Entomological Society of Ontario

Newsletter

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The ESO Newsletter

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2015 . . . . . .

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Become an ESO Member

Do you often forget to pay your yearly ESO membership dues (hint, hint, the start of 2015 and a new membership season is upon us)? Are you a long-time devoted member of the ESO? Based on member feedback, we've created a NEW membership dues option that has been available since 2013:

A one-time payment of $150 to secure a 5 year membership!

The ESO registration form is available on the **ESO website: *entsocont.ca***

For all membership and payment options, including to pay via ***PayPal,*** please visit **www.entsocont.ca , or** mail your invoice and payment to:

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Student, amateur and retired memberships in Canada are free but **must be renewed each year**! Free memberships may be renewed electronically by sending an email to **Michelle** at:
entsocont.membership@gmail.com

Editors' Note

We've been editors of the ESO Newsletter for over a year now, and you may have noticed during our tenure the strives we made to revamp to look of things. The last edition focused heavily on Featured Research, giving local entomologists a chance to showcase their research and field stories while providing entertainment for the rest of us.

This edition, we've added a new section dedicated to students. Based on the "Metamorphosis" article idea of our predecessor, Angela Gradish, our goal is for the Student Central to cater to students by providing them with articles of interest and to help students transition to whatever their next step may be. This Metamorphosis issue highlights the ESO's own Michelle Locke. Also in the Student Central this edition, is Jay Fitzsimmons' incredibly insightful article for students on how to build your resume for non-academic career ambitions.

Also, be sure to check out this edition's articles on field work in Australia, how insects see the world, and highlights from the 2014 AGM and bug eye photo contest! We hope you enjoy!

All the best,
Trevor Burt & Amanda Lindeman

President's Address

Dear Colleagues,

At the beginning of a fresh, new year I am glad to report that the ESO is equally revitalized, in part due to a number of successes in 2014. Last year saw positive news for JESO submissions, more outreach events and new venues for the annual meeting, all of which I hope will continue in 2015. For many years the society's journal (JESO, among many other previous names) was considered one of the top entomological publications and was contributed to by systematists, economic entomologists and naturalists alike. Over the last 10 or more years the publication field has grown immense and unfortunately for JESO, the competition meant declining interest in a journal without an impact factor and online presence. This was remedied in the past several years with online access to JESO through the publisher or ESO website and the rereleasing of electronic versions of articles from the past 140 years. Even though publications were up by the end of the year (thanks John), JESO may not regain the level of submissions it once had in the "heyday" of the society, but it will hopefully be able to hold its own as the "flagship" of the society. On another positive note, the "new look" newsletter has also blossomed with thanks to co-editors, Amanda and Trevor. Colourful insect photos and topical articles of interest make for entertaining reading (as you will see in this issue).

Members of the society (including those on the board) have always been willing to provide their unique services to public and private groups that wanted an entomologist's perspective. A few years ago the ESO outreach committee developed a pamphlet that outlined some of the skills and topics that members could bring to a meeting or classroom. In 2013, ESO members in Ottawa took the plunge themselves by organizing the first annual "Bug Day" that attracted over 1000 interested Ottawa folks to come out and learn more about insects. The success of this outreach event surprised and delighted the ESO and indicated the potential for the society and its friends in local naturalist groups to get the message out - "INSECTS ARE COOL"! The Ottawa

Continued on next page

Bug Day spawned an even larger, repeat event and two others at new locations in Manitoulin Island and London in 2014, both very successful in attendance and positive feedback. Although the ESO has always considered it's self an important conduit of entomology facts and discoveries through the traditional journal and scientific presentation routes, the realization that relatively large public oriented outreach events could revitalize the purpose of the society is definitely heartwarming indeed. In the coming year there is likely going to be repeat events in the three locations, with the potential for Guelph and Toronto joining in. The idea that the society is taking the lead in disseminating facts both educational and fun while promoting science in general to the next generation of young researchers is very rewarding for those of us who only a short time ago were agonizing over the future of this longstanding society.

Another encouraging indicator are ideas for the hosting of the next few ESO AGMs in locations where they have not been held previously or for some time. The annual meeting in Toronto in October was a great success both scientifically and financially (congratulations Antonia and committee!). In the not too distant future, Trent University, Queens University and the University of Guelph campus in Ridgetown may become meeting sites. The Toronto meeting last October brought in an interested number of field naturalists, an important factor in promoting our events in the broader community and encouraging new ESO members. In 2015, the goals should be to support the outreach events in your area, encourage members, new and old, to submit their articles to JESO, and to get students out to the annual meetings to give them a chance to show their talents in front of their peers.

Best wishes to everyone for a happy and prosperous New Year.

Ian Scott
President of the ESO

The new editor of the *Journal of the Entomological Society of Ontario*

Hello!

My name is Chris MacQuarrie and I am the new editor of the Journal of the Entomological Society of Ontario. The newsletter editors asked if I could kindly write a few words to introduce myself to you all.

Before I do that though, I should begin by thanking John Huber for his service to the Entomological Society of Ontario and his stewardship of the journal for these past few years. I'd also like to thank John for agreeing to help me as I learn the ropes at JESO.

So, some of you may be wondering, who is this fellow who has taken over our beloved journal? Well, I am an insect ecologist based in Northern Ontario at the Great Lakes Forestry Centre (GLFC) in Sault Ste. Marie. I study the management and control of native and invasive insects of forests. I grew up in Saskatoon and attended the University of Saskatchewan for my undergraduate degree in biology. After that I then moved to the east coast where I studied the dispersal ecology and flight behaviour of Colorado potato beetles for my Masters degree at the University of New Brunswick. I saw the light shortly after that (or joined the dark side, depending on your perspective) and shifted my sights towards a career in forest entomology, returning west to Edmonton to work on the ecology and management of birch leaf-mining sawflies. I stayed in Edmonton for a post-doctoral fellowship with the Canadian Forest Service working at the Northern Forestry Centre, and it was from there that I was hired on in my current position at GLFC. Along the way I've worked for both Agriculture and Agri-food Canada and the Canadian Forest Service as a technician, and spent some time working in Alaska with the US Forest Service. Up until very recently I had part-time career as an advice columnist writing the 'Dear Buggy' column for the Bulletin of the Entomological Society of Canada. I'm also a husband, father of two girls, and a curler (stones that is, not hair).

Continued on next page

As readers of the previous issue of this newsletter will be aware, JESO is at a crossroads (Sinclair 2014). I have assumed this position with the expectation that a changes are required if JESO is to continue as a going concern. I'm also well aware that this will not be easy. The publishing landscape has changed significantly in the 140 odd years that JESO has been around. It is apparent that JESO must adapt to these new realities if it is to survive.

I am of the opinion though that journals like JESO still have a place in science and that we can be a home to interesting and useful publications. My goal is to help us redefine our niche so that we can thrive in the modern landscape. To that end I have a plan that I'll be working to implement over the coming year. I hope very much to be able to brief you on this in the next issue of the newsletter. In the meantime if you have suggestions, or would like to help out with this project, please do not hesitate to get in touch. I can be contacted at JESOeditor@gmail.com

In closing, I would be remiss if I did not encourage you to consider JESO for your next publication. I know there must be some very interesting stories to tell about Ontario's insects. Please let JESO help you tell that story to the world.

Chris MacQuarrie
JESO Editor

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Field Season Fix:
Searching for Syrphidae Down Under

Written by

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Field Season Fix
Searching for Syrphidae Down Under

Queensland *Episyrphus*

In the summer of 2013, Dr. Jeff Skevington, my former M.Sc. co-supervisor, phoned me up to drop an entomological bombshell. He had obtained the necessary funding to revise the Australian Syrphidae (Flower Flies) fauna, he was interested in bringing me on as a PhD student, and he'd be able to send me to Australia for six months – four months of preliminary taxonomic work in the major collections and two in the field. I would be accompanied by his summer student Sebastian Namek to help database in the collections, and as long as she could pay her own way, Jeff had no problem with my partner Aislinn (Ais) Wyatt tagging along. Having always felt an affinity for the animals most people write off as "creepy", "gross", or "deadly venomous", I'd dreamed of traveling to Australia and working with the native critters since I was a child. Needless to say, I accepted the generous offer. Things were a bit of a blur after that, but after months of applying to actually get into the Ph.D. program at Carleton, planning museum visits, applying for collecting permits, and plotting likely collecting spots on various maps, we were ready to leave. Sebastian, Ais and I would be in the collections from the beginning of May until the end of August, September was up in the air, and we would be meeting up with Jeff and his family in October for 3 weeks of collecting with them before heading home.

The series of flights from Toronto to Sydney were as pleasant as any 36-hour journey can be. By the time we landed in Sydney we were all sleep-deprived and disoriented. Thankfully, culture shock was minimal since, aside from some minor differences in colloquialisms and etiquette, urban Australian culture is quite similar to Canadian. The urban wildlife was different, yet filled familiar niches. There were brushtail possums instead of raccoons, sulphur-crested cockatoos instead of pigeons, sacred Ibis instead of seagulls, gigantic fruit bats instead of… well, we don't have a north American equivalent to those.

Wooroonooran Bulldog Ants (*Myrmecia)*

Working in the collections of the Australian Museum was also strangely familiar. It seems that no matter where you go, entomologists are the same the world over: perhaps a little quirky, but always friendly and helpful, especially towards their own kind. The Australian Museum collection was a bit of a trial-by-fire for Sebastian and I – it had been curated

sometime in the distance past, but there was lots of work to be done, I was only casually familiar with the fauna at that point, and unbeknownst to me there were many, many undescribed species lurking in the "misc." sections of the collection that would confound my attempts to key them to species with the literature available. While I was wrestling with species names, Sebastian had the unenviable task of databasing every syrphid in the collection. Meanwhile, Ais enjoyed the many free museums in Sydney, much to my chagrin. Eventually though, I managed to work out what species was what (I hope), which still needed to be described, and where major revisionary work still needed to be done. The Queensland Museum in Brisbane and the Australian National Collection in Canberra (the nation's capital) held many similar surprises, and each had its unique challenges. Sebastian and I were kept busy with curating, photographing, and databasing, and before we knew it, it was coming up on the end of August, and our four months of museum work had come to an end.

Embioptera in web

For the month before we met up with the Skevington clan, Ais and I decided to head to North Queensland for a rainforest vacation while Sebastian met up with friends and drove the Great Ocean Road to Melbourne. After four months working with pinned specimens, it was finally time to start collecting! Only it still wasn't really the Australian field season. Since the seasons are reversed compared to ours, we had worked through Australian winter – more like a dry season – of which we were still in the tail end. Ais and I flew into Cairns August 30th and immediately drove north to Daintree Rainforest National Park, where it was beautiful but still too dry for much collecting. We managed to pick up a few taxa, but for the remainder of our time in North Queensland I saw the same few species of *Allobaccha* and *Allograpta* wherever we went, and I suspect they must be some of the few syrphids that are active throughout the dry season. The one exception to this was when we visited an old friend of Jeff's and collected off of their mango tree in their yet. We must have netted 5 genera in as many minutes off of that one tree. My only regret was not being able to really do a "thorough" job of collecting for fear of damaging our host's fruit tree!

Although the weather was wrong for collecting syrphids, there were a few entomological highlights to be had in Queensland. In Undara National park we found groups of Embioptera on exposed granite boulders. I had never seen live web spinners before, and marveled at their complex web houses for a moment before ripping one apart and drowning the inhabitants in molecular-grade ethanol. In Mission Beach, we found a number of *Nephila* sp. (golden orb weavers) and their kleptoparasitic entourage of smaller spiders. During an attempt to

Mission Beach Klepto spider

photograph the various species of spider that could be found in a single *Nephila* web, I almost fell face-first through the web, which I'm sure would have been almost as unpleasant for me as it would have been for the massive spider at the center of it. On the same trail, Ais also found a rather large stick insect being attacked by green ants. The ants were unfazed by the stick insect's threat display of flaring its dark purple wings and rocking back and forth, but were unable to withstand the threat of my forceps. Once the ants were cleared off the stick, it continued to "threaten" us for a minute before folding its wings and becoming nearly invisible in the greenery.

Mission beach *Nephila*

As a final six-legged highlight in the rainforest, I found a colony of bulldog ants (*Myrmecia* sp.) near our tent in Wooroonooran National Park. Almost entirely endemic to Australia, Bulldog ants are large, aggressive, and extremely venomous. They are also solitary hunters unlike other ants, and to my eye, behaved more like wasps than ants when hunting – quickly moving from one leaf to the next, constantly scanning for potential prey items. I staked out the colony for quite some time in an attempt to get some good photographs. The photography was a success, but I also ended up with several 1.5 inch-long ants crawling into my shoes while I was doing so. Time seemed to slow down as I waited for the ants to leave my person on their own accord, while accounts of the agony of bulldog ant stings – gleefully recounted by the various entomologists I had met in the last few months – leapt to mind. All too soon, our month in the rainforest was over, and Ais and I flew back to Canberra to meet up with Jeff and his family, attend the Australian Entomological Society Annual General Meeting, and begin the final leg of our collect trip. The meeting went off without a hitch, and while putting together my talk, I added up the numbers and realized that Sebastian and I (mostly Sebastian) had databased approximately 14,000 Syrphidae in the 3 major collections we had visited from May-August. Not a bad amount of data for four month's work. Within hours of the meeting ending, we started driving west towards the outback – Jeff and his family, Angela and Alexander, in their newly purchased Toyota Hilux (nicknamed The Beast by Jeff's wife Angela), and Ais and I in a shiny white Mitsubishi Outlander. The plan was to pick up Sebastian in Wagga Wagga along the way, but Jeff must have been getting antsy to get back into the Australian bush for the first time since his PhD. Sebastian was at the side of the road with his gear where we said we'd meet him, but Jeff, in his excitement, zoomed past to our amusement. I suspect that if Ais and I hadn't stopped to pick him up, Sebastian might still be standing outside that gas station in Wagga Wagga.

En route to Cameron Corner

The next several days were a blur of dusty outback highways and 40 degree heat, as we pushed west and north to Cameron Corner: the spot where New South Wales, Queensland, and South Australia all meet. The landscape changed rapidly as we drove, as the now familiar *Eucalyptus* were replaced by shrubby, stunted Mallee trees (which I later realized were actually still *Eucalyptus*, just a different group of species). Eventually even these sparse trees succumbed to the heat, sand, and dust, and the only vegetation visible were low shrubby grasses. When we finally made it to the Corner, we stopped at the Cameron Corner Store to stock up on gas. This proved to be more complicated than it seemed: the owner/sole employee of the Corner Store was also the bartender, he liked to drink with his customers, and he kept the pumps outside locked. After about an hour of inquiries and gentle reminders, we finally convinced the proprietor to put down his glass long enough to pump gas for the lineup of cars that had formed – at two dollars a litre I thought he'd be more eager.

From Cameron Corner we drove south along the Strzelecki Track, a famous outback highway, more or less in the direction of Adelaide. Collecting was virtually nonexistent along the track, be we had agreed it would be worth the detour to get a real sense of what the desert looked like. Midway through the day, we drove into what must have

The Skevingtons

been some kind of dust storm. Between the high winds and amount of sand and dust in the air, visibility dropped to 20-30 meters. I unfortunately never got pictures from inside the storm for fear of sandblasting my camera, but the mental image of driving into that ominous grey cloud will stick with me for a long time. Within a day or two of driving south towards the coast we had left the desert proper and gotten back into Mallee (the name of both the dominant tree and the habitat) territory.

At this point in the year syrphids were still scarce, although we were getting good numbers of *Simosyrphus grandicornis*, but we were beginning to collect a number of interesting Bombyliidae, Asilidae, Therevidae, etc… all dry-loving Diptera. Syrphids in general tend to favour more mesic habitats than the Mallee, but we were out there in the hopes of finding some of the more rarely collected species. In order to maximize our chances of striking it rich, so to speak, we started concentrating on hilltops in hopes of catching rare syrphids using the elevated areas as mate-finding arenas. Although we tried this throughout South Australia, we had limited success with hilltopping syrphids. In Gammon Ranges National park however, we did stumble across a King Brown snake that was busy hunting skinks on the same hilltop as us. Although it

King Brown snake hunting a skink

Wyperfeld

wasn't my first interaction with a potentially deadly snake in the wild, it was certainly the most memorable. We watched for at least half an hour as it probed into crevices in the rocks – each time it did so skinks would come flying out in all directions. The snake was clearly unfazed by the gawking humans and continued about its business, allowing us to watch its surprisingly active hunting behaviour. As an amateur herpetologist this was one of the highlights of the trip.

Finally, when we arrived in Wyperfeld National Park our luck – and presumably the season – began to change. The hilltop we visited was bustling with activity, and we collected a variety of interesting Diptera, including some syrphids. When it started to get extremely hot out and syrphids became scarce, Jeff taught us to spot and catch Pipunculidae, his other specialty. Sadly, after Wyperfeld it was time for Ais, Sebastian and I to start the long journey home and we left Jeff and his family to continue collecting. Our shiny white vehicle was by now completely caked with dust, mud, and crushed insects and appeared to be orange from a distance. Two days of driving, one disgusted carwash employee, and several flights later, we were back in Pearson International Airport. At the time of writing this article, the Skevingtons are still Down Under, and from what I understand, the syrphid collection has increased exponentially as the wet season has finally hit. I'm looking forward to seeing the specimens.

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Group shot

Insect Vision

Written by

Casey Peet-Pare

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More than meets the eye: examining colour from an insect perspective

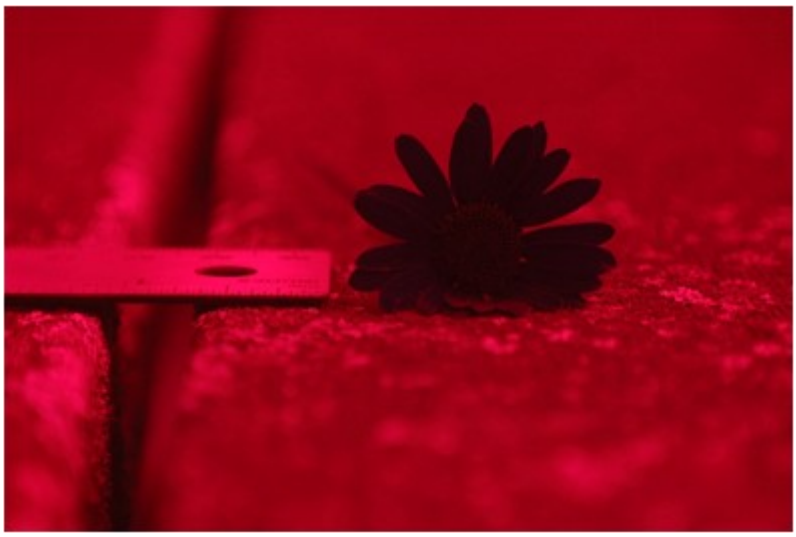
Insect colour is used for a wide range of purposes, from sexual selection to predator defense. People have long admired the brightly coloured patterns of butterflies, and marveled at the complex camouflage of stick and leaf insects. Colour is such an integral part of the natural world that it is often taken for granted, but in reality it is complex and highly subjective.

What colour is a dandelion? How about a lime? Or an orange? It seems obvious. In fact the name of the last fruit should give the answer away. But what if I were to tell you that you got all three answers wrong? That not only are dandelions not yellow, limes not green, and oranges not orange, but that colours don't exist at all? It might sound like something out of a science fiction novel, but colour is not a physical property of an object: it's a sensation created by the brain.

In order to understand how colour is created we have to start with the basics. As you probably know, we are surrounded by electromagnetic radiation. This radiation has different wavelengths, ranging from short wavelength gamma and x-rays to long wavelength radio waves. The portion of the electromagnetic spectrum with wavelengths from 400 to 700 nanometers (nm) is called visible light because it can be detected by human eyes. These wavelengths of light travel through our atmosphere and are absorbed and reflected by the objects and matter around us. Different objects have different surfaces and different compositions, and so they reflect and absorb different wavelengths of light. For example, a flower might absorb light from 400 to 630 nm and reflect light from 630 to 700 nm. Because this light falls within the visible spectrum we are able to detect it with our eyes. The wavelengths of light that are absorbed by the flower disappear, while the reflected wavelengths bounce off the flower and reach our eyes. Objects that reflect more light look brighter, but we are also able to detect which specific wavelengths of light are reflected.

Eyes can detect which wavelengths of light are reflected by an object using cells called photoreceptors. Photoreceptors contain pigments that absorb specific wavelengths of light. Because we have different photoreceptors, with different pigments, each photoreceptor type will react differently to a specific wavelength of visible light. For instance, one photoreceptor type will absorb short wavelengths best while another is most sensitive to long wavelengths. Our visual systems can therefore detect which wavelengths are reflected by comparing photoreceptor responses. This information is sent to the brain which assigns colours to the reflected wavelengths. So, for example, to a non-colour blind human the flower that reflects 630 to 700 nm light will appear red. However, it is important to remember that the flower is not itself red; but only appears red to us.

Because colour is so ubiquitous, and seems objective, it is generally taken for granted that how a human sees the world is also how an animal sees the world. However many insect predators, and insects themselves, have different photoreceptors with different wavelength sensitivities. This means that the colours they see can differ from the colours that we see. Humans are trichromatic, which means we have three different photoreceptor cells that allow us to see colour. Many other mammals have only two types, which means they see a smaller range of colours than us. So a dog may see a ball we consider to be red as a shade of yellow. Other animals have more than three photoreceptor types, for example birds are tetrachromatic (four) and a mantis shrimp has a whopping 16. This means that they can discriminate between a larger number of colours. Therefore shades of a colour that are indistin-



A daisy photographed in visible and UV light. The flower is UV absorbing and so appears uniformly dark in UV. Although the flower petals look white to humans they will not appear truly white to insects because they are not UV-reflective.

A dandelion photographed in visible and UV light. The center of the flower is UV absorbing while the edges are UV reflective. The centre of the flower will appear yellow to insects while the outer edge is UV-yellow.

guishable to us may be easy for a bird to tell apart. Although a difference in the *number* of photoreceptors is fascinating, what is truly amazing is what happens when organisms have *different* types of photoreceptors than humans. Although we think of visible light as only ranging from 400 to 700 nm, many animals can see wavelengths shorter than this: the ultraviolet (UV). Ultraviolet light has wavelengths from about 10 to 400 nm, but the atmosphere only allows light from 300 to 400 nm to reach the earth's surface.

A whole range of animals make use of this part of the spectrum and have photoreceptors sensitive to the UV. Many birds, and some rodents, reptiles, amphibians, and arachnids can see ultraviolet light. And every insect whose visual system has been examined so far has UV sensitivity. This ability to see UV opens up the possibility of a new array of colours that are impossible for us to imagine. Any object that reflects and absorbs visible wavelengths will also reflect or absorb ultraviolet wavelengths of light. This means that any colour we can see can

also be either UV absorbing or UV reflective. A flower which is blue in visible light can be UV reflective and blue or UV absorbing and blue. To an insect or bird an UV absorbing blue and an UV reflecting blue will be seen as two completely different colours. One will appear blue while the other will be UV-blue, a colour we are unable to visualize. Since any "visible" colour can be UV reflective this creates a whole new spectrum of colours beyond the scope of our imagination. Combinations of reflected wavelengths create new colours (for example a combination of "blue" and "red" reflected wavelengths appear "purple" to us), which means that an animal that can see UV can potentially see at least twice as many colours as us. Because a wide range of animals are able to see UV, UV colour has evolved in many organisms. Flowers use UV patterns to communicate with insect pollinators, and insects themselves use UV colour for a variety of purposes. Insects can match their UV reflectivity to their background for camouflage, use UV reflection to attract mates, or make use of UV colour for species recognition or as a warning signal. This has important implications for research involving insects. If you are researching objects an insect sees, such as flowers, it is important to remember that you are seeing the object very differently from the insect. And, if you are researching the insects themselves, you need to keep in mind that how an insect looks to us may be very different from how an insect appears to its predator, prey, or to other insects. So the next time you admire an insect's colours just remember that there is more than meets the eye.

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2014 AGM Report

The 2014 AGM at the University of Toronto was a great success! Special thanks to chair **Antonia Guidotti** and organizing committee Justin Gaudon, Chris Darling, Sandy Smith, Brenna Wells, and Brad Hubley. Thanks to Ian Scott for organizing sponsorship, Jeremy McNeil for organizing speakers, Trevor Burt for website and graphic design and Jeremy McNeil, Joel Gibson, Wayne Knee, Lauren des Marteaux, Sheila Colla and Margaret Pickles for awards and judging.

Photos courtesy of Antonia Guidotti

2014 AGM Travel Award Winners

Travel Award Recipient: Christian Nathan

I am a Master's student in the lab of Dr. Jayne Yack at Carleton University, in the process of concluding my study. My research is in the field of neuroethology, I study acoustic communication in caterpillars. My study focuses on determining the meaning of the complex vibratory signals produced by the Masked Birch caterpillar, *Drepana arcuata*, during territorial interactions with conspecifics.
At this year's annual general meeting I presented a talk entitled "What does one caterpillar say to another? The meaning of complex vibratory signal displays in the Masked Birch Caterpillar, *Drepana arcuata* (Lepidoptera, Drepanidae)." I was honoured to receive the ESO Travel Bursary which I put towards attending the annual general meeting this year. I received some excellent feedback and intriguing questions on my research which gave me ideas for interesting new projects with this species.

Presentation title: What does one caterpillar say to another? The meaning of complex vibratory signal displays in the Masked Birch Caterpillar, Drepana arcuata (Lepidoptera, Drepanidae) - C. Nathan & J.E. Yack
Abstract: The masked birch caterpillar employs a complex vibratory signal display when defending its leaf shelter territory from conspecifics. Three signals are produced: anal scrape, mandible drum and mandible scrape. Why do these caterpillars produce 3 different signals? Based on experimental trials of size asymmetry, we found that features of the mandible drum (duration and amplitude) and mandible scrape (amplitude) were positively correlated with individual size. Since larger individuals are more successful in defending shelters, these signals may be honest indicators of size, supporting the 'content based' hypothesis for multiple signals. Anal scrape characteristics did not vary with size, and we propose that these are alerting components, since they always precede the other two signal types. Signal characteristics varied little with distance and therefore the 'efficacy' based hypothesis for multicomponent displays was not supported. Just how these caterpillars detect such complex vibration patterns will be discussed.

Travel Award Recipient: Luis Cáceres

Presentation title: Insect repellent and attractant activities of Brassicaceae apocarotenoid volatiles α- β- and dihydro- β- ionon—L.A. Cácares, B.D. McGarvey, K.K.-C.. Yeung, A. Hannoufa, M.W. Sumarah, X. Benitez, and I.M. Scott
Abstract: In plants, the apocarotenoids alpha and beta ionone can be synthesized by the oxidative cleavage of carotenoid substrates. α-ionone, β-ionone and dihydro- β-ionone are closely related chemical compounds sharing similar chemical structures. In this study, a systematic set of bioassays using crucifer flea beetle (CFB), *Phyllotreta cruciferae* (Goeze), two spotted spider mite (TSSM) *Tetranychus urticae* (Koch) and silverleaf whiteflies (SWF) *Bemisia tabaci* (Gennadius) were used to assess the repellant/attractant effect of these compounds and evaluate the potential use as a pest management tool. Dynamic Headspace (DHS) collection of volatiles coupled with Gas Chromatography Mass Spectrometry (GC-MS) was used to determine the concentration of β-ionone present in transgenic *Arabidopsis* plants over-expressing *AtCCD1* gene. Similar concentrations of α-ionone, and dihydro- β-ionone were used to investigate the biological activity associated with each herbivore. Results demonstrated that at the concentrations expressed by the *Arabidopsis* plants, β-ionone acted as a repellant, dihydro- β-ionone had attractant properties, and α-ionone did not show any significant activity. The findings are important in the future selection of which cartenoid pathway genes might best be over-expressed or under-expressed to produce the desired blend of apocartenoid volatiles to control insect pest behaviour.

2014 AGM Presentation Award Winners

Best Oral Presentation Winner: Amanda Lindeman

I am a Ph.D. student in the Yack lab at Carleton Univeristy, studying all aspects of acoustic communication in a highly destructive group of bark beetles – *Dendroctonus*. My thesis research ranges from characterizing the acoustic properties of the signals, how they are produced, and what information they convey, to how these signals are "heard" (neuroanatomy/physiology of potential ears) and how individuals respond to them.

Presentation title: The mechanics and function of complex acoustic mating signals in bark beetles (Curculionidae, Scolytinae) - A.A. Lindeman & J.E.Yack

Abstract: Bark beetles (Scolytinae), a group of ecologically and economically important insects, produce complex acoustic signals during interactions with conspecifics. We examined how the two distinct signals of the red turpentine beetle (*Dendroctonus valens*) are produced and how they function in a mating context. We found that the more complex of the two signals contain interruptions produced by controlled, coordinated movements of the abdomen during stridulation. These interrupted chirps are also longer and often produced at a faster rate than simple chirps. The motor skill and vigor required to produce interrupted chirps may make them an honest display of signaler quality: we found that various signal characteristics are related to signaler size. Furthermore, signals likely function in sexual selection as females will select males as mates based on an assessment of male signals and presence of interrupted chirps. We suggest that interrupted chirps serve as a proverbial 'password' for male entrance to a female's gallery.

Best Poster Presentation Winner: Lauren Des Matreaux

I am currently a PhD student in the hot-spot of insect low-temperature physiology, *i.e.* the Sinclair Lab at the University Of Western Ontario. The primary focus of my research is to understand the mechanisms by which insects lose ion and water balance in the cold, and how some insects maintain homeostasis to lower temperatures than others. My approach is to use natural variation in cold tolerance to get at these mechanisms from the molecular to whole-organism level.

Poster Title: Water before ions? Early chill coma ion imbalance challenges the current mechanistic model of chill coma - L. Des Marteaux

Abstract: At their critical thermal minimum, insects enter reversible paralysis known as chill coma during which water and ion balance is lost. It is currently thought that during coma, migration of Na^+ from the hemolymph to the gut is followed by water, causing hemolymph [K^+] to increase. Muscle depolarization resulting from increased hemolymph [K^+] is suggested to explain chill coma paralysis. Chill coma entry is a rapid process, yet ion and water balance in the early stages of chill coma is not well-characterized. We measured water and ion balance in the hemolymph, gut, and muscle of fall and spring field crickets during early chill coma to 1) verify whether hemolymph K^+ disruption explains paralysis, and 2) to generate hypotheses about mechanisms underlying loss of ion and water balance.
Chill coma paralysis preceded the loss of hemolymph K^+. Hemolymph Na^+ actually increased over the first hour of chill coma before returning to control levels by six hours. Hemolymph water migrated to the gut in fall field crickets but not in spring field crickets, the latter of which maintained lower hemolymph Na^+ in general. We hypothesize that temperature-attributed changes in gut epithelial permeability to water, rather than movement of Na^+, explains loss of water balance and subsequent ion balance during chill coma.

2014 Fellow of the ESO

John E. Steele, a proud Newfoundlander, received his B.Sc at Dalhousie University (1954) following which he completed his M. Sc. (1956) and Ph. D. (1959) at The University of Western Ontario and University of Saskatchewan, respectively. Upon completion of his doctorate John was appointed as a Research Officer with Agriculture Canada in London, Ontario. It was there that he conducted the pioneering research that was the first to demonstrate hormonal control of metabolism in insects. In 1964 he moved to the Department of Zoology at the University of Western Ontario as an Assistant Professor. He remained in the Department throughout his career, being promoted to Associate Professor in 1967 and Full Professor in 1975. John officially retired in 1997 but is still active as an Emeritus Professor within the Department.

Professor Steele developed a strong research programme in insect physiology, with an emphasis on insect endocrinology. Among other advances his laboratory was responsible for showing that octopamine was a major aminergic agent in the insect nervous system. John was continuously funded by NSERC from 1966 until 2004, some 6 years after his official retirement, during which time he published 51 papers and 8 book chapters. He was also an invited speaker at numerous entomological meetings around the world. . Just prior to his retirement John was awarded a grant from the German Academic Exchange Service for study in Germany.

John's programme clearly offered an excellent venue for student training, as John mentored 34 undergraduates for their final year theses, as well as 20 M.Sc. and 7 Ph.D students. He also taught 12 different undergraduate and graduate courses during his career.

Professor Steele was very active in service to the community. At Western he was both Acting Chair of Zoology and Acting Dean of Graduate studies, as well as being on countless committees at the departmental, faculty and University levels. He participated on committees for the Ontario Council of Graduate Studies and NSERC, served as a consultant to the World Bank, in addition to serving as an external referee for international promotion and tenure committees, and international scientific journals.

John, a member of the Entomological Society of Ontario since 1964, has had a most distinguished career and the Council is happy to submit his candidacy as a 2014 Fellow of the ESO.

Written by

Jeremy McNeil

ESO Past President

How to get a non-academic insect conservation job in Ontario (based on my sample size of me)

I love my job. But until I got it last year, I didn't know jobs like mine exist: non-academic jobs where you can nerd it up about insects and make a difference for conservation. My goal is to describe how you, Ontario entomology grad students, can build your skills to get contracts in insect conservation management in Ontario. My advice is based on my own experience. I received my PhD from the University of Ottawa in 2013, and now work as a Species at Risk Biologist with the Ontario Ministry of Natural Resources and Forestry, in Peterborough, Ontario. I coordinate recovery strategies for all of Ontario's species at risk, and am the informal expert on insects at risk.

Take control of your career

Do not entrust your career training to your supervisor. Your supervisor is an expert in academic matters, but likely not so much for non-academic jobs. Furthermore, faculty benefit from their grad students publishing research, and it is logical to expect them to push you to publish, publish, publish even when it may not be the best strategy for your career development. Certainly, you should publish your research. It is a "thank you" to your supervisor, it will help your career, and it contributes to scientific knowledge. But there are diminishing personal returns to publication output outside academia – many employers don't care how many articles you publish or what journals they are in. Help your supervisor out, and ensure they help you out, but don't get sucked into the "red zone" of doing work that helps their career more than your own (see figure). Many supervisors are supportive of you pursuing work that will help achieve your career goals, but unfortunately there are also many supervisors who see grad students only as cheap labour whose career goals are irrelevant. Your supervisory committee can help if your supervisor is an academic bully.

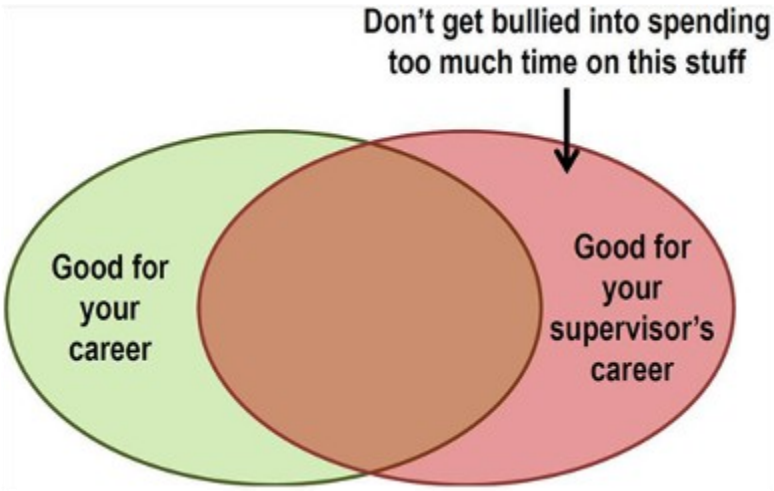
Get useful skills

Writing

Writing reports is part of many non-academic jobs. Your experience as lead author of your research article(s) will help. But reports aren't the same as primary research articles – reports are more like layperson-friendly reviews that describe risks in terms of severity and certainty, and provide recommended actions. Get experience synthesizing diverse information, and experience writing about technical topics for non-academic audiences. This can include newsletters (you're reading one right now that wants submissions), blogs (e.g., http://escsecblog.com/), newspaper articles, etc.

Reviewing and editing

Can you critically evaluate technical material? Experience reviewing manuscripts for journals shows employers you have this skill. Ask your supervisor to work with you to review the next manuscript they are sent by a journal. Constructive reviewing is an acquired skill, and your supervisor should help you acquire it. Journals may be happy to find new, eager reviewers (Donaldson et al 2010).



Some people are good writers … only after a copy editor has fixed their sloppiness. When I hire contractors to write conservation reports, I do not want to spend time editing their work afterward. Experience editing technical writing (e.g., editing newsletters) indicates to employers that your writing won't require someone else's polishing.

Project management

The work you do managing your research projects, especially those that involve diverse collaborators, is excellent project management experience. Score extra points with employers by demonstrating you can also manage projects outside academia. This can be anything from organizing neighbourhood park cleanup days to your department's seminar series. Show you can organize things effectively.

Be found

Make a website

People will google you. If you do not have a personal website, you are effectively putting up a "closed" sign to potential employers. This is not hypothetical – I googled many grad students I met at last year's ESO conference. If you have a website, chances are I bookmarked it so I can find you if there are contract opportunities matching your expertise. If you don't have a website, you're kinda dead to me, professionally. Having a personal website not only shows your interests and experience to potential employers, but also suggests you have ambition and technical skills; the medium of having a website itself conveys a message. There are lots of free ways you can make a simple website. Avoid hosting your site on your university's domain – you'd have to move your site after you graduate.

Join your local natural history club

Natural history skills are sought after by natural resource employers. The best place to learn these skills is off campus, with your local natural history club. Be aware – you will likely be among the youngest members of the club. But that's not a bad thing – senior naturalists have incredible in-the-field knowledge they're eager to share with young'ns. Sometimes they have job leads too. Attend field trips and workshops on whatever topics you like (identifying plants and classifying habitats are two employable skills for natural resource biologists), and record your attendance in your own training tracker so you can provide evidence when you're asked to demonstrate knowledge of natural resources and natural history. Natural history clubs often have opportunities for you to participate in or lead a variety of projects relevant to natural resources (e.g., removing invasive plants from habitats; coordinating biomonitoring surveys; etc.). I bet you'll find participating in local naturalist clubs not only benefits your career, but is also a lot of fun. A list of Ontario's naturalist clubs is available from Ontario Nature (http://www.ontarionature.org/discover/member_groups/member_groups_region.php).

The job market for entomologists in Ontario is tough. But there are some jobs that allow you to have a direct impact on Ontario's insects. The experiences that helped me get my job came from "side projects" I did outside my thesis work. It's tricky to find the right balance between doing thesis research and doing other work, but striving to find that balance (and not feeling guilty about working on non-thesis projects) is worth your while. You have to look out for yourself.

Jay Fitzsimmons, Ph.D.

Jay is a Species at Risk Biologist with the Ontario Ministry of Natural Resources

References

Donaldson, M.R., Hasler, C.T., Hanson, K.C., Clark, T.D., Hinch, S.G. and S.J. Cooke. 2010. Injecting youth into peer-review to ensure its sustainability: a case study of ecology journals. Ideas in Ecology and Evolution 3: 1-7. http://library.queensu.ca/ojs/index.php/IEE/article/view/2346

Metamorphosis: Michelle Locke's transition from Entomology Student to Professional

What do you do with your life once you've gotten a degree in entomology? For me, after completing my M.Sc. in Diptera taxonomy and systematics at Carleton University and Canadian National Collection of Insects, Arachnids and Nematodes (CNC) and working various contracts at the CNC, I wanted to keep working in collections. Collections are fascinating. You can open a drawer and find many undescribed species, collections hold a record of the faunal diversity from years past, they help us identify invasive species coming into our country and they can be displayed to help educate the public on the diversity and role of insects in our environment. This passion and my experience at the CNC led me to my current job as a Scientific Assistant at the American Museum of Natural History in New York City. I work for a Curator who studies scorpions and I'm in charge of the museum's collection of non-spider arachnids (scorpions, mites, amblypigids, solifuges, etc.) and myriapods (millipedes and centipedes). These critters are a bit different from the flies I spent the past five years working on, but the same collections principles apply to this group of invertebrates. My job consists of curating and maintaining the collection, assisting with research (mostly on scorpions), fieldwork (I just went scorpion hunting in SE Asia), working with volunteers and all other things associated with collections management. I really enjoy working with specimens and being a part of an institution that believes in the importance of knowing the diversity of our planet. There are all kinds of great entomology/invertebrate jobs out there and I am glad to have found one in this great community!

Michelle Locke, M.Sc.

Ad posting for graduate students in entomology

Graduate students with entomological background/ interests:
Funding is available for graduate studies in the Rundle lab in the Dept. of Biology at the University of Ottawa.

uOttawa

Work in my lab crosses the disciplines of evolutionary ecology/genetics and animal behaviour, with a focus on sexual selection/sexual conflict and life history evolution. We use various species of insects as empirical model systems (i.e. antler flies, Australian and N. American Drosophila) and conduct work in both the lab and the field (Algonquin Park).

Projects
A comparative study of male and female genitalia evolution across the 7-8 species of Piophilid found in Algonquin Park, with the goal of testing the role of sexual conflict in the divergence of these traits. Also of interest using the same species: quantifying female ejaculate feeding and its consequences for female fitness (fecundity and longevity) and male reproductive success.

Other potential projects include, but are not limited to, evolutionary tests of how mate preferences diverge and their role in the origin of species, the contribution of learning to premating isolation during incipient speciation, and quantifying the link between mating and reproductive success in nature (using antler flies; *Protopiophila litigata*).

The Department of Biology @ uOttawa provides a dynamic, research intensive atmosphere with over 40 faculty and a large graduate program. The city of Ottawa is a vibrant, multi-cultural capital that is both safe and very liveable, with easy access to arts and culture and the outdoors.

For further information, please contact Howard Rundle at hrundle@uottawa.ca

Bug Eye Photo Contest 2014 Winners!

Best Overall: Angela Skevington

Announcements

People's Choice Award
Reni Barlow

Best Ontario Insect
Jennifer Busch

Announcements

1st Place under 13
Alexander Skevington

2nd Place under 13
Colin Walton

3rd Place under 13
Marika Kors

Submissions

Why not submit something to the Newsletter?

If you have a story, project, photo, profile, job posting, or upcoming event that you would like ESO Membership to know about, please contact the **ESO NL Editors** via email at:

amanda.lindeman@gmail.com

trevburt@gmail.com

Subject: *ESO Newsletter*

We would love to hear from you. If there is something you would like to see in the ESO NL, or some activity or event you feel the ESO should be a part of, please let us know.

Topics of Interest

ESO Buffoonery

Field Seasons

Conferences/Events

Biology Note

Funny or Interesting Anecdote

Book/Article/Conference Review

Fun Fact

Scientific Illustration

Photography

Special Projects

Thesis Summaries

ESO Buffoonery . . . again

Complaints about Funding

. . . anything you find interesting

Guidelines

This is *not* a Scientific Journal like **JESO**. **This is a general interest Newsletter/Magazine, so you should try to have some fun with it. We encourage photos and figures, and your profile information with a photo of yourself.**

We *only* recommend:

500-2000 words

A Title

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As of 2011, page charges in JESO have been waived!

Electronic submissions and queries should be directed to:

Chris MacQuerrie

JESOeditor@gmail.com

All persons interested in insects are invited to attend the meetings of the **Ottawa Entomology Club**

Next meeting: Thursday, February 19, 2015 at 7:30 PM

The Book of Beetles: Patrice Bouchard

CNC, Ottawa

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Most photos were reprinted from those submitted to the 2013/2014 ESO BugEye Photo Competition! Submit your bug photo to the 2015 competition and you might find your photo in a future edition of the Newsletter!