

June 2020 Vol. 40 (1)

Boreus



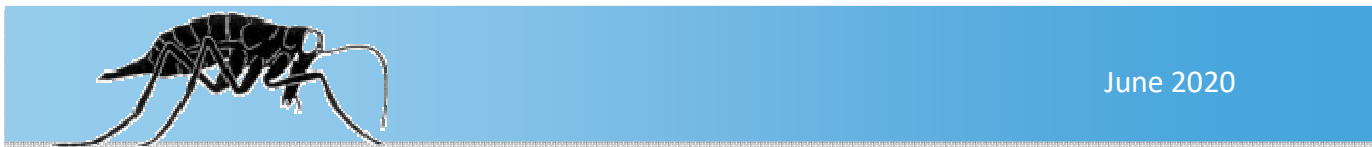
Newsletter of the Entomological Society of British Columbia





Table of Contents

- Table of Contents 3
- The Executive 4
- Publications of ESBC 5
- Journal of the Entomological Society of British Columbia 5
- Boreus 5
- ESBC Website 6
- Facebook 6
- Twitter 6
- Membership 7
- Presidents Report 8
- Grad Students Graduating 9
- Entomology in the News..... 10
- Bee a Citizen Science Project.....13
- North Okanagan Naturalist Club 15
- Entomology Educational Opportunities in Canada..... 16
- Student Scholarships and Awards 16
- DNA Barcoding Website.....18
- Entomological Society of Canada18
- Some International Entomological Societies 18
- BC Butterfly Atlas 19
- Kelowna Museum Request 20
- Executive Contact Information..... 20



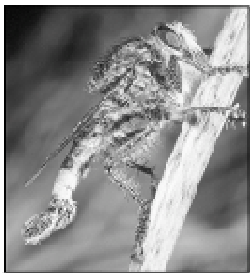
The Executive

President	Tammy McMullan Simon Fraser University, Burnaby
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Second Vice President	Chandra Moffat Agriculture Canada, Summerland
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Editor (Boreus)	Gabriella Zilahi-Balogh Canadian Food Inspection Agency, Kelowna Elton Ko Simon Fraser University, Burnaby, BC
Directors	Grant McMillan (1 st) ICMS, Abbotsford Dan Peach (2 nd) University of BC, Vancouver, BC
Graduate Student Representative	Asim Renyard Simon Fraser University, Burnaby, BC
Honorary Auditor	
Regional Director of National Society	Brian Van Hezewijk Canadian Forest Service, Victoria, BC
Web Page Editor	Brian Muselle University of British Columbia – Okanagan, Kelowna, BC

Publications of ESBC

Journal of the Entomological Society of British Columbia

Journal of the Entomological Society of British Columbia



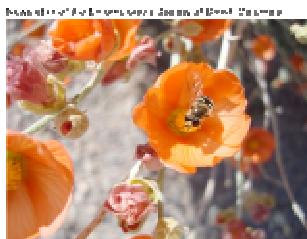
The Journal of the Entomological Society of BC is a peer reviewed, open-access journal. Manuscripts dealing with all facets of the study of arthropods will be considered for publication. Submissions may be from regions beyond British Columbia and the surrounding jurisdictions provided that content is applicable or of interest to a regional audience. Authors are invited to submit ideas for review and forum articles as well. Line drawings or photographs as candidates for the cover are also accepted.

For more information please contact Dr. Kathy Bleiker, Editor-in-Chief at journal@entsocbc.ca.

The deadline for submissions to be included in the 2020 issue is 1 September, 2020. Please submit articles at the JESBC website: <http://journal.entsocbc.ca/>.

Boreus

Boreus



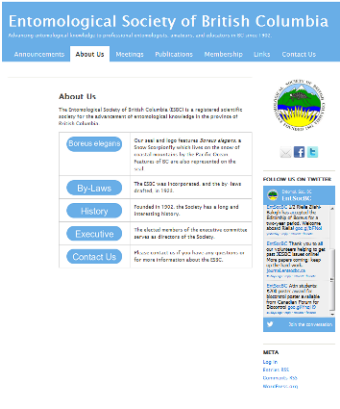
Boreus, the Newsletter of the Society is published in June and December. It contains entomological news, comments, reports, reviews and notices of meetings and other events. While emphasizing the Society's affairs, *Boreus* provides members with a forum for their views and news of British Columbia entomology, as well as informal articles, notes regarding research projects, and anything else that may be of interest to entomologists.

Please submit any entomological photograph, article, event or informational tidbit to the Editor!

Please send correspondence concerning *Boreus* to Dr. Gabriella (Riella) Zilahi-Balogh at boreus@entsocbc.ca.

The deadline for submissions to be included in the June issue is June 1, and the December issue is December 1. Submission dates are flexible. Submit before the end of the month.

ESBC Website



Entomological Society of British Columbia
Sharing entomological knowledge to understand our world, protect our systems, and advance our science.

Announcements | **About Us** | Meetings | Publications | Membership | Links | Contact Us

About Us
The Entomological Society of British Columbia (ESBC) is a registered scientific society for the advancement of entomological knowledge in the province of British Columbia.

Our new and vice President **Dr. Peter A. B. Bond** (University of British Columbia) and **Dr. Jennifer A. Bond** (University of British Columbia) have been elected to the office of President and Vice President of the Society for 2020-2021.

By-Laws
The ESBC was incorporated, and the by-laws adopted in 1952.

History
Founded in 1952, the Society has a long and interesting history.

Executive
The elected members of the executive committee are as follows:

Contact Us
If you have any questions or for more information about the ESBC, please contact us.

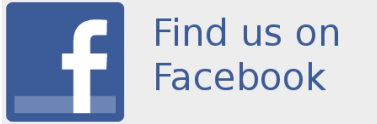
FOR A LOW COST TWITTER
Join us on Twitter: <https://twitter.com/EntSocBC>

MEET
Log In | Register | My Profile | My Messages | My Friends | My Lists | My Settings | My Account | My Notifications | My Activity | My Calendar | My Groups | My Interests | My Recommendations | My Search | My Account Settings | My Account Information | My Account Security | My Account Privacy | My Account Support | My Account Help | My Account FAQ | My Account Terms of Service | My Account Privacy Policy | My Account Cookies Policy | My Account Accessibility | My Account Language | My Account Currency | My Account Timezone | My Account Location | My Account IP Address | My Account User Agent | My Account Referrer | My Account Device | My Account OS | My Account Browser | My Account Screen Size | My Account Resolution | My Account Color Depth | My Account Connection Speed | My Account Connection Type | My Account Connection Location | My Account Connection Time | My Account Connection Status | My Account Connection Error | My Account Connection Message | My Account Connection Details | My Account Connection Log | My Account Connection History | My Account Connection Settings | My Account Connection Options | My Account Connection Preferences | My Account Connection Defaults | My Account Connection Defaults List | My Account Connection Defaults List Item | My Account Connection Defaults List Item Text | My Account Connection Defaults List Item Image | My Account Connection Defaults List Item Video | My Account Connection Defaults List Item Audio | My Account Connection Defaults List Item Link | My Account Connection Defaults List Item Button | My Account Connection Defaults List Item Form | My Account Connection Defaults List Item Table | My Account Connection Defaults List Item Table Row | My Account Connection Defaults List Item Table Column | My Account Connection Defaults List Item Table Cell | My Account Connection Defaults List Item Table Header | My Account Connection Defaults List Item Table Footer | My Account Connection Defaults List Item Table Row Header | My Account Connection Defaults List Item Table Row Footer | My Account Connection Defaults List Item Table Column Header | My Account Connection Defaults List Item Table Column Footer | My Account Connection Defaults List Item Table Cell Header | My Account Connection Defaults List Item Table Cell Footer | My Account Connection Defaults List Item Table Row Header Cell | My Account Connection Defaults List Item Table Row Footer Cell | My Account Connection Defaults List Item Table Column Header Cell | My Account Connection Defaults List Item Table Column Footer Cell | My Account Connection Defaults List Item Table Cell Header Cell | My Account Connection Defaults List Item Table Cell Footer Cell

Main Webpage: <http://entsocbc.ca>

Update your bookmarks, and save our new URL to your browser favorites. Our website provides all the information you need, in one place: ESBC announcements, meeting info, publications, contact information, and other useful links.


Facebook



Join us on Facebook:
<https://www.facebook.com/groups/13552445022/>

Keep in touch with students, colleagues, and friends! Stay up to date with the latest entomological happenings in BC, upcoming conferences, education and employment opportunities.

Twitter



Follow us on Twitter: <https://twitter.com/EntSocBC>

Join the conversation and connect with thousands of other entomologists and insect enthusiasts from all over the world. Stay up to date with insect news, announcements, conferences and job opportunities.



Membership

Membership of the Entomological Society of B.C. is available to anyone interested in entomology. Annual dues are:

- Regular Member (Canadian Resident):
 - **BEFORE MARCH 30** = \$20.00 (CDN)
 - **AFTER MARCH 30** = \$30.00 (CDN)
- Regular Member (International):
 - **BEFORE MARCH 30** = \$30.00 (CDN)
 - **AFTER MARCH 30** = \$40.00 (CDN)
- Student Member:
 - **BEFORE MARCH 30** = \$10.00 (CDN)
 - **AFTER MARCH 30** = \$15.00 (CDN)
- Honorary Members renew at no charge.

Join or renew your membership online via the Society's website <http://entsocbc.ca/membership/>.

Inquiries concerning membership and back issues should be sent to the Treasurer, Dr. Ward Strong, E-mail: treasurer@entsocbc.ca

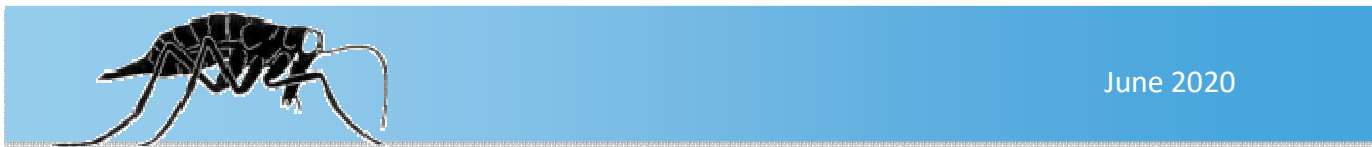
Cover Sketch: *Boreus elegans* (Mecoptera: Boreidae), one of the more conspicuous snow scorpionflies in B.C. Larvae and flightless adults live in, and feed on, moss and clubmoss. Adults appear in the fall and are active on snow on warm winter days. Cover sketch credit Ward Strong and Robert A. Cannings.

Cover Photographs:

Greater Night-stalking Tiger Beetle (<i>Omus dejeani</i>), taken on Denman Island, B.C. Photograph by Jennifer Heron.	Helliwell Provincial Park, May 2012. Photograph by Jennifer Heron
Photographs taken in the Peace Region, BC. Photographs by Jennifer Heron	

Entomological Society of British Columbia

ANNUAL GENERAL MEETING and SYMPOSIUM 2020 TBA



Presidents Report

Position: President, Tammy McMullan

Period under report: [October 5 2019 – April 23, 2020]

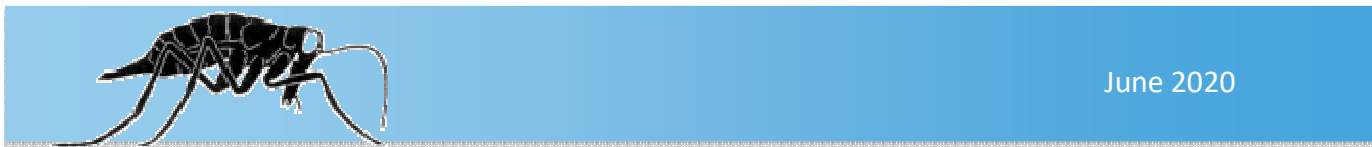
Summary of activities during report period:

As I think back over the months since I became the President of the ESBC, my thoughts are dominated by how Covid-19 has changed how we work, teach, and interact with the community. Covid-19 hasn't changed my duties as President too much. Most of the work I have done as President, involved completing tasks associated with up our successful AGM at the Pacific Forestry Centre in October (emailing out the judges' comments to student presenters, ensuring that student award recipients sent thank you letters to the Donors of Named Prizes). In October, Dr. Gerhard Gries, Asim Renyard (TA) and Jaimie Chalissery (TA), graciously allowed me to give a short presentation to the students enrolled in BISC317 Entomology at SFU. I asked for this time to speak to the students to introduce the ESBC to them and show them how many distinguished entomologists started their careers as students in BISC317. Hopefully we will see many of these students at an AGM in the future. In the fall, most of my time was spent in Science Outreach activities (responding to people who emailed the ESBC). In October, the Entomological Society of Canada requested that all Regional Societies to submit an article for their "Coolest/Cruellest Insect" blog about the insect on the societies' logo. Rather than reinventing the wheel, I contacted Rob Cannings and asked for his consent use his article on *Boreus elegans* for the ESC blog (<https://esc-sec.ca/2020/02/25/boreus-elegans/>). Rob Cannings revised the article and we sent this to the ESC, along with Bob Lalonde's stunning photograph of *Boreus*, which was in the 2019 ESBC Calendar. Bob Lalonde and Rob Cannings worked together to key out the insects in the photograph as *Boreus californicus*. Thank you to both of them for taking on this task. On February 10, the ESBC Executive held a Special Meeting to discuss partnering with the ISBCA for their upcoming meeting in Victoria in 2022. Based upon the concerns expressed during this meeting, I sent a letter to the Organizing Committee of the ISBCA stating our concerns with the draft agreement with Laurel Point Inn. On March 4, 2020, I participated in a teleconference for a joint meeting of the Entomological Societies of Canada. On April 23, I participated in a Zoom conference to discuss butterflies and moths with the students from Westwold Elementary.

Thank you to all the members of the Executive who have stepped up to respond to emails received by the ESBC. I would like to recognize all the contributions of Ward Strong to the ESBC. He currently is the longest serving Executive Member of the society and as Treasurer has ensured that the ESBC has a sound financial footing. Ward has informed the Executive that he is stepping down from his position as Treasurer in December 2020. He will be greatly missed. I would like to thank Lisa Poirier (Past President) who put together the Job Description for the President – it has made my job so much easier.

Recommendations or action items for the attention of the ESBC Executive: None

Respectfully submitted Tammy McMullan, President, 23 April 2020



Graduate Students Graduating

Defended or planning to defend? Why not present your work in the Boreus? This is an excellent opportunity for graduate students to share their research. Send submissions to boreus@esbc.ca.

Danielle Hoefele. Title - Studying the Foraging and Communication Ecology of European Fire Ants

Supervisors - Dr. Gerhard Gries, Simon Fraser University
Dr. Jenny Cory, Simon Fraser University
Dr. Rob Higgins, Agriculture and Agri-food Canada
Dr. Ken Naumann, University of Washington

Abstract - The European fire ant (EFA), *Myrmica rubra* L., is an invasive pest in Greater Vancouver, British Columbia, Canada. EFAs are a nuisance to humans, swarming and stinging aggressively. They also cause ecological damage by altering invertebrate communities. The overarching goal of this thesis was to create a control method for EFAs. My specific research objectives were to: (1) develop an effective and affordable food bait; (2) determine trail following of EFAs in response to synthetic trail pheromone; and (3) determine trail following of ants in response to synthetic trail pheromone blends of multiple ant species. Food baits comprising diverse macronutrients such as carbohydrates (apples), proteins and lipids (dead insects) elicited the strongest foraging responses by EFAs. Re-hydrated freeze-dried baits proved as appealing as fresh baits and superior to rehydrated heat-dried baits. Isomerically pure and impure synthetic trail pheromone (3-ethyl-2,5-dimethylpyrazine) prompted similar recruitment responses of ants. The presence of pheromone, irrespective of dose tested, enhanced the recruitment of ants to food baits, with the dose of 200 ant equivalents eliciting the strongest recruitment responses. Trail pheromone applied in a line leading toward the food bait, but not in a circle surrounding it, was effective in recruiting ants, suggesting that 3-ethyl-2,5-dimethylpyrazine has a guiding but not an attractive function to EFAs. The presence of con- and hetero-specific pheromones had additive or indifferent effects on trail-following responses of garden ants, *Lasius niger*, and carpenter ants, *Camponotus modoc*, respectively. These data provide key information for the development of a highly functional insecticidal food bait for EFAs and other nuisance ant species.

Official completion date – April 16, 2020

Entomology in the News

First report on the emergency dance of *Apis cerana japonica*, which induces odorous plant material collection in response to *Vespa mandarinia japonica* scouting

Avumi Fujiwara, Masami Sasaki and Izumi Washitani

SOURCE: Entomological Science. 2018. 21. 93-96

Abstract

Previously, we observed several instances in which *Apis cerana japonica* performed dancing around the hive entrance and smeared plant materials there immediately after scouting of *Vespa mandarinia japonica*. In this study, we conducted a series of attack simulation experiments with three hornet species to investigate whether the hive entrance dance is a specific response to *V. m. japonica* scouting. We also tracked dancing bees and dance-follower bees to observe whether they perform hive entrance smearing. Only *V. m. japonica* scouting induced dancing, and we confirmed that dancing and dance-follower bees performed smearing behavior at the hive entrance. These results suggest that the hive entrance dance informs nestmates of a specific emergency and of the urgent need to collect odorous plant materials as a counter-attack strategy.



Japanese *Apis cerana* worker bee brings a petal to the hive. SOURCE: The Scientist

Could Satellites Help Head Off a Locust Invasion?

TOPICS: Earth Observatory Entomology NASA

By NASA EARTH OBSERVATORY APRIL 1, 2020

SOURCE: <https://earthobservatory.nasa.gov/images/146495/could-satellites-help-head-off-a-locust-invasion>



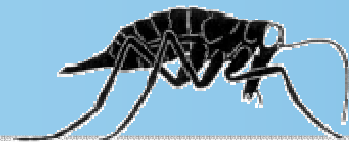
Swarm of locusts. A small swarm of locusts (40 million) can consume as much food as 35,000 people.

A single desert locust (*Schistocerca gregaria*) can consume its body weight in vegetation in one day. That may not sound like much for one 2.5-gram locust, but when 40 million of them gather—considered a small swarm—they can devour as much food as 35,000 people. In one day, a small swarm can jeopardize a farmer’s livelihood.

Since December 2019, croplands in Kenya have been inundated by the voracious insects. By January 2020, at least 70,000 hectares (173,000 acres) of land were infested—Kenya’s worst locust event in 70 years. In February, the swarms spread to ten countries in eastern Africa, threatening food supplies for millions of people. Ethiopia and Somalia have seen their worst locust infestations in 25 years. The United Nations (UN) has warned that the upcoming rainy season may make things worse.

NASA-funded scientists are partnering with the UN and relief organizations to better understand where locusts are likely to swarm. Using remote sensing observations of soil moisture and vegetation, researchers are tracking how environmental conditions influence locust life cycles and hoping to stop outbreaks before they spread.

“The approach that helps prevent large-scale infestations is to catch the locusts very early in their life stages and get rid of their nesting grounds,” said Lee Ellenburg, the food security and agriculture lead for SERVIR at NASA’s Marshall Space Flight Center. The joint program between NASA and the U.S. Agency for International Development (USAID) uses satellite data to improve environmental decision-making in developing nations. The team also partnered with staff at the Desert Locust Information System of the UN Food and Agriculture Organization (FAO) to learn more about locust behavior.



Desert locusts have three main life stages: egg, hopper, and adult. Once they are mature adults, locusts are difficult to find on the ground and eradicate because they can fly 50 to 150 kilometers (30 to 90 miles) per day, especially if winds are strong. However, eggs and hoppers (when they're still developing wings) have limited mobility and are easier to target. Soil moisture is important because females almost always lay their eggs in wet, warm, sandy soil. In general, they do not lay their eggs unless the soil is moist down to 5-10 centimeters (2-4 inches) below the surface. After eggs hatch, the abundance of nearby vegetation becomes the important parameter because it provides sustenance for maturing locusts and guides migration patterns.

The preliminary estimates—developed by scientists at the University Corporation for Atmospheric Research and the University of Colorado—use NASA's Cyclone Global Navigation Satellite System (CYGNSS) micro-satellites and are integrated with NASA's model-based Land Information System.

"The data we have so far show a strong correlation between the location of sandy, moist soils and locust activity," said Ashutosh Limaye, NASA's chief scientist for SERVIR. "Wherever there are moist, sandy locations, there are locusts banding or breeding." Desert locusts rapidly reproduce, so SERVIR researchers are working with FAO to pinpoint potential breeding locations and suggest targeted areas for pesticide sprays.

"Our goal is to learn from FAO how to find out where the breeding grounds are," Ellenburg added. "If the prevailing conditions indicate that locusts will hatch and be taking off, the goal is to go early and destroy their nesting grounds."

"Once locusts lay the eggs and hatch, they start looking for vegetation to feed on," said Catherine Nakalembe, a food security researcher with SERVIR and NASA Harvest. "They start migrating, looking for more to eat, and then keep multiplying."

Nakalembe says vegetation across the region is much greener than average years—in fact, the greenest vegetation observed by satellite since 2000 for the December to March time period. Between October and December 2019, the Horn of Africa received up to four times more rainfall than average, making it one of the wettest "short rain seasons" in four decades. The extra rain made for robust plant growth and bountiful conditions for locusts.

With the upcoming "long rain season" (March through May) in east Africa, conditions could be ripe for more infestations, Nakalembe notes. The NASA team is refining several satellite datasets to assess the damage already caused and to create forecasts of where and how much longer locust outbreaks might occur.

"We work in close coordination with national ministries through our regional partners, and we hope the outcomes from our ongoing work can ultimately support those who are in the front line of managing the current outbreak," said Nakalembe.

NASA Earth Observatory images by Lauren Dauphin, using MODIS data from NASA EOSDIS/LANCE and GIBS/Worldview and soil moisture data from Cyclone Global Navigation Satellite System (CYGNSS) micro-satellites integrated with NASA's model-based Land Information System. Story by Kasha Patel.



The NASA SERVIR and Harvest programs are working closely with Global and Regional FAO offices, USAID, World Food Program (WFP), the SERVIR Hub in East and Southern Africa at the Regional Center of Resources for Mapping Development (RCMRD) in Nairobi, Kenya, the SERVIR Hub in West Africa at the AGRHYMET based in Niamey, Niger, the Greater Horn of Africa IGAD Climate Prediction and Applications Center, NASA Short-term Prediction Research and Transition Center (SpORT) NASA Earth Science Disasters Program, and several satellite missions to provide information and direction on where resources should be directed to mitigate locust outbreaks.

A free and open Entomology, Ecology, and Evolution online seminar series for early career researchers

Pauline Deschodt¹ and Paul Abram²

¹Simon Fraser University, Department of Biological Sciences, Burnaby, BC

²Agriculture and Agri-Food Canada, Agassiz Research and Development Centre, Agassiz, BC

The end of March 2020 was an uncertain time. None of us knew when we would be able to resume research, and conferences for the rest of the year were being canceled. For a lot of researchers, that meant a loss of opportunities to share and discuss research with the wider scientific community. While everyone was dealing with the challenges differently, our sense was that there was some appetite to continue discussing and sharing science, to keep feeling the sense of community that the best conferences can have.

In early April, the two of us got in touch after Pauline published a post on Twitter suggesting that seminars and workshops should slowly be shifted to be held online as we had no idea how long the pandemic will prevent researchers from sharing their work in-person. It took us a few weeks to get organized but what started as a joint Zoom meeting between labs in British Columbia and Quebec slowly grew into a completely open seminar series for graduate students and early career researchers. There was, to our surprise, a lot of interest in the idea and quickly our presentation schedule started filling up.

This was the start of the “Canadian Entomology, Ecology and Evolution Virtual Seminar Series” (CEEVVS). Our first session was held on April 20 and since then we’ve organized 8 seminars with 3 to 4 presentations each and more talks are lined up until early August (see below for the July schedule). Being online has enable us to connect researchers from labs all across Canada, we also started to have presenters from the USA and even Europe.

The presentations have been fantastically diverse, including topics such as sensory ecology, forest entomology, evolution and systematics, natural history, microbial ecology, and forensic entomology. We’ve even broadened the tent beyond entomology to host a few presentations from herpetologists, which has been a great opportunity for us to get outside of our research silos and see the types of approaches taken by ecologists and evolutionary biologists that study another group of organisms.

Hosting these types of regular Zoom seminars has been a great learning experience, and a window into the potential advantages and drawbacks of virtual tools for hosting research presentations. Virtual events are obviously going to become more and more used not only in the next few years during the pandemic, but likely beyond as we become more and more used to them. Of course, a lot is lost without the types of in-person interactions that happen at conventional seminars, but we think it is worth highlighting some of the advantages that we’ve noted.

Perhaps the most important advantage of these seminar series is that (as with ours) they can be held completely free of charge for anyone at any career stage who wants to attend. This means, for example, that undergraduate students who would otherwise be very unlikely to have funding to attend conferences can attend conference-quality research presentations. There are no registration fees, travel (and associated carbon footprint), or accommodation costs, and you can see what your colleague on the other side of the country is doing and ask them questions about their research. For



those who attend on a regular basis, it fosters a sense of familiarity and community with other early-career researchers that could facilitate collaborations in the future. Traditional conferences – especially national and international ones – are becoming prohibitively expensive and end up excluding huge swaths of the research community that don't have the resources to attend, and having these type of completely open seminar series running in parallel is one way to help remedy that.

Another advantage to these types of seminar series is that they can be held on a regular basis but with only a small number of presentations at a time, to avoid the “overload” that we all experience at typical conferences. Weekly sessions, as we were hosting at first, might be a bit too frequent for the post-pandemic world, but perhaps once-every-two-weeks (as we are doing now) or once-per-month sessions would be ideal if there is a devoted following. Also, being online enable us to easily record and share the seminar presentations, and as a result, since May 19, recorded talks have been posted on YouTube so presenters work can be shared outside of the scheduled meeting time. We really hope to keep the CEEEVs going on a semi-regular basis as long as there is interest!

We are trying to broaden the network of the series to include the greatest possible diversity of speakers and topics as we go forward. We have an open sign-up format, where prospective presenters can choose a time slot that works for them. We have a broad range of presentation formats including 15- and 25-minute research presentations, research proposals, data analysis talks, and research retrospectives – where later-career researchers present and reflect on their past graduate work. Everyone is welcome and the atmosphere is (by mandate) friendly and constructive – all are welcome.

To get a link to the sign-up sheet or join the mailing list, please contact us! (paul-abram@hotmail.com, pdeschodt@sfu.ca).



Canadian Ento-Eco-Evo



Virtual Seminar Series

Up-coming schedule:

The seminar series starts at 9:30am PDT / 10:30 am MDT, CST / 12:30 pm EDT / 1:30 pm ADT

July 13th, 2020

- **David Fisher**, Early Career Scientist, “Selection on and heritability of colony-level traits in a neotropical social spider” (University of Aberdeen)
- **Mehrdad Mohamadyani**, PhD candidate, “Entomopathogenic fungi as promising bio-control agent for the long horn beetle” (Ferdowsi University of Mashhad)
- **Clare Scott Chiavo**, Early career Scientist, “A gradient of evolution novelty: cyclopeptide tolerance in mushroom-feeding *Drosophila*” (Appalachian State University)


July 27th, 2020

- **Patricia Okpara**, PhD candidate, “the tole of the black soldier flu, *Hermetia illucens* Linnaeus (Diptera: Stratiomyidae) in combating Municipal waste in Ontario (University of Windsor)
- **Elana Varner**, PhD candidate, “A bumble bee nest-site roadmap: The saving grace of mouse pee?” (Simon Fraser University)
- **Raphaël Royauté**, Postdoctoral researcher, “behavioural syndromes shape evolutionary trajectories via conserved genetic architecture” (Ludwig-Maximilians-Universität München)

Bee a Citizen Scientist Project

Thompson Shuswap Master Gardeners Association
Thompson Rivers University Biology Dept.

Native bees provide critical ecosystem services within the urban and rural environments of the Thompson-Nicola region. Because of the range of ecosystems ranging from Bunchgrass, Interior Douglas Fir and Alpine Tundra we have one of Canada's most diverse bee fauna due, in part, to its high floral diversity. Grassland areas are among the most threatened ecosystems in BC. Kamloops is identified as a critical junction between several major grassland regions within our province.



Although entomologists have sporadically collected in our region, until 2019 there has been no comprehensive native bee survey completed.

For the past three years (2017-2019), Thompson Shuswap Master Gardeners Association (TSMGA) has collaborated with Thompson Rivers University (TRU) botanist, Dr. Lyn Baldwin in a citizen science project to collect baseline data on pollinator abundance within the city of Kamloops. Trained in a two-day workshop by Erin Udal, BC native bee conservationist, participants followed a North American-wide standardized citizen science protocol. Pollinator abundance was surveyed to 7 functional groups in home gardens. Functional groups included Honey Bees, Bumble Bees, Hairy Belly Bees (solitary, cavity nesting bees that collect pollen on their abdomen) Pollen Pants Bees (solitary and semi-social bees that nest in the ground and collect pollen on their legs), wasps, flies and other (beetles, ants, moths and butterflies). Each home survey was completed within 20 minutes on sunny days with a temperature of at least 20 degrees. Only insects that were pollinating were counted. As a comparison with cultivated gardens, and using the same protocols, undergraduate students surveyed adjacent uncultivated areas. Each year, participants in the project also completed group surveys within the same two cultivated city parks and in various uncultivated, natural areas.

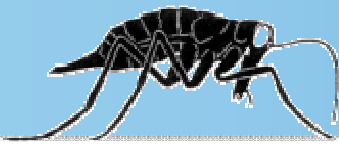
Our citizen science participants (which included Master Gardeners and members of the public) were comfortable in recognizing pollinators to the above functional groups and were able to collect baseline data on pollinator abundance within the city of Kamloops. After three summers of experience and a native bee taxonomy class, participants became more adept in recognizing bees to genera. Although citizen scientist programs are recognized for their ability to broaden the scope of research (Cohn 2008), it was also clear to us that information collected by our citizen scientists was limited in its taxonomic calibre. It is estimated that we have over 300 species in our area because of our bunch grass/ponderosa pine eco-system, but after two years of surveys, we still did not really know what species we had in this region.

With funding from the **Entomological Society of BC** as well as the TD Friends of the Environment Foundation, the City of Kamloops Social Planning Council, Teck Highland Valley Community Investment Program, and the Kamloops Naturalist Club we were able to expand our scope in 2019 for the Bee a Citizen Scientist Project. We carried out our standard citizen science monitoring protocols during three group pollinator surveys within the grasslands of Kamloops; but, at the same time we completed pollinator biodiversity surveys with standard entomological trapping techniques.

Key goals for Bee a Citizen Scientist included:

1. A greater understanding and awareness of pollinator needs in our city and the knowledge to make changes in gardening practices and the skills to enhance nesting sites and forage possibilities.
2. Baseline observational data and knowledge of our green spaces would also help with future decision making in our parks. The City of Kamloops Parks Department would consider pollinator habitat when managing natural areas as well as using more pollinator friendly plants in managed parks.
3. Increase pollinator awareness in various decision-making organizations: City of Kamloops Development, Engineering and Sustainability departments, City of Kamloops operations staff, Tourism Kamloops and future researchers.
4. Increase pollinator awareness within our educational organizations such as the BIG Little Science Centre, Sk'elep school at Tk'emlúps te Secwépemc, TRU Education Department/ Eureka camp and SD73.
5. Children and youth in the Kamloops region would gain a greater knowledge and understanding of pollinators, especially native bees.
6. Bioblitz information and collected specimens would act as an incubator, providing a foundation for future community and educational work.

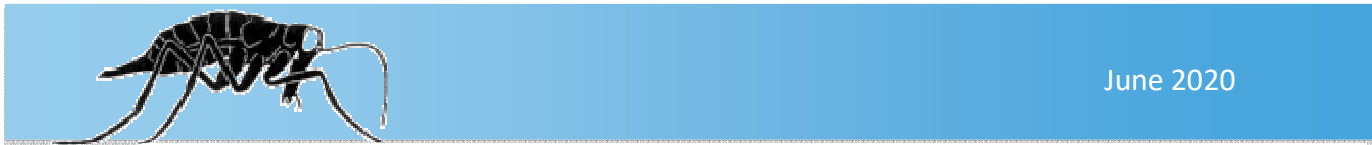
See ESBC website for full report at: <http://entsocbc.ca/wp-content/uploads/2020/07/2019-Citizen-Science-digital-final-4.pdf>



Citizen Scientists. Photo Credit: Elaine Sedgman



Bombus navdenis mating. Photo Credit: Elaine Sedgman



The North Okanagan Naturalists' Club

Presents

THE JAMES GRANT AWARD OF \$400

TO: _____

FOR: THE BEST GRADUATE MASTERS DEGREE PAPER

AT: The Annual General Meeting of the Entomological Society of British Columbia

James Grant was born in Trinity Valley, near Lumby, on May 25th, 1920. He went to school in the North Okanagan and became a farmer and logger before enlisting in the Canadian Army in 1941. He served in the Signal Corps in Europe until 1946.

On his return to Canada he was employed by the Federal Forest Entomology Laboratory in Vernon. His work took him throughout the Province and enabled him to increase his expertise in ornithology, Entomology and botany.

In 1970, he was appointed Field Studies Coordinator for the Vernon School District (22) and remained there until his retirement in 1978. His dedication and extensive knowledge of natural history

made him a mentor and inspiration to many naturalists and students in the Okanagan area, until his death in 1986. Grant was a founding member of the North Okanagan Naturalists' Club. He published at least thirty articles on birds and their biology and operated a hospital for injured hawks and owls from his home in Lavington.

Following his death, the "James Grant Memorial Fund" was established to contribute to the preservation of natural habitat through acquisition of property and for educational purposes, to continue the work he fostered throughout his life. This Entomological Award is presented in his memory by the North Okanagan Naturalists Club.



DATED: _____

PRESIDENT



Entomology Educational Opportunities in Canada

The Entomological Society of Canada publishes a directory of **Entomological Education in Canada**. Available at: <https://esc-sec.ca/student/student-awards/>

Entomological Society of Canada Student Awards

Details of Awards at <https://esc-sec.ca/student/student-awards/>. Deadline for all awards is **March 1** of each year. Look on the website for eligibility for each award.

- Entomological Society of Canada Danks Scholarships
- Entomological Society of Canada Graduate Research Travel Scholarships
- Entomological Society of Canada Postgraduate Awards
- Entomological Society of Canada John H. Borden Scholarship
- Entomological Society of Canada Dr Lloyd M Dodsall Memorial Scholarship
- Biological Survey of Canada Scholarship
- Keith Kevan Scholarship
- Entomological Society of Canada Ed Becker Conference Travel Awards

Student Awards – administered by Entomological Society of America

There are numerous awards. Check them out for eligibility.

<http://www.entsoc.org/about/awards-honors>

<https://www.entsoc.org/awards/sponsors>

Student Scholarships and Awards

Student Oral Presentation Awards

Each year the Entomological Society of British Columbia presents up to three awards for the best student oral presentations. For consideration, students (B.Sc., M.Sc., or Ph.D.) must be registered at a post-secondary institution and in attendance at the Annual General Meeting (AGM). Prizes are awarded at the AGM.

Dan Johnson Award in Insect Ecology

This is a **\$200 annual award** for the best manuscript submitted by a student in the field of insect ecology. The award is open to all students (membership in the ESBC is not necessary). Submitted manuscripts must have been published or accepted for publication since the previous year's submission deadline (usually September 1st of the previous year).

Please submit a covering letter and the manuscript to: secretary@entsocbc.ca.

Graduate Student Scholarship Competition

Award Information:

The Entomological Society of British Columbia awards annually a **scholarship of \$400** to up to two postgraduate students to encourage students engaged in entomological research in BC. Funds are to be used at the student's discretion.

Eligibility:

Applicant must be a full-time postgraduate student at a registered institution in British Columbia at the time of application. Applicant must be partaking in entomological research as part of their degree program.



How to apply:

For consideration, applicants must submit a single PDF file containing:

- An outline of current research (no more than 300 words). Applicants may also choose to include other contributions to the field of entomology outside of their research.
- A curriculum vitae
- A post-secondary transcript
- In addition, applicant must arrange for two letters of reference to be submitted on behalf of the applicant.

Deadline:

Applications and letters of reference should be submitted to the ESBC Secretary at secretary@entsocbc.ca by September 1st of each year. Competition results will be announced at the annual general meeting which is typically held in October each year.

Judging Criteria:

Applications will be judged on the basis of contributions to the field of entomology, scientific importance of their research and the qualifications of the applicant.



DNA Barcoding Website:

There is a new blog exclusively on the topic of DNA barcoding with the aim to have newsworthy information posted a few times per week. The blog is lead by Dirk Steinke, Lead Scientist Barcoding of Marine Life Biodiversity Institute of Ontario University of Guelph, Ontario, Email: dsteinke@uoguelph.ca and blog website <http://dna-barcoding.blogspot.ca/>

Entomological Society of Canada

Blog Available at <http://esc-sec.ca/blog/>
December 2019 Bulletin available online at:
<http://esc-sec.ca/publications/bulletin/>

Some International Entomological Societies

Royal Entomological Society www.royensoc.co.uk/

Entomological Society of Southern Africa www.entsocsa.co.za/

Egyptian Entomological Society www.ees.eg.net/

Australian Entomological Society <http://www.austentsoc.org.au/>

Xerces Society for Invertebrate Conservation www.xerces.org

Chilean Society of Entomology <http://www2.udec.cl/~insectos/>

Butterfly Conservation <http://butterfly-conservation.org/>

European Association of Coleopterology <http://www.ub.edu/aec/>

Dutch Butterfly Conservation <http://www.vlinderstichting.nl/>

Russian Entomological Society http://www.zin.ru/societies/res/index_en.html



Supporting Butterfly Conservation through Collaboration: The BC Butterfly Atlas

The BC Butterfly Atlas is a community-based citizen science project aimed at increasing our knowledge of the status and distribution of butterflies in British Columbia.

Project Description

Beginning in 2012, the BC Butterfly Atlas will harness the efforts of both professional biologists and citizen naturalists to document the distribution and abundance of butterflies in British Columbia. Gathering butterfly records from across BC will help identify which species are truly rare and which are more common, provide a snapshot of butterfly populations to which past and future surveys can be compared, and inform efforts to conserve butterflies and their habitats. Results will be collated into a single database and be made available on maps on the project website. The project also aims to educate and engage the public about the importance of biodiversity and increase involvement in butterfly conservation in BC.

Project Objectives

The BC Butterfly Atlas has the following objectives:

- Increase public interest in butterflies and involvement in butterfly watching;
- Share information on the distribution, abundance, and habitat relationships of butterflies in British Columbia;
- Educate British Columbians on the importance of conservation of butterflies and their habitat; and
- Develop resources and partnerships to improve conservation of butterflies and their habitats.

Background

Mapping biodiversity is a growing stewardship activity around the world, and the information collected is invaluable for the conservation of species and their habitat. Following on the recent success of the BC Breeding Bird Atlas¹ and butterfly atlasing projects in other jurisdictions (e.g., Butterflies of the New Millennium (UK)², Maritimes Butterfly Atlas³, and atlases in several US states), we are initiating a citizen-based survey and atlasing program for butterflies in British Columbia. Despite their important ecological role and value as habitat indicators, butterflies in BC lack adequate information on their distribution, abundance, and habitat relationships needed for effective conservation. An atlasing project would seek to fill this information gap while increasing public awareness and support for butterfly conservation.

¹ <http://www.birdatlas.bc.ca>

² <http://www.butterfly-conservation.org>

³ <http://www.acode.com/butterflyatlas.html>

Kelowna Museum request

Linda Digby of the Kelowna Museum Society is requesting help acquiring insect specimens for the natural history museum. Their interest is the south Okanagan region. They are seeking donations of identified, labelled specimens and photographs from members or students. Contact Linda directly at the museum, www.kelownamuseums.ca.

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