because no one else in the department was studying ectomycorrhizae, Larry Peterson from the University of Guelph became an important mentor for me. While I didn't think consciously about it at the time, having Michele Heath, Nancy Dengler, Verna Higgins, and Pam Stokes as successful female scientist role models in the department likely influenced my career trajectory. My post-doc supervisor at Oxford, Bernard Tinker, was a real critical thinker and I learned a lot from him about experimental design and science writing.

*What are you working on now, and what most excites you about fungi?*

I have a long-standing interest in how ectomycorrhizal fungi respond to disturbance – both natural and anthropogenic. Several students are examining how soil fungal communities respond to severe wildfire, how this affects early colonization of pine seedlings, and whether we can pick up any response to ectomycorrhization by natural germinants in the field. We are finding that ectomycorrhizal fungal communities are quite robust in response to disturbance, as long as new hosts are present soon after the disturbance. Another fun project is that we are revisiting a silviculture systems trial established in 1994 in a high elevation forest to investigate response of the ecosystem to clearcuts of different sizes. In the mid-90s, my first graduate student, Shannon Hagerman, found that ectomycorrhizal fungal inoculum decreased substantially in the parts of the clearcuts that were beyond the reach of the root systems of the remaining forest trees. Twenty-eight years later, several students are now

examining whether the forest fungal community has expanded further into the cutblocks.

Forest fungi are fascinating because they are, at the same time, both micro-organisms and macro-organisms. They play a huge role in carbon cycling in forest soils and can be very long-lived. While individual hyphae can be ephemeral, individual genets can be very long-lived.

*What is your favorite mushroom and why?*

I like all *Laccaria* species. They seem to be very resistant to disturbance so they are important early colonizers.

*What is the best place you visited to study fungi?*

This might seem like an odd answer, but the O'Donnell Roast Yard, where I sampled mushrooms for my PhD research was most fascinating. It was so stark, yet the birch trees and their associated ectomycorrhizal fungi could survive. And as my lab work showed, it really was a mutualist association because some of the fungi were not metal-tolerant unless associated with the birch.

*Any advice for a young mycologist?*

Keep connected with fellow Canadian mycologists. Mycology is a great field because people are so passionate about fungi and so ready to help anyone else who is interested in them. Find a system that fascinates you and you will have a life-time of questions to keep you busy, but remain sceptical about your results. Always think of alternative explanations.

*How do you mycologize as a retired person?*

It's true that retired mycologists never stop studying fungi, isn't it? My husband and colleague, Dan Durall, is going to start to document mushrooms fruiting in the Okanagan Valley. It is an understudied area because it is so hot and dry; therefore, we expect to document some new species. My research has been mostly lab-based, so I look forward to spending time in the field with him learning to ID and photograph mushrooms.

## Jonathan Cazabonne

*How did you get your start in mycology?*



Jonathan Cazabonne

If my memory serves me right, I must have had my first encounter with the term "fungi" during my high school years, in France; but I really discovered the world of mycology during my Higher School Preparatory Classes. I had a few lectures about fungal ecology and a lot about molecular and cellular biology. A large part of the program was dealing with fungi-plant interactions. It was a good start, a fairly complete first step in what would later become my passion. Our biology teacher, Mrs. Bertrand, used to make huge and impressive synthesis diagrams to end a chapter of the program. I still remember the one on mycorrhizae (I always wondered how she managed to fit so much readable information into so little space on the blackboard). It was at this point in my life that I started to 'fall into the mycological soup.' This world (that was still so unknown to me) had a such hold on me that I left my preparatory classes to go to university (Paul Sabatier, Toulouse, France) with the constant idea of doing research in mycology. And since then, everything has accelerated at high speed!

*Who are your mentors?*

Without hesitation, I would say that the people I consider my mentors are those who introduced me to mycology in all its aspects, from fungal ecology and diversity to fungal phylogeny and taxonomy. These mentors are Monique Gardes, Patricia Jargeat and Hervé Gryta. They all work at the Evolution and Biological Diversity (EDB) laboratory based at Paul Sabatier University in Toulouse. They gave me the keys and opportunities to develop my passion and started me on the path I'm currently on. Regarding taxonomic matters, I especially consider Guillaume Eyssartier – research associate at the National History Museum of Paris (MNHN) - as one of my mentors for his great help and support in my early days in fungal taxonomy. Finally, I must say that it is also possible to consider someone a mentor even if you have never met him in person. I'm thinking of Danny Haelewaters, with whom I had first contact when I was looking for European masters and mycology research groups. I was amazed by all his work on Laboulbeniales. Alongside his ideas, enthusiasm, and passion, I was able to publish one of my very first articles. He's definitely a great source of inspiration for me and I hope we can meet someday!

*What are you working on now, and what most excites you about fungi?*

Within the framework of my master's degree at the University of Quebec in Abitibi-Témiscamingue (UQAT), I'm studying fungal communities that we found in esker forests in the Abitibi region, in North-Western Quebec. These ecosystems are under-studied and under-prospected and there is so much to learn about their associated fungi in terms of diversity, ecology, and taxonomy. This project is particularly close to my heart since the local esker situation is currently quite dramatic. Just to give a bit of context, eskers are geological formations formed by the deposit of sand and gravel from glaciers during the last ice age. They represent a very stressful environment, i.e., hydric stress, low nutrient content and acidic soil. One of the most abundant plant species on the esker is the jack pine (*Pinus banksiana* Lamb.). However, they have been heavily exploited for decades for road construction and wood production, while almost nothing is known about what is found there in terms of fungi and their role in the functioning of these unknown ecosystems. Apart from that, I have various projects with different collaborators mainly dealing with fungal ecology and taxonomy issues. On the other hand, I also carry out several scientific popularization projects applied to mycology and I'm currently part of an academic initiative to connect forest ecology and literature research.

I think the most exciting thing about working on fungi is knowing that we are trying to understand organisms and explain ecological processes that are beyond us. Studying fungi makes you therefore humble. It can be hard sometimes to realize we can now, thanks to the emergence of molecular biology, study fungi that we don't even see (e.g., soil fungal communities).

*What is your favorite mushroom and why?*

What a difficult question! Even if I'm tempted to answer that 'all mushrooms are my favourites,' I have one group in mind that particularly stands out for me: entomopathogenic fungi. I've always been interested in the interactions between fungi and other organisms. Some of them are lacking documentation and when you start digging, you realize how much diversity and complexity you can find in microscopic things.

*What is the place where you dream of studying fungi?*

As I've already had some experience with Mediterranean and North American fungi, I would very much like to work in tropical ecosystems (though not exclusively) in the future. The idea of going on mycological expeditions to New Caledonia, Tahiti and Papua New Guinea is appealing to me. We know so little about their fungal diversity and a real lack of fungal taxonomists and expeditions strengthens my will to contribute to our limited knowledge associated with these under-prospected areas of the world.

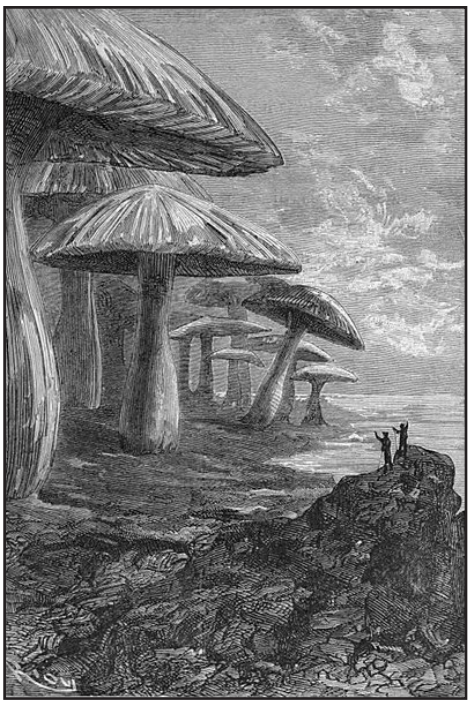
*What question would you like to ask a retiree?*

This is a broad one, but it would be: "According to you, how would you assess the evolution of mycology since the beginning of your career?"

*What are your mycological goals?*

My involvement in the field of mycology, and therefore my goals, are to fill the knowledge gap on these organisms that make up our world as we know it, to make their importance known on the scientific, media and political scene, and to transmit my passion and my knowledge to the general public in order to make them aware of this world that can frighten many, but which in the end is destined to amaze all minds.

*Is there a piece of art including mushrooms that you find inspiring or that you want to share to our readers?*



I'm generally really impressed by pieces of art depicting landscapes that we can call 'mushroom forests,' *i.e*., where the organisms that can reach tens of meters in height are not trees, but fungi. This corresponds perfectly to my vision of what a forest really is, an ecosystem governed by fungi, not by plants. I especially remember the first vision of what a 'mushroom forest' can look like when I first lay my eyes on Edouard Riou's illustration for the original edition of *Journey to the Center of the Earth*, written by Jules Verne. Some would say that this vision is totally fantasized and is acceptable as long as it remains in the category of imagination. However, let's not forget that about 400 million years ago, carpophores of individuals belonging to the genus *Prototaxite* could reach up to 8 meters in height (according to our current knowledge). This is bound to put us in perspective, and to consider that the idea of a world dominated by giant fungi is not so absurd. So is the idea that our current world is still dominated by fungi, most of which are invisible to our eyes.

# Fieldwork Photos from the McCune Lab – Summer 2022



University of Lethbridge PhD student Emma Neigel demonstrates planting technique for experimental translocations of wood-poppy (*Stylophorum diphyllum*) in southern Ontario. Emma is testing whether species distribution models can be used to target suitable habitat for establishing safeguarded populations of plant species-at-risk on protected lands.

University of Lethbridge PhD student Amy Wiedenfeld carefully censusing one of the five known populations of wood-poppy (*Stylophorum diphyllum*) in southern Ontario. Amy is building demographic models of three plant species-at-risk and linking vital rates to local and landscape factors.





Tags mark three wood-poppy seedlings, so that seedling survival rates over time can be quantified.

# CBA Annual Meeting 2022

By Nicole Fenton

The annual conference of the Canadian Botanical Association (CBA) was held at the Rouyn-Noranda campus of UQAT from June 5th to 9th. More than 100 people, members and non-members of the CBA-ABC, came to the conference, as well as about 40 people who participated via video-conference.

Many activities were offered during the five days of the event. On the first day, over 30 participants had the opportunity to attend one of three workshops: introduction to bryology, plant and soil relationships in the Clay Belt, and using genomics to identify species. The day ended with an opening ceremony that acknowledged the long and living history of plant knowledge of the indigenous peoples in the region, featuring elder Oskar Kistabish from the Abitibiwinni First Nation and the drumming group the Screaming Eagles from the Lac Simon First Nation.

The next three days featured a series of talks (59), posters (41) and symposia presented by students and researchers from across Canada. Two symposia, organized by the plant development and ecology/conservation sections of the CBA, focused on development in trees and how it is influenced by the environment, and old-growth forest ecology. The old-growth symposia was accompanied by a photo contest (https://abc-cba2022.uqat.ca/art-picture-gallery.php?lang=en) won by Mélanie Jean with her picture of the Acadian forest.

In addition to the thematic lectures, four keynote speakers also gave presentations on their areas of research. Three speakers explored different areas of root and mycorrhizal research: Melanie Jones from the University of British Columbia, Mélanie Roy from Université Paul Sabatier, and and Annie DesRochers from UQAT. Arunika Gunawardena from Dalhousie University gave her Magister talk on inspiring students to pursue plant-based careers. Dr. Gunwardena won the Magister award in 2016 for her outstanding career as a teacher in botany.

On the third day of the conference, in-person participants had the opportunity to travel to Abitibi-Ouest to visit the Lake Duparquet Teaching and Research Forest research station (https://ferld.uqat.ca/). Different kiosks showed the type of research carried out at the research forest and the history of the area. At the end of the day, participants were treated to a feast at the village church in Rapide-Danseur. The evening concluded with the traditional auction of various donated botanical objects, books and illustrations to raise money for student travel bursaries. A particular thanks goes to John Markham, who accepted to fill the gargantuan shoes of Hugues Massicotte, auctioneer for several decades. John did an outstanding job and we hope he continues in this role for some time! A record breaking $2000 was raised during the event. Thanks to everyone!



Photo by Mélissande Nagati

A delightful banquet was held on the evening of the 8th of June, followed by an awards ceremony and live music. Despite the late night, many participants joined one of the three field trips available: Parc Opémican in southern Témiscamingue, foraging with the Timiskaming First Nation and their organisation the Wild Basket, and the Kékéko Hills just outside of Rouyn-Noranda, local biodiversity hotspot and paleo-island.

Thanks to all the participants who made the event a resounding success!

## The Lawson Medal

The Lawson Medal, the most prestigious award of the Canadian Botanical Association, was established "to provide a collective, formal expression of the admiration and respect of botanists in Canada for excellence in the contribution of an individual to Canadian botany." The 2022 winner of the Lawson Medal (category B for a career in Botany) is Dr. Suzanne Simard of the University of British Columbia. Dr. Simard has become a household name in a large portion of the world as her pioneering work revolutionized understanding of underground interactions and how they are studied. Specifically, her basic and applied research has greatly improved scientific knowledge of the role of below-ground mycorrhizal networks in creating resource bridges among trees in the forest, demonstrating these connections exist even among trees of different species, and translating findings from this research into recommendations for modifications to forest management practices in a rapidly changing climate. She has 180 research publications, which have garnered 8463 citations. Furthermore, Dr. Simard is described as a dynamic and effective instructor, who "inspires students through hands-on learning experiences focused on problem-solving in the field." For this work she received the Killiam Teaching Award in 2006 from UBC.

*Dr. George Lawson (1827–1895) was born in Scotland. He obtained his Ph.D. from the University of Giessen in Germany in 1857. The following year, he accepted an appointment as Professor of Chemistry and Natural History at Queen's College (now University) in Kingston, Ontario. He was instrumental in the foundation of the Botanical Society of Canada, which met from 1860 until 1862. In 1863, Lawson abruptly left Queen's for Dalhousie. At Dalhousie he was active in the Nova Scotia Institute of Science and was a founding fellow of the Royal Society of Canada. From 1885-1895, he was Secretary of Agriculture for Nova Scotia. In 1891 he helped to establish the Botanical Club of Canada (1891-1910) and was its President until his death.*

---



CBA members enjoy a meal and auction with new auctioneer John Markham during the annual conference.

Photo by Mélissande Nagati.

## Mary Elliot Award




This award, named in memory of Mary E. Elliott, recognizes the meritorious service of an individual to CBA-ABC. The 2022 winner was Dr. Selvadurai Dayanadan (Daya) who is a full professor at the University of Concordia. Daya served as the Association's webmaster for a decade, taking over the role from Joe Gerrath, in 2007, also sitting as a board member from 2007 to 2011. Daya was Vice President in 2006 when the Association's Annual meeting took place at Concordia University. In addition to his direct role in the CBA, Daya also served as an associate editor of Botany and has been a regular attendee at CBA meetings. In fact, regular meeting attendees have undoubtably spotted and chatted with Daya as he makes a point of meeting and discussing with the most CBA-ABC members possible during these meetings. Personally, I remember Daya from my student days when he encouraged me to continue with my work, and as a member of the CBA. Daya is a representation of the open, encouraging culture of the CBA and is very deserving of the 2022 Mary E. Elliott Award. Daya not only came to the conference to accept the award in person despite a very busy week where he was also awarded with the Concordia Academic Leadership Award, he also brought his two sons who are embarking on careers of their own in Botany.



The beautiful plaque of spalted bird's eye Big Leaf Maple hand carved by David Sweet represents Daya's research on the genetic characteristics of trees, particularly of Populus and Betula spp.

*Mary Elizabeth Elliott (1923-1976) was a plant pathologist and mycologist who spent 28 years with Agriculture and Agri-Food Canada Ottawa first as a student, then as a research technician and research scientist. Well-known for her work on the taxonomy and physiology of the Sclerotiniaceae, she was also knowledgeable in the identification of mushrooms, a service she offered regularly to the public. In 1975, she became Curator of the National Mycological Herbarium (DAOM). An active member of several mycology and phytopathology societies, she was successively Secretary (1972), Vice-President (1974), and President (1975) of CBA/ABC. She was just at the beginning her term as Past President at the time of her death in 1976.*

## Stan Rowe Award

The ecology section is pleased to announce that there were eight excellent submissions to the Stan Rowe Award for best student paper in ecology in 2022. The judges (Zoe Panchen, John Markham, and Richard Caners) decided there should be a Winner and also an Honorable Mention this year, as two submissions stood out from the overall excellent papers.



Marie Renaudin

Winner: Marie Renaudin

Marie Renaudin, Charlotte Blasi, Robert L. Bradley, Jean-Philippe Bellenger. 2022. *New insights into the drivers of moss-associated nitrogen fixation and cyanobacterial biomass in the eastern Canadian boreal forest.* Journal of Ecology https://doi.org/10.1111/1365-2745.13881

Honorable Mention: Jon Urgoiti

Jon Urgoiti, Christian Messier, William S. Keeton, Peter B. Reich, Dominique Gravel, Alain Paquette. 2022. *No complementarity no gain—Net diversity effects on tree productivity occur once complementarity emerges during early stand development*. Ecology Letters https://doi.org/10.1111/ele.13959



Jon Urgoiti

*John Stanley Rowe was a botanist and ecologist (1918 -2004). He worked as a research officer on the Prairies with the federal Department of Forestry from 1948 to 1967, when he became professor of plant ecology at the University of Saskatchewan. In his work on the ecology of the boreal forest, tundra and peatlands, his treatise, Forest Regions of Canada (1959, 1972) is a key reference for foresters, biologists and land managers.*

## Luella Weresub Award




Jonathan Mack

The 2022 judges of the Weresub award (Greg Thorn, Gavin Kernaghan, Mélissande Nagati, Allison Walker) are delighted to announce that there are two co-winners of the award in 2022:

Co-Winner: Jonathan Mack

Mack, J., Assabgui, R. A., & Seifert, K. A. (2021). *Taxonomy and phylogeny of the basidiomycetous hyphomycete genus Hormomyces.* Fungal systematics and evolution, 7(1), 177-196.



Philip Bell-Doyon

Co-Winner: Philip Bell-Doyon

Bell-Doyon, P., Selva, S. B., & McMullin, R. T. (2021). *Calicioid fungi and lichens from an unprotected intact forest ecosystem in Québec*. Écoscience, 28(2), 127-136.

*Luella Kayla Weresub (1918-1979), mycologist renowned for her works on resupinate hymenomycetes, pursued her career as a research scientist at Agriculture and Agri-Food Canada Ottawa from 1957 to 1979 after three years as professor at the University of Manitoba in Winnipeg. Her mastery of the International Code of Botanical Nomenclature, especially fungal nomenclature of pleomorphic fungi, led her to serve as an expert on committees such as the International Association*

*for Plant Taxonomy's Nomenclature and the International Mycological Associations' Nomenclature committee. Her entire career was devoted to the study of pleomorphic fungi, mainly Ascomycetes, for which she applied the anamorph-teleomorph concept in a bio-geographical and taxonomic context. An active member of CBA-ABC, she served on the board of directors from 1971 to 1973.*

## Taylor Steeves Award

The judges of the 2022 Steeves award (Shelley Hepworth and Elizabeth Schultz) are pleased to announce that they had two excellent submissions in 2022. While both papers were meritorious, the judges were particularly impressed with the paper of Samuel Livingston in which a variety of techniques including electron microscopy, monosaccharide analysis, and quantitative immune labelling were used to map the development and changing molecular components of specialized cell walls used for storage of metabolites in floral glandular trichomes of *Cannabis sativa* plant.



Sam Livingston

Livingston, SJ., Jeong Bae,E., Unda, F., Hahn, M.G., Mansfield, S.D., Page, J.E., Samuels, A.L. 2021 *Cannabis glandular trichome cell walls undergo remodeling to store specialized metabolites*. Plant & Cell Physiology 62:1944-1962 https://doi.org/10.1093/pcp/pcab127

*Professor Taylor Steeves (1926-2011) was a plant morphologist, anatomist and developmental botanist. He was a faculty member at Harvard University from 1954 to 1959, and then joined the University of Saskatchewan in Saskatoon where he was Professor, Department Head, and retired in 1994. Prof. Steeves worked extensively in the areas of shoot development and vascular tissue differentiation. He was a co-author of two textbooks on Botany and Plant Development, and was Editor of Botanical Gazette (now the International Journal of Plant Sciences) and Canadian Journal of Botany (now Botany). Prof. Steeves was a Founding member of CBA/ABC, served as its President, and received the Mary E. Elliott award and the Lawson Medal from CBA/ABC. He was a Fellow of the Royal Society of Canada.*

## Macoun and Undergraduate Travel Bursaries

The CBA-ABC was very happy to extend Macoun and Undergraduate travel bursaries to ten dedicated students to help with travel expenses to attend the 2022 meeting. Coming from both eastern and western coasts with several stops in between, the awardees represented the diverse disciplines included within the CBA-ABC, from plant development, systematics, and ecology. The winners of the 2022 Macoun Travel bursaries are (in alphabetical order): Faezeh Aliabadi (UBC), Nicole Botten (UNBC), Trinie Chisolm (U of Lethbridge), Shanukie Embuldeniya (Dalhousie), Allie Golt (UNBC), Etienne Lacroix-Carignan (U de Montréal), Christina Rossi (Wilfred Laurier), Sophie Tattie (Dalhousie). The winners of the 2022 Undergraduate Travel Awards are Sohiba Kayol Muhammad (Dalhousie) and Natalie Vuong (Waterloo).

*The John Macoun Travel Bursary is named after explorer and naturalist, John Macoun (1831-1920). From 1868 to 1879, he was a professor of natural history at Albert College in Belleville, Ontario and in 1881, he was appointed Botanist to the Geological and Natural History Survey of Canada. A passionate botanist, he contributed over 100,000 specimens to the herbarium of the National Museum of Canada. In 1882, he published the volume 'Manitoba and the Great North-West,' in which he wrote enthusiastically about the agricultural potential of the Prairies. He was a founding fellow of the Royal Society of Canada. More than 50 plant and animal species have been named in his honour.*



Macoun Award Winners




Above: Annie DesRocher speaks at the annual meeting.



Right: Frédérique Guinel and Deb Metsger on the conference field trip.

# CBA/ABC Student Awards, Rouyn-Noranda, 2022

By Mihai Costea

This was perhaps the most intense student competition I have witnessed at a CBA/ABC annual meeting. About 30 posters and 30 oral presentations participated this year! The large number of participants, combined with the excellent quality of their posters and presentations, made the job of the judges very difficult, and I would like to thank the latter for their help (please see below). We congratulate all the students for delivering amazing poster and oral presentations this year. Please do not be discouraged if you did not win; persevere and try again next year — it may be your turn!

Here are the winners, with a few words from each one of them.

IAIN AND SYLVIA TAYLOR AWARD, BEST POSTER

Proposal Stage: Lucie Barbier, Institut de Recherche sur les Forêts, GREMA, UQAT.

Title : Variabilité environnementale et xylogénèse dans les projections du bilan carbone de la forêt boréale.

Directors (Supervisors): Fabio Gennaretti, Sergio Rossi and Etienne Boucher.

Lucie's words: *I am a PhD student at the UQAT. I work on the link between the environment and the wood formation process, called xylogenesis, and its integration in the MAIDEN model. This project is expected to improve the C-balance projections of the boreal forest in eastern Canada*.



Lucie Barbier

Results Stage: (1) Corey Burt, Wilfrid Laurier University.

Title: Discerning friend from foe: Systematic revision of *Cuscuta* L. section *Indecorae* using a combined ecological, morphometric, and phylogenetic approach.

Supervisor: Mihai Costea

Corey's words: *I use traditional taxonomic practices and combine them with modern molecular techniques to resolve the systematics of a small clade in the genus Cuscuta (Dodder). My primary academic and career interests are field botany, herbarium curation, and plant systematics. After completing this Masters, I will return to work as a Terrestrial Ecologist at WSP Canada Ltd., completing botanical inventories and vegetation community classification across Ontario.*



Corey Burt

Results Stage: (2) Tamara Montoya, Carleton University.

Title: Abscission in plants: composition and function of protective surface layers.

Supervisor: Shelley Hepworth

Tamara's words: *I am a fourth-year biology student at Carleton University. I have been lucky enough to have had the opportunity to work with Professor Hepworth and Professor Rowland over the past three summers to study the formation of protective layers as a part of the abscission process. I have always had a fascination with plants and the natural world. Over the course of my studies, I have come to learn that the*



Tamara Montoya

*visible beauty and complexity of plants is mirrored by intricate systems of control of development at the molecular and cellular level! When I am not in the lab I enjoy knitting, doing botanical art, and spending time outdoors.*

LIONEL CINQ-MARS AWARD, BEST PRESENTATION

Proposal Stage: Étienne Lacroix-Carignan, Institut de Recherche en Biologie Végétale and Département de Sciences Biologiques, Université de Montréal.

Title: Hybridization and species boundaries in *Carex* subsect. *Lupulinae*.

Supervisor: Étienne Léveillé-Bourret.

Étienne's words: *I started a master's degree in September 2021 on the taxonomy of Carex subsect. Lupulinae, a group that has undergone many taxonomic revisions, but still holds many surprises! I am an avid botanist and ecologist, and I am interested in all organisms, even neglected groups like lichens and bryophytes, or difficult genera like hawthorns (Crataegus). I am heavily involved in citizen science organizations such as iNaturalist and FloraQuebeca.*



Étienne Lacroix-Carignan

Results Stage: Béatrice Gervais-Bergeron, Institut de Recherche en Biologie Végétale and Département de Sciences Biologiques, Université de Montréal.

Title: Willow aboveground and belowground traits can predict phytoremediation.

Supervisors: Michel Labrecque and Pierre-Luc Chagnon.

Béatrice's words: *I am fascinated by plants and passionate about phytotechnologies and ecological restoration. I graduated from McGill University with a bachelor's in environmental biology and a specialization in plant science and applied ecology. I started a master's in phytoremediation and fast tracked to a Ph.D. at the Institute of research in Plant Biology (IRBV), affiliated with the University of Montréal.*



Béatrice Gervais-Bergeron

(Very!) Honorable Mention: Simon Morvan, Institut de Recherche en Biologie Végétale and Département de Sciences Biologiques, Université de Montréal.

Title: Thermal pruning on wild blueberries: Effect on the ecosystem, productivity and microbiota.

Supervisors: Mohamed Hijri and Maxime Paré

Simon's words: *My PhD project involves studying the fungal and bacterial communities present in the roots and rhizospheric soil of wild blueberries and to link those communities with wild blueberry performance (yield, growth) and agricultural practices. Wild blueberries represent the top fruit export of the country in terms of value (312 million $CAD in 2020). My research contributes to a better understanding of the crop's microbiome and perhaps could pave the way to bio-inoculation trials (microbe inoculation with beneficial potential). After my PhD, I would like to join a research and development team contributing to sustainable solutions and to the development of innovative methods in the fields of microbiology, bio-inoculants or biological control.*



Simon Morvan

Judges for the Taylor and Cinq-Mars Awards:

Iain and Sylvia Taylor Award, best poster: Andre Arsenault, Etienne Leveille Bouret, Richard Caners, Tim Dickinson, Moira Gallaway, Marta Alonso García, Santokh Singh, Liette Vaseur, Jeff Warren.

Lionel Cinq-Mars Award, best oral presentations: Katharina Braeuthingam, Melanie Jean, Mihai Costea, Jennifer Doubt, Deb Metzger, Melissande Nagati, Juanita Carolina Rodriquez, Julian Starr.

---



CBA members attend the banquet at the annual meeting.

Photos by Moira Galway



# Undergraduate Botany Awards 2022

By Mihai Costea

CBA/ABC also supports and promotes botany at an undergraduate level. Each year prizes are awarded to the best poster and best talk at undergraduate science events held in different regions of Canada. Each award is worth $100, and two awards are available for each of the following regions:

- Atlantic Canada (Newfoundland and Labrador, Nova Scotia, Prince Edward Island, New Brunswick)
- Québec
- Ontario
- Prairies (Manitoba, Saskatchewan and Alberta)
- British Columbia

In 2022, the pandemic took a heavy toll on the ability of different groups and universities to organize undergraduate science events. At a regional level, only Science Atlantic survived this year! Science Atlantic is a charitable organization devoted to encouraging and helping undergraduate students to pursue science in ten disciplines: Aquaculture & Fisheries, Biology, Chemistry, Computer Science, Earth Science, Environment, Mathematics & Statistics, Nutrition & Foods, Physics & Astronomy, and Psychology. Their organization model and efforts are commendable and worthwhile to emulate in other regions of Canada as well.

At a university level, this year we selected Thompson Rivers University to represent British Columbia, and Christine Petersen was the local CBA/ABC representative. We could not find a similar undergraduate event in the Prairies, Ontario or Quebec. If your University or Department, organizes a Science/Biology/Botany undergraduate conference, please consider the CBA/ABC awards. They are an excellent means of encouragement for the students who want to pursue botany-related graduate studies. Students or their supervisors do not need to be members of CBA/ABC. Here are the winners for 2022 and a few words from them:

**Science Atlantic Conference** (March 14, 2021)

Best talk: Sohiba Khayol Muhammad, Dalhousie University, Nova Scotia.



Sohiba Khayol Muhammad

Title: The effect of auxin (IAA) on programmed cell death during perforation formation in lace plant leaves (*Aponogeten madagascariensis*).

Supervisor: Dr. Arunika Gunawardena

Sohiba's words: *I am a fourth-year Biology honours student with a minor in Anthropology at Dalhousie University. For my honours thesis, I am studying the role of auxin, a natural plant hormone, in the programmed cell death mechanism of the Lace Plant (Aponogeton madagascariensis). This plant forms perforations throughout its leaf lamina in a highly controlled manner. Understanding the exact mechanism behind this process will help in our understanding of plant programmed cell death. My passion for research stemmed from my first year of university after participating in a research study, and after finding my current supervisor, Dr. Arunika Gunawardena, I knew botanical research was where my interest lies. After graduation, I'll be continuing working with the Gunawardena lab as a research student and working hard towards a publication. Alongside my academics, I love to volunteer with my school and community. I am currently the president of the Dalhousie Bladder Cancer Awareness Society and I am also a proud volunteer of the Ronald McDonald House since 2018. I am also working a part-time job at 811 booking COVID-19 vaccines for the Nova Scotia community.*

Best poster: Jemma Todoschuk, University of Prince Edward Island.

Title: Why plants lie: modelling pollinator deception.

Supervisor: Dr. Stevan Springer

Jemma's words: *Hello, my name is Jemma Todoschuk. I am a fourth-year Biology student specializing in environmental biology at the University of Prince Edward Island. I am interested in why plants lie. We simulated plant-pollinator interactions to have an in-depth understanding of how honesty and dishonesty influence plant-pollinator relationships*.



Jemma Todoschuk

**Thompson Rivers University Undergraduate Research Symposium**
(March 28, 2022)

Best poster: Keilin Gorman

Title: *Cannabis* extracts: A novel approach against multidrug-resistant biofilms.

Supervisor: Dr. Naowarat Cheeptham

Keilin's words: *I am a fourth-year biology student with a minor in psychology at Thompson Rivers University. For my Honours thesis, I've been working on finding alternatives to antibiotics that can be used against multidrug-resistant bacterial biofilms. Plants are an obvious resource to begin searching for novel antimicrobials and being widely researched for medical applications already, cannabis extracts present an interesting opportunity to treat infections. Although I've been focusing on THC, CBD, and CBG, we hope to determine the synergistic effects of many different cannabinoids and terpenes against drug-resistant bacteria. Doing research has been a highlight of my undergraduate degree and I look forward to continuing after I graduate. I hope to attend medical school soon where I will be able to directly apply my research to patient care.*



Keilin Gorman

---




CBA members listening to talks during the annual meeting.

Photo by Mélissande Nagati

# Field trip – June 9 2022 – With the Wild Basket Team from the Timiskaming First Nation

By Moira Galway, Frédérique Guinel, & Shelley Hepworth

After an interesting and beautifully organized conference at UQAT, a small group of us led by Pierre Cartier, Professor at the Cégep d'Abitibi-Témiscamingue, headed towards Notre-Dame-du-Nord where Ni Dakinan is located. Ni Dakinan is the land stewardship and heritage department at Timiskaming First Nation, home of the Saugeen Anishabeg. There, we were warmly welcomed by Lindsay and Tara Dantouze, the Elder Lloyd Thivierge, Environment Monitor, and Mike Laderoute, the Environment Technician at Ni Dakinan.

Wild Basket, a company that harvests products of the forest to make them accessible and bring the community closer to its traditional food system, was co-founded by Tara and Lindsay. After some short introductions, we visited the facilities where the work is being done. Members of the community use a mixture of traditional and modern (e.g., GPS mapping) foraging techniques to harvest sustainably non-timber forest goods, which are preserved onsite. In 2021, the Wild Basket team was able to obtain a trailer, through a partnership with Canadore College, which they take to the harvesting site. The trailer is equipped with fridges and dehydrators, which allow the team to clean, store, and process their edible harvest immediately after the products are collected. The team also harvests medicinal plants and birch bark, which is used to make collecting baskets.



**Fig. 1.** Tara Dantouze explaining what is going on in the processing lab at Ni Dakinan. On the left, she is introducing their newest product line, carbonated water flavoured with sumac or with raspberry/ Labrador tea. On the right, Tara is handling a roll of birch bark; in front of her are laid out many of the products they carry, including Labrador tea leaves in a large plastic bag. (Photos Deb Metsger).

Depending on the season, Wild Basket members hand-pick fiddleheads, Labrador tea leaves, chanterelles, chaga, black spruce seeds, cedar twigs, and many different berries. During our visit at the beginning of June, it was time to collect cattail hearts and oyster mushrooms. With Mike and Lloyd leading us, we drove to Bullrock Forest and stopped on the way to harvest these two specific forest products. Bullrock Forest is part of the traditional territory of the Timiskaming First Nation; it is located 30 km north of the Timiskaming Reserve and south of Opasatica Lake.

The more adventurous participants put on waders and descended into the ditch with Mike, while the least adventurous stayed comfortably on the banks supporting the action of the foragers. The collectors came back



**Fig. 2.** Left: Maxence Martin from UQAT; Arun, Daya Selvadurai's eldest son; and Nicole Botten from UNBC ready to go to the marsh. Right: Mike Laderoute, far left, explaining what the gatherers would be doing while the least intrepid of us (Frédérique Guinel from Ottawa, Deb Metsger from the ROM, Pierre Cartier, and David Garbary and his wife Dolna, from Antigonish, NS) look from the side of the road. (Photos Shelley Hepworth).



**Fig. 3.** Left: Nicole Botten on the far left, Maxence Martin in the center, and Arun Selvadurai on the far right descending the bank of the road. Right: Mike Laderoute explaining what to do to Maxence on the far right and to Arun, bent at the front. (Photos Pierre Cartier).

with a basketful of cattail hearts, which are harvested before the cattails are blooming. At first sight, they are reminiscent of leeks and, when eaten raw, taste like cucumber. However, when cooked, their taste is quite subtle, tasting like neither cucumber nor leek.

Back onto the road, Lloyd and Mike explained to us more about this type of food, how to clean and prepare it for later use. Once the task is completed, one ends up with a 10 cm-long piece of stem taken at the very base of the plant. These young stems will be fried in butter. For those interested, a video of the harvest can be found on the website of the Wild Basket (see website link below).



**Fig. 4.** Left: Arun Selvadurai at the front, followed by Maxence Martin and Mike Laderoute. Right: Cattail bases recently collected from a marsh along the road. (Photos Deb Metsger).



**Fig. 5.** Left: Deb Metsger on the left; Frédérique Guinel in the centre; Shelley Hepworth from Carleton University; Dolna Garbary with her back to the camera. (Photo Moira Galway). Right: Lloyd Thivierge, handling a cattail heart, and Mike Laderoute explaining how to prepare the cattail hearts. Deb Metsger on the far left. (Photo Pierre Cartier).

While driving on the unpaved road, Mike and Lloyd are able to sight trees bearing oyster mushrooms from the cabin of their pick-up truck. Once the treasure is spotted, a ladder is taken from the truck to climb up, and a knife is used to detach carefully the mushroom from the bark.



**Fig. 6.** Left: Mike Laderoute at work collecting a mushroom. Right: A group of us discussing one of the botanical finds of the day. From left to right, Maxence Martin, Shelley Hepworth, Arun Selvadurai, Frédérique Guinel, Deb Metsger, Dolna Garbary, Niraj Selvadurai (Daya's youngest son), and Mike Laderoute. (Photos Pierre Cartier).

On our way to gather, we could not help but botanizing and we were happy to find many spring flowers, and some interesting insects.



**Fig. 7.** Left: Nicole Botten, David Garbary, Deb Metsger, Dolna Garbary on her knees, Pierre Cartier and Mike Laderoute browsing. (Photo Shelley Hepworth). Right: The nodding trillium, *Trillium cernuum*, the northernmost species of the *Trillium* genus. (Photo Deb Metsger).



**Fig. 8.** Left: Starflowers, *Trientalis borealis*, growing alonside Canada mayflowers, *Maianthemum canadense*. Right: A mocassin-flower, *Cypripedium acaule*, found on the side of the gravel road. (Photos Moira Galway).



**Fig. 9.** Left: New growth of balsam fir (*Abies balsamea*) which we were invited to have as a snack on our walk. Buds, needles and the resin of this tree are used medicinally as analgesic agents, as well as antiseptic and healing agents; they are also an excellent source of vitamin C. (Photo Moira Galway). Right: Chaga, a black, hardened, crusty mushroom found on rotting birch (*Betula papyrifera*), is used as a medicinal plant as it contains high levels of antioxidants. (Photo Shelley Hepworth). For those interested, more details are found on the Wild Basket website, under the tag "Herbarium."



**Fig. 10.** Left and right: Pink-striped oak worm moth, recently out of its chrysalis. (Photos Pierre Cartier).

Once our food was collected, we headed to Bullrock station, located on the shore of a beautiful lake. At the station, we were greeted by Lindsay and Tara, who had begun to prepare lunch when we were harvesting. While waiting for the meal to be ready, we drank the refreshing carbonated sumac water. In addition to what we gathered, we were offered fiddleheads, which had been collected in the spring and freeze-dried, and a delicious casserole of wild rice and tomatoes. As a dessert, we were given a maple syrup candy!



**Fig. 11.** Left: Tara Dantouze is preparing the fiddleheads in a frying pan, with Nicole Botten in the background. Right: Mike Laderoute is cooking the cattail hearts, with Tara and Lindsay Dantouze in the background. (Photos Deb Metsger).



**Fig. 12.** Left: Deb Metsger, Shelley Hepworth, Daya Selvadurai, David Garbary, Moira Galway, Lindsay, and Maxence Martin, from left to right. (Photo Pierre Cartier). Right: Our plate of fiddleheads, oyster mushrooms, and casserole. Missing are the cattails,which came later. (Photo Moira Galway).

After lunch, Mike quizzed us to check if we had retained something of what what we had learned in the morning. We had to guess the content of little cups set up on the table. We had to recognize the seeds, leaves, medicinal plants, and different types of bark. As botanists, we did not do too badly!



**Fig. 13.** Left: Mike Laderoute preparing the different samples on which we will be quizzed. In the background is Maxence Martin, and on his right are Daya Selvadurai and Dolna Garbary. (Photo Pierre Cartier). Right: Facing the lake, from left to right, Maxence Martin, Niraj Selvadurai, Deb Metsger, Pierre Cartier, Nicole Botten, Mike Laderoute and Arun Selvadurai. (Photo Moira Galway).

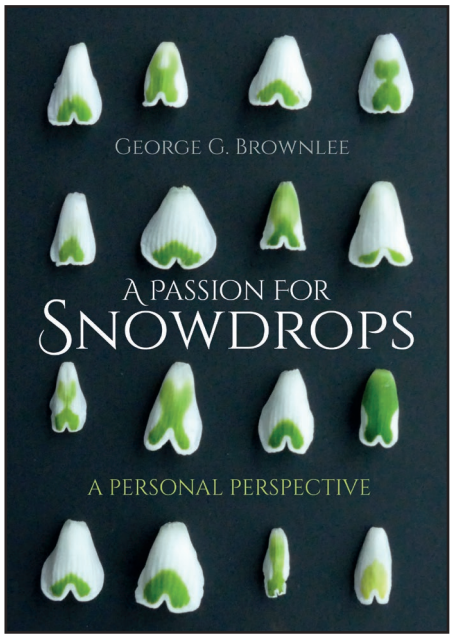
It was then time to say our goodbyes and to thank our hosts, who offered each of us a bag with Labrador tea leaves, a mug, a note book, a soap perfumed with Labrador tea and a carbonated drink for the road back. We had a lovely time at Bullrock, and were very lucky as we avoided heavy rain. We made new friends as we always do in the CBA field trips. And to Frédérique's delight, we even heard a loon!

Some additional sources for those interested:

- https://thewildbasket.com/
- https://www.cbc.ca/news/canada/montreal/wild-basket-trailer-brings-food-1.6037585
- https://www.nidakinan-herbarium.com/about

# Book Review of "A Passion for Snowdrops" by George G. Brownlee

By Julia Nowak
Western University, London, Ontario




What is the first thing that comes to mind when you hear the word "spring"? Being botanists, I would guess it is something related to plants. Even to those who are not botanically inclined, brightly coloured crocuses and daffodils are commonly associated with the coming of spring. But the first harbingers of spring are the delicate small white and green flowers of snowdrops (belonging to the genus *Galanthus*). These wonderful heralds of spring appear early, well before any other flowers are visible.

George G. Brownlee describes himself as a galanthophile for his love for these flowers in "*A Passion for Snowdrops,*" providing a personal perspective and his experiences with growing many varieties of snowdrops in the UK. This little book is divided into eight insightful chapters including thorough descriptions of additional information about snowdrops.

In the introductory chapter, the author wants to "encourage everyone with a garden, however small, to grow snowdrops." A range of snowdrop varieties can flower for half of the year, anywhere from October to the end of March. Requiring little attention (depending on the variety, of course) snowdrops can fill your garden with beautiful flowers. *Galanthus nivalis* (Fig. 1) is known as the common snowdrop; it can easily grow in your garden and can also be found growing in the woods or on the roadsides throughout Britain.



**Figure 1.** *Galanthus nivalis*

The chapter continues to describe the history of snowdrops, including their early mentions in herbal literature in the 16th and 17th centuries. The first described species of *Galanthus* were *G. nivalis* and *G. plicatus* (Crimean snowdrop; Fig. 2), a snowdrop which is more robust and larger in size than its common relative. The early literature describes the authors' interest in snowdrops for their beauty and their sweet smell. The author of this book can obviously relate.

There are many different species and varieties of snowdrops, which are generally identified by the green markings on the outside or abaxial side of the inner petals (as seen in the cover image). The author provides descriptions of the different species and varieties of snowdrops, including the morphological identifiers. The more than 20 species of *Galanthus* are listed in this chapter, including those that are common, uncommon, and rare. The origins of these, as well as of the hybrids and cultivars/varieties, are also included.

What if you wanted to grow snowdrops in your garden? Chapter 2 has you covered. The author includes explanations of where to buy snowdrops, followed by how, when, and where they should be planted, and how they can be propagated or divided, encouraging the sharing of the common and the rare varieties. Thankfully for those of us requiring a little extra help with keeping our garden green and thriving, the author reminds us that these plants are fairly easy to take care of. However, they can become infected with common fungal diseases or can succumb to pests.



**Figure 2.** *Galanthus plicatus*

In the following chapter, the author thoroughly describes his favourite snowdrops with many beautiful photographs and descriptions of the varieties and species



**Figure 3.**

recommended for growing in your garden. Chapters 4 and 5 catalogue the emergence and flowering of the various snowdrops that grow in the author's garden in the UK. Specifically, the catalogue is of the snowdrops that grew in the 2016-2017 season, with these chapters reading like a diary with sequential date entries from October until the end of March.

In chapter 6, the author presents the art history of snowdrops. Images of snowdrops that have appeared in herbal texts or other early publications date back to the late 16th century. Many authors have found interest in illustrating spring flowers including snowdrops. Such works include Anne Pratt's publication on flowering plants in the late 1800s (Fig. 3). The author also discusses the importance of correct identification and labelling of snowdrops in the early literature as well as the challenges of illustrating snowdrops.

Chapter 7 is a thorough list of all the species, subspecies, and cultivars of snowdrops discussed in the book. This includes the authority and specific identifiers, as well as flowering times and duration.

The final chapter lists the famous galanthophiles who have had an interest in cultivation and/or simply a fascination with snowdrops. Many of these names are familiar from the specific epithet or cultivar names of the snowdrops previously discussed in the book.

The appendices provide more information about where snowdrops can be purchased in Europe, North America, Australia, and Oceania; where in the UK and Ireland can snowdrop collections be viewed; and lists of single and double snowdrops for reference.

I love my garden and thoroughly enjoy seeing my plants come up every spring and summer. I have the crocuses and daffodils signalling the start of spring, but must confess that I have not previously grown snowdrops. This book provides an exhaustive account of the author's love of snowdrops and has piqued my interest in *Galanthus* species. I will now be sure to trek down to my local nursery to investigate which varieties can be planted in my garden. I will then be eagerly awaiting the first signs of spring with the emerging snowdrops. If you are not already a galanthophile, "*A Passion for Snowdrops*" will present all the reasons why you should be.

# The Humble Moravian Monk Turns 200

by Tammy Elliott

Gregor Mendel – I am confident that as botanists, we all recognize his contributions to biological theory. We might remember from our biology courses that Mendel developed several important laws of hereditary while he was an Augustinian friar at St. Thomas Monastery in Moravia. When I learned that my second postdoc position would be in Brno, Czech Republic, I did not immediately connect this city with Mendel. Brno is located in the Moravian region of the Czech Republic, and, interestingly, it is where Mendel conducted his famous pea experiments in the gardens of St. Thomas Monastery. My introduction to the importance of Mendel to this city of nearly 400,000 came immediately after arriving, as I travelled passed St. Thomas Monastery and *Mendlovo náměstí* (Mendel Square) on the way to my hotel. Throughout my time in Brno, I have noted that Mendel and his contributions to science are far from being forgotten in this region.

**Mendel's early life**

Johann Mendel was born on July 20, 1822 in the village of Heinzendorf bei Odrau (currently Hynčice, near Vražné) to Anton and Rosine Mendel, farmers who spoke the Silesian German dialect. European political boundaries were different at that time, as the 'Czech lands' and many other regions in central-Eastern Europe were ruled by the Austrian Empire and the powerful Habsburg family. German was the official language of the region, although various languages (i.e. Czech, Romanian, Slovene) were spoken among different ethnic groups. The Austrian Empire was still a feudal state, so the hard labour of many farmers went to paying taxes to the state, church and nobility. The Mendel family were fortunate enough to own land, which included a garden and orchard. This gave Mendel freedom to explore nature and learn about agricultural practices at an early age.




**Figure 1:** Map of the Austrian Empire around the time of Mendel's birth in 1822. Key locations in the life of Mendel are indicated by stars.

The village of Hynčice had a school, since it was part of the estate of Countess Walpurga Truchsess-Zeil, who was interested in having the children in her lands educated. Mendel's teachers soon noticed his exceptional intelligence and arranged for him to go to an advanced school in another village – Lipnik – about 25 km away from Hynčice. After doing well at the school in Lipnik, Mendel transferred to a *Gymnasium* (preparatory school for university) in Opava, approximately 36 km from his home village. During his studies in Opava, Mendel's family had a series of bad harvests and subsequently could no longer help with the young man's tuition. Thus, he started tutoring other students as a way to support himself and his studies.

Although Mendel was struggling financially, he enrolled at the Franciscan University in Olomouc, where he studied from 1840 to 1843. It was during this time that a professor suggested that he enter the Augustinian Monastery in Brno, which would allow him to pursue his intellectual interests without having to struggle financially. Based on my readings, at that time this monastery almost resembled an agricultural college with friars and abbots raising animals and plants not only to provide funds to support the monastery, but also for study. Cyril F. Napp, an influential man who was the monastery's abbot at the time, personally invited Mendel into the Augustinian Monastery. Similar to Mendel, Abbot Napp was keenly interested in natural science and agriculture, which included his own views on heredity. The role of Augustinians as educators to the wider community might also have drawn Mendel into the order.



**Figure 2:** The Augustinian Monastery in Brno, Czech Republic. A giant pea has been placed beside the monastery for the summer of 2022 to commemorate the 200th anniversary of Mendel's birth.

Mendel entered the monastery in 1843, where he soon took on the name 'Gregor.' The intellectual environment at the monastery allowed him to flourish, and in addition to theology, he studied agronomy, pomology (fruit production) and viticulture. He was ordained as a priest in 1847, and two years later he went to the beautiful city of Znojmo (Znaim) where he worked as a substitute teacher. Although Mendel was reportedly a talented and well-liked teacher in Znojmo, he was never able to pass the exams that were required to become a teacher. It was a path in life that he would eventually have to abandon because of his inability to meet the qualification requirements.

The next major phase of Mendel's intellectual development was his studies at the University of Vienna. Abbot Napp provided financial support for Mendel, who focussed on several disciplines of the natural sciences. Mendel took classes from several highly influential professors while in Vienna, including Christian Doppler in physics (for whom Mendel served as a course demonstrator) and Franz Unger in botany. As Unger was one of the proponents of pre-Darwinian evolutionary theory, this must have had a major influence on Mendel's thoughts.

## Studies with peas

In 1853, Mendel returned to St. Thomas Monastery from Vienna, and by the summer of 1854, he was growing thirty-four different strains of *Pisum sativum* (peas) in the monastery's gardens. The pea plant was a well-thought-out model for Mendel to choose, as it is fast growing and easy to cultivate, with discrete trait pairs existing in alternative forms. Starting in 1856 and lasting for a period of eight years, he diligently conducted his experiments on approximately twenty-eight thousand pea plants.

During two evenings in the winter of 1865, Mendel presented the results of his pea experiments to members of the Natural Science Society at Jánská Street 22 in Brno. These presentations were regarded favourably in general, but were only viewed as elaborate studies focussing on hybridization. The proceedings of the presentations, entitled '*Versuche über Pflanzen-Hybriden*' (Experiments with plant hybrids), were published in a long, detailed paper in 1866 by the Natural Science Society of Brno. Although the article was circulated to over a hundred libraries at the time, and Mendel shared his 40 copies with other scientists (including reportedly Darwin), it received little immediate attention and went largely unnoticed in the scientific community. The original manuscript still exists and is on display at the Mendel Museum in Brno after experiencing almost a life of its own.

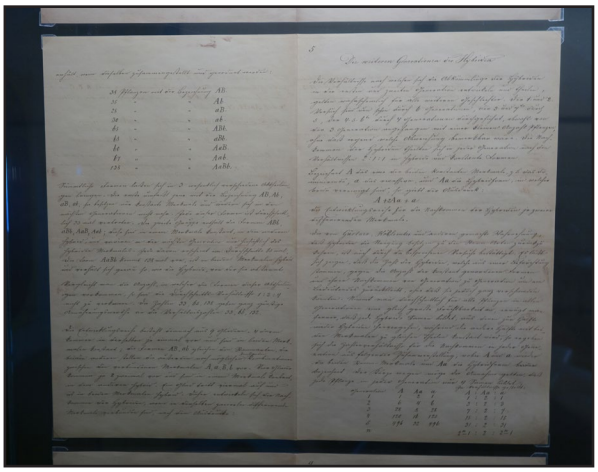


**Figure 3:** Page 5 from Mendel's original manuscript "*Versuche über Pflanzenhybriden*" (Experiments with Plant Hybrids) on display at the Mendel Museum in Brno.

## Other potential models

Towards the end of Mendel's studies on peas, he was contemplating whether the laws that he was developing for *Pisum* would be valid for other hybrids. By 1863, Mendel was considering several other genera of plants native to central Europe as models for his studies. Interestingly, many of these genera are well-represented in our Canadian flora, including *Cirsium, Geum* and *Hieracium*. As many of us botanists know



**Figure 4:** The building at Jánská 22 where Mendel presented the results of his experiments on peas to members of the Natural Science Society on the evenings of February 8 and March 8, 1865.

from experience, cultivating and using native species as experimental models can present challenges. For example, the genus *Hieracium* is apomitic (asexual reproduction often occurs without fertilization), but this was not known in Mendel's time. Thus, Mendel would have never been able to verify or develop any further laws on heredity and hybridization with *Hieracium* as a model. However, this genus served as a common interest between Mendel and the Swiss botanist, Carl Nägeli. Little evidence exists today about Mendel's thoughts and motives apart from a number of letters from him to Nägeli, which largely focus on *Hieracium*. Mendel even sent *Hieracium* specimens to Nägeli for identification.

Of greatest interest to me as a Canadian is Mendel's studies on *Cirsium*. The tendency of *Cirsium* plants to form extensive clonal colonies can make them nuisance weeds, as in *C. arvense* (Canadian thistle). In Mendel's time, *Cirsium* had already received detailed study since it was the focus of Nägeli's doctoral dissertation, and it is evident based on Mendel's letters to Nägeli that he contemplated focussing on *Cirsium* as a model genus for several years. Mendel concluded that even though *Cirsium* had the potential to be an ideal model for studies on heredity and hybridization, the fact that the plants easily spread made them unsuitable for further study.

The legacy of Mendel's interest in *Cirsium* hybridization continues at Masaryk University in the same working group that hosted me for my postdoctoral research. As I write this article, Dr. Petr Bureš is in the Dolomite Mountains of Italy collecting *Cirsium* specimens for his studies on hybridization in the genera. In defence of Mendel's and Bureš choice of study genera, several of the European *Cirsium* species that I have seen are much more beautiful than our weedy *C. arvense*, which originates from a different evolutionary lineage.

**Mendel's later life**

Mendel focussed less on plant experiments as he got older, partially because his eyesight was declining, but also because he had larger leadership responsibilities. He must have been very good at compartmentalizing his religious and scientific lives, something that most likely became more difficult as the monastery was being increasingly censored due to its secular activities. As abbot, Mendel continued to devote time to his studies in other disciplines of the natural sciences, however. In addition to his many contributions to meteorological science, which included the description of a tornado that hit Brno and the abbey in 1870, Mendel was a leading researcher in bee-keeping at the time. He even planted pollen-rich plants on the slopes between the monastery and the city's castle.



**Figure 5:** The Augustinian tomb in the Brno Central Cemetery where Gregor Mendel is buried.

The leadership roles that Mendel served later in life included abbot of St. Thomas Monastery and governor of the Moravian Mortgage Bank. My understanding is that he encountered several challenges during this time, especially in the role of abbot, where he was plagued by a dispute over taxation that lasted years. His scientific work had yet to receive any major public recognition by his death in 1884. During the thirty-four years between the publication of Mendel's experiments on peas and 1900, scientists grasped to develop a set of congruent

theories that could explain the heredity of traits. His work was eventually 're-discovered' by three scientists working individually in 1900, and the discipline of genetics blossomed from there.

**Mendel's legacy continues**

Today, Mendel's contributions to science are acknowledged throughout the world. In honour of his 200th birthday, Brno has just thrown a big celebration with live music in and around St. Thomas Abbey. In addition, several landmarks around Brno are named in honour of the man, including Mendel Square, Mendel Museum and Mendel University; there is even an enormous pea placed beside the monastery for the summer. One can follow an educational walk through the centre of Brno that ties information about Mendel's life with the area's history. It is amazing for me to think that the remains of this amazing man rest just two kilometres from my Brno office, in the Brno Central Cemetery. Within his coffin, his body rests on a bed of *Phragmites*!

Compared to his contemporary, Charles Darwin, Mendel is more of an enigmatic character who lived his life as a modest, diligent man with a deep scientific curiosity. He was motivated by learning and sharing knowledge, as opposed to money and prestige. This humble man holds a constant position among the scientific greats, and it is good to see that this is not overlooked by the region of his origin.

**References**

Fairbanks, D.J. 2020. Mendel and Darwin: untangling a persistent enigma. Heredity 124: 263-273.

Orel, V. and Peaslee, M.H. 2015. Mendel's research legacy in the broader historical network. Science & Education 24: 9-27.

Sturtevant, A.H. 1965. A History of Genetics. Harper & Row, Publishers, New York.

van Dijk, P.J. and Ellis, T.H.N. 2016. The full breadth of Mendel's genetics. Genetics 204: 1327-1336.

**Key websites**

Mendel Festival. https://www.mendelje.cz/en/g-j-mendel/

Mendel Festival. https://www.mendelje.cz/po-stopach-mendela-znojmo/.

MUNI MENDEL MUSEUM. "Gregor Johann Mendel". https://mendelmuseum.muni.cz/en/about-the-museum/gregor-johann-mendel

tourism.olomouc.eu. "Gregor Johann Mendel (1822 – 1884)". https://tourism.olomouc.eu/basic-information/olomouc-and-personalities/veda/article_id=21591/cs

# TOP CANADIAN ORNAMENTAL PLANTS.
# 32. Garden lupins (*Lupinus polyphyllus* hybrids)

ERNEST SMALL[1, 2]

Garden lupins are early-flowering, mostly perennial herbs with extremely showy, colourful spires of flowers. They are one of the popular horticultural standards, mainly grown as massed displays in private residential gardens and public places where ornamental plants are found. Their conspicuous beauty has led to distribution to much of the world. Unfortunately, in many places the plants have escaped to the wild, or have been deliberately naturalized. Weedy garden lupins aren't shrinking violets: they are extremely aggressive invaders, displacing and endangering indigenous plants and animals. As described in this article, they have established in much of eastern Canada, and are even challenging their principal wild ancestor which is native to western Canada.

## Names

**Scientific name:** The genus name *Lupinus* and the word lupin are based on the Latin *lupus*, wolf. It was once thought that lupins took over land, robbing the soil of its fertility, just as wolves robbed shepherds of their livestock. In fact, lupins, like most members of the pea family, have root nodules housing symbiotic nitrogen-fixing bacteria, resulting in enriched soil.

**English names:** "Lupin" is standard in most countries for species of *Lupinus*. "Lupine" is mainly encountered in the U.S., but "lupin" is increasing in usage. The name *L. polyphyllus* conventionally collectively designates garden lupins. The garden lupin is also called Russell lupin, large-leaved lupin, big-leaved lupin, and marsh lupin.

**French names:** Lupin des jardins, lupin à folioles nombreuses, lupin polyphylle, and lupin vivace.



**Figure 1.** A display of lupin cultivars at a flower show. Source: Shutterstock, contributor: Devonpaul.

## Symbolism




**Figure 2.** Bluebonnets (*Lupinus* species of the southern U.S.). (a) Bluebonnets in Texas, which is famous for its vast displays of wild flowering lupins, especially by *L. texensis*. Source: Shutterstock, contributor: Silvio Ligutti. (b) A cow among bluebonnets in Texas. Bluebonnet species are toxic to livestock, especially when large amounts of mature seeds are ingested, but some foraging occurs nevertheless. Photo by Shiva Shenoy (CC BY 2.0).

Six blue-flowered lupin species of Texas are collectively recognized as its state flower. These are called "bluebonnets" for their resemblance to the bonnets worn by pioneer women to protect themselves from sunburn. Ladies, especially the National Society of Colonial Dames of America, were instrumental in persuading lawmakers more than a century ago to recognize bluebonnets as the state flower. Men at

1 Science and Technology Branch, Agriculture and Agri-Food Canada, Neatby Bldg., Central Experimental Farm, Ottawa ON, K1A 0C6
2 © Government of Canada. Verbatim redistribution for personal, non-commercial use is permitted.

the time favoured the hardy cactus and the business-friendly cotton.

## Appearance

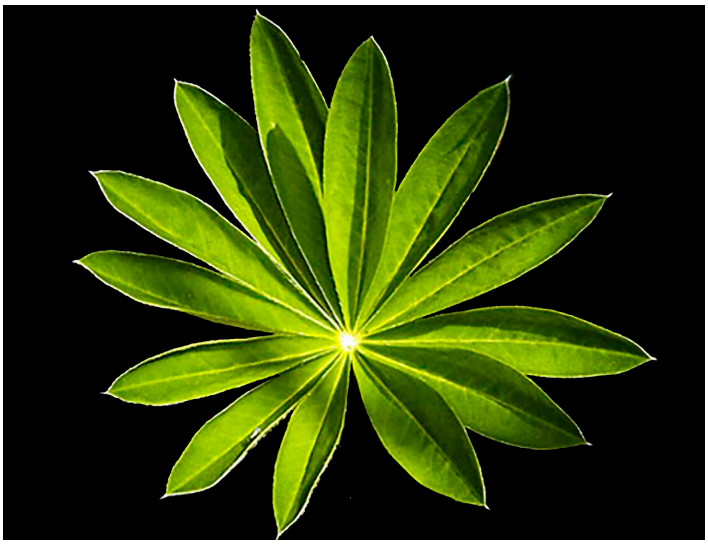


**Figure 3.** Multifoliolate leaf of *Lupinus polyphyllus* 'My Castle'. Photo by Vince (CC BY 2.0).

*Lupinus polyphyllus*, the chief ancestor of the garden lupin, is an erect perennial herbaceous plant with stout, generally unbranched hollow stems growing up to 1.5 m in height, although miniature forms may be less than 30 cm in height. The underground part of the plant is a rhizome, which may be short or long-spreading, and from which a deeply penetrating tap root often develops. The leaves are palmately compound with 5–17 leaflets 3–15 cm long. The basal leaves have long petioles, while those on the upper stems are shorter. In the main ancestral species *L. polyphyllus* sensu stricto, the flowers are blue or purple, but the derived cultivars differ considerably in flower colour. When the plants escape, after several generations the progeny very strongly tend to revert to producing blue/purple flowers, presumably because this is adaptive (genes controlling blue are recessive, so they are not extinguished in the cultivars). The flowers are 1–1.5 cm long, produced on a tall, dense spike (up to 40 cm long), especially in early summer. The flowers are nectarless, contradicting some reports (e.g. Beuthin 2012). Nevertheless, they are quite attractive to insects. The flowers are sometimes alleged to attract butterflies and hummingbirds, but this claim may apply only to ornamental *Lupinus* species other than *L. polyphyllus*. Garden lupin flowers open from the lower to the upper part of the spike, and last 3 to 5 weeks (sometimes 2 months). The pea-like pods are 3–5 cm long, quite hairy, and typically contain

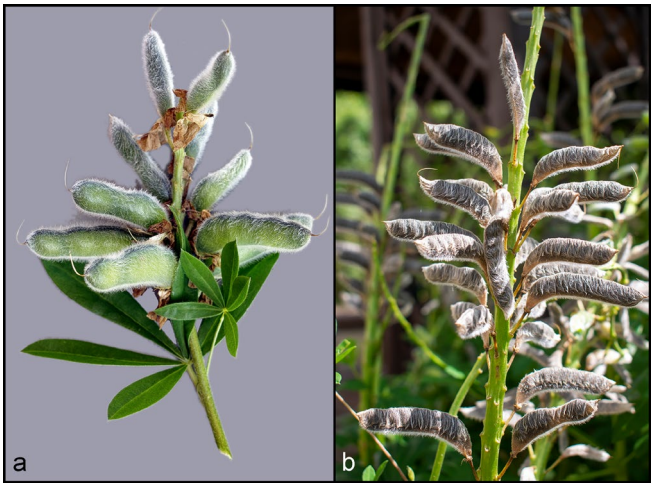



**Figure 4.** Garden lupin (*Lupinus polyphyllus*) in fruit. (a) Young fruit. Photo by Carlfbagge (CC BY 2.0). (b) Mature fruit. Source: Shutterstock, contributor: Patrycja Grobelny.

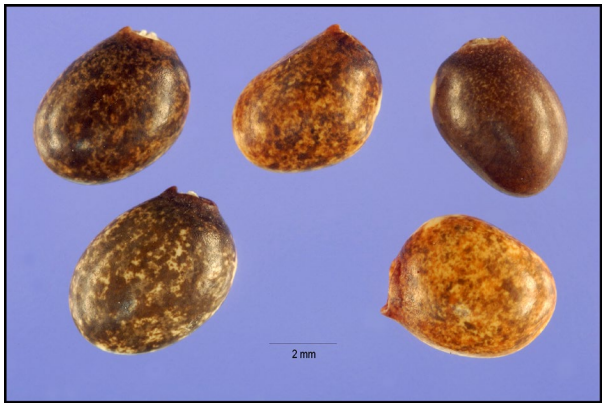



**Figure 5**. Seeds of garden lupin (*Lupinus polyphyllus*). Photo (public domain) by Steve Hurst, U.S. ARS Systematic and Mycology Laboratory.

6–10 mottled seeds. An individual plant may produce hundreds of seeds, which can remain viable in the soil for decades. The seeds are dispersed ballistically up to a few metres from the mother plant (as the pod dries out, it explodes because of uneven tension on opposing sides). *Lupinus polyphyllus* reproduces mainly by seeds but also vegetatively, by true rhizomes (spreading below-ground stems). In cool climates, the above-ground shoot dies back in the autumn and re-emerges in the spring. Annual cultivated forms are available. Perennials may persist for 20 years or more (or much less depending on location). Among horticulturalists, garden lupins are considered to be short-term perennials (even biennials), requiring replanting at least by 6 years.

## Wild *Lupinus* species

Estimates of the number of species in the genus range from about 200 to 300. The species are annual and perennial herbs, and evergreen sub shrubs and

shrubs. Most grow wild in the Americas, with more than two dozen species in Canada. All of the dozen or so Old World species are annuals growing in open and disturbed habitats, mostly in the Mediterranean region and sporadically in Africa north of the equator. *Lupinus* species are common in North Africa, western North America, and South America, where they are found growing on dry hilly grasslands, coastal sands, and cliffs, and along the banks of streams and rivers. Most species occur in open, sunny habitats. The soils are usually light-textured and acidic to neutral, and are usually well drained and fairly deep.

Indigenous North American *L. polyphyllus* is the principal ancestor of the garden lupin. It is a native of moist meadows in western North America from Alaska to California (some authorities have contended that the Alaskan plants are introduced). Similar plants sometimes assigned to the species also occur in South America. The escaped derivatives of the species have become established in much of eastern North America, often colonizing disturbed habitats. They thrive on sandy soils, and tend to avoid heavy soils. The species has often been employed to stabilize soils against erosion, its roots capable of descending to 2 m.

## Domesticates

*Food species*

There has been some consideration given to developing the garden lupin into a food or forage species, but little progress has been made. The *Lupinus* species used for food are discussed in detail in Small (2012), and the information is summarized here. Cultivation of lupins began in both the Old and New Worlds between 3,000 and 4,000 years ago, for both livestock forage and human food. The degree of domestication (genetic change to meet human needs) was quite limited, however, until about a century ago, when modern breeding was initiated. Four annual species are employed as cool season grain legumes (grown for their edible seeds) or forage crops (grown to feed livestock). The Mediterranean Basin is the home of the three most important agricultural species, white lupin (*L. albus*), blue lupin (*L. angustifolius*), and yellow lupin (*L. luteus*). The classical Egyptians, Greeks, and Romans chiefly grew white lupin, both as food for animals and flour for bread. Yellow lupin and blue lupin have probably also been cultivated for thousands of years.

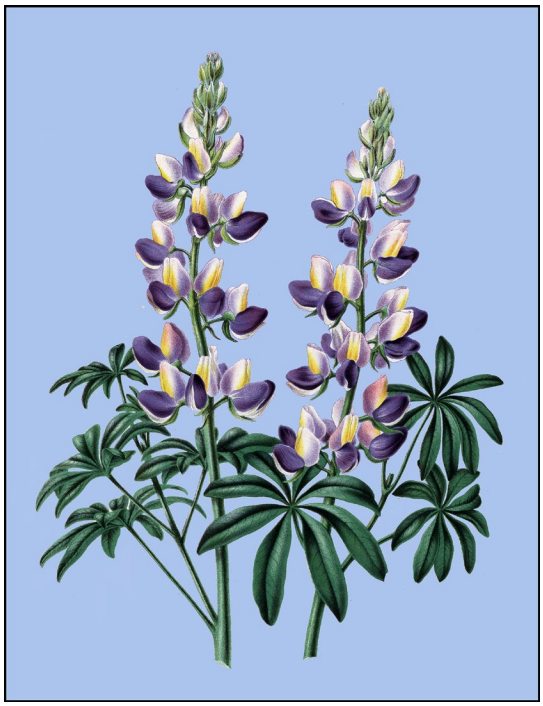


**Figure 6.** Andean lupin (*Lupinus mutabilis*), employed both as an ornamental and a source of edible seeds. Image (public domain) by Abraham Jacobus Wendel, from the 1868 Dutch language book Flora: afbeeldingen en beschrijvingen van boomen, heesters, éénjarige planten, enz. voorkomende in de Nederlandsche tuinen by H. Witte, Groningen: Wolters.

Although there are likely more than 200 *Lupinus* species in the Americas, only Andean lupin (*L. mutabilis*), also known as pearl lupin, is agriculturally important. This is basically an annual (although biennial forms are known) with woody stems and blue, purple, pink, or white flowers. The species is grown not just as a crop but also for its attractive flower colours. Andean lupin has been cultivated for thousands of years in the highlands of South America. It was domesticated in pre-Incan times, at least 1,500 years ago, in the central Andean region.

*Ornamental species*

Several lupin species are employed as garden ornamentals, but the most widely grown is the so-called garden lupin, which is a hybrid complex derived particularly from the blue/purple-flowered *L. polyphyllus*. Wild plants of this and other plants from North America were introduced to Europe in the mid-19th century. The garden lupin is the result of hybridization employing several lupin species. This was largely accomplished by George Russell (1857–1951), an English amateur horticulturalist who hybridized *L. polyphyllus* with other lupin perennial




**Figure 7.** Extremely colourful Russell hybrid forms of the garden lupin. (a) A display at the Chelsea Flower Show in the UK. Photo by ickh710 (CC BY 2.0). (b) A display at Lake Tahoe, California/Nevada. Photo by Mitch Lorens (CC BY ND 2.0).

species, particularly *L. arboreus* and *L. sulphureus*, and possibly also the annual *L. nootkatensis*. Russell's creations exhibited a range of striking flower colours, including red, pink, purple, orange, yellow, and white. These hybrids were released in 1937 to mark the coronation of King George VI, and have come to be known as "Russell lupins." Although Russell lupins are hybrids, they are not first-generation hybrids with equal parentage; *L. polyphyllus* dominates the ancestry of Russell lupins. In recognition of the multi-parental nature of garden lupins, the hybrid names *L.* × *polyphyllus, L.* × *russellii*, and *L.* × *hybridus* are sometimes encountered, although *L. polyphyllus* is mostly cited. More recent breeding has resulted in the creation of extremely attractive cultivars.

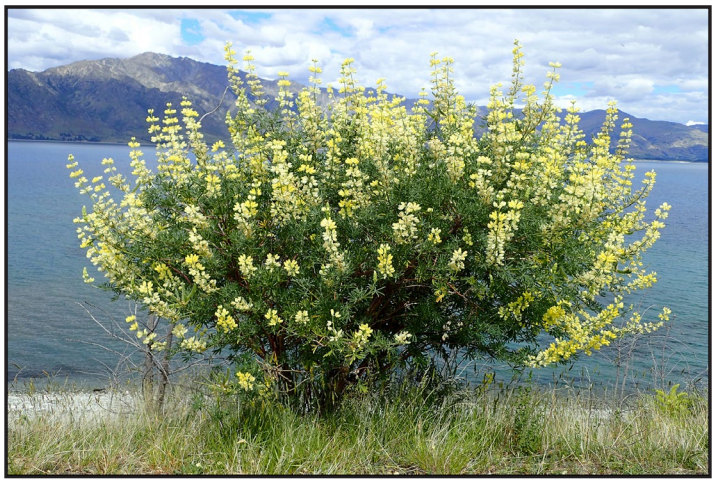


**Figure 8.** *Lupinus arboreus*, a native of California, is thought to be one of the principal wild species hybridized with *M. polyphyllus* to produce the Russell hybrids which dominate available garden lupins. Photo by Krzysztof Ziarnek, Kenraiz (CC BY SA 4.0).

## Weed problems



**Figure 9.** Weedy Russell lupins in New Zealand, where the highly invasive plant has caused extensive ecological damage. Photo (public domain) by SONY DSC.

In parts of the world (including Europe, New Zealand, and eastern North America), plants grown for ornament, erosion control, or soil stabilization have escaped and established wild populations. These 'beautiful nuisances' are sometimes so invasive that they are harmful to local vegetation; for example, in New Zealand, the woodrush (*Luzula celata*) has been shaded out in areas by lupins. Also in New Zealand, weedy lupins have stabilized river gravels, forcing rivers to form deep, rapid channels unsuitable for wading birds such as the wrybill (*Anarhynchus frontalis*), a plover endemic to New Zealand, that has lost about half of its habitat. Invasive lupins can significantly change soils supporting wild plants and their associated fauna: they tend to enrich soil with nitrogen, and their alkaloids leach into the soil, both of these results harming some species. In its introduced range, *L. polyphyllus* outcompetes many local vascular plant species. It can even replace other *Lupinus* species resulting in a reduction in the abundance of butterflies that depend on them (indeed, this has endangered several butterfly species in North America).

Despite the saying "you can't judge a book by its cover," we humans evaluate many things by appearance, and this applies to invasive lupins. In parts of the world, people have deliberately scattered lupin seeds in the wild, sometimes on the theory that beautifying the wilderness will make an area more attractive to tourists and therefore increase business. Undeniably, extensive "infestations" of multi-coloured garden lupin are very attractive, and so they are often featured by Canadian provinces in their advertisements encouraging tourism. Proposals have been attributed to the Nova Scotia

Lupin Society to make invasive lupins the province's "official weed."



**Figure 10.** Weedy lupins in Canada. (a) Emerald Lake, Yoho National Park, British Columbia. Photo (in 1996) by LBM1948 (CC BY SA 4.0). (b) St. John's, Newfoundland. (Photo (in 2014) by Shhewitt (CC BY SA 4.0). (c) Nova Scotia (in 2018). Photo by Dennis Jarvis (CC BY SSA 2.0). 2018. (d) Souris, PEI. Photo (in 2010) by Barney Moss (CC BY 2.0).

## Ornamental use

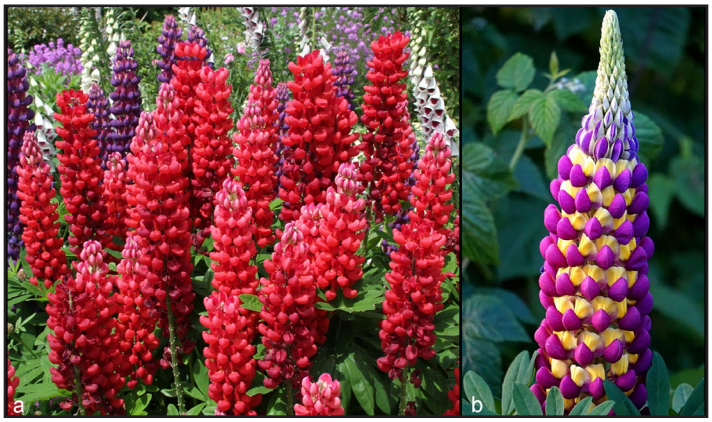


**Figure 11.** Examples of particularly attractive lupin cultivars. (a) An all-red variety. Photo by Tony Hisgett (CC BY 2.0). (b) A variegated, very popular variety: Lupin cultivar 'Manhattan Lights'. Photo (public domain) by Matthias Böckel from Pixabay.com.

The tall, upright flowering spikes of lupins are extremely attractive, and lupins are a favourite ornamental. They can be grown as indoor potted houseplants, but usually aren't because it is difficult to supply sufficient light, and the large rootstocks can be challenging to keep within pots. Small cultivars are most suitable for containers. Lupins are used as cut flowers occasionally, especially when they can simply be collected from local naturalized plants. The long spikes look very appealing in cut-flower arrangements. However, ornamental lupins are primarily employed as bedding plants for residential borders and gardens and landscaping for large commercial and public areas.



**Figure 12.** Freshly collected lupin bouquets. Source: Shutterstock. (a) Border collie holding flowers. Contributor: Ksenia Raykova. (b) Girl holding flowers. Contributor: Denis Zai.



**Figure 13.** Potted garden lupins, as shown here, can be grown as houseplants or simply transplanted to a desired location. Source: Shutterstock, contributor: Manfredxy.

## Toxicity

Toxic quinolizidene alkaloids are synthesized in the young, growing parts of the plant, and are transferred to the seeds as they develop, making wild lupin foliage and seeds bitter. Both livestock and humans avoid consuming wild lupins, except at times of food scarcity. In past times, human consumption of lupin seeds required reducing the high levels of toxins by a lengthy process of soaking and boiling (still widely practiced in some regions). However, modern agricultural cultivars have been selected for low alkaloid content. Ornamental cultivars are high in alkaloids and should

not be employed as food for people or animals.

A small percentage of people (perhaps of the order of 1%) have a food sensitivity to lupins, very likely due to an individual reaction to the seed proteins, not the alkaloids. Of those who have such sensitivity, many are also allergic to peanuts, probably because similar proteins in lupin and peanut cause allergic reactions.

In countries where the wild relatives of lupins occur as native or introduced plants, a special difficulty occurs in maintaining the quality of the related low-alkaloid cultivated varieties. Although most lupins self-pollinate to a considerable degree, sexual crossing occurs readily when the wild and cultivated forms of given lupin species are close together. Also, in some regions high-alkaloid land races (cultivated forms that are not as domesticated as modern cultivars) are commonly grown. The presence of nearby high-alkaloid plants introduces the genes for alkaloid production back into the seeds of the cultivated forms, making the seeds useless for production of low-alkaloid lupins. In countries such as Spain, Portugal, and Italy, where high-alkaloid forms of *L. albus, L. angustifolius*, and *L. luteus* are indigenous, it is difficult to maintain low-alkaloid cultivars. Low-alkaloid varieties of Andean lupin are very unlikely to be grown in Ecuador, Peru, and Bolivia, because the local, high-alkaloid forms prevalent there would contaminate the cultivated material.

## Care of garden plants

*Planting*

Nurseries usually have potted plants available, which can simply be planted in the spring. Plants should be spaced or thinned to 30 to 60 cm apart. Professional propagators frequently start planting stock from cuttings or divisions of the base ('crown'). Occasionally, dormant bare-rooted plants can be obtained. Seeds are the main method of establishing new plants. They are widely available from stores and online sources, and can be planted directly in the soil in late spring (especially in stressful climates) or fall (in areas with mild winters). To hasten development, seeds can also be started in small fibre pots ("plugs"), 4 to 6 weeks in advance of potential spring frost. Perennial forms started from seed won't flower the first year. The seeds are hard-coated, and benefit from scarification. Seeds collected from the plants tend to produce offspring that revert to developing blue-coloured flowers, regardless of the colour of the parent plants. Plants allowed to go to seed will self-seed in the location, and the resulting plants also revert to production of blue-purple flowers.

*Climate*

A climate hardiness zone map for *L. polyphyllus* in Canada is at http://planthardiness.gc.ca/?lang=en&m=24b&speciesid=1004247&phz=t10042471971-2000. It should be kept in mind that cultivars will have different tolerances, and at many locations, microclimates are available that will allow survival in colder regions.

*Exposure*

Full sun is recommended, partial shade is tolerated but flower production will likely be reduced. A location sheltered from wind is preferable for tall varieties.

*Soil & moisture conditions*

Lupins are quite tolerant of soil conditions. In nature the plants are adapted to sandy, nutrient-poor soils, but can tolerate richer soils. Clay soils are unsuitable, but can be improved by mixing in compost. Little to no fertilization is necessary. Soil pH is preferably slightly acidic to neutral. Considerable moisture in the soil is tolerated (the plants naturally colonize some wetlands), but well-drained substrates are preferable. Soils should be moist but not waterlogged. Because the roots can penetrate the soil to a depth of 2 m, once plants are established they are more tolerant of dry top soil.

*Maintaining plants after flowering*

Plants should be deadheaded (spent flowers removed) to prolong blooming, and to encourage a second flowering period in the autumn (which depends on the cultivar). At the end of the season, after the foliage has yellowed, the aboveground stem can be cut down.

*Tips*

Staking may be necessary to prevent very tall varieties from flopping over.

## Curiosities of science and technology

- In ancient Roman times, larger lupin seeds were used as play money, especially in theatrical productions. This association of lupins and money was well known in past centuries in England, and the lupin flower was sometimes called "penny bean." In one episode of the classic British comedy series *Monty Python's Flying Circus*, a Robin Hood character played by John Cleese robbed people of their lupins, a subtlety that very few of the audience would understand.

- "Necromancy" is communication with the dead. In classical Greece, it was sometimes believed that lupins had magical powers, and could be helpful in communicating with departed relatives. The "Oracle of the Dead" was a shrine on the banks of the Acheron River near the ancient city of Ephyra where pilgrims who wanted to contact the spirits of the dead went, first consuming large quantities of "beans" said to facilitate communication. Since the beans of the time included lupins, which back then were likely toxic (unlike modern cultivars), this may have induced hallucinations that led people to believe they were indeed in touch with ancestors.

- The very bitter Andean lupin (*L. mutabilis*) is used as a protective hedge to prevent damage from grazing animals in South America.

- American Indians used wild American lupins for various purposes. When sulphur lupins (*L. sulphureus*) or manycolored lupins (*L. versicolor*) were in flower, the Okanagan and Colville Indians considered it to be a sign that the groundhogs were fat enough to eat. The Kwakiutl rubbed root ash made from seashore lupin (*L. littoralis*) into a newborn baby's cradle to make it sleep well. The Cherokee rubbed sundial lupin (*L. perennis*) on the hands or body to give a person the power to control horses.

- The British Royal Navy constructed over 200 85-man ships designed for minesweeping and escort operations near ports (they could navigate in waters less than 4 m deep), especially during the Second Word War. These were called "flower-class" ships because all of them were assigned unique flower names. H.M.S. Lupin was launched in 1916 and broken up in 1946. For a list of some of the other flower warships see https://military-history.fandom.com/wiki/Arabis-class_sloop. Canadians were assigned many of the ships, renaming them because floral labels seemed insufficiently aggressive. The only extant flower ship is Canadian Navy HMCS Sackville, preserved in a museum in Halifax.

- Seeds of an arctic lupin (*L. arcticus*) from a collared lemming (*Dicrostonyx groenlandicus*) burrow deeply buried in permanently frozen silt of the central Yukon were found to germinate, and it was alleged in a resulting publication in 1967 that they were at least 10,000 years old, and thus the oldest seeds ever germinated. Because the paper appeared in the prestigious journal Science, it has been widely cited. However, in 2009 seeds from the cache were radiocarbon dated and found to have been only 10 years of age when originally collected. Lotus (*Nelumbo nucifera*) is often credited with being the record holder for seed longevity at about 1,300 years, but in 2008 a seed was germinated of date palm (*Phoenix dactylifera*) from the ancient Israeli fortress of Masada, and was radiocarbon dated to be about 2,000 years old. In 2007, Russian scientists employed viable placental tissue from otherwise inviable seeds of narrow-leaves campion (*Silene stenophylla*), an Arctic native of Siberia, to generate viable plants. The seeds were carbon-dated at 32,000 years, so while they were not the oldest seeds to germinate, they represent the oldest preserved plant material to be regenerated.



**Figure 14.** Arctic lupin (*Lupinus arcticus*), a native of Northern Canada and Northwestern North America. Photo by Sandy Brown Jensen (CC BY SA 2.0).

## Key publications


ABC Science. 2012. Plant grown from 30,000 year-old seeds. ABC Science February 22. https://www.abc.net.au/science/articles/2012/02/22/3436826.htm

Ainouche, A.-K. and Bayer, R.J. 1999. Phylogenetic relationships in *Lupinus* (Fabaceae: Papilionoideae) based on internal transcribed spacer sequences (ITS) of nuclear ribosomal DNA. Amer. J. Bot. 86: 590–607.

Dunn, D.B. and Gillett, J.M. 1966. The lupines of Canada and Alaska. Canadian Department of Agriculture Research Branch, Ottawa. 89 pp.

Gladstones, J.S. 1974. Lupins of the Mediterranean region and Africa. Western Australia Department of Agriculture, Technical Bulletin 26: 1–48.

Heller, A.A. 1912. The North American lupines: IV. Muhlenbergia 8: 61–82.

Naganowska, B., Wolko, B., Śliwińska, E., Kaczmarek, Z., and Schifino-Wittmann, M.T. 2005. 2C DNA variation and relationships among New World species of the genus *Lupinus* (Fabaceae). Plant Systematics and Evolution 256: 147–157.

Parrett, R. 1959. The Russell lupin. Its history and cultivation. Holmes & Sons, Andover Hants, U.K. 52 pp.

Phillips, L.L. 1955. A revision of the perennial species of *Lupinus* of North America exclusive of southwestern United States and Mexico. Research Studies of the State College of Washington 23: 161–201.

Porsild, A.E. Harington, R., and Mulligan, G.A. 1967. *Lupinus arcticus* Wats. grown from seeds of Pleistocene age. Science 158(3797): 113–114.

Prass, M., Ramula, S., Jauni, M., Setälä, H., and Kotze. D.J. 2022. The invasive herb *Lupinus polyphyllus* can reduce plant species richness independently of local invasion age. Biol. Invasions 24: 425–436.

Ramula S., and Kalske, A. 2020. Introduced plants of *Lupinus polyphyllus* are larger but flower less frequently than conspecifics from the native range: Results of the first year. Ecol. Evol. 10: 13742–13751.

Ramula, S. and Sorvari, J. 2017. The invasive herb *Lupinus polyphyllus* attracts bumblebees but reduces total arthropod abundance. Arthropod-Plant Interactions 11: 911–918.

Small, E. 2012. Blossoming treasures of biodiversity – 38. Lupins – Benefit and harm potentials. Biodiversity 13(1): 54–64.

Valtonen, A., Jantunen, J., and Saarinen, K. 2006. Flora and lepidoptera fauna adversely affected by invasive *Lupinus polphyllus* along road verges. Biol. Conserv. 133: 389–396.

White, J.G.H., Jarvis, P., and Lucas, R.J. 1995. Fertiliser requirements of Russell lupins. Proc. Agron. Soc. N.Z. 25: 87–90.

Zazula, G.D., Harington, C.R., Telka, A.M., and Brock, F. 2009. Radiocarbon dates reveal that *Lupinus arcticus* plants were grown from modern not Pleistocene seeds. New Phytol. 182: 788–792.


## Key websites


Australian Government, Office of Health and Ageing. 2013. The biology of *Lupinus* L. (lupin or lupine). https://bangladeshbiosafety.org/wp-content/uploads/2017/06/Biology_of_Lupine_Au.pdf [A 64 page, very informative review of various aspects of lupins.]

Beuthin, M. 2012. Plant guide for bigleaf lupine (*Lupinus polyphyllus*). USDA-Natural Resources Conservation Service, Plant Materials Center, Corvallis. 4 pp. https://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/orpmcpg11723.pdf [A basic review, emphasizing weed control in North America.]

International Legume Society (publisher). 2022. Lupins: An update on lupin crops and their potential. J. Internat. Legume Soc. Issue 22. https://www.legumesociety.org/wp-content/uploads/2022/03/legum_perspect_22.pdf [A set of reviews on the genetics and development of the five principal domesticated species.]

Ramula, S. 2021. *Lupinus polyphyllus* (garden lupin). Invasive species compendium. https://www.cabi.org/isc/datasheet/31710 [A review of weedy aspects.]

## Acknowledgements

Brenda Brookes skillfully assembled and enhanced the illustrations for publication. Creative Commons Licenses employed in this article: CC BY 2.0 (Attribution 2.0 Generic): http://creativecommons.org/licenses/by/2.0/; CC BY ND 2.0 (Attribution NoDerivs 2.0 Generic): https://creativecommons.org/licenses/by-nd/2.0/; CC BY SA 2.0 (Attribution ShareAlike 2.0 Generic): https://creativecommons.org/licenses/by-sa/2.0/; CC BY SA 4.0 (Attribution ShareAlike 4.0 International): https://creativecommons.org/licenses/by-sa/4.0/deed.en.




**Figure 15.** A 1900 trade card (public domain) showing lupins in Albania. The Paris-based Guérin-Boutron, a luxury chocolate company, issued well over 1,000 such cards, which are now collector's items.

# Board of Directors CBA/ABC 2022 – 2023


President
Dr. Mihai Costea
Department of Biology
Wilfrid Laurier University
75 University Avenue West,
Waterloo, ON, N1L 3C5 Canada
mcostea@wlu.ca

Past President
Dr. Nicole Fenton
Université du Québec en Abitibi-Témiscamingue,
445 Boulevard de l'Universite
Noranda, QC J9X 4E5, Canada
nicole.fenton@uqat.ca

President Elect
Dr. Santokh Singh,
Department of Botany
University of British Columbia
3156-6270 University Blvd.
Vancouver, BC V6T 1Z4 Canada
santokh.singh@botany.ubc.ca

Vice President
Dr. Anne Worley
Department of Biological Sciences
501 Buller Building,
45 Chancellors Cir.,
University of Manitoba
Winnipeg, MB, R3T 2N2 Canada
Anne.Worley@umanitoba.ca

Secretary
Ms. Deborah Metsger
Botany, Department of Natural History
Royal Ontario Museum
100 Queen's Park,
Toronto, ON M5S 2C6 Canada
debm@rom.on.ca

Treasurer
Dr. Peter Ryser
School of Natural Sciences
Laurentian University
935 Ramsey Lake Road
Sudbury, ON, P3E 2H6 Canada
pryser@laurentian.ca

Director, East
Dr. Jeffery M. Saarela
Research and Collections
Canadian Museum of Nature
240 Mcleod St.,
Ottawa, ON K2P2R1, Canada
jsaarela@nature.ca

Director East
Dr. Etienne Leveille-Bourret
Institute de recherche en biologie végétale
Université de Montreal
4101 Sherbrooke St. E.,
Montreal QC, H1X 2B2 Canada
etienne.leveille-bourret@umontreal.ca

Director East
Ms. Jennifer Doubt
Research and Collections
Canadian Museum of Nature
240 Mcleod St.,
Ottawa, ON K2P2R1, Canada
jdoubt@nature.ca

Director West
Dr. Jana C. Vamosi
Department of Biological Sciences
University of Calgary
2500 University Drive NW,
Calgary, AB, T2N1N4 Canada
jvamosi@ucalgary.ca

Director, West
Ms. Christine Petersen
Biological Sciences,
Thompson River University
Kamloops, BC, V2C0C8 Canada
cpetersen@tru.ca

Director, West
Dr. Jenny McCune
Biological Sciences Department
University of Lethbridge
4401 University Drive
Lethbridge, AB, T1K 3M4 Canada
jl.mccune@uleth.ca

Student Director (West)
Ms. Jacalyn Grey
Department of Biological Sciences
University of Manitoba,
501 Buller Building, 45 Chancellors Cir.,
Winnipeg, MN, R3T 2N2 Canada
greyj@myumanitoba.ca

Student Director (East)
Mr. Corey W. Burt
Department of Biology
Wilfrid Laurier University
75 University Avenue W.
Waterloo, ON N1L 3C5 Canada
burt7030@mylaurier.ca

Bulletin Editor
Dr. Tyler Smith
Central Experimental Farm
Agriculture and Agri-Food Canada
960 Carling Avenue,
Ottawa, K1A 0C6 Canada
tyler@plantarum.ca

Webmaster
Dr. Zoe Panchen
Department of Geography
University of British Columbia
67 Second Ave.,
Ottawa, ON K2P2R1 Canada
zoe.panchen@sympatico.ca