



# Bulletin

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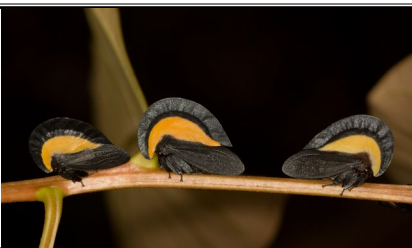


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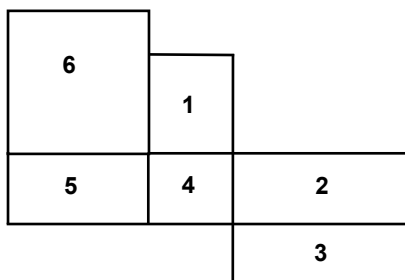
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## Images

**Sous le titre:** *Cucullia lychnitis* sur une tige de Verbascum (Escalona, Aragon, Espagne) 1 juillet 2011. Photo: Francois Lieutier

- 1 La jeune entomologiste Aya Hoover inspectant un cadre d'abeilles (*Apis mellifera*) (ferme de recherche Beaverlodge, Alberta, Canada). Photo: Shelley Hoover
- 2 Un des rares Lucanidés du Canada, *Sinodendron rugosum*, marche dans la mousse (Burnaby Mountain, Colombie-Britannique, Canada), 31 juillet 2013. Photo: Sean McCann
- 3 Femelle *Phiddipus regius* (Lake Placid, Floride, États-Unis d'Amérique). Photo: Guillaume Dury
- 4 Charançon de la graine du chou (*Ceutorhynchus obstrictus*), un ravageur envahissant du canola (Delémont, Suisse). Photo: Tim Haye
- 5 Ces Membracidés ont été trouvés le long d'un petit arbre en Guyane sous la garde de fourmis (pas montrées). Photo: Steven Paiero
- 6 *Platyedra areolata*, émergée de sa chrysalide (Idaho, États-Unis d'Amérique). Photo: Malcolm Furniss

**Couverture arrière:** Un orthoptère indéterminé (trop de segments tarsaux pour un criquet) déplaçant sa biomasse vers le haut de la chaîne alimentaire. L'honneur est au moucherolle à ventre roux... Photo: Bob Lalonde





UNBC

### **'The Times They Are a-Changin' (with apologies to Bob Dylan)**

The past few years have seen a period characterized by a series of transitions for the ESC. In 2011, we moved the journal to Cambridge University Press (CUP), and in 2013, we transitioned to the new Canada Not-for-profit Corporations Act. Both of those changes have involved steep learning curves with both ups and downs as one might expect. Thanks to the incredibly generous commitments from a large number of our members, these changes have thankfully been negotiated smoothly. Since my election as 2<sup>nd</sup> Vice-President in 2012, I have had the pleasure of participating (read 'being an apprentice') in the running of the Society, and it is with both excitement and trepidation that I assume the role of President. It gives me a lot of comfort to know that I can rely on the support of both my predecessor, Rebecca Hallett, who has been incredibly efficient and organized in guiding us through a fairly busy year, and Alec McClay, who somehow manages to keep track of all the committees and obligations we have. The ESC relies on its volunteers, whose diligence and commitment to entomology makes our society special.

### **'The Times They Are a-Changin' (avec des excuses à Bob Dylan)**

Les dernières années ont vu une période caractérisée par une série de transitions pour la SEC. En 2011, nous avons déménagé notre revue vers les Presses de l'Université Cambridge (CUP) et en 2013, nous sommes passés à la nouvelle Loi sur les organisations à but non lucratif. Ces deux changements ont demandé des courbes d'apprentissages abruptes avec des hauts comme des bas, comme on pourrait s'y attendre. Grâce à l'implication incroyablement généreuse d'un grand nombre de nos membres, ces changements ont heureusement été négociés tout en douceur. Depuis mon élection comme second vice-président en 2012, j'ai eu le plaisir de participer (lire « être un apprenti ») dans le fonctionnement de la Société, et c'est avec excitation et trépidation que je remplis mon rôle de Président. Cela me donne beaucoup de réconfort de savoir que je peux me fier sur le soutien autant de mon prédécesseur, Rebecca Hallett, qui a été incroyablement efficace et organisée pour nous guider durant une année plutôt occupée, que de Alec McClay, qui réussit à garder la trace de tous les comités et obligations que nous avons. La SEC dépend de ses bénévoles, dont la diligence et l'implication à l'entomologie rend notre société spéciale.

Nous avons vu le départ de plusieurs personnes occupant des postes clés dans la SEC. Scott Brooks a quitté son poste de trésorier après avoir servi un bon nombre d'années, et je suis extrêmement reconnaissant à Christopher Dufault, qui a assumé ce rôle crucial depuis la deuxième réunion du conseil d'administration à la réunion conjointe annuelle à Saskatoon. Chris Buddle a remis les rênes de rédacteur en chef pour *The Canadian Entomologist* à Kevin Floate, et Rose DeClerck-Floate a complété son année de présidente-sortante. Rose et Rebecca Hallett

We have seen the departure of people from several key positions in the ESC. Scott Brooks has stepped down as Treasurer after serving the Society for a number of years, and I am extremely grateful to Christopher Dufault, who assumed that crucial role as of the Saskatoon JAM second Board Meeting. Chris Buddle has handed over the reigns as Editor-in-Chief for *The Canadian Entomologist* to Kevin Floate, and Rose De Clerck-Floate has completed her year as Past President. Along with Rebecca Hallett, Rose did much of the groundwork for the next significant transition (see below).

The transition to the Canada Not-for-profit Corporations Act has led to some important changes in how we do business. First, we have to move our fiscal year-end to June 30 in order to comply with the regulation of holding the Annual General Meeting within 6 months of that date. The alternative would have been to move the entire JAM to the first half of the year, or to hold the business meeting separate from the scientific program. Neither of those options is appealing, since we have a long standing tradition of fall meetings, and holding an AGM separately would in all likelihood lead to difficulty in achieving a quorum. Second, we no longer elect directors before each meeting, but hold a plebiscite to select candidates for the directors, which are then formally elected at the AGM. In practice, this won't affect you as a member as you will still be asked to vote for candidates for several positions, but the procedure will be different. The Act also involves some changes to reporting obligations.

As you read this, we have moved into uncharted territory in terms of how we run the ESC. In order to streamline our operations while reducing cost, we are engaging an Association Management Company (AMC). You may see evidence of this change over the next year. This means that our headquarters building in Ottawa will be sold, and as of 1 January 2015, we will no longer employ an office manager. I would like to take this opportunity to thank Derna Lisi, who has been with the ESC for 8½ years, and I wish her all

ont fait la plupart du travail pour la prochaine transition importante (voir ci-dessous).

La transition vers la nouvelle Loi pour les organisations à but non lucratif au Canada a amené d'importants changements sur la façon dont nous menons nos affaires. Tout d'abord, nous devons déplacer la fin de notre année fiscale au 30 juin, afin de se conformer à la réglementation sur la tenue de l'AGA dans les 6 mois de cette date. Les alternatives auraient été de déplacer la réunion conjointe annuelle entière durant la première moitié de l'année, ou de tenir l'AGA indépendamment du programme scientifique. Aucune de ces options n'est attrayante puisque nous avons une longue tradition de réunion à l'automne, et tenir une AGA séparément mènerait probablement à des difficultés à obtenir le quorum. Ensuite, nous ne procédons plus à l'élection des directeurs avant chaque réunion, mais nous tenons un plébiscite afin de sélectionner des candidats pour les directeurs, qui sont ensuite formellement élu à l'AGA. En pratique, cela ne vous affectera pas en tant que membres puisqu'on vous demandera de voter pour les candidats des différentes postes, mais la procédure sera différente. La loi implique aussi quelques changements dans les obligations de déclaration.

Alors que vous lisez ceci, nous sommes passés dans un territoire inexploré en termes de la façon dont nous menons la SEC. Afin de simplifier nos opérations tout en réduisant nos coûts, nous engageons une entreprise de gestion d'associations (appelée « AMC » en anglais). Vous verrez des signes de ce changement durant la prochaine année. Cela signifie que l'édifice de notre bureau à Ottawa sera vendu, et à partir du 1 janvier 2015, nous n'emploierons plus de gestionnaire de bureau. Je voudrais saisir cette opportunité pour remercier Derna Lisi, qui a été avec la SEC durant 8 ½ ans, et je lui souhaite tout le meilleur pour le futur. Ce changement est nécessaire en grande partie à cause du besoin de réduire les dépenses. Alors que la SEC est encore en bonne forme, le statu quo aurait éventuellement drainé les coffres. Vous avez

the best in the future. This change has been made necessary in large part by the need to reduce expenditures. While the ESC is still in good shape, status quo would eventually have drained the coffers. You have already noted increased membership dues in 2014, and we would like to avoid major increases in the near future to continue to provide value to you for only 25 cents a day!

I have a few items that I would like to accomplish during my term. One is to strengthen the Society by finding ways of attracting new members. We have introduced an Early Career discount on the regular membership rate to encourage recent graduates and post-docs to join, but we also need to make sure that we are providing value. We live in a time of rapidly changing technology, and it is important that we find ways to change with it, because in this day and age the internet provides so much for free that societies like ours may have less relevance for some. I am looking to you for suggestions – what would you like to see ESC do that we are not already doing?

I have been a member of the ESC since my student days at Simon Fraser University, and it is an honour to be able to serve the Society in the capacity of President over the next year. My election was the result of somebody else's misfortune, however. Therefore, I would like to end by remembering Lloyd Dosdall, who lost his fight with cancer this past summer. Lloyd was in fact duly elected, but had to decline for health reasons. I will serve the Society to the best of my ability, as I know Lloyd would have done.

déjà remarqué une augmentation des frais d'adhésion en 2014, et nous aimerions éviter les augmentations majeures dans un futur rapproché en continuant à vous fournir de la valeur pour seulement 25 sous par jour!

Il y a plusieurs objectifs que j'aimerais accomplir durant mon mandat. L'un d'eux est de renforcer la Société en trouvant des façons d'attirer des nouveaux membres. Nous avons introduit une catégorie d'adhésion de début de carrière afin d'encourager les nouveaux gradués et les post-docs à joindre la Société, mais nous avons besoin de nous assurer que nous fournissons de la valeur. Nous vivons dans un temps où la technologie change rapidement, et il est important de trouver des façons de changer avec elle, parce que Internet fournit tellement de choses gratuitement que les sociétés comme les nôtres peuvent avoir moins de pertinence pour certains. Je me tourne vers vous pour des suggestions – qu'aimeriez voir la SEC faire que nous ne faisons pas déjà?

Je suis membre de la SEC depuis mes années d'étudiants à l'Université Simon Fraser, et c'est un honneur de servir la Société en tant que Président durant la prochaine année. Mon élection a cependant été le résultat de l'infortune de quelqu'un d'autre. Je voudrais donc terminer en me rappelant Lloyd Dosdall, qui a perdu son combat contre le cancer l'été dernier. Lloyd a en fait été dûment élu, mais a dû décliner pour des raisons de santé. Je servirai la Société de mon mieux, comme je sais que Lloyd l'aurait fait.

# The student wing / L'aile étudiante

Paul Abram and Joanna Konopka



## ESC JAM update

### Silent Auction Donations

The Student Affairs Committee held a silent auction of books, art, and other entomology-related knick-knacks at the meeting in Saskatoon, which was a great success- all the items were sold and we raised a total of \$1872 (all proceeds go to the ESC student scholarship fund). Thank you to all who contributed wonderful items to be auctioned and all who participated in the auction. If you have any insect-related items that you are thinking of getting rid of, please consider donating them for next year's silent auction.

### Graduate Student Showcase (GSS)

The Graduate Student Showcase was a great success with attendance as high as for Plenary, Heritage and Gold medal talks due to no direct conflict with other sessions (we will attempt to keep it this way for future meeting). The GSS talks were of excellent quality and diversity, so provided a good opportunity to see great presentations (and maybe take a tip or two away on how to showcase your work in an exciting way). We highly encourage students to apply for GSS next year (after all, we all spend so much time on our projects, so let's showcase what we've accomplished) and to attend this session in the future.

### Directory of Entomological Education in Canada

Over the past year, members of SAC have been working on updating the Directory of Entomological Education in Canada Please visit <http://www.esc-sec.ca/direntomology.php>

## Mise à jour sur la réunion annuelle de la SEC

### Dons aux enchères silencieuses

Le comité des affaires étudiantes a tenu des enchères silencieuses de livres, œuvres d'art, et autres objets liés à l'entomologie à la réunion à Saskatoon, qui ont été un grand succès – tous les items ont été vendus, et nous avons amassé un total de 1872\$ (le tout versé au fonds des bourses étudiantes de la SEC). Merci à tous ceux qui ont contribué en apportant de magnifiques objets et en participant aux enchères. Si vous avez des objets liés aux insectes dont vous pensez vous débarrasser, merci de considérer les donner aux enchères silencieuses de l'an prochain.

### Vitrine aux étudiants gradués

La vitrine aux étudiants gradués a été un grand succès avec une participation aussi élevée que la session plénière, l'allocation du patrimoine ou l'allocation du médaillé d'or puisqu'il n'y avait aucun conflit avec des sessions concurrentes (nous essaierons de conserver cette formule dans le futur). Les présentations étaient d'une excellente qualité et diversifiées, et ont donné l'opportunité de voir de très bonnes présentations (et peut-être de donner quelques trucs sur la façon de présenter votre travail d'une façon excitante). Nous encourageons fortement les étudiants à appliquer pour la vitrine l'an prochain (après tout, nous passons tellement de temps sur nos projets, alors autant mettre en valeur ce que nous avons accompli) et d'assister à cette session dans le futur.

### Répertoire des formations entomologiques au Canada

Durant la dernière année, les membres du comité des affaires étudiantes ont travaillé à mettre à jour le répertoire des formations entomologiques au Canada. Visitez <http://www.esc-sec.ca/f-direntomology.php> pour accéder à la nouvelle version du répertoire et essayez l'option « Recherche » (nouvel ajout cette année). Merci à tous les chercheurs qui ont pris le temps de nous aider à vérifier l'information et à nous mettre en contact avec les nouveaux chercheurs travaillant sur les insectes. Si vous trouvez des erreurs, merci de nous en avvertir.

to access the newest version of the directory and check out the 'Search Directory' option (brand new addition this year). Thank you to all researchers that took time to help us verify the information and put us in contact with newly appointed faculty working on insects. If you find any mistakes in the directory, please let us know.

### Early career membership

We are excited to announce that the ESC Governing Board has approved Early Career category to be added as a membership option. For all of you recent graduates, this means that you will be able to renew your membership at a discounted rate (at least for this, hopefully, short time when you are in a limbo between being a student and getting a 'you're hired' message).

### Getting involved with the ESC

The Student Affairs Committee (SAC) is looking for new members. Volunteering for the SAC is a great way to get involved with the society and promote entomology to students across Canada. If you are interested in joining the SAC (we have several projects we are working on), or just have suggestions for new initiatives in the coming year, email us at [students@esc-sec.ca](mailto:students@esc-sec.ca)

We look forward to hear from you,  
Joanna and Paul

### Adhésion de début de carrière

Nous sommes heureux d'annoncer que le conseil d'administration de la SEC a approuvé une catégorie de début de carrière dans les options d'adhésion. Pour tous ceux qui ont gradué récemment, cela signifie que vous pourrez renouveler votre adhésion à un tarif réduit (au moins pour, nous espérons, la courte période où vous serez dans les limbes entre être étudiant et recevoir un message disant « vous êtes embauché »).

### S'impliquer au sein de la SEC

Le comité des affaires étudiantes recherche de nouveaux membres. Il s'agit d'une très bonne façon de s'impliquer au sein de la Société et de promouvoir l'entomologie auprès des étudiants de tout le pays. Si vous êtes intéressés à rejoindre le comité (nous avons plusieurs projets en cours), ou si vous avez des suggestions pour des initiatives durant la prochaine année, écrivez-nous à [students@esc-sec.ca](mailto:students@esc-sec.ca).

Nous avons hâte d'avoir de vos nouvelles,  
Joanna et Paul

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## 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](mailto:students@esc-sec.ca) with the relevant information following the format below.

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 selon le format ci-dessous à [students@esc-sec.ca](mailto:students@esc-sec.ca).

**Knysh, Kyle.** MSc, 2014. Agricultural land use impacts on cool-spring flora and fauna, with an emphasis on freshwater invertebrate diversity and phenology in spring pools of eastern Prince Edward Island (Canada). Supervisors: Donna Giberson and Michael van den Heuvel, University of Prince Edward Island.

**Turnbull, Matthew S.** MSc, 2014. The effects of global climate change on Canadian boreal forest Collembola communities. Supervisor: Zoë Lindo, University of Western Ontario.

**Wist, Tyler J.** PhD, 2014. Semiochemical-mediated interactions of an invasive leafminer, *Caloptilia fraxinella* (Lepidoptera: Gracillariidae), on a non-native host, *Fraxinus* spp. (Oleaceae) and its native parasitoid, *Apanteles polychrosidis* (Hymenoptera: Braconidae). Supervisor: Maya L. Evenden, University of Alberta.





From left: Bekka Brodie, Catherine Scott, Joelle Lemmen, Bryan Brunet, Julia Mlynarek, ESC Past President Rebecca Hallett.

## 2014 JAM Graduate Student Showcase participants / Participants à la vitrine aux étudiants gradués de la réunion conjointe annuelle 2014

**Moderators / Modérateurs: Tyler Wist and / et Sarah Loboda**

**Bekka S. Brodie (Simon Fraser University), with / avec Tamara Babcock, Alysha Martins, Regine Gries, Sherah VanLaerhoven and / et Gerhard Gries**

### **A Tale of Two Stinkies: Young and gravid blow flies differ in their behavioral responses to semiochemicals from feeding and oviposition sites**

Resources such as feeding and oviposition sites that insects must acquire change in accordance with their ontogenetic development and physiological state. We investigated the effect of physiological state on foraging decisions by adult blow flies (*Lucilia sericata*), and the foraging cues that they exploit to locate resources. When we gave female flies a choice between fresh canine feces (feeding site) and freshly deceased rat carrion (oviposition site), 3-day-old females preferred feces whereas reproductively mature (gravid) females preferred carrion, indicating contrasting resource preferences based on physiological state. To determine the semiochemical cues that attract flies to feces or carrion, we obtained headspace volatile extracts of both resources, and subjected aliquots of these extracts to gas chromatographic-electroantennographic detection (GC-EAD) and GC-mass spectrometric analyses. Synthetic blends of all feces or carrion volatiles that consistently elicited responses from blow fly antennae proved as attractive to flies as feces or carrion. In a series of experiments in which we tested complete synthetic blends versus blends lacking groups of specific organic chemicals (e.g., esters) or individual components, we then determined further that indole and 2 or more lower-molecular-weight alcohols are the key semiochemicals of feces and dimethyl trisulfide (DMTS) is the key semiochemical of carrion. With DMTS and alcohols emanating from both feces and carrion, and indole originating only from feces, we hypothesized, and gathered experimental evidence for the conclusion, that indole is the indicator semiochemical of feces that mediates resource partitioning between young flies foraging for protein meals and gravid flies seeking oviposition sites.

### **Les mouches des moutons jeunes et matures diffèrent dans leurs réponses comportementales aux substances sémi-chimiques provenant des sites de nutrition et de ponte**

Les ressources telles que les sites de nutrition et de ponte que les insectes doivent acquérir changent en fonction de leur développement ontogénétique et de leur statut physiologique. Nous avons examiné l'effet du statut physiologique sur les décisions d'approvisionnement des adultes de la mouche des moutons (*Lucilia sericata*), ainsi que les indices exploités pour localiser les ressources. Lorsque nous donnions le choix aux femelles entre des fèces canines fraîches (site de nutrition) et



une charogne fraîche de rat (site de ponte), les femelles de 3 jours préféraient les fèces alors que les femelles matures (fécondes) préféraient la charogne, indiquant une préférence différente pour la ressource selon le statut physiologique. Afin de déterminer quels indices sémiouchimiques attirent les mouches vers les fèces ou la charogne, nous avons obtenu des extraits volatiles d'espace de tête des deux ressources, et nous avons soumis les aliquotes de ces extraits à la chromatographie en phase gazeuse couplée à la détection électro-antennographique (GC-EAD) et à des analyses de chromatographie en phase gazeuse couplée à la spectrométrie de masse. Les mélanges synthétiques de tous les volatiles de fèces ou de charogne qui amènent une réponse par l'antenne de la mouche étaient aussi attractifs que les fèces ou les charognes. Dans une série d'expériences dans lesquelles nous avons testé le mélange synthétique complet contre des mélanges privés de groupes spécifiques de produits organiques (p. ex. les esters) ou des composantes individuelles, nous avons pu déterminer que l'indole et au moins 2 alcools de moindre poids moléculaire sont les substances sémiouchimiques clés des fèces et le trisulfide diméthylque (DMTS) est la substance sémiouchimique clé des charognes. Avec le DMTS et les alcools émanant des fèces et des charognes, et l'indole provenant seulement des fèces, nous avons émis l'hypothèse et amassé des preuves expérimentales pour la conclusion que l'indole est l'indicateur sémiouchimique des fèces qui médie le partage des ressources entre les jeunes mouches cherchant des protéines et les mouches fécondes qui cherchent des sites de ponte.

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**Bryan M.T. Brunet (University of Alberta), with / avec Felix Sperling**

**Differential introgression identifies speciation genes at varying levels of phylogenetic divergence within the spruce budworm, *Choristoneura fumiferana*, species complex**

Genomes are increasingly identified as porous structures where species boundaries are maintained at "islands of divergence" while much of the genome is free to introgress. This semi-permeable characteristic of genomes can be exploited to identify genes associated with species boundaries and/or adaptive introgression. Here, we examine genetic differentiation and differential introgression between two pairs of spruce budworm species, *C. occidentalis* with *C. fumiferana* and *C. occidentalis* with *C. biennis*. These represent deep and recent divergences in the spruce budworm phylogeny, respectively, and can be used to identify loci exhibiting non-neutral patterns of divergence. Loci with significant allele frequency differences in each comparison were mutually exclusive and resulted in different ancestry coefficient distributions. Whereas the gradient in ancestry coefficients between *C. fumiferana* and *C. occidentalis* was step-like, suggesting strong selection against hybrids, that between *C. biennis* and *C. occidentalis* was linear and gradual. Remarkably, despite these species spanning at least two million years of divergence, similar modes of selection are shown to operate between them. Directional selection was the predominant form of selection acting between species in both comparisons, and may relate to differences in cross-attraction and egg weight. Further work is needed to determine the linkage relationships of these loci and identify "islands of divergence".

**L'introgression différentielle identifie les gènes de spéciation à différents niveaux de divergence phylogénétique dans le complexe d'espèces de la tordeuse des bourgeons de l'épinette, *Choristoneura fumiferana***

Les génomes sont de plus en plus identifiés comme des structures poreuses où les frontières entre les espèces sont maintenues dans des îlots de divergence, alors que la plupart du génome est libre d'introgresser. Cette caractéristique semi-perméable des génomes peut être exploitée afin d'identifier les gènes associés avec les frontières entre espèces et/ou l'introgression adaptative. Nous examinons ici la différenciation génétique et l'introgression différentielle entre deux paires d'espèces de tordeuses, *C. occidentalis* avec *C. fumiferana* et *C. occidentalis* avec *C. biennis*. Ces dernières présentent des divergences profonde et récente, respectivement, dans la phylogénie des tordeuses, et peuvent être utilisées pour identifier des loci montrant des patrons non-neutres de divergence. Les loci avec des

fréquences alléliques significativement différentes au sein de chaque comparaison étaient mutuellement exclusifs et résultaient en des distributions différentes du coefficient de parenté. Alors que le gradient de coefficient de parenté entre *C. fumiferana* et *C. occidentalis* était en escalier, suggérant une forte sélection contre les hybrides, celui entre *C. biennis* et *C. occidentalis* était linéaire et graduel. Bien que ces espèces soient séparées par au moins deux millions d'années de divergence, il est remarquable que des modes de sélection similaires opèrent entre eux. La sélection directionnelle était la forme prédominante de sélection agissant entre les espèces dans les deux comparaisons, et pourrait être liée à des différences dans l'attraction réciproque et la masse des œufs. Des travaux additionnels sont requis afin de déterminer la liaison entre ces loci et d'identifier les îlots de divergence.

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Joelle K. Lemmen (University of Alberta), with / avec Maya L. Evenden

### **Plasticity in response to semiochemicals as part of a reproductive diapause syndrome in a long-lived moth, *Caloptilia fraxinella* (Lepidoptera: Gracillariidae)**

In phytophagous insects that experience a delay in mating as an adult, the timing of mating and host plant location is vital to optimize their own fitness and the fitness of their offspring. *Caloptilia fraxinella* undergoes a nine-month reproductive diapause, including a period of overwintering, before mating and host location occurs. Male response to pheromone and male and female response to host plant volatiles is plastic, and depends on physiological state. The physiological state of reproductive diapause is confirmed by the presence of smaller accessory glands in males during the period of reproductive diapause, and longer glands when moths are reproductively active. Behavioural and electroantennographic assays are used to elucidate the mechanisms underlying the plasticity of moth response to these semiochemicals during different physiological states. Male response to pheromone is highest when moths are reproductively active, which increases their opportunity for mating when females are most receptive. The environmental conditions that male moths experience as an adult impact reproductive status, and long day/warm conditions terminate reproductive diapause while cool/short day or natural outdoor conditions maintain reproductive diapause as measured by pheromone responsiveness. Treatment with a juvenile hormone analogue (JHA) also terminates diapause and increases male responsiveness to pheromone during the period of reproductive diapause. As in pheromone responsiveness, male and female response to host plant volatiles is also highest when moths are reproductively active, at the appropriate time for female host location and oviposition. Treatment with a JHA and female mating status both impact response to host plant volatiles.

### **La plasticité dans la réponse aux substances sémiocchimiques fait partie du syndrome de la diapause reproductive chez un papillon à longue vie, *Caloptilia fraxinella* (Lepidoptera: Gracillariidae)**

Chez les insectes phytophages ayant un délai dans l'accouplement en tant qu'adulte, la synchronisation de l'accouplement et de la localisation de la plante hôte est vitale afin d'optimiser sa propre valeur adaptative et celle de sa progéniture. *Caloptilia fraxinella* traverse une diapause reproductive de neuf mois, incluant une période d'hivernation, avant l'accouplement et la localisation de l'hôte. La réponse des mâles aux phéromones et la réponse des mâles et femelles aux volatils des plantes hôtes est plastique, et dépend de l'état physiologique. L'état physiologique de la diapause reproductive est confirmé par la présence de glandes accessoires réduites chez les mâles durant la période de diapause reproductive, et de glandes plus longues lorsque les papillons sont actifs au niveau reproductif. Des essais comportementaux et électro-antennographiques sont utilisés afin d'élucider les mécanismes sous-jacents à la plasticité de la réponse des papillons à ces substances sémiocchimiques lors des différents états physiologiques. La réponse des mâles aux phéromones est la plus forte lorsque les papillons sont actifs au niveau reproductif, ce qui augmente les opportunités d'accouplement quand les femelles sont plus réceptives. Les conditions environnementales que les papillons mâles subissent comme adultes ont un impact sur le statut

reproducteur, et des conditions de journées longues ou chaudes terminent la diapause reproductive, alors que des journées fraîches ou courtes, ou des conditions extérieures naturelles maintiennent une diapause reproductive telle qu'indiqué par la réponse aux phéromones. Les traitements avec des analogues d'hormone juvéniles (JHA) mettent également fin à la diapause et augmentent la réponse des mâles à la phéromone durant la période de diapause reproductive. Comme pour la réponse à la phéromone, la réponse des mâles et des femelles aux volatils des plantes hôtes est également à son plus fort lorsque les papillons sont actifs au niveau reproductif, au moment approprié pour la localisation de l'hôte et la ponte par les femelles. Le traitement avec la JHA et le statut reproducteur des femelles ont tous deux un impact sur la réponse aux volatils des plantes hôtes.

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**Julia J. Mlynarek (Carleton University), with / avec Mark R. Forbes**

### **Why some damselfly species are so parasitized?**

Insect parasites are often overlooked but they have a negative impact on their hosts. Not all host species are infected by parasites equally. But there are few studies that try to understand why host species have different levels of parasitism. Because many parasites infect damselflies, I used damselfly (Coenagrionidae) host-water mite (*Arrenurus*) parasite associations to observed levels of parasitism (prevalence and intensity) and parasite species richness differences in 16 host species. After these preliminary observations, I determined which host characteristics can explain the observed interspecific variation in parasitism. I measured five host characteristic at several ecological scales: geographic range size, regional occurrence, relative local abundance, phenology and body size, to determine which one had the highest explanatory power of three measures of parasitism (prevalence, intensity of mite parasites and mite species richness). A total of 7107 damselfly individuals were collected representing 16 species from 13 sites in Southeastern Ontario and Southwestern Quebec. Using comparative methods, differences in prevalence and intensity of parasitism could be predicted by a host species' geographic range and phenology. The number of *Arrenurus* species known to infect a given host species was explained by a host species' regional occurrence. These findings suggest the need to measure factors at several ecological scales in order to understand the breadth of evolutionary interactions with host-parasite associations.

### **Pourquoi certaines espèces de demoiselles sont-elles tant parasitées?**

Les parasites des insectes sont souvent négligés, mais ils ont un impact négatif sur leurs hôtes. Toutes les espèces d'hôtes ne sont pas également infectées par les parasites. Il y a cependant peu d'études qui tentent de comprendre pourquoi les différentes espèces d'hôtes ont des niveaux de parasitisme différents. Puisque plusieurs parasites infectent les demoiselles, j'ai utilisé l'association des demoiselles (Coenagrionidae) avec des acariens aquatiques parasites (*Arrenurus*) afin d'observer les niveaux de parasitisme (prévalence et intensité) et la richesse d'espèces de parasites chez 16 espèces hôtes. Après ces observations préliminaires, j'ai déterminé quelles caractéristiques des hôtes peuvent expliquer la variation interspécifique observée dans le parasitisme. J'ai mesuré cinq caractéristiques des hôtes à différentes échelles écologiques : la taille de la distribution géographique, l'occurrence régionale, l'abondance locale relative, la phénologie et la taille corporelle, afin de déterminer laquelle avait le plus fort pouvoir explicatif sur trois mesures de parasitisme (prévalence, intensité d'acariens parasites et richesse des espèces d'acariens). Un total de 7107 individus de demoiselles a été récolté, représentant 16 espèces provenant de 13 sites du sud-est de l'Ontario et du sud-ouest du Québec. En utilisant des méthodes comparatives, les différences de prévalence et d'intensité de parasitisme pourraient être prédites par la distribution géographique et la phénologie d'un hôte. Le nombre d'espèce d'*Arrenurus* connues pour infecter une espèce donnée étaient expliqués par l'occurrence régionale d'une espèce d'hôte. Ces résultats suggèrent le besoin de mesurer des facteurs à différentes échelles écologique afin de comprendre l'étendue des interactions évolutives avec les associations hôtes-parasites.

Catherine Scott (Simon Fraser University), with / avec Devin Kirk, Sean McCann, Regine Gries, Grigori Khaskin and / et Gerhard Gries

**Web reduction behaviour and the chemical communication system of the western black widow, *Latrodectus hesperus***

Polyandry in animals has led to diverse adaptations that allow males to avoid sperm competition, including mate guarding, mating plugs, and altering a female's attractiveness or receptivity. In spiders, pheromones mediate intersexual attraction, mate recognition, and courtship behaviour. Here we report on aspects of the chemical communication system of the western black widow, *Latrodectus hesperus*. Females attract males to their webs with silk-borne sex pheromone. Contact with the silk elicits courtship behaviour by males. Often, the courting male engages in web reduction behaviour, during which he excises and bundles up sections of the web and wraps them with his own silk. Using analytical chemistry, and behavioural experiments in both the laboratory and the field, we investigated (1) the molecular structure and function of the female's contact sex pheromone, (2) the function of web reduction behaviour, and (3) the factors that influence whether or not web reduction occurs. We show that a contact pheromone on the silk elicits web reduction behaviour, and that a serine derivative similar to the pheromone of congeneric *L. hasselti* is likely part of a multi-component pheromone blend. Web reduction decreases the attractiveness of webs to rival males in the field, thereby limiting male-male competition. Female body condition and mating status affect silk cues that trigger web reduction, but whether males engage in this behaviour also depends on their own condition. Our work contributes to the understanding of the complex sexual communication systems of spiders, highlighting the role that interference can play in chemical communication.

**Le comportement de réduction de la toile et le système de communication chimique de la veuve noire de l'ouest, *Latrodectus hesperus***

La polyandrie chez les animaux a mené à diverses adaptations permettant aux mâles d'éviter la compétition spermatique, incluant la défense des partenaires, les bouchons copulateurs, et l'altération de l'attractivité ou la réceptivité d'une femelle. Chez les araignées, les phéromones médient l'attraction intersexuelle, la reconnaissance des partenaires et le comportement de parade nuptiale. Nous rapportons ici sur plusieurs aspects du système de la communication chimique chez la veuve noire de l'ouest, *Latrodectus hesperus*. Les femelles attirent les mâles sur leur toile avec des phéromones sexuelles sur la soie. Le contact avec la soie élicite un comportement de parade nuptiale chez le mâle. Le mâle en parade s'engage souvent dans un comportement de réduction de la toile, durant lequel il excise et entremêle des sections de la toile et les enveloppe dans sa propre soie. En utilisant la chimie analytique et des expériences comportementales au laboratoire et sur le terrain, nous avons investigué (1) la structure moléculaire et la fonction de la phéromone sexuelle de contact de la femelle, (2) la fonction du comportement de réduction de la toile, et (3) les facteurs qui influencent si la réduction de la toile se produit ou non. Nous avons montré que la phéromone de contact sur la soie élicite le comportement de réduction de la toile, et qu'un dérivé serine similaire à la phéromone du congénère *L. hasselti* fait probablement partie d'un mélange de phéromone à plusieurs composantes. La réduction de la toile réduit l'attraction de la toile pour les mâles rivaux sur le terrain, limitant ainsi la compétition mâle-mâle. La condition corporelle de la femelle et le statut reproducteur affectent les indices de la soie qui déclenchent la réduction de la toile, mais le fait que les mâles effectuent ce comportement dépend également de leur propre condition. Nos travaux contribuent à comprendre le système de communication complexe des araignées, mettant en lumière le rôle que l'interférence peut jouer dans la communication chimique.



President Staffan Lindgren (second left) and the winners of President's Prizes: Sabrina Rochefort (left), Sebastian Ibarra (centre), Veronika Lambinet (second from right), and Sharleen Balogh (right). Missing from picture: Tina Dancau.

## 2014 JAM President's Prize Winners and Honorable Mentions

The 2014 JAM Awards Committee, comprising Art Davis, University of Saskatchewan, and Julie Soroka, AAFC, Saskatoon, noted that students from universities in British Columbia made a clean sweep of the prizes awarded in the four oral sessions, with a student from Quebec taking first place in the poster competition.

### Oral Presentations

#### Bees and Pollination

##### Winner:

**Veronika Lambinet** (Simon Fraser University), with M. Bieri, M. Hayden, and G. Gries.

*Bee talk – Do honeybees use the earth's magnetic field as a reference to align their waggle dance?*

##### Honorable mention:

**Danae Frier** (University of Regina), with C. Sheffield.

*Bumblebees do it better: the importance of native bees to the pollination of haskap crops.*

#### Biodiversity and Conservation

##### Winner:

**Sebastian Ibarra** (Simon Fraser University), with S. McCann, R. Gries, H. Zhai, and G. Gries.

*The wrath of the bald-faced hornet – pheromone-mediated nest defence.*

##### Honorable mentions:

**Seung-II Lee** (University of Alberta), with J. Spence and D. Langor.

*Variable retention harvesting and saproxylic beetle conservation in white spruce stands of the boreal ecosystem.*

**Sarah Loboda** (McGill University), with J. Savage, T. Hoye, and C. Buddle.

*Ecological and evolutionary responses of Arctic flies to recent climate change in Zackenberg, Greenland.*

#### Arthropod Biology

##### Winner:

**Sharleen Balogh** (University of Northern British Columbia), with D. Huber and S. Lindgren.

*Host selection of lodgepole pine (*Pinus contorta*) by the Warren root collar weevil (*Hylobius warreni*).*

### Honorable mention:

**Aldo Rios** (University of Manitoba), with A. Costamagna.

*Contribution of soybean aphid alates to colony fitness under predation.*

### Pest Management

#### Winner:

**Tina Dancau** (Simon Fraser University), with T. Haye, P. Mason, and D. Gillespie.

*Mortality factors affecting the diamondback moth (*Plutella xylostella*) in continental Europe: a preliminary life table analysis.*

#### Honorable mention:

**Jon Williams** (University of Guelph), with H. Earl and R. Hallett.

*Laboratory investigations of swede midge, *Contarinia nasturtii*, oviposition and damage symptoms to canola.*

### Posters

#### Winner:

**Sabrina Rochefort** (McGill University), with T. Wheeler.

*Taxonomy and diversity of *Parapiophila* (Diptera: Piophilidae).*

#### Honorable mention:

**Sarah Loboda** (McGill University), with C. Ernst and C. Buddle.

*Yellow pan traps versus pitfall traps: best monitoring tool for ground-dwelling arthropods in the Arctic.*

#### Judges:

Each session of oral presentations, plus the poster session, was judged by a panel of three judges. The following individuals are thanked for serving as judges of the President's Prize competition at JAM 2014: G. Boivin, J. Boone, H. Carcamo, A. Davis, P. Fields, G. Gibson, D. Huber, L. Lumley, P. Mason, L. Poirier, H. Proctor, I. Scott, J. Sweeney, C. Vincent, and T. Wist.

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ESC Student Award Winners. From left: ESC President Staffan Lindgren, Loay Jabre (John H. Borden Winner), Udari Madushani Wanigasekara (MSc Postgraduate Award), and Andony Melathopoulos (PhD Postgraduate Award and Ed Becker Conference Travel Award). Missing from picture: Robyn McCallum (Research Travel Scholarship) and Meredith Miller (Biological Survey of Canada Scholarship).

## Student Awards and Scholarships 2014

**Andony Melathopoulos** from Dalhousie University was the winner of this year's **Becker Award** for student travel to the annual meeting of the Entomological Society of Canada. He also received the **PhD Scholarship**. Andony's research seeks to clarify the relationship between crop management practices, and the response of blueberry yield to pollination. The premise of his work is that while increasing the level of pollination can be effective at increasing the yield of blueberries this is not always the case and other factors can have strong influences.

The 2014 **Borden Award** went to **Loay Jabre** of Acadia University. Loay's interest in IPM is based on his interest in solving pest problems with state of the art technology. His study organism is the cabbage maggot, *Delia radicum*, an economically important pest of Brassicas. He wants to develop the use of volatile organic compounds that are nontoxic, species specific, and can be used as lures for early detection and control of cabbage maggots. Included in his research will be the identification of the potential lures and the development of efficient trap types.

**Udari Madushani Wanigasekara** from the University of Manitoba is the winner of this year's **MSc Scholarship**. She will be studying the hymenopteran parasitoids of cutworms that attack canola. She will identify the species and their phenologies and develop habitat management practices that will improve cutworm management. Udari will also develop an extension publication on the identification of the parasitoid species that will be focussed toward the non-specialist user.

**Robyn McCallum** of Dalhousie University received the **Research Travel Award**. Robyn used the funding to attend a 9-day bee course workshop in Arizona to facilitate her pollination studies. This workshop for pollination ecologists covered the biology of bees, bee taxonomy, morphology, floral relationships and more. The workshop included fieldwork as well as lab work. Robyn's work in Nova Scotia focuses on ways to increase bee numbers and pollination rates in blueberries.



This year's **Biological Survey of Canada Award** went to **Meredith E. Miller** from the University of Guelph. Her project is a review of the *Drosophila* fauna in Ontario and the adjacent provinces and American states. Meredith will expand the taxonomic knowledge available for the North Eastern North American *Drosophila* species, and produce a useful identification tool for agricultural pest monitoring programs. She will create a key to the North Eastern North American *Drosophila* which will include the invasive *D. suzukii* (spotted-wing *Drosophila*), and superficially similar taxa and will create an effective photographic identification tool for this species.

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### 2015 Student scholarships and awards

In 2015 a competition for the following Entomological Society of Canada scholarships and awards will be held:

- MSc and PhD Scholarships
- The Research Travel Award
- The John H. Borden Scholarship in IPM
- The Keith Kevan Scholarship
- The Becker Conference Travel Award.

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 Award is 16 February 2015. For the Becker Award, the deadline will be the same as that for abstract submissions for the 2015 JAM in Montreal.

### 2015 Prix et bourses étudiants

En 2015, une compétition pour les prix et bourses suivants de la Société d'entomologie du Canada se tiendra :

- la bourse pour études graduées
- la bourse de voyage pour la recherche
- la bourse John H. Borden en lutte intégrée
- la bourse Keith Kevan
- la bourse 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 sur ces bourses. La date limite pour toutes les bourses, sauf la bourse Ed Becker, est le 16 février 2015. Pour la bourse Ed Becker, la date limite est la même que pour la soumission des résumés pour la réunion conjointe annuelle 2015 à Montréal.

## Student Mixer



Tyler Wist

Aaron Bell and Iain Phillips at the Student Mixer.



Tyler Wist

Do Amanda St. Onge, Danielle Hoefe and Joelle Lemmen shop at the same store?



Miles Zhang

Sabrina Rochefort, Sarah Loboda, Elodie Vajda, and Julia Mlynarek enjoying each other's company



Miles Zhang

Wallflowers at the Student Mixer. From left: Chaminda Weeraddana, Bryan Brunet, Danielle Hoefe, Michael Onley and Joshua Pol



Tyler Wist

Sebastien Ibarra and Catherine Scott

# Memories of JAM 2014 / Souvenirs de la RAC 2014

## Honours and Awards at JAM 2014

Tyler Wist



Staffan Lindgren presents Dave Gillespie with the Society's prestigious Gold Medal at the Opening Ceremonies

Tyler Wist



Patrice Bouchard receives the C. Gordon Hewitt Award from Staffan Lingren

Tyler Wist



Kateryn Rochon, Regional Director for the Entomological Society of Manitoba, receives the Carr Award on behalf of winner Todd Lawton .....

Amy Yahiro



.....Kateryn subsequently presented Todd with his award in Winnipeg

Miles Zhang



Brian Olson receives the Criddle Award from David Halstead, Acting President of the Entomological Society of Saskatchewan

### ESC Service Awards

Tyler Wist



Rebecca Hallett, Past President, receives a service award from Staffan Lingren



Tyler Wist

Previous Treasurer Scott Brooks receiving a service award from Staffan Lindgren

### ESC Plenary Speakers

Marianna Horn



Plenary speaker Barry Pittendrigh enlightens the audience on Scientific Animations Without Borders



Tyler Wist

Bernie Røitberg, plenary speaker, discussing the changing face of entomology

### SaskCanola Awardees at 2014 JAM

Larry Grenkow



From left to right: Errin Tollefson (SaskCanola, presenter of the awards), James Armstrong, Aaron Bell, Leila Benmerrouche, Charlie Roy, Daniel Wiens, Marianna Horn, and Inger Pors. Recipients missing from photo: Owain Berry and Edyta Sieminska.



### A changing entomologist in a changing world

To start, I must thank the Awards Committee for choosing me as the 2014 Entomological Society of Canada Gold Medal recipient and the anonymous individuals who nominated me for the award. I am humbled and honored by their faith in me, in ways that I simply cannot express. I have been cast into a very august group that includes colleagues, teachers, and icons of entomology who are without exception, people I respect and admire. To find myself in this group is frankly somewhat of a shock. At the start of my professional career, I was simply glad to have a job, and permission to mess around with insects and mites. That, in fact, has not changed. I still value the opportunity to mess around with arthropods, and for the opportunity to work with a host of great people in doing so. This award to me also recognizes the help and support of the colleagues, teachers, students, friends and organizations along the way. Since the theme of this meeting is “Entomology in a Changing World”, my plan for this talk is to provide a personal view of my journey through this changing world, from a dot on the beach on the west coast of Vancouver Island to this particular stage in Saskatoon.

#### Growth - a process of change

I had the good fortune to start life in some of the wildest and most isolated places on the planet, on the west coast of British Columbia. I lived in coastal places and communities such as Spring Island (49.998° -127.421°), Estevan Point and Alert Bay for much of my childhood. My parents, Roy and Phyllis, expected me to read and explore and think my own thoughts and I thank them for that. Animals without spines in tide pools and under rocks and rotting logs formed a large part of my interest as a child. I know my mother and father were particularly tolerant of disposing of the sometimes pungent remains of my explorations. My father tried to encourage a more professional approach by buying me a copy of Bryan P. Beirne's “*Collecting and Preserving Insects*”, which I promptly placed on a shelf and ignored, being more interested in observing than collecting. Somewhere in this period, I decided that I would become a marine biologist, and this goal survived a move to east Vancouver, the trauma of high school and my eventual acceptance as an undergraduate at Simon Fraser University in 1970. I had a succession of good teachers in grade school, especially my mother, who presided over the correspondence school room at the kitchen table while we were at isolated posts on the west coast of Vancouver Island.

#### A change in direction

At the beginning of my third year at SFU, I finally had the pre-requisites to take some of the marine biology courses. However, the courses were full. I had heard that Prof. Thelma Finlayson's entomology course was pretty good, and there was space in it. From the first minutes of the first lecture, I changed my mind about being a marine biologist. Clearly there were more interesting organisms than starfish and crabs. Entomology is, after all, more than the study of the biology of insects. In entomology, we work in the context of change: growth, metamorphosis, evolution and revolution. By the last word in the preceding, I don't mean the bloody, violent sort of revolution, but rather the kind of revolution that brings about new ways of looking at the world, new ideas and new tools – in fact, what the current bureaucracy calls innovation. I think this latter idea was the true hook. I first met Thelma as the prof in my first university class, first day at SFU,

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Dave Gillespie ([Dave.Gillespie@agr.gc.ca](mailto:Dave.Gillespie@agr.gc.ca)) is a research scientist with Agriculture and Agri-Food Canada and is based at the AAFC research centre in Agassiz, British Columbia. His research interests include biological control, and natural enemy behaviour and ecology.

0830 AM. She said then “My door is always open to students.” and that remains utterly true to this day. Thelma supervised my MSc and Bryan Beirne my PhD, and I owe a great deal to these two individuals and to most of the Biology faculty at SFU. Bryan fostered my understanding of bureaucracy and management, and his teachings have stood me well. Bryan’s brisk question of the relevance of my latest results: “Gillespie! So what?!” still echoes in my mind (as does his voice penetrating from his office whenever I wore shorts to campus: “Gillespie! Put some pants on!”)

### Life changing events

I met my wife Beth (Leary) over a plate of *Ascaris* in a parasitology lab at SFU, near the end of my undergraduate degree. Beth, and my son Gordon and daughter Sandra, have been a huge part of my working life. Both Gordon and Sandra helped on weekends in my lab, and learned to move thrips and mites with a brush before they started school. Without their support and encouragement, I would not be where I am today.

### Changing locations

I started my career with Agriculture Canada in 1982, at the Saanichton research station. The director, Dr Joe Molnar, provided lots of support, but beyond suggesting I might work on something in greenhouse crops, absolutely no direction. Technical support from Larry Theaker, Lorrie MacCallum and Jane Seed got me started. One of the great delights of the Research Centre at Saanichton was a fledgling biological control company, Applied Bionomics, which was located in the basement of the entomology/pathology building. This kind of association is much sought after these days, but at that time, the notion of a commercial company co-locating with government was pure heresy. Don Elliot and employees were such great people that they made it work, and Brian Spencer continues to make partnerships and collaborations work to this day.

When I was transferred to the Agassiz Research Centre in 1987, I was fortunate to hire Don Quiring, who was my able technician for 20 years. When he retired due to ill health, Peggy Clarke filled his shoes. Both have been really important in my research program. At Agassiz, proximity to the faculty in the Biology Department at SFU (Bernie Roitberg, John Borden, Mark Winston, and others), and to my AAFC colleagues at the Vancouver Research Centre, particularly Bob Vernon and Dave Raworth, helped me to develop research questions that had sound foundations in theory of population and behavioral ecology.

### Changing an industry

One of the few obligations of my position was to sit on the committee that oversaw the grants that supported Applied Bionomics. This put me into contact with the B.C. Greenhouse Vegetable Growers, and with B.C. Ministry staff, in particular Dr Bob Costello. The first 20 years of my research career were primarily about developing biological control agents and IPM programs for the greenhouse vegetable industry. My colleagues and I, together with very supportive growers, took an industry from a regime of multiple, prophylactic, tank-mixed chemical sprays to a primarily biological control-based IPM program which is supported by an international community of companies producing biological control and pest monitoring technology. The last few bits of technology, based around effective, microbial pesticides, are starting to finally appear in the market. Financial support from the B.C. Greenhouse Growers and Flowers Canada, from industry partners Applied Bionomics, the Bug Factory, Biobest and Koppert; NSERC and, particularly, from AAFC has been essential in the growth of this IPM program.

### A growing community of friends

I have had the pleasure of working with a wonderful community of colleagues and friends, and space prevents acknowledging most. I do have to mention Bruce Broadbent, entomologist at the Vineland Research Centre in Ontario who first introduced me to the broader international community of scientists studying pests of greenhouse agriculture. Bob Footitt, Peter Mason, and scientists at CABI Delémont, especially Ulli Kuhlmann, dragged me out of the glass box, and got me involved in biodiversity studies, classical biological control programmes in field crops and with the host range questions relevant to regulating introductions of new agents against invasive pests. Bernie Roitberg at SFU has provided an academic and intellectual home and a great deal of collaboration and advice on theoretical issues over the years. The postdoctoral fellows, graduate students, and a succession of really talented and enthusiastic undergraduate students are too many to mention here. I thank all of you. Having a rich community of colleagues who are critical thinkers and energetic collaborators in every sense of the word has been immensely important to me.

### The changing entomologist

Over the course of more than 60 years of life and more than 30 years of entomological research, the world has changed around me, and I have changed in response. Over time, the community of people around me has changed, while education and experience have increased my knowledge of the world and have changed my attitudes and beliefs. But these personal changes, though important to me, are not very interesting to you. The preceding life history account probably provides far more than you want to know. What I think is important though is how the changing world has produced change in the entomologist part of me. This perspective is based on a sample of 1, obviously pseudo-replicated in time, which limits the general application of my observations.

There are three core definitions of change:

1. (verb) take or use another instead of;
  2. (verb) to make or become different; and
  3. (noun) an act or process through which something becomes different
- (Wiktionary, <http://en.wiktionary.org/wiki/change>. Accessed 16 October 2014).

These three meanings provide the framework for my thoughts.

### Bifurcations and butterfly effects

In a colloquial context, this is changing tires, changing directions, changing gears and so forth. This is the world of stochastic and random events, butterfly effects and bifurcations. Chaos theory provides a framework for thinking about this kind of change.

Bifurcations are an underlying assumption of Chaos theory. The basic principle is that the trajectory of a complex system is not entirely predictable from the values of its parameters. A relevant example can be extracted from some history of my employing department (Table 1). The community of scientists and professionals has declined dramatically over 32 years. If you had been able, in 1982, to predict the increase in the population of Canada, the gross domestic product, and the departmental budget, you would not likely have predicted the decline in professionals or the increase in managers that has accompanied this. For me, this has meant a dramatic decline in the number and range of expertise of colleagues within the branch. This has meant that my research program now encompasses a much larger range of commodities and problems than an equivalent scientist might have addressed in 1982. Over the years, the decline in the internal and local community of professionals has resulted in me seeking collaborators outside of my region, nationally within AAFC, and outside of my organization, with universities and non-government agencies.



Table 1. A snapshot of Agriculture Canada Research Branch in 1982 and the Agriculture and Agri-Food Canada Science and Technology Branch in 2014. Data are from Statistics Canada reports, and from the departmental reports and main estimates of the Department.

	1982	2014
Population of Canada	24,511,000	35,163,430
Gross domestic product per capita	\$24,000	\$37,500
Scientists and professionals	905	426
Research branch budget*	\$126,003,000	\$519,175,818

\* the 1982 budget would be Can\$285,900,807 in 2014 dollars

Butterfly effects are another principle of Chaos theory. Mr Kenneth M. Dye, Auditor General for Canada, 1981 – 1991, is a wonderful example of such an effect in my work life. In one of his reports in either 1982 or 1984, Mr Dye was critical of the way in which the Research Branch prioritized and assigned funding to research projects. That criticism led to over 30 years of effort by Branch and Department management to develop a system that accommodated the need to spend public money responsibly on issues of government priority, yet allowed for the innovation and exploration that is so important to the research community. This has become an apparently never-ending process, the result of which is a need to continuously learn new ways to propose, manage and report research. For me, the result has been an increasing focus on defining my research in the context of well-founded, *a priori* hypotheses, something my university colleagues have been familiar with for decades. Despite the egregious administrative burden, my science has improved as a result.

Instantaneous rates and trajectories

The other two definitions of change give a context that is much more familiar to most scientists: the process of becoming different, or the differentiation itself. To talk about this type of change, it is important to understand that the following equation does not describe change.

$change \neq state_{t+1} - state_t$  eq. 1

The difference in state between two times is simply a difference. Change is the force that resulted in the difference. In the following equation, which most should recognize from introductory calculus, the instantaneous rate of change is caused by the action of a force, *r*, on state.

$\frac{dstate}{dtime} = r * state$  eq. 2

Thus, the instantaneous rate is the change, and it is driven by a force, *r*, which is the act or process through which something becomes different.

These and similar equations are the stuff of a host of change phenomena we study and rely on in entomology: population models, temperature responses and enzyme kinetics to name a few. On the one hand, we measure the differences in states of subjects and systems over time, and then characterize the consequences of those differences. On the other, we seek to determine and characterize the forces that drive change, and then to use that knowledge to predict, facilitate or prevent further change. In entomology, we explicitly study change: evolution, development and metamorphosis, growth and increase.

### What is 0.693147184?

The number 0.693147184 is the exponent in a simple equation describing the doubling of transistors in a computer every 2 years, a phenomenon known as Moore's law (Moore, 1965). This simple relationship has had a profound effect on my professional life. The smartphone that most now carry is a computer that processes data faster, communicates more extensively, stores more data and is simpler to operate than the computers that occupied large rooms in 1982. This simple relationship has dramatically changed my working life. Rather than having a typist transcribe my longhand, I type my own manuscripts, letters and reports on my PC (or let my tablet transcribe my longhand!). Professional typists are no longer, and I am likely, on a words per minute basis, one of the highest-paid typists on the planet. Letters are no longer the medium of written communications – having been largely supplanted by emails and even shorter text messages and tweets. I find that emails are not nearly as well thought out or crafted as letters I wrote (or received) in the 1980's. The existence of email has increased the apparent urgency of communication but decreased its importance. The increase in computing power has vastly increased the scope of data analysis techniques. For example, generalized linear models with non-normal distributions were simply inaccessible in the 1980s. Today, I spend a lot more time on experimental design and analysis than in 1982, and I like to think that the research I do has benefited from this. However, statisticians have disappeared from the science service of AAFC, and the result is a loss of the collaboration and expert consultation those professionals provided. Images have migrated from film to digital media, and professional photographers are no longer employed by AAFC. I have had to learn a lot of technique in photography as a result, and spend a fair amount of time doing the job they did. Libraries are migrating from physical rooms full of paper and dust to digital rooms where the world's information is accessible from a desktop anywhere on the globe, for those who pay the price of access. However, librarians within AAFC do not facilitate access to that information in the way they once did. I have had to become a lot more familiar with Boolean search logic, and have shifted my reprint collection from piles of paper in filing cabinets to piles of files in virtual cabinets. A vast community of professionals who supported my research has largely disappeared, and I have had to assume all of their roles, and learn many of their skills. Entomology sometimes feels like it is in the background.

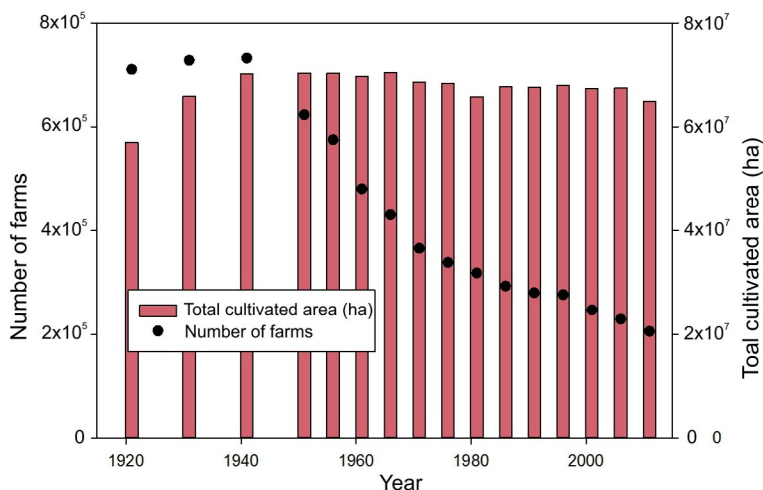
The growth in computing power over 32 years has transformed my research tools beyond recognition. As an example, in order to determine the identity of the parasitoid that killed a host, in the absence of the adult parasitoid, I would have had to dig in the meconium left by the emerging parasitoid, locate the remains of the final instar larva, mount that on a slide and use keys to final instar remains to determine the identity (e.g., Gillespie and Finlayson 1981). Today, this laborious and inaccurate process is replaced by molecular diagnostics (e.g., Garipey et al. 2005) that provide far more accurate and detailed information at a much lower cost. And the overall cost of these methods continues to decline as a result of both computing power and the genomics databasing that is now possible (see the Human Genome project <http://www.genome.gov/sequencingcosts/>).

### What is 0.0114?

The current (2014) exponent in the exponential equation describing human population growth is 0.0114 (<http://www.worldometers.info/>), and this exponent is changing in response to changes in health and education. When I was born, the world contained roughly 2.5 billion people. I was lucky to be born in a part of the world where most of those 2.5 billion had no influence whatsoever. The world population has more than doubled since and, presuming I live to a decent age, will have almost doubled twice in my lifetime. The 7 billion people on the planet are affecting even those extremely remote corners that were once completely pristine. In British

Columbia, the population has increased by almost 60% since 1982. The effect of that increase on my day to day life as an entomologist is interesting. The population increases are to a large extent occurring in cities, and city-based trends like urban farms and organic and hundred-mile diets are starting to affect research questions. What is the best way to manage pests in intensive urban agriculture? On the other hand, urbanization has overwhelmed many of my early research sites, and basic biodiversity studies entail longer drives to undisturbed sites. There is more traffic, which makes drives to visit colleagues less enticing. And, in my avocational entomological pursuits (fly fishing), there are a lot of people fishing in what were once unknown spots. But population growth is having other, more pressing effects on the world around me. We live in an increasingly industrialized world. World energy consumption, primarily in fossil fuels, is increasing at a dramatic rate, driven primarily by population growth (Tverberg 2012).

As the world population grows, there is an increasing need for food production. In Canada, land is being farmed more intensively. There has been little change in total land area in production in the last 50 years, yet the number of farms has steadily decreased (Figure 1). Farms have therefore become steadily larger.



Source: Statistics Canada Census of Agriculture

Figure 1. Trends in cultivated land and number of farms in Canada. Data from the Statistics Canada Census of Agriculture.

Productivity has increased over the same period (Figure 2), and some of this increase is a consequence of increasingly industrial farming practices – improved machinery, increased fertilizer inputs, improved crop protection, and better varieties. The FAO (2009) notes that increases in productivity in the developed world are occurring through improved farming practices, whereas in the developing world dramatic increases in arable land are driving necessary increases in food production.

Global climate change is being driven by accumulations of greenhouse gasses in the atmosphere (IPCC 2013). The effects have been gradual, but anyone in touch with agriculture over the last 32 years will have noticed changes. There are more frost-free days, and more growing degree-days. Key pest species are occurring earlier in the season. My activity in the field is earlier, and summer

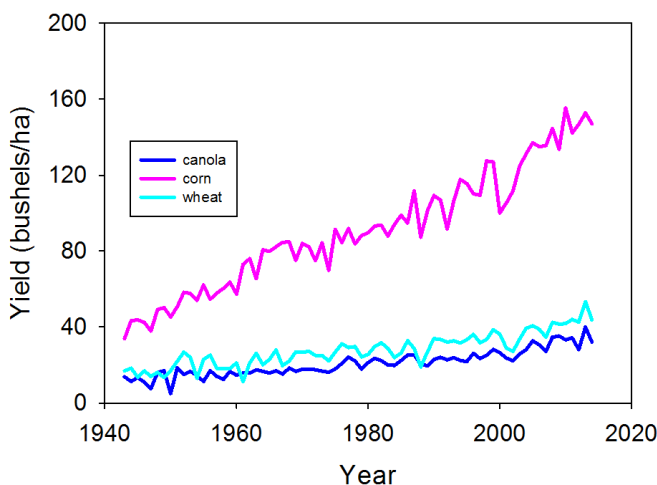


Figure 2 . Trends in crop production in Canada. Data from the Statistics Canada Census of Agriculture.

weather seems much more uncertain than at the start of my career. Allocation of research funds at the first of April each year no longer supports critical spring field operations.

Invasive alien species seem to be on the rise. For example, roughly 20 new alien invertebrates, half of which are pests, become established on the Hawaiian Islands each year, which contrasts to a natural invasion rate of one new invertebrate every 50,000 to 100,000 years (Holt 1998). It seems logical that as world trade increases due to population, opportunities for movement of species from one part of the globe to another are going to increase. And the statistics for detection and establishment are alarming. Only 20 to 50% of new species arriving in the US are detected in inspections, implying that a great proportion goes undetected (Work et al. 2005). It has been estimated that roughly 2% of new introductions manage to establish populations (di Castri 1989). Colautti et al. (2006) estimated the annual costs of a set of the most damaging nonindigenous species in Canada ranged as high as Can\$34.5 billion per year, and concluded that available resources were insufficient to deal with the problem. Problems with invasive species have only increased. Target species in my research project are now mostly invasive species that were detected in Canada in the last 15 years. This does not mean that previous problems have gone away, just that they have been shelved in favour of the more immediate concerns presented by the new problems.

In my view, the important changes currently facing the global human population can be summarized in a single graphic (Figure 3). Human populations and changes in intensity of resource use are driving planet-wide changes that result in the two big picture problems: global climate change and loss of biological diversity. Extending this thought to the right leads one to the inevitable conclusion that these changes are going to have negative impacts on human populations.

The dire consequences of this trend are increasingly on my mind, especially as my opportunities to contribute to the science needed for prevention and adaptation are increasingly limited by time.

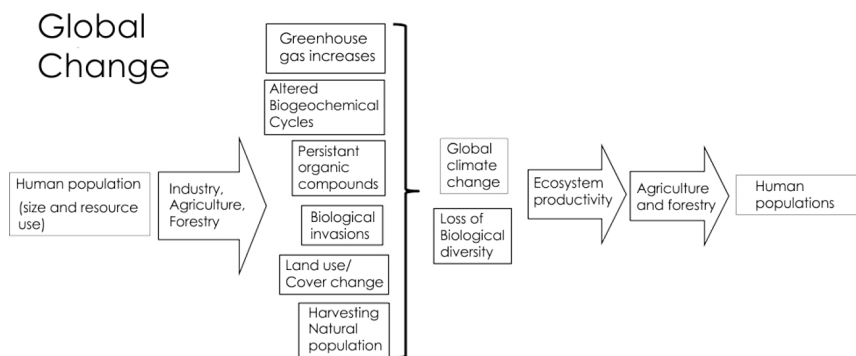


Figure 3. A graphic summarizing effects of global change. The ideas in this graphic are integrated from Didham et al. (2005), Vitousek et al. (1997) and Barnosky et al. (2012).

### What is 0.0256?

The rate of inflation from 1982 to 2014 is described by an exponential equation with an exponent of 0.0256. Goods that cost Can\$100.00 in 1982 now cost Can\$226.90. In the same period, the starting salary of research scientist in AAFC has increased by 116%, suggesting that professional salaries are falling behind inflation. Minimum wages are probably a pretty good indicator of student salaries, and these have increased by 156% from 1982 to 2014 (data from Services Canada labour program <http://srv116.services.gc.ca/dimt-wid/sm-mw/rpt2.aspx?lang=eng&dec=1>, accessed 14 Oct 2014). In 1990, the earliest date I could get data for, a student on minimum wage for a 16-week summer job made roughly Can\$3000, and paid Can\$1464 in tuition, whereas in 2014, the same student would make \$6150, and pay \$5772 (data from Canadian Federation of Students, <http://cfs-fcee.ca/the-issues/tuition-fees-and-access-to-education/history-of-tuition-fees/> accessed 14 October 2014). My sense is that fees for graduate students have increased even more dramatically in this period.

It should be increasingly difficult to entice good students to summer positions and to post-graduate work, but from my personal experience that does not seem to be a problem. However, for an increasing number of the students I work with, expenses and debt are serious concerns. Undergraduates seem to be taking longer to complete degrees because they take reduced course loads to accommodate part time jobs, and even graduate students take jobs on the side to help support their education.

### Death by bureaucracy

There have been a lot of changes in my workplace driven by social change. We inspect eyewash fountains weekly and WHMIS is a universally understood acronym (if you don't know what this is, go to <http://www.hc-sc.gc.ca/ewh-semt/occup-travail/whmis-simdtut/index-eng.php> immediately). Safety is a much bigger part of my lab and field work. Lab coats and steel-toed safety boots have replaced shorts and sandals, and a morning cup of coffee in the lab is no longer allowed. At the same time as these positive changes, bureaucratic processes (travel, human resources, purchasing and reporting), have become much more demanding of my time to the point where I sometimes spend the day dealing with administrative requests for yet more information or process of questionable value.

The social change in the past 32 years has not all been about bureaucracy. Smoking is gone from the workplace, and that makes day to day living a lot more comfortable. We have a long way to go with participation by women and minorities in science, but there has been visible progress. We are a lot more relaxed. Business dress at meetings has been replaced with a much more casual and comfortable attire.

### Some final thoughts

In making this presentation, and in preparing the written version for the *Bulletin*, I wanted to avoid sounding like the “whining old guy complaining about the way things used to be”, and I hope that I have not come across in that way. The points I wanted to convey are these. Firstly, change occurs in time, and is ubiquitous. It sounds trite, but everything really does change, all the time. Secondly, there is no going back - we can only adapt to changed states. Thirdly, some of the change in the world around is really important and urgent, and that is where we need to focus our effort. We must learn to ignore or live with the trivial stuff as much as possible. Finally, as scientists, we are no strangers to change. We observe and measure change, and in doing so, we are agents of change in the world around us; changes in understanding, changes in practice, and changes in policy are the real outcomes of our work, and that has not changed.

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## The entomological thread of federal agricultural research: Saskatoon 1918-2014

### Introduction

Entomology has been a feature of federal agricultural research in Saskatchewan for nearly 100 years. Thanks to the Riegert family, the University of Saskatchewan Archives has a very comprehensive collection of entomological heritage publications, notes and photographs for western Canada that were compiled by Paul Riegert. I was aware of many of Paul's historical publications over the years, but it was awe-inspiring to see the extent of his records and files. A complete listing of the university holdings of [Paul's archives](#) can be found on the Entomological Society of Saskatchewan website.

After several visits to the university archives, I came to the realization that, at best, I could update just one 'thread' of the entomological fabric that Paul had so thoroughly assembled over the years. The publication *A History of the Dominion Entomological Laboratory in Saskatoon, SK* (Riegert 1995) caught my attention when I realized that I had actually met several of the original staff members of the Dominion Entomological Laboratory (DEL) during my tenure as an undergraduate student working at the Canada Agriculture Research Station (CARS) in the 1970s. I was captivated. Hence, I made the decision to begin my presentation with the DEL – Saskatoon, and to follow the entomological thread of agricultural research through CARS (where my career began) and over to the Saskatoon Research Centre (SRC), currently a research facility of the Science and Technology Branch of Agriculture and Agri-Food Canada.

### Dominion Entomological Laboratory

The development of federal government agricultural research began with the establishment of select Experimental Farms under the direction of William Saunders in 1885. By the early 1900s, the demand for entomological expertise within the Prairie Ecozone increased with expanded settlement, in part due to the large-scale disturbance of native prairie soils that influenced the pest status of some indigenous insect populations. In 1913, Norman Criddle was appointed as the entomological officer in Manitoba and Edgar Strickland in Alberta. But it wasn't until 1918 that Dr Alfred Cameron received a joint appointment between the Government of Canada and the University of Saskatchewan, and the Dominion Entomological Laboratory– Saskatoon was founded (Harding 1986). The government did not own any buildings on campus at the time, so the DEL was co-located at the University of Saskatchewan in the basement of the Field Husbandry Building.

Dr Cameron arrived in Saskatoon as the first Officer-in-Charge, with the intent of studying indigenous blackflies (*Simulium* spp.). However, a major grasshopper outbreak in the province demanded his attention and early DEL staff were immediately caught up in monitoring and controlling this major pest of field crops. Dr Cameron left the DEL to return to studying biting flies after only 2 years, and was replaced by Dr Kenneth King. It was Dr King who really

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established the DEL as a centre of excellence in insect ecology (Harding 1986). Although grasshoppers dominated for years as agriculture continued to expand, an array of insect pests surfaced including Hessian fly, bertha armyworm, wireworms and cutworms. As a result, the DEL increased its staff of officers to seven by the early 1930s. Research activities at the DEL were severely disrupted in the early 1940s due to the Second World War. However, the unit was re-invigorated soon after and had a staff of 25 (including officers and technical staff) by 1950. The range of entomological expertise had also expanded and included taxonomy, biology, life history studies, and control options. In addition to grasshoppers, cutworms and wireworms, wheat stem sawfly had become a major issue as well.

The major issues addressed by the newly-established DEL related to pest control, insect ecology, monitoring and forecasting. Control methods were very limited. As a result, early researchers had a mandate to develop control options – cultural, poison baits, etc. For example, Dr Arni Arnason utilized his resources on hand and designed a control method using bags of arsenic powder and horses to control bertha armyworm in 1928 (Fig. 1).



Figure 1 - "Horse and Pole Duster". Dr Arni Arnason using arsenic powder to control bertha armyworm in 1928 (Harding 1986).

Since Paul had already thoroughly reviewed early pest control tactics in "*From Arsenic to DDT*" (Riegert 1968), I decided to focus on the other major initiatives, namely insect ecology, monitoring and forecasting for this presentation. Given the urgency of the grasshopper threats to early agriculture, it seemed fitting to begin with grasshoppers (*Melanoplus* spp.; *Camnula pellucida*) as my example of insect monitoring and forecasting during the DEL era. The earliest reference to a grasshopper forecast map was published in 1920 (Fig. 2).

The DEL preceded the era of blogs and Twitter, but technology transfer was taken seriously using billboards and posters that were displayed in town halls and post offices (Fig. 3). With catchy logos such as "*Fields Cannot Successfully Produce Both Grain and Grasshoppers*" and eye-catching images, the posters enlisted wide farmer support for controlling grasshoppers using four main tactics: (i) Do not seed fields infested with grasshopper eggs; (ii) Plant guard and trap strips to attract the grasshoppers and then control the strips; (iii) Control grasshoppers in roadsides and pastures; and (iv) Repeat the control applications every 4-7 days....with a reminder: "*Don't let your neighbour down*".

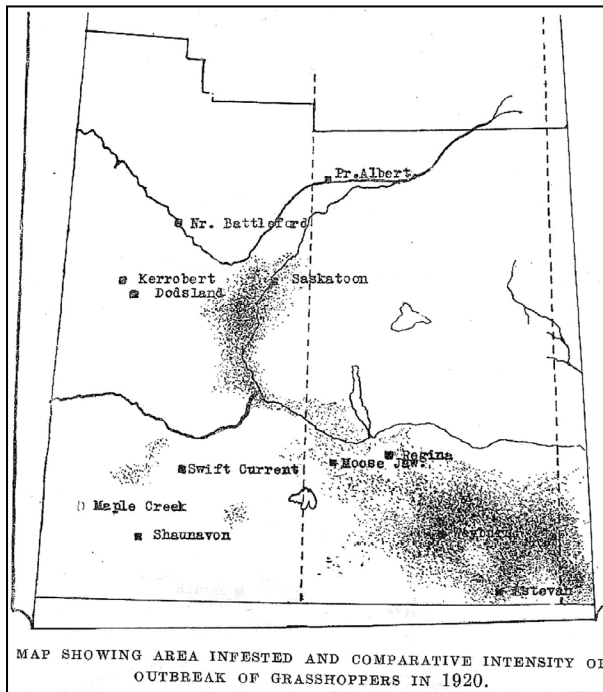


Figure 2. Map showing survey locations of grasshopper distribution in Saskatchewan in 1920 (University of Saskatchewan Archives).

## 1933-34 EMERGENT PROGRAM FOR DESTROYING GRASSHOPPERS

**ENORMOUS NUMBERS OF GRASSHOPPER EGGS** have been laid throughout stubble fields and along roadsides.

A very severe outbreak next spring seems certain. The pest **CAN BE CONTROLLED** effectively and cheaply by general adherence to a sound plan of tillage and poisoning.

### THE ESSENCE OF THE PLAN

- 1. SEED EARLY AND ONLY ON : FALLOW**—(It is free from eggs);  
 SPRING OR FALL PLOWING—(mold-board plowing 5" deep buries eggs so that young hoppers cannot emerge)
- 2. PROTECT CROPS AGAINST INVASION** from nearby stubble fields and roadsides, by proper tillage and poisoning.
- 3. AVOID (a) ANY SEEDING ON HEAVILY INFESTED STUBBLE UNLESS PLOWED.**  
 (b) LATE SEEDING OF ANY KIND.

### WHAT TO DO BEFORE WINTER

- 1. PLOW GUARD STRIPS NOW** around all fields intended for fallow in 1934. If you can do nothing else this fall, do all you can in this direction.
- Where conditions permit, **FALL PLOW** as much as possible of the stubble land that is to be seeded next spring.
- Fall rye may be seeded for spring pasture and hay.
- In discolor soil, if plowing is not feasible, **VERY SHALLOW** tillage this fall and again **VERY EARLY** next spring may be used to somewhat reduce the infestation. With mold-board plow soil, or heavy infestation on any soil, this treatment **WILL NOT MAKE STUBBLE FIELDS SAFE** for SEEDING.


Fields Cannot Successfully Produce Both Grain and Grasshoppers.

## DO YOUR PART AND SUPPORT THE CAMPAIGN

## KILL GRASSHOPPERS

*Crops can be Saved*

•  
**HOPPERS CAN BE CONTROLLED**  
•



### FOUR POINTS OF SPRING AND SUMMER CONTROL

- 1. Summerfallow Heavily Infested Stubble**  
 Seeding infested stubble usually means a lost crop and lost time trying to save it.
- 2. Leave Guard and Trap Strips on Summerfallow and Poison Trap Strips**  
 (See diagram on back page)  
 ALL 1934 summerfallow in the infested area should be treated this way. Work the Guard Strip around your summerfallow early.

**REMEMBER**

- Hoppers will probably not have hatched when summerfallowing starts; but trap strip will catch as fast as hoppers fall on strips and only be killed as about one-quarter million hoppers per acre. Bury them on the fallow with a Guard Strip, let them gather on Trap Strips and kill them. Bury the dead ones away to crop lands and lay eggs.
- Guard and Trap Strips should be at least 2 rods—32 feet wide.

- 3. Kill Hoppers on Roadsides, Pastures and on Summerfallow Trap Strips and Field Margins**  
 Watch for Hatching and Poison Early before Hoppers Spread Through Crops

- Spread poisoned bait among young hoppers.  
 SPREAD IT THINLY—3 GALLONS PER ACRE  
 SPREAD IT EARLY ON WARM, BUSTLY MORNINGS
- If there is good growth to carry the spray, use spray of CHLORODANE.  
 SPRAY CHLORODANE AT 3 LBS PER ACRE.  
 SPRAYING IN EARLY MORNING OR EVENING IS RECOMMENDED.  
 DO NOT SPRAY WHEN WIND IS FROM THE WEST.
- Poisoned baits kill best where vegetation is sparse and dry.
- Sprays kill best where vegetation is tall and rank.

- 4. Repeat baiting or spraying every 4 to 7 days as required**  
 USE BAIT SPREADERS FOR POISONED BAIT

DON'T LET YOUR NEIGHBOUR DOWN  
DO YOUR PART IN THE CAMPAIGN IN YOUR DISTRICT

For further information, see your Agricultural Representative, Agricultural Committee-man, or write the Dominion Entomological Laboratory, Saskatoon, or the Field Crops Branch, Saskatchewan Department of Agriculture, Regina, Saskatchewan.

Figure 3. Posters advocating grasshopper population control in Saskatchewan in 1933 and 1949 (AAFC-Saskatoon Research Centre).

In support of the annual grasshopper campaigns, contoured forecast maps were meticulously hand drawn up until 1980 by data analysts with drafting expertise (Fig. 4). Following the retirement of the data analysts/sketch artists, population data were averaged over rural municipalities for the next 10 years or so until GIS mapping tools became readily available in the 1990s. In summary, field survey data of Saskatchewan grasshopper populations date back to 1920, and are continued today, making it a world class record of annual insect population distribution and density.

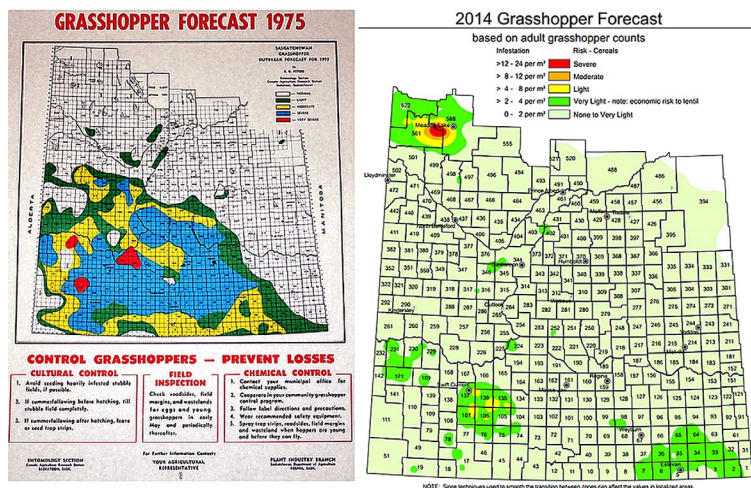


Figure 4. Grasshopper forecast maps for Saskatchewan – 1937 (left) (AAFC-Saskatoon Research Centre) and 2014 (right) (Saskatchewan Ministry of Agriculture)

## Canada Agriculture Research Station

A new government laboratory was constructed on the University of Saskatchewan campus in the mid-1950s, allowing for a consolidation of the federal agriculture 'Science Service' staff. In 1959, the Dominion Laboratories of Entomology, Plant Pathology and Forage Crops were combined forming the new Canada Agriculture Research Station (CARS). Largely due to pressure from lead farm groups, entomology continued to flourish in Saskatoon (Anstey 1986). By the 1960s, CARS had a staff of 20 entomologists with a broad range of scientific expertise. They included:

- Grasshoppers: Howard MacDonald – chemical control; Paul Riegert and Roy Pickford – ecology; Robert Randell – population demography
- Forage crop insects: Harold McMahon and Harvey Craig – control
- Rapeseed insects: Lloyd Putnam – control; Larry Burgess – ecology
- Medical entomology: John McClintock and Raymond Bellamy – Western Equine Encephalitis.
- Biting flies: Hartley Fredeen – control
- Vegetable insects: Woody Stewart – control
- Wireworms: Robert Burrage and John Doane – ecology
- Physiology: Norman Church – development; Al Ewen – reproduction; Richard Davis – nutrition
- Pesticides: Jadu Saha – chemistry; Kenneth MacKinlay – toxicology

Some of the staff were also involved in international and national projects. For example, Hartley Fredeen was seconded to EXPO-67 in Montreal for three years (1965-67) to develop and manage a comprehensive insect control program to mitigate insect problems during EXPO.

However, by the early 1980s, the IPM research team was down to 11 entomologists. Fortunately for producers, this core group was of sufficient size to begin to address the devastating outbreak of a new invasive alien species in 1983, wheat midge (*Sitodiplosis mosellana*). I decided to use wheat midge, as my second example, to continue the discussion on insect monitoring and forecasting. John Doane laid the groundwork for a unique monitoring and forecasting tool that tracked both the pest and its biological control agent, *Macroglenes penetrans*.

Monitoring of overwintering populations is conducted in fall by taking soil cores to a depth of 15 cm. The cores are processed by wet sieving as described by Doane *et al.* (1987), and larval cocoons and larvae counted. All larvae are then dissected to determine if they are parasitized. This unique monitoring tool allows researchers to quantify the positive impact of biological control in managing wheat midge below economic threshold, as well as determining wheat midge population distribution and density.

Figure 5 depicts wheat midge population distribution and density in 1997. On the left is a distribution and density map of total number of midge larvae collected in soil samples. On the right is the same population, but only the viable midge data are presented; the parasitized larvae have been excluded. One can very easily see the positive impact of the parasitoid in reducing risk for the subsequent growing season. The decrease in red, blue and yellow areas reflects the reduction of midge populations in the province to below the economic threshold of 600 midge/m<sup>2</sup>.

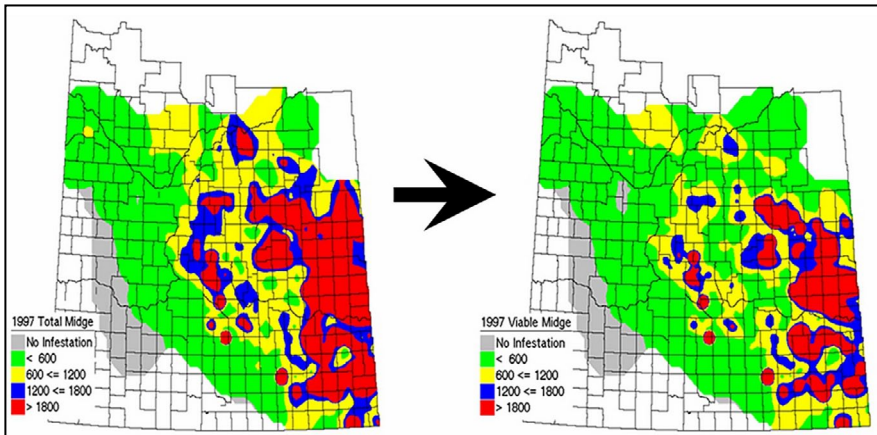


Figure 5. Contoured maps of the distribution and density (numbers/m<sup>2</sup>) of wheat midge populations in Saskatchewan in 1997, based on larval cocoon counts (Olfert *et al.* 2009).

Using these data, Olfert *et al.* (2003) were able to estimate that the total savings in pesticide costs, due to biological control of wheat midge, were about \$248.3 million between 1991 and 2001. Average rates of parasitism in the study ranged from a low of 25% in 1996 to a high of 44% in 2001. The severe outbreak during the mid-1990's and the subsequent insecticide campaign to control wheat midge resulted in an overall decrease in the average rates of parasitism but they quickly bounced back by 1998. This achievement can be directly attributed to the successful implementation of parasitoid conservation techniques and the fact that wheat producers in western

Canada have access to one of the most comprehensive management programs of any insect pest of field crops.

Saskatoon Research Centre

In the mid-1990s, the federal agriculture Research Branch was significantly downsized nationally. However, facilities at CARS were retrofitted and greatly expanded and the new facility was renamed the Saskatoon Research Centre (SRC). Effectively, the number of staff at SRC doubled. However, public-good research (e.g., entomology) became a low priority with the director at the time, who favoured research with commercial potential. For almost a decade, the staff in the Office of Intellectual Property at Saskatoon outnumbered the five remaining entomologists.

Due to similar declining entomology expertise at all federal centres within the Prairie Ecozone, there was a critical need to optimize resources in order to retain a presence in insect monitoring and forecasting. In response, the concept of a coordinated insect surveillance program took shape in the form of the Prairie Pest Monitoring Network (PPMN) in 1996. PPMN is not an official name, it's more like a description of a collaborative and coordinated suite of activities (technology transfer and research) related to insect pests of field crops and their natural enemies. Team members of the PPMN include provincial government entomologists, industry agronomists, university entomologists and federal government entomologists. Funding for the team and its activities comes from crop commodity organizations, industry and governments.

The benefits accruing to agricultural science from the activities of the PPMN are significant. Insect ecologists have access to approximately 5000 insect population abundance/distribution data points annually and hourly weather data from 400 weather stations (Fig. 6).

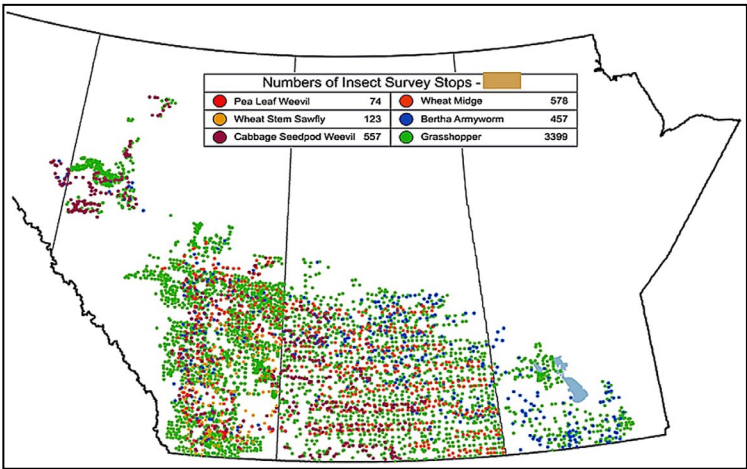


Figure 6. Example of GPS locations of major insect pest population survey data in the Prairie Ecozone in 2014 (AAFC-Saskatoon Research Centre).

In addition to insect population data, wind trajectory data from Environment Canada are downloaded daily during the growing season for 50 sentinel sites in Canada and 20 in the USA and Mexico. Air parcels capable of carrying insect pests reflect the potential for migratory pest movement (Hopkinson and Soroka 2010). Current insect targets of the wind trajectory analyses



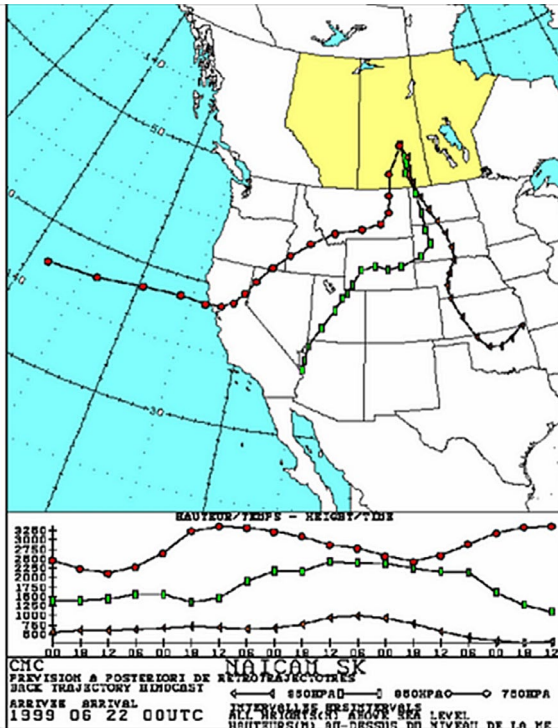


Figure 7. Example of wind current model output (back-trajectory) for Naicam, Saskatchewan, at 500m; 1500m and 2500m above ground. (AAFC-Saskatoon Research Centre).

include diamondback moth (*Plutella xylostella*) and aster yellow leafhopper (*Macrosteles quadrilineatus*). Trajectory analysis can be used to identify regions at risk on the prairies and, in turn, the analyses can provide input for the development of management strategies (Fig. 7).

In summary, all data generated by the PPMN are archived in a crop - insect - weather database. The database is a significant resource for identifying knowledge gaps and developing management tools. In addition, future impact assessments of climate change, new agronomic practices and new crops on pests and their natural enemies are within its scope.

The distribution and abundance of insects are correlated with climate, weather, agronomic practices and natural enemies. As a result, the data can be used to develop and validate bioclimate models. By exploiting these ecological data sets, bioclimate simulation models can be used to identify broad patterns in population distribution

and abundance (agricultural risk). I will illustrate this using as examples diamondback moth and grasshoppers.

Using the date of migratory diamondback moth adult arrival in Canada as a 'bio-fix' date in our bioclimate model, together with Long Term Normal temperature data, we can predict the potential number of generations (crop risk). Number of generations per year is one of the important factors that influence the pest status of diamondback moth. In western Canada, diamondback moth usually has three generations per growing season. The potential for crop yield loss increases with additional generations.

We have a bioclimate model for *M. sanguinipes* and have applied climate change scenarios to assess the potential impact of climate change on grasshopper ecology. Olfert et al. (2011) have shown that, compared to predicted range and distribution under current climate conditions, *M. sanguinipes* would have increased range and relative abundance under three commonly-used general circulation model scenarios in more northern regions of North America. Conversely, model output predicted that the range of this crop pest could contract in regions where climate conditions became limiting.

### Conclusions

Entomology in this province had humble beginnings with the launch of the Dominion Entomological Laboratory in 1918. However, the demand for entomology expertise flourished as agriculture expanded with increased settlement of the Prairie Ecozone. The discipline peaked at the Canada Agriculture Research Station in the 1960s, with a scientific staff of 20 entomologists who had a broad range of expertise. In 2014, this number has been reduced to four scientific research positions at the Saskatoon Research Centre. However, insect ecology monitoring and forecasting are as strongly supported by farmers today as they were in 1918.

Given that the current cadre of entomological research staff at the Saskatoon Research Centre is nearing retirement, succession planning is critical in order to retain the entomological benefits that the agriculture industry has come to expect from **DEL**, **CARS** and now **SRC** for nearly 100 years. Entomology truly has been a major contributor to the success of agriculture in western Canada and, as such, is a most interesting heritage subject.

### Acknowledgements

When first approached about the Heritage Lecture, my first thoughts were that these were awfully BIG shoes to fill! After all, Paul Riegert set a very high bar for entomological ‘Heritage’ in this province (and nationally). On a personal note, I recall that Paul had a short weekly segment on CBC radio years ago titled ‘The Bug Doctor’ where he would answer questions about insects. I don’t know which came first, but I heard that he also had a personalized licence plate for his car: ‘BUG DR’. In retrospect, it would have been equally appropriate for the plate on his car to have been ‘HERITAGE DR’. I would like to thank Drs Julie Soroka and Cedric Gillott for comments on an earlier version of the manuscript. And I would like to acknowledge the tremendous assistance of the staff at the University of Saskatchewan Library Archives.

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### Dr Thelma Finlayson turns 100!

**D**r Thelma Finlayson, OC, turned 100 on 29 June 2014. Thelma is a trail blazing entomologist, who worked for more than 80 years as an entomology researcher, professor and student advisor. She has led an exceptional and inspiring life, overcoming tremendous obstacles as a woman scientist. She has paved the way for all women scientists as the first female scientist to be hired by then Agriculture Canada, beginning her career almost 80 years ago at the Belleville, Ontario, Dominion Institute for Biological Control. She has changed the law regarding women in Canada twice, for instance, challenging government regulations which required married women to resign their positions, establishing an important victory for human rights.

In 1967 Thelma moved to the then fledgling Simon Fraser University and, with Bryan Beirne, co-founded the extremely successful Masters of Pest Management Program which still flourishes today. Thelma has founded a Chair in Biological Control within this program. Thelma's meticulous work with parasitoids has resulted in many monographs and Thelma has had two insect species named in her honour, an oakworm moth, *Anisota finlaysoni* Riotte, and a wasp, *Mesopolobus finlaysoni* DgIr.

Perhaps more important than her excellent research in entomology is the role of mentor that Thelma has played in the lives of thousands of young scientists, particularly women. She has been and continues to be an inspiration to untold numbers of young women for over eight decades. Thelma officially 'retired' 35 years ago but continued working at SFU advising students in academic difficulties, only regretfully stopping recently when walking from the parking lot to the student advising centre became too much. In many cases, the young female scientist she first inspired long ago has 'grown up' and is now a professor or professional in their own right, mentoring their own students. Many of her first students are near retirement now, and have supervised and assisted many other young people, who in turn, have gone on to inspire others. Such people include everyone from the young scientists she mentors, to the successful professionals who were once undergraduate students in academic difficulties. SFU recently named a new advising centre the Thelma Finlayson Centre for Student Engagement.

Thelma has received many awards in her illustrious career including the Order of Canada, 2005; the Diamond Jubilee Award, 2012; the SFU President's 40<sup>th</sup> Anniversary Award, 2006; Honorary LL.D., SFU, 1996; Fellow of the Entomological Society of Canada, 1993; Honorary Member of the Entomological Society of Canada, 1990; Honorary Life Member of the Entomological Society of British Columbia, 1985; Foundation Honorary Member, Professional Pest Management Association of British Columbia, 1984; Honorary Member, Golden Key International Honour Society, 2000; Award of Excellence, Department of Biological Sciences SFU, 1996; and C.D. Nelson Memorial Prize, 1986. Most recently, she was appointed a Fellow of the Entomological Society of Ontario.

Thelma is an amazing lady and a true friend to so very many. Her legacy lives on, in the lives and careers of young Canadian scientists and professionals throughout Canada and the world. She has touched so very many lives.



Greg Ehlers, SFU

Thelma Finlayson's 100th birthday party. Thelma is seated with the President of SFU, Dr Andrew Petter (on left) and former SFU Presidents Dr Jack Blaney (centre) and Dr Michael Stevenson.

Gail Anderson  
Simon Fraser University

### **The Biota of Canada: A new initiative of the Biological Survey of Canada**

**David W. Langor**

#### **Canadian species diversity**

**D**espite being almost totally covered by ice and snow during the Wisconsin ice age, Canada is now home to an amazing diversity of life. At last reckoning, it was reported that about 71 000 species, spanning all 6 Kingdoms of life, were known from Canada's marine, terrestrial and aquatic habitats, and an additional 68 000 species are likely to occur (Mosquin et al. 1995). The species richness and distribution of some groups such as plants and vertebrates are well known. However, many groups of organisms, especially those that are hyper-diverse and contain largely species of small physical size (*e.g.*, invertebrate animals, bacteria, fungi), are much more poorly known owing to inadequacy of surveys and the lack of means to identify species. For some groups of organisms, recent lists of species occur and are readily accessible, but for many groups, information about species present in Canada is scattered and poorly accessible. Recent initiatives such as the Canadian Registry of Marine Species (CaRMS), Bio-Blitzes organized by the Biological Survey of Canada (BSC) and others, the Canadian Journal of Arthropod Identification and bar-coding initiatives are greatly enhancing our understanding of the diversity of Canadian species and our capacity to identify them. The science of taxonomy provides the fundamental underpinnings to the recognition, description and classification of species, and hence to biodiversity science.

#### **The importance of species to Canadians.**

Species have value and importance to humanity. Canada's natural ecosystems are the result of species, the functions they perform, and the physical structures they create. Human health, security and prosperity are intimately dependent on (or impacted by) biota and the economic, ecological and social bounty that species provide. Species provide us with oxygen, food, clean water, clothing,

#### **The Biological Survey of Canada: Documenting Canada's Biodiversity**

The Biological Survey of Canada (BSC) has a 37-year history of collecting, collating, analyzing and disseminating information about Canada's biological diversity. The BSC is a non-profit, charitable organization consisting of biodiversity scientists across the country, and in other countries, who have an interest in Canadian biota. The BSC prides itself in identifying and filling biodiversity information needs using a bottom-up organizational structure, whereby front-line workers identify the needs and work to address them. The BSC has successfully demonstrated its capacity to advance national level biodiversity science and knowledge concerning terrestrial arthropods, which account for >65% of Canadian species, and is now reaching out to the broader biological community to bring together those who are experts with other taxa and who share a common vision and goal of making biodiversity information more accessible.

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shelter, medicines, recreation, intellectual and emotional stimulation and spiritual enrichment. Parasitic and disease-causing species have negative impacts on human health. Consequently, knowledge about the biota we live among and depend upon is of great importance to Canadian society, and we have invested considerable time, effort, and finances to improve that knowledge. Consequently, we know a lot about the native and non-native (= introduced) biota of Canada in terms of composition, distribution and functional roles. Nonetheless, there are still enormous information gaps, particularly concerning hyper-diverse groups that are relatively poorly studied, yet these groups likely play a much more important role in human health and prosperity than some other better-known groups. Clearly, much remains to be discovered about most of Canada's biota. At this time we do not even have an inventory of which species live in Canada.

### **Why do we need a species inventory for Canada?**

The fact that the well-being of Canadians is intimately tied to other species means that there is no comfort or wisdom in remaining blissfully ignorant about the biological entities upon which we depend. Our capacity to respond to and predict societal emergencies involving other species (e.g., pests, diseases, resource depletion) requires detailed understanding of how we interact with those species and the roles that they play in the ecosystems on which we depend. As well, biodiversity is good for the Canadian economy (Canadian Business and Biodiversity Council). Canadian capacity to recognize and pursue innovative products and services generated from other species is directly proportional to the richness of our knowledge about other species. Canada's capacity to meet international obligations (e.g., Convention on Biological Diversity (CBD) Aichi Targets) and fully implement the Canadian Biodiversity Strategy (CBS) depends on understanding the diversity of organisms and their ecological roles. Finally, the matrix of species which surrounds us is dynamic, changing in ways that are neutral, beneficial and detrimental to Canadians. Clearly, Canadians need to be knowledgeable concerning the diverse species webs of which we are an integral part.

Achieving an understanding of the Canadian 'species-scape' that is sufficient to ensure the safety, security, and prosperity of Canadians and the well-being of the species on which we depend is a long-term and step-wise process. Detailed biological study of all species in Canada is likely not achievable or affordable in the lifetimes of current Canadians, and the justifications for such investments still require debate and rationalization in light of other societal needs. However, a basic inventory of species that occur in Canada, including 'vital statistic' information about their known distribution, functional roles, habitat affinity, relative commonness, and population trends is an achievable goal that is foundational to meet the higher level goals established in the CBD and CBS.

Development of a census of life in Canada does not require starting from scratch. A large amount of such information already exists but is scattered and often difficult to access. As well, there are a wide variety of organizations (governments, ENGOs, professional societies, universities) and individuals involved in the collection, organization, mobilization and analysis of biodiversity information. What is needed is an organized effort to bring the scattered information about the biotic diversity of Canada together by first mobilizing the community of biodiversity expertise to create a comprehensive assessment of Canada's biotic wealth, and then developing a gateway to information about species diversity in Canada. Canada has the institutional and individual capability to achieve this goal, and is already active in assembling many of the parts that are needed to build this product, albeit under a variety of institution umbrellas with varying mandates and scope. The new Biota of Canada (BoC) initiative seeks to rally Canada's biodiversity resources to achieve a modern census of life in our country.

### The BoC project: an ambitious initiative

The BSC and partners are active in facilitating the development of a comprehensive census of species diversity in Canada and to provide easy access to information about the diversity of Canada's biota. There is no better time for this ambitious undertaking than during the United Nations Decade on Biodiversity: 2011-2020. To achieve this goal, the BSC is building a consortium of partners to design and launch a new project to collate, summarize, and disseminate to the general public information about the species diversity of Canada. The BoC initiative is inspired by and will be somewhat modelled after an earlier BSC project that culminated in the publication of *Canada and Its Insect Fauna* (Danks 1979). However, there are three major differences between the earlier project and the BoC. First, whereas the earlier project focused on insects and other terrestrial arthropod taxa, the new initiative will be comprehensive by expanding coverage to all species in Canada. Inherently, this means that the team required to build the new product will require the broadest possible range of taxonomic expertise. Second, whereas the earlier project resulted in a hard copy book, the new project proposes to build an open-access, web-based and dynamic product that is regularly updated as new information is provided by knowledgeable contributors. Third, whereas the earlier project had a finite and short life-span, the new initiative proposes to build a tool and content that can be updated continuously and into the foreseeable future.

The BSC Board established some guiding principles to govern the development of the BoC initiative:

- **Open:** The BoC should not be owned by any individual or organization. We desire many people and organizations to work to build it and all should get credit and recognition for their contributions. The BoC will be a product of the community of biodiversity stakeholders in Canada;
- **Inclusive:** The BoC should be constructed so as to capture and utilize all forms of biodiversity information in Canada;
- **Best Practices:** There are many biodiversity information products in Canada and internationally. Examination of the pros/cons of these major products and consultation with the people who built them will help us identify pitfalls and identify efficiencies;
- **Peer Reviewed:** The quality of the content of the BoC should be assessed through public vetting and consensus of contributors and users;
- **Acknowledge contributions:** Data/information contributors should receive public credit for the information contributed;
- **Dynamic:** The product should be dynamic and updated regularly as new information/data comes in;
- **Long-term Vision:** Although the BoC will be built in a modular fashion (we can't do everything at once), we should plan big from the start;
- **Complementary:** The BoC will not duplicate other initiatives but rather work to mesh together ongoing activities and supplement them so that the total is bigger than the sum of the parts.

### Progress

The idea for the BoC was first shared with the entomological community at the 2012 JAM in Edmonton, and a vision for the initiative was published shortly thereafter (Langor 2012). The subsequent feedback was overwhelmingly positive and instilled confidence that the initiative

was addressing real needs. The intervening 2 years have been active as the BSC has worked to establish a foundation for building the BoC infrastructure. There have been three main areas of progress: building strategic partnerships, fleshing out a detailed vision for BoC through the activities of a BoC Working Group, and building networks of biodiversity workers to contribute content. I will briefly summarize progress in these three areas.

**Partnerships.** It was recognized from the beginning that the success of the BoC depends on building a broad partnership base. Canada is blessed to have many organizations that are interested in biodiversity science, information collation and dissemination and conservation. Thus, much effort has been invested by the BSC Board in promoting the BoC vision to other organizations and engaging in discussions to exchange ideas about the BoC 'concept' and how partnerships might be built. The most fruitful and detailed discussions to date have been with Environment Canada's National General Status Working Group and Canadensys. The NGSWG views the goals of the BoC as important to facilitate delivery of its mandate. Environment Canada has provided some funding to the BSC over a 3-year period to engage in work that will benefit both organizations. Canadensys is a consortium of university partners interested in mobilizing biodiversity data, mainly in collections, coordinated through the University of Montreal. Canadensys views the BoC as complementary to its mandate and is working with the BSC to explore funding options to undertake technical work that will address Canadensys and BoC needs.

More recently, discussions have occurred with the Executives of the Canadian Society for Ecology and Evolution (CSEE) and NatureServe Canada (NSC). In both cases, the concept and aims of the BoC initiative were positively received. The CSEE has strong interest in biodiversity science and has particular interest in lobbying. NSC has a strong mandate in biodiversity conservation and in mobilization of biodiversity data, mainly plant, through its network of Conservation Data Centres. Both organizations are committed to providing input into the development of the detailed vision for the BoC that is underway (see below). Future discussions are planned to flesh out more details about how partnerships might evolve.

**BoC Working Group.** In April 2014, a BoC Working Group was established and charged with developing a white paper to articulate how the BoC might look and operate in terms of content, functionality and management. The 11 members of the WG, chaired by David Shorthouse, represent a broad cross-section of biodiversity expertise in Canada. A document is in progress that will address issues such as: audiences, data objects and their characteristics, scientific and vernacular name structure, delivery and points of access, technical development strategies, outreach and citizen science, collaborations and funding. This white paper is expected early in 2015 and will be circulated broadly amongst Canadian biodiversity stakeholders and front-line workers to solicit feedback that will be used to build the BoC infrastructure.

**Networking of biodiversity experts.** With support from Environment Canada, the BSC has hired a part-time employee to tap into all available information sources (publications, databases, experts) to facilitate updated estimates of species diversity in Canada for animals, plants and fungi. These updated estimates will be reported in the *Wild Species* report series of the NGSWG and will also be used as content for the BoC. Achievement of this goal requires assessment of biodiversity information sources and extensive contacts with Canadian biodiversity experts. The personal contacts are serving to advertise the BoC initiative and explore the interest of potential information/data providers in working together to develop new or improved catalogues of Canadian species. As a result, many people have become involved in the BoC and are working at

developing improved species inventories. This work will continue for another 15 months and will result in a significant kick-off for building content for the BoC.

### **You are needed!**

In order to ensure its relevance, viability and long-term success, the BoC must be built by those who best know and understand the supply of and demand for biodiversity information, that is, a bottom-up rather than a top-down approach. Front-line biodiversity scientists and bioinformatics experts must work together to determine the content, design and scope of the project and products. The planning for this project is still in progress and the BSC desires broad feedback from potential partners, contributors and users to ensure that the project is built in a way (content and functionality) that is realistic, useful, user-friendly and meets a variety of needs. At this time the BSC seeks to encourage you to think about the following issues and assess if you are interested in participating in this exciting new initiative:

1. Do you see that there is a need for a coordinated national initiative to develop an inventory of species in Canada? In other words, do you buy into the vision? Is there a niche for this?
2. What sort of content would you like to see collated for all taxa, in the short-term and long-term?
3. What partners do you think the BSC should engage to contribute to this effort?
4. Are there models elsewhere that we should seek to emulate in whole or in part or seek to avoid?
5. What are some pitfalls that we should seek to avoid?
6. Are you interested in contributing to this initiative? What sort of role do you envision for yourself?

This is an opportunity for you to become involved in the earliest stages of this project and have an influence on how it evolves. We would appreciate your candid feedback. Please send your feedback either via email to David Langor ([dlangor@nrcan.gc.ca](mailto:dlangor@nrcan.gc.ca)) or by using the SurveyMonkey questionnaire available at [www.surveymonkey.com/s/N8D58PP](http://www.surveymonkey.com/s/N8D58PP). For updates, continue to check the BSC website <http://biologicalsurvey.ca/pages/read/the-biota-of-canada>

Already the word is spreading rapidly about the BoC initiative and the team is rapidly expanding. The future is ripe with possibilities and Canada has the opportunity, expertise and innovative capacity to build a biodiversity information architecture that will serve our national needs and set a global standard for the management and application of biodiversity information.

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*Dear Buggy,*

*I hear this is your last column for the Bulletin. Why are you leaving?*

*Signing off in Sault Ste. Marie*

Yes, Signing off, it's true. This is my last column for the *Bulletin*. All good things must end, and so too must this column.

I started writing Dear Buggy in the spring of 2008 at the request of then-editor Kevin Floate. I had originally expressed interest in becoming the new assistant editor of the *Bulletin* as the post had recently become open. However, Kevin pulled me aside at the ESC JAM (in Saskatoon, as timing would have it, as I end this column after the end of another ESC meeting in Saskatoon) and asked if I would be interested in taking on a new addition to the Bulletin. His idea was to start a 'Dear Abby' style column that would answer questions on issues about working as, or training to become, an entomologist.

As should be obvious, I accepted Kevin's offer. Kevin had been kicking this idea around for a while and provided me with a list of ideas to start. I decided I would emphasize issues important to graduate students and new graduates. At the time that made a lot of sense as I was still a graduate student but just about to defend my PhD thesis and soon to start a postdoctoral fellowship with the Canadian Forest Service. So, in January of 2008 I submitted my first column. I believe it was on time, which may have been the first, and last, time that ever occurred. (*Certainly, that's true for the last 5 years!* – Editor)

In the almost 6 years since then I have submitted some 18 columns (and 3 blog posts!) on a variety of topics. Many of these were based on my experiences in grad school or while a post-doc. A few were inspired by conversations I had with other students on the issues they were facing as developing entomologists. And a few were just for fun, crafted to satisfy some urge I had to write on a particular topic.

When I started writing Dear Buggy I was living in a one-bedroom apartment I shared with my cat. Or rather, the cat I had shared custody, as he was splitting his time between living with me in Edmonton and with my girlfriend in Minneapolis. Fast forward to the present; I'm now married to that girlfriend, we (that is, she, I, and the cat) moved halfway across the country from our home in western Canada to northern Ontario so that I could take up a position as a research scientist with the Canadian Forest Service. Along the way we had two daughters, and adopted a dog and another cat. This is a rather long digression to say that a lot has changed in the time I've been writing this

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*Buggy has been Chris MacQuarrie, a research entomologist with the Canadian Forest Service in Sault Ste. Marie, Ontario. Currently he's looking for new venues to express his unsolicited opinions. Apparently there's this thing called 'Twitter' that might be worth checking out. Find him there: @cmacquar.*

column, and I feel less connected to the original intent of Dear Buggy that Kevin laid out for me at that long-ago meeting in Saskatoon.

It seems funny to say this, but a lot has changed in the life of a graduate student since I graduated. It's funny because in my mind I'm not that long out of graduate school. In reality, I submitted my last thesis chapter almost 7 years ago, and the current crop of graduate students was in grade school when I started my journey towards a PhD. In short, I'm old!

So how different are things? Well, the rise of social media has changed how graduate students interact with their peers and the larger scientific community. Every day I get to meet and learn from brilliant students all over the world. For instance, as I write this, I am getting updates over Twitter from presentations being given at the Entomological Society of America's meeting in Portland, Oregon, while sitting in my office in Sault Ste. Marie. Tools like Google scholar have made it easier to find information, and the ability to collaborate and discuss online has made interacting with other members of the scientific community so much easier for today's students. I also see students using amazing new analytical tools and techniques that make those I used even a few short years ago seem antiquated. Of course, that's not to say all is rosy for today's graduate student. Funding is harder to obtain, research is more expensive, positions are fewer and competition is more intense. A student graduating today and with an aim to become a professor will likely spend a significant part of the next 10 to 15 years as an itinerant researcher moving from university to university chasing the brass ring of a faculty post (although as I discussed in a recent column, there are other options).

Of course, while the world I originally set out to write about has changed, so has my own place in it. The career progression of a scientist is one that progressively accumulates tasks that take you further and further from the work you were trained to do. I suspect everyone has heard a version of the tale told by the senior principal investigator to his post-doc that his post-doc was the best time of his research life, when to a post-doc the PhD period was the best time of their research life, and so-on down the academic food-chain. I'm not complaining, and in fact I have no time for the so-called 'cult of busy' - the progressive one-upmanship of modern society to see who is 'busier' - so I don't lament or resent the non-science tasks that sometimes fill my daily life. I like my job and most days I gladly tolerate that 'stuff'. However, I have reached a point where my family responsibilities and the work expected of me by my employer take up most of my day. Any additional responsibility I take on, including those things I do for my community means I must steal time from those other things that matter.

Finally, I have a third reason for ending my time as Dear Buggy and that is my, perhaps unique, opinion on the tenure of volunteers. There are always those that will volunteer when the need arises, or show-up when they are asked. I've always been one of those kinds of people. Unfortunately, folks like us tend to stay in our assumed positions for long periods. Often, we do this because we get personal satisfaction out of volunteering our time. However, I think we often stay too long such that others get complacent because the important jobs are always being done. That's a fine state of affairs, but over time the pool of potential volunteers begins to shrink as the same folks take on more and more responsibilities. I think the way to combat this complacency is for us frequent volunteers to do a job for a certain period and then to step back so that others must take our places. Sometimes that might mean that a thing we love will come to an end (like this column). But, by moving aside we allow others the opportunity to step forward and show what they are capable of.

So those are my three reasons for leaving. They're not great, but they're mine and they'll do. In closing I'd like to take a bit of space to thank a few folks who've helped me out over the years. First to Kevin Floate for thinking I was up to this task, I hope I met your expectations. To my current editor, Cedric Gillott, thank you for your patience with my tardiness, and my



occasionally hopeless grammar. I hope I have improved as a writer, at least somewhat. I'd also like to thank the three assistant editors that I've interacted with over the years: Fred Beaulieu, Julia Mlynarek and Donna Giberson who always made my columns look great. I should also thank my letter writers, both real and imagined, who inspired these columns, and all those who suggested ideas or inspired a column. Thank you also to those folks who have written over the years or had a kind word in person at a meeting. I've always wondered if anyone was reading these; thankfully you proved me wrong. Finally, to my wife, thank you so very much for all your help with these columns over the past 6 years; these are as much yours as they are mine.

I don't know what the *Bulletin* has planned for this space, but I do hope that someone out there will want to fill it. I know there are lots of folks out there with something to say. Take a chance. I guarantee you'll have fun. Just do try to get your columns in on time.

Buggy

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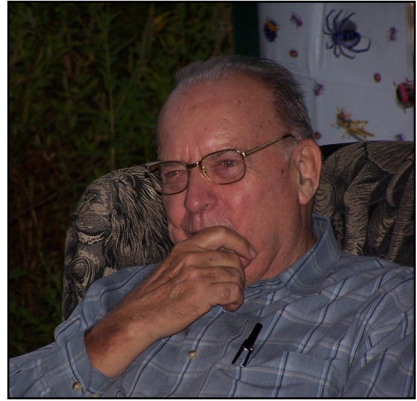
**H**enry Fuller Howden died 21 May 2014 in Victoria, British Columbia just 2 months shy of his 89<sup>th</sup> birthday. Working on a manuscript up until the end, he maintained his sense of humour and joked with doctors and nurses at the Royal Jubilee Hospital that they still hadn't found a cure for old age.

Born in Baltimore, Maryland, 19 August 1925, Henry began collecting insects at an early age. By the time he was 12, his moth and butterfly collection was comprehensive enough to win him an honorary membership in the Maryland Academy of Sciences. A few years later he liquidated his Lepidoptera, used the proceeds to purchase his first set of Cornell drawers, and then focussed on building up his beetle collection, especially scarabs. After completing his schooling at a local military academy, he was accepted into the Department of Entomology & Zoology at the University of Maryland in 1941. His undergraduate training was interrupted in 1944 when he turned 19 and received a draft notice. Enlisting in the U.S. Army, he hoped to join their entomology corps, but instead was assigned to the Air Force as a non-commissioned officer. After completing his military service at Hamilton Field near San Francisco, he returned to Maryland to finish his BSc in 1946 and was accepted directly into their graduate program.

With all of the entomology positions taken, he made a brief foray into the Zoology Department to study fish for an MSc, then returned to insects and received his MSc in Entomology in 1949. This same year he married Anne Elizabeth Thompson, who was also an avid entomologist and recent graduate of the University of Maryland. Leaving Maryland, the newly-weds moved to North Carolina State University (NCU) where Anne studied the succession of insects on pig carcasses for her MSc, and Henry worked on the taxonomy and biology of Geotrupine beetles under Professor Paul O. Richter. Anne would later switch to working on weevils, a group with more agreeable feeding habits, in the eyes and noses of many observers.

During their graduate time in Raleigh, Henry and Anne became good friends with Henry K. Townes, the Ichneumonid specialist, and his wife Marjorie. Both couples were avid collectors and would go on field trips together in the U.S. southeast. On one occasion, Howden recounts that he got a useful lesson in frugality from the elder Henry. During a break in collecting, the group headed to a local restaurant for dinner. Towards the end of the meal, Townes asked his wife to put the excess bread rolls into her purse so they could enjoy them the following day. Marjorie complied with the request, which was observed by the owner of the restaurant. The owner came over and asked if they would like any more rolls. Completely unflappable, Townes replied "yes, that would be nice", so the owner was obliged to bring over another basket of rolls. These were promptly transferred into Marjorie's bag before the bill was paid and the two couples returned to collecting. Learning to pinch pennies in order to extend fieldwork was a foundation of the Townes philosophy, and one that Henry Howden with his Scottish ancestry, was quick to adopt.

Henry was awarded his PhD in 1953, and with it the distinction of being the first to receive a Doctorate in Entomology from NCU. He joked that it stood for Post Hole Digger, a tool that he found useful for excavating scarabs from deep sandy burrows. With five publications completed, he accepted a teaching job at the University of Tennessee in Knoxville. He taught general biology, entomology, and evolution for the next few years, while continuing his research on beetles.



**Henry F. Howden  
(1925 – 2014)**

Since he was only paid by the university during the academic year, he supplemented his income by becoming a consultant to the U.S. Atomic Energy Commission at Oak Ridge during the summer months, investigating the effects of radiation on insects. Henry's enthusiasm for field work, support for the newly-founded Coleopterists Society, and his publication record caught the attention of entomologists at the Department of Agriculture in Ottawa. They were keen to recruit him to work north of the border. After some negotiations, Henry accepted a position as a research scientist with the Canada Department of Agriculture and moved the family to Ottawa in August 1957. He spent the next decade building up the beetle collection at the Canadian National Collection (CNC) through extensive field work, while continuing to publish on the taxonomy of scarabs and other beetle families, as well as papers on insect biogeography.

In 1967 at the invitation of Phil Darlington, Henry took a 6 month sabbatical at Harvard University. He continued to develop the concepts of biogeography as they applied to insect evolution, as a visiting Agassiz Lecturer. When he returned to Ottawa, he extended his leave of absence from the Entomology Research Institute (Canada Department of Agriculture) and began lecturing at Carleton University at the invitation of Herbert H.J. Nesbitt, the Dean of Science. Henry apparently enjoyed teaching and the academic freedom of the university, and certainly didn't miss the ever-increasing red tape and bureaucracy of government. He formally resigned his government position on 31 August 1970, having accepted a full professorship in the Department of Biology at Carleton. His position in the Department of Agriculture was promptly refilled by Aleš Smetana, who had been at the CNC for several years on a visiting fellowship.

Once established at Carleton, Henry was successful in getting NSERC grants that allowed him to purchase a scanning electron microscope, hire technicians, and carry out field work during the summer months. For the next 25 years he taught courses in systematic entomology, evolution & biogeography, and animal systematics. He supervised numerous undergraduate honours theses, as well as 9 MSc and 10 PhD students, and several Postdoctoral Fellows. While most of his graduate students were entomologists, a few studied fish, birds, or amphipods. The academic year at Carleton was broken up by spring break and summer holidays. In most years, Henry and Anne would arrange collecting trips to Central or South America to coincide with these breaks. The numerous insects collected by beating, black-lighting, or pitfall trapping would be brought back to Ottawa in Whirl-pak bags or glass vials charged with ethyl acetate, to be mounted up and studied over the following winter. Specimens not of interest would be passed on to other specialists in their large circle of friends. Many of these exchanges took place in person at the Entomological Society of America (ESA) and Coleopterists Society annual meetings, which both Henry and Anne tried to attend on a regular basis. Their attendance at Entomological Society of Canada (ESC) meetings was much less frequent as Henry explained, because most of the taxonomists in Canada worked in Ottawa or at least passed through it on a frequent basis. Henry's love of field work and his "itchy feet" meant that sabbaticals from teaching were taken on a regular basis, and far from home. The typical destination was Australia, where he and Anne were welcomed by the CSIRO as visiting scientists, and given logistical support to study the scarab and weevil fauna "down-under". In return, all holotypes selected from their Australian material were deposited in the Australian National Insect Collection in Canberra.

The long-term care of insect collections was of major concern to Henry. In 1989 he represented the Canadian Society of Zoologists at a Parliamentary hearing in Ottawa into Bill C-12, the Museums Act. He highlighted the importance of collections and urged support for the Museums Act. Putting his money where his mouth was, he encouraged the director of the newly re-named Canadian Museum of Nature (CMN) to hire an entomologist by offering to donate his and Anne's beetle collection to the museum, along with a sizeable cash endowment. After all, how could the museum purport to represent nature, when it lacked insects, one of nature's most successful

animal groups. Henry's argument was sound, and he got a signed agreement that the CMN would accept their collection plus the endowment. This would eventually lead Henry and Anne to donate over 463,000 specimens and \$300,000 to the CMN in the years to follow.

Henry retired from Carleton in the spring of 1995 as he approached his 70<sup>th</sup> birthday. Retirement from the university didn't slow down his research, as both he and Anne were welcomed as Honorary Research Associates at the CMN where they were provided office space and support. They worked there for the next 11 years, continuing to travel, publish and curate specimens. Details of their time at the CMN can be found in the recent article by Smith et al. (2014).

In May of 2006 Henry suffered a stroke while travelling to western Canada to visit family. This effectively ended his field work and taxonomic research. After a period of rehabilitation, he devoted his efforts to writing up his 60 years of field notes. These were initially made available in a series of 47 instalments running under the title *In Past Years* in the online newsletter *Scarabs* from May 2007 to December 2011. Feedback on the series was positive, so Henry reorganized the text into chronological sequence, adding additional images and text with the view to publishing it as a book. Like all big projects, this took much longer than anticipated, and was only completed posthumously (Howden et al. 2014). This was to be his last publication, number 186.

Henry's support to the entomological community has been long and unwavering. As a graduate student at NCSU, he joined both the ESA as well as the fledgling Coleopterists Society. He was News Editor of the *Coleopterists Bulletin* in 1953, Contributing Editor in 1954, and served two terms as President of the Coleopterists Society in 1968 and 1969. He was elected Chairman of Section A, ESA in 1965 and joined the ESC in 1970 shortly after accepting his faculty position at Carleton. He served on the Board of the American Entomological Institute (founded by Henry Townes) from 1963 to 1996, and was Vice-President of the CanaColl Foundation (founded by another long-time friend Ed Becker) from 1976 to 1998. He started the Ottawa Entomology Club in the 1970's as an informal monthly gathering of people interested in insects, which continues to this day. Henry was a long-time member of the American Association for the Advancement of Science, Sigma Xi - The Scientific Research Society, and the Knox Presbyterian Church in Ottawa. In recognition of his support to science and entomology, he received many awards including being elected Fellow of the ESC in 1985, Honorary Member of the Coleopterists Society in 2003, and Fellow of the ESA in 2005.

Henry's frugality was only exceeded by his generosity, as he provided guidance and advice to students and colleagues, as well as funds to support field work or specimens for research. Out of town visitors in particular were often hosted or entertained at 23 Trillium Avenue, and the Howden guest book reads like a veritable "Who's Who" of distinguished entomologists. If the visitors were fortunate enough to be scarab or weevil workers, then the "in-door" collecting could prove very productive indeed! Henry's legacy will live on with his important contributions to our knowledge of scarab beetles. He is survived by his wife Anne plus their 3 daughters and families, and will be remembered fondly by many friends and colleagues from around the world.

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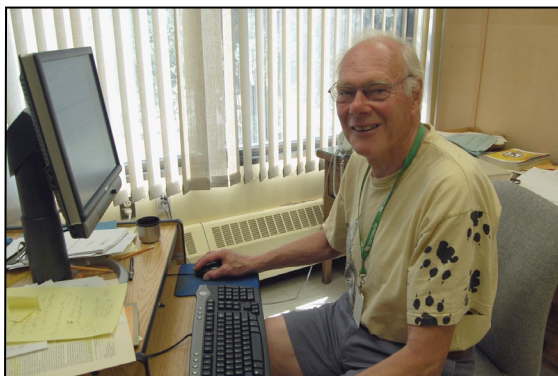
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Bruce D. Gill  
Ottawa

An icon in Canadian entomology was lost in August of this year with the passing of Dr Peter Harris at the age of 83. Highly respected at home and internationally as a pioneering leader in *classical weed biological control*, Peter will be remembered for laying the foundations for, and then greatly contributing to, Canada's reputable programme in this field of applied study. For future generations, he also has left an enduring legacy with the successful mitigation of some of western North America's most invasive rangeland weeds.

Born and raised in England, Peter first came to Canada in 1950 to obtain his BSc (1955) in the Faculty of Forestry at UBC. It was during his undergraduate degree, which also included a summer job with the Federal Division of Entomology (FDE), Belleville, Ontario, Substation on the UBC campus, that Peter's interest in entomology was ignited through the study of forest pests (e.g., bark beetles; see Peter's 2007 Heritage Lecture, *ESC Bulletin*, 39(4): 154-160). While at UBC, Peter also met his wife, Irene (m 1957), and rose to some prominence as an award-winning track and field athlete. These early years of athletics did not fade with time for Peter or Irene (or their three children), as they made physical activity a central part of their lives. After completing his BSc, Peter returned to England to obtain a PhD in entomology at the University of London (1958), studying the European pine shoot moth, although he maintained Canadian ties by collaborating on the same forest pest with FDE entomologists in Belleville and Sault Ste Marie, Ontario. This sustained Canadian connection likely contributed to his hire in 1959 into a biological control research position with Agriculture Canada, which was the beginning of a highly productive career that would span 36 years. He first worked at the 'Research Institute' in Belleville, until its closure in 1972, then at the Research Station in Regina, until it closed in 1992, and lastly at the Agriculture and Agri-Food Canada - Lethbridge Research Centre (AAFC-LRC) until he officially retired in 1995. However, being one to never sit physically or mentally idle, Peter continued to jog and work as an emeritus scientist at LRC until early 2014.

Peter was innovative, a 'big picture' thinker, tenacious and politically astute, which helped greatly in the formative years of the Canadian biological control programme. He persistently sought out, engaged and recruited those who could help him achieve his unwavering goal of providing agricultural producers and land managers with a reliable, economical and environmentally safe weed control option. Through his enthusiasm, drive and practical knowledge, he was often able to deliver. Very early in his career, Peter cultivated close collaborative ties with entomologist colleagues at CABI (formerly the Commonwealth Institute for Biological Control and International Institute for Biological Control) in Switzerland, which has been the contracted source of European weed biocontrol agents for Canada now for over 60 years. Working in close partnership with CABI legends, Dr Helmut Zwölfer and subsequently Dr Dieter Schroeder, Peter set Canada's priorities for the overseas surveys, selection and host specificity testing of mostly insect agents for a number of damaging rangeland weeds. During his



**Peter Harris  
(1930 – 2014)**

career with AAFC, Peter released and field assessed 36 insect and 1 nematode species, of which 70% established in Canada (a high percentage for weed biological control globally) and about a third of these have had measurable impact on their target weed hosts. He had excellent instincts in predicting which agents would be successful based on a broad knowledge of entomology and botany and keen observational skills. He typically was engrossed in developing mechanistic hypotheses on why an agent either succeeded or failed, and could easily bridge disciplines to arrive at novel approaches and conclusions to explain observed field patterns (e.g., his application of soil microbiology with a colleague to investigate the role of plant mycorrhizae in weed biological control). Some of Peter's acclaimed successes include the biological control of diffuse and spotted knapweeds in British Columbia using a suit of 11 established insects working in concert, and of leafy spurge in our Prairie Provinces using a complex of root-feeding flea beetles (*Aphthona* spp). He also is recognized for using biological control to produce major reductions of the pasture weed, nodding thistle, such that herbicide use against the weed was no longer needed in most areas, thus accruing savings for affected livestock producers. Many of the successful agents introduced into Canada by Peter were subsequently approved for use by the USA against the same weeds.

Among Peter's many contributions to the science of classical weed biological control were those that advanced the field globally through their immediate and sustained application by researchers. Together with colleagues, he played a major role in the development of currently used host specificity testing protocols. Peter was ahead of his time in advocating for consideration of both crops and native plant species of concern when delineating the host range of candidate biocontrol agents during pre-release testing. He also encouraged a process of independent scientific review of petitions for agent release, thereby reducing conflicts of interest for the researchers that produce and submit the petitions to regulators for decision. Other contributions of note were his development of an easy-to-use, standardized scoring method for assessment and comparisons of agent impact in the field, and the first to implement an economic analysis of the costs and benefits of weed biological control that could help in selling it to potential project funders.

Peter also was tireless in encouraging general acceptance and adoption of weed biological control in Canada through its promotion to both industry and governments, and the staging of public extension activities. He readily shared and spread his biological control successes by directly engaging the provinces and other stakeholders in educational hands-on events (e.g., farmer field days for the redistribution of leafy spurge beetles), thus engendering an understanding and sense of ownership of the projects and a personal connection with the insect agents. As a result, many a field person grew fond of the insects they managed and became loyal converts to biological control after witnessing what it could do for weed control. When project funding declined, Peter created the concept of 'weed biological control consortia', which brought Canadian and American stakeholders together to jointly fund the overseas exploration and testing of new agents for weeds of common interest.

Among his many accomplishments and awards for his career contributions, a few stand out as particularly noteworthy. These include: published papers in both *Science* and *Nature* in 1969 reporting on how mosquitoes sometimes benefit from feeding on insect haemolymph; made a Fellow of the ESC (1984); awarded the Commemorative Medal for the 125<sup>th</sup> Anniversary of Canadian Confederation (1994); given an award of recognition by the Canadian Forum for Biological Control (1996); awarded the ESC's Gold Medal (1997); inducted as a member of the Order of Canada (1997); formally recognized by his biological control peers at the International Symposium on the Biological Control of Weeds (1999); and made an Honorary Member of the ESAB (2008).

Peter inspired a whole generation of weed biological control researchers and practitioners

with his boundless energy and dedication to learning more about the art and science of his field of study. After notifying the international weed biological control community of his recent death, there was an overwhelming response of personally shared stories of how Peter helped in individual careers and lives. For those who knew him, he was an impressive, likeable man that will be greatly missed by his friends, colleagues and family.

Rose De Clerck-Floate  
AAFC, Lethbridge Research Centre

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**Robert Trottier  
(1942-2014)**

**D**r Robert Trottier passed away 18 July 2014. Originally from Montreal, Robert obtained a BSc in 1964 from the University of Montreal. He was granted an MSc in entomology from McGill University in 1966 and in 1970 a PhD in insect ecology from the University of Toronto. Robert joined the Agriculture Canada staff at Vineland Station in 1970 as an insect ecologist. Through his dynamic research in biometeorology and the development of forecasting systems, he made significant contributions in improving apple pest management programs in eastern Canada. In 1978, Robert moved to Ottawa to accept the appointment of Head, Pesticide Information Liaison Section, Research Program Service, to reorganize and restructure this section and was Acting Director of Research Program Service, in 1980. From 1986 to 1991, Robert was Director, Biosystematics Research Centre, and from 1992 he was Research Coordinator of Pest Management until his retirement in 1998. Robert was a strong supporter of biological control and in 1992 he initiated the AAFC Biological Control Working Group which to this day meets annually.

Peter Mason  
AAFC, Ottawa



**D**r Michael J. Smirle passed away on 27 July 2014, at his home in Summerland while working in what he affectionately referred to as his Mother's garden. Born in Abbotsford, British Columbia, on 18 June 1954, Mike grew up on the family farm in the nearby village of Bradner. Mike was the only child of Jim and Joan Smirle. While growing up, Mike excelled at piano, academics and basketball. After graduating top all-round student in 1972 from Abbotsford Senior Secondary, Mike began his academic career in the faculty of music at the University of British Columbia (UBC). With the passing of his father in January 1974, Mike took the year to travel extensively with his mother. He returned to UBC in the fall of 1974, this time in the Faculty of Science. It was at UBC, on 5 October 1974, that Mike met Mary-Anne, his wife to be, and they began their journey in life together. Mike graduated from UBC in 1979 with a BSc in Biochemistry, following which he returned to his daffodil farm in Bradner where he worked part time as a lumber grader in the local mill. Tiring of shift work, Mike returned to university, this time at Simon Fraser University (SFU), where he pursued a Masters in Pest Management. While studying under Dr Mark Winston, Mike combined an interest in biochemistry with a love for honey bees cultivated as a child on the family farm. His Master's Thesis "Development of a Sensitive Bioassay for Evaluating Sub-lethal Pesticide Effects on the Honey Bee" was followed by doctoral studies, also at SFU, on the "Insecticide Resistance Mechanisms in the Honey Bee". His doctoral studies earned him a prestigious J.H. Comstock Award, from the Pacific Branch of the Entomological Society of America. Upon completion of his PhD in 1989, Mike worked as a sessional instructor at SFU while undertaking a post-doctoral research fellowship at UBC with Dr Murray Isman. Mike's post-doctoral research focused on the metabolism of secondary plant compounds in phytophagous insects and he examined the mode of action of natural-product insecticides, especially neem oil and other allelochemicals. While working 2 years in the Isman laboratory, Mike published three scientific papers and a significant book chapter "Allomones in Insect-Plant Interactions", but more importantly he became close friends with Dr Tom Lowery, with whom he formed a long-lasting collaboration for the remainder of his career. On 1 February 1990, Mike's career brought him and the family, which now included his wife Mary-Anne and two sons, James and Jeffery, to their home in Summerland, British Columbia. Mike worked at the Pacific Agri-Food Research Centre (PARC) of Agriculture and Agri-Food Canada (AAFC) as a respected and valued research scientist until his passing. Working at PARC was like an old home coming as Mike shared his career with no less than eight MPM graduates from SFU and Tom Lowery from UBC. During his 24-plus years at PARC, Mike led a successful research team that focused on insect toxicology and determined the biochemical mechanisms of insecticide resistance,



**Michael James Smirle**  
**(1954 – 2014)**

knowledge essential for developing strategies to manage resistant pest populations. With his capable technician Cheryl Zurowski always in support, Mike contributed to the development of pest management systems for orchard and grape crops, as well as our understanding of the environmental fate of new insecticides. His collaboration on the CIDA Hebei Dry-Land Farming Project, led to his becoming an Adjunct Professor at the University of Beijing, China. He published 34 papers in peer reviewed journals, 2 book chapters and 58 miscellaneous technical articles during his career. At PARC he served as Head of the Environmental Studies Section for a number of years and for the past 4 years served as the Test Site Manager for the Minor Use Pesticide Program at Summerland run by AAFC's Pest Management Centre. For the past few years, he also led a major research project on spotted wing drosophila (SWD) that brought together research scientists from both AAFC Centres in British Columbia, Agassiz and Summerland. Regulatory agencies such as the Pest Management Regulatory Agency (PMRA) sought out Mike for his expertise; as well, he was approached for numerous consultations on SWD. Co-workers at PARC would look to Mike for assistance on many issues as he had a seemingly infinite amount of patience and a calming presence. His ability to bring together disparate individuals into productive groups will be greatly missed. Mike was a longtime member of the Entomological Societies of Canada (ESC) and British Columbia (ESBC). He served as an Associate Editor to *The Canadian Entomologist* (2006 – 2014) and on the Editorial Board of *Biopesticides International* (2004 – 2014). He was President of the ESBC at the time of his passing. Outside of his work Mike's greatest joy was spending time with his boys and their friends. Mike loved every moment that he spent on the sidelines of local soccer pitches and track and field venues, attending his sons' high school plays or, most especially, cheering on James and Jeff at the hockey rink, watching them thrive and grow into the incredible young men they are today. Mike's lifelong love of music allowed him to share his talents as a regular organist at Holy Child Parish and singing with the Musaïc Vocal Ensemble during his years in Summerland. It comes as a shock when the entomological community loses one of its valued scientists. This tragedy is compounded when that scientist is also a great human being, and a close friend for over 30 years - Mike was all of these things. He will be dearly missed by everyone fortunate enough to have known him.

Gary Judd, with input from Tom Lowery and Kenna MacKenzie  
AAFC Summerland

## Book reviews / Critiques de livres

*Dragonflies and Damselflies of the West*. Paulson, D. 2009. Princeton University Press, Princeton, New Jersey, 536pp. (softcover). ISBN: 978-0-69-112281-6. US\$29.95.

*Dragonflies and Damselflies of the West* was the first of two field guides in the series written by Dennis Paulson published by Princeton University Press, the companion being *Dragonflies and Damselflies of the East* published in 2012 (reviewed in the *Bulletin* 44: 145-146). Together the books create a very comprehensive guide to all North American odonates.

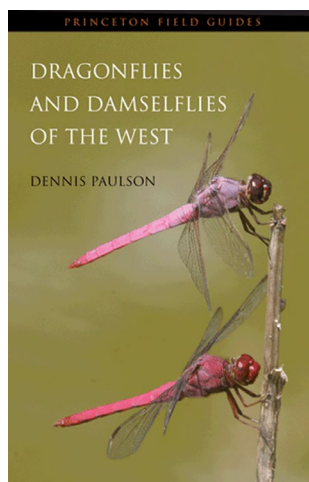
This field guide covers the 348 odonate species of western North America and gives interesting natural history observations to encourage enthusiasm about this group of insects. The guide focuses on those species found west of the boundaries of Ontario, Minnesota, Iowa, Missouri, Arkansas and Louisiana.

The book begins with a short introduction followed by sections covering an array of topics under the umbrella of odonate biology. The section on the general natural history of the order is quite interesting. It includes short paragraphs on perching, thermoregulation, roosting, flight, migration, vision, feeding, predator and prey defences, parasites, sexual patrol, courtship and mating, egg laying and hatching, larval life history, metamorphosis and emergence, and sexual maturation. Paulson also presents sections on odonate anatomy, colours, names, where to find them, photography, collecting and collections, threats to their survival and conservation, research, odonates in the east, and an explanation of species accounts. These sections are all useful as an introduction to the wonderful world of odonates.

Following the introduction, Paulson presents every species of damselfly and dragonfly that is present in the West. The species are grouped by family and genus. He begins with the Zygoptera: Calopterygidae, followed by the Lestidae, Coenagrionidae, Platysticidae and Protoneuridae. This is followed by the Anisoptera: Petaluridae, Aeshnidae, Gomphidae, Cordulegastridae, Macromiidae, Corduliidae and Libellulidae. Each species is presented by both the common name and the scientific name and is clearly illustrated and described. The natural history, habitat, flight season and geographic distribution maps are also included for each species. The pictures are very helpful and include one for each sex and morph, and usually present different angles, which show all the descriptive characters. This full description of each species helps in the proper identification of whatever odonate an enthusiast may encounter. At the beginning of each genus section, there is a description of the genus and a table to help with the identification of the species within that genus. At the end of each group there is usually a drawn guide for important morphological features such as the male and female appendages, depending on what the defining characters are (e.g., mesostigmal plates in Coenagrionidae, subgenital appendages or abdominal tips in various anisopteran groups).

There is also a section on the species that have been added to the western fauna since 2008, and Paulson adds a short, but very useful, appendix on dragonfly publications and resources for additional information.

Dennis Paulson has achieved his goal in creating a comprehensive field guide to the western North American species of odonates. This field guide is very clear. However, a problem, as with many field guides, is that when you have no clue as to what family or genus the species of



odonate you have in hand belongs, you have to flip through many pages looking for what it may be. To be fair, though, the table at the beginning of each group may help you narrow it down. An additional problem is the weight of the guide. For a book its size, it is quite heavy (just over a kilogram), probably due to the glossy heavyweight paper, so taking it on long hikes becomes difficult. Even with these negative points, I think this is an excellent guide. I highly recommend having this field guide and its eastern counterpart in every entomologist's library or in your car/field vehicle. With this book as a reference, the risk of misidentification of an odonate is minimal.

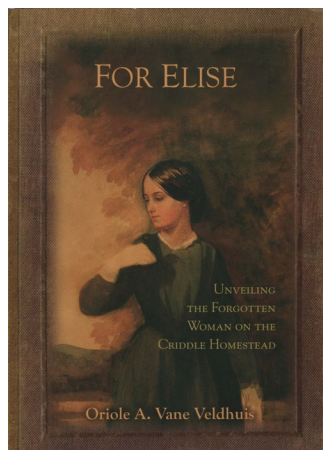
Julia Mlynarek  
University of New Brunswick  
Fredericton

***For Elise - Unveiling the Forgotten Woman of the Criddle Homestead.*** Oriole A. Vane Veldhuis. 2012, published by the author. 495pp. ISBN 978-1-896150-72-7. \$24.95.

Most entomologists in western Canada who have at least a passing interest in history, will eventually become acquainted with the legacy of Norman Criddle and the Criddle/Vane family of southern Manitoba. Norman came to Canada from England as a 7 year old boy, as part of a rather complicated family. Norman's father, Percy Criddle, emigrated with his wife (Alice Criddle) and their four children, and his former common-law wife (Elise Vane) and their five children, to homestead southeast of Brandon in 1882. While enduring the hardships and challenges of prairie life, they created a small bastion of British culture on the newly tilled prairie, setting up tennis courts and a golf course, hosting concerts and dances, and making meteorological, astronomical and biological observations in the spirit of the Victorian England they had left far behind. Norman's early interest in insects and pest control blossomed into an entomological career; he came to the attention of the entomologist Dr James Fletcher, and after some contracts and part-time work he was appointed in 1913 as the first Dominion Entomologist in western Canada. Norman Criddle left a legacy of research on crop entomology, and a vast collection of specimens from which new species continue to be described.

Until recently, most of the information available to us was derived from the diary of Percy Criddle. Percy, an unsuccessful businessman in England, wasn't much of a farmer, but believed he could make money publishing an account of his homesteading life. To this end he faithfully kept a diary. His book plans didn't come to fruition in his lifetime, but long after his death, his daughter Alma Criddle published in 1973 *Criddle-de-diddle-ensis*, a detailed account of their life on the Manitoba prairie. In that book, the complicated marital triangle is presented as an English gentleman, his wife, and the "other woman", all living in relative harmony as they battle the elements and carve a piece of civilization out of their adopted homeland. It deals primarily with the Criddle side of the family, without many details about Elise Vane.

Thus, the popular interpretation of the Criddle/Vane history is that Percy set up his wife and mistress on adjacent homesteads, and we imagined him spending his time happily sauntering between the two. Oriole Vane Veldhuis presents here a rather different take on the family history. It's clear from her work that the story is less salacious, and much more complicated and



heartbreaking than that. A descendant of the Vane side of the family, her book is the result of a 10-year quest to learn more about her great-grandmother, the “forgotten woman of the Criddle homestead”. Besides the well-known diaries of her great grandfather, she uncovered many old letters sent to and from the Manitoba homestead, and delved into archives in Canada and elsewhere, to piece together an alternative history of the family.

*For Elise* is billed as a work of creative non-fiction. Rather than just presenting the raw facts, Veldhuis has fleshed them out with hypothetical details, dialogue and thoughts of the main characters. Thus, a rich and compelling story is told rather than a dry listing of events and dates. This may not fit the expectations for the reader expecting a purely conventional history book, but it makes for a much more engaging and vivid read. To support the creative additions of details, it is liberally sprinkled with quotes from diaries and letters, and contains extensive footnotes indicating information sources. Even such things as details about the weather are supported by sources listed in the footnotes.

Veldhuis has done a remarkable job of bringing the story to life, with a minimum of assumptions on the important historical details. However, there are still places where unknowable details have been filled in with reasonable conjecture. The early years in Europe were not well documented, so many questions remain. How did it come to be that Percy had six children with Elise, yet never felt obliged to marry her? Before they emigrated, did Percy’s legal wife Alice know about Elise and their children? Did Elise know about Alice and her children? There are no direct answers, but there are some clues here. It is clear that for several years Elise was Percy’s common-law wife, and at least some of their children have the name Criddle on their birth certificates. They were engaged in 1863 but never married, probably because at the time of their engagement Percy was under the age of 25 and did not have his parents’ consent. Their last child together, Cecil, was born seven months after Percy and Alice were married, and just one month before Percy and Alice’s first child Norman was born. Clearly, Percy had become enamoured with a new woman, but it appears that he still felt some obligation to his existing family and he maintained contact with them.

Also largely undocumented are the circumstances around Elise agreeing to come to Canada with Percy. Veldhuis fills in the gaps here with a plausible sequence of events, supported as much as possible by old documents. She theorises that on very short notice, Percy announced to Elise that he was moving to Canada with his new family, and that he made an offer for Elise to join them in Canada as their housekeeper. Veldhuis does an excellent job of fleshing out the likely thoughts and reactions of Elise and her family to their situation, while not quite presuming exactly what had transpired. While it is frustrating not to know the answers to some of the questions posed above, Veldhuis is careful not to fabricate any of those unknowable details. Although we don’t know exactly how it was decided, it is clear that Elise did indeed become the servant, beginning with the voyage over. Elise and her children travelled in steerage, as was customary for servants. Meanwhile, Percy, Alice and their children travelled second class, like proper English folk. Percy wrote in his diary that he “visited the emigrant quarters - horrified - smell enough to poison a rat - could only stand them a few moments at a time and then rush on deck for sweet air - or lie down sick.”

We’ll never know if Elise knew what she was getting into when she agreed to emigrate to Canada. She probably felt she didn’t have much choice - either a highly uncertain future, completely abandoned by the father of her children, or the certain drudgery and humiliation of becoming his housekeeper. At least the latter held the promise of a bit of support from Percy, and a future of opportunity for her children.

After the journey to Canada and the early challenges of setting up a viable homestead, the book traces through events such as Elise’s difficulties attempting to register a homestead in her own name, various interactions in the community, and her children growing up, getting married and

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taking steps to start independent lives. There are also details of some difficulties when paperwork arrived informing her of an inheritance to “Elise Criddle”, who of course did not legally exist in Canada.

It’s abundantly clear that Elise’s life at Aweme was very hard, and that Percy gave her very little freedom. He was regularly hosting choir practices and parties, while she was expected to put together food for the guests from their meagre resources. While he was off socializing and getting involved in local politics, she (and to some extent Alice) remained isolated on the farm. He didn’t even permit Elise to attend the wedding of her daughter. Although Percy assisted Elise with her homestead application, it involved the deception that she was a widow, and he essentially rolled her land into the family farm.

Percy never openly admitted that the Vane children were his. From the time they travelled to Canada, all documents portrayed Elise as a widow, with her children who were of no relation to Percy. Even the name Vane was borrowed, apparently from a family near Percy’s boyhood home. According to Vane family lore, on the day they left England, the children were shocked that their name had become “Vane” and that they had to refer to their papa as “Mr. Criddle”. He even stated in his will that they were of no relation to him. Meanwhile, Elise perpetuated a very different lie in her letters to relatives back home, always intimating that she and Percy were living as husband and wife, with no mention of the existence of Alice and her family.

The story comes to an end with the death of Elise, a worn-out woman at the age of 62, in 1903. A postlude provides information on her descendants in the following years, and an outline of Veldhuis’ sources and some thoughts on the writing process. Several appendices provide a family tree, maps, and copies of some important documents such as homestead applications and wills. The forthcoming third edition of the book will also include an index.

This book is clearly a labour of love that has been meticulously researched. I found it to be thoroughly captivating through almost all of its 495 pages. The text is liberally sprinkled with photographs and the occasional line drawing. Veldhuis’ motivation to “set the story straight” interferes very little with the telling of a very interesting life story. It is well written and very professionally put together, and has been so well received that it is going into a third printing shortly.

One potential criticism is that the book is a bit hard on Percy, and that perhaps it applies 21st century morality to a man of the 19th century. However, Percy was pompous and dictatorial by any century’s standards. His diary reveals a scathing opinion of most of those around him, and his behavior was so poor in so many instances, that he begs criticism. Where *Criddle-de-diddle-ensis* was overly deferential to him, *For Elise* provides a welcome counterpoint, to show us the other side of this man. I highly recommend that anyone interested in the Criddle/Vane story read both books. *Criddle-de-diddle-ensis* focuses on the Criddles, and contains many details about Norman’s early entomological career. *For Elise* is about Elise, and her major role in this most interesting family.

Oriole Vane Veldhuis is the great grand-daughter of Percy Criddle and Elise Harrer Vane. She grew up in rural Manitoba, and is a retired school teacher and minister.

*For Elise* is available at several local book stores in Manitoba, and can be ordered online from McNally Robinson booksellers, at:  
<http://www.mcnallyrobinson.com/9781896150727/oriole-veldhuis/for-elise#.VFZPd8k6fe4>

Greg Pohl  
Natural Resources Canada, Edmonton

## 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 (Tom Lowery, [Tom.Lowery@agr.gc.ca](mailto:Tom.Lowery@agr.gc.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 (Tom Lowery, [Tom.Lowery@agr.gc.ca](mailto:Tom.Lowery@agr.gc.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.

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### 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.

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## Currently available for review / Disponibles pour critique

- Hall, P.W., Jones, C.D., Guidotti, A.E., and B. Hubley. 2014. The ROM Field Guide to Butterflies of Ontario. 464 pp. plus photographs. Royal Ontario Museum Press. ISBN: 9780888544971 [paperback]
- Charabidze, D. & Gosselin, M. 2014. Insectes, cadavres et scènes de crimes : Principes et application de l'entomologie médico-légale. 261 pp. DeBoeck Supérieur. ISBN: 9782804184957 [paperback]
- Williams, P., Thorp, R., Richardson, L., & S. Colla. 2014. Bumble Bees of North America. 208 pp., 150 colour illus. Princeton University Press. ISBN 9780691152226 [paperback or ebook]
- Lemelin, R.H. (Ed.) 2013. Management of Insects in Recreation and Tourism'. 365 pp. Cambridge University Press. ISBN: 9781107012882 [hardcover]
- Morales-Ramos, J., Rojas, G. and D.I. Shapiro-Ilan. 2013. Mass Production of Beneficial Organisms, 1<sup>st</sup> Edition, Invertebrates and Entomopathogens. 764 pp. Academic Press. ISBN: 9780123914538 [hardcover or ebook]
- Abrol, D.P. (Ed.) 2013. Integrated Pest Management, 1<sup>st</sup> Edition, Current Concepts and Ecological Perspective. 584 pp. Academic Press. ISBN : 9780123985293 [hardcover or ebook]
- Onstad, D.W. (Ed.) 2013. Insect Resistance Management, 2nd Edition, Biology, Economics, and Prediction. 560 pp. Academic Press. ISBN: 9780123969552 [hardcover or ebook]



- Sanborn, A.F. 2013. Catalogue of the Cicadoidea (Hemiptera: Auchenorrhyncha), 1st Edition. 1002 pp. Academic Press. ISBN: 9780124166479 [hardcover]
- Lonsdale, O. 2013. Review of the Families Tanypezidae and Strongylophthalmyiidae, with a Revision of *Neotanypeza* Hendel (Diptera: Schizophora). Smithsonian Contributions to Zoology, Number 641. vi + 60 pages, 92 figures, 5 tables. (<http://si-pddr.si.edu/dspace/handle/10088/21132>)
- Chyb, S. and N. Gompel. 2013. Atlas of Drosophila Morphology, 1st Edition, Wild-type and Classical Mutants. 248 pp. Academic Press. (hardcover, ebook). ISBN: 9780123846884

## Society business / Affaires de la Société

### Highlights from the Board of Directors Meetings in Saskatoon

#### President's report

This has been a year of transition for ESC, in which we have re-evaluated the way we do our business and the core activities of the Society, in the light of fiscal uncertainty and technological change. The transition to the Canada Not-for-profit Corporations Act was completed, with the submission of our Articles of Continuance and new By-laws to Industry Canada and approval of our continuance in October 2013. A new Treasurer, Christopher Dufault, and Editor-in-Chief, Kevin Floate, have also assumed their roles. Conference registration and membership renewals are on their way to becoming fully online. The Standing Rules have been revised to comply with the new Act and By-laws, and were made available for member review on the website. A financial planning exercise has been initiated. Planning is under way for the Society's activities at the International Congress of Entomology (ICE 2016) in Orlando, Florida, in September 2016. An Ad Hoc Committee on Headquarters Operations chaired by Bernie Roitberg examined staffing and headquarters options. It is my hope that accepting the recommendation of this committee will allow society operations to be fiscally sustainable, enhance membership services, streamline and modernize society operations, open us up to new opportunities with respect to non-traditional revenue streams and new audiences, help to lighten the load on our volunteers, and allow the Society to be strategic about future initiatives, so that the hard work of all our volunteers can have the biggest benefit for the Society and our members.

#### Links with Canadian pest management societies

We were approached by the President of the Canadian Weed Science Society with a request to explore ways of increasing communication with other Canadian societies involved in pest management. Initially this will involve setting up a news corner in the *Bulletin* and the website for the various Societies to share their news.

#### Review and Update of Standing Rules

The chair of the By-Laws Rules and Regulations Committee presented the draft of the revised Standing Rules prepared by the Committee which have been posted on the website for feedback from members since early September. Two amendments were proposed and accepted, one

to remove the specific dollar amounts for dues from the Standing Rules, and one specifying the discounts received by student and early professional members. The revised Rules will be presented at the Annual Meeting of Members for approval.

### **Financial Year End Change**

The process has been initiated to change the financial year end of the Society and the Scholarship Fund to June 30, to comply with the requirement of the Act that the Annual Meeting be held within 6 months of the financial year end.

### **Investment Strategy**

The Treasurer reviewed two proposals from investment advisers to increase the yield on the Society's investments, in view of the very low interest rates currently obtainable from federal and provincial government bonds. The Board voted to accept the proposal from TD Waterhouse.

### **Headquarters Operations**

The President reviewed the work done by the Ad Hoc Committee on Headquarters Operations, and discussed the proposals received from Strauss Event & Association Management (Winnipeg) and Base Consulting and Management (Toronto). After review by the Finance Committee and receipt of revised proposals from both companies, the Committee recommended to accept the proposal from Strauss. The Board voted to accept this proposal.

### **Archives**

Scanning of the Society's archives held at the Headquarters building in Ottawa is under way and is scheduled to be completed in December. The possibility of archiving historical materials with Archives Canada is being investigated.

### **Annual Meetings**

The 2015 Joint Annual Meeting will be held with the Société d'entomologie du Québec in Montreal, 8 – 11 November 2015. There will be no JAM in 2016 because of ICE 2016. Registration for the 2014 JAM was handled by a conference management firm (Conference Manager, a division of de Armond Management Ltd). The experience has been generally positive although there were issues with the system not recording which presentations had been entered for the President's Prize.

### **International Congress of Entomology**

Murray Isman has been appointed Chair of an Ad Hoc Committee to coordinate the Society's interactions with ICE 2016. The Student Affairs Committee and the Annual Meetings Committee recommended a schedule for ESC events at ICE 2016, and provided estimates of associated costs. There was discussion of a proposal that student travel awards for attendance at ICE 2016 be funded by obtaining sponsorships.

### **Scholarship Fund Trustees**

Awards were made as follows: Graduate Research Travel Scholarship: Robyn McCallum, Dalhousie University; Postgraduate Awards (a) PhD recipient, Andony Melathopoulos, Dalhousie University (b) MSc recipient, Rajakaruna Wanigasekara Mudiyansele Udari Madushani Wanigasekara, University of Manitoba; John H. Borden Scholarship: Loay Jabre, Acadia University; Biological Survey of Canada Scholarship: Meredith E. Miller, University of Guelph. To ensure continued maintenance of the Fund's charitable status, the requirements for its arms-

length association with the ESC were clarified within the revised ESC Standing Rules. The Fund's Board of Trustees must next draft their own, independent Standing Rules, which will not be voted on by the ESC membership.

### **Achievement Awards**

The Committee recommended David Gillespie for the Gold Medal, Patrice Bouchard for the C. Gordon Hewitt Award, and Todd Lawton for the Bert & John Carr Award. The Entomological Society of Saskatchewan nominated Brian David Olson of Hazlet, Saskatchewan, for the Norman Criddle Award, and this nomination was unanimously accepted by the Committee. A ¼ oz. Fine Silver Coin (Animal Architects: Caterpillar and Chrysalis - 2014) was purchased and will serve as the award in lieu of the out-of-print book "Criddle-de-diddle-ensis" which has been the traditional award prior to 2013. There was discussion of items to be used for future awards, including perhaps commissioning illustrations of some Criddle insects.

### **Publications Committee**

ESC agreed to a request by Cambridge University Press for an increase in page length for *The Canadian Entomologist (TCE)* to clear a backlog of accepted manuscripts. Swets & Zeitlinger, a major subscription agency handling journal subscriptions for many libraries worldwide, including *TCE*, has gone bankrupt. Abstracts for *TCE* submissions are now only required in the language of the manuscript. The Committee has accepted a change in the publication agreement that would impose a 6 month embargo on the sharing of manuscripts accepted for publication in *TCE*, and require that only abstracts of the Version of Record could be shared or posted online.

### **Blog Administrators**

There have been few submissions to the Blog, and ways of stimulating interest were discussed.

### **ESA Science Policy Fellowship Program**

The Society decided to withdraw from the Entomological Society of America's Science Policy Fellowship Program as the program was very centred on US issues and did not translate well to the Canadian context. There was some discussion of the potential for creating a Canadian equivalent.

## **Minutes of the 64th Annual Meeting of Members Radisson Hotel, Saskatoon, Saskatchewan 30 September 2014**

The meeting was called to order at 17:05 with 74 members present.

### **1. Notice of Meeting**

The notice of meeting was published in the June and September 2014 issues of the *Bulletin*.

### **2. Additions to and approval of the Agenda**

P. Fields **moved** and C. Dufault **seconded** that the agenda be accepted.

### **3. Minutes of the 63<sup>rd</sup> Annual General Meeting**

The minutes of the 63<sup>rd</sup> Annual General Meeting were posted on the website and published in the December 2013 *Bulletin*. N. Holliday **moved** and P. Mackay **seconded** that the minutes be

accepted. **Carried.**

**4. Commemoration of deceased members of the entomological community**

A minute of silence was observed in memory of the following members of the entomological community who passed away during the past year: William Preston, Michael Locke, Roy Pickford, Henry Howden, Dean Struble, Lloyd Dosdall, Robert Trottier, Irenée Rivard, Peter Harris, Dieter Schroeder, and Michael Smirle.

**5. Report from the Board of Directors**

President R. Hallett presented a review of the activities of the Board of Directors during the past year. The Board has decided to enter into a 3-yr contract with Strauss Event & Association Management to provide association management services to the Society. These will include financial and accounting operations, communications, membership database, JAM registration and title submission, teleconferencing, website management, and governance support. P. Mason **moved** and D. Gillespie **seconded** that the membership endorse the Board’s decision to enter into the contract with Strauss. **Carried.**

**6. Approval of Standing Rules**

W. Riel presented the revised Standing Rules, which have been updated to align with Canada’s Not-for-profit Corporations Act and to comply with our new By-laws, and which were approved by the Board of Directors at the meeting on 27 September 2014. The Rules were posted for comment on the Society’s website. W. Riel **moved** and P. Mason **seconded** that the Standing Rules be approved. **Carried.**

**7. Treasurer’s Report**

S. Brooks presented the audited financial statements for 2013. The auditor’s report was posted on the website and summarized in the September 2014 issue of the *Bulletin*.

**Financial year change**

P. Fields **moved** and J. McNeil **seconded** that the membership endorse the Board’s decision to change the Society’s financial year end from 31 December to 30 June, with effect from 2015. **Carried.**

**8. Election of Directors**

R. De Clerck-Floate **moved** and B. Lamb **seconded** that the following slate of Directors be elected for the 2014-2015 Societal year, with the terms of service indicated:

Staffan Lindgren (1-year term)	Societal Director and President
Terry Wheeler (2-year term)	Societal Director and 1 <sup>st</sup> Vice-President
Neil Holliday (3-year term)	Societal Director and 2 <sup>nd</sup> Vice-President
Zoë Lindo (1-year term)	Director at Large
Kirk Hillier (2-year term)	Director at Large
Chris Cutler (3-year term)	Director at Large
Bill Riel (1-year term)	Director from ESBC
Rob Longair (2-year term)	Director from ESA
Jeff Boone (3-year term)	Director from ESS
Barbara Sharanowski (3-year term)	Director from ESM
Patrice Bouchard (1-year term)	Director from ESO
Annabelle Firlej (2-year term)	Director from SEQ
Gaëtan Moreau (2-year term)	Director from AES

**Carried.**

**9. Presentation of Service Awards**

S. Lindgren took over the President's chair and presented service awards to outgoing President R. Hallett, former Editor-in-Chief C. Buddle and former Treasurer S. Brooks.

**10. Appointment of Public Accountant**

C.P. Dufault **moved** and R. Lamb **seconded** that Bouris Wilson LLP of Ottawa be appointed the Society's Public Accountant for the 2014 financial year and for the 6-month period January 1 to June 30 2015. **Carried.**

**11. Resolution on behalf of the ESC**

J. Sweeney moved the following resolution of thanks: Be it resolved that we thank the organizers of the ESC-ESS 2014 JAM for a successful meeting of stimulating scientific presentations and enjoyable social interactions in the beautiful city of Saskatoon and that we show our appreciation for their hard work and dedication with a big round of applause! Carried with a round of applause.

**12. Notice of 65<sup>th</sup> Annual Meeting**

The 65<sup>th</sup> Annual Meeting of Members will be held in Montreal, Quebec, on November 10, 2015.

**13. Adjournment**

The meeting was adjourned at 18:00.

**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 2015. If members have any items they wish to be discussed by the Executive, please send them to the Secretary, Alec McClay ([secretary@esc-sec.ca](mailto:secretary@esc-sec.ca)), by 16 January 2015.

**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 2015. Si des membres aimeraient ajouter des points à l'ordre du jour pour discussion par le conseil exécutif, merci de les envoyer au secrétaire, Alec McClay ([secretary@esc-sec.ca](mailto:secretary@esc-sec.ca)), au plus tard le 16 janvier 2015.

## 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 grantsmanship, 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, Terry Wheeler ([terry.wheeler@mcgill.ca](mailto:terry.wheeler@mcgill.ca)), if you have any eligibility or nomination process questions.

### 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).

Nominators should include the following information for both awards: 1. The name and address of the nominee(s); 2. A statement of relevant achievements (3-5 pages) which may include, but is not limited to, the following: outline of research areas, particularly major contributions; number of articles in refereed journals, books, book chapters, patents; editorial activities; teaching history, numbers of graduate students, teaching awards; value of grants; involvement in ESC; active involve-

## Appel à candidature : Prix d'excellence de la SEC

Connaissez-vous un entomologiste respecté qui mérite une reconnaissance pour ses contributions remarquables dans son domaine au Canada? Cette personne est-elle un leader dans son domaine par son succès en publications, brevets, travail éditorial et/ou subventions, enseignement et mentorat d'étudiants, ou même par du bénévolat actif dans la SEC et d'autres sociétés/organisations? Si oui, considérez de la nommer pour un de nos prix d'excellence de la Société. N'hésitez pas à contacter le président du comité des prix d'excellence, Terry Wheeler ([terry.wheeler@mcgill.ca](mailto:terry.wheeler@mcgill.ca)), si vous avez des questions concernant l'éligibilité ou le processus de nomination.

### Médaille d'or et prix C. Gordon Hewitt

*Ces deux prix récompensent les contributions remarquables en entomologie au Canada par un individu, mais les nominés pour le prix C. Gordon Hewitt doivent avoir défendu leur thèse de doctorat avec succès dans les 12 ans se terminant le 31 décembre de l'année durant laquelle le prix est remis. Les congés parentaux, de compassion ou de maladie ne sont pas comptés dans cette période de 12 ans; cependant, ces périodes doivent être identifiés dans la lettre de la personne qui soumet la candidature.*

Les nominations ne peuvent être faites que par des membres de la SEC, et doivent être signées par la personne qui soumet la nomination et par au moins un personne qui appui la nomination (qui doit aussi être membre de la SEC).

Les personnes qui soumettent la nomination doivent inclure les informations suivantes pour les deux prix : 1. Le nom et l'adresse du nominé ; 2. Un énoncé sur les accomplissements pertinents (3-5 pages) qui peut inclure, mais ne se limite pas à : domaine de recherche, contributions majeures particulières, nombre d'articles dans des revues avec évaluation, livres, chapitres de

ment and/or memberships in other Societies; entomological extension/community involvement; organizing of symposia, meetings; 3. A current curriculum vitae; and 4. The name of the nominator and at least one seconder.

The documentation should stress the particular achievement or achievements to be considered and not merely the general competences of the nominee. Other seconders may merely state their support, without documentation, in a letter of endorsement of the nomination. The Committee shall not prepare the documentation nor conduct research connected with it.

Please send nominations by e-mail to the Chair of the Achievement Awards Committee, Terry Wheeler ([terry.wheeler@mcgill.ca](mailto:terry.wheeler@mcgill.ca)) no later than **28 February 2015**.

### **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 Active or Special Members of the Society, and are to be sent by e-mail to the Chair of the Achievement Awards Committee, Terry Wheeler ([terry.wheeler@mcgill.ca](mailto:terry.wheeler@mcgill.ca)) no later than **28 February 2015**.

livres, brevets, activités éditoriales, histoire d'enseignement, nombre d'étudiants gradués, prix d'enseignement, valeur des subventions, implication dans la SEC, implication active et/ou adhésion à d'autres sociétés, implication dans la communauté entomologique, organisation de symposiums et 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, Terry Wheeler ([terry.wheeler@mcgill.ca](mailto:terry.wheeler@mcgill.ca)), au plus tard le **28 février 2015**.

### **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 actif de la Société au moment de la nomination.*

Collectivement, les membres honoraires ne peuvent pas totaliser plus de 10 membres ou 1% des membres actifs de la Société. Les nominations doivent être supportées par au moins cinq membres actifs ou spéciaux de la Société, et doivent être envoyées par courriel au président du comité des prix d'excellence, Terry Wheeler ([terry.wheeler@mcgill.ca](mailto:terry.wheeler@mcgill.ca)), au plus tard le **28 février 2015**.



## Fellows of the Entomological Society of Canada

*Fellows are deemed to have made a major contribution to entomology, and are to be Active Members of the Society at the time of nomination. Their contribution may be in any area (e.g., research, teaching, application or administration), and may be judged on the basis of contribution to and stimulation of the work of others, as well as by direct personal effort.* Collectively, Fellows may not comprise more than 10% of the active membership of the Society.

Nominations should be supported by at least four Active or Special Members of the Society, and are to be sent by e-mail to the Chair of the Achievement Awards Committee, Terry Wheeler ([terry.wheeler@mcgill.ca](mailto:terry.wheeler@mcgill.ca)) no later than **28 February 2015**.

## 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, Terry Wheeler ([terry.wheeler@mcgill.ca](mailto:terry.wheeler@mcgill.ca)) no later than **28 February 2015**.

## Fiduciaires de la Société d'entomologie du Canada

*Les fiduciaires sont considérés comme ayant apporté une contribution majeure à l'entomologie et doivent être des membres actifs de la Société au moment de la nomination. Leur contribution peut se situer dans n'importe quel domaine (e.g. recherche, enseignement, application ou administration), et ils seront jugés selon leur contribution et la stimulation au 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 supportées par au moins quatre membres actifs ou spéciaux de la Société et doivent être envoyées par courriel au président du comité des prix d'excellence, Terry Wheeler ([terry.wheeler@mcgill.ca](mailto:terry.wheeler@mcgill.ca)), au plus tard le **28 février 2015**.

## 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 devant être entreprises par le candidat, dont une estimation des coûts jusqu'à concurrence de 500\$ ; et 3. Un curriculum vitae à jour.

Les candidatures doivent être envoyées soit par courriel au président du comité des prix d'excellence, Terry Wheeler ([terry.wheeler@mcgill.ca](mailto:terry.wheeler@mcgill.ca)), au plus tard le **28 février 2015**.

## Graduate Student Opportunity in Entomology in the Department of Biological Sciences, University of Alberta

**Principal Investigators:** Drs Maya Evenden [http://www.biology.ualberta.ca/faculty/maya\\_evenden/](http://www.biology.ualberta.ca/faculty/maya_evenden/)  
and Allan Carroll <http://profiles.forestry.ubc.ca/person/allan-carroll/>

**Project title:** *Characterization of the Endemic-Epidemic Population Threshold in the Mountain Pine Beetle*

Highly qualified potential graduate students are invited to join the Department of Biological Sciences at the University of Alberta (<http://www.biology.ualberta.ca/>) in the lab of Dr Maya Evenden. Although based at the University of Alberta, this project will be conducted with Dr Allan Carroll in the Department of Forest and Conservation Sciences (<http://www.forestry.ubc.ca/>) at the University of British Columbia.

**Project:** This project is part of a large multi-institutional, multi-investigator study: “*The NSERC TRIA Network: Turning risk into action for the Mountain Pine Beetle (MPB) epidemic*” (<http://www.thetriaproject.ca/>) with the main goal to fill key knowledge gaps of the MPB-pine-fungal associate system that limits our ability to monitor, assess, and predict MPB risk to Canada’s forests. Within this overall objective, the graduate student will **determine potential for long-term persistence and eruption by MPB in novel pine forests.**

### Objectives

- (1) Quantify the endemic niche of MPB in novel habitats east of the Rocky Mountains.
- (2) Determine the endemic-epidemic threshold in these novel habitats.
- (3) Determine the effect of population density on MPB dispersal capacity.

The student will conduct both field and laboratory experiments to achieve these objectives. Applicants must have an honours degree or higher (e.g., MSc) relevant to biology, training and experience. We seek students with an interest in ecology, and a background in entomology and field work would be an asset. Applicants should have a high GPA (3.5+ or minimum A-), be highly competent in quantitative analyses, and possess excellent written and oral communication skills in English.

The position provides full funding for MSc (2.3 years) or PhD (5 years) to qualified applicants. **Application process:** Applicants must first send a cover letter outlining their relevant background and research interests, their CV, and the names of 2-3 potential references to [mevenden@ualberta.ca](mailto:mevenden@ualberta.ca). Interviews and formal invitation to apply to the graduate program in Biological Sciences may then follow for those who meet the criteria.

For Graduate Program Information see: <http://www.biology.ualberta.ca/programs/graduate/>

### **Graduate Student Opportunity: Spatial Genomic Analysis of North American Mountain Pine Beetle Outbreaks**

We are recruiting a graduate student to investigate the spatial genomic patterns among outbreak populations of mountain pine beetle across North America. This will involve collaborative work among a number of Canadian universities and Canadian Forest Service, conducted under funding to the TRIA project (see [www.thetriaproject.ca](http://www.thetriaproject.ca)). The work will build upon previous spatial genetic studies (e.g., Samarasekera et al 2012; Janes et al 2014) by using a genotype-by-sequencing approach to explore genomic differences among outbreak populations across North America and to identify loci under local selection. Results of this study will improve our understanding of the genetic differences among mountain pine beetle outbreaks and provide much needed information for the ongoing management and predictive modeling of future outbreaks.

The qualified student will conduct the majority of their course work and research at the Prince George campus of the University of Northern British Columbia, but will also have the opportunity to engage in courses and meetings involving TRIA members from other Canadian universities. UNBC is a small, dynamic research intensive university ([www.unbc.ca](http://www.unbc.ca)). Situated in the geographic centre of British Columbia, the Prince George area offers an affordable quality of life and an abundant of summer and winter outdoor recreation activities. Please see our website for more information on the Natural Resources and Environmental Studies Graduate Program including degree requirements and expectations ([www.unbc.ca/nres/](http://www.unbc.ca/nres/)).

**Qualifications:** This is a challenging, but rewarding project requiring a range of interests and aptitudes. Preferably, the successful applicant will have a degree in biology or ecology. Previous experience and coursework in insect biology, population genetics and/or molecular ecology are an asset. The student should be willing to work in a collaborative environment with multiple university and government research partners.

Ideally the graduate student will begin in May 2015, although earlier or later start dates will be considered. We anticipate a competitive stipend (~Can\$20,000/year) and full funding to support lab and other research activities.

For **further information** please contact Brent Murray ([brent.murray@unbc.ca](mailto:brent.murray@unbc.ca); 1-250-960-5638; <http://web.unbc.ca/~murrayb>).

#### **References cited**

- Samarasekera NG, Bartell N, Lindgren BS, Cooke JEK, Davis CS, James PMA, Coltman DW, Mock KE, and Murray BW. 2012. Spatial genetic structure of the mountain pine beetle (*Dendroctonus ponderosae*) outbreak in western Canada: Historical patterns and contemporary dispersal. *Molecular Ecology*, **21**:2931-2948.
- Janes JK, Li Y, Keeling CI, Yuen MMS, Boone CK, Cooke JEK, Bohlmann J, Huber PW, Murray BW, Coltman DW and Sperling FAH. 2014. How the mountain pine beetle (*Dendroctonus ponderosae*) breached the Canadian Rocky Mountains. *Molecular Biology and Evolution* advanced press, April 22, 2014; doi: 10.1093/molbev/msu135

# Joint Annual Meeting / Réunion annuelle conjointe

## THE JOINT ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF CANADA AND THE ENTOMOLOGICAL SOCIETY OF QUEBEC

The Marriott Château Champlain, Montréal, Québec

Sunday 8 November – Wednesday 11 November 2015

The Entomological Society of Québec invites you to the 2015 Joint Annual Meeting of the Entomological Society of Canada and the Entomological Society of Québec to be held at the Marriott Château Champlain Montréal, Québec, from 8 November to 11 November 2015.

Room rates are \$169 per night plus taxes. Parking is \$23 per day. ESC participants staying at the meeting's host hotel will receive a \$15 discount on their meeting registration with proof of their hotel reservation.

The deadline to reserve rooms is 7 October 2015. Rooms might still be available afterwards but we can't guarantee it.

**Marriott Château Champlain**

**1050 Rue de la Gauchetière Ouest, Montréal, Québec H3B 4C9**

**Phone : (514) 878-9000**

<http://www.montrealchateauchamplain.com/index.htm>

### PROGRAM HIGHLIGHTS

Our meeting theme is "Entomology in the Anthropocene". Given that the footprint of human activity can be seen in all corners of the planet, there is a growing consensus among scientists that we have now entered a new epoch that is defined by the significant global impact of human activities on all of Earth's ecosystems and their biodiversity. We want to use the identification of this new epoch as an opportunity to discuss how all fields of research in entomology are adapting to the Anthropocene.

**Plenary symposium theme: Entomology in the Anthropocene.**

**Confirmed Plenary Speakers:**

*-May Berenbaum, Professor and department head, School of Integrative Biology, University of Illinois at Urbana-Champaign*

*-Jessica J. Hellmann, Associate Professor Department of Biological Sciences, University of Notre Dame*

**Symposia:**

Graduate Student Showcase

Biological Survey of Canada

Call for Symposia to be posted by the end of November 2014

**Heritage lecture:**

*-Guy Boivin, Research Scientist, Entomology, Horticulture Research and Development Centre -Agriculture and Agri-Food Canada*

**Student paper and poster competitions**

**Regular poster and presented papers sessions**

**For More Information:**

Check the SEQ webpage ([http://seq.qc.ca/activites/reunions/SEQ-ESC\\_2015/index2.asp](http://seq.qc.ca/activites/reunions/SEQ-ESC_2015/index2.asp)) for updated information on symposia and the call for papers.

**Deadlines:**

August 31 2015: Title/abstract submissions

1st September 2015: Early registration fees

7 October 2015: Hotel room reservation. It is advisable to book your room early, after October 7<sup>th</sup> our block of rooms will be made available to anyone!

## RÉUNION ANNUELLE CONJOINTE DE LA SOCIÉTÉ D'ENTOMOLOGIE DU CANADA ET DE LA SOCIÉTÉ D'ENTOMOLOGIE DU QUÉBEC

Marriott Château Champlain, Montréal, Québec  
Dimanche 8 novembre – mercredi 11 novembre 2015

Nous vous invitons à la réunion conjointe annuelle de la Société d'entomologie du Canada et de la Société d'entomologie du Québec qui se tiendra à l'hôtel Marriott Château Champlain de Montréal, Québec, du 8 novembre au 11 novembre 2015.

Le tarif des chambres est de 169\$ par nuit plus taxes et le parking coûte 23\$ par jour. Les participants au congrès qui dormiront à l'hôtel d'accueil recevront un rabais de 15\$ sur leur inscription au congrès avec la preuve de la réservation de l'hôtel.

La date limite pour réserver une chambre est le 7 octobre 2015, des chambres pourront encore être disponibles après cette date mais sans garantie du prix ou de disponibilité.

Pour réserver :

**Hôtel Marriott Château Champlain**  
**1050 Rue de la Gauchetière Ouest, Montréal, Québec H3B 4C9**  
**Téléphone : (514) 878-9000**

<http://www.montrealchateauchamplain.com/index.htm>

### POINTS SAILLANTS DU PROGRAMME

Le thème de la réunion est « l'entomologie dans l'anthropocène ». Sachant que l'empreinte de l'activité humaine peut être visible à chaque coin de la planète, il y a un consensus croissant parmi les scientifiques que nous sommes maintenant entrés dans une nouvelle époque définie par des effets globaux significatifs des activités humaines sur les écosystèmes de la planète et leur biodiversité. Nous voulons profiter de l'entrée dans cette époque comme opportunité de discuter comment tous les champs de recherche en entomologie s'adaptent à l'anthropocène.

#### **Conférenciers confirmés pour la session plénière: Entomologie dans l'anthropocène**

*-May Berenbaum, Professeur et directrice du département, École de biologie intégrative, Université d'Illinois à Urbana-Champaign*

*-Jessica J. Hellmann, Professeur associé – Département des sciences biologiques – Université de Notre Dame*

#### **Symposium:**

Vitrine aux étudiants gradués

Commission biologique du Canada

L'appel de soumissions pour les symposiums sera en ligne à la fin de novembre 2014.

#### **Allocution du patrimoine:**

*-Guy Boivin, Chercheur scientifique, Entomologie, Centre de recherche et de développement en horticulture-Agriculture et Agroalimentaire Canada*

#### **Compétition étudiantes : présentations et affiches**

#### **Présentations et affiches régulières**

#### **Pour plus d'information:**

Allez voir la page internet de la SEQ ([http://seq.qc.ca/activites/reunions/SEQ-ESC\\_2015/index2.asp](http://seq.qc.ca/activites/reunions/SEQ-ESC_2015/index2.asp)) pour des mises à jour de l'information sur les symposiums et les appels à conférences.

#### **Dates limites:**

31 août 2015: soumission des titres/résumés

1er septembre 2015: première inscription à tarif préférentiel

7 octobre 2015: réservation des chambres d'hôtel. Il est préférable de réserver vos chambres rapidement, après le 7 octobre, nos blocs de chambres réservées seront disponibles pour tout le monde!

## ***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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Entomological Society of Canada  
386 Broadway, Suite 503  
Winnipeg, Manitoba R3C 3R6  
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[www.esc-sec.ca/](http://www.esc-sec.ca/)

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

Send correspondence to:  
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**Submission deadline for the next issue: 31 January 2015**



## ***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.

Publié par la  
Société d'entomologie du Canada  
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[www.esc-sec.ca/](http://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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Rédacteur du *Bulletin*  
Department of Biology  
University of Saskatchewan  
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ISSN: 0071-0741

Droits d'auteur 2014 Société d'entomologie du Canada

**Date de tombée pour le prochain numéro: 31 janvier 2015**

# Officers of affiliated Societies, 2013-2014

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<http://www.acadianes.org/index.html>

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





### Wrapping up another year

Another year of producing the *Bulletin* has slipped by, the fifth under my editorship and the first without a printed version. Moving to an on-line only version of the *Bulletin* has certainly simplified its production and has eliminated the high cost of printing. So far we have received no complaints – but is this tempting fate?

Sadly, with this issue, we say goodbye to the long-standing series ‘Dear Buggy’ which, for some 7 years has discussed a wide range of topics of interest especially to students but also that caught the eye of more elderly readers. Chris MacQuarrie (aka Buggy) now has new responsibilities, both professional and personal, that have precipitated his decision to bring about closure, and the editors sincerely thank him for his strong support of the *Bulletin*’s aim of bringing news, ideas and information to Society members (and, indeed, as it’s an open-access publication, other folks with an entomological bent).

As always, if any reader has an idea for an article or a series running over several issues, please get in touch (provided, of course, that you’re prepared to do the writing!).

### Une autre année qui se termine

Une autre année à produire le *Bulletin* a filé, la cinquième sous ma gouverne et la première sans version imprimée. Passer à une version en ligne seulement du *Bulletin* a certainement simplifié sa production et a éliminé les coûts importants de l’impression. Jusqu’à maintenant, nous n’avons reçu aucune plainte – mais est-ce tenter le sort?

Nous devons tristement, avec ce numéro, dire au revoir à la longue série de « Cher Bibitte » qui, durant 7 ans, a abordé une vaste gamme de sujets d’intérêt, particulièrement pour les étudiants, mais qui a aussi attiré l’attention de lecteurs plus âgés. Chris MacQuarrie (alias Bibitte) a maintenant de nouvelles responsabilités, autant du côté professionnel que personnel, ce qui a précipité sa décision de s’arrêter, et les rédacteurs le remercient sincèrement pour son soutien à l’objectif du *Bulletin* d’apporter des nouvelles, des idées et des informations aux membres de la Société (et, évidemment, puisqu’il s’agit d’une publication libre d’accès, à d’autres personnes ayant un intérêt entomologique).

Comme toujours, si un lecteur a une idée pour un article, ou une série d’articles sur plusieurs numéros, merci de nous contacter (considérant, évidemment, que vous êtes prêt à les écrire!).

# Entomological Society of Canada, 2014-2015

## Société d'entomologie du Canada, 2014-2015

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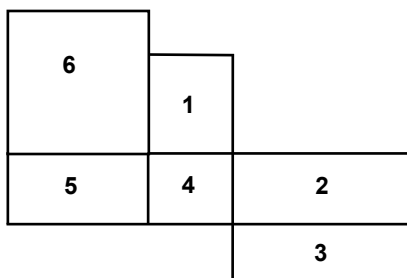
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## Images

**Beneath the title:** *Cucullia lychnitis* caterpillar on a stem of *Verbascum* (Escalona, Aragon, Spain) 1 July 2011. Photo: Francois Lieutier

- 1 Young Entomologist Aya Hoover in action inspecting a frame of honey bees (*Apis mellifera*) (Beaverlodge Research Farm, Alberta, Canada). Photo: Shelley Hoover
- 2 One of Canada's rare stag beetles, *Sinodendron rugosum*, walks across the moss (Burnaby Mountain, British Columbia, Canada); 31 July 2013. Photo: Sean McCann
- 3 Female *Phiddipus regius* (Lake Placid, Florida, United States of America). Photo: Guillaume Dury
- 4 Cabbage seedpod weevil (*Ceutorhynchus obstrictus*), an invasive pest of canola (Delémont, Switzerland). Photo: Tim Haye
- 5 Treehoppers (Membracidae) found along a small tree in Guyana being tended by ants (not shown). Photo: Steven Paiero
- 6 Cicada, *Platypedia areolata*, emerged from its chrysalis (Idaho, United States of America). Photo: Malcolm Furniss

**Back cover:** An undetermined Orthoptera (too many tarsomeres for a shorthorned grasshopper) moving its biomass up the food chain. Say's phoebe is doing the honours...  
Photo: Bob Lalonde

Français à l'intérieur de la couverture avant.