Bulletin

Entomological Society of Canada
Société d'entomologie du Canada

Volume 50
Number / numéro 2

June / juin 2018

Published quarterly by the
Entomological Society of Canada

Publication trimestrielle par la
Société d'entomologie du Canada

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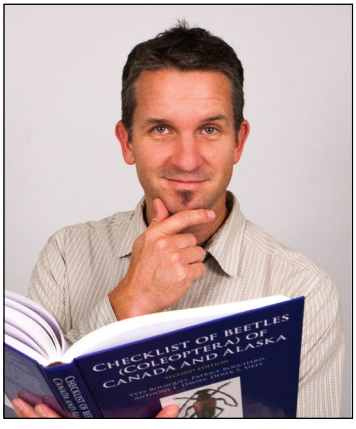
Captions for cover photos can be found on the back cover.
La légende des photos de la couverture se situe sur la couverture arrière.

In 2017, this automated pest monitoring system was used to record the abundance of armyworm moth (*Mythimna unipuncta*; Lepidoptera: Noctuidae). It enables us to catch insects and to take pictures that are automatically sent to the user [St-Mathieude-Beloeil, Québec, Canada].

En 2017, ce système de surveillance automatisé des ravageurs a été utilisé afin d'enregistrer l'abondance de la légionnaire uniponctuée (*Mythimna unipuncta*; Lepidoptera : Noctuidae). Il permet d'attraper des insectes et de prendre des photos qui sont automatiquement envoyées à l'utilisateur. [St-Mathieu-de-Beloeil, Québec, Canada].

[Photo: Julien Saguez]



A passion for insects

People who are passionate about insects and their relatives love to explore the natural world around them. They get pleasure from learning about the multitude of shapes, colours and behaviours displayed by these awesome organisms. While many ento-enthusiasts are happy to learn new things about insects and relatives at their own pace using a wide range of available resources, others make a conscious choice to study entomology more formally.

Individuals who want to study entomology at university often end up taking a few classes as undergraduate students, and a good number continue honing their skills during graduate programmes. While graduate studies are essential if one wants to pursue a career in research, the truth is that most MSc or PhD students will not end up as academics or government scientists. So what do students trained in entomology do then? This is a question that we often face from members of the public during outreach events or informal discussions.

As nicely explained by Server and Janssen (2017), it turns out that people passionate about biological sciences such as entomology have a lot going for them once they have gone through graduate school, especially if they like anything to do with communications. For example, while focussing on delivering

Une passion pour les insectes

Les gens passionnés par les insectes et leurs apparentés adorent explorer le monde naturel autour d'eux. Ils tirent du plaisir à en apprendre sur la multitude de formes, couleurs et comportements retrouvés chez ces organismes formidables. Alors que plusieurs entomo-enthousiastes sont heureux d'apprendre de nouvelles choses sur les insectes et leurs apparentés à leur propre rythme en utilisant une vaste gamme de ressources disponibles, d'autres font le choix d'étudier l'entomologie plus formellement.

Les gens qui veulent étudier l'entomologie à l'université finissent souvent par suivre quelques cours comme étudiants de premier cycle, et un bon nombre continuent d'affûter leurs habiletés durant les programmes de cycles supérieurs. Alors que les études supérieures sont essentielles pour quelqu'un qui veut poursuivre une carrière en recherche, la vérité est que la plupart des étudiants de maîtrise et doctorat ne finiront pas comme professeurs ou scientifiques au gouvernement. Que font donc les étudiants formés en entomologie? C'est une question que nous nous faisons souvent poser par les membres du public dans les évènement grand public ou les discussions informelles.

Comme bien expliqué par Server et Janssen (2017), il semble que les passionnés des sciences biologiques telle que l'entomologie ont beaucoup à faire après les études supérieures, particulièrement s'ils aiment les communications. Par exemple, alors qu'ils se concentrent à livrer des résultats de la plus haute qualité possible dans leur thèse et leurs premières publications, les étudiants accumulent une variété d'habiletés qui sont

results of the highest quality possible in their theses and early publications, students are accumulating a variety of skills which will be applicable to a broad range of what would have traditionally been referred to as alternative positions. These days such alternative positions are becoming more and more the norm and I believe that this is actually an exciting trend.

There seems to be an increasing number of new entomological papers coming out from all over the world nowadays. Even if graduate students are focused on a pretty specific question to delve into, the amount of new information (e.g., algorithms, techniques, datasets) getting published all the time, in addition to all the previous works that they need to synthesize, can certainly seem like an overwhelming job to assimilate at times. However, the skills developed during this process (e.g., critical thinking, processing complex scientific concepts, and clearly communicating the results of previous studies) will be directly transferable to a large number of non-academic positions. To name a few, these include science teaching, grant administration, core facility management, editing and law (Server and Janssen 2017, Pearson 2017). The various opportunities students get to practice their writing and oral communication skills will undoubtedly be valuable for any position in the future.

Many people also use their knowledge about insects and relatives as inspiration, the results of which are expressed in different ways. For example, numerous websites dedicated to insects in art (ancient to contemporary) and a notable recent book by Rooney (2017) effectively display some of the impressive results of this inspiration. A few years ago I was involved in the production of a book on beetles aimed at a "broader than typical" audience. We had made an effort to generate and include high resolution photographs of impressive species of all sizes. I have been happily surprized by the number of people who used some of our photos to stimulate creative ideas of all kinds.

applicables à une vaste gamme de ce qui était traditionnellement considéré comme des postes alternatifs. Maintenant, ces postes alternatifs deviennent de plus en plus la norme et je crois qu'il s'agit en fait d'une tendance excitante.

Il semble y avoir un nombre croissant d'articles entomologiques qui viennent du monde entier en ce moment. Même si les étudiants gradués se concentrent sur des questions très spécifiques, la quantité de données (p. ex. algorithmes, techniques, bases de données) qui sont publiées, en plus des travaux antérieurs qui ont besoin d'être synthétisés, peuvent certainement sembler comme une tâche énorme à assimiler parfois. Cependant, les habiletés développées durant ce processus (p. ex. la pensée critique, le traitement de concepts scientifiques complexes, et clairement la communication des résultats d'études précédentes) sont directement transférables à un grand nombre de postes non-académiques. Pour n'en nommer que quelques-uns, ceux-ci incluent l'enseignement, l'administration de subventions, la gestion de plateformes, l'édition, le droit, etc. (Server et Janssen 2017, Pearson 2017). Les diverses opportunités qui se présentent aux étudiants pour pratiquer leurs habiletés en communication écrite et orale vont sans aucun doute être importantes pour tout poste dans le futur.

Plusieurs personnes utilisent aussi leurs connaissances sur les insectes et leurs apparentés comme inspiration, dont le résultat peut s'exprimer de différentes façons. Par exemple, plusieurs sites web dévoués aux insectes dans l'art (d'ancien à contemporain) et un livre récent de Rooney (2017) montrent efficacement certains des résultats impressionnants de cette inspiration. Il y a quelques années, j'ai été impliqué dans la production d'un livre sur les coléoptères qui visait une audience plus large qu'habituellement. Nous avons fait un effort pour générer et inclure des photographies de haute résolution d'espèces impressionnantes de toute taille. J'ai été agréablement surpris

If you are planning to attend the 2018 joint annual meeting in Vancouver this year, consider attending the two plenaries (at the start and end of the conference). In the Opening Plenary, Randy Olson will challenge students and non-students alike to think about the great importance of storytelling in communication of science in a clear and passionate way (https://www.entsoc.org/events/annual-meeting/opening-plenary-speaker). Equally interesting will be the Closing Plenary by Ryan Church (https://www.entsoc.org/closing-plenary-speaker), an influential concept artist in Hollywood who happens to use his passion for insects in his work on blockbuster movies.

Passion for insects comes in many different forms, it is usually noticeable to our peers and friends, and, as far as I can tell, is always appreciated.

References

Pearson, H. 2017. Careers in science journalism and writing. Cold Spring Harbor Perspectives in Biology, **9(9)**: a032961. doi: 10.1101/cshperspect.a032961

Rooney, E.A. 2017. Inspired by Insects: Bugs in Contemporary Art. Schiffer Publishing, Atglen, Pennsylvania. 176pp.

Server, R. and Janssen, K. 2017. Career options for scientists. Cold Spring Harbor Perspectives in Biology, **9(9)**: a032755. doi:10.1101/cshperspect.a032755

par le nombre de personnes qui ont utilisé certaines de nos photos pour stimuler des idées créatives de toute sorte.

Si vous planifiez assister à la réunion annuelle conjointe 2018 à Vancouver cette année, considérez d'assister aux deux sessions plénières (au début et à la fin de la conférence). Dans la plénière d'ouverture, Randy Olson mettra les étudiants et non-étudiants au défi de penser à la grande importance de raconter une histoire d'une façon claire et passionnée dans la communication des sciences. (https://www.entsoc.org/events/annual-meeting/opening-plenary-speaker). De façon aussi intéressante, Ryan Church, qui fera la plénière de fermeture (https://www.entsoc.org/closing-plenary-speaker), est un concepteur artistique influent à Hollywood qui utilise sa passion pour les insectes dans son travail sur les films à succès.

La passion pour les insectes vient sous différentes formes, elle est souvent perceptible pour nos collègues et amis, et, autant que je puisse en juger, elle est toujours appréciée.

Références

Pearson, H. 2017. Careers in science journalism and writing. Cold Spring Harbor Perspectives in Biology. **9(9)**: a032961. doi: 10.1101/cshperspect.a032961

Rooney, E.A. 2017. Inspired by Insects: Bugs in Contemporary Art. Schiffer Publishing, Atglen, Pennsylvania. 176pp.

Server, R. and Janssen, K. 2017. Career options for scientists. Cold Spring Harbor Perspectives in Biology, **9(9)**: a032755. doi:10.1101/cshperspect.a032755

2018 ESA, ESC and ESBC Joint Annual Meeting
Crossing Borders: Entomology in a Changing World
11–14 November | Vancouver, BC, Canada

Réunion annuelle conjointe ESA, SEC et SECB 2018
Au-delà des frontières: l'entomologie dans un monde en changement
11–14 novembre | Vancouver, Colombie-Britannique, Canada

The Entomological Society of British Columbia invites you to attend the 2018 ESA, ESC, and ESBC Joint Annual Meeting!

The 2018 Joint Annual Meeting will take place in beautiful Vancouver, British Columbia, from **11-14 November 2018**. With a theme of **Crossing Borders: Entomology in a Changing World**, this meeting represents a unique opportunity to share your research, gain exposure, and collaborate across borders and across Societies. Connect with over 3,000 scientists and researchers from around the globe over the 4 science-filled days.

Full meeting details, important deadlines and up to date information can be found on the meeting website: https://www.entsoc.org/events/annual-meeting

We look forward to seeing you in Vancouver!

La Société d'entomologie de Colombie-Britannique vous invite à assister à la réunion annuelle conjointe ESA, SEC et SECB 2018!

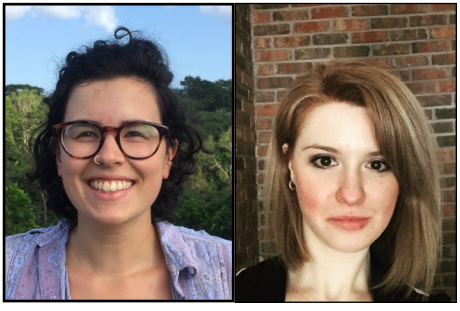
La réunion annuelle conjointe 2018 se tiendra dans la magnifique ville de Vancouver, Colombie-Britannique, **du 11 au 14 novembre 2018**. Avec le thème **Au-delà des frontières : l'entomologie dans un monde en changement**, cette réunion représente une chance unique de partager votre recherche, d'avoir de la visibilité et de collaborer au-delà des frontières et des Sociétés. Soyez en contact avec plus de 3000 scientifiques et chercheurs de tout le globe durant 4 journées remplies de science.

Les détails complets de la réunion, les dates limites importantes et de l'information à jour se trouvent sur le site web de la réunion : https://www.entsoc.org/events/annual-meeting/french

Au plaisir de vous voir à Vancouver!

STEP Corner / Le coin de la relève

Anne-Sophie Caron and Rachel Rix



2018 ESA, ESC, and ESBC Joint Annual Meeting

The next JAM is coming up in Vancouver in November 2018! A lot of activities, including debates, Linnaean games and student mixers are taking form. If you want to get involved, you can contact the local student committee through Dan Peach (dap3@sfu.ca) or Joanna Konopka (jkonopk@uwo.ca). We hope to see you there!

Research Roundup

We continue to publicize graduate student publications to the wider entomological community through our Research Roundup initiative. Check out the ESC blog for most recent featured articles. If you want your recently published article featured (or we missed yours last month!), send us an email at students@esc-sec.ca. For regular updates on new Canadian entomological research, you can join the ESC Students Facebook page or follow us on Twitter @esc_students.

Getting involved with the ESC

The Student and Early Professional Affairs Committee (SEPAC) is looking for new members (especially Early Professionals). Volunteering for the SEPAC is a great way to get involved with the Society and promote entomology to students across Canada. If you are interested in joining or just have

La réunion annuelle ESA, SEC et SECB de 2018

La prochaine réunion annuelle, qui aura lieu à Vancouver en novembre 2018, s'en vient à grands pas! Une foule d'activités incluant des débats, les jeux linnéens et la soirée étudiante prennent forme. Si vous voulez vous impliquer dans l'organisation, vous pouvez contacter Dan Peach (dap3@sfu.ca) ou Joanna Konopka (jkonopk@uwo.ca) du comité étudiant local. Nous espérons vous y voir!

Aperçu de la recherche

Nous continuons à faire la publicité des publications des étudiants gradués auprès de la communauté entomologique via notre initiative Aperçu de la recherche. Consultez le blogue de la SEC pour les plus récents articles. Si vous voulez que votre plus récent article soit mis en vedette (ou si nous l'avons manqué le mois dernier!), envoyez-nous un courriel à students@esc-sec.ca. Pour des mises à jour régulières sur la recherche entomologique canadienne, adhérez à la page Facebook des étudiants de la SEC ou suivez-nous sur Twitter à @esc_students.

S'impliquer au sein de la SEC

Le comité des affaires étudiantes et des jeunes professionnels cherche de nouveaux membres (particulièrement des jeunes professionnels). S'impliquer bénévolement pour le comité est une excellente façon de s'impliquer au sein de la Société et promouvoir l'entomologie auprès des étudiants au Canada. Si vous êtes intéressés à joindre le comité, ou si vous avez des

suggestions for new initiatives in the coming year, email us at students@esc-sec.ca, or contact us personally at annesophie.caron.p@gmail.com or Rachel.Rix@dal.ca. We look forward to hearing from you,

Anne-Sophie and Rachel.

suggestions pour de nouvelles initiatives pour la prochaine année, écrivez-nous à students@esc-sec.ca. Vous pouvez aussi nous contacter personnellement à annesophie.caron.p@gmail.com ou Rachel.Rix@dal.ca. Au plaisir d'avoir de vos nouvelles,

Anne-Sophie et Rachel.

Thesis Roundup / Foisonnement de thèses

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

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

Wider aspects of a career in entomology. 2. A winter project

Hugh V. Danks

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

My research at the Entomology Research Institute in Ottawa, starting in the late 1960s, focussed mainly on the cold hardiness of insects in small ponds, where severe winter conditions would be expected. Insect larvae should be easy to find in these shallow aquatic habitats, in contrast to my initial attempts to sample terrestrial insects overwintering above the snow under the bark of dead trees (see the previous article in this series [ESC *Bulletin* **50**: 25)]. As I began the study, local entomologists told me that the project would certainly be rewarding, because the small ponds in the region would be frozen and would contain abundant insects. The mean daily temperature in Ottawa for the 3 months of midwinter was about −10°C. Obviously, they said, all of these habitats will soon be converted to ice until the spring thaw.

It then took me nearly 3 months to find a suitable habitat that was solidly frozen, and not only because the difficulty had been increased that year by unusually early snow cover. This discovery brought a lesson about research: in the absence of first-hand information, even knowledgeable and competent people might be wrong about the adaptations of insects and the conditions they experience.

Actual examination and monitoring of sample habitats showed that three factors were chiefly responsible for these erroneous expectations. First, snow lying above the ice on a pond (as shown in Fig. 1a) provided even more effective insulation than expected, especially in sheltered habitats where snow accumulated. The large amount of air trapped between the snowflakes made for excellent insulation, even more so when the snow was light and fluffy. Second, the habitat did not cool steadily throughout the winter towards air temperatures that were always lower. Rather, there was equilibrium between the cold air above the insulating snow and the heat trapped in the earth below, so that habitat temperatures rose again whenever the air temperature was not extremely low. A third factor reducing the impact of winter temperatures on the fauna was the seasonal pattern of temperature and precipitation. Evaporation was reduced by cool temperatures in the fall at the same time as heavy rains refilled the ponds well beyond the edges of their smaller areas during the hot, dry summer (see Fig. 1b). Few organisms moved back before winter to the summer-dry edges. These three factors meant that most insect habitats were not completely

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

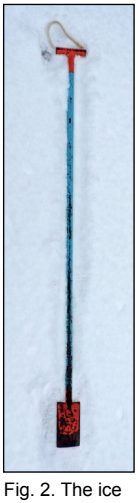
Fig. 1a. Winter snow on one of the ponds studied in Ottawa.

H. Danks

Fig. 1b. The same pond at its lowest level in late summer, showing the summer-dry edge.

frozen despite the cool-temperate climate. In reality, the insects overwintering there experienced patterns of winter temperature that were much less severe than anyone predicted, and relatively few habitats were exposed to temperatures below freezing. Greater exposure would only be likely in regions with less snow and colder winters, particularly in windswept ponds with more limited snow cover.

Sampling insects in winter posed several challenges, because even ponds that remained largely unfrozen were sealed beneath a covering of many centimetres of ice and a considerable depth of snow. Therefore, snow was first shovelled off, a job producing some perspiration. A steel ice chisel (Fig. 2) was then used to open a hole in the ice for sampling, a job producing more perspiration (a manual auger proved less effective, and a powered auger too heavy to carry regularly in the field). Finally, core samples were taken from the substrate, a cold job made even colder as the perspiration just generated cooled down. Moreover, samples from these shallow ponds were most accurate when the corer could be applied directly to the substrate by reaching down through the ice into the cold water below it. Arm-length rubber gloves helped to protect hands and arms, but gloves that were thick or lined, although warm, were unmanageable for sampling. Thin ones without insulation were required to deploy the sampler effectively, but were colder to use and froze up stiffly whenever they were withdrawn from the water.



H. Danks

Fig. 2. The ice chisel used for winter sampling in 1969 (total length 135 cm).

Some of the apparatus available in those days to assess the cold hardiness of chironomid larvae from these samples was more primitive than devices developed subsequently. Many techniques for scientific study have improved markedly over a relatively short period. Although walk-in freezers in the Institute could be used to determine rates of survival by exposing sets of larvae to subfreezing temperatures of different severity and duration, other experiments depended on more specialized equipment. For example, the Engineering Research Service of the Department of Agriculture worked with me to develop an apparatus to measure supercooling points, thereby allowing the temperatures at which individual larvae froze to be discovered, as well as whether they could survive the resulting formation of internal ice. The chamber that held the test insect was cooled by liquid nitrogen carried through insulated pipes from a giant tank, an extraordinarily inelegant device by modern standards (Fig. 3). Although the improvements in this arena have not been as dramatic as in some other fields, they bring a similar lesson: technology becomes obsolete faster than good scientific ideas do. Consequently, exclusive reliance on a given technique is unwise. Indeed, not many years ago a graduate student might invest most of the time


H. Danks

Fig. 3. An apparatus built in 1969 to measure insect supercooling points, and operated by liquid nitrogen.

during several years of research in documenting an appropriate number of DNA sequences, a task that can now be done with an automated machine in less than one afternoon.

Sophisticated equipment is not always best. On occasion in Ottawa, sampling could begin only after a very simple tool had been used to allow the driver of the field vehicle to see the road ahead—snow or ice had to be cleared from the windows with a snow-brush or ice-scraper! In later years, diverse types of snow brushes appeared on the market. A few of them were especially compact; one was even embellished with faux fur. Most were unbelievably large, rigid or extensible, made of exceptionally strong materials, with broad scraper blades, and with brushes that could be rotated. However, these large, complex, and expensive tools were cumbersome and generally less useful than the original format I had used: a hardwood stick with a simple brush at one end and a small plastic blade at the other. At first, I wondered why the smooth blade was relatively narrow, and why its back edge bore a number of teeth (Fig. 4). Even when snow had melted and refrozen on to a windshield (heated while the vehicle was being driven), the ice did not pose much of a challenge to the scraper; nor did a thin coating of freezing rain. However, the situation changed dramatically when a substantial amount of freezing rain fell—typically at an air temperature just below freezing—followed by a rapid decrease in temperature as a frigid air mass moved in. Such an event turned the frozen rain into a rock-hard coating that defied removal (Fig. 5). The toothed side of the blade was essential to give the user a chance of penetrating the coating of ice in order to break it up. The narrow blade and long handle allowed the necessary substantial pressure to be applied, but it was advisable to carry a spare unit in case the first one broke. In the most difficult circumstances, it would take a very long time to clear glass surfaces to provide an adequate view of the road for driving. Sometimes, for example, the temperature dropped well below


H. Danks

Fig. 4. A simple automobile snow-brush, showing the toothed side of the ice-scraper blade (total length 64 cm).


H. Danks

Fig. 5. Freezing rain on the window of a car.

−10°C overnight after several millimetres of freezing rain had fallen. In the morning, as everyone prepared to set off for work and fought to remove ice from the windshields of cars that had been parked out of doors, the air was filled all over the city with multiple loud, harsh scraping sounds, like the erratic stridulation of dozens of giant grasshoppers.

In the ponds under study, temperatures were recorded throughout the winter. Knowing these conditions helped to interpret the results of laboratory experiments on the cold-hardiness of chironomid larvae. The temperatures in several ponds could be measured manually during frequent visits, but continuous automatic records from one such pond were also required for comparison. However, no compact data loggers or computer units had yet been developed that could be left unattended for long periods or could transmit results to off-site monitors. Rather, a dozen long grey wires ran from temperature sensors (thermistors) in various relevant subhabitats to a waterproof box containing a machine with a drum that rotated to record the tracings of multiple pens, programmed to strike a chart of specially treated pressure-sensitive paper at frequent intervals. Considerable power was needed to run this machine for long periods; one or two car batteries were kept beside it and had to be replaced at intervals. Snowshoes were essential to drag the heavy sled carrying the batteries into the remote location chosen for study. Nevertheless, this machine supported many more sensors and was much more compact than its laboratory equivalent (which is shown on the right hand side of Fig. 3). The manufacturer described it somewhat optimistically as a "portable thermograph".

On a midwinter day I was in a location outside Ottawa at one of my study ponds, checking the thermograph and changing its paper chart, when the silence was broken by what sounded like the loud inhalations and exhalations of a very distressed cow struggling towards me. An RCMP officer soon appeared, red-faced and sucking in air with great effort as he walked through the deep snow in ordinary boots, sinking in to well above his knees at each step. He seemed to be close to exhaustion, as he pulled each leg out again with considerable difficulty and a gasp for breath. I got the impression that he might soon pass out. Clearly, he had seen my car parked by the side of the road and had followed my snowshoe tracks into the woods for several hundred metres, pursuing someone presumed to be up to no good. Had he found such a person, it is unclear how the miscreant could have been apprehended. Gulping in breaths and barely coherent, he stopped and asked what I was doing. I explained my experiment briefly, and also noted that he was standing near the location of some of my sensors beneath the snow, which was not desirable. "I'm terribly sorry, sir", he panted, turned around, and set off the way he had come, continuing to wheeze painfully as he floundered slowly back along his conspicuous trail to the road. He must have survived the double journey, however, because his vehicle had gone by the time I returned to my car.

When spring was foreshadowed and snow was starting to melt but still covered the ground, some cold-hardy adult insects appeared. Terrestrial species gain access to the snow surface especially around the bases of deciduous trees where snow melts around trunks warmed by the sun (Fig. 6). Insects difficult to collect at other times, such as snow scorpionflies (Boreidae), can be found on the snow in late winter. At the same time, adults of several species of chironomid midges emerge from the water. They can come up even through cracks in the ice, for example, and are active at very low temperatures. I went into the field in March to

H. Danks

Fig. 6. The base of a tree in late winter, with the snow receding around it especially on the sunny south side.

look for these midges with Don Oliver, a chironomid taxonomist who worked at the Entomology Research Institute, and who had assisted in identification of the species I had sampled from ponds during the winter. Don knew of some likely habitats in nearby Gatineau Park, and so we set off along the park trails. These lengthy trails were used mainly by cross-country skiers, and would be ruined by anyone walking in boots. Because I could not yet ski, I wore snowshoes. Don used his skis. I would walk on for many paces, while similar progress by my companion required only that he slide forward after a single stride, assisted by a push with a ski pole. He spent most of his time at rest between slides waiting for me to catch up. Despite the amount of practice in snowshoeing that I had accrued by then, it was a challenge to trudge non-stop for many kilometres while we looked for the habitats and their midges. As Don claimed repeatedly that the habitats he remembered must be just around the next corner, I began to harbour the suspicion that he was not trying to find them but was giving me exercise instead! Some people might consider this punishment to be the result of karma generated by the exhausting trek of the RCMP officer earlier in the year.

A number of years later, I discovered that the same experimental site visited by the officer had been "tidied up" as part of a park and its trails, eliminating the pond. This trend continued, so that still later, when I needed photographs to illustrate a presentation on winter environments and insect cold hardiness, suitable places were hard to find. Moreover, many images were spoiled by highly visible and intrusive man-made features, ranging from water-containment structures to distant apartment buildings (as exemplified in Fig. 7a). Fortunately, by then—in the absence of any general trend to reduce the footprint of humans on the environment—the introduction of digital photography and the advance of software such as Photoshop had made it feasible to remove these distracting elements from the final images (compare Fig. 7b).

Fig. 7a. Ice along the edge of an island in the Ottawa River, with buildings in the background.

H. Danks

Fig. 7b. The same photograph modified to remove the buildings.

The Annotated Insect Collectors' Code

Carolyn Trietsch and Andrew R. Deans

In early 2016, we set out to create a code of ethics for students taking our Insect Biodiversity and Evolution (ENT 432) class at Penn State. We circulated the first draft (Trietsch and Deans 2016) among the Entomological Collections Network (ECN) listserv looking for ways to improve it, and were impressed by the amount of feedback we got. Since then, the Code has appeared on the Frost Curator's Blog (Deans 2016), as an interactive poster at the Entomological Society of America (ESA) Annual 2017 conference in Denver, CO (Deans and Trietsch 2017), and will soon appear in an article in *American Entomologist* (Trietsch and Deans, in press).

Here, we present an annotated version of the code to explain the ideas behind it and discuss the issues in entomology we tried to address. The code is modeled after the modern version of the Hippocratic Oath written by Louis Lasagna (1964).

I strive to fulfill, to the best of my ability, the following ideals:

● I will respect the hard-won scientific gains of those entomologists in whose steps I walk and gladly share my scientific gains and knowledge with those who are to follow.

Science is a collaborative effort that builds upon the work of others (Sonnenwald 2007). Every citation in a manuscript is a testament to this. Just as we give credit to the scientists who made our work possible, we also can't forget that others will come after us and build upon our own work (and hopefully cite us too).

This statement both looks to the future while honoring the past, which is necessary for scientific advancement. We collect for the sake of science, which is why this is the first statement of the oath.

● I will aid in the dissemination of scientific knowledge, both to those who study insects and those who do not.

Scientists work on the very edge of knowledge. When we discuss our research at conferences or publish our results in journals, we create a foundation of knowledge for others to expand upon. Dissemination of information is essential for scientific progress, hence the push to coordinate research efforts across disciplines and make data available to everyone (Bisby 2000; Deans et al. 2012; Wieczorek et al. 2012; Robertson et al. 2014).

What about communicating with non-scientists? Some question the value of outreach, wondering why they should spend time trying to reach a disinterested public instead of focusing on research or writing grants (Ecklund et al. 2012; Johnson et al. 2014). It is important to remember that academic elitism is as much a danger to science as willful ignorance. How will people know how important science is if we don't bother to tell them?

Carolyn Trietsch (carolyntrietsch@gmail.com) is a PhD candidate in the Department of Entomology at The Pennsylvania State University, working on Ceraphronoidea morphology and systematics. Andrew R. Deans is a professor in the Department of Entomology and the Director of the Frost Entomological Museum at The Pennsylvania State University, working on insect systematics and biodiversity. A non-annotated version of the Insect Collector's Code will appear in an upcoming issue of the American Entomologist.

We need to know how to communicate science effectively so people can know what's going on in the world around them, what impact their actions can have, and why they should care (Nisbet and Scheufele 2009; Johnson et al. 2014). For entomologists, science communication can involve working with farmers to manage pests and increase food production (Escalada and Heong 2007; Aker 2010), teaching locals how to use bed nets to reduce malaria transmission (Minja et al. 2001), or even just sharing our passion for insects and the natural world with those around us.

Communication is an integral part of entomology, which is why the theme of the Entomological Society of America (ESA) annual 2017 conference in Denver (Entomological Society of America 2017) was "Ignite. Inspire. Innovate.", with multiple symposia dedicated to scientific communication and popular science writer Mary Roach as the keynote speaker. Due to the importance of outreach and communication, not just for entomologists but for scientists in general, we decided to include a clause promoting the dissemination of information as the second statement of the oath.

● I will not discriminate against others, and I will strive to create a safe working environment, whether in the field, the classroom, or the lab.

What does a scientist look like? Anyone. We have nothing to gain by excluding those who want to participate in the scientific endeavor (Clancy et al. 2014). Thus, we felt it was important to include this statement early in the oath.

● I will treat insects humanely. As a collector, it is within my power to take insect life; I will not take insects that will not be deposited in a natural history collection or otherwise made available for research and education. While bycatch is often unavoidable, I will, to the best of my ability, attempt to reduce the unnecessary loss of insect life and find use for these specimens.

Do insects feel pain? This is the subject of much debate and discussion (Eisemann et al. 1984; Mather 2001; Elwood and Appel 2009; Elwood 2011; Adamo 2016), and recently led to the ban of boiling live lobsters in Switzerland (Weintraub 2018). The truth is that we don't know enough to definitively say whether insects can suffer or not. Until we know for certain, can we afford to assume that they don't? Even if insects cannot feel pain, it's worth acknowledging these issues and being conscious of them.

This statement is meant to hold us responsible as collectors and as scientists. Let's fight back against the stereotype of the "mad scientist"—we are not killing insects indiscriminately and experimenting for our own pleasure. We are professionals, and we should strive to act professionally.

● I will consider the ecological impact of removing insects and their products (galls, nests, etc.) from the environment when collecting, whether the species are protected by law, known to be declining, or are considered to be of least concern. I will strive to avoid or minimize disturbance to the environment.

As scientists and collectors, many of us are devoted to conserving resources and protecting the environment. We are worried about the human impact on the environment, but we cannot exclude ourselves from this and forget about our own impact. Again, we are professionals and should strive to act professionally.

● I will secure appropriate permits and permission prior to collecting insects, and I will honor and uphold the provisions stated by each permit. I will keep copies of all permits on my person while collecting and furnish them to authorized agents upon request. I will save all permits associated with specimens as proof that they were collected legally.

This statement goes hand-in-hand with the two that precede it. Acquiring the appropriate permits and permission should not be an afterthought when conducting fieldwork. Museums practice this by not accepting specimens from exotic places unless there are documents to show that they are collected properly, as stipulated by the International Union for Conservation of Nature (IUCN) and the Convention on International Trade in Endangered Species (CITES). Collectors should also be held accountable for what they do in the name of science.

● I will keep detailed field notes of my collecting activities and will make these available to the greater scientific community.

There is only so much that a dead insect can tell us. We can study its morphology and physiology, we can extract its DNA and look into its genetic history, but we can only guess at its behavior and life history. When working with a dead specimen, it's easy to forget that at one point that specimen was alive.

Often, the only connection we have between the specimen's life and death is the collector. A few minutes devoted to note-taking in the field could lead to countless discoveries (Canfield 2011). In one case, access to field notes allowed for the rediscovery of a unique species of Orthoptera (Woller and Hill 2015). Field notes are valuable fountains of information - we need to capture them (O'Brien 2014, 2015). The difference between knowing and not knowing could come down to a pen, paper and a few minutes of notetaking.

● I will prepare and label specimens according to standards established by professional entomologists who work with collections.

What good is a specimen if it's in such poor condition that nothing can be gleaned from studying it? In such a situation, was collecting the specimen even worth it?

At the very minimum, all specimens should be labeled with the date, sampling method, collector name, and location, preferably with the latitude and longitude so it can be georeferenced. The label should be affixed to a specimen's pin, slide, or inside the vial or container it is stored in. Also, it is imperative that the label be either typed or written clearly in an ink that will not fade over time (Gibb and Osetto 2006).

● I will not create false data.

Colonel Richard Meinertzhagen was an amateur ornithologist and big game hunter who, in exchange for his generous donations of specimens (including almost 20,000 animal pelts and half a million lice), was given access to the collections of the Natural History Museum in London (Fortey 2008). In the years following his death, however, it soon became apparent that he was not a generous donor, but a "colossal fraud" (Garfield 2007). He had stolen specimens from museums, relabeled them and then donated them as newly discovered species (Knox 1993; Fortey 2008).

New cases of Meinertzhagen's fraud are still being discovered, even extending to his field notes (Prŷs-Jones and Collar 2016). Since there are genuine specimens mixed in with the fraudulent ones, it will take hours of manpower and careful work to go back through each specimen and verify its history. Needless to say, this is a huge setback to those trying to work on

the specimens. With taxonomic research already "in crisis" (Agnarsson and Kuntner 2007), this is time we cannot afford to waste.

Falsification of specimen labels is damaging to science, and must be avoided at all costs. It's important to note that the withholding of vital information can be just as harmful as direct falsification. Collectors should always strive to provide detailed, accurate information. Failure to do this can impact research for decades.

Due to its importance, we decided that this clause should not be the final statement of this code, as it was in earlier versions, but should directly follow the clauses that deal with preparation of specimens and labels.

● I will properly store all specimens under my care, and I will not allow specimens to become damaged or degraded through neglect.

Insect specimens are fragile - be sure to store them properly, and handle them carefully! Keep in mind that accidents happen: if you do break off a piece of a specimen, or knock a specimen off its point mount entirely, don't just brush it off and pretend it never happened. Notify the curator of the collection, or if the specimens are yours, take steps to make sure the separate piece stays with the rest of the specimen. Remember that there will be others after you who will look at the specimen in the future.

● I will properly use and dispose of preservatives, killing agents, and other chemicals associated with specimen collection and preparation. I will never use these chemicals to harm myself or others.

Collecting and preserving insects usually requires one to use dangerous chemicals like hexamethyldisilazane, sodium cyanide, and Bouin's solution. Even ethyl alcohol and ethyl acetate, chemicals we've come to accept as relatively safe, are dangerous when misused. We've all taken laboratory safety courses and heard horror stories of lab accidents, but the danger here isn't just to ourselves; it's to those around us, and even those who come after us. We must be mindful of how these chemicals are stored and used, and be sure that we are not leaving a dangerous legacy for those entomologists who follow in our footsteps.

● I will make arrangements for any personal specimens or collections in my possession to be deposited in a museum in the event of my untimely death.

Insect specimens are a collector's legacy. The collections at the Frost have been much enriched by the John O. Pepper aphid collection, the K. C. Kim collection of sucking lice, the George H. and Alice F. Beatty Collection of odonates and, of course, the specimens collected by the museum's namesake, Stuart W. Frost.

Not making preparations for your specimens would be the equivalent of throwing your legacy away. It is always better that your specimens go to a museum where they can be used and appreciated rather than thrown in the garbage.

● May I always act so as to preserve the finest traditions of natural history, and so long as I uphold these traditions and the stated ideals, may I long experience the joy of my contributions to the furthering of scientific knowledge.

We are scientists; we should aim to be good ones!

References

Aker, J.C. 2010. Dial "A" for agriculture: a review of information and communication technologies for agricultural extension in developing countries. Agricultural Economics, **42**: 631-647. https://doi.org/10.1111/j.1574-0862.2011.00545.x

Agnarsson, I., and Kuntner, M. 2007. Taxonomy in a changing world: seeking solutions for a science in crisis. Systematic Biology, **56**: 531-539. https://doi.org/10.1080/10635150701424546

Adamo, S.A. 2016. Do insects feel pain? A question at the intersection of animal behaviour, philosophy and robotics. Animal Behaviour, **118**: 75-79. https://doi.org/10.1016/j.anbehav.2016.05.005

Bisby, F.A. 2000. The quiet revolution: biodiversity informatics and the internet. Science, **289**(5488): 2309-2312. https://doi.org/10.1126/science.289.5488.2309

Canfield, M.R. (Ed.). 2011. Field notes on science & nature. Harvard University Press. Cambridge, MA.

Clancy, K.B., Nelson, R.G., Rutherford, J.N., and Hinde K. 2014. Survey of academic field experiences (SAFE): Trainees report harassment and assault. PLoS One, **9**: e102172. https://doi.org/10.1371/journal.pone.0102172

Deans, A.R. 2016. The Insect Collector's Oath. [blog post, 19 January 2016]. Retrieved from https://sites.psu.edu/frost/2016/01/19/the-insect-collectors-oath/

Deans, A.R., and Trietsch, C. 2017. The Insect Collector's Oath. [poster presentation, 8 November 2017]. "ENTOMOLOGY 2017: Ignite. Inspire. Innovate." Annual Meeting of the Entomological Society of America, Denver, Colorado.

Deans, A.R., Yoder, M.J., and Balhoff, J.P. 2012. Time to Change: How we describe biodiversity. Trends in Ecology & Evolution, **27**: 78-84. https://doi.org/10.1016/j.tree.2011.11.007

Ecklund, E.H., James, S.A., and Lincoln, A.E. 2012. How academic biologists and physicists view science outreach. PloS One, **7**: e36240. https://doi.org/10.1371/journal.pone.0036240

Eisemann, C.H., Jorgensen, W.K., Merritt, D.J., Rice, M.J., Cribb, B.W., Webb, P.D., and Zalucki M.P. 1984. Do insects feel pain?—A biological view. Experientia, **40**: 164-167.

Elwood, R.W. 2011. Pain and suffering in invertebrates? ILAR Journal, **52**: 175-184.

Elwood, R.W. and Appel, M. 2009. Pain experience in hermit crabs? Animal Behaviour, **77**: 1243-1246. https://doi.org/10.1016/j.anbehav.2009.01.028

Entomological Society of America. 2017. "ENTOMOLOGY 2017: Ignite. Inspire. Innovate." Annual Meeting of the Entomological Society of America. 5-8 November 2017. Denver, Colorado. Program booklet available at: http://www.entsoc.org/sites/default/files/files/2017%20AM%20Program%20Book-Final-Web-REVISED.pdf [accessed 8 February 2018]

Escalada, M.M., and Heong, K.L. 2007. Communication and implementation of change in crop protection. *In* Ciba Foundation Symposium 177-Crop Protection and Sustainable Agriculture. John Wiley & Sons, Ltd. Chichester, U.K. pp. 191-207.

Fortey, R. 2008. Dry Storeroom No. 1. Alfred A. Knopf. New York.

Garfield, B. 2007. The Meinertzhagen mystery: the life and legend of a colossal fraud. Potomac Books, Inc. Washington, D.C.

Gibb, T.J., and Oseto, C.Y. 2006. Arthropod collection and identification: field and laboratory techniques. Academic Press. Burlington, MA.

Johnson, D.R., Ecklund, E.H., and Lincoln, A.E. 2014. Narratives of science outreach in elite contexts of academic science. Science Communication, **36**: 81-105. https://doi.org/10.1177/1075547013499142

Knox, A.G. 1993. Richard Meinertzhagen—a case of fraud examined. Ibis, **135**: 320-325. https://doi.org/10.1111/j.1474-919X.1993.tb02851.x

Lasagna, L. 1964. New York Times Magazine. 28 June 1964. pp. 11, 40-43.

Mather, J.A. 2001. Animal suffering: An invertebrate perspective. Journal of Applied Animal Welfare Science, **4**: 151-156. https://doi.org/10.1207/S15327604JAWS0402_9

Minja, H., Schellenberg, J.A., Mukasa, O., Nathan, R., Abdulla, S., Mponda, H., Tanner, M., Lengeler, C., and Obrist, B. 2001. Introducing insecticide-treated nets in the Kilombero Valley, Tanzania: the relevance of local knowledge and practice for an Information, Education and Communication (IEC) campaign. Tropical Medicine & International Health, **6**: 614-623. https://doi.org/10.1046/j.1365-3156.2001.00755.x

Nisbet, M.C., and Scheufele, D.A. 2009. What's next for science communication? Promising directions and lingering distractions. American Journal of Botany, **96**: 1767-1778. https://doi.org/10.3732/ajb.0900041

O'Brien, M.F. 2014. Field Notebook Digitization: Richer data augments narratives. [oral presentation]. iDigBio Workshop: Digitizing Source Materials. Retrieved from: https://www.idigbio.org/wiki/index.php/Digitizing-From-Source-Materials [accessed 8 February 2018]

O'Brien, M.F. 2015. Putting the ghosts into the machine digitizing field notebooks at the UMMZ. [oral presentation]. Entomological Collections Network Annual Meeting: Digitization Efforts Session. Retrieved from: https://www.idigbio.org/wiki/index.php/ECN_2015 [accessed 8 February 2018]

Prŷs-Jones, R.P., and Collar, N.J. 2016. The May 1924 Meinertzhagen record of cranes over London. Bulletin of the British Ornithologists' Club, **136**: 149-150.

Robertson, T., Döring, M., Guralnick, R., Bloom, D., Wieczorek, J., Braak, K., Otegui, J., Russell, L., and Desmet, P. 2014. The GBIF Integrated Publishing Toolkit: Facilitating the efficient publishing of biodiversity data on the internet. PLoS One, **9**: e102623. https://doi.org/10.1371/journal.pone.0102623

Sonnenwald, D. H. 2007. Scientific collaboration. Annual Review of Information Science and Technology, **41**: 643-681. DOI: 10.1002/aris.2007.1440410121

Trietsch, C. and Deans, A.R. 2016. Insect Collector's Oath, version 1. figshare. https://doi.org/10.6084/m9.figshare.2065344.v3

Trietsch, C. and Deans, A.R. *In press*. The insect collectors' code. American Entomologist.

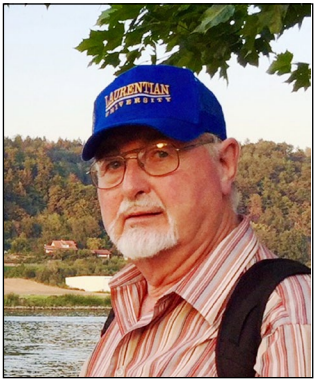
Wieczorek, J., Bloom, D., Guralnick, R., Blum, S., Döring, M., Giovanni, R., Robertson, T., and Vieglais, D. 2012. Darwin Core: an evolving community-developed biodiversity data standard. PloS One, **7**: e29715. https://doi.org/10.1371/journal.pone.0029715

Weintraub, K. 2018. The Swiss consider the lobster. It feels pain, they decide. New York Times, 12 January 2018. Retrieved from: https://www.nytimes.com/2018/01/12/science/lobster-pain-swiss.html [accessed 8 February 2018]

Woller, D.A. and Hill, J.G. 2015. *Melanoplus foxi* Hebard, 1923 (Orthoptera: Acrididae: Malanoplinae): rediscovered after almost 60 years using historical field notes connected to curated specimens. Transactions of the American Entomological Society, **141**(3): 545-574.

Exhibit on monarch butterflies at Royal Ontario Museum sparks memories from 1963 on how this iconic insect launched a career

Joe D. Shorthouse

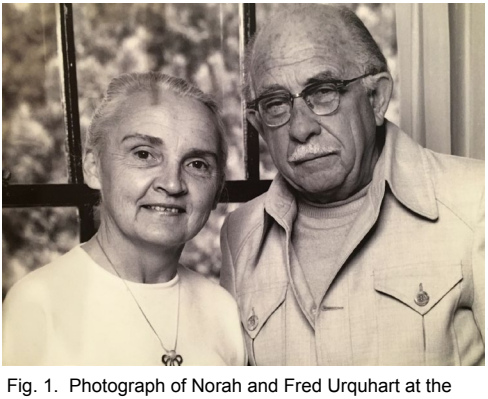


On a recent visit to the Royal Ontario Museum in Toronto, my wife Marilyn and I visited a display of winning photographs from the Wildlife Photographer of the Year contest run out of the Museum of Natural History in London, England. As we were walking down aisles of numerous back-lit, enlarged photographs of wildlife from around the world, I noticed an exhibit on monarch butterflies in a nearby room. The display highlighted how this butterfly, *Danaus plexippus*, undertakes the world's longest insect migration.

As is known by all interested in the natural world, monarchs undertake a journey in the fall from southern Canada to over-wintering sites in central Mexico. Here they wait out the winter tightly aggregated on branches and trunks of tall, gray-green oyamel fir trees, *Abies religiosa*, above 3 000 m on volcanic mountains not far from the Sierra Madre range, in the Michoacán province. The distance from southern Canada to Mexico is about 4 000 km.

After living off their fat reserves all winter, monarchs head northward in March and with just a few weeks to live, they begin laying eggs at about the latitude of southern Texas. The adults from this generation continue to fly north and lay eggs on common milkweed, *Asclepias syriaca*, and this is repeated for 2 or 3 more generations until adults reach southern Canada. As they fly north, they traverse a landscape dominated by human activity, especially agriculture.

The ROM display celebrated the life-time work of entomologist Fred A. Urquhart. Fred and his wife Norah (Fig. 1), along with thousands of volunteers, discovered the overwintering site of this iconic butterfly. The display brought back memories of my teens when I attempted to help unravel the mystery of where monarchs in southern Alberta went to escape winter's cold.

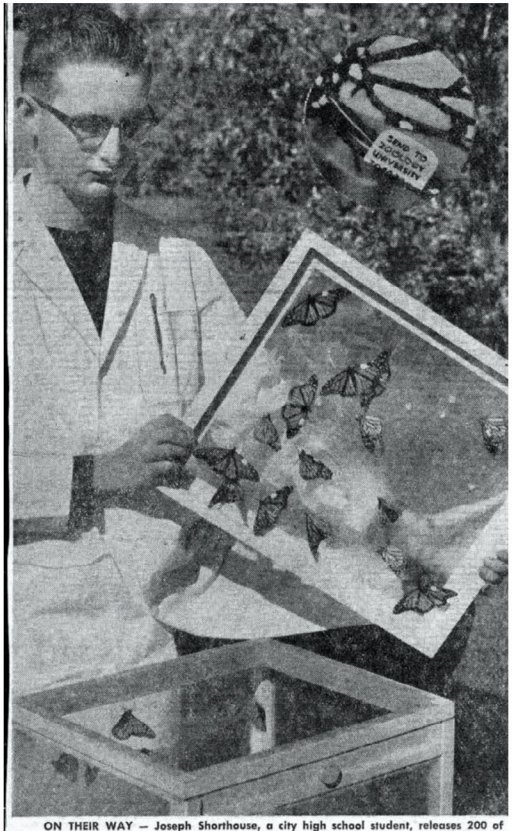


J.D. Shorthouse

Fig. 1. Photograph of Norah and Fred Urquhart at the monarch butterfly display at the Royal Ontario Museum in January, 2018.

Back in 1962, 56 years ago this spring, I read about the monarch mystery and wrote Fred Urquhart to say that I frequently saw adult monarchs around my home town of Lethbridge, Alberta. He sent me tags in 1963 and I was given space in a greenhouse at the Lethbridge Research Station of Agriculture Canada to rear and study monarchs. I was

Joe Shorthouse (roses@cyberbeach.net) is a professor emeritus in the Department of Biology, Laurentian University, and a frequent contributor to the Bulletin.



ON THEIR WAY — Joseph Shorthouse, a city high school student, releases 200 of the rare Monarch butterflies in the last phase of a study to plot the migration patterns of the colorful creatures. The 17-year-old is directing Alberta work for the study conducted by Dr. F. A. Urquhart of the University of Toronto. A total of 350 Monarchs were released here this year to determine whether the butterflies migrate as thought to California or possibly to Mexico and Texas. The insert above shows the tag on all the butterflies instructing anyone who finds a Monarch to send it immediately to the University. —Herald Photo

Lethbridge Herald Summer of 1964

* * * Help Wanted From Public * * *

350 Monarchs Released

A flurry of black and orange is winging its way south from Lethbridge to study whether Monarch butterflies really can fly thousands of miles from here to Texas and Mexico, as theory has it.

The theory is being studied by 17-year-old Joseph Shorthouse, 2317 13th Ave. S., who recently released 350 of the rare and colorful creatures here.

The latest group, 200 from the University of Toronto, were released here Saturday. And now the young high school student is awaiting word of findings to plot the migration patterns.

The first Monarch butterflies were found this far West only a few years ago. Since then the theory that they migrate to the southern U.S. and Mexico has been developed.

This summer Joe has been raising butterflies at the Lethbridge Research Station to help study the migration theory. He has been working under Dr. F. A. Urquhart of the University of Toronto.

Of the 350 released, 100 were raised here and released earlier. The latest 200 arrived here Friday by air from Toronto.

Joe, who Dr. Urquhart has named his chief associate for Alberta in the study, is looking for other study associates to help in the work. He said there are only four in Alberta and one in B.C. He needs many more to make the project a success.

The LCI student, who plans to become an entomologist, says that by releasing the large number of tagged Monarchs the exact route south and winter quarters can be determined.

Monday he issued a plea to south Albertans that any Monarchs found should be sent immediately to the University, along with details of the location, time, weather and temperature.

Early theory had it that the Monarchs would head for Pacific Grove, Calif., where others migrate from other parts of Canada and the U.S.

However, the direction of the flight from here has led Joe to think these may be heading for Texas or Mexico.

He said the theory may be hard to believe, but some have been found on the masts of ships out in the Pacific Ocean, in Hawaii, the Philippines and Australia. The only likely place of origin could be the West Coast.

Reason for the increased findings here is believed a result of irrigation. The Monarch feeds on the milkweed plant which grows in irrigated areas.

Fig. 2. Article in the Lethbridge Herald in the summer of 1964 with a cage of tagged monarchs sent to Lethbridge by Fred Urquhart for release.

employed as a summer student in the laboratory of Alex Harper in the summers of 1963 and 1964 and after hours I worked with monarch larvae and adults.

I reared, caught and tagged all the monarchs I could find in southern Alberta using Urquhart's tags. Then in the fall of 1963, at the age of 16, I presented a paper on my findings at the 11th Annual Meeting of the Entomological Society of Alberta which was held in Lethbridge.

In August of 1964, Urquhart sent me 200 live and tagged monarchs in glassine envelopes and again I was allowed to use rearing cages at the Lethbridge Research Station to feed the monarchs for several days before they were released (Fig. 2). This experience led to a science fair project on monarchs (Fig. 3) and then in the fall, I accompanied Alex Harper to Edmonton where I gave my second paper on monarchs at the 12th Annual Meeting of the Entomological Society of Alberta (Fig. 4).

As if the thrill of speaking at the Edmonton conference wasn't enough, I was an overnight guest in the home of Brian Hocking. I remember being transfixed by his study filled with books, lecture notes, and slide trays. After the Edmonton experience, I knew that studying entomology at the University of Alberta was for me.

To my knowledge, none of the tagged monarchs I released in southern Alberta were recovered and to this day, it is not known if Alberta monarchs join their eastern relatives on the trek to Mexico or if some make it over the mountains to western California. Even so, I have always considered myself part of Urquhart's team of 'monarch associates'. I corresponded with Fred after I was hired as an entomologist at Laurentian University, and he was delighted that his beloved butterflies contributed to a career. I never met Fred, but I did meet Norah at a meeting of the Entomological Society of Ontario in London.

Fig. 3. Lethbridge and District Science Fair project on monarch butterflies in 1964.


E.Gushul


E.Gushul

TWELFTH ANNUAL MEETING - EDMONTON 1964

Fig. 4. Photographs from Proceedings of the Twelfth Annual Meeting of the Entomological Society of Alberta in Edmonton in 1964. Ken Richards and Joe Shorthouse at the banquet (note the unexpected dinner guest between them). Right is Joe Shorthouse presenting his second paper on biology of southern Alberta monarchs.

There are many entomologists in North America who were first attracted to Lepidoptera in their younger years, and in particular the monarch butterfly, and credit these insects with their career choice. However, I expect few readers of the Bulletin are aware that Rosemarie De Clerck-Floate, a well-known member of our Society, is linked to monarchs. In the fall of 1980, Rosemarie, a first year Laurentian University student from Spanish, Ontario, came to my office and announced that she wanted to become an entomologist. I was astounded to hear that she undertook a science fair project on monarchs and won first prize for a project on their parasites. She then went to the Canada Wide Science Fair in the spring of 1980 where she won third prize in the Senior Biology section.

I gave Rosemarie desk space in my laboratory and hired her as a summer assistant for the 4 years of her undergraduate program. As she blossomed during her undergraduate program, there

was little doubt that she would become an entomologist. However, it was an amazing coincidence that she would one day become a research scientist with Agriculture and Agri-Food Canada in Lethbridge, in a building within 500 m of where in 1963 and 1964 I had fed Urquhart's monarchs.

But the connection between Rosemarie and monarchs continued for she met Kevin Floate while an MSc student at the University of Saskatchewan. My family and I attended their wedding at Spanish, where the church was within a kilometre of the site where she undertook her Science Fair project. Who would have guessed that Rosemarie and Kevin would in turn become Presidents of the Entomological Society of Canada (Kevin is currently First Vice-President and will become President in the fall of 2018), likely the first wife and husband in the history of scientific organizations in Canada to do so. Monarchs have the habit of bringing people together and forging unexpected linkages and opportunities.

J.D. Shorthouse

Fig. 5. Male monarch in the Royal Ontario Museum display with one of the original tags made by Fred Urquhart.

Seeing the ROM display on monarchs prompted me to reacquaint myself with the Urquharts and their research program which finally led to the discovery of the overwintering sites in 1975. Fred Urquhart (1912-2002) was director of zoology and palaeontology at the ROM and a professor at the Scarborough campus of the University of Toronto. His research on the route and destination of monarchs started in 1937, and for 38 years he and Norah reared and tagged thousands of monarchs at their home in Scarborough and recruited hundreds of volunteers to report sightings. They affixed a tiny tag to the right forewing which stated "Send to Zoology University of Toronto Canada" (Fig. 5).

He issued the first appeal for volunteers in 1952 to assist with the tagging. Thousands of people participated and then in January 1975, their efforts paid off when two volunteers vacationing in Mexico phoned the Urquharts to say they had found millions of monarchs on the Neovolcanic Plateau in Michoacán about 240 km from Mexico City.

Although both ailing seniors, the Urquharts were able to see the over-wintering sites for themselves in 1976 and the discovery was published in National Geographic magazine in August of the same year with an article entitled 'Discovered: The monarch's Mexican winter haven' (Urquhart 1976). Returning from the site, Fred wrote "Those who have had a dream and have lived to see that dream come true will have some conception of my feelings when I first entered the Mexican forest and there, before my eyes, was the realization of a dream that had haunted me since I was 16."

It has been gratifying to see that an insect I helped study in 1963 has become the world's most famous and favourite butterfly. I read Urquhart's (1960) book '*The Monarch Butterfly'* in 1963. He wrote four books, a monograph, and 62 papers in peer-reviewed journals, as well as numerous scientific reports and popular articles.

Among the many discoveries the Urquharts made was that monarchs travel only in daylight and can fly up to 130 km/day. They discovered that the trip north spans several generations while the much longer-lived 'super generation' flies from southern Canada to Mexico in the fall. The Urquharts started the Insect Migration Association which has today morphed into Monarch Watch, a Kansas-USA based non-profit organization that tags, monitors yearly numbers and sells milkweed seeds for gardens. The Urquharts were the first in North America to undertake a

'citizen science' program to solve a scientific problem. For their solving one of the world's most perplexing biological phenomena, Fred and Norah were jointly appointed to the Order of Canada in May of 1998.

The life story of the Urquharts' and the monarch migration is celebrated in the 2013 IMAX film '*Flight of the Butterflies*'. This beautiful film was produced by Canadian Jonathan Barker of SK Films and stars the iconic Gordon Pinsent as Fred Urquhart.

Since the time of the Urquharts' studies there have been dozens of articles and several books on the biology of monarchs (see also Urquhart 1987). An excellent review article is Malcolm (2018).

Unfortunately, the fate of monarchs has changed dramatically since the discovery of overwintering sites in 1976. Entomologists and the general public, as reported frequently in the popular media, are well aware that both the eastern and western monarch populations have declined. There were once about a billion adults in Mexico, then about 400 million in the early 1990s, dropping to a historic low of about 35 million in 2013-2015. The decline has alarmed nature lovers from Canada to Mexico.

Many factors are thought responsible for the decline, including loss of milkweed in prime spring breeding habitats, increased mortality during fall migration and loss of wintering habitat in Mexico (Sarkar 2017). Stenoien et al. (2016) argued that a key factor is landscape-level changes associated with the widespread use of genetically modified herbicide resistant crops that dominate the monarch's extensive core summer breeding range. Glyphosate-tolerant corn and soybeans have enabled the extensive use of herbicides, generating widespread losses of milkweed.

Citizen science data across the breeding range indicated that loss of milkweed has precipitated the decline in monarchs. Stenoien et al. (2016) reported a 97% decline of milkweed in agricultural fields in Iowa between 1999 and 2009. In response, the monarch conservation community has promoted the restoration of milkweed in breeding regions. Pleasants (2017) estimated that an increase of 1.6 billion milkweed plants would be needed in Midwestern USA to populate a 6 ha overwintering site in Mexico with monarchs.

Both the eastern and western populations of monarchs also appear to be suffering from a loss of nectar resources from flowering plants and degraded overwintering forest habitats due to deforestation, influence of invasive plants, and habitat fragmentation (Fischer et al. 2015). The complex life history of monarchs has resulted in their becoming an indicator of human impact – the 'canary in the cornfield' (Malcolm 2018).

Why monarchs are special

Since the time when I first studied monarchs as a teenager, this charismatic insect has become the most well-known butterfly in the world and has captured the attention of children, citizens, activists and politicians. It has generated public passions, spawned organizations, and captured the attention of world leaders. It has reached iconic status, becoming a symbol of nature, environmental health, spiritual metamorphosis and renewal (Gustafsson et al. 2015). It has united school children in three countries, citizen scientists, scientists, politicians and numerous organizations in the common goals of admiring, understanding and preserving this insect and its migration. The decline of monarchs has resulted in public discussions about food safety, economic trade-offs, sustainable development, and human survival.

Monarchs have become a symbol of transnational conservation efforts. They have been incorporated into classroom instruction and enrichment programs from K-12 in Canada, Mexico and the USA, making them embedded in our culture. The intimate association between monarchs and toxic milkweed has been used in grade-school lessons in ecology to explain coevolutionary interactions between two species (Gustafsson et al. 2015).

Stories on monarchs have drawn attention to the consequences of pesticide use, changes in land use, and climate change. They have become a powerful communication vehicle and an ally in environmental politics (Gustafsson et al. 2015). The conservation of monarchs even became

a commitment for the leaders of Canada, Mexico and the United States at a North American Free Trade Agreement summit in 2014.

Several citizen science organizations such as Monarch Watch, the Monarch Monitoring Project, and Journey North have resulted in passionate volunteers advancing data collection, public engagement with science, and environmental education. Appeals have been made by the David Suzuki Foundation and Monarch Watch to plant milkweed to compensate for changed agricultural landscape.

Our connection with butterflies (and to a lesser extent moths) is explained by Michael McCarthy in his splendid 2015 book '*The Moth Snowstorm: Nature and Joy*'. McCarthy eloquently describes how as a young man 'butterflies entered my soul" and how he was spellbound and electrified. His book is about joy and wonder and suggests that the moment we find ourselves suddenly and involuntarily admiring butterflies, with startling intensity, is due to an inherent relationship between humans and the natural world. He suggests we are hard-wired to experiencing joy when we contact biota in natural habitats, an emotion that was forged in the psyche of our distant ancestors.

I concur with McCarthy and his emphasis on experiencing a special feeling of joy and wonder when interacting with monarchs. Even after watching them for 55 years, I feel the same emotions perhaps even more strongly in my senior years, when I see monarchs near our summer cabin on Manitoulin Island in Ontario. Marilyn and I often stroll along a boardwalk near Providence Bay on the south shore of Manitoulin Island in May and June and when we see a shabby monarch that has just flown across Lake Huron I become emotional and want to cry out "Well hello there, how are you"? Then, in the fall at the same spot, I have the urge to shout "God speed to Mexico" (and according to Marilyn have frequently done so) when we watch monarchs rise into the air after fueling on shore-side flowers and head south across this huge lake.

Of interest, according to the recently published 'World Scientists' Warning to Humanity: A Second Notice' (Ripple et al. 2017), one of the 13 steps Humanity must take to sustain itself is 'increasing outdoor education for children, as well as the overall engagement of Society in the appreciation of nature'. No insect in Canada is more suitable for this role than the monarch butterfly.

References

Fischer, S.J., Williams, E.H., Brower, L.P., and Palmiotto, P.A. 2015. Enhancing monarch butterfly reproduction by mowing fields of common milkweed. American Midland Naturalist, **173**: 229–240. http://dx.doi.org/10.1674/amid-173-02-229-240.1

Gustafsson, K.M., Agrawal, A.A., Lewenstein, B.V., and Wolf, S.A. 2015. The monarch butterfly through time and space: the social construction of an icon. BioScience, **65**: 612-622.

Malcolm, S.B. 2018. Anthropogenic impacts on mortality and population viability of the monarch butterfly. Annual Review of Entomology, **63**: 277-302. https://doi.org/10.1146/annurev-ento-020117-043241 .

McCarthy, M. 2015 The Moth Snowstorm: Nature and Joy. John Murray. London, England.

Pleasants, J. 2017. Milkweed restoration in the Midwest for monarch butterfly recovery: estimates of milkweeds lost, milkweeds remaining and milkweeds that must be added to increase the monarch population. Insect Conservation and Diversity, **10**: 42–53.

Ripple, W.J., Wolf, C., Newsome, T.M., Galetti, M. Alamgir, M., Crist, E., Mahmoud, M.I., Laurance, W.F. and 15,364 scientist signatories from 184 countries. 2017. World scientists' warning to humanity: A second notice. BioScience, **67**: 1026-1028.

Sarkar, S. 2017. What is threatening monarchs? BioScience, **67**: 1080. https://doi.org/10.1093/biosci/bix120

Stenoien, C., Nail, K.R., Zalucki, J.M., Parry, H., Oberhauser, K.S., and Zalucki, M.P. 2016. Monarchs in decline: a collateral landscape level effect of modern agriculture. Insect Science, **00**:1-14 (early online) https://doi.org/10.1111/1744-7917.12404.

Urquhart, F.A. 1960. The Monarch Butterfly. University of Toronto Press. Toronto, Ontario.

Urquhart, F.A. 1976. Found at last: the monarch's winter home. National Geographic Magazine, August **150** (2): 160-173.

Urquhart, F.A. 1987. The Monarch Butterfly: International Traveler. Nelson-Hall, Chicago.

Harmonization of common names for the butterfly *Pieris rapae* (Linnaeus, 1758)

Stéphanie Boucher, Patrice Bouchard, Adam Brunke, Hume Douglas, and Rémi Hébert

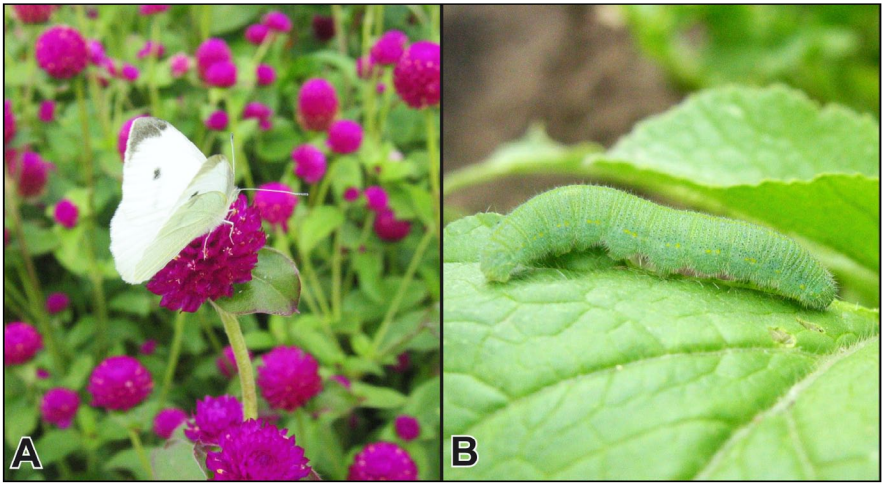


Fig. 1. A. *Pieris rapae* (L.), live adult; B. *P. rapae* (L.), live caterpillar.

Introduction

Pieris rapae (Linnaeus, 1758) (Fig. 1A) is a well-known butterfly of the family Pieridae. This species is native to Europe but is now well established on every continent of the world except South America and Antarctica (CABI 2018). It is widespread in North America where it was first introduced in Quebec in the 1860s (Layberry et al. 1998). The caterpillar of *P. rapae* feeds on multiple plants in the mustard family (Brassicaceae). It is considered a serious pest as it commonly feeds on cultivated plants in this family, including cabbage, broccoli, Brussels sprouts, cauliflower, radish, turnip and many others (Wagner 2005). The caterpillar (Fig. 1B), measures up to 3 cm in length, is pale green and densely covered with short white setae (Wagner 2005). The adult has a wingspan of 3.2 to 4.7 cm, is mostly white or pale yellowish-white with the forewing black or brownish apically in addition to one (male) or two (female) dark spots (Figs. 2A–B).

This butterfly species has multiple common names in the literature. In English, these include: cabbage butterfly; cabbage white; cabbage white butterfly; European cabbage white; imported

The authors are members of the ESC Common Names Committee. Lead author, Stéphanie Boucher (stephanie.boucher@mcgill.ca) is currently chair of the committee and is in the Department of Natural Resource Sciences of McGill University, Macdonald Campus, in Ste-Anne-de-Bellevue. Patrice Bouchard, Adam Brunke and Hume Douglas are at the Canadian National Collection of Insects, Arachnids and Nematodes, in Ottawa. Rémi Hébert is with the Canadian Wildlife Service, Environment and Climate Change Canada, in Gatineau.

Fig. 2. A. adult male *Pieris rapae*; B. adult female *P. rapae*.

cabbageworm; small cabbage butterfly; small cabbage white; small white; and white butterfly. In French, the following names are commonly used: piéride du chou; piéride de la rave; petit blanc du chou; and petite piéride du chou (EOL 2015). The Entomological Society of Canada common name database previously had two English common names, cabbage butterfly and imported cabbageworm, and two French names, piéride du chou and piéride de la rave, for this species.

Inconsistent use of common names internationally

The Insect Common Names Committee of the Entomological Society of Canada (the authors of this article) recently received a request to remove "piéride du chou" and keep only "piéride de la rave" as an official French common name for *P. rapae*. The reason for this suggestion was that "piéride du chou" is, and has been for a long time, the official common name of another similar species in France: *P. brassicae* (Linnaeus, 1758), while "piéride de la rave" is used for *P. rapae* in France.

Although *P. brassicae* does not occur in Canada, the use of the common name "piéride du chou" creates confusion when searching the literature, especially for those who are unfamiliar with the current species distribution. It also creates confusion regarding which species have become established in Canada.

The Insect Common Names Committee also noticed a similar problem with the use of "cabbage butterfly" as one of the official English common name for *P. rapae* on the ESC common name database. Usage of this common name also creates confusion in the literature as it also refers to *P. brassicae* in some parts of the world.

Changes to the Entomological Society of Canada common name database

After consultation and discussions, the Insect Common Names Committee decided to adopt two English common names and one French common name for *P. rapae*: small cabbage white, imported cabbageworm, and piéride de la rave. The name "imported cabbageworm" is retained as a second English common name mostly because of Canadian pest control product registrations associated with that name (but not 'small cabbage white'). Removing this larval-

associated name from use could cause confusion for people trying to apply pest control products and obtain information using this name. The name 'imported cabbageworm' is also the official common name given by the Entomological Society of America (2018). The widely-used resource Wikipedia (2018) also lists both names. About 5% of species in the ESC common names database have two common names. Many species with two common names are those that are pests as larvae and also have conspicuous adults that are commonly noticed by people away from their larval hosts. We decided not to apply the name "cabbage white" because this name is also used for *P. brassicae* in Europe.

Summary.

Confusion between the butterfly *P. rapae*, which is adventive in Canada, and the European *P. brassicae* exists when using their common names in both French and English. We have restricted the official common names of *P. rapae* to **piéride de la rave**, **small cabbage white**, and **imported cabbageworm**, all previously used to refer to this species. While external expert opinions were not unanimous and we appreciate that changes in official common names may create some initial instability, we argue that increased international harmonization will promote clarity over the long term, especially if the similar *P. brassicae* becomes established in North America.

Acknowledgments.

We would like to thank Vincent Hervet for bringing the problem associated with the French common name piéride du chou for the species *P. rapae* to our attention. We would also like to thank the following lepidopterist specialists who provided us with an external opinion on this matter: Jean-François Landry and Chris Schmidt (Canadian National Collection of Insects, Arachnids and Nematodes), Maxim Larrivée and Stéphane Letirant (Montreal Insectarium).

References

CABI. 2018. *Pieris rapae* (cabbage white butterfly). *In:* Invasive Species Compendium. Wallingford, UK: CAB International. https://www.cabi.org/isc [accessed 26 April 2018].

Entomological Society of America. 2018. Common Names of Insects Database [online]. Available from https://www.entsoc.org/common-names [accessed 13 April 2018].

EOL 2015. Encyclopedia of life. *Pieris rapae*. Cabbage White Butterfly. http://eol.org/pages/176683/names/common_names [accessed 27 April 2018].

Layberry, R.A., Hall, P.W., and Lafontaine, J.D. 1998. The Butterflies of Canada. University of Toronto Press, Toronto.

Wagner, D.L. 2005. Caterpillars of Eastern North America: A guide to identification and natural history. Princeton University Press.

Wikipedia. 2018. *Pieris rapae* [online]. Available from https://en.wikipedia.org/wiki/Pieris_rapae [accessed 13 April 2018].

Now tell us what you really think – results of a survey of members and JAM participants

Chris J.K. MacQuarrie and Joanna Konopka

In the fall of 2017 the Entomological Society of Canada (ESC) Board of Directors commissioned a survey of society members and attendees at the 2017 Joint Annual Meeting (the JAM) in Winnipeg. The purpose of this survey was to assess how members and attendees felt about the 2017 JAM and how members perceive the annual meeting experience. This survey also included a shorter section directed towards early professionals and students. In addition to these data, we also collected basic demographic information from all the respondents. Herein we report on highlights of this survey.

The survey was developed by Chris MacQuarrie and Joanna Konopka with input from Patrice Bouchard, Christopher Dufault, Paul Fields, Neil Holliday, Rheal Lafreniere, Chandra Moffat and Geoff Powell. The survey was developed in English and then translated into French by Véronique Martel. The survey data was collected using the GoogleForms service. The survey was posted to the web on 27 November 2017 and was available until 15 December 2017. Members of the ESC and registrants to the 2017 JAM were notified of the survey by email on 27 November, when the survey was posted. A reminder email was sent approximately 2 weeks later.

Demographics

A total of 340 people were sent the notice of the survey and 121 responses were collected, a response rate of 36%. More respondents were male (n=68) than female (n=50); most were between the ages of 30 and 59 (n = 74) and Canadian (n = 116). Respondents identifying themselves as either professors (n = 21) or researchers (n = 31) were the two most frequent reported job categories. Twenty-four respondents were graduate students and 8 were post-doctoral fellows. Twenty percent of the survey respondents self-identified as early professionals, which the ESC defines as individuals who received their last degree within the past 3 years. This category does not include students, but would include post-doctoral fellows. For non-early professional respondents to the survey, we assessed the reported career spans. These ranged from less than 5 to more than 50 years (Fig. 1).

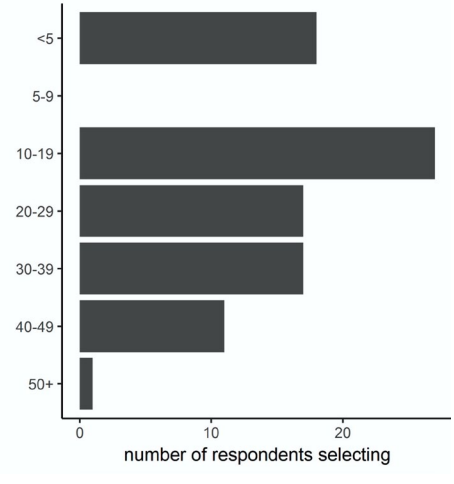


Fig. 1. Reported career length of non-early professionals.

Most of the respondents consider themselves

Chris MacQuarrie (christian.macquarrie@canada.ca) is Chair of the ESC's Annual Meetings Committee and a Research Scientist at Natural Resources Canada's Great Lakes Forestry Centre in Sault Ste. Marie, Ontario. Joanna Konopka is a member of the Annual Meetings Committee and a graduate student in the Department of Biology at Western University in London, Ontario.

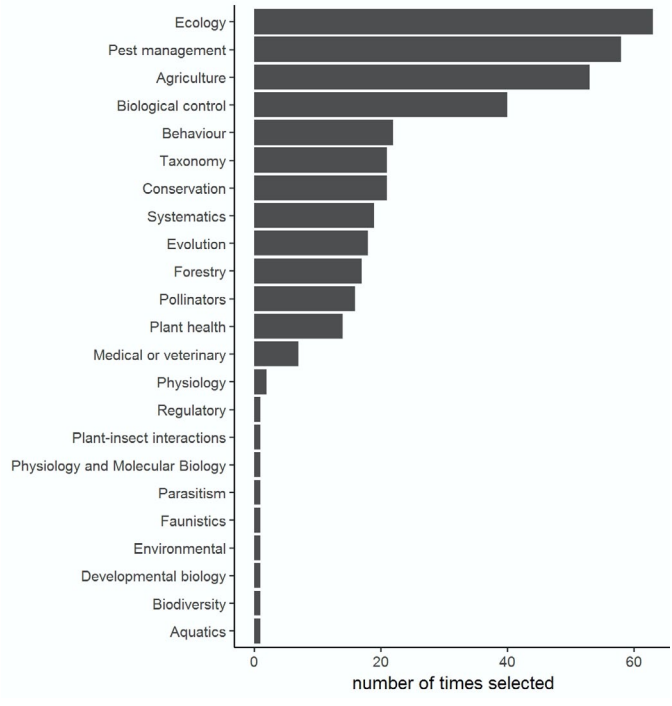


Fig. 2. Reported research areas.

professional entomologists (n = 92) working in government or academia (n = 90), though there was a non-trivial number of amateur entomologists who answered the survey (n = 23). Respondents to the survey reported a wide variety of research areas, with Ecology, Pest Management and Agriculture the most commonly reported (Fig. 2).

These demographic data suggest that the respondents were a representative cross-section of the ESC membership. However, since this survey was voluntary the results should be interpreted with caution as the respondents were not selected at random from the ESC membership and 2017 JAM attendees, nor did we attempt random selection, as our respondents were a representative sample of the entire membership and attendees. Thus, the results may be subject to some amount of selection bias.

One goal of the survey was to assess the relationship of ESC members to the Society. We found that many of the survey respondents were new members to the Society and the majority have been members for less than 20 years (Fig. 3). There were, however, a number of

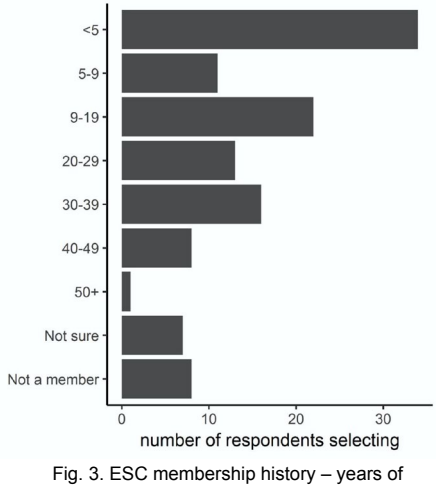


Fig. 3. ESC membership history – years of membership.

long-term members who answered our questions, including one 50+ year member of the ESC. Most of the respondents reported being a member of at least one other entomological society. The Entomological Society of America (ESA), The Entomological Society of Ontario and the Entomological Society of Manitoba were the other societies most commonly reported by the respondents to the survey.

Joint Annual Meetings

Of the 121 respondents, 87 said they attended the 2017 JAM. For those that did not attend, the two most frequent reasons given were insufficient funds and conflicts with a previous commitment (e.g., fieldwork, teaching, another meeting, family responsibilities).

Of those that did attend, one quarter (n = 21) attended for the first time. The top four reasons for attending the JAM were "learn about research", "give a presentation", "network", and "keep in touch with colleagues".

We asked the respondents for their impressions of the total cost of the 2017 JAM, relative to other conferences they had recently attended. The majority (n = 51) rated the meeting cost[1] as 'average', though one quarter rated it higher than average (n = 21) or much higher than average (n = 2). The vast majority of attendees of the JAM paid for most of their conference expenses using grant or institutional funds (n = 72, reporting >75% of expenses paid from grants or institutional funds).

We asked all respondents to the survey, both those that attended the 2017 JAM and those that did not, about what criteria the ESC and the regional entomological societies should use when deciding on future meeting locations. The respondents selected 'minimizing cost' and 'proximity to major airport' as the most frequent criteria (Fig. 4). Overall interest in future JAMs appears to be strong; 66% of attendees of the 2017 JAM would attend a future JAM and 66% of all respondents indicated they plan to attend the 2018 Entomological Society of America - Entomological Society of Canada and Entomological Society of British Columbia (ESA-ESC-ESBC) Joint Annual Meeting in Vancouver.

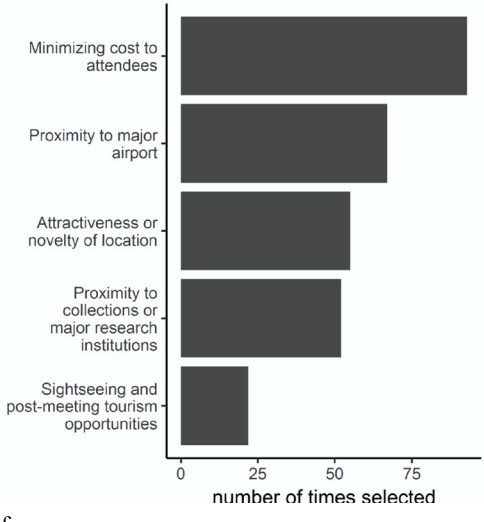


Fig. 4. Selection criteria for future joint annual meetings.

Early Professionals

A total of 46 respondents (representing 37% of all survey respondents) identified as students or early professionals. Of those students and early professionals, 93% have attended a JAM and 78% have attended a regional entomological society meeting in the past. Fewer than half (43%) have attended an ESA meeting.

The majority of the student and early professionals are familiar with the Graduate Student

[1]The early registration rate for the 2017 Joint Annual Meeting was $350 for regular members, $265 for early professionals and $175 for students. All rates increased by $100 after 11 September 2017.

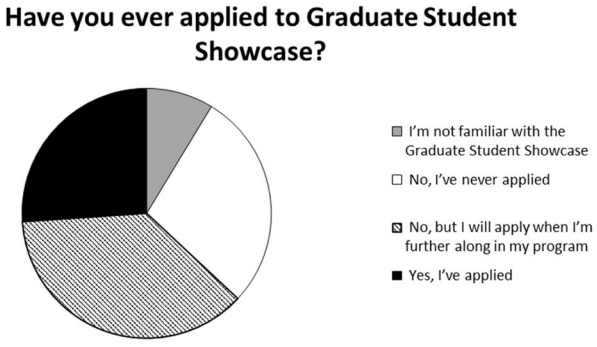


Fig. 5. Graduate Student Showcase familiarity among students and early professionals (represented as a percent of total student and early professional respondents) assessed with a question: Have you ever applied to participate in the Graduate Student Showcase?

Showcase (GSS) and either have applied to participate in the GSS, or plan to apply when they are closer to graduation (Fig. 5). Most students and early professionals expressed interest in participating in symposia, webinars, or workshops centred around specific research topics, networking, or career development. The topics of job opportunities in Canada vs. USA (72%) and public vs. private (65%) were most popular. Networking and collaboration (59%) and grant

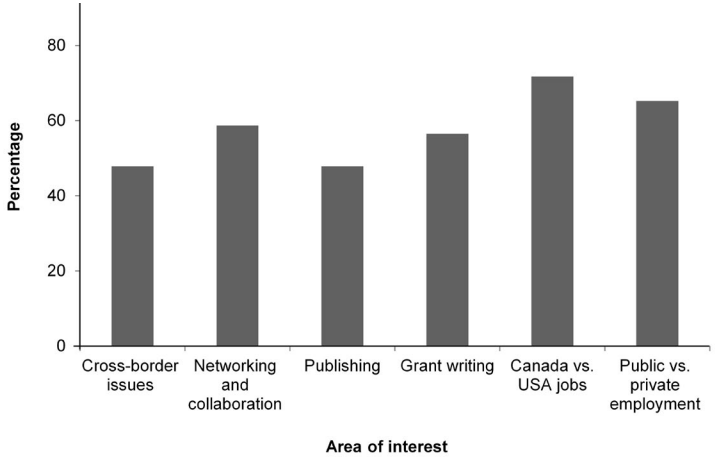


Fig. 6. Percentage of students and early professionals expressing interest in participating in symposia, webinars, or workshops centred around specific research topics, networking, or career development.

writing (57%) were the next most popular choices, followed by publishing (48%) and cross-border issues (48%) (Fig. 6).

Fifty percent of students and early professionals agreed that it is important that there be teams representing Canada in the student team competitions at the 2018 ESA-ESC-ESBC meeting. However, the interest in participating in both the Linnaean Games (12%) and student debates (7%) was low. This low interest was attributed to lack of time to prepare (38%), being hesitant about having enough entomology knowledge (28%), and the competitive nature of those events

(9%). However, 25% of students and early professionals expressed interest in participating in informal or friendly versions of such events.

Discussion

To our knowledge this survey is the first attempt by the ESC to poll its members on their opinions about the JAM. The results suggest that overall interest in our meetings is strong but there are significant demographic and financial headwinds that could influence the success of future meetings. For instance, any reduction in grant funds or institutional support that members use to attend a meeting could reduce future attendance.

Our respondents appear to be sensitive to these considerations when they indicate that the cost of the meeting and ease of travel are the most important criteria when selecting future meeting locations. These feelings are tempered though by the observation that ESC meeting costs are perceived as 'average' when compared to other meetings. In future surveys we may wish to assess the 'willingness to pay' among ESC members with regards to meeting costs.

We suspect that the cost of attending an ESC meeting will always be a concern for our members. Despite this, interest in our meetings is strong. Most attendees are return visitors and see scientific value in attending the meeting. Those who chose not to attend the 2017 JAM identified financial costs and conflicts as the reasons for not attending, not a lack of interest in the program. This is heartening as it suggests that ESC members continue to see value in the JAM. The challenge then for the ESC and the regional entomological societies is to determine how we can increase the value of the meeting while containing costs.

One solution may be to meet more frequently with other societies in order to share the burden of running a meeting. The ESC has already begun this experiment with the 2018 and 2019 conferences in Vancouver and Fredericton, respectively. Another solution is to broaden the sponsorship base for the meetings in order to defray costs. Work is underway by the ESC to address this as well. A third solution is to increase the attendance at meetings.

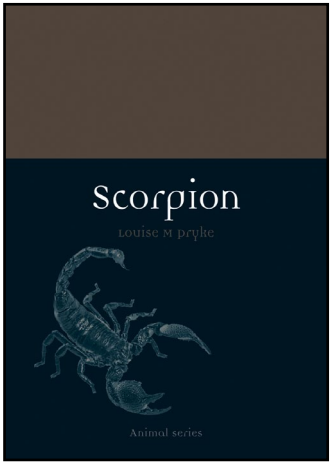
To increase attendance at our meetings, the Society will have to ask its members to act as advocates and promotors of the JAM among their colleagues and students. This survey has showed us that the JAM is as important to its members as it is to the health of the ESC. The ESC does a lot of work to promote its meetings but it also relies on its members to be advocates. This survey has shown that many of you see value in our meetings and our Society. Let's make sure that our colleagues and institutions are aware of that value.

Improving the attendance at JAMs will also require improving the experience for students and early professionals. Based on general comments from this group, more student-specific or early professional-specific activities are needed at future JAMs.

This survey may also put to rest the perennial question regarding Canadian student participation in competitive, Linnaean Games-type events. The answer is a resounding 'No'. That stated, students and early professionals have expressed some interest in friendly competitions in the style of the ESA's Linnaean Games and student debates. Future JAM organizers may wish to take this under advisement when planning student activities.

This survey has been an educational experience for all of us involved. It has, to use the cliché, allowed us to take the pulse of the Society. And while hardly systematic and not terribly rigorous, it has shown us what you value in your meeting, and a bit of what you don't. If we are to continue as a going concern then the JAM must remain in its central role. This survey has shown us what the Society and its members can do to help the JAM continue to succeed.

We thank all those that responded to the survey. If you have any questions or comments on this article, the survey, or want to request a copy of the complete survey report, please contact Chris MacQuarrie, Joanna Konopka or Patrice Bouchard.



Scorpion. Pryke, Louise M. 2016. Reaktion Books, Animal series. London, UK. 208 pp. ISBN 9 781 78023 592 9. Paperback. US$19.95.

Scorpions give most people an uneasy feeling and they apparently have for a very long time. Louise Pryke tries to demonstrate how interesting scorpions are and why we, as humans, are fascinated by this group of arthropods. She does this in seven main chapters not including an introduction, a timeline of scorpions from their appearance until today, and many references.

In the Introduction, called "Shining a light on scorpions", Pryke presents the different elements that will be discussed in the book: "A basic guide to biology of scorpions", "Scorpions in prehistory and the ancient world", "The scorpion king", "Scorpion weapon", "Scorpions in the stars", then "Scorpions on the screen and beyond", and finally "The sting in the tail".

The "basic guide to the biology of scorpions" is an overview of their diversity and classification, and ecology. It includes many facts about their evolution, their fluorescence under UV light, their feeding and mating habits, and their toughness. In the next chapter readers learn about scorpions from the fossil record through to ancient human civilizations. This is followed in Chapter 3 by a discussion of how scorpions were viewed in ancient Egypt. In Chapter 4 the author talks about how scorpions were used to either intimidate enemies or as biological weapons through time. Then, the book moves into exploring the spiritual notions of scorpions, starting with an examination of the use of scorpions as a constellation, as a zodiac sign, in yoga and in other spiritual realms. The sixth chapter explores the depiction of scorpions in all artistic forms: movies, literature, art, etc. Finally, Pryke discusses the contributions of scorpions to medical practice and the importance of their conservation, and stresses how little we know about this fascinating group of arthropods.

I had high expectations for this book because I have read others like it in the Animal series and they have never disappointed. This continues to be the case. This is a wonderful little book with great depictions and images of scorpions for somebody who wants to get the basics of scorpions and is interested in how they have been viewed throughout human history. There is so much information that I at times felt overwhelmed and knew I would not be able to retain it with only a single read. I was disappointed when it finished. I think the only drawback is that I wish each chapter could have been expanded into its own book.

Julia Mlynarek
AAFC, RDC
Harrow, Ontario

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://esc-sec.ca/publications/bulletin/#toggle-id-2) and is updated as new books are received.

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

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

Preference will be given to ESC members.

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.

La SEC reçoit fréquemment des livres non demandés pour des critiques. Une liste de ces livres est disponible en ligne (http://esc-sec.ca/publications/bulletin/#toggle-id-2) et est mise à jour lorsque de nouveaux livres sont reçus.

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

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

La préférence est donnée aux membres de la SEC.

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.

Books available for review / Livres disponibles pour critique

Pohl, G.R. et al. 2018. Annotated checklist of the moths and butterflies (Lepidoptera) of Canada and Alaska. Pensoft *Series Faunistica* No 118. ISBN: 978-954-642-909-4 [e-book]

Saguez, J. 2017. Guide d'identification des vers fil-de-fer dans les grandes cultures au Québec. Centre de recherche sur les grains. ISBN: 978-2-9813604-5-8 [e-book]

Dale, M.R.T. 2017. Applying graph theory in ecological research. Cambridge University Press. ISBN: 9781316105450. [e-book]

Danks, H.V. 2017. The Biological Survey of Canada: A Personal History. Biological Survey of Canada. ISBN: 978-0-9689321-9-3 [e-book]

Kirk-Spriggs, A.H. and B.J. Sinclair, eds. 2017. Manual of Afrotropical Diptera, Volumes 1 & 2. South African National Biodiversity Institute.

Allison, J.D. and R.T. Cardé [Eds.]. 2016. Pheromone communication in moths: Evolution, behavior and application. University of California Press. ISBN: 978-0-520-27856-1 [hard cover].

Appel, E. & S.N. Gorb. 2015. Comparative Functional Morphology of Vein Joints in Odonata. Zoologica Vol. 159. ISBN: 978-3-510-55046-3. [paperback]

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 2018 for the indicated positions. Members will receive more details on this year's process by email. In accordance with our new By-laws under the Canada Not-for-profit Corporations Act, a plebiscite/vote first will be held to 'select candidates' for a slate of Directors. The slate will then be presented for formal election at the Annual Members' Meeting in Vancouver in November.

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 2018**. PLEASE REMEMBER TO VOTE!

To vote, use the following link: https://docs.google.com/forms/d/e/1FAIpQLSd1l5hQIrBeQe1okqe8bziLABScm_AWtCyR1_6GlFAkhRms-A/viewform?usp=sf_link

Les personnes suivantes ont été nominées et ont accepté de se présenter pour les élections de 2018 pour les postes indiqués. Les membres recevront plus de détails sur le processus de cette année par courriel. Conformément à notre nouveau règlement intérieur en vertu de la loi canadienne sur les organisations à but non lucratif, un plébiscite/vote sera d'abord tenu afin de « sélectionner les candidats » pour une liste de directeurs. La liste sera ensuite présentée pour une élection formelle à la réunion annuelle des membres à Vancouver en novembre.

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 2018**. N'OUBLIEZ PAS DE VOTER!

Pour voter, utilisez le lien suivant : https://docs.google.com/forms/d/e/1FAIpQLSd1l5hQIrBeQe1okqe8bziLABScm_AWtCyR1_6GlFAkhRms-A/viewform?usp=sf_link

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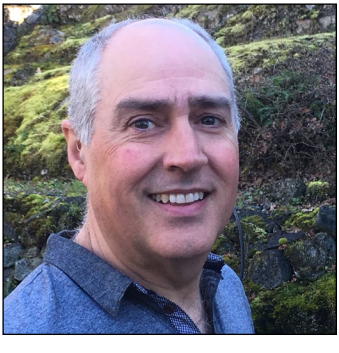
Candidates for Societal Director / Second Vice-President : Candidats pour le poste de director / directrice sociétal(e) / second(e) vice-président(e)



Bill Riel (NRCan, Victoria)
(left / gauche)

and / et

Kenna MacKenzie (AAFC, Summerland)
(right / droite).

Candidates for Director-at-Large : Candidats pour le poste de conseillère

Jason Gibbs
(University of Manitoba)
(left / gauche)

and / et

Suzanne Blatt
(AAFC, Kentville)
(right / droite).

68th Annual Meeting of Members and Board of Directors Meetings

The Annual Business Meeting of Members of the Entomological Society of Canada will be held at the Vancouver Convention Centre, 1055 Canada Place, Vancouver, British Columbia, on Tuesday, 13 November 2018, from 2:30 pm to 3:30 pm, in Meeting Room 109. The Board of Directors Meeting will be held at the Pan Pacific Hotel, 300-999 Canada Place, Vancouver, British Columbia, on Sunday, 11 November 2018, from 8:00 am to 3:00 pm, in the Oceanview Suite 3. The incoming Board of Directors will meet immediately following the Annual Business Meeting of Members, also in Meeting Room 109 at the Vancouver Convention Centre, on Tuesday, 13 November 2018, from 3:30 pm to 4:00 pm. Matters for consideration at any of the above meetings should be sent to Vincent Hervet, Secretary of the Entomological Society of Canada (see inside back cover for contact details).

68e assemblée annuelle et réunions du conseil d'administration

L'assemblée annuelle des membres de la Société d'entomologie du Canada se tiendra au Vancouver Convention Centre, 1055 Canada Place, Vancouver, Colombie-Britannique, le mardi 13 novembre 2018 de 14h30 à 15h30 dans la salle Meeting Room 109. La réunion du conseil d'administration se tiendra au Pan Pacific Hotel, 300-999 Canada Place, Vancouver, Colombie-Britannique, le dimanche 11 novembre 2018 de 8h00 à 15h00 dans la salle Oceanview Suite 3. Le nouveau conseil d'administration se réunira immédiatement après l'assemblée annuelle des membres le mardi 13 novembre 2018 de 3h30 à 4h00 dans la salle Meeting Room 109 au Vancouver Convention Centre. Les sujets à aborder pour n'importe laquelle de ces réunions doivent être envoyés à Vincent Hervet, secrétaire de la Société d'entomologie du Canada (voir le troisième de couverture pour les coordonnées détaillées).

Members' discounts

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

Remise pour les membres

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

Fourteenth Annual Photo Contest

The Fourteenth Annual Photo Contest to select images for the 2019 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, laboratory 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 in which the photos are printed.

Submission deadline is **31 August 2018**. 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.

Quatorzième concours annuel de photographie

Le quatorzième 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 2019 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 intégrée 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 acceptées. 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 août 2018**. 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.

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. Donations can also be made online via the Members' Area (https://esc-sec.site-ym.com/donations/).

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. Des dons peuvent également être faits via la section des membres (https://esc-sec.site-ym.com/donations/).

2017 Donors – Donateurs et donatrices pour 2017

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Philogene, B.J.R.
Poland, Therese
Richards, Miriam
Roitberg, Bernard
Rosenberg, David M.
Shorthouse, Joseph D.
Sweeney, Jon

… and those who preferred to remain anonymous.
… et ceux et celles qui ont préféré rester anonyme.

ESC Secretary / Secrétaire, SEC

The Entomological Society of Canada is looking for a member willing to serve in the position of Secretary, starting in November 2018. The duties of the Secretary are to support the President and Board of Directors by:

- Scheduling meetings of the Executive Council, Board, and the Members, preparing agendas, obtaining reports from Officers and others, sending out notices of meetings, attending the meetings, and recording minutes. Meetings are normally held by conference call, except for those that take place at the Society's Joint Annual Meeting.
- Working with our Association Management Company (Strauss event & association management) to ensure that records of Society activities such as agendas, minutes, reports, and correspondence are preserved.
- Providing information on Society business to the Bulletin Editor, Webmaster, and Strauss for publication, posting, and circulation to the membership as necessary.
- Maintaining up-to-date membership lists and contact information for the Society's Board and Committees.

• Providing information as required to Strauss for the Society's annual filings with Corporations Canada and other government agencies.
• Preparing ballots and supporting information for plebiscites to recommend candidates for nominations as Societal Director and Director-at-Large, and for any other questions on which votes may be required, providing instructions on voting procedures, and notifying candidates and the membership of the results of voting. Advising affiliated societies when they need to provide names for nominations as Regional Directors.

A familiarity with the Society's by-laws, rules, and guidelines, past experience as a Board member, and the ability to work in French and English would all be assets. This is a great opportunity to serve one of the oldest biological societies in North America and to deepen your contacts with the Canadian entomological community. Any member interested in serving in this position should contact the President, Patrice Bouchard (patrice.bouchard@agr.gc.ca), by **30 June 2018**. The final selection will be made by an ad hoc committee convened by the President.

La Société d'entomologie du Canada cherche un membre prêt à remplir le poste de secrétaire dès novembre 2018. Les tâches du secrétaire sont de soutenir le président et le conseil d'administration en :
• Fixant les dates de réunions du conseil exécutif, du conseil d'administration et des membres, préparer les ordres du jour, obtenir les rapports des dirigeants et autres, envoyer les avis de réunions, assister aux réunions et préparer les comptes rendus.
• Travaillant avec la compagnie de gestion des associations (Strauss event & association management) pour s'assurer que les documents des activités de la Société, comme les ordres du jour, comptes rendus, rapports et correspondance sont préservés.
• Fournissant de l'information sur les affaires de la Société au rédacteur du Bulletin, au webmestre et à Strauss pour la publication, l'affichage et la circulation aux membres lorsque nécessaire.
• Maintenant à jour la liste de membres et les coordonnées du conseil d'administration et des comités de la Société.
• Fournissant l'information requise à Strauss pour les rapports annuels de la Société avec Industrie Canada et les autres agences gouvernementales.
• Préparant les bulletins de votes et l'information pour les plébiscites afin de recommander des candidats pour les nominations de directeur sociétal et conseiller, et pour toute autre question pour laquelle le vote est nécessaire, en fournissant les instructions sur les procédures de vote et en avisant les candidats et les membres des résultats du vote. Avisant les sociétés affiliées lorsqu'elles doivent fournir des noms pour les nominations comme directeurs régionaux.

Une certaine connaissance du règlement intérieur, des règles permanentes et des lignes directrices, une expérience antérieure comme membre du conseil d'administration et la capacité de travailler en français et en anglais sont des atouts. Il s'agit d'une belle opportunité de servir une des plus vieilles sociétés biologiques en Amérique du Nord et d'approfondir vos contacts avec la communauté d'entomologistes canadiens. Tout membre intéressé à occuper ce poste doit contacter le président, Patrice Bouchard (patrice.bouchard@agr.gc.ca), avant le **30 juin 2018**. La sélection finale sera faite par un comité ad hoc convoqué par le président.

THE CANADIAN PHYTOPATHOLOGICAL SOCIETY

LA SOCIÉTÉ CANADIENNE DE PHYTOPATHOLOGIE

CPS.SCP News

Vol 62 (1) March 2018

https://phytopath.ca/wp-content/uploads/2018/04/CPS-SCP-News-62-1-March-2018_v02.pdf

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Meeting announcements / Réunions futures

XI European Congress of Entomology
Naples, Italy, 2-6 July 2018
http://www.ece2018.com/

XV International Congress of Acarology
Antalya, Turkey, 2-8 September 2018
http://www.acarology.org/ica/ica2018/

Joint Meeting of the Entomological Society of Canada, the Entomological Society of British Columbia and the Entomological Society of America
Vancouver, 11-14 November 2018
https://www.entsoc.org/events/annual-meeting
https://www.entsoc.org/events/annual-meeting/french

13th International Congress of Orthopterology
Agadir, Morocco, 24-28 March 2019
http://www.ico2019morocco.com/

Joint Meeting of the Entomological Society of Canada, the Acadian Entomological Society and the Canadian Society for Ecology and Evolution
Fredericton, 18-21 August 2019
For more information: Twitter @CSEE_ESC2019; email csee.esc.2019@gmail.com

26th International Congress of Entomology (Entomology for our planet)
Helsinki, Finland, 19-24 July 2020
http://www.ice2020helsinki.fi/

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

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

Bulletin of the Entomological Society of Canada

Editor: Cedric Gillott
Assistant Editor: Donna Giberson

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

Published by the
Entomological Society of Canada
386 Broadway, Suite 503
Winnipeg, Manitoba R3C 3R6
E-mail: info@esc-sec.ca
www.esc-sec.ca/

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

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

ISSN: 0071-0741

Submission deadline for the next issue: 31 July 2018

Bulletin de la Société d'entomologie du Canada

Rédacteur: Cedric Gillott
Rédactrice adjointe: Donna Giberson

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

Publié par la
Société d'entomologie du Canada
386 Broadway, Suite 503
Winnipeg, Manitoba R3C 3R6
E-mail: info@esc-sec.ca
www.esc-sec.ca/

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

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

ISSN: 0071-0741

Date de tombée pour le prochain numéro: 31 juillet 2018

Officers of affiliated Societies, 2017-2018
Dirigeants des Sociétés associées, 2017-2018

Entomological Society of British Columbia

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B.C. Ministry of Agriculture
1767 Angus Campbell Road, A
Abbotsford, BC, V3G 2M3
Tel: (604) 556-3031
E-mail: Tracy.Hueppelsheuser@gov.bc.ca
http://entsocbc.ca

Entomological Society of Alberta

President	Bette Beswick
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Agriculture and Agri-Food Canada /
Agriculture et Agroalimentaire Canada
5403 - 1 Ave S. Lethbridge, Alberta T1J 4B1
Tel: (403) 317-2247
E-mail: esalberta@gmail.com
http://www.entsocalberta.ca

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Saskatchewan Watershed Authority
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Tel: (306) 933-7474
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http://www.entsocsask.ca

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Living Prairie Museum
2795 Ness Ave
Winnipeg MB R3J 3S4
E-mail: SSemmler@winnipeg.ca
http://home.cc.umanitoba.ca/esm/

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Vista Centre
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E-mail: entsocont.membership@gmail.com
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Centre de recherche et de développement en horticulture
430, boul. Gouin
Saint-Jean-sur-Richelieu (Québec) J3B 3E6
Tél : (579)224-3063
Email : secretariat@seq.qc.ca
http://www.seq.qc.ca/

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Forest Protection Limited
Fredericton International Airport
2502, Rte 102 Hwy, Lincoln, NB E3B 7E6
E-mail: treasurer@acadianes.ca
http://www.acadianes.ca

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

The last word / Le dernier mot

Cedric Gillott, Editor / Rédacteur

How do they get there?

At risk of being accused of not having anything to say (which for me would be a first!), I want to echo the President's assertion that studying insects, whether professionally or as a hobby, is a joyful thing. Even after almost two decades of retirement, I still find these 6-legged creatures fascinating. In particular, I am engrossed by the many and different kinds of interactions between insects from widely separate groups: parasite/parasitoid–host, predator–prey, mutualism, etc.

We enjoy a small greenhouse attached to our home, used to grow our 'winter' tomatoes and salad greens (mesclun), as well as for the growing of bedding plants (annual flowers and vegetables) for eventual transplantation in the garden. There is no plant material of any kind in the greenhouse from around the end of May until near the end of August when the 'winter' tomato seeds are germinated. Further, no plant material from outside is brought into the greenhouse for overwintering.

Without fail, however, every year starting in late March we begin to find aphids on the tomato plants and especially the mesclun. Initially, they are wingless but as their numbers rocket, alates are formed, and their progeny are soon found on the bedding plants, sometimes with dire results. My efforts to control them (without the use of insecticides) include squashing them on the greenhouse windows where they accumulate in hundreds and collecting/releasing all the neighborhood

Comment sont-ils arrivés là?

Au risque d'être accusé de n'avoir rien à dire (ce qui serait une première fois pour moi!), je voudrais faire écho à l'affirmation du Président qu'étudier les insectes, que ce soit de façon professionnelle ou comme loisir, est quelque chose d'agréable. Même après presque deux décennies de ma retraite, je trouve toujours ces créatures à 6 pattes fascinantes. En particulier, je suis absorbé par les nombreuses et différentes sortes d'interactions entre les insectes de groupes très séparés : parasite/parasitoïde-hôte, prédateur-proie, mutualisme, etc. Nous aimons bien notre petite serre attachée à notre maison, que nous utilisons pour faire pousser nos tomates et verdures (mesclun) d'hiver, ainsi que pour faire pousser nos plantes de plates-bandes (fleurs annuelles et légumes) pour d'éventuelles transplantations dans le jardin. Il n'y a pas de matériel végétal d'aucun sorte dans la serre à partir de la fin de mai jusqu'à environ la fin août quand les graines de tomates « d'hiver » sont plantées pour germination. De plus, aucun matériel végétal de l'extérieur n'est mis à l'intérieur de la serre pour l'hiver.

Inévitablement cependant, chaque année, à partir de la fin mars, nous commençons à trouver des pucerons sur les plants de tomates, et particulièrement sur le mesclun. Au début, ils sont aptères mais alors que le nombre augmente, les ailés sont formés et leur progéniture se retrouve rapidement sur les plantes pour les plates-bandes, parfois avec des résultats désastreux. Mes efforts pour les contrôler (sans utiliser d'insecticides) incluent de les écraser sur les fenêtres des serres lorsqu'ils s'accumulent par centaines et de récolter et relâcher toutes les coccinelles du coin qui sont à la fois affamées et actives

ladybird beetles which are both ravenous and sexually active after their long hibernation.

But a question that has puzzled me for a long time is "Where do the aphids come from initially?". Is it possible that some aphid eggs could be collected along with the mesclun seeds as these are harvested, then packaged? Development, then hatching, of the aphid nymphs might occur under the warm and moist conditions when the mesclun is sown. Another possibility that I rather like is that ants may be the perpetrators. The soil bed in which the tomatoes and mesclun are planted is in direct contact with the ground below so not surprisingly we have ant visitors (quite possibly, *Tapinoma sessile*, the odorous house ant, which is a well-known feeder on homopteran honeydew). The spring appearance of the ants coincides with the appearance of the aphids in the greenhouse. Could it be that the ants store aphid eggs in their underground nests over winter, then, with the onset of warmer weather, bring them up and place them on the succulent vegetation they find in our greenhouse?

sexuellement après leur longue hibernation.

Mais une question qui me rend perplexe depuis longtemps est « D'où viennent les pucerons à l'origine? ». Est-il possible que des œufs de pucerons soient ramassés avec les graines de mesclun quand elles sont récoltées et emballées? Le développement et l'éclosion des nymphes de pucerons pourraient se produire dans les conditions chaudes et humides dans lesquelles le mesclun est semé. Une autre possibilité que j'aime bien est que les fourmis soient les coupables. Le terreau dans lequel les tomates et le mesclun sont plantés est en contact direct avec le sol, nous avons donc, sans surprise, des fourmis en visite (fort probablement *Tapinoma sessile*, la fourmi odorante, qui est bien connue pour se nourrir du miellat des homoptères). L'apparition printanière des fourmis coïncide avec l'apparition des pucerons dans la serre. Se pourrait-il que les fourmis entreposent des œufs de pucerons dans leur nid souterrain durant l'hiver, et qu'ensuite, avec l'arrivée des températures plus chaudes, elles les apportent et les placent sur la végétation qu'elles trouvent dans notre serre?

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Patrice Bouchard
Canadian National Collection of Insects, Arachnids and Nematodes
Agriculture and Agri-Food Canada
Ottawa, ON, K1A 0C6
Tel: (613) 759-7510, Fax: (613) 759-1701
E-mail: ESCPresident@esc-sec.ca

First Vice-President / Premier vice-président
Kevin Floate
Lethbridge Research and Development Centre
Agriculture and Agri-Food Canada
Lethbridge, AB T1J 4B1
Tel: (403) 317-2242
E-mail: kevin.floate@agr.gc.ca

Second Vice-President / Second vice-présidente
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School of Criminology, Simon Fraser University
8888 University Drive, Burnaby, B.C. V5A 1S6
Tel: 778 782 3589 Fax: 778 782 4140
E-mail: ganderso@sfu.ca

Past President / Président sortant
Neil Holliday
Department of Entomology
University of Manitoba
Winnipeg, MB, R3T 2N2
Tel: (204) 474-8365 Fax: (204) 474-7628
E-mail: Neil_Holliday@UManitoba.CA

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Canadian National Collection of Insects, Arachnids and Nematodes,
Agriculture and Agri-Food Canada, K. W. Neatby Building,
960 Carling Avenue, Ottawa, Ontario K1A 0C6.
Tel.: (613) 759-1701
E-mail: ESCTreasurer@esc-sec.ca

Secretary / Secrétaire
Vincent Hervet
Lethbridge Research and Development Centre
Agriculture and Agri-Food Canada
5403 - 1 Avenue South
Lethbridge, AB T1J 4B1
E-mail: ESCSecretary@esc-sec.ca

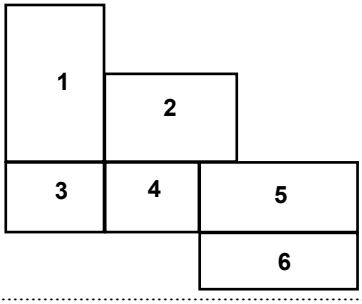
Bulletin Editor / Rédacteur du *Bulletin*
Cedric Gillott
Dept. of Biology, University of Saskatchewan
112 Science Place, Saskatoon, SK S7N 5E2
Tel: (306) 966-4401 Fax: (306) 966-4461
E-mail: cedric.gillott@usask.ca

Asst. *Bulletin* Editor / Rédactrice adj. du *Bulletin*
Donna Giberson
Dept. of Biology, U. Prince Edward Island
Charlottetown, PE, C1A 4P3
E-mail: giberson@upei.ca

Webmaster / Webmestre
Jordan Bannerman
University of Manitoba
email: jordan.bannerman@umanitoba.ca

The Canadian Entomologist Editor-in-Chief / Rédacteur en chef
Dezene Huber
University of Northern British Columbia
Ecosystem Science and Management Program
3333 University Way
Prince George BC V2N 4Z9
Tel: (250) 960-5119
E-mail: editor@esc-sec.ca

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



Front cover/Plate supérieur:

1 *Glyptapanteles militaris* (Hymenoptera: Braconidae). In 2017, many armyworm moth (*Mythimna unipuncta*; Lepidoptera: Noctuidae) larvae were parasitised by *Glyptapanteles militaris*. Cocoons were collected in wheat fields and reared until adult emergence. This photograph shows the head of an adult of the beneficial insect [Shawville, Québec, Canada]

Glyptapanteles militaris (Hymenoptera : Braconidae). En 2017, de nombreuses chenilles de la légionnaire uniponctuée (*Mythimna unipuncta*; Lepidoptera: Noctuidae) ont été parasitées par le parasitoïde *Glyptapanteles militaris*. Les cocons ont été récoltés dans des champs de blé à Shawville et ont été élevés jusqu'à l'émergence des adultes. Cette photo montre la tête d'un adulte de cet insecte bénéfique [Shawville, Québec, Canada]

[Photo: Julien Saguez]

2 Eight-spotted skimmer (*Libellula forensis*; Odonata: Libellulidae), perching on a twig near the outflow to a large marsh pond [Sergeant Bay Provincial Park, British Columbia, Canada]

La libellule *Libellula forensis* (Odonata : Libellulidae) posée sur une brindille près de l'écoulement d'un grand étang marécageux [Parc provincial Sergeant Bay dans le sud-ouest de la Colombie-Britannique, Canada]

[Photo: Donna Giberson]

3 A *Hybomitra* (Diptera: Tabanidae) [Kokanee Glacier Provincial Park, British Columbia, Canada]

Une *Hybomitra* (Diptera: Tabanidae) [Parc provincial de Kokanee Glacier en Colombie-Britannique, Canada]

[Photo: Ward Strong]

4. A foraging *Villa* (Diptera: Bombyliidae) [Kelly Lake, British Columbia, Canada]

Un *Villa* (Diptera: Bombyliidae) qui butine [Kelly Lake, Colombie-Britannique, Canada]

[Photo: Bernard Roitberg]

5. Flower longhorn, *Cortodera subpilosa* (Coleoptera: Cerambycidae), 21 June 2016 [Wagonwheel Road, Kootenay Boundary, British Columbia, Canada]

Le longicorne *Cortodera subpilosa* (Coleoptera : Cerambycidae), 21 juin, 2016 [Wagonwheel Road, Kootenay Boundary, Colombie-Britannique, Canada]

[Photo: Adam Blake]

6. When camouflage fails—a nymph of the stink bug *Palomena prasina* (Hemiptera: Pentatomidae) [Delémont, Switzerland]

Quand le camouflage échoue—une nymphe de la punaise verte, *Palomena prasina* (Hemiptera : Pentatomidae) [Délémont, Suisse]

[Photo: Tim Haye]

Back cover/Plate inférieur:

A live female Asian longhorned beetle (*Anoplophora glabripennis*; Coleoptera: Cerambycidae) [Insect Production and Quarantine Laboratory in the Great Lakes Forestry Centre, Sault Ste. Marie, Ontario, Canada]

Une femelle longicorne asiatique vivante (*Anoplophora glabripennis*; Coleoptera : Cerambycidae) provenant [Laboratoire de production d'insectes et de quarantaine au Centre de foresterie des Grands Lacs à Sault-Sainte-Marie en Ontario, Canada]

[Photo: Amanda Roe]

www.esc-sec.ca

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

Date of issue: June 2018 /
juin 2018

ISSN: 0071-0741