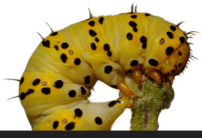

Bulletin

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Société d'entomologie du Canada

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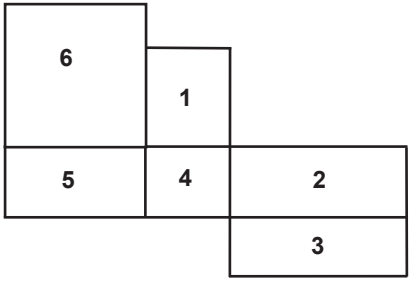


Up front / Avant-propos

Rebecca Hallett, President of ESC / Présidente de la SEC

Before you dash out to the field...

Although it barely seems to be true, as I walk across campus shivering and contemplating the need for gloves in mid-May, Spring has finally come to Canada. It was a long cold winter for most of us this year, a time for contemplating and considering Society matters as we nurtured arms and backs aching from yet another round of snow shovelling. But now, Spring has come! Plant and insect life is springing madly from the ground and overwintering hiding spots, and renewal is in the air. A number of Society activities that I have mentioned in previous columns are about to reach fruition and there will be much to report in the next issue of the Bulletin regarding those matters.

At this point, the outdoors is beckoning, field season activities are underway and we are all looking forward to another productive research season. I know we're all itching to get out there, so I just want to bring your attention quickly to a few important items before you go.

Avant que nous ne vous précipitiez sur le terrain...

Même si cela semble à peine vrai, alors que je marche sur le campus en grelottant et en constatant le besoin de porter des gants à la mi-mai, le printemps est finalement arrivé au Canada. La plupart d'entre nous avons eu un hiver long et froid cette année, et donc beaucoup de temps pour envisager et considérer les questions de la Société alors que nous soignions nos douleurs aux bras et au dos après une autre ronde de pelletage de neige. Mais maintenant, le printemps est arrivé! Les plantes et les insectes émergent du sol et de lieux d'hivernage cachés, et le renouveau est dans l'air. Bon nombre d'activités de la Société que j'ai mentionnées dans ma dernière rubrique concernent l'atteinte de réalisations et il y aura beaucoup à rapporter dans le prochain numéro du Bulletin à ce sujet.

En ce moment, l'extérieur est attirant, les activités de terrain sont en route et nous espérons tous une autre saison productive de recherche sur le terrain. Je sais que nous avons tous hâte de sortir dehors, alors je veux simplement attirer votre attention brièvement sur quelques points importants avant que vous n'y alliez :

Rappelez-vous de vous inscrire et de soumettre vos titres pour la **réunion conjointe annuelle SEC-SES 2014 « L'entomologie dans un monde en changement »**, qui se tiendra du 28 septembre au 1er octobre 2014 à Saskatoon. Nous utilisons un nouveau système d'inscription pour cette conférence, et tous les membres ont reçu le code de réduction des membres par courriel le 2 mai.

Remember to register and submit your titles for the **ESC-ESS JAM 2014 *"Entomology in a Changing World"***, to be held 28 September – 1 October 2014 in Saskatoon. We are using a new registration system for this conference, and all members were sent the members' discount code by email on 2 May.

- Visit the meeting's website at http://www.entsocsask.ca/esc/esc-ess.html for more information and to register on line.
- The submission deadline for Papers & Posters is **1 August 2014**. (Note, however, that the deadline for entries for the **Graduate Student Showcase**, is **1 July 2014** – see page 71.)
- Early registration ends **1 August,** and online registration ends **1 October**.

Remember to vote online in the Plebiscite for the Board of Directors when the call comes out. Due to our transition to the Canada Not-for-Profit Corporation Act (CNCA), some changes have been made to our elections process.

- Under the CNCA, the former Governing Board is now called the "Board of Directors".
- Each year a plebiscite will be held for the positions of Director-At-Large and 2nd Vice President.
- The results of the plebiscite will be used in constructing the slate of candidates for the Board of Directors. The slate will then be ratified, or formally elected, at the AGM in the Fall.
- Please make sure to vote – we need your input into this important process that determines the governance of our Society!

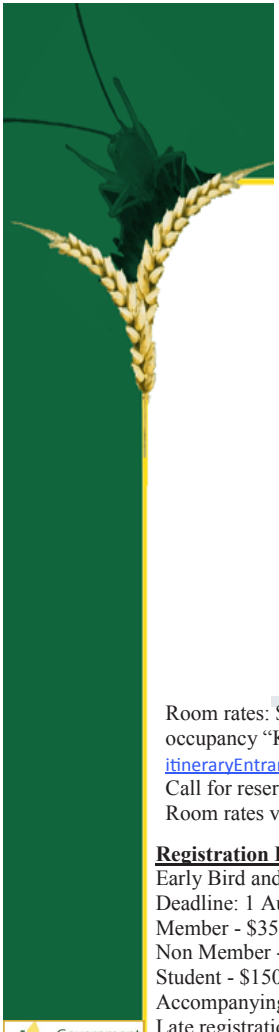
That's it! Have a wonderful and productive research season. I look forward to hearing all about the fruits of your labours at JAM 2014!!

- Visitez le site Internet de la réunion à http://www.entsocsask.ca/esc/sec-ses.html pour plus d'informations et pour s'inscrire en ligne.
- La date limite pour la soumission des présentations est le **1er août 2014**. (Veuillez noter, cependant, que la date limite pour la **vitrine aux étudiants gradués** est le **1er juillet 2014** – voir page 71)
- Les inscriptions hâtives se terminent le **1er août**, et les inscriptions en ligne se terminent le **1er octobre**.

N'oubliez pas de voter en ligne lors du plébiscite du conseil d'administration quand l'appel sera lancé. À cause de notre transition vers la nouvelle Loi canadienne sur les organisations à but non lucratif (LOBNL), quelques changements ont été apportés à notre procédure d'élections.

- En vertu de la LCOBNL, bien qu'en français, on parle encore de conseil d'administration, en anglais, l'ancien « Governing Board » s'appelle maintenant « Board of directors ».
- Chaque année, un plébiscite sera tenu pour les postes de conseiller et second vice-président.
- Le résultat du plébiscite sera utilisé afin de bâtir la liste de candidats pour le conseil d'administration. La liste sera ensuite ratifiée, ou formellement élue, à l'AGA à l'automne.
- Merci de voter – nous avons besoin de votre apport dans ce processus important qui détermine la gouvernance de notre Société!

Voilà! Ayez une saison de recherche magnifique et productive. J'espère vous entendre concernant le fruit de vos labeurs à la réunion 2014!



Joint Annual Meeting of the Entomological Societies of Canada and Saskatchewan

"Entomology in a Changing World"

Saskatoon, Saskatchewan

Sunday 28 September–Wednesday 1 October 2014

Radisson Hotel

405-20th Street E, Saskatoon, Saskatchewan

Room rates: $172 for single or double occupancy "Queen" rooms and $182 single or double occupancy "King" rooms (+$12/day parking) (http://www.radisson.com/reservation/itineraryEntrance.do?pacLink=Y&promoCode=ENTOM&hotelCode=SKSASKAT) code ENTOM
Call for reservations using group code "Entomological Society of Canada". 1-800-665-3322
Room rates valid until August 27, 2014.

Registration Details

Early Bird and Title Submission Deadline: 1 August 2014
Member - $350
Non Member - $450
Student - $150
Accompanying Person - $50
Late registration add - $100

Program Highlights

Plenary Symposium: Entomology in a Changing World
Heritage Lecture
Gold Medal Address
Graduate Student Showcase
Student Paper and Poster Competitions
Regular Oral and Poster Presentation Sessions

Symposia:
Biological Control in a Changing World
Insect "omics"-Impact on Insect Management
The Changing Face of Urban Entomology

Réunion annuelle conjointe des Sociétés d'entomologie du Canada et de la Saskatchewan

"L'entomologie dans un monde en changement"

Saskatoon, Saskatchewan

Dimanche 28 septembre –mercredi 1 octobre 2014

Radisson Hotel

405-20th Street E, Saskatoon, Saskatchewan

Tarif des chambres: 172$ en occupation simple ou double en chambre « Queen » et 182$ en occupation simple ou double en chambre « King » (+12$/jour de stationnement) (http://www.radisson.com/reservation/itineraryEntrance.do?pacLink=Y&promoCode=ENTOM&hotelCode=SKSASKAT) code ENTOM
Appelez pour réserver en utilisant le code de groupe « Entomological Society of Canada »: 1-800-665-3322. Taux valable jusqu'au 27 Août 2014.

Détails pour l'inscription

Date limite hâtive et titre soumission: 1 août 2014
Membre - 350$
Non Membre - 450$
Étudiant - 150$
Accompagnateur - 50$
Pour les inscriptions tardives, adjouter—100$

Points saillants du programme

Session plénière: "L'entomologie dans un monde en changement"
Allocution du patrimoine
Présentation de la médaille d'or de la SEC
Salon des étudiants gradués
Compétition étudiante: présentations et affiches
Présentations et affiches régulières

Symposia:
- La lutte biologique dans un monde en changement
- Les « Omiques » des insectes – Impact sur la gestion des insectes
- Le nouveau visage de l'entomologie urbaine

On work-life balance in early career

So you say you want to be a research scientist? Think you can handle the work load and still keep a semblance of a normal life? But doesn't that beg the question, what is the work load of a 'typical' scientist?

We've all heard stories of researchers who work 80 hours a week, never take a vacation, and neglect their personal needs (including grooming). I'm convinced that this is an urban myth, like Sasquatch or the PhD student who finishes their program in 3 years. Reality is probably less extreme. Regardless, the part of those stories that we don't talk about is if that kind of life, be it real or not, is something we should aspire to.

The term 'work-life balance' was coined, according to the sages at Wikipedia, in the 1970s to describe the relationship and competing demands of our working lives and our personal lives. (For the graduate students reading this column, a personal life is that thing your supervisor says you're not allowed to have. You'll get it back when you defend. I promise.) The term is most often applied to jobs and professions where the division between work life and home life is easily defined. For scientists though, the distinction between our two lives is often not as clear. For most scientists, their research pursuits often blend into their personal lives, especially in entomology where the pursuit can often be both a profession and a hobby.

The distinction between researchers and members of other professions is where the pressure to work long hours comes from. In many careers the pressures are "top-down" (to borrow a term from ecology). That is, the intrusion of work life into home life is driven by the needs of the employer, or the needs of a client. For scientists, the pressures are often "bottom-up" (to use the complementary term), and come from within. This manifests as a desire to do more, to take on one more research question, and assume more responsibilities because of a need to chase one more interesting question, or bulk out our CVs. Top-down pressures are easily regulated. We can turn off the BlackBerry and refuse to answer the phone after 5pm. Bottom-up pressures are harder to manage, because the off switch can be harder to find.

Just what is a "normal" work-life balance? I put normal in quotation blocks, because in truth there likely is no such thing as a normal balance. Instead, and as with all things "normal", there is a distribution of all possible combinations of work and life. Some combinations will be more frequent than others, and where you fall on that distribution will depend on your personal circumstances. However, I'd expect you'd find most researchers clustered towards the 'work' end of the distribution.

If we assume this distribution is real and we were to follow an individual over the course of their career, we might see them move about from place to place as their life changes. I quipped earlier about graduate students not being allowed have a life, so then we might expect their life to be heavily weighted towards work. When graduate students becomes fully-fledged researchers

Chris MacQuarrie is a research scientist with Natural Resources Canada, Canadian Forest Service, in Sault Ste. Marie where he studies the management of native and invasive insects. Currently, he's hoping he never hears the term 'polar vortex' again. Have an idea for a column? Send it to cjkmacquarrie@gmail.com, ping me on Twitter @cmacquar, or post in the Facebook student group.

and their responsibilities away from work grow and change, we might find that they are pulled towards the 'life' end of the distribution, but bounce around a lot as various demands come and go. Later on as senior researchers, we might find they've arrived at a stable point where those demands have achieved equilibrium. It should be obvious that it's normal for us to float along our hypothetical distribution over the course of a career. What we should avoid though is the temptation to draw conclusions about what is an 'ideal' or 'normal' work-life balance just based on observations of mentors or our peers. What is normal and healthy for one individual may not be for another.

If our position on the distribution of work-life balance will change over time then it's likely that at times we will be in the 'wrong' part of the distribution. But how do you tell? Well, for a moment then perhaps we should explore indicators of balance. This is not an exhaustive list, but it should give us some things to look for. Does your work get done on time, and is it done well? Are you delivering on your professional commitments on time and as promised? Do you feel like you could take on extra responsibilities without compromising what you're doing now? In your private life are you maintaining healthy relationships with your family and friends? Are you eating well and getting exercise? Are you looking after your home and personal commitments? Your answers to these questions should give you an indication of how you're managing your work-life balance.

My point above is perhaps better illustrated as a metaphor because it's unlikely you will ever achieve a perfect balance. Rather, envision these indicators as lights or dials in a control panel. You might see that some are in the green, while others are in the red. Trouble is likely indicated when a cluster of indicators are all in the red at the same time. For scientists, it's our 'life' indicators that are the ones most likely to be in the red. If they are, it's important to pay attention, because our work lives and our private lives are linked. Having a bunch of indicators in the red is a good sign that the whole system is in danger of overloading and collapse.

Achieving work-life balance can be tricky, but it's not impossible. An edition of my column would not be complete without a list of helpful tips, so here are some for achieving a good work-life balance.

1. Create boundaries, and respect them. It is possible to work as much as you want as long as you are strict about when you are not going to work, or what work you take on. This can be as simple as refusing to answer email after certain time at night, or as complicated as limiting the number of graduate students you supervise at once.

2. Budget your time (and don't over spend). There is a finite number of hours in the day and days in a year. Every time you consider taking on a new project (be it at home or at work) evaluate how it will impact the time remaining in your budget. If your time budget is fully allocated but you really want to take on something new, then do the hard thing and give up something else. (This is this position I'm in now and which inspired me to write on this topic. I have an opportunity to take on a new role, but it means giving up something else.) These decisions are hard, but to quote a colleague: "be strategic with your time and burn the candle at one end".

3. Enlist help to maintain balance. A bad balance between work and life doesn't become apparent until we reach a breaking point. Often, this comes at the expense of damaging an important relationship. As your life gets more complicated, and you begin to have more responsibilities, discuss these things with those who matter to you. Perspective is an important thing, and it is often those around us who can see if we're headed towards a bad place.

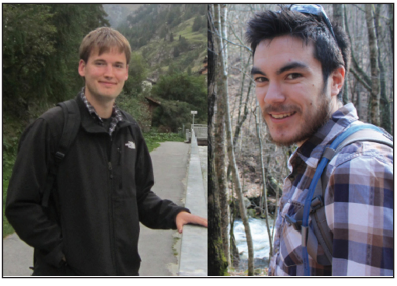
4. Have a life outside work. Work can overtake our life if we have nothing else. A pastime that has nothing to do with our work can be an outlet for frustrations and help define boundaries. I suspect this is why many successful researchers often are avid musicians or participate in sport. Devoting time to these activities forces us to carve out space from our working lives, and by doing so forces us to get the most out of the time we're at work.

Balance is a difficult thing to achieve, and once you have it, it's even harder to maintain. Life is short, there is never enough time and you cannot do it all. Do the things you want, and do them well. Make time for the important people in your life and most of all, have fun!

Buggy

The student wing / L'aile étudiante

Paul Abram and Boyd Mori



After a winter that seemed like it would never end, the field season is now in full swing – but it's never too early to start thinking about this year's Joint Annual Meeting in Saskatoon, which runs from 28 September to 1 October. The ESC offers travel scholarships to attend annual meetings, information for which you can find at http://www.esc-sec.ca/studentawards.php. If you are a graduate student nearing the end of your degree, please have a look at the call for abstracts for the Graduate Student Showcase, which is included in this issue of the Bulletin. The small amount of extra work it takes to apply to present in this symposium really pays off in terms of visibility, and it looks great on your CV!

Also, if you are starting to think about a graduate degree in entomology, whether it's your first or just another in a long series, you might find it helpful to consult the updated Directory of Entomological Education in Canada here: http://www.esc-sec.ca/direntomology.php. This is still a beta version, so we are also looking for your feedback on its accuracy and completeness. If you see something that should be changed, you can get in touch with us at directory.ent.can@gmail.com.

The Student Affairs Committee is your student voice to the Entomological Society of Canada, if you have any questions, comments, or suggestions about student concerns feel free to email us at students@esc-sec.ca.

Have a great summer,

Paul & Boyd

Après un hiver qui semblait ne jamais vouloir finir, la saison de terrain bat maintenant son plein – mais il n'est jamais trop tôt pour commencer à penser à la réunion conjointe annuelle de cette année à Saskatoon, qui se tiendra du 28 septembre au 1er octobre. La SEC offre des bourses de voyage pour assister aux réunions annuelles, pour lesquelles vous trouverez des informations sur http://www.esc-sec.ca/f-studentawards.php. Si vous êtes un étudiant gradué près de la fin de votre diplôme, jetez un œil sur l'appel à soumission pour la vitrine aux étudiants gradués, qui est inclus dans ce numéro du Bulletin. La petite quantité de travail supplémentaire que cela demande de présenter dans ce symposium vaut vraiment le coût en termes de visibilité, et ça paraît bien sur votre CV!

De plus, si vous commencez à penser à faire des études graduées en entomologie, que ce soit votre premier diplôme ou un autre d'une longue série, vous trouverez peut-être utile de consulter le répertoire des formations entomologiques au Canada mis à jour ici : http://www.esc-sec.ca/f-direntomology.php. Il s'agit d'une version beta, alors nous voulons de vos nouvelles sur son exactitude et son intégralité. Si vous voyez quelque chose qui devrait être changé, vous pouvez nous contacter à directory.ent.can@gmail.com. Le comité des affaires étudiantes est votre voix à la Société d'entomologie du Canada, alors si vous avez des questions, commentaires, ou suggestions concernant des questions qui touchent les étudiants, écrivez-nous à students@esc-sec.ca.

Passez un bel été,

Paul & Boyd

Graduate Student Showcase 2014: Call for Applications

Graduate students are invited to present their research at the 2014 Graduate Student Showcase (GSS). The GSS will be held on Sunday 28 September 2014 from 4 to 6 pm during the Joint Annual Meeting of the Entomological Society of Canada and the Entomological Society of Saskatchewan in Saskatoon (28 September–1 October 2014). The purpose of the GSS is to provide a high profile opportunity for graduate students near the completion of their degrees to present a more in depth overview of their thesis research.

Applicants to the GSS must:

- have defended or plan to defend their thesis at a Canadian University within one year of the meeting
- be the principal investigator and principal author of the presented work
- be registered at the meeting

Eligible candidates who wish to be considered for the GSS must submit a complete application to gsscommittee@gmail.com, following the instructions below:

1) Submit a 250 word abstract describing the proposed presentation highlighting their work
2) Submit a 1 page (single-spaced, 12 font) outline of their research, including rationale/significance, methodology, and results to date
3) Arrange to have the principal supervisor **email** a letter of support that confirms the anticipated or actual date of graduation and comments on the proposed presentation and the applicant's presentation and research abilities
4) Include a CV listing previous conference presentations and other presentation experience.

Vitrine pour les étudiants gradués 2014 : Appel à soumission

Les étudiants gradués sont invités à présenter leurs recherches lors de la vitrine pour les étudiants gradués 2014. Cette vitrine se tiendra le dimanche 28 septembre de 16:00 à 18:00 durant la réunion conjointe annuelle de la Société d'entomologie du Canada et de la Société d'entomologie de la Saskatchewan à Saskatoon (28 septembre – 1er octobre 2014). Le but de cette vitrine est de fournir une opportunité unique, pour les étudiants gradués approchant la fin de leur diplôme, de présenter une revue plus approfondie de leur thèse de recherche.

Tout candidat doit :

- avoir soutenu, ou prévoir soutenir leur thèse dans une université canadienne à l'intérieur d'un an avant ou après la réunion,
- être le principal investigateur et le principal auteur des travaux présentés,
- être inscrit à la réunion.

Les candidats éligibles qui souhaitent être considérés pour la vitrine pour les étudiants gradués doivent soumettre une application complète à gsscommittee@gmail.com, selon les instructions suivantes :

1) Soumettre un résumé de 250 mots décrivant la présentation proposée sur leurs travaux
2) Soumettre une page (interligne simple, taille 12) présentant les grandes lignes des recherches, incluant les fondements et la portée, la méthodologie et les résultats jusqu'à maintenant
3) S'assurer que le directeur principal envoie, **par courriel**, une lettre confirmant la date réelle ou anticipée de graduation, et commentant la présentation proposée et les habiletés de recherche et de présentation du candidat
4) Inclure un CV qui liste des présentations données dans des conférences précédentes et l'expérience de présentation.

All information must be submitted/emailed by **1 July 2014** All applicants will be notified of the status of their application. Unsuccessful applicants to the GSS will have their talks automatically moved to a President's Prize Oral session.

Differences between the GSS and the President's Prize (PP) Competition include:

- The GSS will take place in its own dedicated time slot; there will be no conflicting talks!
- Presenters in the GSS are given more time to speak about their research (24 minutes total, 20 for the presentation & 4 for questions) compared to the PP (15 minutes total)
- Abstracts for talks presented in the GSS are published in the *ESC Bulletin*, an open access publication
- The selection process for the GSS is competitive (only selected students speak), compared to the PP where all students who enter speak but only one per category receives a prize
- All presenters in the GSS receive an honorarium

We would like to encourage all eligible students to apply for the GSS. Supervisors, please encourage your students to apply and please help us to spread the word!
Any questions can be directed to gsscommittee@gmail.com

Ikkei Shikano and Tyler Wist
Co-Chairs of the Graduate Student Showcase Committee

Toutes les informations doivent être soumises par courriel avant le **1er juillet 2014**. Tous les candidats seront informés du statut de leur application. Les candidats non-sélectionnés pour la vitrine verront leur résumé *automatiquement* transféré pour une présentation orale pour le prix du président.

Les différences entre la vitrine pour les étudiants gradués et le prix du président incluent :

- La vitrine se tiendra dans sa propre période de temps – il n'y aura aucun conflit avec d'autres présentations!
- Les participants de la vitrine ont davantage de temps pour présenter leurs recherches (24 minutes au total, 20 pour la présentation et 4 pour des questions) que les participants au prix du président (15 minutes au total)
- Les résumés des présentations de la vitrine sont publiés dans le *Bulletin de la SEC*, une publication libre d'accès
- Le processus de sélection pour la vitrine est compétitif (seuls les étudiants sélectionnés présentent), alors que dans la compétition pour le prix du président, tous les étudiants qui soumettent un résumé présentent, mais un seul étudiant par catégorie reçoit un prix
- Tous les participants à la vitrine pour les étudiants gradués reçoivent un montant honoraire de 120$

Nous encourageons tous les étudiants éligibles à appliquer pour la vitrine pour les étudiants gradués. Merci aux directeurs d'encourager vos étudiants et de diffuser l'information! Toute question peut être adressée à **gsscommittee@gmail.com**.

Ikkei Shikano et Tyler Wist
Co-présidents du comité de la vitrine pour les étudiants gradués

Thesis Roundup / Foisonnement de thèses

If you or a student you know has recently defended an entomology-related thesis at a Canadian University, and would like notice of this accomplishment published here and on the ESC website, please email

students@esc-sec.ca

with the relevant information 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.

Chubaty, Alexander M. PhD, 2013. Individual host selection decisions and population-level responses in a time- and energy-limited forager, *Dendroctonus ponderosae* Hopkins. Supervisor: Bernard Roitberg, Simon Fraser University.

Williams, Kathryn L. MSc, 2014. Relative distribution and biomass of Invertebrates in fens and marshes in the boreal region of northeastern Alberta. Supervisor: Jan J.H. Ciborowski, University of Windsor.

Royauté, Raphael. PhD, 2014. Factors influencing behavioural variation in apple orchard populations of the jumping spider *Eris militaris* (Aranae: Salticidae). Co-supervisors : Christopher M. Buddle, McGill University, and Charles Vincent, Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu.

Catton, Haley. PhD, 2014. Patterns and impact of herbivory by a biological control insect on its target weed and a native non-target plant. Co-supervisors: Bob Lalonde, University of British Columbia Okanagan, and Rose De Clerck-Floate, Agriculture and Agri-Food Canada, Lethbridge.

Laura Timms

Why do we call ourselves entomologists? Persistence and adaptation in Canadian entomological societies over 150 years

Modified from the Heritage Lecture presented at the Joint Annual Meeting of the Entomological Societies of Canada and Ontario, Guelph, 20 October 2013

Introduction

Members of the present day Entomological Society of Canada (ESC) come from a variety of professional backgrounds and areas of study; it is somewhere at the intersection of these differences that we find the current idea of what entomology is. This idea of entomology has grown and changed in numerous ways since the Society was founded in 1863, developing from a pastime for Victorian professionals into a distinct discipline with its own identity and culture. Throughout these changes, the ESC has been an integral part of shaping the character of the discipline and the people who practise it. In this paper I will explore how the culture and identity of entomologists has developed since 1863, and propose some reasons for the longevity and cohesiveness of entomological societies in Canada.

The founding story of the ESC has been written about elsewhere (Bethune 1913; Baker 1939; Glen 1956; Spencer 1964; Holland 1966; Connor 1982), and I will therefore not go into great detail about the events. Briefly, Henry Croft, a chemistry professor with an interest in collecting insects, suggested that two young men of his acquaintance with a similar passion might want to get in touch with each other. Those two men were Charles Bethune, a divinity student, and William Saunders, a pharmacist. Bethune and Saunders became regular correspondents, and in the fall of 1862 the three men sent a letter of invitation to other entomophiles of their acquaintance to attend a meeting to discuss the formation of an entomological society. Several months later, on 16 April 1863, the ESC was formally created.

A number of historical accounts of the Society have been written in the century and a half since that day, several by Society members. In these previous accounts, many authors have looked back on the history of the society and described characteristics of different periods. Robert Glen (1956) identified the hiring of C.G. Hewitt as Dominion Entomologist in 1909 and the publication of the Destructive Insects Act in 1910 as turning points in the identity of the group. George Spencer (1964) also discussed the change that occurred around this period, but referred to it more dramatically as "The Decline of the Amateur". Glen, in his look back in preparation for the centennial celebrations, declared that the period that followed 1910 could be referred to

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as The Determinative Period (Glen 1956). And Philip Corbet drew a line after the end of World War II, defining the period from 1946 until 1972 as an era of Post War Expansion, which he then suggested was followed by a period of Consolidation and Stabilization (Corbet 1973).

Glen, Spencer, and Corbet defined these eras in the Society's past based on personal experience and historical narratives. A more objective definition can be achieved by looking at how annual membership numbers have changed over time (Figure 1). Using both qualitative and quantitative data, I therefore propose five eras in the history of the ESC – with names that reflect a more historiographical perspective than the personal ones described above, and with slightly modified dates. The periods I suggest include: Professionalization (1863-1909); Institutionalization (1910-1945); Expansion (1946-1970); Existentialism (1971-1995); and, Autonomy (1996-2013). What I see as the defining people, events, and characteristics of each period are described below, but first I would like to take a brief divergence into the social sciences.

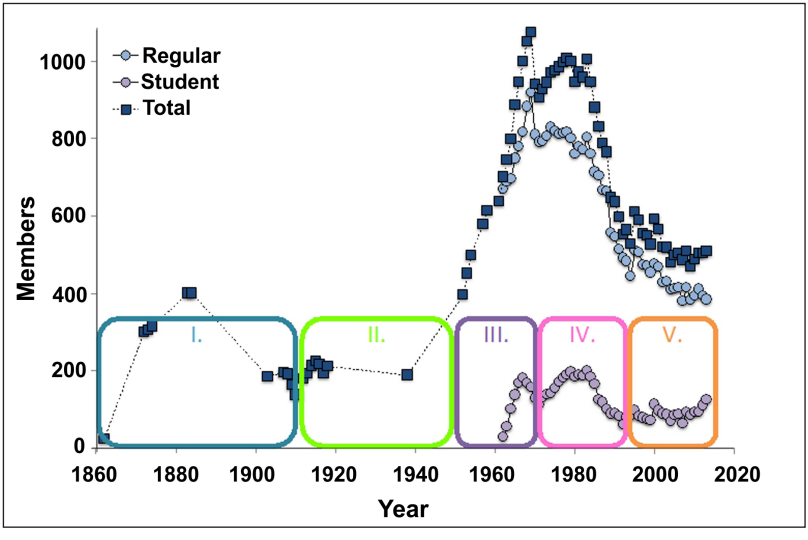


Figure 1. Membership of Entomological Society of Canada over time, showing five eras in the history of the Society as defined by historical turning points and trends in membership. Membership numbers were obtained from a variety of sources, including Danks (1994).

How does a field of study like entomology acquire status as a discipline?

Historians and sociologists suggest that a field has become a discipline when it has developed separate journals, departments, societies, and meetings, focusing on well-established bodies of knowledge with specialist terminology and techniques (Thackeray and Merton 1972; Burian 1992). An important step in discipline founding is professionalization, a process often conceived of as involving four stages (Daniels 1967). First, pre-emption describes the development of specific knowledge, for which training is required to understand – even for those with general knowledge of the field. Next, institutionalization involves the formation of specialized organizations, departments, and establishments. This stage is followed by legitimation, where the discipline attempts to justify its existence by proving its usefulness to society at large. Finally,

professional autonomy occurs when a discipline has reached maturity – Daniels (1967) suggests that it is at this point that practitioners of the discipline feel free to pursue "pure" research in the area, without needing to demonstrate how it may be applied.

With these definitions in mind, it can be said that entomology did not exist as a discipline in North America in 1863 when the Entomological Society of Canada (ESC) was created. The founding of the Society was itself an important step in the development of the discipline, as were the activities of the Society in its first few years of existence. In addition, the different stages of professionalization can also be seen to have occurred over the 150 years of the Society's history, and can provide a useful lens for describing and analyzing the course of that history.

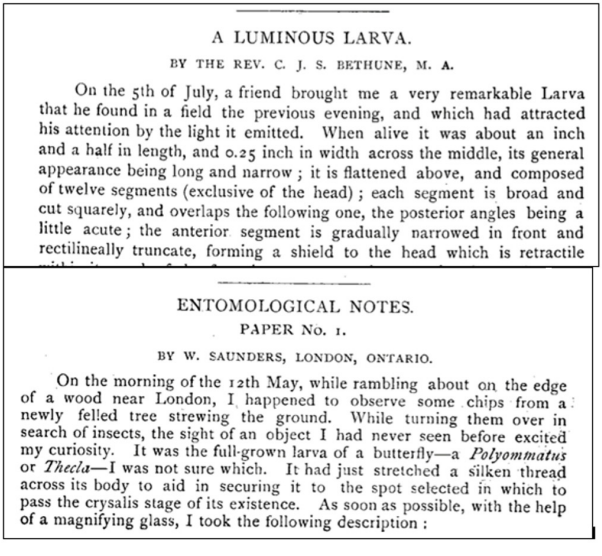
1863-1909: Professionalization

> *"If we look, however, at Entomology and its objects alone, we cannot fail to see at once that it is practically without limit – that there is work enough for thousands of investigators for almost innumerable generations to come"* – Bethune 1874, pp. 181-182

The members to whom President Bethune spoke those words on 23 September 1874 – at the eleventh annual general meeting of the Society, although it had recently changed its name from the ESC to the Entomological Society of Ontario for reasons described in Timms (2009) – were a very different set of people than you might expect to find at a modern day ESC meeting. They included, among others, druggists, accountants, bookbinders, railway engineers, tailors, and several members of the clergy – including Reverend Bethune himself. These were professional gentlemen who found time for their entomological pursuits when not absorbed "in the cares of business or in the labors necessary for obtaining a livelihood" (Bethune 1876).

Papers in the early volumes of *The Canadian Entomologist*, first published in 1868, demonstrate the curiosity and enthusiasm with which these "brethren of the net" (Reed 1913) explored the insect life around them. These papers were full of natural history observations, descriptions of specimens, and personal accounts of collecting adventures in the field (Figure 2). Annual meetings regularly included field trips and picnics, and attendees would bring specimens from home to show to each other and compare identifications (Baker 1939). For the most part, Society members during this period were occupied with describing and listing the insects of Canada; this is reflected in 80% of all published papers in *The Canadian Entomologist* between 1868 and 1907 that fell into the category of systematics and morphology (Hodson 1985).

However, there was some indication of a division in the membership as early as 1873. In his opening editorial to



A LUMINOUS LARVA.

BY THE REV. C. J. S. BETHUNE, M. A.

On the 5th of July, a friend brought me a very remarkable Larva that he found in a field the previous evening, and which had attracted his attention by the light it emitted. When alive it was about an inch and a half in length, and 0.25 inch in width across the middle, its general appearance being long and narrow; it is flattened above, and composed of twelve segments (exclusive of the head); each segment is broad and cut squarely, and overlaps the following one, the posterior angles being a little acute; the anterior segment is gradually narrowed in front and rectilineally truncate, forming a shield to the head which is retractile

ENTOMOLOGICAL NOTES.

PAPER No. 1.

BY W. SAUNDERS, LONDON, ONTARIO.

On the morning of the 12th May, while rambling about on the edge of a wood near London, I happened to observe some chips from a newly felled tree strewing the ground. While turning them over in search of insects, the sight of an object I had never seen before excited my curiosity. It was the full-grown larva of a butterfly—a *Polyommatus* or *Thecla*—I was not sure which. It had just stretched a silken thread across its body to aid in securing it to the spot selected in which to pass the crysalis stage of its existence. As soon as possible, with the help of a magnifying glass, I took the following description:

Figure 2. The opening sentences of the first two papers ever published in *The Canadian Entomologist,* Volume 1, 1868.

Volume 5 of the journal, Bethune acknowledges receiving some complaints that the papers were "becoming too technical" and therefore inaccessible to all but "deep students of the science" (Bethune 1873). At the same time, economic entomology was emerging as a new area of interest, arising out of the "great and incessant efforts of a few naturalists to make their work useful" (Fletcher 1888). The rise of economic entomology paralleled the increasing importance of agriculture and natural resource exploitation in Canada (Palladino 1996); entomologists who were willing to apply their skills to problems facing farmers found themselves in great demand. In 1886, Saunders was appointed as the first director of the Dominion Experimental Farms system, marking the first official transition of a Canadian entomologist from amateur to professional. Bethune followed a similar path in 1906, becoming Professor of Entomology and Zoology at the Ontario Agriculture College in Guelph.

It was the end of an era, and not everyone was happy about it. In a letter to Bethune dated a month before the 47th Annual Meeting, Henry Lyman complained that the Society's meetings were "less enjoyable" than they used to be, primarily because members didn't spend as much time sharing collecting trip stories and comparing specimens as they had previously done (Lyman 1910). It was also around this time that the Society moved its headquarters from London to Guelph, and lost the membership of many amateur entomologists in the process (Connor 1982). The decreased representation of amateurs in the Society can be seen in the decline in membership numbers that took place around this time (Figure 1). However, the clearest sign that the professionalization of entomology had occurred took place in 1909, when the university-trained C. Gordon Hewitt was selected over the self-taught naturalist Arthur Gibson to replace the late James Fletcher as Dominion Entomologist (Castonguay 2004).

1910-1945: Institutionalization

Although he intended to return to England shortly after his appointment, Hewitt quickly developed a big vision for entomology in Canada, and began to effect changes soon into his tenure as Dominion Entomologist (Hewitt 1921). He helped write and pass the Destructive Insect and Pest Act in 1910, which resulted in the provision of federal funds for the building and staffing of entomology labs across the country. He separated the entomology division from the Experimental Farms system in 1914 and created the Entomological Research Branch, with an initial staff of 28 and with sections specializing in agriculture, forestry, quarantine, and systematics (Anonymous 1914a). In addition, he formalized the creation of the Canadian National Collection of Insects in Ottawa, including selecting standardized United States National Museum of Natural History drawers and cabinets for storage and ensuring the collection was placed in a fire-proof building (Anonymous 1914b).

These actions set the stage for a well-funded network of federal entomological research institutions in Canada, administered centrally by the Entomological Research Branch. It was also a time of expansion in formal entomological education across the country. Hewitt believed that it was necessary to use experimental approaches to help solve the problems of insect outbreaks, and emphasized the need to hire university-trained staff to carry out this work (Castonguay 2004). Graduates from the only two Canadian institutions providing degrees in entomology at the time, Macdonald College and the Ontario Agricultural College, were in high demand in both Canada and the United States. Courses and programs in entomology were soon developed at other institutions, including the University of Manitoba (1920), the University of Alberta (1922) and the University of Montreal (1931) (Glen 1956).

The momentum of this institution-building was slowed down by three major events: World War I, the Great Depression, and World War II. Nevertheless, entomology in Canada made "slow but steady progress", including opening new research labs and the creation of the federal Science

Service – which absorbed the Entomological Research Branch and renamed it as the Entomology Division (Glen 1956). By the end of World War II, there were 140 full-time entomologists working for the federal government, in addition to a number of recently hired professors and lecturers at universities across the country (Glen 1956). The fact that membership numbers remained relatively steady during this period despite all the global disturbance is a testament to the large amount of work that went into building these foundational entomological institutions (Figure 1).

1946-1970: Expansion

> *"In 10 years the status of the investigator has been vastly bettered in terms of relative salary, prestige, opportunity for travel, and working conditions; large modern laboratories have been built at some 15 centres; headerhouses, greenhouses, insectaries, etc., have been added at a dozen other locations; all essential facilities and conveniences have been provided, including comprehensive reference libraries, a variety of transport, and land for experimental purposes; co-operation with other research institutions has been broadened through the establishment of federal research grants for work on Science Service projects; and, by arrangement with the National Research Council, a number of post-doctorate fellowships are now tenable at Science Service laboratories."* – Glen 1956, p. 299

As the period of institutionalization can be defined by the hiring of C.G. Hewitt, the period of expansion begins with the appointment of Kenneth Neatby as the Director of Science Service in 1946. Neatby's philosophy was that "to be pursued really effectively and adequately, research should be free of any other compelling calls" and "not necessarily closely related to the solution of immediate practical problems" (Ogg 1950, quoted in Spencer 1964). To that end, Neatby more than tripled the annual budget of the Science Service, created postdoc positions at federal labs, hired more staff, built facilities, and encouraged interdisciplinary work.

The combination of secure funding, creative freedom, interdisciplinary interactions, and good management is recognized as a successful method for encouraging innovation in institutions (e.g., Bell Labs, Google, see Gertner 2012); one need only to look at the output of Canadian entomologists during this period to see that Neatby's approach worked. For example, within the context of research in biological control, there were classic works produced on functional responses (Holling 1959), cold hardiness (Salt 1953), and associative learning (Arthur 1966), among others. Concurrent with this period of creativity and productivity, the membership of ESC increased dramatically – from less than 400 members in the early 1940s to over 1000 in the late 1960s (Figure 1). It was partly the increasing membership numbers that inspired the re-founding of the Entomological Society of Canada in 1950, as it was felt that a national society was needed to manage such a large and widespread community of entomologists.

The historical accounts produced by Society members around the time of the centennial celebrations in 1963 are full of strong, confident statements about the position of entomology in Canada and in general portray a positive outlook about the future of the field (e.g., Glen 1956, Spencer 1964, Holland 1966). In his presidential address for the year 1962, Anthony Brown commended the culture of collaboration between university and government entomologists and praised the diversity and quality of entomological research being conducted across the county (Brown 1962). However, Brown (1962) also noted that the lion's share of entomologists in Canada at the time were employed by the federal government, and suggested that this may prove to be a problem in times of austerity. This would prove to be a very prescient statement.

1971-1995: Existentialism

"Time is running out for our profession. We must communicate this fact now to our fellow entomologists. We must jolt them out of their indifference and convince them that unless each individual entomologist has his own public education campaign our profession will lose the opportunity to contribute directly to mankind's nurture and survival, will lose its identity. Our profession will cease to exist." – MacGillivray 1977, p. 94

The golden era of federal research funding ended in the early 1970s with the closure of a number of programs and laboratories, as well as the cessation of government subsidies to both the ESO and ESC (Baldwin 1971; Corbet 1973). In response to these cuts and others, the ESC wrote letters expressing their concern to the ministers involved as well as the Prime Minister. However, it seems that their concerns fell on deaf ears, and no replies were ever received. A potential solution identified by the Society was an increased participation in science and education policy; in 1970 the ESC joined SCITEC, a national science policy organization. It also began to produce policy papers and statements on such topics as pesticides (ESC 1970) and university research funding (Mackauer et al. 1978).

At the same time, there was some anxiety within the Society that entomology would disappear into the ever-expanding subdisciplines of the "new biology", and that basic entomological education would be replaced with the newer, non-organismal based fields of study (e.g., Kevan 1973). Again, the solution proposed was promotion and education to convince the public that entomology was an important profession and to encourage students to pursue entomological studies (e.g., MacGillivary 1977). One problem with this approach, however, was highlighted when an entomological manpower study found that "we shall soon be producing twice as many PhDs as there are jobs available for them in government, industry, and universities" (MacEwen et al. 1976). Despite this, the Society formed an employment committee, and for a few years produced booklets of *Resumés of Entomological Society of Canada members seeking employment*.

Membership started declining in the early 1980s – decreasing an average of 6% per year between 1983 and 1995 (Figure 1). This was accompanied by deficits and instability in the Society's finances, a common theme in the Presidents' messages in the *Bulletin* throughout this period (e.g., Riegert 1993). In 1995, the board decided to conduct a strategic review of the future of the ESC, including assessing its relevance to members as well as to the public. The review concluded that the ESC needed to stop behaving like a society with over 1000 members and come to terms the fact that it was "appreciably smaller than it once was" (Safranyik 1995). The changes that were implemented as a result of the review led to a reorganization of the Society that defined the next era in its history.

1996-2013: Autonomy

The post-strategic review ESC achieved the goal of financial stability relatively quickly, and at the same time saw membership numbers stabilize (Figure 1). The Presidents' messages in the *Bulletin* no longer featured pleas for engagement in policy and public education, but emphasized the good financial condition of the Society and reported on miscellaneous business (e.g., Gibson 2001). In comparison with earlier eras, the published commentary from the ESC during this period is calmer and less opinionated; one gets the sense of a society going about its business quietly, with minimal self-reflection (but see Buddle et al. 2011 for an exception).

One recurring issue of business over this period was the development of an online presence, from the development of a website in 2001 to the creation of a twitter account in 2012. All back issues of *The Canadian Entomologist*, the full *Memoirs of the ESC*, and the *Bulletin* from 2003

on are now available online, as are a number of monographs and books (see: http://www.esc-sec.ca/pubover.php). The ESC is also associated with the online-only *Canadian Journal of Arthropod Identification*, which produces picture-based keys for Canadian arthropods. Together, these resources combine to make the ESC and entomology in Canada perhaps the most accessible it has ever been – to members and non-members alike.

Why do we call ourselves entomologists?

Entomology and entomologists in Canada have changed a great deal in the last 150 years. Based on the brief review I have just presented, I can attempt to provide a broad sketch of how the majority of entomologists in earlier periods would have described themselves: as natural historians (1863-1909); economic entomologists (1910-1945); pure scientists (1946-1970); and, as an endangered species (1971-1995). However, it is more difficult to say how present day entomologists think of themselves, or how many of those who study insects would even use the term entomologist to self-identify.

To address these questions, I conducted an online survey titled "Why do we call ourselves entomologists?" asking people to answer questions on their use of the label entomologist versus alternate descriptors. The survey included nine questions (Appendix Table 1), and was sent out via email and social media and was advertised in the *Bulletin*. Over 150 people answered the survey, 62 from Canada. For the purposes of this paper, I will report only the results from Canadian respondents.

Both frequency of use of and attachment to the label entomologist were positively associated with length of time the respondent had been interested in insects, but the age of the respondent was not significantly related to either response variable (Appendix Table 2). The two response variables were also positively related to each other; in other words, more frequent use of the label entomologist was associated with higher levels of attachment to the label. However, there was no relationship between the frequency of use of the label entomologist and attachment to an alternate label or between the attachment to the label entomologist and an alternate label. Mean attachment to the label was high across all fields, ranging from 3.10 for biocontrol workers (n=10) to 4.29 for taxonomists/systematists (n=17).

Most interesting were the free form comments about why respondents did or did not use the label entomologist to describe themselves. I used key words to classify comments into categories describing both positive and negative associations with the label entomologist (Appendix Table 3). Comments often fell into more than one category; for example, as the respondent described multiple reasons why they used the label entomologist.

There were a greater number of positive comments than negative. Positive comments indicated a wide variety of reasons why the respondents were happy to use the label entomologist, in particular due to a sense of history and community in entomology (n=9) as well how describing oneself as an entomologist provides opportunities to talk to and teach people about insects (n=11). The negative comments included less variation, with the dominant categories relating to a feeling of not knowing enough about insects to be called an entomologist (n=6) and with feeling like the label entomologist was too limiting (n=11). Perhaps most alarming were the two people who felt like they weren't accepted by entomologists, despite their desire to occasionally use the term.

Is there a carrying capacity for entomologists in Canada?

If we return to the membership data in Figure 1 and examine it as a population biologist might, it appears as if there are two stable population levels for the ESC – one around 1000 members and one around 550 members. This leads to the question: is there a carrying capacity for entomologists in Canada? Danks (1994) identified federal government funding and research

scientist jobs as the resources that drove membership trends between 1960 and 1994. The brief history of the Society that I have presented in this paper would support Danks' argument; certainly, the increases in spending and hiring after WWII contributed to a rise in entomology jobs across the country. However, there are other, smaller drivers to note – for instance, the decrease in membership after amateur entomologists began to leave the Society.

Given that it is rarely within the capabilities of the ESC to affect funding levels (although the importance of public education and participation in national science issues should still be stressed), we should consider what it is that we can do as a society to improve the environment for entomologists in Canada. I would suggest that we look to the results of the survey, particularly the comments in the positive categories, to remind ourselves of why someone might want to be called an entomologist. Specifically, as a society we should strive to be welcoming and inclusive, emphasize the mentoring of students, take opportunities to share our passion for entomology with children, and in general share the sense of wonder that many of us feel about insects. In addition, we should continue to review our history to see what can be learned from the past. For instance, these words from Charles Bethune express some of the same ideas as above but in a much more entertaining way:

> *"To all our friends and correspondents – to all who read these pages, we bid a kindly greeting. Once more we are entering upon a new volume; for the third time we solicit the attention and assistance of all lovers of nature throughout the continent – of all especially who delight in the study of the wonderfully varied forms, structures and habits of Insects. In addition, we now also desire to draw into our friendly circle of readers and observers in the same great field of nature, that numerous class of haters of insects, who hate them with a deadly hate, who give them no quarter in any case, and who devote them all alike to execration and unsparing destruction. Friends, we invite you all to come and join us in our work, which is one of deepest pleasure, even though often filled with toil; come with us and search into the mysteries of the insect world; help us to trace out the wondrous beauties of structure, form and coloring of the marvels of the Creator's power; help us to investigate thoroughly the lives, metamorphoses, habits, occupations, food, and all other matters connected with these tiny creatures; join us in working out their scientific arrangement and nomenclature; aid us in rightly discriminating between friend and foe, between noxious, beneficial and neutral insects, and let us all unite in the endeavour to discover the best means of counteracting the ravages of the one, and of encouraging and protecting the other."*
> – Bethune 1871, p. 1

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Appendix

Table 1. Survey questions used in the online survey "Why do we call ourselves entomologists?"

Question	Answer selections	
1. Which of the following best describes your current occupation?	Research scientist Working with an NGO Undergraduate student Research technician Graduate student Postdoc	Consultant University or college professor Retired Unemployed Other (please specify)
2. Which category below includes your age?	17 or younger 18-20 21-29 30-39	40-49 50-59 60 or older
3. Which of the following best describes your field of study/work? You can choose more than one, or add a new field if yours is missing.	Taxonomy/systematics Behaviour Integrated pest management Biological control Ecology	Physiology Biodiversity Evolutionary biology Forestry Agriculture Other (please specify)
4. How long have you been interested in insects?	Less than a year 1-5 years 5-10 years 10-25 years More than 25 years	
5. Do you call yourself an entomologist?	Yes, all the time Yes, most of the time Sometimes Almost never Never	
6. How strongly attached are you to the label entomologist when describing yourself?	1 – not at all attached 2 3 4 5 – very strongly attached	
7. (a) If you call yourself something other than an entomologist, what label do you use? (b) Using the same scale as Q6, how strongly attached to that label are you?	(a) Free form	(b) 1 – not at all attached 2 3 4 5 – very strongly attached
8. Please explain why you think the label entomologist is (or is not) important to you?	Free form	
9. Any final comments?	Free form	

Table 2. Kendall's tau correlations between pairs of variables from respondents to the survey "Why do we call ourselves entomologists?"; bold text indicates p-values significant at a level of $\alpha = 0.05$.

Variable pair	Correlation	Z	p
Length of interest in insects Frequency of use of label entomologist	0.30	2.81	**0.005**
Age of respondent Frequency of use of label entomologist	0.19	1.77	0.078
Length of interest in insects Attachment to label entomologist	0.21	2.02	**0.044**
Age of respondent Attachment to label entomologist	0.12	1.16	0.246
Frequency of use of label entomologist Attachment to label entomologist	0.76	7.24	**<0.001**
Frequency of use of label entomologist Attachment to alternate label	-0.13	-1.26	0.209

Table 3. Synthesis of free form comments in response to survey questions 8 and 9 into categories with positive and negative associations to the label entomologist, with frequency of comments that fell into each category as well as key words used to identify the comments as belonging to that category

Association	Category	Frequency	Key words	
Positive	Identity	4	▪ interest ▪ personality ▪ vocation ▪ identity	
	Childhood interest	6	▪ roots ▪ blood ▪ mentor ▪ family	
	Unique / special	6	▪ pride ▪ fun ▪ important ▪ select	▪ distinguished ▪ unique ▪ interesting ▪ quirky
	History & community	9	▪ community ▪ helpful ▪ cooperative ▪ enthusiastic ▪ generous ▪ nice	▪ history ▪ generations ▪ timeless ▪ tradition ▪ transcends disciplines
	Public education	11	▪ inspiring ▪ means something ▪ attract attention ▪ discussion	▪ reactions ▪ questions ▪ promotion
Negative	Not accepted	2	▪ not accepted ▪ told not an entomologist	
	Depends on context	2	▪ adapt ▪ audience ▪ context	
	Use insects as models	4	▪ model organisms ▪ use insects to …	
	Not qualified	6	▪ not qualified ▪ don't know enough ▪ haven't earned it	
	Too narrow	11	▪ narrow ▪ constraint ▪ confining ▪ not informative	▪ not natural ▪ unimportant ▪ limiting ▪ taxonomist

Araneus gemmoides (Araneae: Araneidae) death by a parasitoid (Hymenoptera: Ichneumonidae)

Joanne Bovee and Robin Leech

The event documented here started in Edmonton, Alberta, when a female *Araneus gemmoides* laid several hundred eggs in August or September 2004. It ended on 18 May 2006 when a few spiderings, still in their second instar, were fed on and eventually killed by parasitoids. Figures 1-12 represent a photographic account of the life and death of a second instar *A. gemmoides* Chamberlin & Ivie 1935, host to the ichneumonid parasitoid, *Polysphincta koebelei* Howard 1892. The pictures were taken by the senior author from about mid-April to late June 2006 with a digital Canon Rebel XT, a Canon 100 mm macro-lens, and an external flash. *Araneus gemmoides* is a new host record for this parasitoid, and this is the first record of *P. koebelei* in Canada.

The larger *Araneus* spiders have a 2-year life cycle starting when the eggs are laid. Eggs are laid at the end of summer or early fall and over-winter. The eggs hatch in June of the next year. Ordinarily, at the end of the first summer, these spiders have a body length of at least 6-10 mm, and over-winter a second time. At the beginning of the second summer, the spiders grow quickly, and molt to adults. They mate in early summer, the male dies shortly thereafter, and the female carries the sperm in the spermathecae till she lays her eggs at the end of her second summer.

Life for parasitized 2nd instar *Araneus* spiders is very different from that of a normal spider. The 2nd instar spiders are about 3 mm long or less. Once the parasitoid is attached to the spider (and this happens shortly after the spider has molted from the yolk-filled hatchling to the 2nd instar), the spider will not molt or grow. This means that the spider and parasitoid share life together for upwards of a year. If the spider were to molt, then the larva's attachment site would be shed with the spider's exuvia. The photos herein show the ichneumonid larva growing larger, ultimately killing the spider, and after sucking out all the internal contents, abandoning the spider's exoskeleton.

There are many parasitoids that use spiders or their eggs as a food source, and chief among them are members of the wasp family Ichneumonidae, the tribe Polysphinctini in particular. Larvae of the genus *Polysphincta* are ectoparasitoids that attach to the antero-dorsal part of a spider's abdomen (Eberhard 2000, 2001), while larvae of the ichneumonid genus *Gelis* devour spider's eggs. And there are other parasitoid groups such as Nematomorpha (Mermithidae) worms (Leech 1966) and acrocerid fly larvae (Cady et al. 1993) that live and feed inside a spider's abdomen. The rate of parasitism ranges from about 1% to 5% (Finch 2005). Leech (1966) found a similar rate with mermithid worms (*Hexamermis* sp.) in *Pardosa glacialis* on northern Ellesmere Island. *Araneus gemmoides* is widespread throughout much of western North America. It is one of the larger, 2-humped orb-weaving spiders. Adult females are seen most commonly in late August or early September when they are at their largest and about to lay eggs. A full-grown female may have an abdomen about 15 mm or more in diameter, and a leg span of about 35 mm. White (1952) clearly and fully presented the life cycle of *Araneus diadematus* Clerck 1757, and the life cycle of *A.gemmoides* is nearly identical.

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Spiderlings freshly emerged from the egg sac do not feed as they are full of yolk. It is this stage that the spiderlings balloon and disperse - within a few days of emergence from the egg sac.

Shortly after their first ballooning, the spiderlings have digested the yolk remaining from their life as an egg. They now molt to the 2nd instar (Figs 1, 2), then start building small orb webs. Prey caught in these orb webs are the spiderlings' first external food.

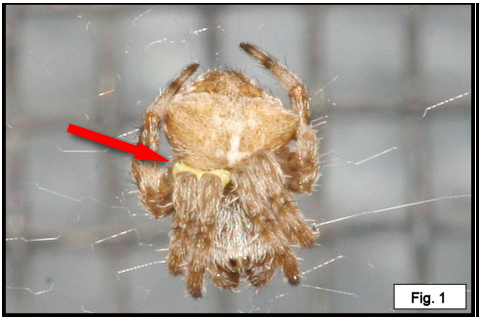

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Fig.1. 18 April 2006. The ichneumon larva is hidden between the right antero-dorsal side of the abdomen and legs I and II folded against the abdomen (red arrow indicates its position). The spider is about 3 mm long, and the orb web shape is normal.

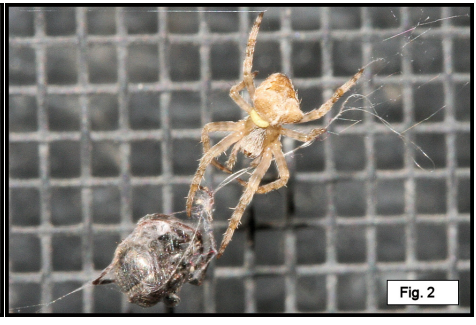

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Fig.2. 18 April 2006. With the spider's legs extended to hold the prey, the larva is clearly visible on the right antero-dorsal side of the abdomen.

These first orb webs are when wasps, such as the female of *P. koebelei*, find spiders, and sting to subdue them. The wasp then glues an egg on the antero-dorsal side of the abdomen of the spider. Some weeks or even months later, the larva hatched during the summer of 2005, and attached to the spider's abdomen where the egg was attached. The spider did not grow in size after the egg was laid on it, and the larva did not increase in size during the summer of 2005.

It may seem that the wasp larva "wasted" a whole summer and did not grow, but this is part of the survival strategy. Ichneumonid wasps have several strategies for survival (Gauld 1988; Whitfield 1998; Andrew Bennett pers. comm.). The two main strategies are called *kionobiontic* and *idiobiontic*. Kionobiont parasitoids allow the host to continue its development (and feeding) while feeding on it. Idiobiont parasitoids are those that prevent further development of the host after immobilizing it, and, almost without exception develop outside the host. *Polysphincta* species are external kionobionts.

The female parasitoid attacked the spider in order to lay an egg on the spider's abdomen. Either a compound or compounds in the sting fluids, or a compound or compounds in the glue used to attach the egg to the spider, caused cessation of activity for the next month or so by the host. In this case, the spider, after it had fed on a few small insects caught in its orb web, was attacked during the summer of 2005 and temporarily immobilized. By fall 2005, the larva and its host spider were set to hibernate (Korenko & Pekar 2011). Come early April 2006, the spiders had built small orb webs, and this is when the first author spotted the new webs and the spiders. At that time there were no adult parasitoid wasps flying.

On 18 April 2006, the first author began her photographic record of the spider-ichneumon larva interaction. Life began for this spider as an egg in late August 2004; the spider was attacked by the adult parasitoid during the summer of 2005, and its life ended on 18 May 2006 as a parasitized, dead 2nd instar. The larva (hidden beneath the spider's first and second legs [Fig. 1])

attached to the spider by its posterior end where the egg was glued. In the process of hatching, the empty egg case drops off. Very rarely have these parasitoids been observed and photographed from the beginning larval stage through to the adult stage.

Initially, the 2nd instar spider continues to feed and when it extends its legs to grasp prey, the tiny ichneumonid larva can be seen (Fig. 2). In Figures 3 & 4, dated 10 and 14 May, respectively, the larva is clearly visible, and considerably larger than in Figure 2. The larva feeds on the spider by scratching the abdomen, then sucking up fluids as they ooze out.

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Fig.3. 10 May 2006. In 2 weeks, the larva has increased considerably in size, while the spider remains the same size.

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Fig.4. 14 May 2006. The larva's head and mandibles are visible. This is the last food that the spider will catch and eat. Behavioral changes in the spider will soon follow.

Many changes occurred on 17 May 2006 (Figs 5, 6, 7 & 8). The spider's abdomen started to shrivel (Fig. 5), and in just over 3 h (Fig. 6), the larva grew about one-third larger. In the late afternoon, the spider started building a special pyramid-shaped web that will be used by the larva to house the pupa and cocoon. The pyramid-shaped web is above the spider's own orb web (Fig. 7). It was completed before nightfall on 17 May (Fig. 8). See Eberhard (2010a) for other shapes of special larva-induced webs.

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Fig.5. 17 May 2006. Noon. The spider's abdomen is starting to shrivel, but she is still alive. The larva has been feeding voraciously. Note the increase in the larva's size between this picture and the next over 3 h later.

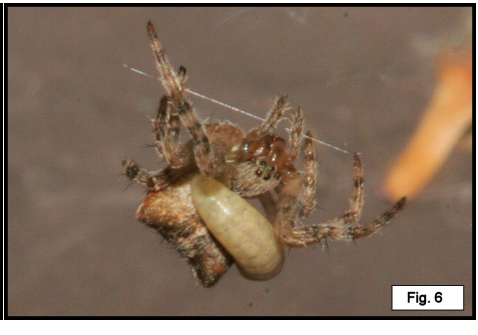

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Fig.6. 17 May 2006. 3:42 p.m. In just over 3 h the larva is about one-third larger. The position of the front legs indicates that the spider is moribund.

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Fig.7. 17 May 2006. 3:43 p.m. The spider hastily finished making the pyramid-shaped web (above its orb web) that will be used by the larva as its cocoon and pupation centre. Note the spider's abdomen has shrivelled.

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Fig.8. 17 May 2006. ~3:45 p.m. The pyramid-shaped web is at the centre of the picture. The spider and its attached larva are at the extreme upper right corner of the picture. The pyramid-shaped web is completed, and the larva is about to drop the spider's exoskeleton.

By 18 May (Fig. 9), the spider died, and was dropped by the larva. The larva then moved to the centre of the pyramid-shaped web. By early morning of 19 May (Fig. 10), the larva started building its cocoon, which took several days to complete.

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Fig.9. 18 May 2006. 5:09 p.m. The spider died. Its insides were completely gone, leaving the spider exoskeleton resembling an exuvia. The spider's remains were dropped. The spines on the larva's dorsum are distinct. These help the larva move about in the webbing.

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Fig.10. 19 May 2006. 5:19 a.m. By this morning the larva had moved to the centre of the pyramid-shaped web and started making its cocoon.

On 25 May (Fig. 11) the larva had pupated, head end up. Note the dark larval exuvia at the bottom of the cocoon. The eyes, head, thorax and abdomen are now clearly visible. On 12 June (Fig. 12), after about two weeks as a pupa, the adult *P. koebelei* emerged from the cocoon. The adult wasp is about 5 mm long.

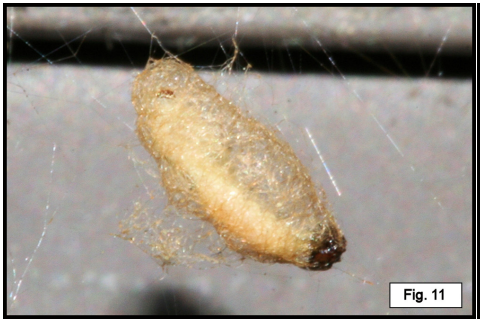

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Fig.11. 25 May 2006. The larva took several days to complete the cocoon. The larval exuvia is the dark area at the lower end of the cocoon. The eyes, head, thorax and abdomen of the pupa are visible.

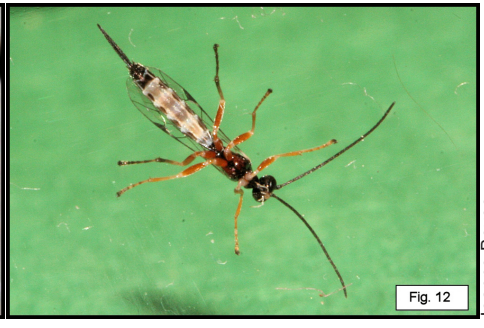

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Fig.12. 12 June 2006. An adult female *Polysphincta koebelei* emerged from the pupa after about 15 days. She is about 5 mm long.

A fascinating, but not well understood, aspect of the spider-ichneumon interaction is just what causes the spider's behaviour to abruptly change a few hours before its death, so that it constructs the small pyramid-shaped web in which the ichneumon larva will pupate. Various possibilities have been proposed. The first is that the adult wasp, when it stung the spider to subdue it, simultaneously injected a chemical that eventually programmed the spider to initiate building the pyramidal web. A variant on this is that the female includes such a chemical in the glue used to attach her egg to the host. A more likely interaction, and one for which there is a little evidence, is that the mature ichneumon larva produces the behaviour-changing chemical which enters the host during the parasitoid's feeding activity. This more proximal interaction seems more reasonable, given the precise timing required for the web's construction and cocoon building by the larva. Eberhard's (2010b) study on the interaction between the related ichneumon *P. gutfreundi* and the penultimate instar of the orb spider *Allocyclosa bifurca* supports this proposal. This author found that if the wasp larva were experimentally removed just before the spider's anticipated death, the spider's behaviour gradually recovers in reverse order.

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Joe Shorthouse

Fig. 1. Tina – the cricket catcher!

Tina: the sheltie cricket catcher

Joe D. Shorthouse

As university professors in most disciplines can attest, retaining the attention of students today in this era of cell phones, tablets, and laptops can be a frustrating challenge. This is especially so for students unsure if they are destined for a career in science and uneasy with daily PowerPoint presentations filled with facts, jargon, buzzwords, and graphs. It is easy to make lectures that are boring and dry, but much more difficult to design ones that have students riveted to their seats. One way to avoid dreariness in at least a few lecture topics is to insert stories of personal experiences.

Using personal stories establishes a connection between a classroom of students and the lecturer and there is evidence that they enhance learning (Metz et al. 2007). When facts and information are framed by a compelling story, which holds the attention of an audience, the information presented becomes

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much more memorable. Stories are how we remember in contrast to PowerPoint where it is easy to forget lists and bullet points. The discipline of entomology is full of stories of potential use in lectures since entomologists, perhaps more than other kinds of biologists, have a knack for getting themselves into odd predicaments resulting in stories that combine entertainment along with useful information.

I regularly inserted a few personal stories throughout the term in my courses in entomology and was amazed by their impact. Stories are great attention grabbers that allow one to introduce much related information that would otherwise go unnoticed in a PowerPoint presentation. I relate here one of the stories I frequently used as part of a lecture on Orthoptera.

In the summer of 1986, the Shorthouse family drove from Sudbury to Alberta to visit relatives, and as is common when a parent is a field-oriented entomologist, made frequent stops along the way to search for insects. In our case we searched for insect galls on wild roses, and our children had grown up thinking it perfectly normal to spend a few hours each day of vacation walking through patches of roses to fill whirl-pak bags with galls.

Near Morden, Manitoba, we drove down a gravel side road to make one of our frequent stops to exercise our two shelties: 6 year old Shelly and 9 month old Tina (Fig. 1). As anyone familiar with sheltie pups knows, Tina was full of energy and required being leashed at all times when outdoors.

Conveniently, just where we stopped there was a thick patch of wild roses a quarter hectare in size right to the edge of the road. There was no traffic and even though it was late in the afternoon and we were anxious to find our motel, it was safe enough for everyone to grab a whirl-pak bag and walk the edge of the road searching for galls. Shelly always stayed by our sides so she was allowed to walk with us without her leash. After a few minutes, I thought it safe to release Tina as well, thinking it would be good practice for our pup to learn walking beside her masters. Where else could she go – other than up and down this deserted road.

All was well for about 5 minutes when Tina suddenly darted into a rabbit run and disappeared. Horrified that she was lost within the bowels of the large rose patch, never to appear again, we spent the next 3 or 4 minutes frantically walking up and down the road hollering for her to return. We spread out listening for sounds of her running through the brush, but could hear nothing. Suddenly, she came charging out of a rabbit run further up the road and ran back towards us. I grabbed her as she ran circles around us, and along with the others, hugged her as our eyes filled with tears of joy and relief.

However, as I began to realize the gravity of what had just occurred, and that our pup had a lot to learn about obedience, I began to scold her. I noticed that she had not opened her mouth since reappearing and as part of my scolding, commanded her to spit out whatever she was holding. Of course she refused and so I had to pry open her mouth with my fingers. Imagine my surprise when a full grown, female Mormon cricket (*Anabrus simplex* Haldeman), with its legs, antennae, and long ovipositor intact, jumped to the road. I released the dog, grabbed the cricket and ran to the car for a jar of alcohol. Anxious to regain her prize, Tina remained at my feet until the specimen was inside the jar. I praised her for being such a good dog and bringing us a Mormon cricket. Along with the praise, I left her off the leash as the others came back to the car.

Big mistake! Tina ran past everyone, spotted another rabbit run, and disappeared. As with the first time, we all ran up and down the road hollering her name and pleading for her to return. Again, she suddenly appeared about 5 minutes later and ran towards us, jumping at our legs until I was able to catch her. Same as the previous time, lots of hugs and petting, and then another serious scolding. While scolding her, I again noticed her mouth was shut as she was obviously holding something between her jaws. I pried open her mouth, and to our shock, another Mormon cricket hopped out onto the road. I handed Tina to my wife with instructions to hang onto her

collar until one of the kids returned with a leash, then grabbed the cricket. Again, it was in perfect condition, but this time it was a male. In a span of about 20 minutes, our disobedient sheltie had managed to collect a fine pair of Mormon crickets.

At this point in the lecture, I would reach into my briefcase and, like a magician, remove the jar with the two crickets (Fig. 2). As the jar passed from student to student, I would begin discussing some of the intriguing attributes of Mormon crickets. I usually started by explaining the close tie between The Church of Jesus Christ of Latter-day Saints (the Mormons) and California gulls (*Larus californicus* Lawrence) which are credited with saving the Mormon's first crops in 1848 in the Salt Lake Valley in Utah by devouring thousands of crickets during an outbreak. This outbreak is commemorated by a monument to the gulls in Salt Lake City.

Joe Shorthouse

Fig. 2. The Mormon crickets captured by Tina.

This was also an ideal time to discuss the hazards of common names since the Mormon cricket took its name from the Mormon Church and is not a cricket, but rather a shield-backed katydid. Drawing from key references on Orthoptera (Vickery and Kevan 1985; Capinera et al. 2004), I would explain that Mormon crickets live throughout western North America in rangelands dominated by sagebrush and forbs where they are one of the largest insects, some being 6 cm in length. I described how this species sometimes experienced population explosions with bands (the word 'swarm' is restricted to flying insects) of up to 15 adults/m^2; however, with the advent of insecticides, this rarely occurs today. Mating behaviour perks interest when it is explained that the male lies curled under the female or on his back with genitalia attached while she continues walking about, dragging the male beneath her (Vickery and Kevan 1986). Eating habits also prove interesting when the students hear that this usually phytophagous insect consumes almost anything green, but also resorts to cannibalism (MacVean 1990).

Before the arrival of settlers in Utah, Mormon crickets were used as food by native peoples, especially during years of abundance when they yielded a high energy return for the energy expended in their harvest (Srivastava et al. 2009). Insects such as Mormon crickets are an excellent source of protein (Taylor 1975, DeFoliart 1994), and have been used as chicken feed (DeFoliart et al. 1982). What better way to introduce entomophagy and its potential for solving the world's food shortage.

In telling amusing or compelling stories, one accentuates the human side of science and engages students in questioning. They not only allow you to weave a lot of information into the telling, they arouse emotions and energy. Clough (2011) argues that stories play an important role in reminding students that science is a social endeavour that involves working with and helping people and that researchers work in teams solving problems collaboratively (including collecting rose galls and katydids as a family). Relying too heavily on textbooks, cookbook laboratory activities and audiovisual materials ignores or downplays human influences in scientific investigations.

It has been argued that inserting stories of historical nature in lectures humanizes the subject by raising personal, sociological, and philosophical issues which tend to increase interest and motivation (Metz et al. 2007, Clough 2011). A taste of history often demonstrates that knowledge is not fixed but rather its advancement has been a human struggle to understand, overcome falsity and stumble towards the truth (Matthews 1988). There is a rich history associated with orthopterans and settlement of the prairies in western North America (Riegert 1980, DeFoliart et al. 1982) and the sheltie story set up the opportunity to explore some of this history. The saga of Norman Criddle, and his unorthodox family (Shorthouse 2011), who in 1919 was appointed by the federal government as western Canada's first entomologist, employed in a laboratory he built near Aweme, Manitoba (and an expert on orthopterans), never fails to fascinate students.

Entomologists are aware that insects serve as the best examples in the natural world to inspire and encapsulate creative energy among young people and that a rich legacy of insect studies have transformed the way all biologists view the natural world (Price 2003). For a good example of historical accounting, check out Matthew Cobb's (2006) book "Generation: Seventeenth-Century Scientists Who Unraveled the Secrets of Sex, Life, and Growth" where he describes how the interactions between Jan Swammerdam, Marcello Malpighi, and Robert Hooke in the mid 1600's, as they unraveled insect development, changed the direction of biological thought. Cobb (2006) makes a convincing argument that without their contributions, the theory of natural selection would not have arisen. Price (2003) reminds us that all insects are endlessly fascinating and puzzling and solving these puzzles provides happiness in one's existence, along with great memories for university students.

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Mainz, Germany, 3-7 August 2014
http://www.sip2014.mainz.jki.bund.de/

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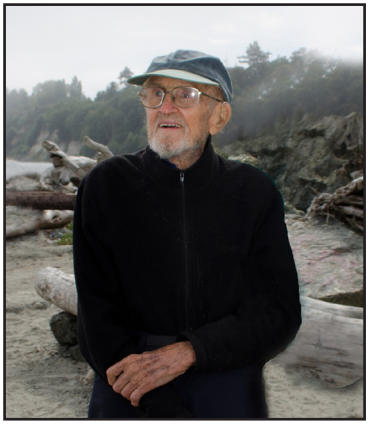
York, UK, 3-8 August 2014
www.ece2014.com

7th International Conference on the Biology of Butterflies
Turku, Finland, 11-14 August 2014
http://nymphalidae.utu.fi/icbb2014/

XXV International Congress of Entomology (Entomology without Borders)
Orlando, Florida, 25-30 September 2016
http://ice2016orlando.org/

Readers are invited to send the Editor notices of entomological meetings of international, national or Canadian regional interest for inclusion in this list.
Les lecteurs sont invités à envoyer au rédacteur en chef des annonces de réunions entomologiques internationales, nationales ou régionales intéressantes afin de les inclure dans cette liste.

Roy Pickford passed away on 14 January 2014 in Victoria, British Columbia, aged 96. Roy grew up and received his school education in the Moose Jaw area of Saskatchewan. From 1940-1945, he served in the Second World War with the Survey Regiment of the Royal Canadian Engineers, and it was during this service that he met Ada ter Braake in Holland. They married in 1948. After demobilization, Roy began his university education, receiving a BSA in 1949 from the University of Saskatchewan. It was during the later part of his undergraduate studies that Roy's career-defining association with entomology emerged when in the summer of 1948 he was employed as a seasonal assistant at the then Dominion Entomological Laboratory in Saskatoon.



Ben Pickford

Roy Pickford
19 September 1917
– 14 January 2014

As Riegert (1990) noted 'From then on entomology to Roy meant grasshoppers, a group of insects to which he devoted all of his research years.'

Roy began full-time employment at the DEL in 1949, but for the next 2 years the data he collected was used for his Master's research. In 1951, Roy received a MSc from the University of Saskatchewan. His thesis, supervised by J.G. Rempel, looked at the biology of *Arphia conspersa* (speckle-winged grasshopper) and *Pardalophora apiculata* (coral-winged grasshopper), two species that, unusually, overwinter as nymphs on the Prairies.

For the next 25 years, in a wide range of field and laboratory studies, Roy focused his attention on the biology, ecology and management of grasshoppers. In particular, he was involved in the annual surveys and forecasting of outbreaks, testing the effectiveness of organic insecticides for population control, investigating the nutritional ecology of several species (showing, among other things, that some species don't eat much 'grass', but prefer a variety of broad-leaved plants), and conducting a range of biological studies including parasitism and, especially, reproduction. A significant outcome of the laboratory side of this research was the development and selection of a non-diapause strain of the migratory grasshopper (*Melanoplus sanguinipes*), the single most important grasshopper pest species on the Prairies, in which embryonic development was immediate and complete after egg laying, removing the requirement for a lengthy exposure of eggs to low temperature (Pickford and Randell 1969). This strain has since been extensively used by many experimental entomologists across North America.

Shortly after I joined the Department of Biology at the University of Saskatchewan in 1965, I had a visit from the department head with Roy in tow. Roy wished to do a PhD, and was I prepared to supervise him. Roy's reason for someone approaching 50 wanting to do a PhD was very simple: he wished to prove to himself that he was capable of such a project! He had no interest in comparing himself to or bettering other colleagues: it was solely for his personal satisfaction. Thus, this friendly, good-natured individual became my first graduate student, a remarkable arrangement given that he was old enough to be my father and had almost two decades more experience than I on North American acridids! Roy's thesis project, a study of the reproductive biology of the migratory grasshopper, generated some fascinating data, especially about the role of the male, a highly promiscuous beast that produces, on average

seven spermatophores during a single mating. Roy also showed that during mating the male transfers chemicals to the female which 'advise' her that she now has sperm available and can proceed to produce multiple eggs that are fertilized as they are being laid. Likely related to his early retirement, Roy may not have received full credit for these discoveries, as I am sure that he would have continued as part of the research group looking at the nature and roles of these fascinating chemicals. Through other graduate students and post-doctorals, my lab continued to examine these materials for several decades. Indeed, even today, almost 15 years after my own retirement, there is collaboration between members of the Biology Faculty and Martin Erlandson (AAFC, Saskatoon) aimed at unravelling the mysteries of accessory gland substances in the male migratory grasshopper.

Roy completed his PhD in 1971 and almost immediately took leave of absence to spend a year based in London, England, at the then Anti-Locust Research Centre. This included a trip to Africa (Mali, Ghana, and Nigeria) to study locusts up close. Roy's return to active service at the Saskatoon Research Laboratory of AAFC was a relatively short one as he retired in September 1975, though not before serving as the President of the Entomological Society of Saskatchewan in 1973.

Initially, Roy and Ada moved to Brentwood Bay, British Columbia, but some years later moved to Thetis Island where they built a home in the forest and began an intensive gardening operation with fruit trees, vegetables, herbs and flowers. Grafting fruit trees was one of Roy's specialities. Roy also enjoyed woodworking, reading, and sailing. Indeed, he and Ada were founding members of the Saskatoon Sailing Club in 1963 and significantly involved in the Club's acquisition of land on which to build a clubhouse on the shore of Redberry Lake, Saskatchewan, in 1965.

References

Pickford, R. and Randell, R.L. 1969. A non-diapause strain of the migratory grasshopper, *Melanoplus sanguinipes* (Orthoptera: Acrididae). The Canadian Entomologist **101**: 894-896.

Riegert, P.W. 1990. Entomologists of Saskatchewan. Published jointly by the Entomological Societies of Canada and Saskatchewan.

Cedric Gillott
Saskatoon

64th Annual Meeting of Members and Board of Directors Meetings

The Annual Meeting of Members of the Entomological Society of Canada will be held at the Radisson Hotel, Saskatoon, Saskatchewan, on Tuesday, 30 September 2014. The Board of Directors Meeting will be held at the same location on Saturday, 27 September 2014, from 8:30 to 17:00. The incoming Board of Directors will also meet immediately following the Annual General Meeting. Matters for consideration at any of the above meetings should be sent to Alec McClay, Secretary of the ESC (see inside back cover for contact details).

64e assemblée annuelle et réunions du conseil d'administration

L'assemblée annuelle de la société d'entomologie du Canada se tiendra à l'hôtel Radisson de Saskatoon, en Saskatchewan, le mardi 30 septembre 2014. La réunion du conseil d'administration se tiendra au même endroit, le samedi 27septembre 2013 de 8:30 à 17:00. Le nouveau conseil d'administration se réunira également immédiatement après l'assemblée annuelle. Les sujets à aborder pour n'importe laquelle de ces réunions doivent être envoyés à Alec McClay, secrétaire de la SEC (voir le troisième de couverture pour les coordonnées détaillées).

Nominations for ESC Board of Directors / Nominations pour le Conseil d'administration de la SEC

The following have been nominated and agreed to stand for election in 2014 for the indicated positions. Members will receive more details on this year's process by email or in the mail. However, note that under the new by-laws approved last year by ESC members under the Canada Not-for-profit Corporations Act, a plebiscite/vote first will be held to 'select candidates' for a slate of Directors, to then be presented for formal election at the Annual Members' Meeting in Saskatoon in September.

Les personnes suivantes ont été nominées et ont accepté de se présenter pour les élections de 2014 pour les postes indiqués. Les membres recevront plus de détails sur le processus de cette année par courriel ou par la poste. Cependant, veuillez noter que selon le nouveau règlement intérieur approuvé l'an dernier par les membres de la SEC en vertu de la Loi canadienne sur les organisations à but non lucratif, un plébiscite/vote se tiendra d'abord afin de sélectionner les candidats pour une liste de directeurs qui seront ensuite présentés pour une élection formelle à l'assemblée générale annuelle des membres à Saskatoon en septembre.

Nominations

The current ballot will select candidates for a Director-at-Large and a Societal Director (Second Vice-President). The plebiscite will be conducted electronically but paper ballots will still be mailed to members who do not have email addresses. Electronic votes must be submitted or ballots mailed to the Elections Committee by **15 July 2014**.
PLEASE DO NOT FORGET TO VOTE!

Ce vote sélectionnera les candidats pour les postes de conseillers et de directeur sociétal (second vice-président). Le plébiscite sera conduit électroniquement, mais des bulletins de vote papier seront envoyés aux membres ne possédant pas de courriel. Les votes électroniques doivent être soumis ou les bulletins de vote envoyés au comité des élections au plus tard le **15 juillet 2014**.
N'OUBLIEZ PAS DE VOTER!

Candidates for Societal Director/Second Vice-president : Candidats pour le poste de directeur sociétal/second vice-président
Neil Holliday (University of Manitoba) (left / gauche) and / et Jenny Cory (Simon Fraser University) (right / droite).

Candidates for Director-at-Large : Candidats pour le poste de conseiller
Ken Fry (Olds College) (left / gauche), and / et Chris Cutler (Dalhousie University) (right / droite).

ESC Scholarship Fund

Once again the Society would like to thank and acknowledge the very generous donors to the ESC Scholarship Fund. These tax-deductible donations are very important to the Society, as it is only because of these donations that the scholarship fund is self-sustainable. Donations can be made at any time and a receipt for income tax purposes in Canada will be issued. Please make cheques payable to the Entomological Society of Canada.

Le Fonds de bourses d'études de la SEC

La Société tient à remercier, une fois de plus, les très généreux donateurs et donatrices au Fonds de bourses d'études de la SEC. Ces dons déductibles d'impôt sont très importants pour la Société, puisque c'est seulement grâce à ces dons que le Fonds de bourses d'études est autosuffisant. Les dons peuvent être faits en tout temps, et un reçu pour fin d'impôt vous sera envoyé. Veuillez libeller votre chèque au nom de la Société d'entomologie du Canada.

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David L. Wood

… and those who preferred to remain anonymous.

… et ceux et celles qui ont préféré rester anonyme.

Highlights from the January 2014 Executive Council Meeting

Alec McClay, Secretary

The Executive met by conference call on 28 January 2014.

The President reported that an **Ad Hoc Committee on Headquarters Operations** has been formed with Bernard Roitberg as Chair, tasked with determining what type of service and skills would best suit the ESC's needs for the running of society business. The Ad Hoc Committee on Headquarters Operations met for the first time on January 27 and has begun to consider options including the use of association management companies, the possibility of selling the Headquarters building, and ways of conducting more business online. Christopher Dufault will become the new **Treasurer**, effective Fall 2014, and was appointed as a member of the Finance Committee, effective December 2013. Maxim Larrivée, chief of the entomological section of the Montréal Insectarium, has agreed to serve as the General Chair of the 2015 JAM.

The **Ad Hoc Committee on Transition** has started the task of updating the Standing Rules to ensure compliance with the new By-laws and the Canada Not-for-profit Corporations Act. This is also an opportunity to ensure that all Committee Guidelines are in compliance and up to date. It was suggested that some items currently in the Standing Rules could be transferred to the Committee Guidelines, which are easier to modify. The updated Standing Rules must be presented to the whole ESC Membership prior to the next AGM, where a vote will take place to adopt the new Standing Rules.

Kevin Floate will become the new **Editor-in-Chief of *The Canadian Entomologist***, effective Fall 2014, and will work with Chris Buddle as co-editors during the transition period.

Rose De Clerck-Floate was appointed to serve as **ESC representative to the Entomological Society of America's "Science Policy Fellow" program** for advanced graduate students and early-career professionals. This committee will work with ESA staff to design and implement a Science Policy Fellowship program for the ESA and ESC.

JAM 2013 generated a sizeable profit, and the ESC loan has been repaid. The intention of the JAM 2013 Organizing Committee is to disburse the profit equally between the ESC and the ESO.

We obtained a legal opinion on practices involving the collection of monies for ESC scholarships, given that the **Scholarship Fund** is a registered charity and a separate entity from the Society. Although scholarship fund contributions are collected together with ESC membership dues, they are held in a separate bank account and separate tax returns are filed. This was considered an adequate separation of the Scholarship Fund to meet Charities Directorate rules. It will be necessary to ensure that the proper procedures are captured in the Standing Rules and Committee Guidelines for the Scholarship Fund.

The Treasurer reported that the $30,000 investment from the **Endowment Fund** that was cashed in June 2013 to assist with a potential cash shortfall has been reinvested back into the Fund. Due to better than expected sales of the **Digital Archive**, the ESC is currently projected to receive about $25,000 more in royalties for 2013 than previously expected. However as access to the Archive is sold on a one-time basis, this revenue is not expected to continue at the same level.

The **Publications Committee** reported that the scanning of all back issues of the *Bulletin* is being undertaken. The Executive approved in principle a change to the Standing Rule regarding abstracts, which will provide that authors are required to provide an abstract in the language in which their manuscript is written. Authors who wish to have an abstract in both languages will be required to provide a high-quality translation of their abstract.

A revised proposal for an **Early Professional membership category** was approved in principle by the Executive. An Early Professional Member is a person who is within 3 years (based on the calendar year) of graduation from their highest educational degree, and will receive a 25% discount on membership dues.

The Entomological Society of British Columbia has approved a plan to host a **joint meeting** with the Entomological Society of Canada and the Entomological Society of America in Vancouver in 2018.

Tenth Annual Photo Contest

The Tenth Annual Photo Contest to select images for the 2015 covers of *The Canadian Entomologist* and the *Bulletin of the Entomological Society of Canada* is underway. The cover images are intended to represent the breadth of entomology covered by the Society's publications. Insects and non-insects in forestry, urban or agriculture; landscapes, field, laboratory or close-ups; or activities associated with physiology, behaviour, taxonomy or IPM are all desirable. A couple of 'Featured Insects' (for the spine and under the title) are also needed. If selected, your photo will grace the cover of both publications for the entire year. In addition, winning photos and a selection of all submitted photos will be shown on the ESC website.

Contest rules:

Photos of insects and other arthropods in all stages, activities, and habitats are accepted. To represent the scope of entomological research, we also encourage photos of field plots, labora¬tory experiments, insect impacts, research activities, sampling equipment, etc. Photos should, however, have a clear entomological focus.

Digital images must be submitted in unbordered, high-quality JPG format, with the long side (width or height) a minimum of 1500 pixels.

Entrants may submit up to five photographs. A caption must be provided with each photo submitted; photos without captions will not be accepted. Captions should include the locality, subject identification as closely as is known, description of activity if the main subject is other than an insect, and any interesting or relevant information. Captions should be a maximum of 40 words.

The entrant must be a member in good standing of the Entomological Society of Canada. Photos must be taken by the entrant, and the entrant must own the copyright.

The copyright of the photo remains with the entrant, but royalty-free use must be granted to the ESC for inclusion on the cover of one volume (6 issues) of *The Canadian Entomologist,* one volume (4 issues) of the *Bulletin*, and on the ESC website.

The judging committee will be chosen by the Chair of the Publications Committee of the ESC and will include a member of the Web Content Committee.

The Photo Contest winners will be announced on the ESC website, and may be announced at the Annual Meeting of the ESC or in the *Bulletin*. There is no cash award for the winners, but photographers will be acknowledged in each issue the photos are printed.

Submission deadline is **31 July 2014**. Entries should be submitted as an attachment to an email message; the subject line should start with "ESC Photo Contest Submission". Send the email message to: photocontest@esc-sec.ca.

Dixième concours annuel de photographie

Le dixième concours annuel de photographie visant à sélectionner des images pour les couvertures de *The Canadian Entomologist* et du *Bulletin de la Société d'entomologie du Canada* pour 2015 est en cours. Les images sur la couverture doivent représenter l'étendue entomologique couverte par les publications de la Société. Des photos représentant des insectes ou autres arthropodes forestiers, urbains ou agricoles, des paysages, du travail de terrain ou de laboratoire, des gros plans, ainsi que montrant des activités associées à la physiologie, au comportement, à la taxonomie ou à la lutte intégrées seraient souhaitées. Deux « insectes vedettes » (pour le dos et sous le titre) sont également recherchés. Si elle est sélectionnée, votre photo ornera la couverture des deux publications pour l'année entière. De plus, vos photos gagnantes et une sélection de photos soumises seront montrées sur le site Internet de la SEC.

Règlements du concours :

Les photos d'insectes et autres arthropodes à n'importe quel stade, effectuant n'importe quelle activité et dans n'importe quel habitat sont acceptés. Afin de représenter les sujets de la recherche entomologique, nous encourageons également les photos de parcelles de terrain, expériences de laboratoire, impacts des insectes, activités de recherche, équipement d'échantillonnage, etc. Les photos doivent, cependant, avoir un intérêt entomologique clair.

Les images numériques doivent être soumises sans bordure, en format JPG de haute qualité, avec le plus grand côté (largeur ou hauteur) d'un minimum de 1500 pixels.

Chaque participant peut soumettre jusqu'à cinq photographies. Une légende doit être fournie pour chaque photo soumise : les photos sans légendes ne seront pas acceptées. La légende doit inclure la localisation, l'identification du sujet le plus précisément possible, la description de l'activité si le sujet n'est pas un insecte, et toute information intéressante ou pertinente. Les légendes doivent avoir une longueur maximale de 40 mots.

Les participants doivent être membres en bonne et due forme de la Société d'entomologie du Canada. Les photos doivent avoir été prises par le participant, et le participant doit en posséder les droits d'auteur.

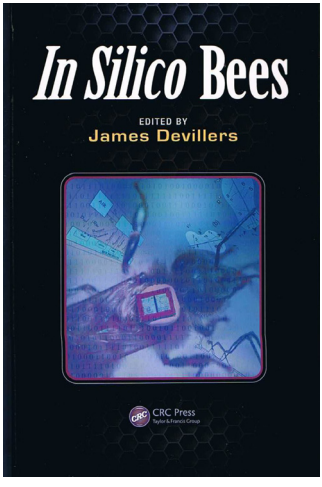
Le participant conserve les droits d'auteur de la photo, mais l'utilisation libre de droits doit être accordée à la SEC afin de l'inclure sur la couverture d'un volume (6 numéros) de *The Canadian Entomologist*, un volume (4 numéros) du *Bulletin*, et sur le site Internet de la SEC.

Le comité d'évaluation sera choisi par le président du comité des publications de la SEC et inclura un membre du comité du contenu du site Internet.

Les gagnants du concours de photographie seront annoncés sur le site Internet de la SEC et pourront être annoncés à la réunion annuelle de la SEC ou dans le *Bulletin*. Il n'y a pas de prix en argent pour les gagnants, mais les photographes seront remerciés dans chaque numéro où les photos seront imprimées.

La date limite de soumission est le **31 juillet 2014**. Les soumissions doivent être faites en pièces jointes d'un courrier électronique. L'objet du message doit débuter par « Soumission pour le concours de photographie de la SEC ». Envoyez vos courriels à : photocontest@esc-sec.ca.

***In Silico* Bees**. Devillers, J. (editor). 2014. CRC Press of Taylor & Francis Group, Boca Raton, London & New York. 292 pp. US$119.95.



Computers are now part of everyday life. In science they are used for modelling, computation, and statistical analyses. The book is not about artificial, robot bees. It is about how computing (*In Silico*) can be applied to understanding bee biology, behaviour, ecology, foraging, diseases, pests, and pesticide interactions. *In Silico* Bees is a collection of computational methods of direct interest to scientists primarily interested in ecology, behaviour, and ecotoxicology of bees, especially honeybees (*Apis mellifera*). The chapters of the book, each written by internationally known experts in the field, present studies by which readers (peers, other professional researchers, and advanced students) can understand the significance, value, and limitations of models in theoretical and applied apidology. The range of different modelling tools and approaches used is broad. Various chapters embrace agent based models, adaptive multi-agent organizational models, models based on differential equations, and statistical approaches including artificial neural networks and ecological niche modelling. Unfortunately, there is no preface by which readers can understand the way in which this book is arranged, or what *In Silico* means.

Societal organization and behaviour are covered in the first four chapters. They cover topics as diverse as how the social integrity of honeybee colonies can be modelled and how foraging recruitment and allocation are organized. Chapter 1 reviews automated systems that capture and analyse normal and abnormal behaviours in honeybees both in-hive and in the field. Chapter 2 addresses modelling of how honeybee societies are organized and allocate resources to the multitude of tasks they need to accommodate. The third chapter delves more deeply into some of the same issues and presents some different perspectives. Chapter 4 then concentrates on foraging and recruitment of foragers. The four chapters take readers from in-hive social integrity to outside-the-hive foraging biology in healthy, functional colonies.

Chapter 5 also has major ecological implications in respect of unhealthy colonies. It introduces the theory and utility of models in understanding the epidemiology of honeybee parasites and diseases. The model presented parallels observed sudden declines in colonies afflicted with Varroa mites and associated viral pathogens.

Chapter 6 takes readers into landscape ecology, focusing on feral colonies of Africanized honeybees that inhabit, and are a public danger in, the urban milieu in the southwestern USA. Two other chapters (10 and 11) are also mostly ecological in context. Chapter 10 addresses inter-specific competition for pollen foraging in solitary bees. There are parallels for honeybees in their various competitive interactions (between colonies, between races, and between species). Chapter 11 models the potential for the invasiveness of the bee-hawking wasp, *Vespa velutina*, which has become a beekeeping pest of great concern in Europe.

There are three chapters (7, 8 and 9) devoted to pesticide issues in apidology. The Quantitative Structure-Activity Relationship (QSAR) (Chapter 7) can be used to predict the activity of organic molecules from physico-chemical and structural characteristics and those have been found, in general, to be better than previous predictions in the literature. Chapter 8 invokes the pathways by which contaminants, including pesticides, circulate throughout afflicted colonies. Chapter 9 takes

the specific example of pyriproxyfen (a juvenile hormone mimic) through QSAR and pathways to in-hive contamination through SimBeePop (an agent-based model for predicting long-term effects of contaminants on honeybee populations) noting that it can adversely affect hive strengths at sub-lethal doses.

Although this book is highly technical, each chapter is preceded by an easily understood abstract. We recommend readers to read the abstract before tackling the details, mathematics, and modelling presented. Researchers and technical personnel in apidology will find the book of great use in understanding the complexities of bee biology and how those complexities can be considered practically for the betterment of beekeeping.

Peter G. Kevan & Hermann Eberl
University of Guelph

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).

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).

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

La préférence est donnée aux membres de la SEC.

Guidelines

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

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

Lignes directrices

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

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

Currently available for review / Disponibles pour critique

Rivers, D.B. and Dahlen, G.A. 2014. The Science of Forensic Entomology. 400 pp. Wiley Blackwell. ISBN: 9781119940371 (paperback)

Evans, A.V. 2014. Beetles of Eastern North America. 560 pp., 1,500+ illus. Princeton University Press. ISBN: 9780691113647 (paperback)

Smallshire, D. and Swash, A. 2014. Britain's Dragonflies: A field guide to the damselflies and dragonflies of Britain & Ireland (3rd edition). 224 pp, 321 colour illus. Princeton University Press. ISBN 9780691161235 (paperback)

Paulson, D. 2012. Dragonflies and Damselflies of the East. 544 pp., 675 colour illus. Princeton University Press. ISBN: 9780691122830 (hardcover)

Williams, P., Thorp, R., Richardson, L. and Colla, S. 2014. Bumble Bees of North America. 208 pp., 150 colour illus. Princeton University Press. ISBN 9780691152226 (paperback or ebook)

Bug Bingo. 2014. Board game, 64 illus. Laurence King Publishing. ISBN: 9781856699402.

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 Shapiro-Ilan, D.I. 2013. Mass Production of Beneficial Organisms, 1st Edition, Invertebrates and Entomopathogens. 764 pp. Academic Press. ISBN: 9780123914538 (hardcover or ebook)

Abrol, D.P. (Ed.) 2013. Integrated Pest Management, 1st 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)

Hoy, M. 2013. Insect Molecular Genetics, 3rd Edition, An Introduction to Principles and Applications. 840 pp. Academic Press. (hardcover, ebook). ISBN: 9780124158740

Chyb, S. and Gompel, N. 2013. Atlas of *Drosophila* Morphology, 1st Edition, Wild-type and Classical Mutants. 248 pp. Academic Press. (hardcover, ebook). ISBN: 9780123846884

Paiero, S.M, Jackson, M., Jewiss-Gaines, A., Kimoto, T., Gill, B.D. and Marshall, S.A. 2012. Field Guide to Jewel Beetles (Coleoptera: Buprestidae) of Northeastern North America. Canadian Food Inspection Agency. 164 maps. 411p

Paulson, D. 2009. Dragonflies and Damselflies of the West. 536 pp., 863 colour illus. Princeton University Press. ISBN: 9780691122816 (paperback)

Officers of affiliated Societies, 2013-2014
Dirigeants des Sociétés associées, 2013-2014

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

Bulletin of the Entomological Society of Canada

Editor: Cedric Gillott
Assistant Editor: Donna Giberson

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

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

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

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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.

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Cedric Gillott, Editor / Rédacteur

Changes lead to improvements

An immediate bonus resulting from the appointment of Donna (Giberson) as Assistant *Bulletin* Editor has been the fresh ideas that she brings from her time spent as Editor of the *Biological Survey of Canada Newsletter*. The most important of these, and one which I know has been well received, is to supply all authors of special features and obituaries with a complimentary eprint in pdf format of their contribution. This is a small token perhaps but one which reflects our genuine thanks to those who help to make the Society's quarterly magazine an interesting and informative read. (Incidentally, should contributors of other *Bulletin* articles feel 'left out' of this new arrangement, simply get in touch with us and we'll rectify the matter!)

The second major change to the *Bulletin* relates to its format and specifically to the fact that there is no longer a print version. When we were producing a version for the printer, a key job for the Assistant Editor, who is responsible for the layout of each issue, was to ensure that all the material fitted comfortably into a multiple of four pages – not an easy task given the other constraints necessary for ensuring that the *Bulletin* retained its good-looking and easily readable format. With the change to an on-line only version, starting with the March 2014 issue, there is no such restriction to the number of pages produced.

Other changes now in place are minor, more of a gentle dusting rather than a major spring clean, such as the modifying of certain text items and alterations to fonts, but all serving we think to improve the overall quality of the *Bulletin*. We hope you agree …!

Les changements mènent à des améliorations

Un gain immédiat résultant de la nomination de Donna (Giberson) comme rédactrice adjointe du *Bulletin* a été les idées fraiches qu'elle a rapporté du temps passé comme éditrice du *Bulletin de la Commission biologique du Canada*. La plus importante de ces idées, et qui sera certainement bien reçue, est d'offrir aux auteurs des articles spéciaux et nécrologiques une copie en format pdf de leur contribution. Il s'agit peut-être d'un petit geste, mais qui reflète nos sincères remerciements à ceux qui aident à faire du magazine trimestriel de la Société une lecture intéressante et informative. (Accessoirement, si les contributeurs des autres articles du *Bulletin* se sentent « mis de côté » par ce nouvel arrangement, contactez-nous simplement et nous rectifierons le tir!)

Le deuxième changement majeur au *Bulletin* a trait à son format, et plus particulièrement au fait qu'il n'y a plus de version imprimée. Quand nous produisions une version pour l'imprimante, une tâche clé pour le rédacteur adjoint, qui est responsable de la mise en page pour chaque numéro, était de s'assurer que tout le matériel s'insérait correctement dans un multiple de quatre pages – ce qui n'est pas une mince tâche considérant les autres contraintes nécessaires pour s'assurer que le *Bulletin* conserve son format agréable et facile à lire. Avec le changement vers une version en ligne seulement, depuis le numéro de mars 2014, il n'y a plus cette restriction sur le nombre de pages produites.

D'autres changements maintenant en place sont mineurs, plutôt du niveau d'un dépoussiérage que d'un ménage de printemps, tels que la modification de l'apparence de certains textes, mais tous dans le but, nous pensons, d'améliorer la qualité générale du *Bulletin*. Nous espérons que vous êtes d'accord…!

Entomological Society of Canada, 2013-2014
Société d'entomologie du Canada, 2013-2014

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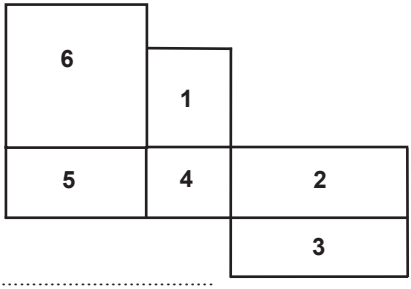

Images

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: Guillame 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.

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