

Bulletin

Entomological Society of Canada
Société d'entomologie du Canada

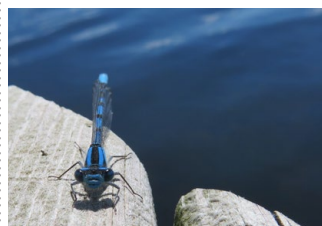
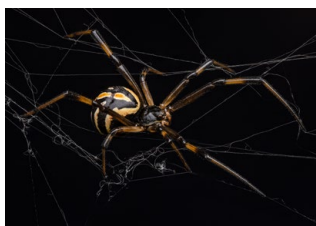
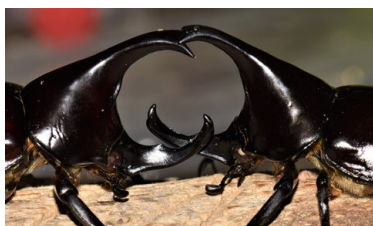
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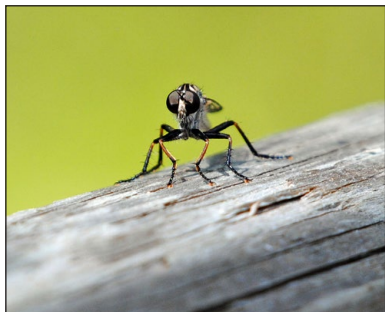
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La légende des photos de la couverture se situe sur la couverture arrière.



Robber fly in the Subfamily Asilinae (Diptera: Asilidae),
photo taken at Trout Creek Point [Summerland, British
Columbia, Canada]

Une mouche à toison de la sous-famille Asilinae
(Diptera : Asilidae) photographiée à Trout Creek Point
[Summerland, Colombie-Britannique, Canada]
[Photo: Robyn DeYoung]



Waggle Dance

It has been a wild and woolly waggle dance over the last year and a half, but I'm proud to say that the Entomological Society of Canada has met and adapted to each challenge in succession. Although I am writing this piece a week before the 2021 JAM, I can already see that it will feature an exciting series of talks and events, all online and skillfully orchestrated by Amro Zayed and Miriam Richards. A huge thank you also goes to Bill Riel for guiding the Society so capably as President for the past year, along with my Executive Council colleagues Gail Anderson, Chris MacQuarrie, Neil Holliday and Ward Strong. We're unfortunately losing Ward as Treasurer at the end of November, having benefitted greatly from his patience and grace as ESC finances continue to evolve. But we are relieved to know that Bryan Brunet is stepping into the Treasurer position in December, and we'll be reconfiguring the duties of that position over the coming months to make it more sustainable. And on the subject of transitions, we are very fortunate that Cedric Gillott is staying on as *Bulletin* Editor for another 6 months to ensure a more effective handoff to Bernie Roitberg.

I am honoured to serve as ESC president for 2022. I've been a member since I was welcomed as a grad student in the early 1980s, and I'm delighted to take part in passing the torch to the next generation of enthusiastic entomologists. Our 1st VP, Chris MacQuarrie,

Danse en 8

La Société d'entomologie du Canada s'est livrée à une danse en huit effrénée au cours de l'année et demie écoulée, mais je suis fier de dire qu'elle a relevé tous les défis qui se sont succédés. Bien que j'écrive cet article une semaine avant la réunion annuelle conjointe de 2021, je peux déjà voir qu'elle présentera une série passionnante de conférences et d'événements, tous en ligne et savamment orchestrés par Amro Zayed et Miriam Richards. Un grand merci également à Bill Riel pour avoir dirigé la Société de manière si compétente en tant que président au cours de l'année écoulée, ainsi qu'à mes collègues du conseil exécutif, Gail Anderson, Chris MacQuarrie, Neil Holliday et Ward Strong. Nous perdons malheureusement Ward Strong au poste de trésorier à la fin du mois de novembre. Nous avons bénéficié de sa patience alors que les finances de la SEC continuent d'évoluer. Mais nous sommes soulagés de savoir que Bryan Brunet occupera le poste de trésorier en décembre, et nous reconfigurerons les fonctions de ce poste au cours des prochains mois pour le rendre plus durable. Et toujours à propos de transitions, nous avons la chance que Cedric Gillott reste au poste de rédacteur en chef du *Bulletin* pour six mois supplémentaires, afin d'assurer un transfert plus efficace à Bernie Roitberg.

C'est un honneur pour moi de servir en tant que président de la SEC pour 2022. Je suis membre depuis mon accueil en tant qu'étudiant au début des années 1980, et je suis ravi de participer au passage du flambeau à la prochaine génération d'entomologistes enthousiastes. Notre 1^{er} vice-président, Chris MacQuarrie, a pris l'initiative d'inviter des représentants des sociétés d'entomologistes amateurs de tout le Canada à notre récente réunion de toutes les sociétés régionales d'entomologie du Canada. J'ai très hâte de travailler avec Colin Favret, notre nouveau 2^e vice-président, car il apporte

took the initiative to invite representatives of amateur entomology societies across Canada to our recent meeting of all the regional entomological societies in Canada. I'm very much looking forward to working with Colin Favret, our new 2nd VP, as he brings a new voice to our deliberations. Our Equity, Diversity and Inclusion Committee is now established, chaired in succession by Christine Noronha and Sebastian Ibarra, and is developing several initiatives, most immediately including a keynote lecture by Maydianne Andrade and an EDI townhall at the 2021 JAM. Our Communications Committee will be permanent in spring of 2022, and will be handling the important task of maintaining a positive presence on diverse media channels. We are also most fortunate that Véronique Martel has agreed to chair the Publications Committee. After all, the *Bulletin* and *The Canadian Entomologist* have been the most enduring face of our Society.

Our challenges for the coming years will be to become more inclusive as a society and community, and to reconfigure structures that help us to thrive in a post-pandemic world. We are nearing 2 years with only online meetings by our executive, our board and the JAM. The now-familiar Zoom format has worked well for us under pandemic circumstances, and our Strauss partners have kept these processes well-oiled. But now we need to think carefully about how much and how best to move back to in-person meetings. Most of us have sorely missed the opportunities for personal connections, unplanned new encounters and greater focus on presentations that the old-style meeting format served so well. On the other hand, we need to ask how we can better include those who might not be able to afford in-person conferences, or those who find the environmental ethics of travel problematic. The good news is that preparations are going very well for our continental-scale 2022 JAM in Vancouver, and planning is advancing for a cozier Canadian-scale meeting in 2023 in Saskatoon. Together with this year's JAM, each of these meetings will give us an

une nouvelle voix à nos délibérations. Notre comité sur l'équité, la diversité et l'inclusion est maintenant établi, présidé successivement par Christine Noronha et Sebastian Ibarra, et développe plusieurs initiatives, dont les plus immédiates sont une allocution de Maydianne Andrade et une session de discussion sur l'ÉDI lors de la réunion annuelle conjointe de 2021. Notre comité des communications sera permanent au printemps 2022 et s'occupera de la tâche importante de maintenir une présence positive sur divers canaux médiatiques. Nous avons également beaucoup de chance que Véronique Martel ait accepté de présider le comité des publications. Après tout, le *Bulletin* et *The Canadian Entomologist* sont le visage le plus durable de notre Société.

Nos défis pour les années à venir seront de devenir plus inclusifs en tant que société et communauté, et de reconfigurer les structures qui nous aident à prospérer dans un monde post-pandémique. Cela fait bientôt deux ans que les réunions de l'exécutif, du CA et que la réunion annuelle conjointe se déroulent uniquement en ligne. Le format Zoom, désormais familier, a bien fonctionné pour nous dans ces circonstances de pandémie, et nos partenaires Strauss ont veillé à ce que ces processus soient bien huilés. Mais nous devons maintenant réfléchir soigneusement à la quantité et à la meilleure façon de revenir aux réunions en personne. La plupart d'entre nous se sont cruellement ennuyés des occasions de nouer des liens personnels, de faire de nouvelles rencontres imprévues et de se concentrer davantage sur les présentations, autant d'éléments que l'ancien format de réunion a si bien servis. D'un autre côté, nous devons nous demander comment mieux inclure ceux qui n'ont pas les moyens de se payer des conférences en personne, ou ceux qui trouvent l'éthique environnementale du voyage problématique. La bonne nouvelle est que les préparatifs de notre réunion annuelle conjointe à l'échelle continentale de 2022 à Vancouver vont bon train et que la planification d'une réunion plus chaleureuse à l'échelle canadienne en 2023 à Saskatoon progresse. Tout comme la réunion annuelle conjointe de cette année, chacune de ces

opportunity to learn to better meet the needs of all Canadian entomologists in the coming years.

As a society, we've been wending our way along a complex pandemic path. To keep our communications constant and communities connected, it takes vigilance, diligence, trust and graciousness. Our many generous and active volunteers make that possible. Without all of you, we could not exist as the wonderfully multifaceted society that we have become. I am convinced that our secret sauce has been our egalitarian devotion to exploring the exuberant diversity of insects and their allies, each pirouette and waggle conveying its own message of optimism. With the exquisite diversity of insects to inspire us to keep moving forward with a common aim, the bugs themselves have much to teach us about balancing persistence and adaptability.

réunions nous donnera l'occasion d'apprendre à mieux répondre aux besoins de tous les entomologistes canadiens dans les années à venir.

En tant que société, nous nous sommes engagés sur la voie complexe d'une pandémie. Pour maintenir nos communications constantes et nos communautés connectées, il faut de la vigilance, de la diligence, de la confiance et de la bienveillance. Nos nombreux bénévoles généreux et actifs rendent cela possible. Sans vous tous, la société aux multiples facettes que nous sommes devenus ne pourrait exister. Je suis convaincu que notre ingrédient secret a été notre dévouement égalitaire à l'exploration de l'exubérante diversité des insectes et de leurs alliés, chaque pirouette et chaque frémissement transmettant son propre message d'optimisme. Avec l'exquise diversité des insectes pour nous inspirer à continuer d'avancer avec un objectif commun, les insectes eux-mêmes ont beaucoup à nous apprendre sur l'équilibre entre persistance et adaptabilité.



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STEP Corner / Le coin de la relève

Rowan French and Matt Muzzatti



Joint annual meeting

The ESC and the Entomological Society of Ontario hosted their joint annual meeting online from 15 to 18 November. Dr Catherine Scott led SEPAC's fundraiser this year by organising the sale of custom-designed bandanas featuring insects from the logos of all the regional societies. Custom artwork was designed by Mary Capaldi. Bandanas will be sold until they are sold-out and can be purchased here - <https://www.etsy.com/listing/1083781950/preorder-esc-bandana-fundraiser-for-the>. Thank you, Catherine!

The Graduate Student Symposium (GSS) is a high-profile opportunity for graduate students near the completion of their degrees to present a more in-depth overview of their thesis research. The GSS speakers are selected by a panel of GSS-alumni early career researchers, and talks represent significant entomological research by graduate students across Canada. This year, SEPAC received a high number of very strong applications to the GSS – thank you to all that applied.

Congratulations to the 2021 GSS Awardees:

Rachel Rix (Dalhousie University)

Phenotypic and molecular response in a beneficial insect predator stimulated by mild stress

Antonia Musso (University of Alberta)

Induced and long-term terpene responses to mountain pine beetle mass attack in lodgepole and jack pines

Réunion annuelle conjointe

La SEC et la Société d'entomologie de l'Ontario ont tenu leur réunion annuelle conjointe en ligne du 15 au 18 novembre. Dre Catherine Scott a dirigé la collecte de fonds du comité des affaires étudiantes et des jeunes professionnels en organisant la vente de bandanas personnalisés représentant des insectes issus des logos de toutes les sociétés régionales. L'œuvre d'art personnalisée a été conçue par Mary Capaldi. Les bandanas pourront être achetés jusqu'à l'épuisement des stocks sur ce lien - <https://www.etsy.com/listing/1083781950/preorder-esc-bandana-fundraiser-for-the>. Merci Catherine!

La Vitrine aux étudiants des cycles supérieurs est une occasion unique pour les étudiants qui sont sur le point d'obtenir leur diplôme de présenter un aperçu plus approfondi de leurs travaux de thèse. Les étudiants conférenciers sont sélectionnés par un panel de jeunes chercheurs ayant présenté dans cette vitrine, et les présentations témoignent de l'importance de la recherche en entomologie menée par des étudiants à travers le Canada. Cette année, le comité des affaires étudiantes et des jeunes professionnels a reçu un grand nombre de candidatures très solides pour la vitrine - merci à tous ceux qui ont postulé.

Félicitations aux lauréats de la vitrine 2021 :

Rachel Rix (Dalhousie University)

Réponses phénotypique et moléculaire chez un insecte prédateur bénéfique stimulé par un stress modéré

Antonia Musso (University of Alberta)

Réponses induites et à long terme de terpènes chez le pin tordu et le pin gris suite à l'attaque massive par le dendroctone du pin ponderosa

Matthew Meehan (Western University)

From individuals to communities: the effect of climate change on ectothermic predators

Asha Wijerathna (University of Alberta)

Interactions of pea leaf weevil (Coleoptera: Curculionidae) with its primary and secondary host plants in Alberta

Matthew Meehan (Western University)

Des individus aux communautés : l'effet du changement climatique sur les prédateurs ectothermes

Asha Wijerathna (University of Alberta)

Interactions du charançon rayé du pois (Coleoptera : Curculionidae) avec ses plantes hôtes primaires et secondaires en Alberta

Research roundup

We continue to publicize graduate student publications to the wider entomological community through our Research Roundup initiative. Check out the ESC blog for the most recent featured articles. If you would like your recently published paper to be featured, send us an email at students@esc-sec.ca. For regular updates about Canadian entomological research, join the ESC Students Facebook page or follow us on Twitter @esc_students.

Getting involved with the ESC

SEPAC is always keen to take on new members! Volunteering for SEPAC is a great way to get involved with the Society and promote entomology across Canada. If you are interested in joining or just have suggestions for new initiatives in the coming year, email us at students@esc-sec.ca, or contact us personally at rowan.french@mail.utoronto.ca or mattmuzzatti@cmail.carleton.ca. We look forward to hearing from you!

Rowan & Matt

Aperçu de la recherche

Nous continuons à faire connaître les publications des étudiants à l'ensemble de la communauté entomologique grâce à notre initiative Aperçu de la recherche. Consultez le blogue de la SEC pour les articles les plus récents. Si vous souhaitez que votre article récemment publié soit mis en vedette, envoyez-nous un courriel à students@esc-sec.ca. Pour des mises à jour régulières sur la recherche entomologique canadienne, rejoignez la page Facebook des étudiants de la SEC ou suivez-nous sur Twitter @esc_students.

S'impliquer au sein de la SEC

Le comité des affaires étudiantes et des jeunes professionnels est toujours prêt à accueillir de nouveaux membres! Le bénévolat au sein du comité est une excellente façon de s'impliquer dans la Société et de promouvoir l'entomologie au Canada. Si vous êtes intéressé à vous joindre à nous ou si vous avez des suggestions de nouvelles initiatives pour l'année à venir, envoyez-nous un courriel à students@esc-sec.ca, ou contactez-nous personnellement à rowan.french@mail.utoronto.ca ou mattmuzzatti@cmail.carleton.ca. Nous avons hâte de vous lire!

Rowan & Matt

Thesis Roundup / Foisonnement de thèses

SEPAC wants to recognize and celebrate the accomplishments of newly minted entomology grads! If you or a student you know has recently defended an entomology-related thesis at a Canadian University, please send the following details to students@esc-sec.ca: student's name, date, degree, thesis title, supervisor(s), and university. This information will appear on the ESC website and in the next ESC Bulletin.

Congratulations to the following graduate students for successfully defending their entomologically oriented theses!

Le comité veut reconnaître et célébrer les réalisations des nouveaux diplômés en entomologie! Si vous, ou un étudiant que vous connaissez, a récemment soutenu sa thèse dans un domaine lié à l'entomologie dans une université canadienne, merci d'envoyer les informations suivantes à students@esc-sec.ca: nom de l'étudiant, date, diplôme, titre de la thèse, directeur(s) et université. Cette information apparaîtra sur le site web de la SEC et dans le prochain Bulletin de la SEC.

Félicitations aux étudiant suivants pour leur succès à soutenir leur thèse!

Mahmoud El-Saadi. 2021, MSc. Carleton University. Investigating a link between cold stress and bacterial leak from the gut of *Locusta migratoria*. Supervised by Heath MacMillan (Carleton University).

Serita Fudlosid. 2021, MSc. Carleton University. Developmental effects of microplastic ingestion on the tropical house cricket *Gryllodes sigillatus*. Supervised by Heath MacMillan (Carleton University).

Emily Hanuschuk. 2021, MSc. University of Manitoba. The effects of human-driven landscape disturbance on wild bee communities and plant-bee networks across southern Manitoba, Canada. Supervised by Jason Gibbs (University of Manitoba).

Reid Miller. 2021, MSc. University of Manitoba. Management and landscape effects on beneficial tallgrass prairie insects – a study of bees and beetles. Supervised by Jason Gibbs (University of Manitoba).



2021 ESC Student Award Recipients

Tyler Wist

Chair, ESC Student Awards Committee

Our ESC student awards were presented at the ESC Annual Members Meeting (19 October 2021). Thanks to Past-President Gail Anderson for presenting the awards.

Many thanks to the committee members of the ESC Student Awards Committee who judged the 2021 submissions: Marla Schwarzfeld, Christian Hébert, Adam Brunke, Lisa Poirier, Jayne Yack, Joanna Konopka, and our ex officio member, Neil Holliday (ESC Secretary). Thanks also to the many supervisors and referees who provided reference letters to support the students' applications. We appreciate how much time and effort it takes to create a reference letter.

Emily Lemke (Simon Fraser University, right) was awarded the **MSc Post Graduate Scholarship** and the **John H. Borden Scholarship** for her work on the communication ecology of click beetles, agricultural pests found throughout North America, using a recently developed pheromone lure.



Matthew Meehan (Western University, left) was awarded the **PhD Post Graduate Scholarship** for his studies on how soil mesostigmatid mites are affected by climate warming at multiple ecological levels. Matthew was also awarded a **Danks Scholarship**.



Two **Danks Scholarships** were awarded this year to **Matthew Meehan** (above) and **Denis Boudreau** (University of Moncton, right). Denis Boudreau is studying the effect of forest niches on beetle community composition and, as noted above, Matthew Meehan is investigating climate warming effects on the composition of mesostigmatid mite communities.



Two **Dr Lloyd M. Dosdall Memorial Scholarships** were awarded this year.

Dylan Sjolie (University of Saskatchewan, left) was one recipient for his agricultural entomology work on the population dynamics of the wheat stem sawfly in his MSc program. **Justis Henault** (University of Winnipeg, right) was the other recipient for his work on the larval feeding behaviour and microhabitat of the endangered Powersheik skipperling in Manitoba.



The **Keith Kevan Scholarship** was awarded to **Linley Sherin** (McGill University, right) for her studies on the origin and diversification of parasitoid flies in the suborder Brachycera.



The **ESC Graduate Research Travel Scholarships** were awarded to help fund field research at the PhD level to **Kelly Murray-Stoker** (University of Toronto, left) who is studying the effects of



urbanization using stream caddisfly communities across the United States and Canada and to **Anthony Zerafa** (McGill University, right) who is working on ecological monitoring of terrestrial arthropods in the Arctic.



2022 ESC Student Awards / Bourses d'études de la SEC 2022

Tyler Wist

Chair, ESC Student Awards Committee / Président, Comité des bourses d'études de la SEC

Hello ESC students! Please submit your applications for the ESC Student Awards by 1 March 2022 to be eligible for the awards. Please read the details on the webpage carefully ([Student Awards – Entomological Society of Canada \(esc-sec.ca\)](https://esc-sec.ca)) and submit all applications by email to the ESC Association Coordinator at info@esc-sec.ca. Awards available this year are the Biological Survey of Canada Scholarship (\$2000), the John H. Borden Scholarship (\$1000), two Danks Scholarships (each at \$1500), two Dr Lloyd M. Dosdall Memorial Scholarships (\$1000 each), Postgraduate Scholarships (MSc and PhD, each at \$2000), and the Graduate Research Travel Scholarships. For all awards, two letters of reference are required (see website) as well as all of your official grades from undergraduate to your current level of education.

Bonjour aux étudiants de la SEC ! Veuillez soumettre vos candidatures pour les bourses d'études de la SEC avant le 1^{er} mars 2022 afin d'être éligible. Veuillez lire attentivement les détails sur la page web ([Bourses d'études - Société d'entomologie du Canada \(esc-sec.ca\)](https://esc-sec.ca)) et soumettre toutes les demandes par courriel à la personne responsable de la coordination de l'association de la SEC à info@esc-sec.ca. Les bourses disponibles cette année sont la bourse de la Commission biologique du Canada (2000\$), la bourse John H. Borden (1000\$), deux bourses Danks (à 1500\$), deux bourses commémoratives Dr Lloyd M. Dosdall (à 1000\$), des bourses d'études supérieures (maîtrise et doctorat, chacune 2000\$) et des bourses de voyage pour la recherche. Pour toutes les bourses, deux lettres de recommandation sont requises (voir site web) ainsi que toutes vos notes officielles depuis le premier cycle jusqu'à votre niveau d'études actuel.



Entomological Society of British Columbia

The Entomological Society of British Columbia held another successful Conference and Annual General Meeting online this year from 19–21 October 2021. Over the 3 days, participants heard 31 contributed papers from undergraduate and graduate students, government scientists and academic faculty. The conference theme was “Entomology of the Future” and many of the participants took that theme to heart with presentation topics such as LED lighting effects on trophic interactions or AI-powered smart insect traps. On the final day of the conference, attendees heard two plenary speakers. Dr Zoë Lindo, of Western University, presented her exciting research on the biogeography of oribatid mite communities in Canada. Dr Lindo described her past work on mites in the suspended soils of old-growth forests, and more recent studies on the trans-Pacific migration of Asian mites rafting on tsunami debris from Japan to BC. Her talk prompted many questions and a lively online discussion. To close out the conference, Dr Staffan Lindgren, Professor Emeritus from the University of Northern British Columbia, gave a thoughtful presentation on ‘Entomology as a Career’. Citing the many twists and turns his career as a forest entomologist has made, he left all those listening with some valuable advice: *Persevere through the hard times, build good networks, take advantage of good luck when you can, and embrace diversity in all its forms.*

Each year the Society gives several awards for outstanding student presentations at the conference. **Clarissa Capko** won 1st place in the undergraduate category with **Lana Harach** and **Kenza Zobaida** being tied for 2nd place. **Jaime Chaliserry** was awarded 1st place in the Master’s category with **Elton Ko** taking 2nd place. **Asim Renyard** won 1st place in the Doctoral presentations and Andreas Fischer came in second. The judges had some difficult decisions to make but thanked all the students for the extremely high calibre of their presentations.

Additional award winners were **Emily Lemke** and **Jaime Chaliserry** who each won the Dan Johnson Award for best submitted manuscript in the field of insect ecology. **Asim Renyard** and **Sam Meraj** each won an ESBC Graduate Student Scholarship.

Following the conference, the Society held its Annual General Meeting. Among other items of business, members elected several new board members. Julie Carillo was elected 2nd Vice President, Markus Clodius was re-elected Treasurer, Asim Renyard was re-elected as Student Director, and Dan Peach was re-elected as Director.



Entomological Society of Alberta

The ESA hosted a virtual conference on 15–16 October 2021. The online conference was well attended with ca. 50 registrants. There were 21 oral presentations and 4 posters. The Annual General Meeting of the Society followed the second day. **Olivia de Bourcier** was presented with the Undergraduate Research Award. **Dave Lawrie** was recognized for his contributions to entomology throughout the community with the Fredrick S. Carr Award. Next year the ESA meeting will be hosted in southern Alberta with the exact location and dates to be announced.

Dr Mindi Summers and colleagues at the University of Calgary have been working on digitization of over 230 Alberta bee species. This resource is publicly accessible via: <https://biodiversity.ucalgary.ca/>



Entomological Society of Saskatchewan

USask announces new Insect Research Facility

The new University of Saskatchewan (USask) Insect Research Facility (USIRF) will be the first of its kind in a western Canadian university and one of only a handful of facilities in the country specifically designed to conduct research on arthropod plant pests and beneficial insects.

Funding for the design and construction of the USIRF will be provided from a variety of sources. Contributions include \$500 000 from Western Grains Research Foundation (WGRF) as part of its \$32 million Capacity Initiative. Additional funding includes \$285 000 from the Canada Foundation for Innovation, \$70 000 from the Saskatchewan Canola Development Commission, \$70,000 from Saskatchewan Pulse Growers, \$70 000 from the Saskatchewan Wheat Development Commission, and \$50 000 from USask.

The USIRF will be led by Dr Sean Prager, the first entomologist at USask's College of Agriculture and Bioresources. He was specifically recruited in response to increased need for entomological research, training and instruction in Saskatchewan and at USask.

"This new facility will add substantial research capacity to the University of Saskatchewan," said Prager. "It will allow us to work with the USask Crop Development Centre, Agriculture and Agri-Food Canada and USask plant breeders to identify problematic resistance traits to pests that are yet to be established. This provides a massive head start when you consider the time it takes to breed new varieties and cultivars. We will also be providing training opportunities to develop advanced economic entomological skills that have become increasingly important."

"Insects can be harmful as crop pests or beneficial as crop pollinators or as natural enemies to insect pests," said WGRF Board Chair Dr Keith Degenhardt. "Research at USIRF will be positive for producers and will find new methods for predicting pest outbreaks and decreased pesticide use."

"This new research facility will result in new and sustainable pest management strategies for important Western Canada field crops including canola, wheat, barley, oats and pulses," added Garth Patterson, WGRF executive director.

The USIRF will be located inside the Agriculture Building on the USask Saskatoon campus. Architectural planning has already begun and once complete, the USIRF will hold dozens of different species of insects at a time.

(This article appeared first in USask's Discovery Digest, and is reprinted here by permission of the author.)



Berenice Romero

High magnification image of a pea aphid (*Acyrtosiphon pisum*). Pea aphids are one of many species of insects that will be studied in the new University of Saskatchewan Insect Research Facility.

Annual General Meeting

The ESS will be holding its AGM virtually on 3 December 2021, with student presentations and a business session to follow.



Entomological Society of Manitoba

The Entomological Society of Manitoba Executive has recently agreed to make a financial donation to EntoPOC to support BIPOC entomologists wishing to join entomological societies.

The ESM will be holding their annual meeting virtually. Gail Anderson (Simon Fraser University) is the keynote speaker for a planned symposium on Arthropods in a Human World. The date has not been finalized at the time of this report, but please see the ESM website for updates (<https://home.cc.umanitoba.ca/~fieldspg/>). Student paper submissions will be welcomed. The call for papers will be announced via email to members and posted on the ESM website. Submissions can be made to the Scientific Program chair Vincent Hervet (vincent.hervet@agr.gc.ca).

The *Proceedings of the Entomological Society of Manitoba* welcomes submissions on topics in any area of entomology. Manuscripts can be sent to either co-editor Kelsey Jones (kelsey.jones@canada.ca) or Jason Gibbs (jason.gibbs@umanitoba.ca).



Entomological Society of Ontario

The ESO, as well as the Ontario Agricultural College at the University of Guelph, hosted a virtual bug day on 22 August 2021 organized by Aleksandra Dolezal, Jenny Gleason, and Marlee Lyle. This group of individuals presented lots of cool insect photos as well as many fun facts on Facebook ('Guelph

Bug Day'), Twitter (@GuelphbugDay), YouTube (<https://bit.ly/35Xo5Pt>) and Instagram (@guelphbugday).

At this event, the winner of the #GuelphBugDay2021 iNaturalist project was announced as @AnibalHCastillo with 54 insect observations! What an amazing demonstration of local biodiversity! The runner up was @ETHouless with 41 observations!

It is anticipated that Guelph Bug Day 2022 will be in person.



Equity, Diversity, and Inclusion - Thoughts, Opinions, and Comment Sebastian Ibarra Jimenez

Hi! Welcome to the newest section of the *Bulletin*, a space open to folks wishing to share ideas, publications, and content related to equity, diversity, and inclusion (EDI). This space has been carved out by the ESC's EDI Committee and the ESC's Executive Council (EC) in response to calls for actions that acknowledge the systemic barriers faced by entomologists, and other scientists, who identify as members of groups other than the mainstream community. This space is not, however, a solution to these barriers, but an invitation for folks to learn from one another, an open space to a diverse group of voices who in the past and the present have found it difficult to speak their truths.

Because of our historical, cultural, structural, and other privileges, some of us have freely pursued our passion for arthropods. A subset of us have succeeded in finding a career path that fulfills us, both personally and professionally. However, there are folks in our field who have or are currently experiencing denial of opportunities, oppression, and discrimination just because of their gender identity, sexual orientation, ethnicity, religion, skin colour, disability, country of birth, and more. Many more never had the opportunity to explore the fascinating world of arthropods at school or university because they never had the resources to do so. This space is devoted to raising awareness about the disparities that exist within our field, in Canada and beyond. For these reasons, it is part of the EDI Committee's mandate to create and submit EDI related content to the *Bulletin*.

I believe that by listening to one and other, and learning from our colleagues' experiences and suggestions, we will become a more welcoming society. I know that the endless path towards EDI is not a pleasant road; some of us will feel uncomfortable, embarrassed, sad, impotent, and more during our journey. While we listen to our friends express their ideas and suggestions, it is important to remember the courage it takes to speak up on one's behalf. Not all of us have the same agency. Thank you to all willing to listen and thank you in advance to all who will submit paper recommendations and comments for us to read.

The first submission under this new section, and an example of sought-after content, is brought to you by EDI Committee Members Diana Wilches Correal (Agriculture and Agri-Food Canada, Lethbridge Research and Development Centre) and D. Catalina Fernandez, a PhD student at the University of Windsor. Diana and Catalina invite us to read the two publications referenced below, for which they have provided summaries. Thank you and talk soon!

Decoloniality and anti-oppressive practices for a more ethical ecology. Trisos, C. H., Auerbach, J., and Katti, M. 2021. *Nature Ecology and Evolution*, **5**: 1205–1212.

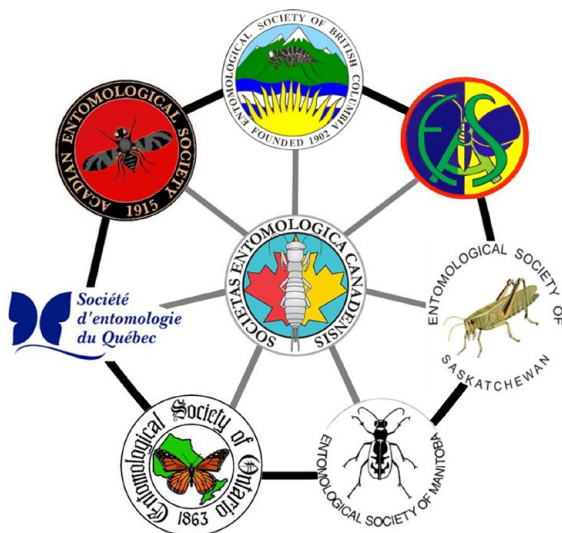
In this perspective, the authors summarize the legacy of colonialism in ecology and how the discipline can thrive through inclusiveness. The perspective suggests that ecologists' awareness of a long history of resource extraction, power imbalances, and dispossession of lands and existing knowledge is a first step to making ecology inclusive. Then, awareness should be followed by decoloniality (i.e., actively undoing those systems and ways of thinking). The authors outline five positive actions that will promote more effective, creative, and inclusive ways of practising

Sebastian Ibarra Jimenez works as a Pest Management Research Scientist, for British Columbia's Ministry of Forests, Lands, Natural Resource Operations and Rural Development. Sebastian is ESC's Director Equity, Diversity, and Inclusion, and chairs the EDI Committee. Feel free to contact Sebastian at sebsibarra@gmail.com.

ecology. These are: **1) decolonize your mind** by combining multiple sources of knowledge and ways of communicating science, **2) know your histories** by acknowledging the past and recent role of ecology in ongoing inequalities, **3) decolonize access** by addressing issues of research ownership, data sovereignty, and data availability, **4) decolonize expertise** by amplifying and giving credit to local knowledge as expert knowledge, and **5) practice ethical ecology in inclusive teams** by creating diverse research groups that allow members from different backgrounds to contribute and develop new knowledge.

Diversity beyond insects in entomology and allied disciplines. Orfinger, A. B. 2020. *Journal of Insect Science*, 20(5): 4.

In this short letter published in the *Journal of Insect Science*, the author discusses the impact of education on the lack of diversity in the field of entomology within the United States of America. The letter introduces the problem as the striking underrepresentation of Black and Latin American students in entomology and parasitology graduate programs. The author links the root of the problem to the long history of inequities experienced by these minorities since the times of slavery, constraints in the early years of schooling, lack of early exposure to entomology, little sense of belonging in ecology and related disciplines, and impediments in post-secondary education. Additionally, the author highlights the importance of diversity in entomology and provides examples of how both the discipline and the general community will benefit from diverse perspectives and ideas by increasing collective intelligence, innovation, and science quality. The letter is, as the author calls it a “renewed call to arms”. It encourages those in a position of authority within the field of entomology to mentor, collaborate with and support students or colleagues of all ages, backgrounds, and minority groups, while educating themselves on exclusion and racial issues to promote a more inclusive academia.



Wider aspects of a career in entomology.

16. Exploring insect cold hardiness

Hugh V. Danks

This series of articles outlines some ancillary aspects of my entomological career, for the potential amusement of readers. It reports the sometimes unexpected challenges of working in new places and in the real world, an approach that serves also to expose some conclusions about research and other entomological activities and some information about insects and their environments.



My early work in Canada focussed on the cold hardiness of chironomid midges from shallow ponds in temperate and arctic regions (see *ESC Bulletin* 50: 50, 173). Those studies showed that many chironomid larvae tolerate freezing itself—unlike most cold-hardy insects, which supercool, preventing ice from forming in their bodies. Winter survival in chironomids depends too on further adaptations (including special winter cocoons), as well as on habitat selection and other ecological traits. Moreover, most temperate ponds were much less cold in winter than might have been anticipated.

I continued to study insect cold hardiness throughout my career, although my own cold hardiness seemed to diminish with time! A propensity to synthesize relevant information from the literature¹ was encouraged in particular because other commitments reduced the feasibility of fieldwork and experiments. Nevertheless, a few modest research projects provided stimulus and context for my reviews, even though the research itself was not always complete enough to submit for publication.

Large and flowing aquatic habitats were of particular interest because winter conditions differ so much from the shallow ponds already examined, yet chironomid midges are equally abundant. However, lakes (e.g., Figure 1) are often hard to access, troublesome to sample in cold weather, and unsafe when incompletely frozen. For example, even “solid” ice seldom freezes uniformly, snow cover slows down freezing, and ice that has thawed and refrozen is only half as strong as clear new ice. Sampling is hampered by intermittent melts, causing water (including seepage from the shore) to refreeze into the surface snow, and by ice shoves, which pile up ice at the edge of the largest lakes. Even in summer, deep central areas are challenging to sample effectively, and shoreline substrates are disturbed by waves.

Running water presents additional problems. Water movement hinders ice formation, and flowing water steadily erodes and weakens existing ice from below, making



Michael J. Bennett (CC BY-SA 3.0)

Figure 1. A frozen lake in Ontario.

¹Even some of my early papers devoted as much space to discussions as to results!

Hugh Danks (hughdanks@yahoo.ca) retired in 2007 after many years as head of the Biological Survey of Canada. In that role, he helped to coordinate work on the composition and characteristics of the arthropod fauna of the country, and to summarize the results. In addition, his research studied cold hardiness, diapause, and other adaptations to seasonality in northern regions.



Figure 2. Two midwinter views of a fast river, largely unfrozen despite very low temperatures.

ivers treacherous (Figure 2). In spring, the thaw generates fragments of ice (Figure 3) and massive run-offs, which may destroy stream nets and other equipment.

These impediments can be overcome, but only with expensive logistic support (including power boats), and sampling equipment that can cope with deep or fast-flowing water. Clearly, it was both impracticable and dangerous to work alone—especially when armed only with a canoe paddle!

Terrestrial habitats can be accessed more easily, although my initial overland travel in snowshoes was relatively slow (see *ESC Bulletin* 50: 54). Skiing is supposedly more efficient, but my first exposure was as a beginner in a downhill skiing class, with skis that were far less advanced than they are today. Made of fibreglass with metal edges, those thick, heavy, and virtually inflexible planks were hard to control, despite massively engineered bindings and boots of bone-crushing rigidity. During my lessons, stories emerged about beginners who had broken their legs in slow twisting falls—whilst merely standing around in their skis listening to the instructor. I tried cross-country skiing instead, which proved more useful.

In the woods, most winter habitats are well protected beneath the excellent insulation provided by snow (cf. Figure 4). Safeguarded in this way, many species overwinter under leaves and logs, or in the soil. Some spiders and other arthropods even remain active at the insulated ground surface throughout the winter. Fallen trees (Figure 5) shelter some cold-hardy insects, including



Figure 3. Ice fragments on a large river in spring.



Figure 4. Snow above fallen leaves trapped around shrubs, providing protected overwintering habitats for many insects.



Figure 5. Fallen logs in winter.

Beatriz Moisset (CC BY-SA 4.0)



Figure 6. The ichneumonid *Ichneumon laetus*, which overwinters under bark. Length about 1.4 cm.



Beatriz Moisset (CC BY-SA 4.0)

Figure 7. Larvae of the pyrrhoid beetle *Dendroides canadensis*, which overwinters under bark. Length up to about 2 cm.

H. Danks



Figure 8. Loose bark on a dead tree trunk above the snow.



Andy Reago & Chrissy McLaren
(CC BY 2.0)

Figure 9. The depressariid [formerly oecophorid] moth *Agonopterix pulvipennella*, which overwinters under bark above the snow. Length about 1 cm.

ichneumonids (Figure 6) and beetle larvae (Figure 7).

Habitats under the loose bark of dead standing trees (Figure 8) become extremely cold and dry, and insects overwintering there should be particularly well adapted to harsh conditions. I examined the habitats, identified their characteristic properties, collected specimens—adults of a few species of ichneumonids and flat-bodied moths (e.g., Figure 9), and adults and larvae of several other taxa—and integrated findings from the literature. That information allowed me to design a complex sheet to record data on the temperature, moisture content, orientation, concealment, and other features of potential overwintering sites, as well as the location, posture, and behaviour of overwintering insects. Two or three species showed modest correlations, such as a preference for north-facing or for south-facing sites. However, despite long hours of searching, too few specimens were found to allow meaningful analyses. Some years later, uncomfortable memories of those labyrinthine data sheets were stirred by certain German authors, whose papers (on other subjects) presented meagre data but paid fanatical attention to minutely detailed classifications!

Outside the woods, the seed heads of cattails are abundant and fully exposed to winter cold (Figure 10). Heads that turn ragged and look “moth-eaten” may indeed house caterpillars of the shy cosmet moth (Figure 11). However, the heads are frayed not only by the caterpillars (which produce silk that hinders the dispersal of seeds), but also by normal seed dispersal, and damage by chickadees (which search for the larvae by pulling the heads apart).



Figure 10. Cattail seed heads: in summer (L); and in winter (R). Seed-head length about 20 cm.

A given seed head may contain only a few individuals, and birds or parasitoids may already have found them. In any case, the larvae are difficult to sort out from the tufts of cottony hairs that serve to disperse the seeds. A typical head contains more than 200 000 seeds, so careless handling causes thousands of fine tufts to float off into the air. Consequently, obtaining and studying the tiny caterpillars was laborious, and detailed experiments on their cold hardiness did not prove worthwhile². That project nevertheless confirmed the value of considering information about habitats, life cycles, parasites, predators, and so on, before focussing on some limited aspect of cold hardiness.

During the project, a fellow scientist was kind enough to ask their technician to help me sort out the larvae. Unfortunately, the technician specialized in work avoidance. He was assigned relatively few tasks, because his meagre efforts often saved a researcher less time than would be needed to instruct him³. Perhaps a project on cattails would have been feasible if he had been diligent, like most employees⁴.

Stems of goldenrod are exposed above the snow in winter, and several insect species make galls on them. These abundant plants (Figure 12) in fact comprise many species of *Solidago*, about

²Apparently, no detailed study of the cold hardiness of this species has yet been made. It is widely distributed across the world, including areas with warmer winters. In the British Isles it is known as the bulrush cosmet moth.

³Regrettably, his supervisor had avoided the unpleasant tasks of proper documentation and critical annual appraisals, even though his behaviour was well known. After several years of “satisfactory” appraisals, it was difficult to hold him to account.

⁴However, one other slacker spent hours busily walking along the corridors with documents, as though he was using the library or transferring data—but the sheets of paper he carried were merely props to help him avoid real work!



Figure 11. A cattail seed head collected in winter. Extracted from that same seed head, and circled mid-R at the same scale, is an overwintering larva of the shy cosmet moth (cattail seedhead moth), the cosmopterigid *Lymnaecia phragmitella*, about 4 mm long.

Figure 12. Seasonal development in stands of goldenrod. L and R from top to bottom: growing plants; plants with galls; plants in flower; dead plants and seed heads in early winter.



a dozen of which are common in Ontario. They are characteristic of disturbed ground and among the first species to invade after disturbance. The perennial plants multiply through rhizomes as well as seeds (and can regenerate after fire), so they persist for a number of years until succeeded by shrubs. However, succession became more difficult to track near Ottawa as productive fields were replaced by housing subdivisions, shopping malls, and country homes!

The most common galls belong to the goldenrod gall fly, which spends much of its life inside the gall (Figure 13) and overwinters as a fully grown larva (Figure 14)⁵. The larva makes an exit tunnel nearly to the surface of the gall before overwintering.

Much work on cold hardiness has been done on the larvae, which survive when frozen solid. Large quantities of the cryoprotectant glycerol (and some sorbitol) are sequestered for the winter. Larvae survive less well and produce less fecund adults when (despite greatly depressed respiration rates) their energy reserves are depleted by warm

⁵Adults emerge in late spring and oviposit in the growing tips of goldenrod.



Figure 13. Galls of the goldenrod gall fly, the tephritid *Eurosta solidaginis*: in summer (L); and in winter. Gall diameter about 2 cm.



Figure 14. Winter gall of the goldenrod gall fly, opened to show the larva within.

interludes, which may also subject them to freeze-thaw cycles.

The gall flies are part of a complex system, just like the cattail moth. For example, they are common on only three of the species of *Solidago*, and their preference for those species varies regionally. The gall fly appears to invade most goldenrod stands relatively rapidly, but its local abundance is by no means random. Some long-established sites build up large populations (e.g., Figure 15).

A number of parasitoids and a mordellid beetle predator attack the larvae in summer. Chickadees and downy woodpeckers peck into the galls during winter, and are reported to tap on each gall to locate the exit channel and so retrieve the morsel inside more easily. The attack of parasitoids is more successful on smaller galls, but birds prefer larger ones. Some parasitoids overwinter as larvae in the galls (Figure 16), and must have comparable cold hardiness.

The elliptical galls of the goldenrod gall moth also occur on goldenrod (Figure 17). The larva overwinters in a silk-lined cavity just below the gall⁶. In this species, substantial amounts of glycerol act as an antifreeze down to temperatures close to -40°C. The moth too belongs to a community of parasitoids and other associates, although apparently birds do not seek the larvae.

Most ecological factors have not been integrated with the physiological work. Presumably, cryoprotectants and energy reserves are affected by the size of the larva, in turn possibly correlated with the gall size that influences natural enemies. However, understanding the relationships among these and other factors would require extensive research, which was not feasible for me.

Nevertheless, in due course my interest in the gall fly highlighted another aspect of its winter survival, and showed that joint projects, even limited ones, can have great value. One possible feature of frozen insects came to light during my early studies in the high arctic, when chironomid larvae collected from frozen ponds were embedded for cytological examination by

⁶The gelechiid moth *Gnorimoschema gallae-solidaginis* also produces an elliptical gall on goldenrod, but the species overwinters as an egg, and the galls are empty in winter.



H. Danks

Figure 15. Winter stems of goldenrod, showing the potential local abundance of galls.



H. Danks

Figure 16. Larva of the eurytomid *Eurytoma gigantea* (Chalcidoidea) inside a gall of the goldenrod gall fly.



H. Danks

H. Danks

Figure 17. Galls of the goldenrod gall moth, the tortricid *Epiblema scudderiana*: in summer (L); and in winter. Maximum gall diameter about 1 cm.

my colleague Bob Byers (see ESC *Bulletin* **50**: 175). Back in Ottawa, he saw that the mitochondria appeared to have broken down. Bob had no way to follow up or verify the observation⁷, and thought that it might be an artifact in material prepared under difficult field conditions. Eventually, however, mitochondrial degradation was documented independently by Olga Kukal in the arctic woollybear (Figure 18); and later still, Olga and I collaborated in a project on that species.



O. Kukal

Figure 18. Arctic woollybear, the larva of thymiantriine eretid *Gynaephora groenlandica*. Caterpillars overwinter many times during the long life-cycle. Length about 3.5 cm.

Another cooperative project, with David Levin in his laboratory at the University of Victoria, British Columbia, used modern techniques to examine mitochondria in both the goldenrod gall fly and the arctic woollybear. Seasonal degradation of mitochondria was confirmed in the caterpillars, with concomitant reduction of mitochondrial DNA. Similar changes took place in gall-fly larvae, and mitochondrial DNA and respiration rates increased very rapidly when larvae were warmed. These findings suggest that mitochondrial degradation may be widespread, at least in species that tolerate freezing like the gall fly, the arctic woollybear, and arctic chironomids⁸. Perhaps, by suspending metabolism, it relates to energy use or molecular protection, not simply to reduced respiration.

My earlier cooperative venture at the same university involved a visit to the laboratory of Richard Ring, to follow up his initial (unpublished) finding of glycerol in pupae of winter moth (Figure 19) and Bruce spanworm (*Operophtera bruceata*), which remain dormant for several months during the dry summer. I planned to generate additional data using high-pressure liquid chromatography (HPLC)⁹, but was not able to calibrate the chromatograph. A graduate student (who had used the same equipment successfully) tried to assist me, but made no progress either. Only then did we discover that the machine had recently been made available to a large class of untrained undergraduate students, and was now unusable!



Donald Hobern (CC BY 2.0)

Figure 19. Pupa of the winter moth, the geometrid *Operophtera brumata*. Length about 1 cm.

Despite this setback, the existing data for pupae prompted me to synthesize published information to highlight the fact that key adaptations for resistance to dehydration in summer are the same as those known for cold hardiness in winter: the production of various solutes ("cryoprotectants") such as glycerol, adjustments of water content, and selection of sheltered habitats, suggesting that many of the physiological and ecological adaptations interpreted as conferring cold hardiness serve too to ensure survival in dry environments.

⁷Moreover, soon afterwards the Canada Department of Agriculture discontinued its support of projects on insect cold hardiness.

⁸Later work by others showed no such response in the goldenrod gall moth, which avoids freezing by supercooling.

⁹Now referred to as high-performance liquid chromatography.

A subsequent joint project documented the presence of trehalose in pupae of the winter moth, and emphasized its potential roles. This sugar has a number of significant properties, in addition to its ability (like many cryoprotectants) to depress the freezing point of solutions. For example, trehalose has low reactivity, and when dried to very low water levels forms a glass, even at biologically relevant temperatures. Glasses are amorphous rather than crystalline, a structure that appears to prevent proteins and other substances in the glass from undergoing distortions or harmful chemical changes. Trehalose can therefore protect tissues against injury from both desiccation and freezing, as reported in diverse organisms.

The fact that key adaptations resist both dryness and cold is now widely accepted, prompting further research, and confirming that even small projects, especially cooperative ones, can produce useful results.

My short stay in Japan in 2004–2005 included a minor role in a project on the striped rice stem borer (the crambid *Chilo suppressalis*). The species overwinters as a fully grown larva, which accumulates glycerol (and some trehalose) and can survive when frozen. Work with fat-body cells showed that water-transport proteins (aquaporins, located in the cell membrane) are essential to survival, by mediating the replacement of water by glycerol in the tissues. This function of aquaporins is now well established, and even includes research on a familiar species: the goldenrod gall fly¹⁰.

My explorations of cold hardiness showed the value of cooperative work; and they generated additional conclusions. First, of course, there are practical barriers to field studies in winter—apart from preventing frostbite, avoiding temporary or permanent immersion in partly frozen water bodies, and offsetting the ways in which Murphy's Laws of Fieldwork conspire to hamper research. Taking samples and recording data are particularly challenging in heavy or blowing snow—and any tool briefly laid down soon disappears. Labelling has to be foolproof even in thick gloves, or when samples just taken under the ice of ponds and lakes are wet. In the days before compact audio devices, it was difficult to record notes, especially detailed written descriptions rather than simple measurements.

Documenting information with photographs is troublesome in winter. Gloves hinder adjustment and activation of the camera, and equipment or batteries may function poorly in cold weather. In snowy places, especially in sunshine, photographs can easily be overexposed, producing highly



Figure 20. A snow-covered creek in winter: photographed with adequate exposure (L); and overexposed (R).

¹⁰Consistent with an obsession with goldenrod, the caterpillar of *Agonopterix pulvipenella*, the moth shown in Figure 9, feeds on that plant.

saturated images with little definition (cf. Figure 20)¹¹. People seeing the most extreme examples might wonder why anyone had bothered to photograph a white bedsheet ...

Another conclusion from my explorations is that staying in the same field of study has many advantages. Becoming familiar with the full extent of a subject area reveals its complexity, and is useful to explain specific findings as well as suggest fruitful lines of enquiry.

A researcher need not investigate every aspect personally, of course, but a wide approach helps to identify projects that are feasible, productive, and informative. Moreover, realizing these benefits by integrating information already published is possible without additional funding!

Considering insect cold hardiness as broadly as possible reveals that the habitat conditions, life cycles, and physiology of species are interlocked. Therefore, understanding the full significance of any one adaptation requires detailed knowledge about others, a conclusion that must apply to scientific studies in general.

For example, overwintering sites are not in a static deep freeze during the winter. All of them—even under snow—warm up and cool down as the weather changes (e.g., *ESC Bulletin* 50: 50). Therefore, more extensive records than might be expected are needed to discover the winter conditions that insects actually have to withstand. In addition, the spring melt of snow and ice is a powerful and dynamic process that interacts with insect habitats.

Each species overwinters in particular stages and places, but these details depend not only on exposure to cold (and other conditions), but also on protection from natural enemies, and on patterns of development and reproduction in relation to the seasons. Therefore, work that is too narrowly focussed is difficult to interpret.

Adaptations of physiology and biochemistry show many common themes, such as widely distributed haemolymph solutes. However, relating the great differences among species to specific features of their natural environments has only just begun.

These wide perspectives prompted and supported my reviews of cold hardiness, life-cycle control, and allied themes, and towards the end of my career led me to re-examine the winter adaptations of aquatic insects, the subject of my early research. Impediments to the study of large and flowing aquatic habitats were finally overcome ... by synthesizing the literature without facing the difficulties of winter fieldwork!

¹¹Such errors are less frequent with the sophisticated autoexposure capabilities of modern cameras.



New discoveries of fossil Odonata in Western North America

Rob Cannings and Bruce Archibald

Most of us who love to study or watch dragonflies and damselflies don't think of their fossils much. Sure, we know of those huge Palaeozoic giant "dragonflies" or griffinflies (Order Meganisoptera, family Meganeuridae) from the Carboniferous and Permian periods and we have a vague idea of the evolution of the more recent Odonata. But I (RC) had paid little attention to the details of odonate fossils until a decade ago when Bruce Archibald, an insect paleontologist, and I became friends and started our fossil studies. Since then, we have worked on dozens of Eocene fossils, about 50 million years old, from the Okanagan Highlands – with some surprising results.

In the Eocene, the Okanagan Highlands was a temperate upland spread across about a thousand kilometers of southern British Columbia, from the Bulkley Valley in the north, south into northern Washington (Archibald et al. 2011). Sediment that settled to the bottom of a series of lake basins across its length preserved plant and animal fossils from the surrounding forest and wetland communities before the onset of current colder and more seasonal climates following the Eocene. Warmer regional coastal lowlands to the west supported forests with a subtropical character, while at the elevations of the Okanagan Highlands, mean annual temperatures would have been much like those of Vancouver and Seattle today. Winters, however, were mild with few, if any, frost days (Archibald et al. 2014).

In our first paper (Archibald and Cannings 2019) we looked at fossils of dragonflies (suborder Anisoptera), which are much less common than other odonates preserved in the region. We found eight previously unknown species, six of which were well-preserved enough to be given scientific names. They belong to the Aeshnidae and Gomphidae and would not look out of place today flying beside a pond or stream, even though the newly described genera that they belong to are extinct. Some other dragonfly groups that are now familiar diversified after this; for example, the Libellulidae (Skimmers), so abundant today, had not even appeared.

One of our new dragonfly genera (*Ypshna*) appears closely related to another fossil darter of the same age from Denmark. This is not surprising, because North America and Europe were then connected by continuous land across Greenland and there were mild climates north to the Arctic Ocean. You could have walked from Kamloops to Copenhagen without getting your feet wet – through forest all the way!

Finding a clubtail dragonfly in these fossils was exciting. This dragonfly family was rather common in the Early Cretaceous Period elsewhere in the world but wasn't seen again in the fossil record until tens of millions of years after the time of our new fossil species. Our specimen, which we named *Auroradraco eos* (dawn dragon) begins to fill about a 66-million-year gap in the evolutionary history of the family.

Next, we took on 78 more regional odonate fossils, all of which we took to be damselflies. Eventually, their true nature became clear, and we announced the discovery of a new suborder of Odonata, the Cephalozygoptera, closely related to damselflies (Archibald et al. 2021). The

Rob Cannings (rcannings@royalbcmuseum.bc.ca) is an Emeritus Curator at the Royal British Columbia Museum, where he was Curator of Entomology from 1980 to 2013. He mainly studies the systematics of Odonata and Asilidae (Diptera) but publishes on a variety of insect orders. Bruce Archibald (sba48@sfu.ca) is a research associate in the Department of Biological Sciences, Simon Fraser University. He has worked on the rich fossil insect record of British Columbia and Washington for decades. PDFs of his papers can be downloaded from www.brucearchibald.com.

monograph can be downloaded free here: <https://doi.org/10.11646/zootaxa.4934.1.1>. It turns out that fossils of this group have been sitting in museum drawers for well over a century, and that many had been described and named. Bruce and I were joined on this project by Robert Erickson and Seth Bybee of Brigham Young University, who examined the phylogeny of the new group, and Rolf Mathewes, an experienced paleoecologist from Simon Fraser University.

In 1858, entomologist and paleontologist Hermann Hagen discovered a fossil that he assumed to be a damselfly (Hagen 1858). Strangely, however, its head did not have the “hammerhead” shape generally agreed to be of primary importance in defining the Zygoptera but was more rounded, with its eyes closer to the centre of the head and not protruding. He wrote that this was merely the product of distortion during fossilization.

We found that 72 of our 78 fossils belong to the extinct family Dysagrionidae. These were mostly only wings (Figure 1), however, a few had heads (Figure 2), and we were surprised that they also looked like Hagen’s odd heads.

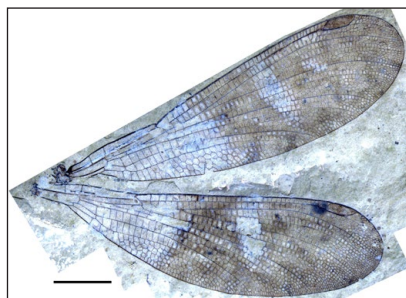


Figure 1. *Okanagrion threadgillae* holotype. Scale bar = 5 mm. Copyright Zootaxa, used by permission.

Finally, after some detailed measurements of fossils, both our new ones and others illustrated in the literature, we concluded that this rather spherical head shape was real. What had looked wrong for so long was actually right. We coined the name “Cephalozygoptera” for the new suborder (from the Greek *kefali* = head, and Zygoptera = damselflies), indicating that these odonates are distinguished from damselflies by their heads. Some traits of wing venation in these fossils mostly contradict definitions of the Zygoptera, but none are individually unambiguous diagnostic traits of the suborder.

After poring through a century and a half of scientific papers, we realized that more of these insects with “wrong-looking” heads had been found since Hagen’s day. Almost every paleontologist who studied them had written that the heads had been somehow distorted during fossilization, although a few showed some hesitation in accepting this idea, yet still assigned them to the Zygoptera. Only one researcher working on a dysagrionid from the Cretaceous of China wrote that his specimen wasn’t a damselfly, but belongs in some unknown place among the defined suborders, perhaps the Anisozygoptera, which is relictual today (Zhang 1992).

Nel and Zheng (2021), challenged the existence of Cephalozygoptera, returning to the argument that its defining head morphology is an artefact, distorted from a zygopteran shape

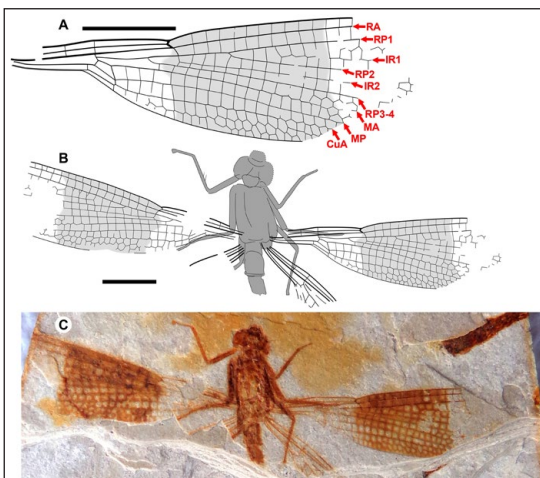


Figure 2. *Okanopteryx macabeensis* paratype. A, labelled drawing of wing; B, drawing of specimen; C, photograph of specimen. Both scale bars = 5 mm. Copyright Zootaxa, used by permission.



B. Archibald

Figure 3. The McAbee Fossil Beds, Cache Creek, British Columbia (view to east). The Thompson River is in the background.

during fossilization. In our rebuttal (Archibald and Cannings 2021b), we showed that there is no force acting before or during fossilization that might distort the conservative zygopteran head shape to become the diagnostic Cephalozygoptera one. We concluded that the evidence raised by Nel and Zheng (2021) as well as additional information we brought to bear on the question actually supports our proposal that the observed head shape of the Cephalozygoptera is their true shape, and that the Cephalozygoptera is a valid taxon.

The Cephalozygoptera consist of about 60 species in approximately 20 genera of two extinct families, the Dysagrionidae and Sieblosiidae; both previously thought to belong to the Zygoptera. We named 5 new genera and 16 new species. In British Columbia these fossils come from the McAbee beds near Cache Creek (Figure. 3) and Driftwood Canyon Provincial Park near Smithers, and in Washington from the northern town of Republic. The new species were flying jewels of their time; many have colourful, banded wings.

We also named a new family, the Whetwhetaksidae, consisting of the single genus *Whetwhetaksa*, found on the traditional land of the Colville Indian Tribe of northern Washington. This name is formed from the word “*whetwhetaks*”, suggested by the Colville elders, meaning “dragonfly-like” insects in their language. The single species described is particularly interesting, with an extremely long pterostigma, unknown in Zygoptera, more like those found in petalurid dragonflies. It is up to about 10 times longer than wide; a quarter to almost a third the length from the nodus to the wing apex.

Phylogenetic analysis of the suborders of Odonata and fossil Burmese amber genera, using the extinct family Tarsophlebiidae as the outgroup, recovers Anisoptera and Anisozygoptera as sister taxa with high support, consistent with other recent analyses (Needham et al. 2014 and references therein). Cephalozygoptera and Zygoptera are recovered as sister taxa with high support, while the Burmese *Burmadysagrion*, *Electrodysagrion*, and *Paleodysagrion*, formerly considered to belong to the Dysagrionidae, are recovered as members of Zygoptera. There is only weak support for Dysagrionidae and Whetwhetaksidae as sister taxa and, although the latter family likely also belongs in the Cephalozygoptera, we are uncertain of its placement. It's intriguing that although the fossil Anisoptera of British Columbia and Washington living in the same communities look familiar to us today, the Cephalozygoptera don't look so modern at all – we don't know why these two suborders had such different evolutionary trajectories.

It was also a surprise to see that damselflies are so rare among these fossils. We know of only one specimen, which we have named in a new genus and species (Archibald and Cannings 2021a). Its family, the Euphaeidae, still lives, but is restricted to the Old World, mainly in southern Asia.

The Cephalozygoptera had a rich and long history. The oldest known species lived among dinosaurs in the Cretaceous Period of China but it was apparently later, in the early Cenozoic, that

they diversified and flourished across the northern continents. In the Eocene the Dysagrionidae were the only family of Cephalozygoptera in the Holarctic (as well as, perhaps, the rarer Whetwhetaksidae?) and were by far the most abundant Odonata in the temperate uplands of British Columbia and Washington. They were less common, but still well-represented, in the warmer lowlands of mid-continental Colorado and Wyoming but were less frequent in the uplands of Colorado. They also occurred in the Eocene of Europe and Asia. After the Eocene, the Dysagrionidae declined and the Sieblosiidae were the common members of the suborder in the Oligocene and Miocene of Eurasia as northern regions cooled. The last known cephalozygopterans lived around 10 million years ago in France and Spain.

These discoveries help us understand the development of life, particularly since the extinction of the dinosaurs. These cephalozygopterans, like their close relatives the damselflies and dragonflies, would have been important elements in food webs of ancient ponds and streams. Understanding their significant presence in the history of the Odonata reveals more complex, richer evolutionary pathways than once envisioned in the development of modern wetland communities. Our investigations pose new questions, however. Cephalozygopteran fossils are much more common than those of dragonflies or damselflies in ancient British Columbia and Washington – why they declined and went extinct is a mystery.

Acknowledgements

We thank our co-authors of Archibald *et al.* (2021) – Robert Erickson, Seth Bybee, and Rolf Mathewes – for their contributions and enthusiasm. A version of this article was first published in *Argia* 33(2): 14–17 (Newsletter of the Dragonfly Society of the Americas). It is modified and presented here with permission of *Argia*'s editor.

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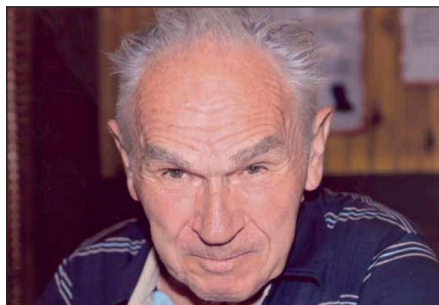
Dr Aleš Smetana was an internationally renowned expert on the taxonomy and systematics of several families of beetles, mainly rove beetles and water scavenger beetles (Coleoptera: Staphylinidae, Hydrophilidae). These beetles are important worldwide as predators and decomposers in a wide variety of terrestrial manmade and natural ecosystems. He was so deeply and broadly connected to the Coleopterist community (especially our tight-knit ‘family’ of staphylinidologists — ‘rove beetle people’) that it still feels incredibly strange to imagine a world without Aleš, who had productively continued working at his office each day, and every year attended the various beetle taxonomy meetings in Europe to share stories, science, exciting new specimens and good wine.

Aleš passed away on 25 August 2021 at 90 years old. He is survived by his wife Lise, three sons Dan, Tom and David, and his grandchildren Kevin, Chelsea, Ryan, Evan, Cameron and Nolan.

Aleš was known for his love of high-performance automobiles, volleyball and keeping fit, cultivating exotic plants, foraging for mushrooms, an expansive knowledge of Latin and other languages (Czech, German, English), and honest and open opinions about scientific practice and philosophy. He was a role model for any working in entomology, in his work ethic, aspiration for correctness, and enthusiasm for the subject, but he was also a model of gentlemanly behaviour and political correctness, and was always willing to help with problems of all kinds. As a testament to his proficiency in languages, and creative, honest personality, he once wrote a carefully constructed article in French (far from his native tongue) critiquing recent beetle classifications by a French colleague, which he argued relied too heavily on male genitalia, calling the practice ‘the cult of the aedeagus’!

Aleš was a true giant in his field and was constantly breaking ‘new ground’ in poorly known beetle groups, especially his beloved staphylinids. Many of his monographs represented the first modern inroads for a given group in North America, Himalaya, Taiwan and China, and were critical for the success of later phylogenetic and applied studies, in which he was also an important collaborator. His love of adventure led him to collect irreplaceable samples from the wilderness of the Canadian North, Russia, Himalaya, Taiwan, Japan, Borneo and later, China. In total, Aleš published 472 papers or books on beetles, describing 34 genera and 973 species that are still considered valid. In recognition of his impact, Aleš has at least five genera and at least a whopping 264 species named after him.

Aleš was born 6 April 1931 in Kralove, Czechoslovakia. At the age of 10, he had already started collecting beetles and by 13, he had brought home a bag full of the inner contents of an ant nest (*Formica rufa*), from which he sorted out beetles in the living room — much to his mother’s dismay (Farkač and Löbl, 2011)!¹ This enthusiastic and early start was nurtured by his supportive father, Dr Oldřich Smetana, who was a medical doctor and a bibliophile who bought classic European books for him, such as Reitter’s Fauna Germanica. Later, when Aleš was a fully-fledged entomologist, his father accompanied him on field excursions around Europe, including Slovakia,



L. Smetana

Aleš Smetana (1931–2021)

Aleš in Verona, Italy (2010).

¹This reference contributed much of the following information on Aleš’ early life

Austria and Romania. One can hardly imagine a better start for a budding taxonomist!

Aleš studied at Charles University (Prague, Czech Republic) for his undergraduate degree and obtained a medical degree from the same institution in 1956. Combining his love of entomology with new training in medicine, he joined the Institute of Parasitology (Czechoslovak Academy of Sciences, Prague) and successfully defended a C.Sc. [Soviet-era equivalent of a PhD.] thesis on the taxonomy and systematics of Anoplura ['sucking lice'] of Czechoslovakia. Some years later, he joined the virology unit of the same institute, researching the transmission of arboviruses via ticks and mosquitoes. During this period, Aleš simultaneously continued his taxonomic work on beetles, already participating in a variety of foreign collecting trips with such eminent European Coleopterists as W.O. Steel, I. Löbl, G. Lohse and G. Benick.

Aleš' Canadian life began in 1967, when he starting working at the Canadian National Collection of Insects, Arachnids and Nematodes (CNC, then 'Entomology Research Institute') as a National Research Council of Canada postdoctoral fellow. During this short 2-year period, he produced a comprehensive monograph on North American Quediini rove beetles (Coleoptera: Staphylinidae: Staphylininae) that was later (Smetana 1971) published in the Entomological Society of Canada's Memoir Series. In the same 2 years, he also extensively sampled North America, including all Canadian provinces and territories (except Newfoundland, Nunavut and the Maritimes), and much of the western and southeastern United States. This incredibly valuable baseline, laid down in only 2 years' time, is only matched in the CNC Coleoptera, especially staphylinids, by Aleš' later collecting efforts, together with colleagues such as Milt Campbell. Upon seeing his unpublished monograph on Quediini, the director of the institute was apparently so impressed that he was committed to ensure Aleš would return as a permanent employee.

Fortunately, Aleš did return and began working officially as Research Scientist at the Central Experimental Farm on 23 September 1971 (Figure 1). He was appointed to work on the poorly known North American diversity of the terrestrial water scavenger beetles (Hydrophilidae), alongside which he continued work on rove beetles, also greatly in need of taxonomic attention in North America. During his appointment at the CNC, Aleš drove massive growth of the beetle collection, with numerous expeditions to Canada and the United States (1970–1980s), the Himalaya of Nepal (five yearly trips 1981–1985) (Figure 2), Japan (1980, 1991), Taiwan (1990, 1991, 1992, 1994, 1995) (Figure 3) and later, albeit self-funded, multiple trips to China. In support of the trip to Japan in 1991, Aleš was the recipient of a visiting scientist grant from the Natural History Museum of Chiba, Japan. For about 15 years, Aleš served as Curator of Coleoptera at the CNC. Amongst a multitude of other papers, Aleš completed a series of comprehensive monographs and their supplements on North American hydrophilids (Plate 1A) and staphylinids (Plate 1B–C), many of which were published with the ESC. In 1986, Aleš described a new genus and species of Alaskan Leptotyphlinae (Plate 1D), a group of blind, minute (<2 mm) and flightless rove beetles that live



Canadian National Insect Collection

Figure 1. The 'Coleoptera Coffee Club' in the Coleoptera Unit of the Canadian National Collection of Insects, Arachnids and Nematodes, AAFC. From left to right: Go Sato, Don Bright, Ed Becker, Aleš Smetana. No date recorded.

strictly in unglaciated regions of the world, generally deep in soil and thought to be highly sensitive to harsh conditions. This discovery was remarkable as Alaska was the last place we would have expected these beetles to exist! Other landmark publications include monographs on the Quediini rove beetles of the Himalaya (1988) and Taiwan (1995). In total, Aleš published over 288 research papers, books and large monographs before his retirement, many of which are regularly cited in diverse papers on taxonomy, climate change and natural resources ecology, conservation, biocontrol and archaeology (subfossil deposits in association with humans). Aleš was also a major contributor to *The Canadian Entomologist* and its associated publications, with 19 publications describing 179 species-group and 14 genus group names (Bouchard et al. 2018).

Aleš 'retired' 28 years later in 1999 but continued to work each day at his office as an Honorary Research Associate. During this time as an HRA, Aleš focused his research to the then nearly unknown rove beetle fauna of China, especially the Staphylininae (Plate 1E–G) but also the Omaliinae (Plate 1H), which he often jointly published with Alexey Shavrin (Russia).

Aleš continued to make collecting trips with colleagues to China in 2000, 2002 and 2005. From 1999–2021, Aleš published an incredible 184 additional papers, a significant portion of which contributed toward the comprehensive book 'The quediine subtribes of mainland China' (Smetana 2017). Another major accomplishment during his retirement was his involvement as co-editor and contributor to the critical resource 'Catalog of Palaearctic Coleoptera' in eight volumes (2004–2013; e.g., Löbl and Smetana 2004), for which he received a medal for outstanding achievement at the 20th Symposium Internationale Entomofaunisticum Europae Centralis in Cluj, Romania (2008); he later coauthored the rove beetle chapter in the second edition (2015). These catalogs, representing a gargantuan amount of work, provide authoritative information on all scientific names ever published for species occurring in Europe, the Middle East, temperate Asia and Russia.

At every stage in his career, Aleš made a bold and lasting impression on both science and his peers. He is deeply missed by many friends of both the 'younger' and 'older' generations, who have lately shared their wonderful stories on social media or through email. There is no doubt that Aleš has left behind a legacy of both invaluable specimens and fond memories.

Adam Brunke and Anthony Davies (Ottawa, Ontario)



Figure 2. Crossing the Arun River (Nepal) by foot bridge. 1980s [exact date unknown].



Figure 3. Collecting on Hsin-kangshan, southern Taiwan (April, 1998).

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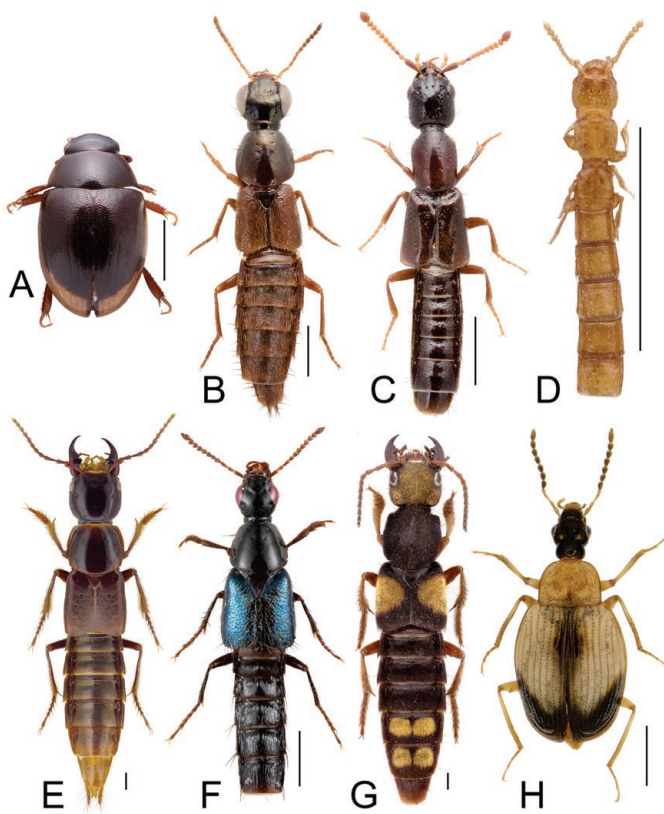


Plate 1. Genera and species described by Aleš Smetana. A) *Cercyon cinctus* Smetana (Hydrophilidae), a distinctive, transcontinental Nearctic species; B) *Quedius vulpinus* Smetana, a rare western Nearctic species, living in moss; C) *Oxybleptes kiteleyi* Smetana, — *Oxybleptes* Smetana is endemic to eastern North America and its sexually dimorphic species form mysterious swarms in Fall; D) *Chionotyphlus alaskensis* Smetana — *Chionotyphlus* Smetana is a relictual genus restricted to the loess soils of small, unglaciated parts of Alaska; E) *Quelaestrygon puetzi* Smetana — *Quelaestrygon* Smetana is an enigmatic and phylogenetically isolated Chinese genus that now represents its own tribe; F) *Anthosaurus caelestis* Smetana — *Anthosaurus* Smetana is an Oriental genus that has diverged from its predatory ancestors to feed on the pollen of flowering trees; G) *Agelosus nigricollis* Smetana, an attractive Chinese species; H) *Trigonodemus schuelkei* Smetana, from China, is one of the most striking species of this mushroom-associated genus. Scale = 1 mm.

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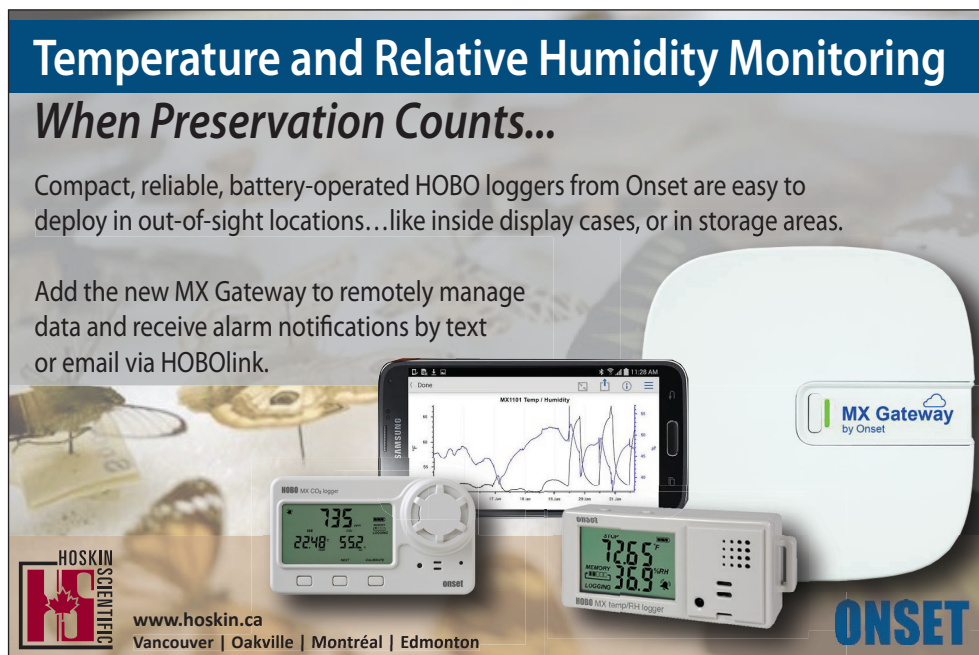
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Highlights of the recent Board of Directors meeting

The ESC Board of Directors has met by videoconference twice since the report in the September issue of the *Bulletin*. The outgoing Board met on 13 October 2021, and the incoming Board met immediately after the Annual Meeting of Members on 19 October 2021. The meeting of the incoming Board was devoted to routine appointments of officers, trustees, signing authorities and committee chairs, and so the remainder of this report will deal with the business conducted at the final meeting of the outgoing Board.

The Board received reports from all ESC committees and officers. There were also updates on progress in the organization of future Joint Annual Meetings (JAM). The organization of the online 2021 JAM is proceeding on track, with approximately 240 registrants at the time of the Board meeting, and an encouraging level of corporate sponsorship. The Board received brief updates on the 2022 JAM (joint with the Entomological Societies of British Columbia and of America), the 2023 JAM (joint with the Entomological Society of Saskatchewan), and the 2024 JAM (Joint with the Société d'entomologie du Québec). The Board received information on a process to plan for the format of future JAMs, given the many indications, including the ESC member survey, that show a need to change from traditional, solely in-person conferences. The process will begin with input from the Regional Societies that partner with ESC for JAMs, and lead to a focussed Board meeting on the topic.

ESC Treasurer, Ward Strong, reviewed the ESC financial statements for 2020–21, and these were accepted by the Board. The Board also received for information the financial statements of the ESC Scholarship Fund. The Board approved a motion recommending that the Annual Members' Meeting approve an increase in membership dues of about 6%, to become effective in 2023. The Board was also in agreement with a recommendation from the Finance Committee that the Treasurer take steps to reduce the Society's exposure to the effects of inflation.

The Board received a report with recommendations from the Task Force on Financial Stability of *The Canadian Entomologist*. The report's financial projections indicate that in the near future, income from the journal will be less than the costs of publication. For several years past, there has been substantial income from the sales of digital archives of the journal, but these sales are diminishing because of market saturation, and are expected to cease soon. A major expense of publication is the salary of the journal's technical editor; this position is essential to maintaining the quality of the journal as the publisher's technical editing is insufficient to deal with the conventions and formatting requirement of entomological papers. The technical editor reduces the load of the Editors-in-Chief, who could not take over the task of copy-editing papers and working with the publisher's ever-changing layout contractors. The Board recognized that *The Canadian Entomologist* is an essential element of the Society and must be maintained. It was agreed that the journal should be managed with the objective of being revenue neutral, and that the Society's accountant should establish separate accounting for the journal so that income from the journal is held separately, and available for use in the future as a "rainy day fund". This fund would be a priority destination for excess funds from operations of ESC. It was also agreed that the Publications Committee should engage in discussions with the publisher on the anticipated financial implications of current and likely future trends in scientific publishing, including a shift towards Open Access publishing. The Task Force has recommended that when termination of the current publishing contract nears, the current and possible alternative publishers should be contacted to identify which publisher offers terms that best protect the financial sustainability of the journal. The Board received information about the ESC's request to the publisher of *The Canadian Entomologist* to amend the contract, which refers to a print publication, rather than

the E-journal format that the journal will have from 2022 onwards¹. The publisher sees no need to make changes at this point. As in 2025—without intervention—the contract would roll-over unchanged for a further seven years, it was agreed that, ESC will require that the changes be made at the end of the current contract, if it is decided to renew it.

At the request of the Insect Common Names Committee, the Board approved changes to the Committee's mandate statements to include the object of harmonization of common names (whenever suitable) with those approved by other organizations, such as the Entomological Society of America. The Board also approved recommendations from the Membership Committee, which proposes to conduct membership drives for regular and student members, develop a program to encourage entomology enthusiast membership, and reward membership purchase or renewal at JAM 2022 with t-shirts featuring the logos of the eight affiliated entomological societies in Canada. The Board received information on the plans to convert the ad hoc Communications Committee into a standing committee. An urgent priority for the ad hoc Committee is to identify people who can work with authors submitting blog posts about their papers in *The Canadian Entomologist* to ensure that the post appears at the time of article publication.

The Board received, and approved in principle subject to suggestions for improvement, a draft of a society code of conduct (as distinct from the already-developed Meeting code of conduct). The final version of the code will be considered for approval at the next Board meeting and then posted on the website.

¹As noted above, *The Canadian Entomologist* will be an **e-only journal** starting **January 2022**. If you are interested in learning more, please see this [FAQ](#) from Cambridge University Press. You can also read [more here](#) about ongoing print reduction efforts at CUP in line with environmental and sustainability targets.

Tel que mentionné ci-dessus, *The Canadian Entomologist* deviendra une revue **entièrement en ligne** dès **janvier 2022**. Si vous souhaitez en apprendre davantage, consulter la section [FAQ](#) des Presses de l'Université Cambridge. Vous pouvez également en apprendre [plus ici](#) sur les efforts de réduction des impressions en cours aux Presses de l'Université Cambridge, conformément aux objectifs environnementaux et de durabilité.

Participants in the Meeting of the Outgoing Board of Directors (L–R from top):

Directors: Bill Riel, President; Felix Sperling, 1st Vice-President; Chris MacQuarrie, 2nd Vice-President; Gail Anderson, Past President; Brian van Hezewijk, Regional Director ESBC; Boyd Mori, Regional Director, ESAB; James Tansey, Regional Director ESS; Jason Gibbs, Regional Director ESM; Rose Labbé, Regional Director ESO; Étienne Normandin, Regional Director SEQ; Catherine Scott, Regional Director AES; Jessica Vickruck, Regional Director-elect AES; Suzanne Blatt, Director at large & Co-Editor in Chief *The Canadian Entomologist* [TCE]; Rachel Rix, Student and Early Professional Director; Matthew Muzzatti, Student and Early Professional Director-elect; Sebastian Ibarra Jimenez, Director for Equity, Diversity & Inclusion.

Officers: Neil Holliday, Secretary; Ward Strong, Treasurer; Geoff Powell, Executive Director; Dezene Huber, Co-Editor in Chief TCE; Amanda Roe, Co-Editor in Chief TCE; Cedric Gillott, Editor ESC Bulletin; Morgan Jackson, Social Media Administrator. Not pictured: Heather Proctor, Editor *Canadian Journal of Arthropod Identification*.



71st Annual Meeting of Members
Zoom Video Conference
19 October 2021, 2:00 PM CDT
MINUTES

1. Call to Order

The meeting was called to order at 2:02 PM CDT by President Bill Riel, with 55 members participating.

2. Notice of Meeting

The notice of the meeting was published in the June and September 2021 issues of the *Bulletin*, and was sent to all members by email on 16 September 2021, with three subsequent reminders.

3. Additions to and approval of the Agenda

Motion: that the agenda be approved as posted.

Moved by Neil Holliday, **seconded** by Bill Riel. **Carried.**

4. Minutes of the 70th Annual Meeting of Members

Secretary Neil Holliday reported that the minutes of the 70th Annual Meeting of Members were published in the December 2020 issue of the *Bulletin*.

Motion: that the minutes of the 70th Annual Meeting of Members be approved as distributed.

Moved by Neil Holliday, **seconded** by Bill Riel. **Carried.**

5. ESC Scholarship Awards

Past President, and Chair of the ESC Scholarship Trust, Gail Anderson, recognized the recipients of the 10 ESC scholarships awarded in 2021.

6. Commemoration of deceased members of the entomological community

President Riel reported the passing of seven Canadian entomologists since the previous Annual Meeting of Members: Fred Bennett, Trinidad and Gainesville, FL; George Brossard, Montréal, QC; Dustin Hartley, Edmonton, AB; Olga Kukal, Kingston, ON; David M. Rosenberg, Winnipeg, MB; Ales Smetana, Ottawa, ON; and Paul D. Syme, Sault Ste. Marie, ON. A moment of silence was observed in memory of these deceased entomologists.

7. Report from the Board of Directors

President Riel reported that this had been a challenging year for the Board, but nevertheless busy and productive. He provided a synopsis of the activities of the Board during the year. These included striking of a task force to examine the long-term financial viability of *The Canadian Entomologist* (TCE); the task force had made a number of recommendations that the Board is exploring or implementing. President Riel thanked Kevin Floate for his fine work in chairing the task force. The Board had approved and supported the transition from an in-person Joint Annual Meeting (JAM) to our first ever all-virtual JAM; thanks are due to the local organizing committee, particularly Amro Zayed and Miriam Richards, for effectively adapting to the great challenges of switching the meeting format. The Board had approved the transition of the format of TCE to an entirely digital publication, beginning with the 2022 volume. The Board had approved a process to elect Student and Early Professional Directors that had been developed by the Student and Early Professional Affairs Committee. The Board had created an ad hoc Communications Committee to coordinate and streamline all forms of ESC communication to its members and the outside world; this committee will transition

to a standing committee in the coming year and will replace the Social Media Administrator positions. The Board had approved funding of several Equity, Diversity and Inclusion (EDI) activities including three initiatives for the coming year that are being led by the ESC's EDI Committee, sponsorship of the "Black in Ento" conference, and a donation to EntoPOC — an organization that supports entomology students of colour. President Riel noted that, although the Board is not responsible for the ESC Scholarship Fund, it is noteworthy that the Fund has filed for incorporation; this filing was the result of much hard work by current and former trustees, particularly Patrice Bouchard.

President Riel thanked outgoing Board members Gail Anderson, Catherine Scott, Suzanne Blatt, and Rachel Rix. He particularly acknowledged the contributions of Rachel, who had served as the Student and Early Professional representative on the Board, and in the last year as Student and Early Professional Director, and had ably represented students and early professionals on the Board. President Riel also noted that the ESC is currently seeking a new treasurer, and asked members to consider who might be suitable for that position.

President Riel provided information on numbers of members currently and in recent years. He noted that membership numbers were reduced in 2020 in the absence of a Joint Annual Meeting, and are rebounding somewhat in 2021.

Membership Category	Current Members			
	2018	2019	2020	2021
Early Professional	34	36	20	22
Emeritus	64	71 (2*)	73 (3*)	78 (4*)
Honorary Member	6	5	5	5
Regular	281 (51*)	252 (66*)	215 (69*)	226 (77*)
Student	142	169	95	107
Enthusiast	—	—	24	44
Grand Total	527 (51*)	532 (68*)	431 (72*)	482 (81*)
* Members using auto-renewal				

President Riel urged members to register for JAM 2021, and again paid tribute to the efforts of the local organizing committee, whose members had risen to the challenge of switching to an online meeting, and had assembled an excellent program. He also drew attention to JAM 2022, which is to be held jointly with the Entomological Societies of America and British Columbia, and will be from 13–16 November 2022 in Vancouver, BC. The meeting will be mostly in person, with some online elements. The ESC is represented on the meeting planning committee by Felix Sperling, Chris MacQuarrie and Bill Riel.

8. Resolution to approve the actions of the Board

Motion: that all bylaws, contracts, acts and proceedings of the Board of Directors of the ESC enacted, made, done or taken since 20 October 2020, being the date of the last Annual Meeting of Members, be approved, adopted, ratified, sanctioned and confirmed.

Moved by Bill Riel, **seconded** by Charles Vincent. **Carried.**

9. Treasurer’s Report

Treasurer Ward Strong reported that the ESC’s financial statements for 2020–21 had been posted on the ESC website since 16 September 2021.

Motion: that the 2020-2021 financial statements for the Entomological Society of Canada be approved.

Moved by Ward Strong, **seconded** by Christopher Dufault. **Carried.**

Treasurer Strong noted that the 2020–21 financial statements of the ESC Scholarship Fund, had also been posted on the website.

Motion: that the members receive for information the 2020–2021 financial statements of the Entomological Society of Canada Scholarship Fund.

Moved by Ward Strong, **seconded** by Bill Riel. **Carried.**

9.1 Review Engagement for 2021–2022

Motion: that Bouris, Wilson LLP of Ottawa be appointed as public accountants to ESC and the ESC Scholarship Fund to conduct the review engagement of both sets of financial statements for the 2021–2022 financial year.

Moved by Ward Strong, **seconded** by Christopher Dufault.

Discussion: Julie Soroka asked for an explanation of the difference between a review engagement and audit. It was explained that a review engagement is sufficient to satisfy the requirements of the Canada Not-for-profit Corporations Act, and, while comprehensive and satisfying the need for due diligence, it is less expensive than an audit.

The motion was **Carried.**

10. Increase in Membership Dues effective 2023

President Riel pointed out that the membership dues increase that is about to be presented, was recommended by the ESC Board of Directors. Treasurer Strong explained that the increase was to keep pace with the effects of inflation on the costs of operating ESC, and such increases were normally considered every second year. The last increase was approved at the 2019 Annual Meeting of Members and became effective in the 2021 membership year.

Motion: that membership rates increase by approximately 6%, effective for the 2023 membership year.

Moved by Ward Strong, **seconded** by Rosemarie De Clerck-Floate.

Discussion: Rob Bennett asked for the actual cost of regular membership rate under the proposed new rate. Association Coordinator Ryan Jones provided the information:

Membership category	Current rate	Proposed rate
Student with TCE	\$56.25	\$59.50
Student without TCE	\$28.25	\$30.00
Entomology Enthusiast	\$56.25	\$59.50
Early Professional	\$85.00	\$90.00
Emeritus with TCE	\$75.00	\$79.50
Emeritus without TCE	\$00.00	\$00.00
Regular	\$112.50	\$119.25

The motion was **carried.**

11. Election of Directors

Motion: that the following candidates be elected as directors

Position	Candidate	Term
Societal Director (2 nd Vice-President)	Colin Favret, Université de Montréal, QC	3 years
Director-at-large	Kyle Bobiwash, University of Manitoba, MB	3 years
Regional Director, ESBC	Brian van Hezewijk, CFS, Victoria, BC	3 years
Regional Director, ESO	Roselyne Labbé, AAFC, Harrow, ON	3 years
Regional Director, AES	Jessica Vickruck, AAFC, Fredericton, NB	1 year
Student & Early Professional Director	Matt Muzzatti, Carleton University, ON	3 years

Moved by Neil Holliday, **seconded** by Amanda Roe.

Discussion: Secretary Holliday explained that the ESC By-laws require that all directors be elected for a 3-year term. Where a regional director resigns during their term, the rotation of regional directors is preserved by electing a director for the remainder of the 3-year term. This is why the AES regional director is to be elected for 1 year.

The motion was **carried**.

12. Transfer of office

Bill Riel passed a “virtual gavel” to Felix Sperling, the incoming president. Retiring Past President, Gail Anderson, ushered Colin Favret to the virtual podium to assume his duties as the 2nd Vice-President.

13. Presentation of Service Awards

President Felix Sperling paid tribute to the amount of work done by volunteers in the Society, and recognized four of these volunteers with service awards. He presented service awards to Bill Riel, outgoing President; Ward Strong, Treasurer for a year; Cedric Gillott, who has served as Editor of the ESC *Bulletin* since 2010 and was long-time chair of the Heritage Committee; and Morgan Jackson, who was co-founder of the ESC Blog and has shepherded it since 2012, and served as technical editor of the *Canadian Journal of Arthropod Identification*, on JAM local organizing committees and on the EDI Committee.

14. Resolution of Thanks

Rachel Rix presented the resolution of thanks on behalf of ESC:

“Whereas the Entomological Society of Canada will meet jointly with the Entomological Society of Ontario in an online meeting in November 2021; and

Whereas we anticipate a full and interesting meeting of lectures, symposia, papers, and posters; and
Whereas the meeting has been planned with care and concern for those participating; and
Whereas the Local Organizing Committee has been faced with extraordinary challenges because of the pandemic;

Be it resolved that the Entomological Society of Canada expresses its sincere thanks to the Local Organizing Committee for their hard work and skill in arranging a worthwhile and entertaining program; and

Be it further resolved that the Society expresses its thanks to the corporate sponsors that generously donated funds to support activities at the meeting; and

Be it further resolved that the Society expresses its thanks to the Management and Staff at Showcare Event Solutions Inc. for their courteous assistance during the Meeting.”

The resolution was approved by a round of applause.

Secretary Holliday explained that the approval empowered the ESC secretary, once the JAM has happened, to write letters of thanks to those identified in the resolution.

15. Notice of 72nd Annual Meeting of Members

The next Annual Meeting of Members is scheduled to take place on Tuesday 15 November 2022 at the Vancouver Convention Centre, Vancouver, BC.

16. Adjournment

Motion: that the meeting be adjourned.

Moved by Felix Sperling, **seconded** by Rob Bennett. **Carried.**

President Sperling declared the meeting adjourned at 2:45 PM CDT.

Executive Meeting - Call for Agenda Items

If members have any items they wish to be discussed at the next Board of Directors or Executive Council meeting, please send them to the Secretary, Neil Holliday (see inside back cover for contact details), as soon as possible.

Réunion du conseil exécutif – Points à l'ordre du jour

Si des membres aimeraient ajouter des points à l'ordre du jour pour discussion à la prochaine réunion du Bureau des directeurs ou du Conseil de l'exécutif, merci de les envoyer au secrétaire, Neil Holliday (voir le troisième de couverture pour les informations de contact), le plus tôt.

Members' discounts

Entomological Society of Canada members can enjoy discounts on publications from Annual Reviews, Elsevier, Cambridge University Press, and the Entomological Society of America. Details of how to benefit from these discounts are available on the member's area of the Entomological Society of Canada website at: <https://esc-sec.site-ym.com/>.

Remise pour les membres

Les membres de la Société d'entomologie du Canada peuvent bénéficier d'une remise lors d'achats de publications de : Annual Reviews, Elsevier, Cambridge University Press et de la Société d'entomologie d'Amérique. Les informations nécessaires pour profiter de ces remises sont disponibles dans la section des membres du site de la Société d'entomologie du Canada à : <https://esc-sec.site-ym.com/>.

Call for nominations: Societal Director (Second Vice-President), Director at Large

The Society will hold an online ballot to select candidates for a Societal Director and Director at Large. The selected candidates will then be presented as a slate for formal election by members at the Annual Meeting in Vancouver in November. Nominations for these positions must be signed by three active members of the Society and be received by the Secretary of the Entomological Society of Canada, Neil Holliday, by 28 February 2022 (see inside back cover for contact details).

Appel à candidatures : Directeur sociétal (second viceprésident), conseiller

La Société tiendra un vote en ligne afin de sélectionner des candidats pour les postes de directeur sociétal et de conseiller. Les candidats sélectionnés seront ensuite présentés à la réunion annuelle à Vancouver en novembre pour une élection formelle par les membres. Les nominations pour ces postes doivent être signées par trois membres actifs de la Société et être reçues par le secrétaire de la Société d'entomologie du Canada, Neil Holliday, au plus tard le 28 février 2022 (voir le troisième de couverture pour les informations de contact).

The 2021 Photo Contest winners

We are excited to announce the winners of the 2021 Entomological Society of Canada photo contest! This year saw entries from 12 different photographers, with a total of 44 images submitted. Thanks to everyone who submitted images! If you did not get images in by the deadline, there is always next year!

With entries from all over the country and representing a wide range of taxa, the judging was tough, and we thank our two anonymous judges for the difficult decisions they have arrived at. We have awarded the top three images as winners, followed by three honourable mentions.

The winning photos will appear on the covers of the 2022 *Bulletin*.

The **first-place winner** is **Andrea Brauner**, with a stunning image of a hickory tussock moth caterpillar. The bokeh and the cute feet carried this image all the way to the winners' circle!

Second place goes to **Debra Wertman**, with a beautifully-captured shot of an aggregation of mountain ash sawfly larvae feeding on a leaf. This is a great illustration of social behaviour in non-aculeate Hymenoptera!

Our **third-place winner** is **Robert Lalonde**, with a marvelous closeup of a male megachilid and his fantastically hairy face and beautiful green eyes.

First honourable mention goes to **Warren Wong**, up close with a strawberry blossom weevil deep into a tulip. Just kidding, it is, of course, in a strawberry blossom.

The **second honourable mention** goes to **Lauren Nesbitt**, with a kinda cute, kinda creepy shot of a white tiger moth clinging to a window, peering into our souls with its black compound eyes.

And last but not least comes our **third honourable mention**, to **Gregory Courtney**, with the only beetle in the top 6, a scirtid marsh beetle peeking out from behind a leaf.

Call for Nominees: ESC Achievement Awards

Do you know a well-respected entomologist who deserves recognition because of their outstanding contributions to their science in Canada? Is this person a leader in their field due to successes in publishing, patenting, editorial work and/or grant acquisition, in the teaching and mentoring of students, or through active volunteer involvement in the ESC and other societies/organizations? If yes, consider nominating them for one of our Society's Achievement Awards. Do not hesitate to contact the Chair of the Achievement Awards Committee, Chris MacQuarrie (Christian.MacQuarrie@NRCan-RNCan.gc.ca), if you have any questions about eligibility or the nomination process.

Gold Medal and C. Gordon Hewitt Award

Both awards are for outstanding entomological contributions in Canada by an individual, but the nominees for the C. Gordon Hewitt Award must have successfully defended their doctoral thesis in the 12 years ending on December 31 of the year in which the Award is received. Parental, compassionate or medical leave is not counted as part of the 12-year period; however, such periods must be identified in the letter from the nominator.

Nominations can only be made by members of the ESC, and signed by the nominator and by at least one seconder (also to be a member of the ESC). Verified communication from a recognized email address will be accepted in lieu of a signature. Nominators should include the following information for both awards: 1. The name and address of the nominee(s); 2. A statement of relevant achievements (3–5 pages) which may include, but is not limited to, the following: outline of research areas, particularly major contributions; number of articles in refereed journals, books, book chapters, patents; editorial activities; teaching

Appel à candidature: Prix d'excellence de la SEC

Connaissez-vous un entomologiste respecté qui mérite une reconnaissance pour ses contributions remarquables à sa science au Canada? Cette personne est-elle leader dans son champ d'étude par ses succès en publication, brevets, travail éditorial et/ ou obtention de subventions, enseignement, mentorat d'étudiants, ou par son implication bénévole auprès de la SEC et d'autres sociétés/ organisations? Si oui, veuillez considérer de nommer cette personne pour un des prix d'excellence de notre Société. N'hésitez pas à contacter le président du comité des prix d'excellence, Chris MacQuarrie (Christian.MacQuarrie@NRCan-RNCan.gc.ca) si vous avez des questions sur l'éligibilité ou le processus de nomination.

Médaille d'or et prix C. Gordon Hewitt

Les deux prix sont pour des contributions entomologiques exceptionnelles au Canada par un individu, mais les candidats pour le prix C. Gordon Hewitt doivent avoir soutenu avec succès leur thèse de doctorat dans les 12 dernières années au 31 décembre de l'année de remise du prix. Les congés parentaux, de soignant ou de maladie ne comptent pas dans la période de 12 ans : ces périodes doivent cependant être identifiées dans la lettre de présentation.

Les candidatures doivent être soumises par des membres de la SEC, et doivent être signées par la personne qui soumet la candidature et par au moins une personne qui l'appuie (également membre de la SEC). Une communication vérifiée par une adresse courriel reconnue sera acceptée comme signature. Les candidatures doivent inclure les informations suivantes pour les deux prix : 1. Le nom et l'adresse du candidat; 2. Un énoncé des accomplissements pertinents (3-5 pages) qui peuvent inclure, mais ne se limitent pas à : le domaine de recherche et particulièrement les contributions majeures; le nombre d'articles dans des revues avec

history, numbers of graduate students, teaching awards; value of grants; involvement in ESC; active involvement and/or memberships in other Societies; entomological extension/community involvement; organizing of symposia or meetings; 3. A current curriculum vitae; and 4. The name of the nominator and at least one seconder. The documentation should stress the particular achievement or achievements to be considered and not merely the general competences of the nominee. Other seconders may merely state their support, without documentation, in a letter of endorsement of the nomination. The Committee will not prepare the documentation nor conduct research connected with it. Please send nominations by e-mail to the Chair of the Achievement Awards Committee, Chris MacQuarrie (Christian.MacQuarrie@NRCan-RNCan.gc.ca), no later than **28 February 2022**.

Honorary Members of the Entomological Society of Canada

An Honorary Member is deemed to have made an outstanding contribution to the advancement of entomology, and may be an Active Member or former Active Member of the Society at the time of nomination.

Collectively, Honorary Members are not to comprise more than 10 members or 1% of the active membership of the Society. Nominations should be supported by at least five members of the Society, and are to be sent by e-mail to the Chair of the Achievement Awards Committee, Chris MacQuarrie (Christian.MacQuarrie@NRCan-RNCan.gc.ca) no later than **28 February 2022**.

évaluation par les pairs, livres, chapitres de livres, brevets; activités éditoriales; historique d'enseignement, nombre d'étudiants diplômés, prix d'enseignement; valeur des subventions; implication au sein de la SEC; implication active et/ou adhésion à d'autres Sociétés; implication dans la communauté entomologique et vulgarisation; organisation de symposiums ou de réunions; 3. Un curriculum vitae à jour; et 4. Le nom de la personne qui soumet la nomination et au moins une personne qui l'appuie. La documentation devrait mettre en évidence le ou les accomplissements particuliers à considérer, et pas seulement les compétences générales du nominé. D'autres personnes peuvent aussi manifester leur appui, sans documentation, dans une lettre de soutien de la nomination. Le comité ne préparera aucune documentation et ne fera aucune recherche en lien avec la nomination. Merci d'envoyer vos nominations par courriel au président du comité des prix d'excellence, Chris MacQuarrie (Christian.MacQuarrie@NRCan-RNCan.gc.ca), au plus tard le 28 février 2022.

Membres honoraires de la Société d'entomologie du Canada

Un membre honoraire est considéré comme ayant apporté des contributions remarquables à l'avancement de l'entomologie et peut être un membre actif ou un ancien membre de la Société au moment de la nomination.

Collectivement, les membres honoraires ne peuvent pas totaliser plus de 10 membres ou 1% des membres actifs de la Société. Les nominations doivent être appuyées par au moins cinq membres de la Société, et doivent être envoyées par courriel au président du comité des prix d'excellence, Chris MacQuarrie (Christian.MacQuarrie@NRCan-RNCan.gc.ca), au plus tard le 28 février 2022.

Fellows of the Entomological Society of Canada

Fellows are deemed to have made a major contribution to entomology, and are to be Active Members of the Society at the time of nomination. Their contribution may be in any area (e.g., research, teaching, application or administration), and may be judged on the basis of contribution to and stimulation of the work of others, as well as by direct personal effort.

Collectively, Fellows may not comprise more than 10% of the active membership of the Society. Nominations should be supported by at least four members of the Society, and are to be sent by e-mail to the Chair of the Achievement Awards Committee, Chris MacQuarrie (Christian.MacQuarrie@NRCan-RNCa.gc.ca) no later than **28 February 2022**.

Wanted: Applicants for the Bert & John Carr Award

The Bert and John Carr Award was created in 2010 (see *ESC Bulletin*, June 2010 [p.102] or September 2010 [p. 170]) to support research activities by individuals who study insect faunistics, or the natural history and taxonomy of Canada's insect fauna. Preference is given to applications by amateurs, but those by students and others will be considered. Applications should consist of: 1. The name and address of the applicant; 2. A statement of the research activity to be undertaken, including a cost estimate of up to \$1000; and 3. A current curriculum vitae. Applications are to be sent by e-mail to the Chair of the Achievement Awards Committee, Chris MacQuarrie (Christian.MacQuarrie@NRCan-RNCa.gc.ca) no later than **28 February 2022**.

Fiduciaires de la Société d'entomologie du Canada

Les fiduciaires sont considérés comme ayant apporté une contribution majeure à l'entomologie et doivent être des membres actifs de la Société au moment de la nomination. Leur contribution peut se situer dans n'importe quel domaine (p.ex. recherche, enseignement, application ou administration), et ils seront jugés selon leur contribution et la stimulation du travail des autres, ainsi que par leurs efforts personnels.

Collectivement, les fiduciaires ne peuvent pas totaliser plus de 10% des membres actifs de la Société. Les nominations doivent être appuyées par au moins quatre membres de la Société, et doivent être envoyées par courriel au président du comité des prix d'excellence, Chris MacQuarrie (Christian.MacQuarrie@NRCan-RNCa.gc.ca), au plus tard le 28 février 2022.

Recherchés : Candidats pour le prix Bert & John Carr

Le prix Bert et John Carr a été créé en 2010 (voir le *bulletin* de la SEC, juin 2010 [p.102] ou septembre 2010 [p.170]) afin de soutenir des activités de recherche par des individus qui étudient la faunistique des insectes ou l'histoire naturelle et la taxonomie de la faune entomologique du Canada. La préférence sera donnée aux candidatures provenant d'amateurs, mais les candidatures d'étudiants ou d'autres individus seront considérées. Les candidatures devront inclure : 1. Le nom et l'adresse du candidat; 2. Un énoncé sur les activités de recherche qui seront entreprises par le candidat, incluant le coût estimé jusqu'à 1000\$; et 3. Un curriculum vitae à jour. Les candidatures doivent être envoyées par courriel au président du comité des prix d'excellence, Chris MacQuarrie (Christian.MacQuarrie@NRCan-RNCa.gc.ca), au plus tard le 28 février 2022.

EDI Workshop / Atelier ÉDI

Sebastian Ibarra Jimenez

The ESC Equity, Diversity, and Inclusion Committee would like to invite everyone to attend the workshop “Strategies for Combatting Bias and Discrimination in STEM”, delivered by Dr Lisa Willis. The event will take place on 25 January 2022, and it will be virtual. For more details, please below. See you all there!

Time: 10 am PST; 1 pm EST

Website: <https://willisglycobiologylab.com/inclusivestem/>

Duration: 2 hours

Format: Online via Zoom

Le comité de l'équité, de la diversité et de l'inclusion de la SEC souhaite inviter tout le monde à assister à l'atelier « Strategies for Combatting Bias and Discrimination in STEM », présenté par Dre Lisa Willis. L'événement aura lieu le 25 janvier 2022, et sera virtuel. Pour en savoir plus, voir ci-dessous. Au plaisir de vous y voir!

Heure : 10:00 HNP; 13:00 HNE

Site web : <https://willisglycobiologylab.com/inclusivestem/>

Durée : 2 heures

Format : En ligne, par Zoom

Registration: TBD, please stay tuned to the ESC blog, website, and e-blast for more details as the date approaches.

Inscription : À déterminer, consultez le blogue, le site web et les courriels de la SEC pour plus de détails à l'approche de cette date.

The Entomological Society of Canada is donating \$500 to EntoPOC, on behalf of Dr Willis, for this workshop. Thank you, Dr Willis!

La Société d'entomologie du Canada fait un don de 500\$ à EntoPOC, au nom de Dre Willis, pour cet atelier. Merci Dre Willis!

Indigenous Canada Course at the University of Alberta / Cours « Indigenous Canada » à l'Université de l'Alberta

Sebastian Ibarra Jimenez and Gail Anderson

We would like to encourage everyone to take the University of Alberta's course “Indigenous Canada”, offered online through their Faculty of Native Studies. This is a great course! It's self-paced, so it allows you to take it whenever you have the time. It provides an Indigenous perspective on key issues faced by Indigenous peoples in Canada.

We both came to Canada as adults to go to university so, although we have tried to learn about Canada's past and present, and about Indigenous Peoples in Canada, there was a lot of information we were missing. We both found this course eye-opening and extremely helpful. As well, it is only very recently that K-12 classes have included information about residential schools and Indigenous

Nous aimerions encourager tout le monde à suivre le cours « Indigenous Canada » de l'Université de l'Alberta, offert en ligne par la Faculté des études autochtones. Il s'agit d'un excellent cours ! Il est autodidacte, ce qui vous permet de le suivre quand vous en avez le temps. Il offre une perspective autochtone sur les principaux problèmes auxquels sont confrontés les peuples autochtones du Canada.

Nous sommes tous deux venus au Canada à l'âge adulte pour aller à l'université et, bien que nous ayons essayé de nous renseigner sur le passé et le présent du Canada, ainsi que sur les peuples autochtones du Canada, il nous manquait beaucoup d'informations. Nous avons tous deux trouvé ce cours révélateur et extrêmement utile. De plus, ce n'est que très

history so most people who did their primary and secondary schooling in Canada could greatly benefit from this information as well. The course has 12 modules with each module including an average of 1 hour video lessons, broken into short clips, plus reading material, where students explore topics that go from Indigenous world views, Indigenous-settler relations, land claims, treaties and aboriginal law, aboriginal-Crown relations, the history and legacy of residential schools, self-determination, to Indigenous art, and more. The course begins with examples of Indigenous worldviews and relations with the land, followed by a brief history of settler-Indigenous relationships through early contacts and the fur trade to the present day.

We highly recommend that all ESC members take this course as part of our journey towards reconciliation, as defined by Gaudry and Lorenz (2018) as the second step in a three-step spectrum of Indigenization. We need to educate ourselves on Indigenous people's histories, relations, and settler-Indigenous relationships. Reconciliation shifts the responsibility for change from Indigenous peoples to all of us. Inclusion of Indigenous peoples into academia, government, and private industry can have adverse effects if the systemic barriers faced by Indigenous peoples, as well as self-determination rights, are not recognized first.

"Indigenous Canada" is a course that provides a foundational understanding on the current issues faced by Indigenous peoples in Canada. It is an interesting and engaging course and does not involve a large time commitment. It is also done totally on your own time. It is, of course, a foundational course and the history and present times of Indigenous peoples can only be touched upon in 12 weeks, but it gives us all a great basis on which to build and personally, has left us looking for more courses, books, and information in general about Indigenous Peoples, history, and relations. This course is an excellent starting point.

As ESC is committed to equity, diversity,

récemment que les classes de la maternelle à la 12^e année ont inclus des informations sur les pensionnats et l'histoire des peuples autochtones, de sorte que la plupart des personnes qui ont fait leurs études primaires et secondaires au Canada pourraient également bénéficier de ces informations. Le cours comporte 12 modules, chacun d'entre eux comprenant en moyenne une heure de leçons vidéo, divisées en courts clips, ainsi que du matériel de lecture, où les étudiants explorent des sujets tels que la vision du monde des autochtones, les relations entre les autochtones et les colons, les revendications territoriales, les traités et le droit autochtone, les relations entre les autochtones et la Couronne, l'histoire et l'héritage des pensionnats, l'autodétermination, l'art autochtone, etc. Le cours commence par des exemples de visions autochtones du monde et de relations avec la terre, suivis d'une brève histoire des relations entre colons et Autochtones, depuis les premiers contacts et le commerce des fourrures jusqu'à aujourd'hui.

Nous recommandons vivement à tous les membres de la SEC de suivre ce cours dans le cadre de notre cheminement vers la réconciliation, tel que défini par Gaudry et Lorenz (2018) comme la deuxième étape d'un spectre d'indigénisation en trois étapes. Nous devons nous éduquer sur l'histoire des peuples autochtones, leurs relations et les relations entre les colons et les Autochtones. La réconciliation fait passer la responsabilité du changement de celle des peuples autochtones à celle de chacun d'entre nous. Si les obstacles systémiques auxquels sont confrontés les peuples autochtones et leurs droits à l'autodétermination ne sont pas reconnus, leur intégration dans les universités, les gouvernements et les entreprises privées peut leur être négatifs.

«Indigenous Canada» est un cours qui permet d'acquérir une compréhension fondamentale des problèmes actuels auxquels sont confrontés les peuples autochtones du Canada. Il s'agit d'un cours intéressant et engageant qui n'implique pas un grand investissement en temps. Il peut être suivi entièrement à votre rythme. Il s'agit, bien sûr, d'un cours de base et l'histoire et le

and inclusion, we think it is a great idea for people to take this course, so that discussion of these topics can move forwards and our society can become more welcoming for all who are interested in entomology.

Reference / Référence

Gaudry, A., & Lorenz, D. (2018). Indigenization as inclusion, reconciliation, and decolonization: Navigating the different visions for indigenizing the Canadian Academy. *AlterNative: An International Journal of Indigenous Peoples*, 14(3), 218-227.

présent des peuples autochtones ne peuvent qu'être effleurés en 12 semaines, mais il nous donne à tous une excellente base sur laquelle construire et, personnellement, nous a amené à chercher d'autres cours, livres et informations en général sur les peuples autochtones, leur histoire et leurs relations. Ce cours est un excellent point de départ.

La SEC s'étant engagée en faveur de l'équité, de la diversité et de l'inclusion, nous pensons que c'est une excellente idée que les gens suivent ce cours, afin que la discussion sur ces sujets puisse progresser et que notre société devienne plus accueillante pour tous ceux qui s'intéressent à l'entomologie.

How you can help protect Canada's plant resources: report a plant pest / Contribuez à protéger les ressources végétales du Canada en signalant les phytoravageurs

Submitted on behalf of the Agriculture and Agri-Food Canada (AAFC) Biological Control Working Group, with the following authors / Soumis au nom du Groupe de travail sur la lutte biologique d'Agriculture et agroalimentaire Canada (AAC), avec les auteurs suivants :
Bruno Gallant (CFIA / ACIA), Suzanne Blatt (AAFC / AAC), Hume Douglas (AAFC / AAC), Roselyne Labbé (AAFC / AAC), Kathryn Makela (AAFC / AAC).

As entomologists, you are likely attuned to the natural environment and always have an eye out for insects. While entomologists mostly encounter native or previously recorded non-native insects, you might also sometimes come across new non-native insect species.

Some of these insects have the potential to negatively impact Canada's agriculture, forestry and environmental resources. It is important that their impacts be quickly determined to minimize potential damage and related control costs and efforts.

The ability to act quickly in response to finding an insect pest of concern is dependent on the timely reporting of information to relevant authorities. This includes reporting insects which are, or may be, a [plant pest regulated under the Plant Protection Act](#) to the Canadian Food Inspection Agency (CFIA).

One of the roles of the CFIA is to protect

En tant qu'entomologiste, vous êtes sans doute attentif à l'environnement naturel et à l'affût de tout insecte. Les insectes rencontrés sont pour la plupart des espèces indigènes ou des espèces introduites déjà signalées, mais vous pourriez parfois croiser de nouvelles espèces non indigènes.

Certains de ces insectes peuvent avoir des effets négatifs sur les secteurs agricole et forestier et les ressources environnementales du Canada. Il est important de rapidement déterminer les effets de ces insectes pour réduire au minimum les dommages qu'ils pourraient causer ainsi que les coûts et les efforts nécessaires pour lutter contre eux.

Notre capacité d'agir rapidement face à la découverte d'un insecte préoccupant dépend de la transmission rapide de l'information aux autorités compétentes. Cela consiste notamment à signaler à l'Agence canadienne d'inspection des aliments (ACIA) les insectes qui sont ou pourraient être des [organismes nuisibles réglementés en vertu de](#)

plant health and the agricultural and forestry sectors by preventing or controlling the spread of plant pests in Canada. To this end, it maintains pest-specific [domestic plant protection programs](#) which are supported by regularly conducted [pest surveys](#).

To further enhance the chances of detecting new pest populations, the [Plant Protection Act](#) requires Canadians to [report known or suspected plant pests](#) to the CFIA if they appear in an area where they have not previously been known to exist.

In addition, entomologists interested in conducting research on an insect pest must follow requirements developed by the CFIA for the [handling of plant pests in Canada](#). These requirements serve to ensure that work conducted on live pests does not result in their escape and spread into the environment.

To report a pest, please contact your [local CFIA office](#) or report it directly through the [CFIA website](#).

To learn more about what you can do to prevent the spread of plant pests, visit the [CFIA's domestic plant protection measures web page](#), as well as the [Canadian Council on Invasive Species](#) website which provides tools and resources that apply to invasive species in general.

[la Loi sur la protection des végétaux](#).

L'ACIA a entre autres pour rôle de protéger la santé des végétaux ainsi que les secteurs agricole et forestier en prévenant ou en limitant la propagation des phytoravageurs au Canada. À cette fin, elle administre des [programmes phytosanitaires nationaux](#) et réalise régulièrement des [enquêtes connexes ciblant les organismes nuisibles](#).

Pour améliorer la détection des nouvelles populations d'organismes nuisibles, la [Loi sur la protection des végétaux](#) exige que les Canadiens [déclarent à l'ACIA les phytoravageurs connus ou présumés](#) qui font leur apparition dans un endroit où ils n'avaient encore jamais été signalés.

De plus, les entomologistes qui désirent mener des recherches sur un insecte nuisible doivent respecter les exigences de l'ACIA concernant [la manipulation des phytoravageurs au Canada](#). Ces exigences sont là pour s'assurer que les organismes nuisibles vivants utilisés dans le cadre des travaux ne s'échappent pas et ne se propagent pas dans l'environnement.

Pour signaler un organisme nuisible, communiquez avec votre [bureau local de l'ACIA](#) ou rendez-vous sur le [site Web de l'ACIA](#).

De plus amples renseignements sur ce que vous pouvez faire pour prévenir la propagation des phytoravageurs sont présentés sur la [page Web de l'ACIA concernant les mesures de protection des végétaux en territoire canadien](#) ainsi que sur le site Web du [Conseil canadien sur les espèces envahissantes](#), qui fournissent des outils et des ressources relatifs aux espèces envahissantes en général.

Advertising in the *Bulletin* / Publicité dans le Bulletin

The *Bulletin* welcomes enquiries regarding advertising within its pages.

For 2022, the advertising rates in the *Bulletin* have been set at \$235/annum for a half-page advertisement, and \$410/annum for a full-page advertisement, in each of the March, June, September and December issues.

For further information, please contact the *Bulletin* Editor (cedric.gillott@usask.ca).

The *Bulletin* accueille les demandes de publicité dans ses pages.

Pour 2022, les tarifs publicitaires du *Bulletin* ont été fixés à 235 \$/an pour une demi-page et à 410 \$/an pour une page entière dans chacun des numéros de mars, juin, septembre et décembre.

Pour de plus amples informations, veuillez contacter le rédacteur du *Bulletin* (cedric.gillott@usask.ca).

List of Contents: Regional Journals / Table des matières : Revues des sociétés régionales

Contents of regional society journals

This regular feature highlights research published in the five regional society journals that include peer-reviewed papers. It should be noted that some regional society journals are not published on a regular basis and may not always include peer-reviewed articles.

Contenu des revues des sociétés régionales

Cette rubrique régulière met en lumière la recherche publiée dans les cinq revues des sociétés régionales qui incluent des articles révisés par les pairs. Veuillez noter que certaines revues des sociétés régionales ne sont pas publiées sur une base régulière et peuvent ne pas toujours inclure des articles évalués par les pairs.



Journal of the Entomological Society of Ontario Volume 152 (2021)

<https://journal.lib.uoguelph.ca/index.php/eso/index>

Audet, T., Romero, N., and Richards, M. 2021. Negative effects of early spring mowing on a bee community: a case study in the Niagara Region. *JESO*, **152**: 39–55. [PDF](#)

Vizza, K., Beresford, D.V., Hung, K.-L. J., Schaefer, J.A., and MacIvor, J.S. 2021. Wild bees (Hymenoptera: Apoidea) from remote surveys in northern Ontario and Akimiski Island, Nunavut, including four new regional records. *JESO* **152**: 57–80. [PDF](#)



Canadian Weed Science Society Société canadienne de malherbologie

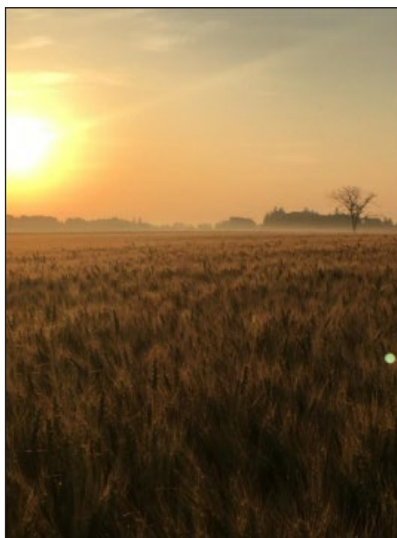
CWSS-SCM Newsletter

The Society has recently adopted a new style for its newsletter so that there is no longer a Table of Contents. To see what's new in Canadian weed science since the last *Bulletin*, go to:

September <https://secureservercdn.net/192.169.220.85/c8x.545.myftpupload.com/wp-content/uploads/2021/09/September-2021-email-blast.pdf>

October <https://secureservercdn.net/192.169.220.85/c8x.545.myftpupload.com/wp-content/uploads/2021/10/10october-2021-email-blast.pdf>

November <https://secureservercdn.net/192.169.220.85/c8x.545.myftpupload.com/wp-content/uploads/2021/11/11november-2021-email-blast.pdf>





THE CANADIAN PHYTOPATHOLOGICAL SOCIETY
LA SOCIÉTÉ CANADIENNE DE PHYTOPATHOLOGIE

CPS-SCP News

VOL. 65, NO. 3 (September 2021)

https://phytopath.ca/wp-content/uploads/2021/10/CPS-SCP-News-65-3-September2021_v3.pdf

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Meeting announcements / Réunions futures

Note: In view of the COVID-19 situation, readers should check the meeting website to ascertain if the conference is still proceeding and, if so, in what format.

10th International IPM Symposium: Implementing IPM across Borders and Disciplines

Denver, 28 February–03 March 2022

<https://ipmsymposium.org/2021/>

Entomological Society of America International Branch, 2022 Virtual Symposium

25–27 April 2022

(no website to date)

25th Biennial International Plant Resistance to Insects Workshop

Malmö, Sweden, 31 May–2 June 2022

<https://ipri25.com/>

26th International Congress of Entomology (Entomology for our planet)

Helsinki, Finland, 18–23 July 2022

<https://ice2020helsinki.fi/>

XVI International Conference on Ephemeroptera and XXI International Symposium on Plecoptera

Virtual meeting: 25–29 July 2022

(no website to date)

Ecology of Aphidophaga 15

Catalonia, Spain, 19–23 September 2022

<https://aphidophaga15.udl.cat/>

Joint Annual Meeting of the Entomological Society of Canada, Entomological Society of America, and the Entomological Society of British Columbia

Vancouver, 13–16 November 2022

(no website to date)

Entomological Society of America International Branch, 2023 Virtual Symposium

24–26 April 2022

(no website to date)

Entomology 23 (Annual Meeting of the Entomological Society of America)

National Harbor, Maryland, 5–8 November 2023

(no website to date)

Readers are invited to send the Editor notices of entomological meetings of international, national or Canadian regional interest for inclusion in this list.

Les lecteurs sont invités à envoyer au rédacteur en chef des annonces de réunions entomologiques internationales, nationales ou régionales intéressantes afin de les inclure dans cette liste.

Bulletin of the Entomological Society of Canada

Editor: Cedric Gillott

Assistant Editor: Donna Giberson

The *Bulletin of the Entomological Society of Canada*, published since 1969, presents quarterly entomological news, opportunities and information, details of Society business, matters of wider scientific importance and book reviews.

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E-mail: info@esc-sec.ca
www.esc-sec.ca/

The Entomological Society of Canada was founded in 1863 primarily to study, advance and promote entomology. It supports entomology through publications, meetings, advocacy and other activities.

Send correspondence to:
Cedric Gillott
Bulletin Editor
Department of Biology
University of Saskatchewan
112 Science Place, SK S7N 5E2
Telephone: (306) 966-4401
Fax: (306) 966-4461
E-mail: cedric.gillott@usask.ca

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Rédacteur: Cedric Gillott

Rédactrice adjointe: Donna Giberson

Le *Bulletin de la Société d'entomologie du Canada*, publié depuis 1969, présente trimestriellement des informations entomologiques, des occasions, des renseignements sur les opérations de la Société, des dossiers scientifiques d'importance et des analyses d'ouvrages.

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386 Broadway, Suite 503
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E-mail: info@esc-sec.ca
www.esc-sec.ca/fr/

La Société d'entomologie du Canada a été établie en 1863 principalement pour promouvoir l'étude et l'avancement de l'entomologie. Elle soutient l'entomologie par l'entremise de publications, de réunions et d'autres activités.

Envoyer vos soumissions à:
Cedric Gillott
Rédacteur du *Bulletin*
Department of Biology
University of Saskatchewan
112 Science Place, SK S7N 5E2
Telephone: (306) 966-4401
Fax: (306) 966-4461
courriel : cedric.gillott@usask.ca

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Droits d'auteur 2021 Société d'entomologie du Canada

Date de tombée pour le prochain numéro: 31 janvier 2022

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 Department of Entomology, Univ. of Manitoba
 12 Dafoe Road, Winnipeg, Manitoba R3T 2N2
 E-mail: entsocmanitobasecretary@gmail.com
<http://home.cc.umanitoba.ca/esm/>

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President Amanda Roe
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 Vista Centre
 1830 Bank St. P.O. Box 83025
 Ottawa, ON K1V 1A3
 E-mail: entsocont.membership@gmail.com
<http://www.entsocont.ca>

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 430, boul. Gouin
 Saint-Jean-sur-Richelieu, QC J3B 3E6
 Tél : (579)224-3063
 Email : secretaireseq@gmail.com
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 Secretary/Treasurer Sara Edwards
 Faculty of Forestry and Env. Management
 University of New Brunswick
 3 Bailey Drive,
 P.O. Box 4400 Fredericton, NB E3B 5A3
 E-mail: treasurer@acadianes.ca
<http://www.acadianes.ca>

Editor's note: Society Directors and Officers are reminded to check these lists, and submit corrections, including the names and positions of new officers.



JAM2021 and beyond

Congratulations to the JAM2021 Local Organising Committee, led by Amro (Zayed) and Miriam (Richards), for putting on a terrific meeting! The Society's first all-virtual conference went smoothly and its access was not too difficult even for an octogenarian registrant (who 'magically' even scored 29 Game Points!). In all sessions that I attended, there were some really good presentations, with the highlight for me being Maydianne Andrade's keynote lecture "*Bias and Inclusion in Practice*".

As a member survey has indicated, a virtual component for future JAMs is desirable, as this format is certainly a much cheaper way to attend a conference. Further, the organisation of this format would seem to be less costly and less complex than the traditional in-person affair. However, a mixed-format JAM would appear on the face of it to be much more costly and risky (from a financial perspective) for the local hosting society. Obviously, each format will incur its own fixed costs. But then, how will the LOC begin to judge how many registrants there will be in each category. This becomes important, for example, when the LOC has to sign a contract with the host hotel (more than a year ahead of the JAM) guaranteeing reservations for a specified number of rooms. Failure to fulfil this contract may result in a heavy financial penalty (as was seen when JAM2021 was cancelled as a live event in Niagara Falls).

As the Board Highlights (p. 205) indicate, after the regional societies have provided their

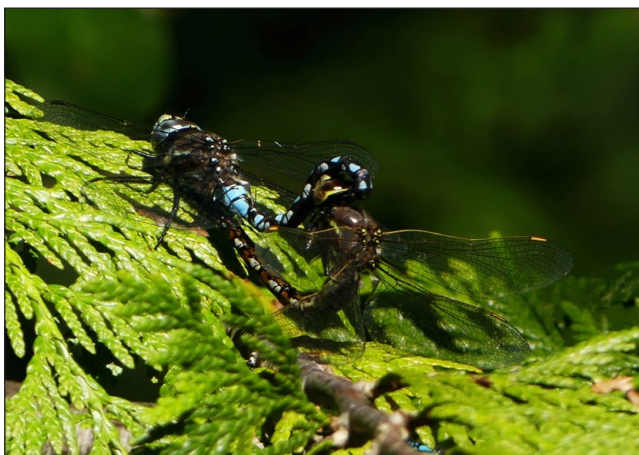
Réunion 2021 et au-delà

Félicitations au comité organisateur local de la réunion annuelle 2021, dirigé par Amro (Zayed) et Miriam (Richards), pour cette réunion exceptionnelle! La première conférence entièrement virtuelle de la société s'est déroulée sans problème et l'accès n'a pas été trop difficile, même pour un participant octogénaire (qui a même marqué, « par magie », 29 points à ce jeu!). Toutes les sessions auxquelles j'ai assisté ont donné lieu à de très bonnes présentations, le point culminant étant pour moi la conférence principale de Maydianne Andrade intitulée « *Bias and Inclusion in Practice* ».

Comme l'a indiqué une consultation des membres, une composante virtuelle pour les futures réunions annuelles conjointes est souhaitable, car ce format est certainement un moyen beaucoup moins coûteux d'assister à une conférence. De plus, l'organisation de ce format semble être moins coûteuse et moins complexe que la traditionnelle conférence en personne. En revanche, une réunion annuelle hybride semblerait à première vue beaucoup plus coûteuse et risquée (d'un point de vue financier) pour la société hôte locale. De toute évidence, chaque format entraînera ses propres coûts fixes. Mais alors, comment le comité organisateur local pourrait-il évaluer le nombre d'inscrits dans chaque format? Cela devient important, par exemple, lorsque le comité organisateur doit signer un contrat avec l'hôtel (plus d'un an avant la réunion annuelle conjointe) garantissant la réservation d'un certain nombre de chambres. Le non-respect de ce contrat peut entraîner une lourde pénalité financière (comme cela a été le cas lorsque la réunion annuelle 2021 a été annulée en tant qu'événement en personne à Niagara Falls).

input, the Board will hold a specific meeting to discuss the future format of JAMs. Despite the success of the first all-virtual JAM, we may not see a great change to our annual meeting format for some time. The 2022 meeting in Vancouver, co-hosted with the Entomological Societies of America and British Columbia, will be a hybrid, with some parts being offered both to the in-person attendees and on-line. The Entomological Society of Saskatchewan, the 2023 co-host, has already indicated that it will stick with the traditional format. And at this time, we can only speculate as to what the Société d'entomologie du Québec will do in 2024.

Comme l'indiquent les points saillants du CA (p. 205), une fois que les sociétés régionales auront donné leur avis, le CA tiendra une réunion spécifique pour discuter du format futur des réunions annuelles conjointes. Malgré le succès de la première réunion annuelle conjointe entièrement virtuelle, il se peut que le format de notre réunion annuelle ne subisse pas de grands changements avant un certain temps. La réunion de 2022 à Vancouver, organisée conjointement avec les Sociétés d'entomologie d'Amérique et de Colombie-Britannique, sera hybride, certaines parties étant proposées à la fois aux participants en personne et en ligne. La Société d'entomologie de la Saskatchewan, l'hôte conjoint de 2023, a déjà indiqué qu'elle s'en tiendrait au format traditionnel. Et pour l'instant, nous ne pouvons que spéculer sur ce que fera la Société d'entomologie du Québec en 2024.



D. Glibson

California darners (*Rhionaeschna californica*) mating, Smuggler Cove Provincial Park, BC, mid May, 2021

Entomological Society of Canada, 2020-2021

Société d'entomologie du Canada, 2020-2021

Executive Council / Conseil exécutif

President / Président

Felix Sperling
University of Alberta, Edmonton, Alberta
ESCPresident@esc-sec.ca

First Vice-President / Premier vice-président

Chris Macquarrie
CFS Sault Ste Marie, ON
Christian.MacQuarrie@NRCan-RNCn.gc.ca

Second Vice-President / Second vice-président

Colin Favret
Université de Montréal, Montréal, QC
Colin.Favret@umontreal.ca

Past President / Président sortant

Bill Riel
Natural Resources Canada, Victoria, BC
bill.riel@NRCan-RNCn.gc.ca

Directors-at-Large / Conseillers

Christine Noronha, Charlottetown, PE (2022)
christine.noronha@canada.ca
Emma Despland, Montreal, QC (2023)
emma.despland@concordia.ca
Kyle Bobiwash, Winnipeg, MB (2024)
Kyle.Bobiwash@umanitoba.ca

Regional Directors / Directeurs régionaux

Brian van Hezewijk, Victoria, BC (ESBC)
brian.vanhezewijk@canada.ca
Boyd Mori, Edmonton, AB (ESAB)
bmori@ualberta.ca
Danielle Stephens (Representative Director, ESS)
danielle.stephens@gov.sk.ca
Jason Gibbs, Winnipeg, MB (ESM)
jason.gibbs@umanitoba.ca
Rose Labbé, Harrow, ON (ESO)
roselyne.labbe@canada.ca
Étienne Normandin, Montreal, QC (SEQ)
etienne.normandin@gmail.com
Jess Vickruck, Fredericton, NB (AES)
jess.vickruck@agr.gc.ca

Student and Early Professional Director / Administrateur pour les étudiants et les jeunes professionnels

Matt Muzzatti, Ottawa, ON
MATTMUZZATTI@cmail.carleton.ca

Director for Equity, Diversity & Inclusion / Administrateur pour l'équité, la diversité et l'inclusion

Sebastian Ibarra Jimenez, Vernon, BC
sebsibarra@gmail.com

Treasurer / Trésorier

Bryan Brunet
Agriculture and Agri-Food Canada, Ottawa ON
ESCTreasurer@esc-sec.ca

Secretary / Secrétaire

Neil Holliday
University of Manitoba, Winnipeg, MB
ESCSecretary@esc-sec.ca

Bulletin

Editor / Rédacteur

Cedric Gillott
University of Saskatchewan, Saskatoon, SK
cedric.gillott@usask.ca

Asst. Editor / Rédactrice adj.

Donna Giberson
U. Prince Edward Island, Charlottetown, PE
giberson@upe.ca

Webmaster / Webmestre

Cass Chowdhury
Simon Fraser University, Burnaby, BC
cass_chowdhury@sfu.ca

The Canadian Entomologist

Editors-in-Chief / Rédacteurs / Rédactrices en chef

Dezene Huber, U. Northern British Columbia
Prince George, BC
Suzanne Blatt, AAFC, Kentville, NS
Amanda Roe, NRC, Sault Ste. Marie, ON
editor@esc-sec.ca

Canadian Journal of Arthropod Identification

Editor-in-Chief / Rédactrice en chef

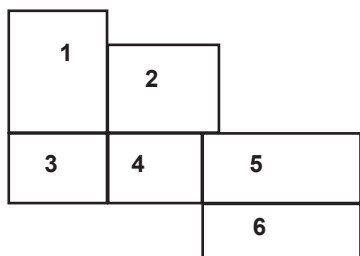
Heather Proctor
University of Alberta, Edmonton, AB
hproctor@ualberta.ca

Social Media Administrators / Administrateurs des médias sociaux

Morgan Jackson, Ste. Anne de Bellevue, QC
morgandjackson@gmail.com
Angela Gradish, Guelph, ON
agradish@uoguelph.ca

Head Office / Siège social

Entomological Society of Canada
386 Broadway, Suite 503
Winnipeg, MB, R3C 3R6 Canada
Tel: 1-888.821.8387; +1-204.282.9823
Fax: +1-204.947.9767
E-mail: info@esc-sec.ca www.esc-sec.ca/
www.esc-sec.ca/fr/



www.esc-sec.ca

Entomological Society of Canada
Société d'entomologie du Canada
386 Broadway
Suite 503
Winnipeg, MB
R3C 3R6
E-mail: info@esc-sec.ca

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Front cover/Page couverture:

1. A female *Cyphoderris monstrosa* (Orthoptera) found hanging out in a backyard [Summerland, British Columbia, Canada]
Une femelle *Cyphoderris monstrosa* (Orthoptera) trouvée dans une cour arrière [Summerland, Colombie-Britannique, Canada]
[Photo: Andrea Brauner]
2. Portrait of a male American rubyspot, *Hetaerina americana* (Odonata: Calopterygidae), photographed along the Châteauguay River on 13 August 2020. A small population of this colourful damselfly was discovered at this site, well north of its usual range, several years ago [Ste-Martine, Quebec, Canada]
Portrait d'un mâle de la courtisane d'Amérique (*Hetaerina americana*) (Odonata : Calopterygidae) photographié le long de la rivière Châteauguay le 13 août 2020. Une petite population de cette demoiselle colorée a été découverte sur ce site, bien au nord de sa distribution habituelle, il y a quelques années. [Sainte-Martine, Québec, Canada]
[Photo: Richard Yank]
3. Two male rhinoceros beetles (Xylotrupes: Dynastinae) preparing to 'fight.' Prize fighters are bred and bets are placed on which male will throw the other off a cylindrical piece of wood [Chiang Mai, Thailand]
Deux mâles scarabées rhinocéros (Xylotrupes, Dynastinae) se préparant à se « battre ». Les combattants sont issus d'élevage et les paris sont placés sur le mâle qui lancera l'autre sur un morceau de bois cylindrique. [Chiang Mai, Thaïlande]
[Photo: Matt Muzzatti]
4. Subadult female black widow spider (*Latrodectus* sp.) walking on her web [Tsawwassen, British Columbia, Canada]
Une femelle subadulte de la veuve noire (*Latrodectus* sp.) marchant sur sa toile. [Tsawwassen, Colombie-Britannique, Canada]
[Photo: Andreas Fischer]
5. *Enallagma civile* (Odonata: Coenagrionidae) watching the foot traffic along a boardwalk [Riding Mountain National Park, Manitoba, Canada]
Enallagma civile (Odonata : Coenagrionidae) observant la circulation piétonne le long d'un trottoir [Parc national Riding Mountain, Manitoba, Canada]
[Photo: Mel Hart]
6. Collecting insects and setting up pan traps on the dry slopes as part of the Biodiversity Galiano Project [Galiano Island, British Columbia, Canada]
Récolte d'insectes et installation de pièges à interception sur des pentes sèches dans le cadre du projet Biodiversité Galiano [Île Galiano, Colombie-Britannique, Canada]
[Photo: Chris Ratzlaff]

Back cover/Quatrième de couverture:

Samurai wasp, *Trissolcus japonicus* (Hymenoptera: Scelionidae), parasitising eggs of *Halyomorpha halys* [Delémont, Switzerland]
La guêpe samuraï, *Trissolcus japonicus* (Hymenoptera : Scelionidae), parasitant des oeufs de *Halyomorpha halys* [Delémont, Suisse]
[Photo: Tim Haye]