

Newsletter of the Entomological Society of British Columbia





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June 2023



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# **Publications of ESBC**

# Journal of the Entomological Society of British Columbia



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.

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

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: <u>http://journal.entsocbc.ca/</u>.

#### **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 <u>boreus@entsocbc.ca</u>.

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.



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#### 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:
f	Find 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**

@EntSocBC

#### 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.

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# 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, Marcus Clodius, E-mail: <u>treasurer@entsocbc.ca</u>

**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 (Omus	Helliwell Provincial Park, May 2012.	
dejeani), taken on Denman Island, B.C.	Photograph by Jennifer Heron	
Photograph by Jennifer Heron.		
Photographs taken in the Peace Region, BC. Photographs by Jennifer Heron		





# Entomological Society of BC Annual General Meeting and Symposium September 15 – 16, 2023 Terrace Room Thompson Rivers University 805 TRU Way, Kamloops, B.C.





#### Friday, September 15th

	8:00am – 8:15am
8:15am – 8:45am	Plenary speaker 1 - Michelle Tseng
8:45am – 9:00am	
9:00am – 9:15am	
9:15am – 9:30am	
9:30am - 9:45am	
9:45am -10:00am	
10:00am -10:30am	Break
10:30am – 10:45am	Graduate student session 2: moderator
10:45am – 11:00am	
11:15am – 11:30am	
11:30am – 11:45am	
11:45am – 12:00pm	
12:00pm – 1:00pm	Lunch Provided
<b>12:00pm – 1:00pm</b> 1:00pm – 1:15pm	Lunch Provided Introduction of 2nd plenary speaker
<b>12:00pm – 1:00pm</b> 1:00pm – 1:15pm 1:15pm – 1:45pm	Lunch Provided Introduction of 2nd plenary speaker Plenary speaker 2 – Celia Boone
<b>12:00pm – 1:00pm</b> 1:00pm – 1:15pm 1:15pm – 1:45pm 1:24pm – 2:00pm	Lunch Provided Introduction of 2nd plenary speaker Plenary speaker 2 – Celia Boone Graduate student session 3/Undergraduate student session: <i>moderator</i>
<b>12:00pm – 1:00pm</b> 1:00pm – 1:15pm 1:15pm – 1:45pm 1:24pm – 2:00pm 2:00pm – 2:15pm	Lunch Provided Introduction of 2nd plenary speaker Plenary speaker 2 – Celia Boone Graduate student session 3/Undergraduate student session: <i>moderator</i>
<b>12:00pm – 1:00pm</b> 1:00pm – 1:15pm 1:15pm – 1:45pm 1:24pm – 2:00pm 2:00pm – 2:15pm 2:15pm – 2:30pm	Lunch Provided Introduction of 2nd plenary speaker Plenary speaker 2 – Celia Boone Graduate student session 3/Undergraduate student session: <i>moderator</i>
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Friday Sept. 15th – Terrace Room, TRU. Evening Social and Insect Extravaganza. Snacks and a no-host bar.

#### Saturday, September 16<sup>th</sup>

# ESBC Annual General Meeting 2023 – business meeting and awards presentations



#### **Conference Registration**

Regular member	\$50	\$60
Regular non-member	\$60	\$70
Student member	\$40	\$50
Student non-member	\$50	\$60

This years meeting will be held September 15-16th at Thompson Rivers University. The theme of the meeting is "Insects: the Environmental Heartbeat". This theme is very pertinent given the recent erratic and extreme climate events around B.C. Speakers at the conference will present a diverse range of topics including climate repercussions; ecological shifts; insect extinctions; ecosystem health and stability; and beneficial/detrimental insect issues following disturbances (e.g. wildfire, drought).

We are pleased to have the following two amazing keynote speakers give their interpretation of this theme in the context of their research.

- Dr. Michelle Tseng, Assistant Professor, Botany, Zoology. Department of Biology, University of British Columbia.
- Dr. Celia Boone, Skeena Region Forest Entomologist, BC Ministry of Forests.

The conference will be a full day on Friday Sept. 15th with break refreshments and lunch provided to those registered. Saturday Sept. 16 will be a half day finishing at noon. Saturday will be submitted presentations and/or a short walking tour near Thompson Rivers University depending on the number of submitted papers.

Evening Social and Insect Extravaganza Friday Sept. 15th

There will be snacks and a no-host bar provided where attendees can socialize and meet the B.C. entomology community. We invite those attending to bring a small insect collection, photographs, insect artwork or any other entomological item you might want to showcase to colleagues.



# **Entomology in the News**

# Mosquito bite prevention through self-assembled cellulose nanocrystals

<u>Daniel Voignac, Evyatar Sar-Shalom, Yossi Paltiel, Oded Shoseyov, Jonathan Bohbot</u> <u>Author Notes</u>

PNAS Nexus, Volume 2, Issue 4, April 2023, pgad069, https://doi.org/10.1093/pnasnexus/pgad069

# Abstract

Mosquitoes are the deadliest of all combined insects and animals affecting millions and killing hundreds or thousands of people each year. Existing protection methods however are limited and include volatile compounds that actively repel mosquitoes such as N,N-Diethyl-meta-toluamide (DEET) or different essential oils such as geraniol and citronella. Most are odorous compounds and require organic solvents for dispersion. This work investigates the barrier properties of cellulose nanocrystals (CNCs). CNCs are known to self-assemble in strong, transparent, chemical barrier films. They are fully bio-based, and their surface chemistry is ideal for aqueous dispersion of many compounds. This work saw a significant 80% decrease in feeding on human skin when a thin CNC coat was applied. The effect was further confirmed by artificial feeding on *Aedes aegypti* wherein CNC appears to act as a chemical camouflage to the many cues sought by the insects. The combined effect of CNC with indole reduced egg laying post exposure to mammalian blood close to null with 99.4% less eggs as compared to control. The chemical barrier effect was assessed through a simple headspace experiment showing that the same CNC coat blocked the passage of ammonium hydroxide vapor, a commonly used mosquito attractant, when applied on a filter paper membrane.



# Developing methods for chilling, compacting, and sterilizing adult *Aedes aegypti* (Diptera: Culicidae) and comparing mating competitiveness between males sterilized as adults versus pupae for sterile male release

Dylan A Tussey, Rachel Morreale, Danilo O Carvalho, Steven Stenhouse, Aaron M Lloyd, David F Hoel, Daniel A Hahn

Journal of Medical Entomology, tjad079, <u>https://doi.org/10.1093/jme/tjad079</u>

# Abstract

The yellow fever mosquito, Aedes aegypti L., can transmit several pathogens responsible for human diseases. With insecticide resistance development becoming a concern, alternative control strategies are needed for Ae. aegypti. Sterile insect technique (SIT) is an increasingly popular option being explored. However, logistical issues in mass production and sterilization make it difficult to maintain a SIT program. Male mosquitoes are typically irradiated as pupae because this is the earliest developmental point at which females can be separated from males, but asynchrony in pupation and high variability in pupal responses to irradiation based on pupal age make it difficult to sterilize mass guantities of pupae on a regular schedule in a rearing facility. Young adult mosquitoes have wider windows for irradiation sterilization than pupae, which can allow facilities to have fixed schedules for irradiation. We produced a workflow for adult Ae. aegypti irradiation in a mosquito control district with an operational SIT program that currently irradiates pupae. The impacts of chilling, compaction, and radiation dose on survival were all assessed before combining them into a complete adult irradiation protocol. Males chilled up to 16 h prior to compaction and compacted to 100 males/cm<sup>3</sup> during radiation resulted in low mortality. Males irradiated as adults had increased longevity and similar sterility compared to males irradiated as pupae. Additionally, males sterilized as adults were more sexually competitive than males sterilized as pupae. Thus, we have shown that irradiating adult males can be a viable option to increase the efficiency of this operational mosquito SIT program.

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# Agriculture and climate change are reshaping insect biodiversity worldwide

Charlotte L. Outhwaite, Peter McCann, Tim Newbold

Nature, 2022; 605, pages 97-102

# Abstract

Several previous studies have investigated changes in insect biodiversity, with some highlighting declines and others showing turnover in species composition without net declines. Although research has shown that biodiversity changes are driven primarily by land-use change and increasingly by climate change, the potential for interaction between these drivers and insect biodiversity on the global scale remains unclear. Here we show that the interaction between indices of historical climate warming and intensive agricultural land use is associated with reductions of almost 50% in the abundance and 27% in the number of species within insect assemblages relative to those in less-disturbed habitats with lower rates of historical climate warming. These patterns are particularly evident in the tropical realm, whereas some positive responses of biodiversity to climate change occur in non-tropical regions in natural habitats. A high availability of nearby natural habitat often mitigates reductions in insect abundance and richness associated with agricultural land use and substantial climate warming but only in low-intensity agricultural systems. In such systems, in which high levels (75%) cover) of natural habitat are available, abundance and richness were reduced by 7% and 5%, respectively, compared with reductions of 63% and 61% in places where less natural habitat is present (25% cover). Our results show that insect biodiversity will probably benefit from mitigating climate change, preserving natural habitat within landscapes and reducing the intensity of agriculture.



# AWARDS

#### EDI award announcement for Boreus and Twitter

At the ESBC we believe that all should be welcome and included in the entomological community. Sadly, in entomology, and STEM in general, this is not the case. As one step we are taking forward, the ESBC is pleased to announce our new Equity Diversity and Inclusion Award. We hope this award will help reduce some of the barriers faced by those historically excluded from entomology. Please apply!

Visit: http://entsocbc.ca/scholarships-awards/ for more info!

#### Student award ad for Boreus and Twitter:

We are now accepting applications for our Graduate Student Scholarships and the Dexter Johnson Award in Insect Science, both of which have been increased to \$1000! Apply apply apply!

Visit: http://entsocbc.ca/scholarships-awards/ to for more info!



Black lightning in the Florida Everglades G.Zilahi-Balogh



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# **Equity diversity & inclusion award**



## For details visit: http://entsocbc.ca/

The Entomological Society of British Columbia annually awards a scholarship of **\$1000** to support the participation of one graduate student from a group currently underrepresented within the ESBC. Funds may be used at the student's discretion. Applications should be submitted to the ESBC Secretary at secretary@entsocbc.ca by September 21st, 2022. Competition results will be announced at the AGM!





#### ENTOMOLOGICAL SOCIETY OF BRITISH COLUMBIA



#### **Student Oral Presentation Awards**

Each year the Entomological Society of British Columbia presents up to three awards for the best student oral presentations. Prizes are awarded at the AGM.

#### Dexter Johnson Award in Insect Science

This is a **\$1000 annual award** for the best manuscript submitted in any peer-reviewed journal by a student in the field of insect ecology. Please submit a cover letter and the manuscript to secretary@entsocbc.ca by Sept 21st, 2022.

### For details visit: http://entsocbc.ca/

#### Graduate Student Scholarship Competition

The Entomological Society of British Columbia awards annually a scholarship of **\$1000** 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. Applications should be submitted to the ESBC Secretary at secretary@entsocbc.ca by September 21st, 2022. Competition results will be announced at the AGM.



#### **Draft for ESBC new award for entomologists – 2023**

#### Entomological Society of British Columbia Legacy Award

The Entomological Society of British Columbia has initiated a new award, the Entomological Society of British Columbia Legacy Award, to recognize B.C. entomologists that have made outstanding contributions to their discipline of entomology throughout their career. This award will be awarded to an individual in recognition of their significant contributions in research, mentoring, teaching, extension, innovation, pest management and active volunteer involvement in the ESBC and other societies/organizations in B.C. and beyond. The Legacy Award has been created so that members of the ESBC, past and current, can be recognized for their achievements and contributions to the field of entomology. This award will only be awarded in years when deserving candidates have been nominated and will be awarded to one deserving nominee or exceptional team/collaboration. Consideration should be given to mid- to late-career entomologists or retired entomologists.

Award recipients may be asked to present a short talk on their career accomplishments at the ESBC AGM in the year following the announcement of their nomination.

#### Nominations:

Nominations for the Legacy Award in Entomology can be submitted by any member in good standing of the ESBC. The nominee should have an outstanding record of scientific contribution, mentorship, and service to the furtherment of entomology in British Columbia. A nomination package must include:

- A letter from the nominating ESBC member outlining why this person should be considered for this award. The nomination letter should highlight primary contributions on which the nomination is based. Explain why the nominee is especially well qualified to receive the award. Please save the complete nomination package (nomination letter, supporting letters) as a single file in either pdf or Microsoft word format. Label the file with the name of the person being nominated and the year.
- 2. Supporting letters from two additional ESBC members supporting the nomination of this entomologist. Supporting letters should be solicited by, and addressed to, the nominator. A minimum of two, and maximum of three supporting letters will be accepted. Each supporting letter should not exceed one single-spaced page.
- 3. Nomination packages are limited to four single-spaced pages.
- 4. Email the nomination file to: ESBC Secretary (Rob Higgins, <u>Rhiggins@tru.ca</u>)

The nomination package must be submitted no later than August 31<sup>st</sup> for consideration at the next ESBC AGM.





Bee foraging on a flower. Photo by: Elton Ko

# **Educational or Research Opportunities**

#### details on ESC website https://esc-sec.ca/opportunities/

#### **MSc and PhD Student Position – Spruce Budworm Overwintering**

The Toxopeus lab at St. Francis Xavier University (Nova Scotia) is recruiting a graduate student to study diapause in the eastern spruce budworm, and important forest pest. Full details are available here: <u>https://jantinatoxopeus.com/opportunities/</u>Contact: Jantina Toxopeus (jtoxopeu@stfx.ca)

# MSc and PhD Student Positions – Behaviour, Evolution and sexual conflict in water striders

NSERC and St. Francis Xavier University, Nova Scotia Field work in the Maritimes, lab experiments, genetic and genomic work Starting date: Flexible Contact: Dr. Jen Perry (jperry@stfx.ca)

# Postdoctoral Research Associate – Biological control of emerald ash borer at Michigan State University

Research will examine the interactions of ash species composition, spatial variation, tree health, and emerald ash borer population densities on parasitoid establishment, abundance, diversity, and parasitism rates within lingering ash stands.

Contact: Marianna Szucs (<u>szucsmar@msu.edu</u>) or Toby Petrice (<u>toby.petrice@usda.gov</u>)



June 2023

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Interested applicants may apply at the following link: <u>https://careers.msu.edu/en-us/job/514155/research-associatefixed-term</u>

#### PhD opportunities in the UK

Details: See ESC website

#### MSc opportunities in the UK

Details: See ESC website

#### **Global opportunities**

Details: See ESC website

# **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 <u>boreus@esbc.ca</u>.

#### Elton Ko, MPM

Title	-	Multimodal mate-finding and floral foraging behavior of <i>Aedes</i> and <i>Culex</i> mosquitoes
Supervisors	-	Dr. Gerhard Gries, Simon Fraser University Dr. Carl Lowenberger, Simon Fraser University Dr. Fiona Hunter, Brock University

Abstract - I investigated mate location and nectar foraging behavior in the diurnal yellow fever mosquito, *Aedes aegypti*, and the crepuscular house mosquito, *Culex pipiens*. High-speed video recordings revealed that incident light reflects off the wings of swarming Ae. *aegypti* males. In behavioral experiments, LED assemblies flashing light at the wingbeat frequency of females (665 Hz) mediated swarm and mate recognition at long range, whereas play-back of wingbeat sound (665 Hz) mediated mate recognition at short range. As predicted by the sensory drive theory, light flashes had no signal function for swarming Cx. *pipiens*. All five milkweed species/varieties tested attracted Cx. *pipiens*. Phenylacetaldehyde and benzaldehyde were the key floral semiochemicals emitted by showy milkweed, *Asclepias speciosa*. Combining floral attractant of *A. speciosa* with those of four other plant species did



not result in a super-flower blend that was more attractive to Ae. aegypti than the A. speciosa floral blend on its own.

Official completion date - Defended January 21, 2022

#### Jaime M. Chalissery, MPM

Title	-	Trail pheromone ecology of the pavement ant, <i>Tetramorium immigrans</i> , and the European fire ant, <i>Myrmica rubra</i>
Supervisors	-	Dr. Gerhard Gries, Simon Fraser University Dr. Jenny Cory, Simon Fraser University Dr. Robert J. Higgins, Thompson Rivers University Dr. Dong-Hwan Choe, University of California, Riverside

Foragers of many ant species deposit trail pheromones that guide nestmates to food resources. We identified 2-Methoxy-6-methylbenzoate ('MMMB') as the single-component trail pheromone of the pavement ant, *Tetramorium immigrans* (Hymenoptera: Formicidae). MMMB was sensed by worker antennae, induced trail following in laboratory bioassays, and effectively recruited nestmates to food baits in field settings. We deduced that only groups, and not individuals, of the European fire ant, *Myrmica rubra* (Hymenoptera: Formicidae) respond to pheromone trails. Furthermore, we determined that a 3-component pheromone blend comprising 3-ethyl-2,5-dimethylpyrazine ('EDP', the previously known trail pheromone component), (Z,E)- $\alpha$ -farnesene, and (Z,E)- $\alpha$ -homofarnesene, was superior to EDP in prompting (i) sustained trail-following behavior in laboratory bioassays and (ii) relatively faster recruitments of foraging ants to apple baits in a field experiment. All data combined provide impetus to develop synthetic trail pheromones coupled with lethal food baits as a tactic for integrated control of pest ants.

Official completion date - Defended April 14, 2022



# Student Awards – administered by Entomological **Society of America**

There are numerous awards. Check them out for eligibility. http://www.entsoc.org/about/awards-honors

# **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/

Canadian Entomologist Bulletin June 2022 https://esc-sec.ca/wp-content/uploads/2022/06/2022-2-June-ESCBull.pdf

# 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



# **Executive contact information**

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Secretary	Rob Higgins secretary@entsocbc.ca
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Boreus Newsletter Editor	Gabriella Zilahi-Balogh boreus@entsocbc.ca
Web Page Editor	Adam Blake webmaster@entsocbc.ca



Io Moth, Automeris io from Florida Keys G. Zilahi-Baloggh