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Calliphoridae (Diptera), Oyama, BC. Sitting on a bright chrysanthemum, this blow fly seems to be making up in aesthetics what it lacks in personal hygiene. Photo: Ward Strong

Calliphoridé (Diptère), Oyama, C.-B. Posée sur un chrysanthème coloré, cette mouche semble compenser ses lacunes en hygiène personnelle par l'esthétique. Photo



Lynnda Holliday

On meetings and their makers

The antecedents of modern scientific societies began to appear in Europe in the late 15th century, and many national scientific societies of today trace their origins to the 17th, 18th or 19th centuries. These societies often started with men (only men) from a city or region meeting occasionally for an evening of science and fellowship. Meetings would consist of a presentation of scientific results, an account of an expedition, a demonstration of an experiment, or an exhibition of specimens. Following the presentation was a question period, and then a time of free discussion usually accompanied by food and drink. As these events became more formalized, membership structures were devised, and frequently only members, or guests sponsored or vetted by a member, were permitted to make presentations at meetings. Records of presentations at meetings appeared as “Proceedings” or “Transactions” of the society and, as these were written equivalents of a presentation by a member or a vetted guest, the concept of peer-reviewed publication was born. Until publication-counting became a metric determining career advancement, the core activity of many scientific societies remained the meeting.

Des réunions et leurs organisateurs

Les précurseurs des sociétés scientifiques modernes ont commencé à apparaître en Europe à la fin du 15^e siècle, et plusieurs sociétés scientifiques nationales d’aujourd’hui trouvent leurs origines au 17^e, 18^e ou 19^e siècle. Ces sociétés ont souvent commencé avec des hommes (seulement des hommes) d’une ville ou d’une région qui se réunissaient occasionnellement pour une soirée de sciences et de fraternité. Les réunions consistaient en une présentation de résultats scientifiques, le compte-rendu d’une expédition, la démonstration d’une expérience ou une exposition de spécimens. Après la présentation, il y avait une période de questions suivie d’une discussion libre généralement accompagnée de nourritures et boissons. Alors que ces événements devenaient plus formels, l’adhésion était plus structurée, et souvent, seuls les membres, ou des invités commandités ou approuvés par un membre, pouvaient faire des présentations à des réunions. Les archives des présentations aux réunions apparaissaient comme « Comptes rendus » ou « Transactions » de la société, et, puisque ce sont des équivalents écrits d’une présentation par un membre ou un invité approuvé, le concept de publication révisée par les pairs était né. Jusqu’à ce que le décompte de publications devienne une mesure déterminant l’avancement de carrière, l’activité principale de plusieurs sociétés scientifiques demeurerait la réunion.

La formule pour une réunion en soirée d’une société scientifique du 19^e siècle diffère un peu d’une réunion ou conférence scientifique du 21^e siècle. Il y a des éléments impliquant la présentation de résultats ou d’idées scientifiques. Il y a des opportunités formelles de questions, défis ou discussions de ces présentations avec le présentateur et les autres. Par la suite, il y a des opportunités informelles d’échanger des idées, de rencontrer son rival sur le terrain ou de développer des collaborations. Ces opportunités informelles – encore une fois

The formula for an evening meeting of a 19th century scientific society differs little from that of a 21st century scientific meeting or conference. There are structured elements involving presentation of scientific results or ideas. There are formal opportunities to question, challenge or discuss those presentations with the presenters and with others. Then there are informal opportunities to exchange ideas, to meet one's rivals in the field or to develop collaborations. These informal opportunities — still usually lubricated by food and drink — may be referred to as “networking”, a fashionable term that has many meanings. There is the algorithm-driven networking of on-line networks, which delivers junk email about the latest developments in alien fields from the laboratories of network “connections” that one never knew one had. There is purposeful networking, for example to make oneself known to a future potential employer or employee; this certainly happens at scientific meetings. But scientific meetings cannot be beaten for networking that arises spontaneously: the unplanned encounter in an elevator that leads to collaboration, the talk in an unfamiliar sub-discipline that provokes a change of research direction, or the “eureka moment” when one is shocked out of a too-complacent worldview by a chance remark from a fellow attendee. For serendipitous potentially career-altering encounters with people and ideas, scientific conferences have no equal.

This year, the ESC's annual meeting was in partnership with the 25th International Congress of Entomology (ICE) in Orlando, Florida. The Congress drew 6682 registrants from 102 countries; Canadians made up 5% of the attendees, third behind the United States and China. ESC events at the conference, including a symposium on spruce budworm genomics organized by Michel Cusson, and the awards ceremony and receptions, were well attended. An area in which our members shone particularly was the International Graduate Student Showcase: Paul Abram, Chandra Moffat, and Boyd Mori, former members of ESC's Student and Early Professional Affairs

généralement facilitées par de la nourriture et des boissons — peuvent être comparées à du réseautage, un terme à la mode qui a plusieurs significations. Il y a le réseautage mené par algorithme sur des réseaux en ligne, qui livrent des pourriels sur les derniers développements dans le domaine des extraterrestres provenant de laboratoires de contacts que l'on ne savait même pas qu'on avait. Il y a le réseautage utile, par exemple afin de se faire connaître à un futur employeur ou employé potentiel; cela se produit certainement lors des réunions scientifiques. Mais rien ne se mesure au réseautage qui se produit spontanément : les rencontres non planifiées dans un ascenseur qui mènent à une collaboration, la présentation dans une sous-discipline peu familière qui provoque un changement dans la direction de la recherche, ou le moment « eureka! » quand quelqu'un est sous le choc d'une vision du monde complaisante par une remarque d'un collègue. Pour des rencontres heureuses avec des gens et des idées pouvant potentiellement changer le cours d'une carrière, les conférences scientifiques n'ont pas leur égal.

Cette année, la réunion annuelle de la SEC se tenait en partenariat avec le 25^e congrès international d'entomologie (ICE) à Orlando en Floride. Le congrès a attiré 6682 participants de 102 pays : les canadiens composaient 5% des participants, troisième derrière les États-Unis et la Chine. Les événements de la SEC à la conférence, incluant un symposium sur la génomique de la tordeuse des bourgeons de l'épinette organisé par Michel Cusson, la cérémonie des prix, et les réceptions, ont eu une bonne participation. Un domaine dans lequel nos membres ont particulièrement brillé est la vitrine internationale aux étudiants diplômés : Paul Abram, Chandra Moffat et Boyd Mori, anciens membres du comité des affaires étudiantes et des jeunes professionnels étaient trois des cinq organisateurs de la session, et trois des huit conférenciers étaient d'origine canadienne (voir pp. 154-157). Murray Isman, représentant officiel de la SEC, était l'un des sept membres de la SEC impliqué dans l'organisation de l'ICE 2016. À la réunion,

Committee were three of the five session organizers, and three of the eight showcased papers were of Canadian origin (see pp. 154-157). Murray Isman, who was the official representative of ESC, was one of seven ESC members involved in the organization of ICE 2016. At the meeting, Charles Vincent began a term on the ICE Council, and so will be involved in the next ICE, to be held in Helsinki in 2020 (and see p. 157).

ICE 2016 was the biggest yet; the last time ICE was in the United States (Washington, 1976) there were 2300 attendees, and the 1988 ICE in Vancouver drew 2765 delegates. Such large events make for a crowded program as for many participants paper presentation is a condition of funding to attend. To accommodate the demand, ICE 2016 included 4421 oral presentations; almost all were 15 minute talks and no one was allowed to present more than one item. Thus, apart from a few plenary speakers, world leaders in their fields were unable to develop a topic much beyond the sound-bite level. Such a packed program produced conflicts, with talks on the same topic in different sessions at the same time, or in adjacent time slots where the transit time between venues made it impossible to hear both. As a result, many participants chose not to plan an elaborate thread among target talks in their specific fields, but chose a session of interest and stayed there; such a strategy can lead to those serendipitous encounters mentioned above. Excitement was evident everywhere one went at ICE.

Animated conversations among delegates were ubiquitous. But certainly the highest level of excitement emanated from the 2500 school children who attended Insect Expo for activities such as maggot-painting,

Charles Vincent a débuté un mandat sur le conseil de l'ICE et sera donc impliqué dans le prochain ICE qui se tiendra à Helsinki en 2020 (voir p. 157).

L'ICE 2016 était le plus gros à ce jour : la dernière fois que l'ICE s'est tenu aux États-Unis (Washington 1976), il y avait 2300 participants, et l'ICE 1988 à Vancouver avait attiré 2765 participants. Des événements de cette ampleur amènent un programme chargé puisque pour beaucoup de participants, la présentation d'une conférence est une condition pour obtenir le financement pour y assister. Pour combler ces demandes, l'ICE 2016 a inclus 4421 présentations orales : presque toutes étaient de 15 minutes, et personne ne pouvait présenter plus d'un item. Ainsi, à part quelques conférenciers des sessions plénières, les leaders mondiaux dans leur domaine étaient dans l'impossibilité de développer un sujet plus loin qu'un bref aperçu. Un tel programme chargé amène des conflits d'horaire, avec des présentations sur le même sujet dans différentes sessions en même temps, ou dans des créneaux adjacents avec un temps de déplacement entre les salles empêchant d'assister aux deux. Plusieurs participants ont donc choisi de ne pas planifier un horaire élaboré parmi les présentations ciblées dans leur domaine spécifique, mais ont choisi une session intéressante et y sont restés : une telle stratégie peut mener à ces rencontres

heureuses mentionnées plus haut. L'excitation était évidente partout où l'on allait à l'ICE. Les conversations animées entre les participants étaient omniprésentes. Mais le niveau d'excitation le plus élevé émanait certainement des 2500 enfants qui assistaient à l'exposition d'insectes pour des activités comme la peinture d'asticots, la danse des abeilles et l'accompagnement



During ICE 2016, Charles Vincent participated in Insect Expo, an event organized by ESA during which 2500 children from primary and secondary schools in the greater Orlando area came over a 4-hour period to learn about insects. Charles was posted at "Antennae", one of the most visited of the 20 kiosks.

waggle dances and walk-through dichotomous keys, and spectacles such as cockroach races. In summary, ICE was intellectually invigorating and stimulating, but perhaps one would not want all meetings to be so large.

The episodes of exciting intellectual diversification that ICE offers every 4 years can be complemented rather nicely by smaller less frenetic meetings, such as ESC Joint Annual Meetings (JAMs), where scheduling conflicts are fewer, there are more opportunities for speakers to develop their topics, and one may actually meet the people one is hoping to see. There are parallels between the relationship of ICE to ESC JAMs and the relationship of ESC JAMs to the annual meetings of our affiliated regional societies. Larger and less locally-focussed meetings jolt us out of our familiar environment, and are more likely to induce the serendipitous breakthrough, but may make it more difficult to maintain existing contacts and appreciate the continuity of research developments of local colleagues.

Larger meetings require greater time and financial investments to organize. Although the professional full-time staff of the Entomological Society of America did much of the detailed organizing of ICE, the two co-chairs of the conference set aside most of their scientific activities for several years to bring ICE to fruition. In contrast, regional society meetings may be organized by just a few people, often working with a familiar venue and established formulae for registration and paper submission. When a regional society hosts a JAM, the workload is much higher than for the normal regional annual meeting. Finances and accounting are more complex. Venues and accommodations must be booked years in advance. Procedures for registration and paper submissions must be organized. As JAMs recur in the same region about once every 7 years, those with experience of previous JAMs may not be available. Also, that experience may not be as valuable as it once was: rapidly-evolving software and changes in taxation and insurance

dans les clés dichotomiques, ainsi que des spectacles comme la course de coquerelles. En résumé, l'ICE était intellectuellement vivifiant et stimulant, mais on pourrait ne pas vouloir que toutes les réunions soient aussi grandes.

Les épisodes de diversifications intellectuelles excitantes que l'ICE offre tous les 4 ans peuvent être assez bien complémentées par les réunions plus petites et moins frénétiques, comme la réunion conjointe annuelle de la SEC, où les conflits d'horaires sont moins nombreux, où il y a plus d'opportunités pour les orateurs de développer leur sujet, et où l'on peut réellement rencontrer la personne que l'on veut voir. Ce sont des parallèles entre les relations entre l'ICE et les réunions annuelles de la SEC, et les relations entre les réunions annuelles de la SEC et les réunions annuelles de nos sociétés régionales affiliées. Les réunions plus grosses et moins centrées sur ce qui se passe localement nous sortent de notre environnement familial et sont plus enclines à provoquer la percée heureuse, mais peuvent rendre plus difficile de maintenir nos contacts et d'apprécier la continuité dans le développement de la recherche de nos collègues locaux.

Les réunions plus grandes demandent plus d'investissements en temps et en argent à organiser. Bien que le personnel professionnel à temps plein de la Société d'entomologie américaine ait géré la plupart des détails de l'organisation de l'ICE, les deux co-présidents de la conférence ont mis de côté la plupart de leurs activités scientifiques pour plusieurs années afin d'amener l'ICE à son aboutissement. Au contraire, les réunions des sociétés régionales peuvent être organisées par seulement quelques personnes, travaillant généralement dans un lieu connu et avec des formules établies pour l'inscription et la soumission des présentations. Quand une société régionale reçoit la réunion annuelle conjointe, la charge de travail est bien plus grande que pour la réunion annuelle régionale normale. Les finances et la comptabilité sont plus complexes. Le site et l'hébergement doivent être réservés des années d'avance. Les procédures pour l'inscription et la soumission des présentations doivent être organisées. Puisque la

requirements can render procedures obsolete from one meeting cycle to the next.

Among the benefits of using an association management company for administrative activities is that such companies are continuously involved with conference organization for multiple clients. Their software is current, and their staff is familiar with its use, and with the regulatory framework in which conferences must operate. ESC's associate management contract takes the management of registrations, credit card transactions, tax levies, and paper submissions out of the hands of local organizing committees, leaving them free to fashion the scientific program and social activities of the meeting without the burden of the mechanical aspects of organization. Other aspects of meeting organization can also be handled by the association management company if the local organizing committee wishes, and ESC can provide guidance on the costs and benefits of these additional services. To guide the participants in the process of conference organization in this new era, the ESC Board, which includes Regional Directors representing their societies, has adopted a policy document that outlines who does what.

Among steps that ESC is now taking is to develop a sustained national fund-raising strategy that will complement the local organizing committee's fundraising efforts. By their nature, local organizing committees cannot develop long-term annual patterns of giving that result in donor budgets having fixed line items for donations to support the JAM. ESC can do this. ESC will also develop, with input from regional societies, a financial framework document, that outlines financial commitments and revenue sharing arrangements for each JAM. ESC recognizes that its relationship with regional societies is a mutualism. ESC is dependent on regional societies for the labour and local knowledge to make a JAM successful. Both ESC and regional societies rely on revenue from the JAM to support society operations. The steps that ESC has taken and plans to take are

réunion conjointe revient dans la même région à tous les 7 ans environ, ceux qui ont l'expérience des dernières réunions conjointes ne sont pas nécessairement disponibles. De plus, cette expérience peut ne pas être aussi utile qu'elle l'était : les logiciels évoluant rapidement et les changements dans les taxes et les exigences d'assurance peuvent rendre les procédures obsolètes d'une réunion à la suivant du cycle.

Parmi les avantages d'utiliser une compagnie de gestion d'associations pour les activités administratives est que ces compagnies sont continuellement impliquées dans l'organisation de conférences pour leurs multiples clients. Leur logiciel est donc actuel, et leurs employés familiers avec son utilisation et avec le cadre réglementaire dans lequel les conférences doivent opérer. Le contrat de gestion d'association de la SEC enlève la gestion des inscriptions, les transactions par cartes de crédits, les prélèvements fiscaux et les soumissions des titres des mains des comités organisateurs locaux, les laissant libre de modeler le programme scientifique et les activités sociales de la réunion sans les aspects mécaniques de l'organisation. D'autres aspects de l'organisation de réunions peuvent aussi être pris en charge par la compagnie si le comité organisateur local le désire, et la SEC peut fournir des lignes directrices sur le coût et les avantages de ces services additionnels. Afin de guider les participants dans le processus d'organisation de conférence dans cette nouvelle ère, le CA de la SEC, incluant les directeurs régionaux représentant leur société, a adopté un document qui donne les grandes lignes de qui fait quoi.

Une des étapes que la SEC prend est de développer une stratégie de levée de fond nationale durable qui complètera les efforts du comité local pour le financement. De par leur nature, les comités organisateurs locaux ne peuvent pas développer des patrons annuels à long-terme de dons, afin que le budget des donateurs ait des lignes fixes chaque année pour soutenir la réunion conjointe annuelle. La SEC peut le faire. La SEC développera également, avec l'apport des sociétés régionales, un document de cadre financier qui présentent les grandes lignes des arrangements dans les

not designed to jeopardize this mutualistic relationship, but to make it more beneficial for both. These steps should reduce the workload for the regional society so that even smaller societies with few members do not feel hesitant about taking their place in the JAM rotation. Continuing the JAM rotation among regional societies makes them and the national society stronger, and provides that sequence of larger and smaller meetings that can confront our members with the unexpected eureka moment, help maintain their networks large and small, and allow them to stay in touch with local, national and international research developments.

engagements financiers et le partage des revenus pour chaque réunion conjointe. La SEC reconnaît que sa relation avec les sociétés régionales est du mutualisme. La SEC dépend des sociétés régionales pour le travail et la connaissance localement afin de faire une réunion réussie. La SEC et les sociétés régionales dépendent des revenus de la réunion conjointe pour soutenir les opérations de la société. Les étapes que la SEC a faites et les plans pour les prendre ne sont pas conçus pour mettre en péril cette relation mutualiste, mais pour la rendre encore plus bénéfique pour les deux. Ces étapes devraient réduire la charge de travail pour la société régionale afin que même les plus petites sociétés ayant peu de membres ne soient pas hésitantes à prendre leur place dans la rotation pour la réunion conjointe annuelle. Continuer la rotation entre les sociétés régionales les rend, ainsi que la société nationale, plus fortes, et fournit cette séquence de réunions plus grandes et plus petites qui peuvent amener nos membres à ces moments eureka inattendus, les aider à maintenir leurs petits et grands réseaux, et leur permettre de rester en contact avec les développements de la recherche locale, nationale et internationale.



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Réunion conjointe annuelle des Sociétés d'entomologie du Canada et du Manitoba

Hôtel Fairmont, Winnipeg (Manitoba)
22-25 octobre 2017

Petit, c'est beau

Tous les entomologistes savent bien que ce qui est petit est beau. Et bien que les réunions ICE 2016 et ESA-ESC Vancouver 2018 seront formidables, il est aussi agréable de ne pas être perdu dans une foule de plusieurs milliers de délégués. Au nom des Sociétés d'entomologie du Manitoba et du Canada, nous avons donc le plaisir de vous inviter à la **Réunion conjointe annuelle ESC-ESM de 2017 : Petit, c'est beau**.

Notre site, le magnifique hôtel Fairmont, est relié aux boutiques et aux restaurants du centre-ville par une série de passages couverts. De plus, la Fourche, lieu historique au confluent des rivières Assiniboine et Rouge, est à deux pas de l'hôtel. Les dates choisies pour la réunion coïncident avec les migrations spectaculaires d'oiseaux dans la vallée de la rivière Rouge et sont favorables à la collection d'insectes en fin de saison.

Les frais de l'inscription anticipée seront de 350 \$ pour les membres réguliers, 450 \$ pour les non membres, 175 \$ pour les étudiants, et l'inscription d'une seule journée se fera à 200 \$.

Oratrice principale :

- Angela Douglas
- Cornell University
- L'interface entre les insectes et les bactéries

Colloques :

- Pollinisation
- Ectoparasites
- Foresterie
- Dynamique des populations
- Commission biologique du Canada
- Étudiants des cycles supérieurs

Réunions conjointes :

- | | |
|----------------------|---|
| Le 20 octobre | Agriculture et Agroalimentaire Canada, le groupe de travail sur la lutte biologique |
| Les 26 et 27 octobre | Forum de l'Ouest sur la lutte antiparasitaire |

Si vous aimeriez organiser un colloque ou un atelier, veuillez communiquer avec :

Paul Fields, Président du comité scientifique, paul.fields@agr.gc.ca

Pour tout autre renseignement, veuillez communiquer avec :

Rhéal Lafrenière, Président général, Rheal.Lafreniere@gov.mb.ca

Site Web de la réunion :

http://home.cc.umanitoba.ca/~fieldspg/ESC_ESM_meeting_webpage/index.html



**Joint Meeting of the
Entomological Societies of
Canada and Manitoba**

**Fairmont Hotel, Winnipeg, Manitoba,
22-25 October 2017**

Small is beautiful

All entomologists know small is beautiful. Yes ICE 2016 and ESA-ESC Vancouver 2018 will be good meetings, but it is also great not to get lost in a crowd of thousands of delegates. On behalf of the Entomological Societies of Manitoba and Canada, we are pleased to invite you to the **2017 Joint Annual Meeting ESC-ESM: Small is Beautiful**.

The beautiful Fairmont Hotel is connected through a series of walkways to shops and restaurants in downtown Winnipeg. The historic The Forks, at the junction of the Assiniboine and Red Rivers, is a short walk from the hotel. The meeting is scheduled to coincide with the spectacular bird migration along the Red River Valley and the possibility of late season insect collecting.

Early registration fees will be set at \$350 for regular members, \$450 for non-members, \$175 for students and a single day registration of \$200.

Keynote speaker:

- Angela Douglas
- Cornell University
- Interface between insects and bacteria

Symposia:

- Pollination
- Ectoparasites
- Forestry
- Population Dynamics
- Biological Survey of Canada
- Graduate Students

Associated Meetings:

- October 20 Agriculture & Agri-Food Canada Working Group on Biocontrol
October 26-27 Western Forum on Pest Management

If you are interested in organizing a symposium or a workshop contact:

Paul Fields, Scientific Chair, paul.fields@agr.gc.ca

For all other inquires contact:

Rhéal Lafrenière, General Chair, Rheal.Lafreniere@gov.mb.ca

Meeting website:

http://home.cc.umanitoba.ca/~fieldspg/ESC_ESM_meeting_webpage/index.html

Canadian Highlights at ICE 2016

Regular and STEP members of the ESC were extensively involved in ICE organization, and many were recognized during the Congress for their work in the Society and for Entomology in Canada. Shown below is a small selection of images from the Congress. For more information on the activities of the STEP members at the meeting, see the STEP section below. For more photographs, please visit <https://www.flickr.com/photos/144418395@N06/albums>. As well, the Entomological Society of America has posted a huge album of general congress pictures at <https://www.flickr.com/photos/entsoc/sets/72157674272381700>.

Honours and Awards at ICE 2016



Guy Boivin receives the 2016 Gold Medal from Patrice Bouchard.



Patrice Bouchard presents the C. Gordon Hewitt Award to Amro Zayed.



Fred Beaulieu receives the certificate of Fellow of the ESC on behalf of Valerie Behan-Pelletier.



Tyler Wist receives the certificate of Honorary Member of the ESC on behalf of Cedric Gillott.



Jens Roland accepts the certificate of Honorary Member of the ECS on behalf of Judy Myers.



Stefaniya Kamenova accepts the Bert and John Carr Award on behalf of Anna Solecki.



Alec McClay receives a Service Award from Neil Holliday for his 5 years as ESC Secretary.



Gerhard Gries is the recipient of the ESA's 2016 Recognition Award in Insect Physiology, Biochemistry, and Toxicology.

Board of Directors



Tyler Wist for the ESC

Attendees at the first Board of Directors meeting at ICE 2016. Back row (from left): Kirk Hillier, Fiona Hunter, Christopher Dufault, Rob Currie, Neil Holliday, Morgan Jackson, Rob Longair; front row (from left): Geoff Powell, Patrice Bouchard, Gaétan Moreau, Véronique Martel, Bill Riel, Chris Cutler, Sophie Cardinal.



Tyler Wist for the ESC

Treasurer Christopher Dufault in pensive mood before the Awards Ceremony.

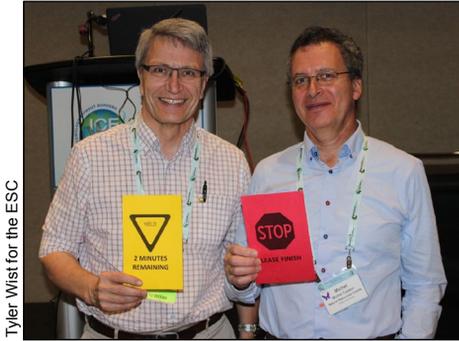


Tyler Wist for the ESC

A relieved Neil Holliday brings down the gavel on the Board of Directors' Meeting at ICE 2016.

Symposium. Spruce Budworm Genomics: From Basic Science to Outbreak Management.

The Symposium, organised by Michel Cusson (Natural Resources Canada), included Felix Sperling (University of Alberta), Gwylim Blackburn (University of Alberta), Sandrine Picq (Natural Resources Canada/Laval University), Marcelo Brandão (University of Campinas, Brazil), Lisa Lumley (Royal Alberta Museum) and Patrick James (University of Montreal).



Felix Sperling and Michel Cusson



Marcelo Brandão



Gwylim Blackburn



Sandrine Picq



Patrick James



Lisa Lumley

'R and R' was always welcome at ICE 2016.



Tyler Wist for the ESC

Charlie Bailey and Marianne Alleyne enjoying their Alligator Drool.



Tyler Wist for the ESC

Vincent Hervet, Swaroop Kehr and Habibullah Bahar.



Tyler Wist for the ESC

Carly Tribull (Sam Houston State University) and Morgan Jackson telling friends what they are missing at the Congress.



Tyler Wist for the ESC

Julien Saguez and Véro Martel.



Tyler Wist for the ESC

Entotweeters posing with an absent friend.



Tyler Wist for the ESC

Bob Lamb, Udari Wanigasekara, Pat MacKay, and Ishan Samaranyake.



Tyler Wist for the ESC

Scott Meers, Haley Catton and Christine Noronha, apparently comparing eastern and western Canadian wireworm problems.



Megan Colwell for the ESC

Amro Zayed, Justin Croft, Tian Wu, Wayne Knee, Joel Gibson, Kevin Floate, Tyler Wist and Sophie Cardinal.

STEP Corner / Le coin de la relève

Anne-Sophie Caron and Miles Zhang



Change in SEPAC

The newly elected SEPAC Co-Chair is Anne-Sophie Caron (McGill University). Anne-Sophie and Miles Zhang (University of Central Florida) will jointly chair SEPAC in 2016-2017. On behalf of SEPAC student representatives, we would like to thank Joanna Konopka (Western University) for her hard work as co-chair for the past 2 years. While Joanna will continue to serve as a student member, some of the other old guards including Paul Abram (University of Montreal), Chandra Moffat (University of New Brunswick), and Boyd Mori (University of Alberta) are officially retiring from their respective positions, and we would also like to express our appreciation for their services, and wish them the best of luck with their new careers as professional entomologists. Finally, we would like to welcome Rachel Rix (Dalhousie University) as our newest recruit into the SEPAC family.

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 recently featured articles. If you want your recently published article featured (or we missed yours last month!), send us an email at entsoccan_students@gmail.com. For regular updates on new Canadian entomological research, you can join the ESC Students Facebook page (Entomological Society of Canada Student Group) or follow us on Twitter (@esc_students).

Changement au CAEJP

La co-présidente nouvellement élu du CAEJP est Anne-Sophie Caron (Université McGill). Anne-Sophie et Miles Zhang (Université du centre de la Floride) co-présideront le CAEJP en 2016-2017. Au nom des représentants étudiants du CAEJP, nous voudrions remercier Joanna Konopka (Université Western) pour son travail ardu comme co-présidente durant les 2 dernières années. Bien que Joanna continue de servir comme membre étudiant, certains anciens comme Paul Abram (Université de Montréal), Chandra Moffat (Université du Nouveau-Brunswick) et Boyd Mori (Université de l'Alberta) se retirent officiellement de leurs postes respectifs. Nous voudrions leur exprimer notre appréciation pour leurs services, et leur souhaiter la meilleure des chances dans leurs nouvelles carrières comme entomologistes professionnels. Finalement, nous aimerions accueillir Rachel Rix (Université Dalhousie) comme nouvelle recrue dans la famille du CAEJP.

Aperçu de la recherche

Nous continuons de faire la publicité des publications des étudiants gradués auprès de la communauté entomologique via notre initiative de l'aperçu de la recherche. Consultez le blogue de la SEC pour les plus récents articles en vedette. Si vous désirez que votre article récemment publié y apparaisse (ou si nous l'avons manqué le mois dernier!), envoyez-nous un courriel à entsoccan_students@gmail.com. Pour des mises à jour régulières sur la recherche entomologique canadienne, vous pouvez joindre la page Facebook des étudiants de la SEC (appelée « Entomological Society of Canada Student Group ») ou nous suivre sur Twitter (@esc_students).

Getting involved with the ESC

The Student and Early Professional Affairs Committee (SEPAC) is looking for new members (especially Early Professionals). Volunteering for the SEPAC is a great way to get involved with the society and promote entomology to students 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.

We look forward to hearing from you,
Miles and Anne-Sophie.

S'impliquer au sein de la SEC

Le comité des affaires étudiantes et des jeunes professionnels (CAEJP) recherche de nouveaux membres (particulièrement de jeunes professionnels). S'impliquer dans le CAEJP est une excellente façon de s'impliquer au sein de la Société et de promouvoir l'entomologie auprès des étudiants de tout le Canada. Si vous êtes intéressés à vous joindre à nous, ou si vous avez des suggestions pour de nouvelles initiatives pour la prochaine année, écrivez-nous à students@esc-sec.ca.

Nous avons hâte d'avoir de vos nouvelles.
Miles et Anne-Sophie.

Thesis Roundup / Foisonnement de thèses

If you or a student you know has recently defended an entomology-related thesis at a Canadian University, and would like notice of this accomplishment published here and on the ESC website, please email students@esc-sec.ca with the relevant information (name, date, degree, thesis title, supervisor[s], and university).

Si vous, ou un étudiant que vous connaissez, a récemment soutenu sa thèse dans un domaine lié à l'entomologie dans une université canadienne, et que vous voulez publier l'avis de cette réalisation ici et sur le site web de la SEC, merci d'envoyer les informations pertinentes (nom, date, diplôme, titre de la thèse, directeur[s] et université) à students@esc-sec.ca.

Uherek, Christiane. M.Sc, 2016. Assessing effects of habitat manipulation on invertebrates in an Arctic barrenlands stream. Supervisors: Bill Tonn and Heather Proctor, University of Alberta.

ICE 2016 Student Competition Winners, Gagnants de la compétition étudiante de l'ICE 2016

Oral Presentations:

Erin Campbell, University of Alberta, 1st place Graduate Student Oral Competition: Morphology, Systematics, and Phylogeny: Flies, Lepidopterans, and Others

Tian Wu, University of Western Ontario, 1st place Graduate Student Oral Competition: Apidology, Sericulture, and Social Insects: Termites

Mathilde Gaudreau, Université de Montréal, 1st place Undergraduate Student Oral Competition: Ecology and Population Dynamics

Krystal R. Hans, University of Windsor, 2nd place Graduate Student Oral Competition: Medical and Veterinary Entomology: Livestock Pests and Decomposers

Lauren Des Marteaux, University of Western Ontario, 2nd place Graduate Student Oral Competition: Physiology and Biochemistry: Abiotic/Biotic

Catherine Little, Memorial University of Newfoundland, 2nd place Graduate Student Oral Competition: Invasive and Exotic Entomology: Drosophilids

Zachariah Telfer, University of Guelph, 2nd place Graduate Student Oral Competition: Integrated Pest Management and Sustainable Agriculture: Thrips and Others

Miles Zhang, University of Central Florida, 2nd place Graduate Student Oral Competition: Genetics and Evolutionary Entomology: Behavior

ICE 2016 Student Competition Winners, Gagnants de la compétition étudiante de l'ICE 2016

Poster Presentations:

Amanda Chamberlain, University of British Columbia, 1st place Graduate Student Poster Competition: Invasive and Exotic Entomology

Chaminda De Silva Weeraddana, University of Alberta, 1st place Graduate Student Poster Competition: Insect Chemical Ecology

Adam Blake, Simon Fraser University, 1st place Student Virtual Poster Competition: Graduate

Asha Wijerathna, University of Alberta: 2nd place Graduate Student Poster Competition: Agricultural and Forest Entomology

Diana Wilches, University of Lethbridge, 2nd place Graduate Student Oral Competition: Urban Entomology in a Changing Environment: Home and Warehouse Pests

Tara Celetti, University of Guelph, 2nd place Graduate Student Poster Competition: Ecology of Pesticides, Resistance, Toxicology, and Genetically Modified Crops

2016 ESC Student Award Winners Gagnants des prix étudiants SEC 2016



Tyler Wist for the ESC

Leanna Lachowsky accepts the PhD Award on behalf of Celina Baines. Celina also received the PhD Research Travel Award.

The **PhD Scholarship** was awarded to **Celina Baines** of the University of Toronto. For her thesis she is studying the mechanisms of flight and the causes of dispersal in backswimmers (*Notonecta* spp.). In particular, she is focusing on how body condition influences the decision to disperse, and how this interacts with environmental conditions and the presence of competitors and predators.

The **PhD Research Travel Award** also went to **Celina Baines** (see above), who will be using the award to fund a trip to work with Dr Justin Travis, a theoretician specializing in the evolution of dispersal based at the University of Aberdeen, to develop a theoretical model of condition dependent dispersal

Aldo Rios of the University of Manitoba won the **MSc Award**. He is studying the ecology of alate soybean aphids (*Aphis glycines*), focussing on the role of crowding and plant nutrition on wing formation and the impact of alates on the overall fitness of the aphid colony.



Tyler Wist for the ESC

This year's **John H Borden Scholarship** was awarded to

Edyta Sieminska of the University of Saskatchewan. Edyta's project focuses on the characterization and biology of the Bertha armyworm, *Mamestra configurata*, pheromone communication channel.

Bertha armyworm is a major pest, feeding on a wide range of plant species in western Canada, and this research will contribute to the development of a more responsive and accurate pheromone trap monitoring system for this pest.

Aldo Rios receives the MSc Award.



Megan Colwell for the ESC

Tyler Wist accepts the John H. Borden Award on behalf of Edyta Sieminska.

Tyler Wist for the ESC



Udari Wanigasekara accepts the Biological Survey of Canada Award.

Udari Wanigasekara of the University of Manitoba is the winner of the **Biological Survey of Canada Scholarship**. Udari is studying hymenopteran parasitoids that attack cutworms in canola, in particular the characterization of the parasitoid complex and their phenology. This research will provide a framework for future studies of parasitoids on cutworms and their potential enhancement through habitat manipulation.

The **Dr Lloyd M Dossdall Memorial Scholarship** went to **Ishan Samaranayake** who is at the University

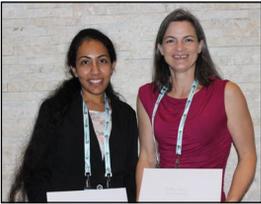
of Manitoba. Ishan is studying how landscape complexity affects the biological control of soybean aphids, particularly looking at effects on dispersal behaviour of transient aphidophagous predators between soybean fields and different neighbouring habitats.



Ishan Samaranayake receives the Dr Lloyd M. Dossdall Memorial Scholarship.

Tyler Wist for the ESC

Tyler Wist for the ESC



The Danks Award winners were Udari Wanigasekara (left) and Matthew Meehan (received by Lisa Lumley).

A new award was established this year in memory of **David Danks**. Two **Danks Scholarships** were awarded, one to **Udari Wanigasekara** (see above), for her work on hymenopteran parasitoids, and a second to **Matthew Meehan**, from the University of Alberta, who is examining the suitability of mesostigmatid mites as indicators of disturbance.



Tyler Wist for the ESC

Recipients of ICE Travel Awards. From left; Lukas Seehausen, Ishan Samaranayake, Jess Vickruck, Catherine Little, Leanna Lachowsky, Crystal Ernst, Paul Abram, Thomas Théry. (Also receiving awards but missing from picture are Anna Solecki, Morgan Jackson, Giovanni Fagua González, Laura Ferguson, Nuria Morfin-Ramirez, and Zachariah Telfer.)

Student scholarships and awards

In 2017, a competition for the following Entomological Society of Canada scholarships and awards will be held: MSc and PhD Scholarships, the Research Travel Awards, the John H. Borden Scholarship in IPM, the Keith Kevan Award for insect systematics, the Dr Lloyd M. Dosdall Memorial Scholarships in arthropod community ecology, the Danks Scholarships for studies on Canadian arthropod fauna, and the Becker Conference Travel Awards. Details of the application procedures are available on the Society website <http://www.esc-sec.ca/studentawards.php>. Students are encouraged to apply for these awards. The deadline for all but the Becker Awards is 16 February 2017. For the Becker Awards, the deadline will be the same as that for abstract submissions for the 2017 JAM in Winnipeg.

Prix et bourses étudiants

En 2017, une compétition pour les prix et bourses suivants de la Société d'entomologie du Canada se tiendra : la bourse pour études graduées, les bourses de voyage pour la recherche, la bourse John H. Borden en lutte intégrée, la bourse Keith Kevan pour la systématique des insectes, la bourse Dr Lloyd M. Dosdall pour l'écologie des communautés d'arthropodes, les bourses Danks pour l'étude de la faune canadienne d'arthropodes, et les bourses Ed Becker pour la réunion annuelle. Les détails de la procédure d'application sont disponibles sur le site Internet de la Société <http://www.esc-sec.ca/f-studentawards.php>. Nous encourageons les étudiants à appliquer pour ces bourses. La date limite pour toutes les bourses, sauf les bourses Ed Becker, est le 16 février 2017. Pour les bourses Ed Becker, la date limite est la même que pour la soumission des résumés pour la réunion conjointe annuelle 2017 à Winnipeg.

ICE 2016: International Graduate Student Showcase – Canadian Presenters / Vitrine internationale aux étudiants gradués – présentateurs canadiens



Tyler Wist for the ESC

The IGSS Organising Committee: (From left) Boyd Mori, Chandra Moffat, Paul Abram, and Carey Minteer (Missing from photo: Mervat Mahmoud).

Jess L. Vickruck (Brock University)**Dominance hierarchies in the carpenter bee *Xylocopa virginica*: Establishing, maintaining, and changing reproductive strategies**

Introduction: In social societies where reproduction is not divided evenly, rankings within the group can have marked consequences on individual fitness. It would therefore be an asset to achieve the highest rank possible, or maintain the flexibility to capitalize on higher ranking positions. The eastern carpenter bee *Xylocopa virginica* is a facultatively social species which is common throughout eastern North America. Females in social *X. virginica* nests assume 1 of 3 reproductive strategies: primary females monopolize both foraging and reproduction, secondary females may attain some reproduction and wait in the queue, and tertiary females do not forage or lay eggs but remain in the nest as guards.

Methods: To test the flexibility of each reproductive strategy, we conducted detailed behavioural observations and bee removal experiments within nests over the summers of 2011-2013. Using non-lethal DNA sampling, we used species specific microsatellite loci to examine relatedness among social groups.

Results/Conclusion: Our results show that while secondaries are quick to assume the position of the primary once she is removed, tertiary females almost never change reproductive strategies, remaining inactive even if she is the only female in the nest. By sitting still, tertiary females are able to overwinter a second time and can become primary females in their second summer. Relatedness among nestmates was very low and was not explained by reproductive strategy comparisons. This lack of relatedness was explained by females reducing competition among kin through spring dispersal.



Tyler Wist for the ESC

Hiérarchies de dominance chez l'abeille *Xylocopa virginica* : Établir, maintenir et changer ses stratégies reproductives

Dans les sociétés sociales, où la reproduction n'est pas divisée uniformément, les niveaux hiérarchiques au sein du groupe peuvent avoir des conséquences marquées sur la valeur adaptative d'un individu. Atteindre le plus haut rang possible, ou maintenir la souplesse nécessaire pour capitaliser sur des positions plus élevées, serait donc un atout. L'abeille *Xylocopa virginica* est une espèce sociale facultative commune dans l'est de l'Amérique du Nord. Dans les nids sociaux de *X. virginica*, les femelles adoptent l'une des 3 stratégies de reproduction suivantes: les femelles primaires monopolisent à la fois la nourriture et la reproduction; les femelles secondaires peuvent espérer atteindre un certain niveau de reproduction; les femelles tertiaires ne s'alimentent pas et ne pondent pas d'œufs mais assument le rôle de gardes pour le nid.

Méthodes: Afin de tester la flexibilité de chacune des stratégies reproductives, nous avons effectué, au cours des étés 2011-2013, des observations comportementales détaillées et des expérimentations de retrait d'abeilles des nids. Grâce à des techniques non létales d'échantillonnage d'ADN, nous avons utilisé des loci microsatellites spécifiques aux espèces afin d'examiner les liens de parenté entre les groupes sociaux.

Résultats/Conclusion: Nos résultats démontrent que bien que les femelles secondaires prennent rapidement la position des premières lorsque celles-ci sont retirées du nid, les femelles tertiaires ne changent pratiquement jamais de stratégie reproductive, demeurant inactives même si elles sont les dernières femelles du nid. En restant immobiles, les femelles tertiaires sont en mesure d'hiverner une deuxième fois et peuvent devenir des femelles primaires au cours de leur deuxième

été. Le niveau d'apparentement entre les congénères du nid était très faible et n'était pas expliqué par les comparaisons des stratégies reproductives. Ce manque d'apparentement s'expliquait par la réduction de la compétition chez les femelles congénères lors de la dispersion printanière.

M. Lukas Seehausen (University of Toronto)

When things are getting hot: Consequences of exposure to high temperatures on a parasitoid-host relationship

Introduction: Because insects are poikilothermic organisms, temperature is a key driver of their physiological processes and life history traits. As a consequence, an insect's seasonal pattern of phenology might be influenced by temperature as well as interactions between different trophic levels, which in turn can induce changes in population dynamics. One of the most important outbreaking insects in conifer forests of eastern North America is the spruce budworm *Choristoneura fumiferana* (Lepidoptera: Tortricidae). Population dynamics of this forest pest have been linked to parasitoids as an important mortality factor. One larval parasitoid, *Tranosema rostrale* (Hymenoptera: Ichneumonidae), is particularly effective in low-density populations of the spruce budworm. This parasitoid is associated with a symbiotic polydnavirus, which affects the host's immune system.

Methods: We reared spruce budworm larvae parasitized by *T. rostrale* in growth chambers at different temperatures ranging from 5-30°C. Survival, developmental time, longevity and female fecundity of the parasitoid were analysed at different temperatures.

Results/Conclusion: The overall performance of the parasitoid was severely reduced at high temperatures. Dissections of parasitized and plastic bead injected host larvae revealed that *T. rostrale* development is constrained and the host's immune system improved at high temperatures. RNA analysis (qPCR) of parasitized larvae confirm the results on the molecular level: the expression of *T. rostrale*'s polydnavirus genes is poor at high temperature, whereas the expression of genes related to spruce budworm's immune system is increased. The use of Individual Based Models will give insight into the role of temperature on this parasitoid-host relationship under field conditions.



Tyler Wist for the ESC

Quand ça commence à chauffer: Conséquences de l'exposition à des températures élevées sur une relation parasitoïde-hôte

Introduction: Puisque les insectes sont des organismes poikilothermes, la température est un facteur clé influençant leurs processus physiologiques et leurs traits d'histoire de vie. Par conséquent, le patron saisonnier de la phénologie d'un insecte pourrait être influencé par la température ainsi que par les interactions entre différents niveaux trophiques. Ceci pourrait induire des changements dans les dynamiques de populations. L'un des insectes ravageurs les plus importants dans les forêts de conifères de l'est de l'Amérique du Nord, est la tordeuse des bourgeons de l'épinette *Choristoneura fumiferana* (Lepidoptera : Tortricidae). Les parasitoïdes sont un facteur de mortalité important de la tordeuse et ils influencent grandement la dynamique de population de ce ravageur forestier. Un parasitoïde larvaire, *Tranosema rostrale* (Hymenoptera: Ichneumonidae), est particulièrement efficace chez les populations de faible densité de la tordeuse des bourgeons de l'épinette. Ce parasitoïde est associé à un polydnavirus symbiotique qui affecte le système immunitaire de l'hôte.

Méthodes: Nous avons élevé des larves de tordeuses de bourgeons de l'épinette parasitées par *T. rostrale* dans des chambres de croissance à différentes températures allant de 5 à 30 °C. Le taux

de survie, le temps de développement, la longévité et la fécondité des femelles du parasitoïde ont été analysés à différentes températures.

Résultats / Conclusion: La performance globale du parasitoïde a été fortement réduite à des températures élevées. Les dissections de larves parasitées et de larves d'hôte injectées de billes de Sephadex ont révélé que le développement de *T. rostrale* est limité et que le système immunitaire de l'hôte est plus performant à des températures élevées. L'analyse d'ARN (qPCR) des larves parasitées confirme les résultats au niveau moléculaire: l'expression des gènes du polydnavirus de *T. rostrale* est faible à des températures élevées, alors que l'expression de gènes liés au système immunitaire de la tordeuse des bourgeons de l'épinette est augmentée. L'utilisation de modèles centrés sur l'individu donnera un aperçu du rôle de la température sur cette relation parasitoïde-hôte dans des conditions de terrain.

Leanna E. Lachowsky (University of Calgary)
Is sex allocation in mountain pine beetles, *Dendroctonus ponderosae*, a response to male-biased mortality?

Introduction: Mountain pine beetles, *Dendroctonus ponderosae*, have long been observed to have female-biased sex ratios at maturity. Although this has been attributed to male-biased mortality during development, the hypothesis has not been directly tested.

Methods: In field and lab studies, we determined that mortality is indeed male-biased in nature in response to winter conditions as well as in benign lab environments. To better understand possible underlying selective processes, we explored patterns of sex allocation and mortality in individual broods.

Results/Conclusion: As predicted, egg sex ratios were male-biased while adult sex ratios were more female-biased with greater mortality. Further, maternal quality may influence the number, size and sex of offspring produced and, in turn, their survival. Trivers and Willard predict biased allocation according to maternal state. Sex allocation differed among females in relation to body size and laying order. Larger mothers laid larger eggs earlier while smaller mothers laid larger eggs later. Hatch rates were high especially for larger eggs. Smaller mothers were more likely to lay female offspring early, while larger mothers were more likely to lay males early. As eggs were laid, the probability of laying males increased for mothers of all sizes. Hatch rates were high for early laid eggs of both sexes, but hatch rates of male eggs declined rapidly further along the gallery. Thus patterns of allocation reflect Fisher's prediction that mothers should compensate for biased mortality by increasing allocation to that sex.

L'allocation du sexe chez les dendroctones du pin ponderosa, *Dendroctonus ponderosae*, est-elle une réponse à la mortalité biaisée des mâles?

Introduction: Des rapports des sexes biaisés vers les femelles sont observés depuis longtemps chez *Dendroctonus ponderosae*. Bien que cela ait été attribué à la mortalité biaisée des mâles au cours du développement, l'hypothèse n'a jamais été directement testée.

Méthodes: Dans des études sur le terrain et en laboratoire, nous avons déterminé que la mortalité est en fait biaisée vers les mâles en nature en réponse aux conditions hivernales ainsi que dans des conditions de laboratoire. Pour mieux comprendre les processus sélectifs sous-jacents possibles, nous avons exploré les modèles d'allocation et de mortalité sexuelle chez les progénitures individuelles.



Tyler Wist for the ESC

Résultats / Conclusion: Tel que prédit, les rapports des sexes chez les œufs étaient biaisés vers les mâles, tandis que les rapports des sexes chez les adultes étaient biaisés vers les femelles avec une plus grande mortalité. En outre, la qualité maternelle peut influencer le nombre, la taille et le sexe de la progéniture produite et, ultimement, leur survie. Trivers et Willard prédisent une allocation biaisée selon l'état maternel. L'allocation des sexes différerait parmi les femelles en fonction de la taille du corps et de l'ordre de ponte. Les femelles plus grosses ont pondus des œufs plus gros plus tôt, tandis que les femelles plus petites ont pondus des œufs plus gros plus tard. Les taux d'émergence étaient élevés surtout pour les œufs plus gros. Les femelles plus petites étaient plus susceptibles de pondre des femelles tôt, tandis que les femelles plus grosses étaient plus susceptibles de pondre les mâles tôt. Au fur et à mesure que les œufs étaient pondus, la probabilité de pondre des mâles augmentait pour toutes les femelles (peu importe leur taille). Les taux d'émergence étaient élevés chez les deux sexes pour les œufs pondus tôt, mais les taux d'émergence des œufs mâles diminuaient rapidement plus loin le long de la galerie. Par conséquent, les patrons d'allocation reflètent la prédiction de Fisher selon laquelle les femelles devraient compenser la mortalité biaisée en augmentant l'allocation à ce sexe.

People in the news / Gens qui font les manchettes

Charles Vincent – Distinguished Scientist

At the XXV International Congress of Entomology (Orlando, Florida), Charles Vincent (Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, Quebec) was presented with the Distinguished Scientist Award by the Entomological Society of America International Branch (ESA-IB). In 2009, the ESA voted to create an International Branch and Charles was the first person to be elected as president-elect of the ESA-IB, which has now 1700 members worldwide.

The Distinguished Scientist Award recognizes members of the International Branch of ESA who have made outstanding contributions to the science of entomology. The nominees must be widely recognized by both the International Branch and the ESA as a major contributor to the science of entomology.

During the International Congress of Entomology in Orlando, Charles was elected member of the Council for International Congresses of Entomology. The purpose of the Council is to provide continuity and direction to the International Congresses of Entomology and to serve as the Entomology Section of the International Union of Biological Sciences. It consists of not more than 23 scientists who shall represent as wide a field as possible both geographically and by entomological discipline. The XXVI International Congress of Entomology will be held on 26-31 July 2020, in Helsinki, Finland.

Left, Margaret C. Hardy (President, ESA-IB); centre, Megha Parajulee (Incoming ESA-IB President); right, Charles Vincent (Awardee).



Studying mason bees in the mountains

Jessica Forrest

Introduction

Cavity-nesting solitary bees in the genus *Osmia* (Hymenoptera: Megachilidae; Fig. 1) are commonly known as mason bees, due to the clay walls many of them build to enclose the brood cells of their larvae. Some species in this genus are propagated for use as agricultural pollinators, particularly of orchard crops (Sedivy and Dorn 2014). For reasons I will explain below, *Osmia* spp. have become preferred study organisms in my lab, where we investigate plant–pollinator interactions and responses of bee populations to environmental change - particularly climate change. In this article, I give an overview of some of the work my students and I have been doing to understand the factors regulating mason bee populations around the Rocky Mountain Biological Laboratory in Colorado (Fig. 2) - and how these factors are changing as growing seasons get longer and hotter.

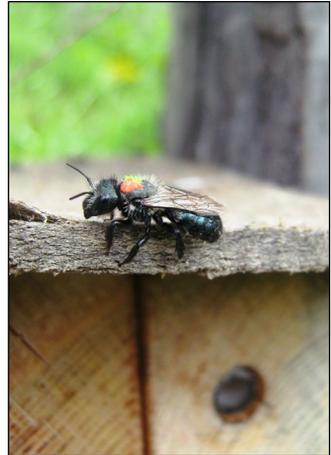


Fig. 1. Female *Osmia iridis* resting on a nesting block (trapnest) at a field site in Colorado. This bee has been individually marked with orange and green paint.

Osmia Natural History

Like other megachilids, *Osmia* spp. are long-tongued solitary bees. Female megachilids carry pollen on a brush of erect bristles (scopa) on their abdominal (technically, metasomal) sternites. Many species of *Osmia* are oligolectic, gathering pollen only from a restricted set of floral host plants; others are polylectic (pollen generalists). While some *Osmia* spp. nest in underground burrows (like most other bees), several construct nests in existing above-ground cavities, such as those left by wood-boring beetles in dead



Fig. 2. Two study sites near the Rocky Mountain Biological Laboratory, Colorado. (A) Rosy Point, elevation 2880 m. (B) Virginia Basin, elevation 3440 m.

Jessica Forrest is an Assistant Professor of Biology at the University of Ottawa. Her lab (<https://forrestlab.wordpress.com/>) studies pollination - from both the plant and the pollinator perspectives - and the effects of environmental change on bee populations. This article is a spin-off from a plenary symposium paper presented at the 2015 ESC JAM in Montreal.

or dying trees. Within these wooden tunnels, each female bee works on her own to provision a series of brood cells, separated from one another by partitions of mud or macerated plant tissue (Cane et al. 2007; Torchio 1989). Each brood cell is first stocked with a lump of pollen and regurgitated nectar, the results of numerous foraging trips during which the nest is left undefended. Once the pollen-and-nectar provision is complete, the bee lays an egg on the provision. The next foraging trips are devoted to collecting materials for cell-wall construction. Once the bee has constructed and sealed several such brood cells (usually over the course of several days), she constructs a further, outer nest seal, thicker than the brood cell partitions, but of the same material. She may then proceed to construct another nest, if she can find a suitable cavity and if floral resources remain available.

Because of their nesting habits - and perhaps because suitable natural nesting sites are scarce - many *Osmia* species will readily nest in artificial “trapnests” (Cane et al. 2007; Krombein 1967). In my lab, these are constructed by drilling holes of 6–10 mm diameter through 15-cm long sections of untreated softwood lumber, charring the fronts of the wood blocks (bee lore has it that blackening them in this way makes the blocks more attractive to bees in search of natural dead wood), dipping the charred blocks in water-based polyurethane, allowing them to dry, re-drilling the holes to make them smooth, plugging the backs of the holes with caulking, covering the blocks with roofs, lining the holes with custom-ordered paper straws (the front ends of which are blackened with black spray-paint, for reasons mentioned above), and attaching the completed blocks to promising-looking trees at sunny meadow edges (Forrest and Thomson 2011; Fig. 3). This method was adapted from that used by researchers at the Logan “Bee Lab” (USDA-Agricultural Research Service 2016), but numerous other trapnest designs exist (e.g., Fye 1965; Krombein 1967; Sheffield et al. 2008). The paper-straw liners are not essential



Fig. 3. Experimental trapnest attached to dead aspen (*Populus tremuloides*).



Fig. 4. Paper straw containing an *Osmia* nest. Windows have been cut into two of the brood cells. The cell on the left contains a parasite larva (*Sapyga* sp.) feeding on a bee egg.

from the bees’ perspective, but they allow us to extract the nests over the course of their construction and monitor nest progress. In addition, by cutting small windows in the walls of the straws, we can look inside completed brood cells to check for parasite eggs or larvae (Spear et al. 2016; Fig. 4). At the same time, we can take a small sample of the pollen provision for identification (typically to the plant family or genus level) back in the lab.

The size (~8–16 mm in length) and robustness of most *Osmia* make it possible to apply identifying markings to individual bees (Fig. 1). (In my lab, we use Testors model-airplane paint, applied dorsally to the mesosoma using the tip of a blade of grass or conifer needle.) Because these insects are central-

place foragers, returning to a single nest repeatedly over a period of several days and frequently constructing successive nests in nearby cavities, it is possible to observe individual bees throughout their lifetimes and, by dissecting their completed nests, to obtain estimates of lifetime reproductive output, something that is impossible for most wild insects.

Determinants Of Emergence Phenology

Many ecologists are concerned that climate change may lead to temporal mismatches between formerly interacting species, including plants and their pollinators, if each species adjusts its phenology differently in response to changing environmental cues (reviewed by Forrest 2015; Straka and Starzomski 2014). However, determining which environmental cues actually govern bee phenology can be difficult, since most collection records come from bees caught at flowers and thus are themselves dependent on flowering phenology. In previous work, I used emergence traps attached to nests of bees and wasps, including *Osmia* spp., that had colonized my experimental trapnests to obtain independent data on timing of emergence at sites along an elevational gradient in the Rocky Mountains (Forrest and Thomson 2011). By regularly checking the emergence traps, and by simultaneously recording local temperatures using data-loggers, I obtained the data necessary to build degree-day models of bee emergence. In addition, we were able to conduct a reciprocal transplant experiment (moving bee nests from low- to high-elevation sites and vice versa before the start of winter) to test for a genetic component to emergence timing (we didn't find one).

Our data allowed us to determine that phenologies of cavity-nesting Hymenoptera and wildflowers were both largely controlled by temperature: insect emergence and wildflower bloom both occur earlier when it's warmer, and both can be described equally well by degree-day models. However, the plants in our dataset were responsive to lower temperatures than were the insects, and the literature suggests that this pattern is a general one (Forrest and Thomson 2011). As a result, we expect springtime warming in our study area to disproportionately advance the flowering time of plants relative to bee emergence. My lab is now following up on this result to determine whether the resulting variation in bee-plant synchrony has any fitness consequences for oligolectic (pollen-specialist) *Osmia* species.

Warming summers

Despite shifts in seasonal activity periods, climate change has meant that many organisms are experiencing warmer temperatures, or more frequent warm temperatures, than would have historically been the case. All else being equal, warmer environmental temperatures should increase population growth rates in many temperate-region insects, which are generally operating below their thermal optima (Deutsch et al. 2008). One could expect warmer summers to be particularly beneficial to insects inhabiting high-elevation regions where low environmental temperatures can often prevent insect flight muscles from reaching the temperatures necessary for flight (e.g., Kingsolver 1983). Recently, my lab has been investigating whether warmer conditions do in fact lead to increased reproductive output in *Osmia* bees inhabiting cool subalpine meadows (~3000 m above sea level) in Colorado. Our results show that warmer days do allow female bees to construct brood cells - and, consequently, lay eggs - more quickly. However, warmer temperatures also benefit the bees' primary natural enemies, the brood parasitic wasps *Sapyga* spp. (Hymenoptera: Sapygidae; Fig. 5), which are



Fig. 5. Female *Sapyga* sp. waiting outside the entrance of a potential host bee nest.

apparently active only when it's warm. Thus, the overall effect of warmer conditions for the bees seems to be neutral (Forrest and Chisholm in press). We are continuing to monitor the dynamics of these *Osmia* populations to determine how they are affected by long-term changes in climate.

Determinants of voltinism

A key component of a population's growth rate is its generation time. *Osmia* spp. are typically univoltine, overwintering as adults within cocoons and emerging early in spring. However, populations with both univoltine and semivoltine (biennial) individuals - sometimes occurring in the same nest - have been found in a few species (Fye 1965; Torchio and Tepedino 1982). In our high-elevation study area, we have observed the same phenomenon (Forrest and Thomson 2011), but we find that in most species, the semivoltine phenotype is more common. In fact, in some species, we have never observed a bee complete a generation in a single year.

Are the growing seasons in this area too short and too cold for a univoltine life cycle to be feasible? Or is it too risky for bees to "commit" to a univoltine life cycle in these habitats, where doing so could lead them to be caught mid-metamorphosis at the onset of winter? The nesting biology of these bees lets us conduct experiments in the lab to answer these questions. We bring newly completed nests (in their paper straws) indoors and assign individual nest cells (contained in gelatine capsules; Fig. 6) to growth-chamber treatments that differ in the duration of "summer" or in growing-season temperature regime. We also leave some nests in the field and (non-destructively) open them in the spring to determine at which stage each bee overwintered in the field—and whether it survived. By combining these data with our own local weather records, as well as the longer-term records (1950–current) from the nearby NOAA weather station, we hope to understand the adaptive significance of the bees' developmental "choices" in the context of past climate. Ultimately, we want to use this understanding to forecast how *Osmia* generation times are likely to change in the future.



Fig. 6. Gelatine capsules containing *Osmia* spp. cocoons. Two sections of paper straw are also present.

Conclusion

The cavity-nesting behaviour of many *Osmia* species makes several aspects of their biology (e.g., pollen use, parasitism rates, larval development) accessible in a way that the biology of ground-nesting bees is not. As shown by the references listed below - along with many others I have not cited here - my lab is not the first to take advantage of this fact! However, through

a combination of multi-site field observations and nest dissections, along with laboratory experiments and analysis of local weather data, we have been able to make some novel discoveries. The long-term goal is to integrate those discoveries into population models that will let us predict *Osmia* population dynamics under future environmental conditions. While we are only studying a few bee species - out of tens of thousands - I believe these bees can provide some insight into the factors that affect temperate solitary bee populations in general.

Acknowledgements

I thank the Rocky Mountain Biological Laboratory for access to field sites and for logistical and financial support over the years. I am also grateful to the many undergraduates who helped with data collection. In particular, I thank Sarah Silverman for first suggesting that we cut open some *Osmia* brood cells to check for parasites, and Regan Cross for running the voltinism experiments.

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Robin passed away in Edmonton, on 17 June 2016, after a battle with cancer. He remained upbeat to the very end, treating “every day on this side of the grass” as a good day. He was an independent spirit who lived life on his own terms, and it was a life full of adventure. He was irrepressibly enthusiastic about everything he did, and generous with his time and expertise. He was a consummate teacher, who donated his time and wisdom to school children and naturalists’ groups throughout the course of his life, and always found time to mentor others. Thanks to visits by “The Spiderman” to local schools, thousands of children have grown up in the Edmonton area with an enriched view of nature. In later years, he was a stalwart on the entomological list-serve AlbertaBugs. He felt that every query deserved a reply, and he would inevitably reply to identification requests, even if it was simply an educated guess. One AlbertaBugs reader reminisced on his passing: “Every spider that crosses my path is now viewed with curiosity and wonder rather than suspicion. I have Robin to thank for that.” He will be sorely missed by the online arachnological community, and the local naturalist community. Robin is survived by his wife Lorie Taylor Leech, as well as two children from a previous marriage, and three grandchildren.



Robin Ernest Leech
(1937 - 2016)

Early Days

Robin was born on 1 February 1937, in Berkeley, California, to Hugh and Frances (Quail) Leech. His father was a water beetle specialist, who was doing an MSc in Berkeley at the time. His mother had a BA in English and Economics. Early in the summer of 1937, the family moved to Vernon, British Columbia, where his father took up a job with the Canadian Forest Service. Robin’s early days were steeped in Entomology, learning how to identify insect groups as a very young boy on his father’s knee, and becoming a lifelong insect and spider collector at an early age.

In 1947 the family moved to the San Francisco Bay area of California, where Robin’s father started a new job at the California Academy of Sciences. Robin was an athletic student at high school, where he was on the swimming, track, and cross-country running teams. Throughout high school, he had a part-time job at a meat market in his home town of Mill Valley.

University Years

Robin left California in the fall of 1955 to attend the University of British Columbia in Vancouver. He had early plans to become a surgeon, but “disastrous results in first-year chemistry kinda put the end to that”. For the summer of 1956, Robin landed a job as an assistant to Ed Cashman on the Northern Insect Survey, a program of the Canadian government to do a biological inventory of the vast Arctic. They were stationed that summer at Aklavik (Northwest Territories) and near the Firth River delta (Yukon).

The following year, Robin was invited on a 14-month expedition to Africa with Dr Edward S. Ross of the California Academy of Sciences. After classes ended at UBC in the spring of 1957, Robin travelled to California for 2 months of preparations and packing. He and Ross, and Ross' botanist wife Wilda Ross, set off with a customized 1.5 ton GM truck camper, and vast quantities of collecting and photographic gear, sponsored in part by National Geographic. They drove across the southern USA, and then set off by boat from New Orleans to Africa. When they arrived, Robin quickly found his specific entomological calling - within an hour or so of getting inland, they encountered spiny-bodied gasteracanthine spiders, and Robin was hooked for life on arachnids. Many adventures ensued, including meeting the Leakey family of anthropologists, seeing the *Coelocanth* holotype specimen, and encountering ancient *Welwitschia* plants. They logged about 25,000 miles and visited almost every African country south of the Equator. Over the course of the expedition, they collected over 250,000 insects and arachnids and some 400 reptiles and amphibians. Apparently it was the largest single collection of specimens for scientific study collected in Africa on one expedition up to that time. They also took over 20,000 feet of 16 mm Kodachrome movie film, and many thousands of 35 mm Kodachrome slides, which became the basis of a popular article in National Geographic (Ross 1961).

Robin returned to Canada in time for his next year of studies at UBC in the fall of 1958.

For the summer of 1959, Robin spent a month working for Agriculture Canada (now AAFC) at the Peachland research station, followed by 3 months with the Northern Insect Survey, this time stationed with Ted MacDougall at Summit Lake, on the Alaska Highway in northeastern British Columbia. Instead of returning to school again in the fall, Robin was invited by J. Linsley Gressitt of the Bishop Museum in Honolulu, to join a 2-year expedition to the southern Pacific and Antarctica. The project was funded by the United States Antarctic Research Program (USARP), and Robin's work involved studying aerial-borne arthropods to help determine where exotic pests of Hawaii were coming from (for an account of the Antarctic trips, see the National Geographic story by McDonald 1962). Robin spent two summers chasing airborne insects in Antarctica. His partner for the first year was American weevil specialist Charlie O'Brien; for the second year it was Robin's younger brother Tom. The winter in between, he took a 4-month assignment from the USA government to study vectors of bubonic plague in Vietnam and Laos.

Robin returned to Canada in 1961 for another year at UBC, followed by a third summer on the Northern Insect Survey, this time collecting up and down the Alaska Highway. Robin completed his BSc in April 1963, with perhaps the most colourful and adventurous "eight year undergrad degree" on record.

In May 1963, Robin set off on another adventure, this time to Lake Hazen on the northern end of Ellesmere Island. He spent two summers there collecting spiders for his MSc thesis project at the University of Alberta, under Dr George E. Ball, entitled "The spiders (Araneida) of the Hazen Camp area, Ellesmere Island, Northwest Territories [now Nunavut], Canada (81°49'N, 71°18'W)". He graduated in 1965, and published his results the following year (Leech 1966). During this time in Edmonton, Robin met and married Alice Payne. They had two children together; Katherine (born in 1967) and Stuart (born in 1969).

Robin and Alice spent the following year in Ottawa, where Robin worked in the spider section of the Canadian National Collection. They returned to Edmonton in 1966, where Robin began his PhD studies, again under the supervision of Dr George Ball. He defended his thesis, entitled "Revision of the amaurobiid spiders of the Nearctic region (Arachnida: Araneida)", in December 1970. The Leech family then moved hurriedly back to Ottawa so that Robin could sign some papers before midnight on 31 December, to begin a National Research Council of Canada post-doctoral fellowship at the CNC.

Working Life

When the NRCC fellowship ended in 1972, Robin took on a number of positions in various capacities. These included a 2-year stint dealing with bison diseases for Parks Canada in Ottawa (1972-74), and 4 years with the Research Secretariat of Alberta Environment, in Edmonton (1974-78).

During the time that Robin worked at Alberta Environment, he and several co-workers set up a group that would become the Alberta Society of Professional Biologists (ASPB), with Robin as the first secretary. The group eventually became accredited by the Alberta government, to grant professional status to biologists. Robin remained involved in various capacities with the ASPB for the rest of his life.

From 1978 to 1984, Robin worked as a private consultant for the federal and Alberta governments, on various environmental matters. He also did photographic work with an Edmonton-area film maker, Albert Karvonen, making films and educational materials about the flora and fauna of Alberta. Robin and Alice divorced in 1979, and he married Maja Laird in 1980. In the latter part of this period, after the photographic work dried up, Robin supplemented his consulting income by driving a taxi cab.

In 1984, Robin began contract teaching in the Biological Sciences program at the Northern Alberta Institute of Technology (NAIT) in Edmonton. He became a full-time teacher in 1988, and taught there until he retired in May 2002. He taught many courses there including comparative vertebrate anatomy, meteorology, ecology, invertebrate zoology, entomology, botany, English grammar and report writing. Robin approached teaching with the same enthusiasm and gusto that he demonstrated in all other aspects of life, and he was an important mentor for many students.

In 1987, Robin and Maja divorced. In July 1989, he married Bonnie MacDonald, an Australian. Their careers on separate continents kept them apart for extended periods. That proved too difficult, so they parted ways in 1994, and divorced amicably in 1998.

Retirement Years

In retirement, Robin continued his research on spiders. In later years, his life and research partner was artist and educator Lorie Taylor Leech, whom he married in 2010. He and Lorie carried out spider survey work together at the Wagner Natural Area near Edmonton, and Robin was a co-author of a book chapter on spiders of the Canadian Prairies (Cárcamo et al. 2014).

In March 2012, Robin suffered a fall that broke his back and rendered him a paraplegic. Unable to properly examine spiders, he developed his latent interest in optics and binoculars, and published several technical papers on them. He continued sharing his enthusiasm and expertise on arthropods and optics, co-writing several popular articles featuring arthropod photographs (Bovee & Leech 2014; Popil & Leech 2015; Leech & Popil 2015).

Robin had always had an interest in grammar and the English language, at least as far back as his “minor” in English for his undergraduate degree. This was developed further in his teaching at NAIT. He coined the name “Ball words” for grammatically correct sequences of identical words, in honor of his thesis supervisor George Ball (Leech 1994). In later years, he wrote a popular book on puns (Leech 2015) that was illustrated by his wife Lorie Taylor Leech. In his final months, they were working together on a second volume.

Robin has published approximately 150 popular and scholarly articles, primarily on spiders but also on other arthropods and a few on other subjects such as ammunition and binoculars. Probably most notable were the results of his PhD work on amaurobiid spiders (Leech 1972).

Robin was a long-time member of the Entomological Society of Alberta and the Entomological Society of Canada. He served for decades as an Associate Editor of the ESC’s journal, *The Canadian Entomologist*. He was also a charter member of the American Arachnological Society.

Robin was a tireless proponent of the ASPB. He served as its Executive Director from 2002 to 2009. He was awarded an Honorary Life Membership with that society in 2013. The ASPB has created a University of Alberta graduate scholarship endowment in his memory. He was also heavily involved in the John Janzen Nature Centre in Edmonton, and was the founding president of the Edmonton Nature Centres Federation.

Over the course of his professional life, Robin amassed a large reprint collection, including some very old and rare items, and a large spider collection of approximately 75,000 specimens. Robin's spider collection has been donated to the University of Alberta's Strickland Museum.

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Gregory Pohl
Edmonton



Longtime member of the Entomological Society of Canada Anne Howden passed away in the early hours of 9 September 2016 at the Royal Jubilee Hospital in Victoria, British Columbia. Anne was born on 19 July 1927 in Baltimore, Maryland, to a family of two sisters and two brothers. She was married to acclaimed scarab beetle systematist Henry F. Howden (1925-2014) and they had three daughters: Patience, Barbara and Lucy.

Anne received a Master's degree from the University of North Carolina in Entomology in 1950 studying the succession of insects on carrion. She

later switched her focus to the taxonomy and natural history of weevils, specifically the tribe Tanymecini for which she was a world authority. With Henry, she travelled the world in their search for new and interesting species of beetles, she collecting weevils and he scarabs. These field expeditions were recorded for posterity in the book *Collecting Memories, a Sixty Year Chronicle of a Pair of Beetle Collectors* (Howden et al. 2014). The Henry and Anne Howden collection of beetles of over 450,000 specimens was donated to the Canadian Museum of Nature in Ottawa, along with a generous endowment fund for entomology research.

Anne was a member of the Entomological Society of Canada, the Entomological Society of America and the Coleopterists Society. She served as the President of the Coleopterists Society (1983) and has been recognized as one of a selected few honorary members of the same society. For many years she was a Research Associate at Carleton University and later at the Canadian Museum of Nature. She was a meticulous scientist well known among her close colleagues for her fine attention to detail in her species descriptions and her studies of morphology.

During her career she published 35 scientific articles dealing mainly with the taxonomy of weevils. These papers range from new species descriptions to comprehensive monographs on the genera *Pandeleteius* and *Hadromeropsis*, particularly in South America. In her scientific papers, Anne described 96 new species of weevils.

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Robert S. Anderson and Andrew B.T. Smith,
Canadian Museum of Nature
Ottawa



**Anne Elizabeth Howden (Thompson)
(1927 - 2016)**

Monarchs in a Changing World: Biology and Conservation of an Iconic Butterfly. Oberhauser, Karen S., Nail, Kelly R., and Altizer, Sonia (editors). 2015. Comstock Publishing Associates, Cornell University Press, Ithaca, New York. 321 pp. ISBN 978-0-8014-5315. Hardcover, US\$35.00.

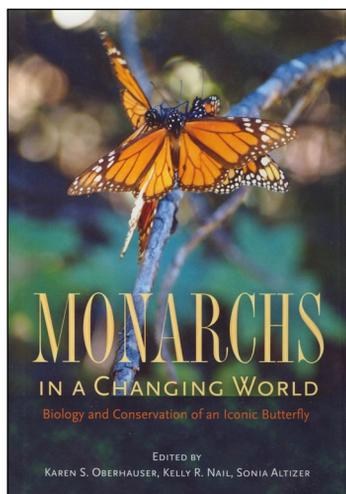
The monarch butterfly (*Danaus plexippus* L.) truly deserves to be referred to as “iconic”. It is undoubtedly the most readily identified insect species in North America and has been nominated to be the national insect of the USA. Until a few years ago, monarchs were commonly observed in gardens and fields of southern Canada east of the Rockies during summer. Fall aggregations of monarchs awaiting favourable winds to cross Lake Erie and Lake Ontario on their 4000+ kilometre migration to wintering sites in central Mexico were awe inspiring to all who experienced them. That migration—elucidated by University of Toronto professor Fred Urquhart in 1975—has captivated biologists and lay people alike. The recognition of those wintering aggregations of monarchs stimulated Mexico in 1980 to create the first Monarch Butterfly Reserve to protect the approximately 400 million monarchs that graced the region during the winter months in the past.

Now, some 40 years later, the winter monarch population is only ~25% of what it was then and reached a dangerous low of only ~25 million butterflies (0.67 ha) in 2013-14 (Center for Biological Diversity, 2016). Slow but constant degradation of the Oyamel Fir forests in Mexico has contributed to this population decline, but more insidious are (1) the precipitous loss of milkweed plants caused by the massive use of the herbicide glyphosate (see Chapter 14) coupled with (2) the effects of climate change (warmer and drier conditions at the overwintering sites and droughts in the southern USA- see Chapters 8-11). The miraculous migration of the monarch butterfly is now being referred to as an “endangered phenomenon” (Brower *et al.*, 2012).

At the same time that the monarch population has been decreasing, research on monarchs has been progressing quickly. Most of the chapters in *Monarchs in a Changing World* seem to derive from presentations at the 2012 Monarch Biology and Conservation meeting in Minneapolis, Minnesota. I believe this book was stimulated by a desire to make the information presented at that conference available to a much broader audience.

The book is divided into five sections related to (I) model programs for citizen science, education, and conservation; (II) monarchs as herbivores, prey, and hosts; (III) monarchs in a changing climate; (IV) conserving monarchs; and (V) new perspectives on migration, evolution and population biology. Each section begins with a helpful overview of the chapters within it, and each chapter begins with a clear summary. I did not find much integration of the five sections, nor between the individual chapters within the same section. The editors recognized this and have encouraged readers to skim the summaries and read chapters of interest in any order. I will comment on a few topics below that I found most interesting.

I have been a doubter of the value of data obtained by “citizen entomologists” due to frequent misidentification of insects by the public. The monarch, by being showy and readily identified, overcomes that problem and has stimulated numerous efforts that successfully engage the public. In fact, Urquhart’s initial discovery of the wintering sites in Mexico depended on the help of hundreds of volunteers who reported the locations of marked monarchs they observed. Today, with the internet, it has become extremely easy for members of the public to report observations of adults, larvae, etc., thereby contributing “data” of interest to others.



One successful citizen scientist program is Journey North, reviewed in Chapter 1 along with other environmental outreach efforts based on monarchs. Thousands of observers report sightings of monarchs and other animals to Journey North, enabling a detailed picture of both spring and fall migrations. Those data can be checked for accuracy prior to being analyzed to uncover patterns. Analyses of fall migration data from Journey North (Chapter 18) indicate that in early fall monarchs are moving south at an average rate of 13 km/day, but that migration speeds up in the second half to 42 km/day. Moreover, it seems that the average speed of the migration is steadily increasing year by year, from 20.2 km/day in 2005 to 33.8 km/day in 2011 (see Fig. 18.4), for unexplained reasons. Other analyses (Chapter 24) use Journey North data to determine correlations of population estimates between different segments of the annual life cycle of monarchs. Surprisingly, there is no correlation between late summer population estimates and the size of the wintering population, despite good data for both variables. The several possible explanations given in Chapter 24 provide the starting point for future research to elucidate the reasons underlying that lack of correlation.

Chapter 24 reviews research on the sporozoan parasite *O.E. (Ophryocystis elektroscirrha)* that can cause death of pupae and deformities, reduced longevity, and reduced flight ability of adults. Toxic cardenolides ingested from their host plants by larvae reduce the reproduction of this parasite. Interestingly, infected adult females prefer to lay a higher proportion of their eggs on milkweeds with high cardenolide content, whereas uninfected females do not show any such preference. Through selective oviposition, females can ensure that larvae end up on plants they can use to self-medicate as they feed! On a broader scale, the process of migration may have evolved in part because of the escape from *O.E.* in time and space that monarchs enjoy as they emigrate from natal sites containing infectious spores into relatively “clean” habitats.

As pointed out by the editors, this volume is not intended as a basic source of information on the life history, migration, mimicry, and other basic aspects of the biology of the monarch. Rather, it is a vehicle through which both new, original research and summaries of broader topics have been made accessible to others. It is not stated, but I wonder if the book and its parent conference were not in part attempts to influence the media and politicians about the plight of the monarch. Is it due to chance alone that meetings of the leaders of the Canada, USA, and Mexico in both 2014 and 2016 had monarch butterfly conservation on their agendas, and that the USDA approved \$4 million for monarch butterfly conservation in 2016? If the book has had any influence on those political developments, then it has been wildly successful.

While I understand the desire of the participants of the 2012 conference to share new findings with a diverse audience, I am not sure a lengthy scientific book was the best way to achieve that. I doubt that its scientific style and format will attract much interest from the community of naturalists. However, I personally enjoyed learning many new things about the biology of this well-known insect species. I believe that any biologist with an interest in butterfly biology will find something of interest within this volume.

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Gard W. Otis
University of Guelph

Insectes, cadavres et scènes de crimes : Principes et application de l'entomologie médico-légale.

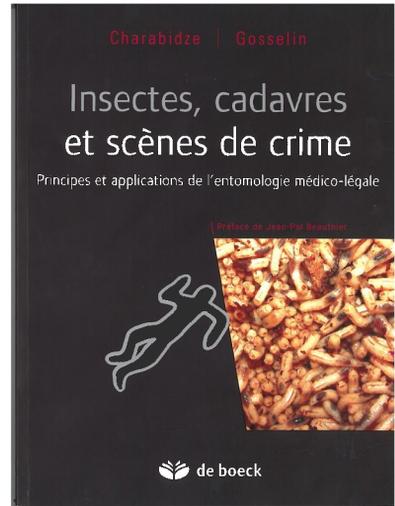
Charabidze, D. & Gosselin, M. 2014. 261 pp. DeBoeck Supérieur. ISBN: 9782804184957 [paperback]. €49.00.

Insectes, cadavres et scènes de crime... Le titre résume très bien le contenu de ce livre qui se veut une initiation à l'entomologie médico-légale. Cœurs sensibles attention car quelques photos très explicites de cadavres et de chairs grouillantes d'asticots risquent de vous retourner le cœur. Ce livre écrit par Damien Charabidze et Matthias Gosselin comporte 16 chapitres avec une introduction et une conclusion. Les chapitres sont écrits par des spécialistes de renom dans le domaine de l'entomologie médico-légale originaires de France, Suisse, Belgique et du Canada. À qui s'adresse ce livre? Toute personne francophone intéressée à avoir un aperçu du monde de l'entomologie médico-légale. Un étudiant voulant s'orienter dans ce domaine professionnel y trouvera une bonne base de départ. Un professeur voulant enseigner l'utilité des insectes dans la société y trouvera toute l'information nécessaire pour bâtir un chapitre de cours sur l'entomologie forensique. Clairement, ce livre n'apprendra rien à un chercheur travaillant dans le domaine de l'entomologie forensique. Mais tous les curieux comme moi de cette discipline seront comblés par ce livre qui est très facile d'approche, bien illustré et largement référencé. Dans chaque chapitre vous trouverez des sections « à retenir », « pour aller plus loin » ou « question de discussion » qui en font définitivement un livre avec une vocation pédagogique.

Quand une personne décède, il y a une succession d'étapes par lequel le corps humain passe : rigidité cadavérique, lividité et putréfaction. Passé 48h, il est difficile de dater l'heure de la mort d'un cadavre juste en observant son état et c'est là que l'utilisation des insectes entre en scène. L'entomologiste forensique cherche à dater l'arrivée des premiers insectes sur un cadavre pour en déterminer le moment du décès... Très simple dit comme cela.

Le préambule de ce livre est tout en contraste : Marion Montaigne signe le premier chapitre avec ses dessins sympathiques qui illustrent l'entomologie forensique de manière humoristique. Elle compare un cadavre à un village et son supermarché. Dix pages de dessins qui jettent un regard ironique sur le métier d'entomologiste forensique. Alors que le deuxième chapitre porte sur Marcel Leclercq, un chercheur et médecin légiste belge qui a développé l'entomologie forensique en Europe et c'est malheureusement le chapitre qui est le moins intéressant du livre. Il comprend de multiples tableaux récapitulatifs des cas traités et des espèces de mouches trouvées par M. Leclercq durant ses années de pratiques. Un hommage au travail colossal de ce pionnier qui prend la forme d'une liste d'épicerie avec peu d'intérêts si on ne fait pas partie du domaine.

La suite du livre aborde le domaine en quatre thèmes et nous fait découvrir toutes les ramifications de l'entomologie forensique: l'explication de la thanatologie et du processus de décomposition du corps *post mortem*, la biologie des insectes nécrophages et leur utilisation pour l'estimation de l'intervalle *post mortem*, les aspects juridiques et l'assurance qualité, les cas particuliers que sont la décomposition d'un corps en milieu aquatique et la problématique des drogues sur les cycles de vie des nécrophages. Enfin, le dernier thème aborde les applications possibles dans le domaine de l'archéentomologie funéraire et l'importance de l'anthropologie pour la datation des corps morts depuis trop longtemps et où l'utilité des insectes atteint sa limite.



Les sections que j'ai préférées? Il y en a beaucoup.... Le quatrième chapitre du livre qui vous transporte dans l'univers odorant des insectes et de leur écosystème, le cadavre. Quels sont les processus chimiques mis en jeu et les molécules dégagées par un cadavre? Comment étudie-t-on la réponse des insectes à ces signaux chimiques? Considérant la complexité du domaine de l'écologie chimique, ce chapitre réussit très bien à expliquer tous ces processus simplement à un novice du domaine.

Les cinquième et sixième chapitres passent au peigne fin les diptères et les larves nécrophages. Saviez-vous que les mouches Calliphoridae et Sarcophagidae sont les championnes de la datation? Ce sont les premières mouches à pondre dans les orifices des cadavres. Les dermestes quant à eux s'attaquent au cadavre déjà sec quand il est en squelettisation et les lépidoptères, souvent peu communs sur un cadavre, utilisent les cheveux pour en faire leur cocon. Cycles de vie, écologie comportementale, principales espèces, problématiques associés à chaque famille, tout y est détaillé et vous permet de mesurer l'étendue des connaissances sur la poignée d'espèces utiles à ce domaine.

Le chapitre huit détaille des études de cas qui nous permettent de nous rendre compte des difficultés rencontrées sur le terrain, des limites de cette méthode. Par exemple, trouver des larves en diapause sur un corps compliqué beaucoup la datation car on ne peut alors que déterminer l'âge minimal des larves. Également, quand plusieurs générations d'insectes se suivent, seule une date de décès pivot peut être trouvée représentant le dernier jour où le décès peut avoir eu lieu.

Le chapitre 11 nous introduit à l'importance de l'accréditation des laboratoires en médico-légale, des standards européens en matière d'échantillonnage, d'équipement, de protocole d'élevage, la certification des experts... Ce chapitre très complet et bien illustré explique comment l'entomologie pratiquée dans ce domaine doit se soumettre à des exigences sévères au même titre que d'autres disciplines criminalistes.

Pour conclure, ce livre est un excellent ouvrage pédagogique que je recommande à toute personne sauf à un spécialiste du domaine et gardez en mémoire que ce livre relate essentiellement les connaissances, les pratiques et les étude de cas en majorité pour les pays francophones d'Europe.

Annabelle Firlej
IRDA, Saint-Bruno-de-Montarville, Québec



Books available for review / Livres disponibles pour critique

The ESC frequently receives unsolicited books for review. A list of these books is available online (<http://www.esc-sec.ca/bulletinbooks.php>) and is updated as new books are received.

If you wish to review one of these books, please send an email to the Chair of the Publications Committee (Maya Evenden, mevenden@ualberta.ca).

You should briefly indicate your qualifications to review the topic of the book, and be able to complete your review within 8 weeks.

Preference will be given to ESC members.

La SEC reçoit fréquemment des livres non demandés pour des critiques. Une liste de ces livres est disponible en ligne (<http://www.esc-sec.ca/f-bulletinbooks.php>) et est mise à jour lorsque de nouveaux livres sont reçus.

Si vous souhaitez critiquer un de ces livres, veuillez envoyer un message au président du comité des publications (Maya Evenden, mevenden@ualberta.ca).

Vous devez brièvement indiquer vos qualifications pour critiquer le sujet du livre, et être en mesure de terminer votre critique en 8 semaines.

La préférence est donnée aux membres de la SEC.

Guidelines

Book reviews should be approximately 800-1200 words in length. They should clearly identify the topic of the book and how well the book meets its stated objective. Weaknesses and strengths of the book should be described.

Formatting of the review should follow that of reviews in recent issues of the Bulletin. A scan of the book cover (jpeg or tiff format, about 500 kb) should be submitted with the review.

Lignes directrices

Les critiques de livre doivent compter entre 800 et 1200 mots. Elles doivent clairement identifier le sujet du livre et si le livre rencontre bien les objectifs énoncés. Les forces et faiblesses du livre devraient être décrites.

Le format des textes doit suivre celui des critiques des récents numéros du Bulletin. Une version numérisée de la couverture du livre (en format jpeg ou tiff, environ 500 kb) devra être soumise avec la critique.

Currently available for review

Genise, J.F. 2017. Ichnoentomology: Insect Traces in Soils and Paleosols. 695 pp., 108 b/w illustrations, 289 illustrations in colour. Springer International. ISBN: 978-3-319-28208-4 [hard cover]. Also available as an e-book.

Miller, K.B. & J. Bergsten. 2016. Diving Beetles of the World. 336 pp, 300 color photos, illus., and drawings; Johns Hopkins Univ. Press. ISBN: 9781421420547 [hardcover]

Mignon, J., É. Haubruge & F. Francis. 2016. Clé d'Identification des Principales Familles d'Insectes d'Europe. 96 pp, 85 figures, Presses agronomiques de Gembloux. ISBN: 978-2-87016-141-8

Pryke, L.M. 2016. Scorpion. 221 pp, colour plates, photos. The University of Chicago Press. ISBN: 9781780235929 [soft cover]

Dodd, A. 2016. Beetle. 192 pp, colour plates, photos, The University of Chicago Press. ISBN: 9781780234885 [soft cover]

Gandy, M. 2016. Moth. 238 pp, colour plates, photos. The University of Chicago Press. ISBN: 9781780235851 [soft cover]

Schmidt, J.O. 2016. The Sting of the Wild. 280 pp., 13 colour plates. Johns Hopkins University Press. ISBN: 9781421419282 [hardcover]

Appel, E. & S.N. Gorb. 2015. Comparative Functional Morphology of Vein Joints in Odonata. Zoologica Vol. 159; 104 pp, 53 figures, 1 table; E. Schweizerbart'sche Verlagsbuchhandlung. ISBN: 978-3-510-55046-3. [paperback]

Giberson, D.J., & H.A. Cárcamo [Eds.]. 2014. Arthropods of Canadian Grasslands. Vol. 4: Biodiversity and Systematics, Part 2. 479 pp; photos, maps, checklists. Biological Survey of Canada. ISBN: 9780968932179 [soft cover]

Cárcamo, H.A. & D.J. Giberson [Eds.]. 2014. Arthropods of Canadian Grasslands. Vol. 3: Biodiversity and Systematics, Part 1. 413 pp; photos, maps, checklists. Biological Survey of Canada. ISBN: 9780968932162 [soft cover]

Highlights from the Board of Directors Meetings in Orlando.

Treasurer

Assessment of possible sales tax liabilities on past Joint Annual Meetings is continuing. Full information required to assess this has been received from five of the seven regional societies. Information required from Charities Directorate for the incorporation of the Scholarship Fund is expected to be received soon. Bouris Wilson will conduct an audit of the 2016–2017 financial statements, rather than a review engagement, as a consequence of ESC's income exceeding \$250,000 in the 2015–2016 financial year. The Board approved a revision of the Society's investment policy for the General and Endowment Funds, and recommended a revision of the policy for the Scholarship Fund, to permit the following ranges of asset mix in each of these funds: equities (20-40%), fixed income (50-79%), and cash and equivalents (1-10%). The Board discussed ways of cutting costs and increasing income.

Website

The Executive and Web Content Committee will meet by the end of October to clarify paths forward, stage of progress, and what is need to move forward with the changes to the website structure.

Achievement Awards Committee

Changes were approved to the Committee Guidelines and the Standing Rules for the Achievement Awards Committee to correct the 2014 Standing Rules with respect to procedures for Honorary Memberships so that they are in line with past and current practice, and to add requesting of a nominee for the Criddle Award to the duties of the Achievement Awards Committee.

Joint meeting with ESA and ESBC in 2018

A liaison committee will be appointed, chaired by Pat Bouchard, to coordinate planning for the joint meeting with the Entomological Society of America and the Entomological Society of British Columbia in Vancouver in 2018.

Public Education Committee

The Board discussed ways to enhance the activities of the Public Education Committee, including a dedicated area on the website, and identifying resources for public entomological education in Canada.

Membership Committee

The Board discussed a possible restructuring of the Membership Committee and strategies to promote the benefits of membership.

Annual Meetings

The Board approved a revision to the policy statement on organization of Joint Annual Meetings passed earlier in the year. Statements were added providing that the Society will appoint an individual from ESC to liaise with the Local Organizing Committee throughout the meeting planning and implementation process, and that the Local Organizing Committee will operate the on-site registration desk, using forms and credit card processing arrangements provided by Strauss.

Scholarship Trust Fund

Staffan Lindgren will continue to serve as the chair of the Scholarship Trust Fund for the 2016–2017 year until Terry Wheeler is able to take over these duties.

Meeting Schedule

Incoming President Neil Holliday indicated that he believed that the Society's business would proceed more rapidly if there were more Board Meetings during the year, and these should focus on issues, of which the current most pressing are membership and balancing our operating budget. He expects to call three issues-focused relatively short Board Meetings during the course of the year, potentially in December, March and June. The Board also approved a plan to hold a strategic planning session in conjunction with the 2017 Joint Annual Meeting in Winnipeg.

CUP and Strauss Contracts

The current contracts with Cambridge University Press for publication of *The Canadian Entomologist* and with Strauss Event and Association Management both expire in 2018. The Board noted the need to begin preparing for negotiations on renewal of these contracts.

Minutes of the 66th Annual General Meeting Orange County Convention Center, Orlando, Florida 27 September 2016

1. Call to order

The meeting was called to order at 14:42 by First Vice-President Neil Holliday, in the absence of President Terry Wheeler, with 41 members present.

2. Notice of Meeting

Notice of the meeting was sent to all members by email on 3 September 2016 and was also published in the June issue of the *Bulletin*.

3. Additions to and approval of the Agenda

The Agenda was approved as circulated on a motion by Bill Riel, seconded by Tyler Wist.

4. Minutes of the 65th Annual General Meeting

The minutes of the 65th Annual Meeting of Members were approved as circulated on a motion by Bob Lamb, seconded by Rob Longair.

5. Commemoration of Deceased Members of the Entomological Community

The Heritage Committee reported the deaths since the previous Annual Meeting of Thelma Finlayson, George Gerber, Leonard Kelton, and Robin Leech. A moment of silence was observed in their memory.

6. Report from the Board of Directors

First Vice-President Neil Holliday reported on the Board's activities for the year.

Since last reporting to the membership, the Board of Directors has met three times and the Executive Council has met three times. All but two of the meetings were by the free teleconference service provided to the Society by Strauss Event and Association Management; this service is also available for meetings of Society committees. The second year of the contract for management services with Strauss has seen resolution of virtually all of the

problems associated with the first year. Membership renewals for the 2016 year went much more smoothly than in the previous year. We still need to address problems associated with abandonment of paper-based membership renewal, as members ignore or forget email reminders to renew. In 2016, those who did not renew on line by mid-February received a mailed renewal form and follow-up; nevertheless there are still those who may think they have renewed but have not. The transfer of the Society's registered office to the Strauss office has been completed. A policy document has been approved by the Board that basically outlines who does what with respect to joint annual meetings in the new era in which on-line registration and paper submission, and registration fee processing are performed by Strauss. Efforts are ongoing to incorporate the ESC Scholarship fund; Treasurer Christopher Dufault has been searching back files on the scholarships and we hope soon to receive information from the Charities Directorate on the information they have on file. A substantial donation from Hugh and Thelma Danks has allowed for the establishment of new scholarships, the first two of which have just been awarded. The Committee on redesign of the Society's website has developed a plan for changes, and Executive Council will be meeting with all concerned parties within a month to move towards implementation of the new design. For the last 2 years, Murray Isman and his committee have represented ESC in the ICE organization process, and during the last year, Past President Staffan Lindgren has very capably steered the local arrangements for ESC at ICE. We thank all involved for their efforts. Incoming First Vice-President Patrice Bouchard is leading development of the team that will represent the ESC in the organizing of the joint meeting of the Entomological Societies of America, Canada and British Columbia (Vancouver, 11-14 November 2018). The Board is committed to ensuring that this meeting is truly joint and caters to our member's interests and needs. At its most recent meeting on 24 September, the Board highlighted two issues that are to receive special attention in 2016–17: reversing the slow decline in membership, and balancing the operating budget of the Society. Kevin Floate has indicated his intention to step down as Editor-in-Chief at the end of 2017, and a search has been initiated for his replacement. If anyone is interested in this position, please contact me. *The Canadian Entomologist* has flourished under Kevin's editorship and its impact factor has increased; we thank Kevin, and editorial assistant Andrew Smith for their excellent work. We also thank all other officers, committee chairs and committee members for their many services to ESC; without them, the Society could not function. Particular thanks go to Alec McClay, who has very capably served the Society as Secretary for 5 years, and is desirous of stepping down as soon as a replacement can be found. Again, if you are interested in this position, which has the perk of having expenses paid to ESC Annual Meetings, please let me know.

7. Resolution to approve the actions of the Board

Motion by Tyler Wist, seconded by Charlie Bailey: **RESOLVED** that all by-laws, contracts, acts and proceedings of the Board of Directors of the ESC enacted, made, done or taken since 10 November 2015, being the date of the last Annual General Meeting, be approved, adopted, ratified, sanctioned and confirmed.

CARRIED.

8. Treasurer's Report

Treasurer Christopher Dufault reviewed the Financial Statements for 2015 – 2016, which have been posted in the Members' Area of the website.

8.1 Appointment of auditors

Motion by Christopher Dufault, seconded by Bob Lamb: That Bouris Wilson LLP of Ottawa be appointed as the Society's public accountant to conduct an audit for the financial year 1 July 2016 to 30 June 2017.

CARRIED.

9. Standing Rule Changes

9.1 Achievement Awards Committee

Some changes to the Standing Rules for this Committee are needed to make the treatment of new Honorary Members equivalent to that of new Fellows, and to modify the standing rule that applies to the Achievement Awards Committee so that it conforms to current practice. The following changes were proposed by Neil Holliday and seconded by Bill Riel:

Standing rule 1 (e) Honorary Member. Add:

New Honorary Members shall be announced in the *Bulletin* as soon as possible after they are named

Modify Standing Rule X 4 (b) as shown below

X 4 (b) Achievement Awards Committee

The Committee shall consist of three to five Members, one of whom will be the First Vice-President of the Corporation who will normally function as Chair. Members of the Committee shall not be eligible for re-appointment for a 3-year period after serving on this committee.

The Committee shall invite Members of the Corporation to nominate worthy eligible persons for the Entomological Society of Canada Awards for Outstanding Achievements in Entomology: the Gold Medal Award, the C. Gordon Hewitt Award and Honorary Membership.

The Committee shall invite applications from individuals for the Bert and John Carr Award in support of research activities on the faunistics, natural history or taxonomy of Canada’s insect fauna.

The Committee shall select worthy recipients for these Awards from among the nominees/ applicants, but may not itself make nominations/applications. With the exception of Honorary Membership, the person chosen to receive each Award shall require the endorsement of the Governing Board. If a suitable recipient is not found, an award will not be made. Names of those selected by the Committee for Honorary Membership shall be forwarded to the Secretary for inclusion in a ballot of the Society’s membership

The Committee shall select worthy Active Members as Fellows of the Corporation from among persons nominated. Each person chosen as a Fellow of the Corporation shall require the ratification of the Governing Board.

The Committee shall invite the affiliated society hosting the next Joint Annual meeting to choose a recipient for the Norman Criddle Award.

CARRIED.

10. Election of Directors

The following slate of Directors was proposed for election by Secretary Alec McClay and seconded by Pat MacKay:

Position	Candidate	Length of term	Ends at AGM
Societal Director (2 nd Vice-President)	Fiona Hunter	3 years	2019
Director at Large	Laura Timms	3 years	2019
Regional Director, ESAB	Haley Catton	3 years	2019
Regional Director, SEQ	Étienne Normandin	3 years	2019
Regional Director, AES	Suzanne Blatt	3 years	2019

CARRIED.

With this election Neil Holliday succeeded to the office of President and officially took over the chair of the meeting. Second Vice-President Fiona Hunter was escorted to the dais by First Vice-President Patrice Bouchard.

11. Presentation of Service Awards

President Neil Holliday presented Alec McClay with an award to mark his service as Secretary from 2011 to 2016.

12. Resolutions on behalf of the ESC

12.1 Resolution of thanks

The following vote of thanks was moved by Véronique Martel:

Whereas the Society's participation in the 2016 International Congress of Entomology in Orlando, Florida, has been an enjoyable, rewarding, and intellectually stimulating experience, be it resolved that the Society's thanks are extended to:

- The Council of the International Congresses of Entomology, chaired by Dr Hari C. Sharma and the ICE 2016 Organizing Committee, co-chaired by Dr Alvin Simmons and Dr Walter Leal, for their enthusiastic support of the Society's involvement in the Congress
- The Governing Board and staff of the Entomological Society of America, for their financial and logistical support of the Society's social and business events at the Congress
- In particular, Ms Rosina Romano, ESA Director of Meetings, for her efficient and accommodating support to the Society in the lead-up to the Congress
- The Society's Ad Hoc Committee for ICE, chaired by Professor Murray Isman, and the Annual Meeting Committee, chaired by Dr Chris MacQuarrie, for their efforts in planning the Society's events at the Congress, coordinating with the Entomological Society of America and the ICE 2016 Organizing Committee, and fund-raising for the Student and Early Professional Travel Awards
- The Board of Trustees of the ESC Scholarship Fund, chaired by Professor Staffan Lindgren, and the ESC Student Awards Committee, chaired by Professor Jenny Cory, for administering and adjudicating the ICE Student and Early Professional Travel Awards
- Enterra Feed Corporation and Dow Agrosiences Canada for their generous financial support of the ICE Student and Early Professional Travel Awards.

The management and staff of the Orange County Convention Center and the Congress Hotels, for providing an efficient, comfortable, and well-organized venue for the Congress and the Society's events.

CARRIED by a round of applause.

13. Notice of 67th Annual General Meeting

The 67th Annual Meeting of Members will take place in Winnipeg, Manitoba, on Tuesday, 24 October 2017.

14. Adjournment

The meeting was adjourned at 15:30 on a motion by Kevin Floate.

Important new appointments / Nouvelles nominations importantes

The Society is pleased to announce the appointments of Aynsley Thielman (University of Northern British Columbia) as Secretary, and Jordan Bannerman (University of Manitoba) as Webmaster.

La Société est heureuse d'annoncer la nomination de Aynsley Thielman (Université du Nord de la Colombie-Britannique) comme secrétaire, et de Jordan Bannerman (Université du Manitoba) comme webmestre.

Executive Meeting – Call for Agenda Items

The next Interim Meeting of the ESC Executive will take place by conference call on a date to be determined in February 2017. If members have any items they wish to be discussed by the Executive, please send them to the Secretary, Aynsley Thielman (aynsley.thielman@unbc.ca), as soon as possible.

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

La prochaine réunion intérim du conseil exécutif de la SEC se tiendra par appel conférence à une date à déterminer en février 2017. Si des membres aimeraient ajouter des points à l'ordre du jour pour discussion par le conseil exécutif, merci de les envoyer au secrétaire, Aynsley Thielman (aynsley.thielman@unbc.ca), le plus tôt possible.

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, Bernie Roitberg (roitberg@sfu.ca), if you have any questions about eligibility or the nomination process.

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, Bernie Roitberg (roitberg@sfu.ca) si vous avez des questions sur l'éligibilité ou le processus de nomination.

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

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

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 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 second. 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, Bernie Roitberg (roitberg@sfu.ca), no later than **28 February 2017**.

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, Bernie Roitberg (roitberg@sfu.ca) no later than **28 February 2017**.

Fellows of the Entomological Society of Canada

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 évaluation par les pairs, livres, chapitres de livres, brevets; activités éditoriales; historique d'enseignement, nombre d'étudiants gradués, 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, Bernie Roitberg (roitberg@sfu.ca), au plus tard le **28 février 2017**.

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 nomination 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, Bernie Roitberg (roitberg@sfu.ca), au plus tard le **28 février 2017**.

Fiduciaires de la Société d'entomologie

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, Bernie Roitberg (roitberg@sfu.ca), no later than **28 February 2017**.

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 \$500; and 3. A current curriculum vitae. Applications are to be sent by e-mail to the Chair of the Achievement Awards Committee, Bernie Roitberg (roitberg@sfu.ca) no later than **28 February 2017**.

du Canada

Les fiduciaires sont considérés comment 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, Bernie Roitberg (roitberg@sfu.ca), au plus tard le **28 février 2017**.

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 500\$; et 3. Un curriculum vitae à jour. Les candidatures doivent être envoyées par courriel au président du comité des prix d'excellence, Bernie Roitberg (roitberg@sfu.ca), au plus tard le **28 février 2017**.

ESC Photo Competition Winners!

We are pleased to announce the winners of the annual ESC photo contest and thank the entrants for their participation. These high quality photos of arthropods and entomology-related activities will be enjoyed by our membership throughout the year as they are used to decorate *The Canadian Entomologist* and *Bulletin* covers. Congratulations to all the participants for the enjoyable photos.

The top three entries are:

1st Place: Andrea Brauner for her photo of a moulting milkweed bug, *Oncopeltus fasciatus*.

2nd Place: Matthias Buck for his male orchid bee, *Euglossa dilemma*.

3rd Place: Tim Hays for 'Face to face with the death's-head hawkmoth, *Acherontia atropos*

Entomologists in Action: Greg Pohl for members of the Arthropod Species Specialist Subcommittee of COSEWIC conducting an insect survey.

Honourable mentions go to:

Jordan Bannerman – *Megarhyssid* wasp ovipositing on a dead maple tree.

Jesse MacDonald - Wolf spider (family: Lycosidae) carrying her young.

RoseMarie DeClerck-Floate – Mayflies, *Hexagenia* sp., in tandem.

Chris Ratzlaf - A wingless male *Chionea alexandriana* fly in winter.

Thank you to Bob Lalonde for organizing the photo competition and to Maya Evenden and Ward Strong for helping Bob select the winners from the very many excellent photographs. If you have not done so previously, please keep those cameras handy and consider submitting a photo next year.

Tom Lowery
Publications Committee



Call for interest for the position of Editor-in-Chief of *The Canadian Entomologist*

The Entomological Society of Canada (ESC) is seeking an Editor-in-Chief for *The Canadian Entomologist (TCE)* to start September 2017.

The Editor-in-Chief of *TCE* is one of the Officers of the ESC and is responsible for the journal's scientific and editorial integrity. *TCE* is an international journal that publishes on all aspects of entomology. Published by Cambridge University Press, *TCE* received about 200 new submissions from 30 countries in 2015. One of the world's oldest entomological journals, *TCE* celebrates its 150th anniversary in 2018.

The Executive Council of the ESC is keen to hear from members of the Society interested in this exciting and challenging position. For further questions regarding this position or to suggest potential candidates, please contact ESC President Neil Holliday; Neil_Holliday@UManitoba.CA.

Avis à manifestation d'intérêt pour le poste de rédacteur scientifique pour *The Canadian Entomologist*

La Société d'entomologie du Canada (SEC) recherche un rédacteur scientifique pour *The Canadian Entomologist (TCE)* à compter de septembre 2017.

Le rédacteur scientifique de *TCE* est un des administrateurs de la SEC et est responsable de l'intégrité scientifique et éditoriale de la revue. *TCE* est une revue internationale qui publie sur tous les aspects de l'entomologie. Publiée par les presses de l'Université Cambridge, *TCE* a reçu autour de 200 nouvelles soumissions en provenance de 30 pays en 2015. *TCE*, qui est une des plus vieilles revues entomologiques du monde, célébrera son 150^e anniversaire en 2018.

Le conseil exécutif de la SEC aimerait être contacté par les membres de la Société intéressés par ce poste excitant et plein de défis. Pour des questions concernant le poste ou pour suggérer des candidats potentiels, veuillez contacter le président de la SEC, Neil Holliday; Neil_Holliday@UManitoba.CA.



M. Larrivée

Asterocampa celtis (Lepidoptera: Nymphalidae)

Announcements / Annonces

The Canadian Entomologist: Call for Special Issue

The Canadian Entomologist (TCE) regularly publishes special issues of manuscripts with a common theme that review or report significant findings of fundamental and (or) general entomological interest.

Submissions currently are being solicited for a special issue to be published in 2018 to celebrate *TCE*'s 150th anniversary. It will include manuscripts that each will provide a historical overview on a different aspect of entomological research in Canada. The first six submissions accepted for publication will be given free access on *TCE*'s website. If you wish to contribute to this second special issue, please contact Dr Kevin Floate (Kevin.Floate@agr.gc.ca) by 31 January 2017.

Proposals for special issues can be submitted at any time to *TCE*'s Editor-in-Chief. Proposals will be reviewed for suitability by the Publications Committee of the Entomological Society of Canada. Manuscripts submitted as part of a special issue are subject to the regular peer review process. There are no page charges.

For more information on *The Canadian Entomologist*, please visit the journal's website at: <http://journals.cambridge.org/action/displayJournal?jid=TCE>

Kevin Floate, Editor-in-Chief
The Canadian Entomologist



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Content of newsletters published by the Canadian Phytopathological Society
Contenu des bulletins publiés par la Société canadienne de phytopathologie



THE CANADIAN PHYTOPATHOLOGICAL SOCIETY

LA SOCIÉTÉ CANADIENNE DE PHYTOPATHOLOGIE

CPS.SCP News **Vol 60 (3) September 2016**

<http://phytopath.ca/wp-content/uploads/2016/10/CPS-SCP-News-60-3-September-2016.2.pdf>

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Meeting announcements / Réunions futures

Malaria – From Innovation to Eradication

Kampala, Uganda, 19-23 February 2017

<https://www.keystonesymposia.org/17B5>

Third FAO-IAEA International Conference on Area-wide Management of Insect Pests: Integrating the Sterile Insect and Related Nuclear and Other Techniques

Vienna, Austria, 22-26 May 2017

<http://www.entsoc.org/event-calendar/third-fao%E2%80%93iaea-international-conference-area-wide-management-insect-pests-integrating>

The 5th International Forum for Surveillance and Control of Mosquitoes and Mosquito-borne Diseases

Nanjing, China, 22-26 May 2017

www.mosquitoforum.net

IOBC-WPRS Working Group: Integrated Control in Protected Crops, Temperate Climate

Niagara Falls, Canada, 4-8 June 2017

<http://iobccanada2017.ca/>

The Third Hemipteran-Plant Interactions Symposium

Madrid, Spain, 4-8 June 2017

<http://www.hpis2017.csic.es/>

Society for Invertebrate Pathology, 50th Anniversary Meeting

San Diego, California, 13-17 August 2017

Contact: Surendra Dara (skdara@ucdavis.edu)

26th International Conference of the World Association for the Advancement of Veterinary Parasitology, WAAVP 2017

Kuala Lumpur, Malaysia 4-8 September 2017

<http://www.waavp2017kl.org/index.php>

Entomological Society of Canada Joint Annual Meeting 2017

Winnipeg, 22-25 October 2017

The meeting will be held in conjunction with the Entomological Society of Manitoba

<http://www.esc-sec.ca/annmeet.php>

Entomological Society of America Annual Meeting 2017: Ignite, Inspire, Innovate

Denver, Colorado, 5-8 November 2017

<http://www.entsoc.org/events/annual-meeting>

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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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.

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Submission deadline for the next issue: 31 January 2017



Bulletin de la Société d'entomologie du Canada

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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www.esc-sec.ca/

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:
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ISSN: 0071-0741

Droits d'auteur 2016 Société d'entomologie du Canada

Date de tombée pour le prochain numéro: 31 janvier 2017

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



A continued source of enjoyment

In the world of insects there's always something new to fan one's interest. Saskatchewan is currently in the midst of another forest tent caterpillar (*Malacosoma disstria*) outbreak cycle, though these pests are being given a good run for their money as 'top dog' by boxelder bugs (*Boisea trivittata*) whose numbers have increased vastly in recent years. I have read anecdotal reports that, like those of many other insects, populations of boxelder bugs are cyclical over a 10-year period (though I have yet to see a scientific paper that presents evidence for this). (I have also discovered that there is a strong correlation between the numbers of these insects and media interest in them!)

The old 'favorites' notwithstanding, each year brings entomological surprises that please and intrigue an old green thumb such as myself. This year, around mid-July, I began to notice tiny holes on the foliage of our sweet potatoes. Almost all young leaves showed signs of damage, though it did not materially affect their growth (and the eventual size of the harvest). Careful (microscopic) examination revealed the presence of small (just a few millimetres long), hairy green caterpillars, so I popped a few infested leaves in a jar and, as the taxonomists say, 'reared them to emergence'. The adult moth, with about a 17-millimetre wingspan and about the same

Une source continue de plaisir

Dans le monde des insectes, il y a toujours quelque chose de nouveau pour aviver notre intérêt. Saskatchewan est présentement au milieu d'un autre cycle d'épidémie de livrée des forêts (*Malacosoma disstria*), même si ces ravageurs aient eu de la compétition pour le titre de maître incontesté par les punaises de l'érable négondo (*Boisea trivittata*) dont le nombre a grandement augmenté dans les dernières années. J'ai lu des rapports anecdotiques à l'effet que, comme bien d'autres insectes, les populations de punaises de l'érable négondo ont des cycles de 10 ans (bien que je n'aie pas encore vu d'articles scientifiques qui en présentent des preuves). (J'ai aussi découvert qu'il y a une forte corrélation entre le nombre de ces insectes et leur intérêt pour les médias!)

En plus des vieux « favoris », chaque année apporte ses surprises entomologiques qui plaisent et intriguent un pouce vert comme moi-même. Cette année, vers mi-juillet, j'ai commencé à remarquer de petits trous dans le feuillage de nos patates douces. Presque toutes les jeunes feuilles montraient des signes de dommages, bien que leur croissance (et éventuellement la taille de la récolte) n'en était pas affectée. Un examen attentif (microscopique) a révélé la présence de petites (quelques millimètres de long) chenilles vertes et poilues, alors j'ai placé quelques feuilles infestées dans un bocal et, comme les taxonomistes disent, je les ai élevés jusqu'à l'émergence. Le papillon adulte, avec une envergure d'environ 17 mm et la même longueur pour le corps, a des ailes plumeuses se tenant à angle droit avec le corps, l'aile antérieure directement au-dessus de l'aile postérieure, soutenu

body length, perched with feathery wings held at right angles to the body, the fore wing held directly above the hind wing, supported by legs that seemed far too long for its body. It was easily identified as a morning-glory plume moth (*Emmeline monodactyla*) (Pterophoridae), apparently a common moth in many parts of the world, including North America, yet which had never previously visited the Gillott acreage!



The other newcomer to the acreage in 2016 was found masquerading as a boxelder bug amid a large group of these creatures on the house side in early September. About 1.5 times larger than a boxelder bug, its form momentarily suggested some form of assassin bug, but digging a little deeper revealed that it was another coreid, the Western conifer seed bug (*Leptoglossus occidentalis*). Like boxelder bugs, it is 'a nuisance invader of homes in fall' (Cranshaw 2004). The species has expanded its range eastwards, which may account for its recent discovery of our Scots pine and dogwood, two of its favored host plants. Whatever the reason for its arrival, it and the plume moth presented yet another opportunity for a decrepit entomologist to exercise his brain and learn a little more about our weird and wonderful six-legged friends.

Reference

Cranshaw, W. 2004. Garden Insects of North America: The Ultimate Guide to Backyard Bugs. Princeton University Press, Princeton, New Jersey.

par des pattes qui semblent beaucoup trop longues pour le corps. Il a été facilement identifié comme un ptérophore commun (*Emmeline monodactyla*) (Pterophoridae), un papillon apparemment commun dans plusieurs parties du monde, incluant l'Amérique du Nord, mais qui n'avait jamais visité les terres Gillott avant!

L'autre nouvel arrivé sur les terres en 2016 a été trouvé déguisé en punaise de l'érable négondo parmi un large groupe de ces créatures sur le côté de la maison au début septembre. Environ 1,5 fois plus gros qu'une punaise de l'érable négondo, sa forme suggérait momentanément une sorte de réduve, mais en creusant un peu plus, il s'est révélé qu'il s'agissait d'un autre coréidé, la punaise américaine du pin (*Leptoglossus occidentalis*). Comme la punaise de l'érable négondo, il s'agit d'une « nuisance envahissant les maisons à l'automne »¹ (Cranshaw 2004). L'espèce a agrandi sa répartition vers l'est, ce qui peut expliquer sa découverte récente sur le pin sylvestre et les cornouillers, deux de ses plantes hôtes préférées. Peu importe la raison de son arrivée, elle et le ptérophore ont constitué une opportunité de plus pour un entomologiste décrépiti d'exercer son cerveau et d'en apprendre un peu plus sur nos étranges amis à six pattes.



Référence

Cranshaw, W. 2004. Garden Insects of North America: The Ultimate Guide to Backyard Bugs. Princeton University Press, Princeton, New Jersey.

¹Traduction libre de « a nuisance invader of homes in fall »

Entomological Society of Canada, 2016-2017 Société d'entomologie du Canada, 2016-2017

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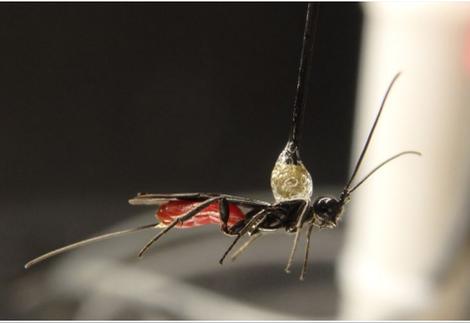
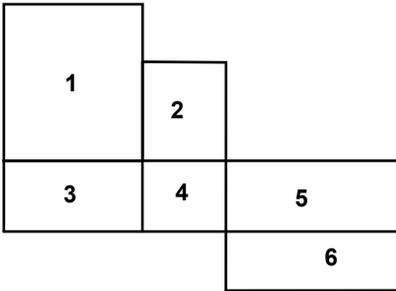
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Front cover/Plate supérieur:

1. Graduate students collect at a light trap late at night (Vernon, BC). The bright lights are powered by the car's battery.
Des étudiants diplômés capturent des insectes dans un piège lumineux tard dans la nuit (Vernon, C.-B.). Les lumières vives sont alimentées par une batterie de voiture. [Photo : Ward Strong]
2. Predator versus parasitoid: *Rhinocoris annulatus* feeding on an ichneumonid (Delémont, Switzerland).
Prédateur contre parasitoïde : *Rhinocoris annulatus* se nourrissant d'un ichneumon (Delémont, Suisse). [Photo : Tim Haye]
3. A spruce budworm (*Choristoneura fumiferana*) pupa on a balsam fir branch. The spruce budworm is a major native defoliator in Eastern Canada. Near Baie-Comeau, QC.
Une chrysalide de tordeuse des bourgeons de l'épinette (*Choristoneura fumiferana*) sur une branche de sapin baumier. La tordeuse des bourgeons de l'épinette est un défoliateur indigène dans l'est du Canada. Près de Baie-comeau, Qc. [Photo : Véronique Martel]
4. The longhorned beetle *Bellamira scalaris* preparing for takeoff in Denver, NS.
Le longicorne *Bellamira scalaris* se préparant à s'envoler à Denver, NS. [Photo : Colin MacKay]
5. Cecropia moth, *Hyalophora cecropia*, just after molting to third instar. This lab-reared caterpillar is from the F2 generation of a gravid female collected in 2014 from Black Donald Lake near Calabogie, ON.
Un saturnie cécropia, *Hyalophora cecropia*, après la mue vers le troisième stade. Cette chenille élevée en labo est de la génération F2 d'une femelle féconde capturée en 2014 au lac Black Donald près de Calabogie, Ont. [Photo : Andrea Brauner]
6. *Megachile* Latreille, 1802 (Megachilidae) leafcutter bees are important pollinators widely used in alfalfa growing areas. Their reproductive biology is quite interesting. This specimen was excavating its nest in an old wood retaining wall in our garden. Prince George, BC.
Megachile Latreille, 1802 (Megachilidae). Les abeilles découpeuses sont d'importants pollinisateurs largement utilisés dans les aires de cultures de Luzerne. Leur biologie reproductive est plutôt intéressante. Ce spécimen creusait son nid dans un vieux mur de soutènement en bois dans notre jardin. Prince George, C.-B. [Photo : Staffan Lindgren]

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Back cover/Plate inférieur:

- Female *Atanycolus* sp., a North American parasitoid of emerald ash borer, tethered to a flight mill in a laboratory at the Canadian Forest Service, Great Lakes Forestry Centre (Sault Ste. Marie, ON) to study factors affecting flight.
Une femelle *Atanycolus* sp., un parasitoïde nord-américain de l'agrile du frêne, attachée à un moulin de vol dans un laboratoire du Service canadien des forêts, au Centre de foresterie des Grands-Lacs (Sault-Ste-Marie, Ont.), afin d'étudier les facteurs qui affectent le vol. Photo : Justin Gaudon.