December 2019 Vol. 39 (2)

Boreus

Newsletter of the Entomological Society of British Columbia

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The Executive

The Entomological Society of British Columbia is a scientific Society founded in 1902 for the advancement of entomological knowledge in the province.

President	Tammy McMullan **Simon Fraser University, Burnaby**
First Vice President	Wim van Herk **Agriculture Canada, Agassiz**
Second Vice President	Chandra Moffat **Agriculture Canada, Summerland**
Secretary	Tracy Hueppelsheuser **British Columbia Ministry of Agriculture, Abbotsford**
Treasurer	Ward Strong **BC Ministry of Forests, Vernon**
Editorial Committee (Journal)	Kathy Bleiker (Editor-in Chief) **University of Northern B.C., Prince George** Joel Gibson, **Royal B.C. Museum, Victoria** Lorraine Maclauchlan **B.C. Ministry Forests & Range, Kamloops** Bob Lalonde **University of British Columbia – Okanagan, Kelowna** Steve Perlman **University of Victoria, Victoria** Leland Humble **Canadian Forest Service, Victoria** Rob McGregor **Douglas College, New Westminster** Staffan Lindgren **University of Northern B.C., Prince George, Prof. Emeritus** Dezene Huber University of Northern B.C., Prince George Marla Schwarzfeld **Agriculture Canada, Ottawa**
Editor (Boreus)	Gabriella Zilahi-Balogh **Canadian Food Inspection Agency, Kelowna** Elton Ko **Simon Fraser University**
Directors	Grant McMillan (1st) **ICMS, Abbotsford** Dan Peach (2nd) **University of BC, Vancouver**
Graduate Student Representative	Asim Renyard **Simon Fraser University, Burnaby**
Honorary Auditor	
Regional Director of National Society	Brian Van Hezewijk **Canadian Forest Service, Victoria**
Web Page Editor	Brian Muselle **University of British Columbia – Okanagan, Kelowna**

Publications of ESBC

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

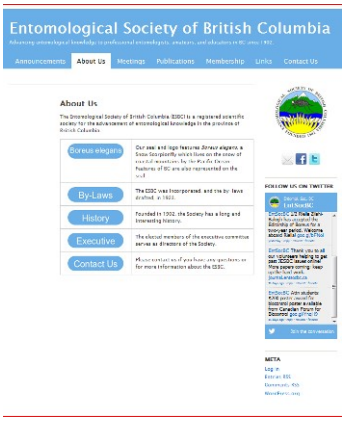
Boreus, the Newsletter of the Society is published in June and December. It contains entomological news, comments, reports, reviews and notices of meetings and other events. While emphasizing the Society's affairs, *Boreus* provides members with a forum for their views and news of British Columbia entomology, 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



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

Find us on 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

@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.

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 (*Omus dejeani*), 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 - OCTOBER 4, 2019

Pacific Forestry Centre, Victoria

PROGRAM

8:30 – 9:00	**REGISTRATION**		
9:00 – 9:05	**WELCOME AND ANNOUNCEMENTS**		
Time	**Title**	**Presenter**	**Type of Talk**
9:05-9:20	Characterization of a selfish genetic element in *Drosophila testacea*	Candice Powell	Student
9:20-9:35	Genetic and organismal parasitism: Male *Drosophila testacea* carrying selfish X chromosomes are more likely to be killed by parasitoid wasps	Jessica Fraser	Student
9:35-9:50	Do polyphenisms protect the green peach aphid from parasitoids?	Yonathan Uriel	Student
9:50-10:05	Mixed pathogen infections and pathogen transmission in the field	Pauline Deschodt	Student
10:05-10:20	Population dynamics and potential antimicrobial properties of bacteria in the gut of common bed bugs	Sam Meraj	Student
10:20-10:40	**Break – Refreshments Provided**		
10:40-10:55	Insights into the evolution of bark beetle-fungus mutualisms, and their ecological impacts: The alder bark beetle and its association with a *Neonectria* canker pathogen	Debra Wertman	Student
10:55-11:10	Predicting disturbance interactions of sub-cortical insects in postfire environments	Katherine Kitchens	Student
11:10-11:25	Do western carpenter ants, *Camponotus modoc*, locate food sources via food odourants?	Stephanie Cooper	Student

11:25-11:40	The macro- and micro nutrient composition of food baits affects foraging decision by western carpenter ants, *Camponotus modoc*	Claire Gooding	Student
11:40-11:55	Ability of select agents in food baits to cause mortality in European fire ant workers and queens	Jan Lee	Student
11:55-12:10	Attraction of brown marmorated stink bugs to odorants from different phenological stages of sunflower	Warren Wong	Student
12:10–1:00 Lunch Provided	**LUNCH BREAK –**		
1:00-1:15	Female false black widow spiders sense, and behaviorally and physically respond to, female conspecific sex pheromone	Andreas Fischer	Student
1:15-1:30	The spectral sensitivity of mosquito taxa and its role in mate location	Elton Ko	Student
1:30-1:45	Bumblebee nest-site conservation: The saving grace of mouse pee?	Elana Varner	Student
1:45-2:00	Cold storage effects of brown marmorated stink bug (*Halyomorpha halys*) host eggs on its egg parasitoid *Trissolcus japonicus*	Jade Sherwood	Regular
2:00-2:15	The biology and ecology of *Plutella armoraciae*, a recently rediscovered diamondback moth species in Interior British Columbia	Paul Abram	Regular
2:15-2:35 Refreshments Provided	**Break –**		

Time	Title	Presenter	Type of Talk
2:35-2:50	Temporal isolation in the spruce budworm species complex (Lepidoptera: Tortricidae: *Choristoneura*)	Tyler Nelson	Regular
2:50-3:05	Invasion and the body snatchers	Brian Van Hezewijk	Regular
3:05-3:20	Bumble bees in Alberta's oil sands	Riley Waytes	Regular
3:20-3:35	Initiating a classical biological program for Spotted wing drosophila (*Drosophila suzukii*) in Canada	Chandra Moffat	Regular
3:45-5:00	**Business Meeting!**		

Entomological Society of British Columbia
Annual General Meeting Minutes
3:50-5:02, October 4, 2019

Pacific Forestry Centre Victoria, B. C.

Call to Order: 3:50 pm by Lisa Poirier, ESBC President. 37 people present.

1. Agenda: any additions? None.
2. Approval of agenda: Dan Peach so moved, Brian van Hezewijk 2nd, Carried.
3. Minutes from previous AGM (available in Boreus December 2018 38(2), pp 8-17): Any discussion? None.
4. Approval of 2018 AGM Minutes: Bill Riel so moved, Robb Bennett 2nd, Carried.
5. Executive Reports

    a. Grad Student Representative, Dan Peach

Position: Student Director
Period under report: April 15, 2019 – October 3, 2019
Summary of activities during report period: The last few months have been a busy time. In addition to the ESBC-related activities mentioned below, I successfully defended my PhD, entered into a life-long collaboration (marriage) with my wife Grace, and am about to start a postdoctoral fellowship at UBC. In partnership with the Stanley Park Ecology Society (SPES), I organized an ESBC-SPES bioblitz in Stanley Park this summer. Between the day and evening collecting portions of the biolblitz we had almost 20 ESBC members attend, including more than a dozen student members. The daytime event was VERY well-attended by the public. Almost 100 species of insects were observed, including many first records for the park and several species of conservation concern. The feedback we received has indicated this was a huge success, and SPES has informed us they would like to make it an annual event. Along with grad student Asim Renyard, I also assisted Tammy McMullan in running an ESBC outreach stand at Van Dusen Garden's "Pollinator Days" event. For the two days I was present we had a non-stop flow of elementary school classes and other children coming by to participate in a "Picky Pollinators" game where they had to match different of pollinators to the types of flowers they visit. I was also able to find an eager grad student, Elton Ko, who has signed up to act as an assistant editor for the Boreus newsletter. While my tenure as student director is now coming to an end, it has been a fantastic experience. I hope to continue contributing to the society and to that end will be running for a director position.

Recommendations or action items for the attention of the ESC Board of Directors: Is there interest on our end in making the Stanley Park Bioblitz an annual event?
Respectfully submitted Dan Peach Student Director Submitted October 2, 2019

b. Regional Director of the National Society (Ent Soc of Canada), Brian van Hezewijk

Position: Regional Director to the ESC
Period under report: 16 Apr 2019-2 Oct 2019
Summary of activities during report period: ESC Board of Directors Meeting Aug 18, 2019 - ESC Membership rates will be increasing by approximately 7% in 2021 - Finance committee is revising the terms of the profit sharing agreement between the ESC and the regional societies so that the smaller societies will benefit more from surpluses from large joint meetings that are usually held in BC, Ontario, and Quebec. - Board of Directors are looking for people to write more blog articles for "Canada's coolest/cruelest insects" Annual General Meeting of ESC – Aug 20, 2019 - Incoming board members are Gail Anderson (President), Felix Sperling (2nd vice president), Christine Noronha (Director-at-large), James Tansey (Regional Director, ESS), Boyd Mori (Regional Director, ESAb). - The next JAM will be in Calgary Alberta on 18-21 October 2020 Meeting of the Entomological Societies of Canada, Aug 20, 2019 - Entomological Enthusiast membership category is now in place for the 2020 membership year - A "Meeting Code of Conduct" is now being implemented for future JAMs There will be a Special Members Meeting of the ESC by teleconference at 10am (Pacific Time) on Oct 22, 2019. It will be a short meeting with the sole purpose of considering the 2018-19 financial statements of the Entomological Society of Canada, which are now available to members in the members' of the ESC website. This is special meeting is required because the Financial Statements were not ready for the earlier-than-usual AGM in August.

In July I submitted the latest installment of the "News from the Regions" describing the ESBC events at VanDusen Gardens as well as the BioBlitz in Stanley Park. Thanks to Dan and Tammy for helping with that and providing photos on short notice. The deadline for my next submission is Oct 31, 2019 for the December issue. If you have anything interesting to contribute please send it to me.
Recommendations or action items for the attention of the ESC Board of Directors: None
Respectfully submitted, Brian Van Hezewijk, Regional Director to the ESC, 04 October 2019

c. Editors

i. Boreus, Gabriella Zilahi-Balogh

Position: Boreus (newsletter) Editor
Period under report: 5 November 2018 – 3 October 2019
Summary of activities during report period: This is my Boreus report. Elton Ko - a ~~PhD~~ student at SFU has agreed to work on Boreus with me. The plan is to transfer responsibilities after the Dec 2019 edition if he agrees. Nothing has changed as usual we are always looking for submissions. The Dec 2019 edition deadline for submission is early December. Elton introduce himself at the AGM. I understand that he will attend.
Recommendations or action items for the attention of the ESC Board of Directors: None
Respectfully submitted, Riella Zilahi-Balogh Newletter Editor October 3, 2019

- *Correction* to Boreus Editor's Report- Elton Ko is a Masters of Pest Management student at SFU
-

ii. Website, Brian Muselle

Position: Webmaster
Period under report: 04 / 06 / 2019 – 10 / 02 / 2019

Summary of activities during report period:
Similar to last time, nothing to report. Website vitals are continually good. Website traffic has been steadily increasing over the years, and consistently before major events (AGM, KAM, etc). An online payment site (https://entsocbc.square.site) has been created and added to our website to make purchasing memberships, merchandise, and event registrations more streamlined for customers. The website is relatively easy to add or change items/pages if need be. I believe it has been a great addition to our website. I think people are relieved to have this option.
On a personal note, since the last report, I have completed my master's in biology (specializing in agricultural entomology) and attended convocation in June; so it's been nice not stressing about school.

Recommendations or action items for the attention of the ESC Board of Directors:

(i) In terms of the online payment site, I would like to get everyone's opinion on the site and provide me with any changes/additions/subtractions needed; of course, after the AGM weekend.

(ii) As mentioned last time, it would be fun to have members and/or the public submit photos they have taken of BC insects. Once a month, we, as executives, choose the best one from that month and add it to a calendar for the next year (therefore 12 top photos per year). The winners of the photos get the calendar for free and we sell the calendars on our merchandise page. We could also post the photos, with permission, on the website advertising the diversity of insects in BC and promote the community involvement. It may be fun to have an insect diversity page on our website – a kind of 'what's that insect' or 'have you seen this insect?' or 'BC insect citizen science repository'.

Respectfully submitted,
Brian Muselle,
Webmaster,
October 10, 2019

iii. Journal, Kathy Bleiker

Position:
Editor JESBC

Period under report:
1 April 2019 – 4 October 2019

Summary of activities during report period:

Journal:

2019 Volume

To date, we have 3 notes, 3 articles, Dr. Belton's obituary, and 1 Perspective; however, a couple of these are still under review, so they have not been accepted yet. Please encourage folks to submit ASAP if they want to make the 2019 volume. There is no hard cut-off date for the 2019 volume, but it will be difficult to get anything submitted after Nov. 1 through the entire process by Dec. 31. So, please submit ASAP if you're thinking about it!

A couple MSs are in layout. I'm working with a new layout person (Alicja Muir), so we are getting the kinks worked out now before the early Dec. rush.

I thought it might be a good addition to JESBC to periodically invite eminent researchers to submit a "Perspective". (Perhaps every other year is a reasonable target for a Perspective, lest we run out of potential authors!) I invited Vince Nealis to submit the inaugural Perspective. Below is a draft of proposed wording for JESBC's website to describe this section:

"Perspectives offer an opportunity to express a personal opinion, viewpoint, or to stimulate discussion on an existing problem, fundamental concept, emerging hypothesis, or new innovation or strategy. Perspective articles may include original data in addition to personal opinion, and may be focused on current advances and future directions in a specific subject area. Perspectives are published occasionally, and will normally be solicited; however, authors may submit ideas or proposals for a Perspective to the Editor-in-Chief."

Archiving Initiative

Dezene Huber is leading this initiative with assistance from Alex Chubaty and Monique Keiran. Dezene has personally looked at every single article that has gone online over the past months. There is a lot of very useful information published in JESBC over the decades, and now it is very accessible! Check out the archived volumes online going back more than a century!

Archiving is nearly complete – just 5 more volumes! The older volumes took a lot more time than the newer volumes due to the low quality of the metadata. Note that Alex's efforts to extract data digitally saved many hours of Monique's time. Once all volumes are archived, we will look at a secure, distributed back-up system. Currently the Biodiversity Heritage Library mirrors us and serves as a backup, but the articles are not broken out of issues. Having our articles online will mean more traffic to our website from indexing services like Google Scholar.

An enormous thank-you to the Exec and the Society for supporting this initiative, and to Dezene for leading it!

Recommendations or action items for the attention of the ESC Board of Directors:

i) Please send out a tweet, or post on website, encouraging folks to submit to JESBC soon if they want to make the 2019 volume.

Respectfully submitted,
Kathy Bleiker
Editor, Journal of the Entomological Society of British Columbia
2 October 2019

d. Treasurer, Ward Strong

Position:
Treasurer

Period under report:
November 5, 2018- October 2, 2019

The ESBC is on very solid financial footing with $98,356 in our bank account and $132,409 in net assets.

Income: Membership fee income is strong; only 39 of 2018 registrants did not re-register. Most of

these were people who signed up only to get the lower membership rate to the 2018 ESA/ESC/ESBC meeting in Vancouver. Merchandise is now for sale on the website, though most sales have been at events, not through the website. AGM shared revenues were crazy high, a mixture of ESA profit-sharing (about $72k) and ESC sponsorship and merchandise (about $4k). JESBC page charges were from a mix of 2017, 18 and 19 papers.

Expenses: The Merchandise Expenses is left over from purchases and postage for the ESA/ESC/ESBC meeting. Misc Expenses were mostly to pay for the Pollinator Biodiversity Study with the Shuswap Master Gardener's Association (ongoing), and the Picky Pollinators event at Van Dusen Gardens. Journal Publishing was for typesetting for the 2018 Journal and copyediting the 2017-18 Journal; Typesetting and Archiving was mostly for digital archiving of the remaining few legacy volumes that were not finished with volunteer labour.

Balance Sheet: Assets are predicated on the expectation of a minimum GIC return (.55% compounded daily), but these GIC's have historically delivered close to, or at, the maximum return of 16% overall. The Accounts Payable is a cheque written but not yet cashed for catering at the current AGM and Symposium.

GIC's: One GIC came due in January 2019; I reinvested the funds as per the resolution at the 2018 AGM (#8 below). We have 4 GIC's of $10,000 each, coming due in 2020, 21, 22, and 23:

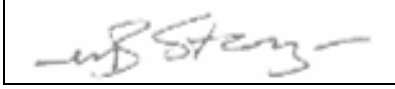
GIC	Name	Matures	Invested	Return (max)	Return (min)
4	BMO Growth GIC	14-Dec-20	$10,000.00	$11,600.00	$10,222.44
6	BMO Growth GIC	08-Feb-21	$10,000.00	$11,600.00	$10,222.44
7	BMO Growth GIC	12-Oct-22	$10,000.00	$12,800.00	$10,222.44
8	BMO Growth GIC	11-Apr-23	$10,000.00	$12,800.00	$10,222.44

Membership: We stand at 162 members, of which 39 are in arrears (not yet paid for 2019). The term of Tamara Richardson, our non-member absentee Director, will soon expire, at which point she will become a non-member subscriber.

Membership includes 39 student members and 8 Honorary Members. With 123 paid-up members, we have room for one or two more honorary members (which can make up 10% of the membership.

Paypal account: Paypal demanded that I provide a lot of personal information in order to continue using their service, apparently in accordance with Canadian law. I provided some information, but then they asked for more very personal information (including personal tax returns, SIN, former residential addresses, etc), and asked it from all executive members. We decided to not comply, and Paypal has frozen our account. I was able to withdraw all funds from our Paypal account, but am unable to close the account or unlink it from our bank account. Their customer service is unhelpful. We no longer use Paypal, and have switched to Interac e-transfers and Square for credit card payments.

Respectfully submitted,
Ward Strong Treasurer



Entomological Society of British Columbia

Income and Expense Statement

Period: January 1, 2019 to October 2, 2019

REVENUES		
Membership fees		$5,003.44
Merchandise Sales		$183.64
GIC Maturity Deposit		$10,241.43
Misc Revenues		$9.67
AGM:		$78,398.11
Registration	$2,159.23	
Shared revenues, 2018	$76,238.88	
Journal:		$2,716.40
Page charges	$2,716.40	
Misc Journal Revenue	$0.00	
TOTAL INCOME:		**$96,552.69**
EXPENSES		
Bank fees		$10.50
Website		$0.00
Merchandise Expenses		$836.79
GIC Purchase		$10,000.00
Misc Expenses		$1,914.38
Transfers from Paypal account to bank		$3,811.50
AGM:		$2,605.19
Facilities	$0.00	
Catering	$2,605.19	
Awards	$0.00	
Misc AGM Expenses	$0.00	
Journal:		$9,178.82
Publishing	$2,492.31	
Distribution	$130.28	
Typesetting and archiving	$6,556.23	
TOTAL EXPENSES:		**$28,357.18**
NET INCOME		**$68,195.51**

As of: 2019-Oct-02

ASSETS				
BMO Chequing Account			92,877.74	
Paypal account			0.00	
Accounts Receivable			0.00	
GIC's (minimum return)			40,889.74	
	Min return*	Max return**		
GIC 4: Dec 14, 2020	10,222.44	11,600.00		
GIC 6: Jan 16, 2021	10,222.44	11,600.00		
GIC 7: 12 Oct 2022	10,222.44	11,600.00		
GIC 8: 11 Apr 2023	10,222.44	11,600.00		
Total Assets				**$133,767.48**

LIABILITIES				
Accounts Payable			1,358.44	
Total Liabilities				**$1,358.44**

NET ASSETS **$132,409.04**
LIQUID ASSETS **$91,519.30**

*Total Assets based on Minimum GIC return.
**Potential maximum value at maturity

e. President, Lisa Poirier

Position: President
Period under report: 12 Apr 2019 – 4 Oct 2019

Summary of activities during report period:

Another year draws to an end, along with my term as President of the ESBC. I have very much enjoyed serving the Society in this role, and I thank you all for electing me. The Society is in excellent shape, due entirely to our wonderful Executive and supportive members.

A new initiative this year is the formation of an Outreach Committee. Judy Myers, Renée Prasad, Asim Renyard, and Dave Holden plan to tackle some of the myriad of outreach opportunities, funding requests, and chances to promote entomology and the ESBC in the larger community. I'd like to thank them all for volunteering, and I look forward to seeing the Society expand its outreach efforts in the future.

Ward Strong (Treasurer) has dealt with some unusually large transactions this year, thanks to our involvement in the ESA/ESC/ESBC JAM last fall in Vancouver, and I thank him for keeping our finances straight. Brian Muselle (Webmaster) has been incredibly quick with updates and postings to our Society webpage, Twitter, and Facebook accounts, and we are all better informed because of his efforts. Between them, Ward and Brian have transitioned the Society to a new and improved online payment system. Tracy Hueppelsheuser (Secretary) has done an outstanding job of keeping us all organized, and reminding us what we are supposed to be doing, when we are supposed to be doing it, and what we did last time – thank you, Tracy. We have a close working relationship with the Entomological Society of Canada, and Brian Van Hezewijk has been busy promoting that relationship as Regional Director to the ESC. Brian was also instrumental in local arrangements for this fall's AGM in Victoria, and I thank him for his help. Our Society is also well-promoted through our publications. Kathy Bleiker (Editor-in-Chief of JESBC), and Riella Zilahi-Balogh (Editor of Boreus) have produced excellent issues this year. They always need new material, so please do consider contributing to one or both publications. Our Student Director, Dan Peach, has done a stellar job of involving students in the Society, and has shown a real talent for public engagement as well. Tammy McMullan has been invaluable to me, especially as a proofreader/editor, and in the organization of the fall AGM. The Society will be in great hands next year with Tammy as President. I also want to thank all of the other members of the Executive for making this a relatively easy position to fill.

I want to extend particular thanks for their service to those whose terms on the Executive are ending. Ward Strong's contributions to the financial stability of the Society are well-known, and much- appreciated. Dan Peach is leaving his position as Student Director, as he is now Dr. Peach – congratulations, Dan! Tamara Richardson's term as Director is also finished, and we wish her well in her endeavours.

Finally, I thank all of you, the ESBC members, for making this such a great society.

Recommendations or action items for the attention of the ESBC Executive:

None

Respectfully submitted Lisa Poirier
President
4 October 2019

6. Discussion and acceptance of reports
   No discussion.
   Rob Cannings moves acceptance of reports. Staffan Lindgren 2nd. Carried.

7. Presentations of Student Awards

a. Dan Johnson Award – no submissions received

b. ESBC Graduate Student Award – **Andreas Fischer**, PhD candidate Simon Fraser University

c. Student Presentation Awards

- Best Bachelor of Science Presentation – **Jessica Fraser** – University of Victoria, "Genetic and organismal parasitism: Male *Drosphilia testacea* carrying selfish X chromosomes are more likely to be killed by parasitoid wasps"
- Okanagan Naturalists' James Grant Award for Best Masters Presentation – **Yonathan Uriel** – Master of Pest Management candidate, Simon Fraser University. "Do polyphenisms protect the green peach aphid from parasitoids?"
- Best PhD Presentation – **Andreas Fischer** – PhD candidate, Simon Fraser University, "Female false black widow spiders sense, and behaviorally and physically respond to, female conspecific sex pheromone"

Thank you to all the applicants for your interest and for your worthy applications. Thank you to all the judges that adjudicated. It is always difficult to pick winners from a strong field of applicants. Thank you to the organizations: The Okanagan Naturalists and the ESBC for supporting the awards in 2019 and encouraging the study of entomology in BC.

8. Executive Elections; elected by acclimation
   Call for nominations from the floor - None
   a. Elected by acclaim -2nd VP: Chandra Moffat
   b. Elected by acclaim- Treasurer: Ward Strong
   c. Elected by acclaim – Student Representative: Asim Renyard
   d. Elected by secret ballot – Director: Dan Peach
   e. Lisa Poirier thanked outgoing Executive Members
9. New business
   a. Lisa Poirier acknowledged the sad passing of a four of ESBC Members since the last AGM

      Dr. Peter Belton
      Dr. James (Jim) Corrigan
      Dr. Jordan Burke
      Dr. William (Bill) Friend

   b. Outreach Committee – The Outreach Committee proposed a number of projects which could be undertaken by their committee. During the discussion about their proposed projects, several members of the audience cautioned the Outreach Committee to focus on a few projects and not take on too much.

10. Transfer of Presidency: Lisa Poirier passes the gavel to Tammy McMullan.

Adjourn: Tammy McMullan calls for adjournment at 5:02 pm. Dan Peach so moves.

Student Winners

Jessica Fraser (UNBC), receiving ESBC Undergraduate Student Award with Lisa Poirier.
Photo Credits: with Brian van Hezewijk

Yonathon Uriel (UNBC), receiving ESBC Undergraduate Masters Student Award and the James Grant Award
Photo Credits: with Brian van Hezewijk

Andreas Fischer (UNBC), receiving ESBC Graduate Student PhD Award with Lisa Poirier.
Photo Credits: with Brian van Hezewijk

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.

<u>Heather Coatsworth.</u> Title - Characterizing and engineering a dengue refractory phenotype in *Aedes aegypti*

Supervisors - Dr. Carl Lowenberger, Simon Fraser University
Dr. Jim Mattsson, Simon Fraser University
Dr. David Theilmann, Agriculture and Agri-food Canada
Dr. Dawn Cooper, University of Washington

Abstract - Dengue viruses infect ~400 million people annually and are transmitted principally by *Aedes aegypti*. Severe dengue (dengue hemorrhagic fever and dengue shock syndrome) can be fatal, and there are no efficient drugs or vaccines to prevent the disease. Not all *Ae. aegypti* transmit dengue viruses; in Cali, Colombia,

approximately 30% of feral populations are naturally refractory to all four vial serotypes through midgut mechanisms (Cali-MIB), while the remaining 70% are susceptible (Cali-S) and transmit the viruses. We used a combination of molecular biology and bioinformatic methods to identify differences between the refractory and susceptible strains. RNA sequencing, 16S rRNA bacterial profiling, and a genome wide association study (GWAS) were used to flag a subset of genes thought to contribute to the Cali-MIB and Cali-S phenotypes. Genes from this subset that were able to 'flip' the phenotype from susceptible to refractory through RNAi based knockdowns were further tested with gene-editing technology to knock-out these genes using clustered regularly interspaced palindromic repeats (CRISPR) – CRISPR associated protein 9 (Cas9) guide RNA complexes. This research identified multiple genes we believe contribute to vector competence, created a DNA based assay for identifying Cali-MIB and Cali-S mosquitoes, and edited the germ-line of *Ae. aegypti*. This information could allow us to create lines of permanently refractory mosquitoes to dampen dengue transmission.

Official completion date – October 11, 2019 (Defended June 25, 2019)

Kari Zurowski. Title - Reproductive trade-offs in the click beetle, *Agriotes obscurus,* exposed to the fungal pathogen *Metarhizium brunneum*

Supervisors – Dr. Jenny Cory, Simon Fraser University
Dr. Ron Ydenberg, Simon Fraser University
Dr. Alida Janmaat, University of the Fraser Valley
Mr. Todd Kabaluk, Agriculture and Agri-food Canada

Abstract

Several of the more pathogenic fungal species that infect insects have been developed as biological control agents. Adult insects can respond to potentially lifespan-reducing pathogen challenges by fighting infection, allocating resources to resistance over other activities. Alternatively, they can allocate resources to maximizing fecundity in response to early death, the terminal investment hypothesis. The click beetle *Agriotes obscurus* is an agricultural pest, and the fungus *Metarhizium brunneum* is being developed as a control agent. I examined the impact of *M. brunneum* challenge on *A. obscurus* reproduction and whether this changed under different nutritional conditions in beetles of varying ages. Beetles reduced their preoviposition period in response to fungal-induced decreases in lifespan when they were older, resulting in maintained fecundity,

or under starved conditions, although fecundity could not reach the level of fed beetles. These results suggest that *M. brunneum* should be used early in the season when resources are abundant.

Official completion date –Defended September 20, 2019

Dan Peach. Title - Floral and honeydew foraging ecology of select mosquito species

Supervisors – Dr. Gerhard Gries, Professor, Senior Supervisor
Dr. Carl Lowenberger, Professor, Supervisor
Dr. Margo Moore, Professor Emerita, Supervisor
Dr. Sheila Fitzpatrick, Research Scientist, Examiner, Agriculture and Agri-Food Canada
Dr. Woodbridge Foster, Professor Emeritus, External Examiner, Department of Entomology, The Ohio State University

Abstract - Both male and female mosquitoes exploit a wide variety of plant sugar resources, including floral nectar and aphid honeydew, as important sources of carbohydrates. Mosquitoes are generally considered nectar thieves that do not pollinate the flowers they visit, and volatile semiochemicals are believed to be the primary driver of mosquito attraction to plant sugar sources. Using the northern house mosquito, *Culex pipiens*, and its nectar host the common tansy, *Tanacetum vulgare*, we showed mosquito-induced seed-set. We found that semiochemicals from *T. vulgare* flowers are attractive to *Cx. pipiens* and the yellow fever mosquito, *Aedes aegypti*, that visual and olfactory inflorescence cues in combination attract more mosquitoes than olfactory cues alone, and that plant CO_2 enhances the attractiveness of a 20-component synthetic blend of tansy inflorescence odourants. This blend included 9 odourants found in human odour, which are also attractive. Electroretinograms revealed that *Cx. pipiens* eyes can sense ultra-violet (UV) wavelengths, with peak sensitivity at 335 nm. Experiments found that UV inflorescence cues of T. vulgare and the common hawkweed, *Hieracium lachenalii*, enhance the attractiveness of inflorescence odour to female *Cx. pipiens* through floral patterns of UV-absorption and UV-reflection. We then established the attraction of Ae. aegypti to honeydew odourants from the green peach aphid, *Myzus persicae*, and the pea aphid, *Acyrthosiphon pisum*, feeding on fava bean, *Vicia faba*. We collected and analyzed headspace odourants from honeydew of *A. pisum feeding* on *V. faba*. An 8-component synthetic blend of these odourants and synthetic odourant blends of crude and sterile honeydew we prepared from literature data all attracted female *Ae. aegypti*. The synthetic blend containing microbial odour constituents proved more effective than the blend without these constituents. Our data support the hypotheses that mosquitoes are pollinators, that the entire inflorescence gestalt of olfactory, CO_2 and UV cues is more attractive to mosquitoes than floral odourants alone, that olfactory cues attract mosquitoes to honeydew, and that microbe-emitted volatiles play a role in mosquito attraction to honey!

The Entomological Society of British Columbia

SYMPOSIUM - OCTOBER 5, 2019

The "Insect Apocalypse": Good and Bad News about Insect Diversity

Pacific Forestry Centre, 506 Burnside Rd. W, Victoria

PROGRAM

Several recent publications, and considerable media attention, have focused on the "Insect Apocalypse", or possible declines in the diversity and biomass of insects around the globe. Entomologists are only too aware of the need for greater understanding of insect diversity, and of the constraints to achieving that understanding. This symposium will explore some of the current insect diversity research that is happening in BC and the key role of museum collections in advancing biodiversity studies against a background of the recent popular interest in insect declines.

Time	Title	Presenter
8:30 – 9:00	**REGISTRATION**	
9:00 – 9:10	**WELCOME AND OPENING REMARKS**	
9:10-9:45	Counting the Uncounted: Addressing the global insect apocalypse, a pending reality or a Prestonian shortfall.	Neville Winchester University of Victoria International Canopy Network
9:45-10:20	Beetle diversity of British Columbia: state of knowledge, challenges, and insights	Charlene Wood LGL Limited Sidney, BC
10:20-10:45	**BREAK**	

10:45-11:20	Using natural history collections to quantify changes in insect diversity in Vancouver over the last 70 years	Michelle Tseng Biodiversity Research Centre University of British Columbia
11:20-11:55	Apocalypse when? Ongoing research on baseline insect and spider diversity and biogeography in British Columbia	Joel Gibson Curator of Entomology Royal British Columbia Museum
11:55–12:40	**LUNCH BREAK – Lunch Provided**	
12:40-1:15	Plant-Pollinator Interactions of the Oak-savanna: evaluation of community composition and dietary specialization.	Tyler Kelly Department of Biological Sciences Simon Fraser University
1:15-1:50	"Hey, Look What I Found!": An overview of entomological surveys on BC's Central Interior Plateau	Lisa Poirier University of Northern British Columbia Prince George, BC

Entomology in the News

Image of the Day: Ant Attack!
New ant species from Borneo explodes to defend its colony

Amongst the countless fascinating plants and animals inhabiting the tropical rainforests of Southeast Asia, there are the spectacular "exploding ants", a group of arboreal, canopy dwelling ants nicknamed for their unique defensive behaviour.

When threatened by other insects, minor workers can actively rupture their body wall. Apart from leading to the ants' imminent death, the "explosion" releases a sticky, toxic liquid from their enlarged glands, in order to either kill or hold off the enemy. Curiously enough, while these ants' peculiar behaviour was first mentioned in distant 1916, no new species have been formally described since 1935, due to insufficient evidence. Instead, scientists used to simply refer to them as the members of a remarkable species group - *Colobopsis cylindrica*, better known as "the exploding ants". That was until an interdisciplinary research team from Austria, Thailand and Brunei came together led by their shared fascination with these insects and their extraordinary mechanism of self-sacrifice (also called autothysis) in 2014. Thus, entomologists, botanists, microbiologists, and chemists from the Natural History Museum Vienna, Technical University Vienna, IFA Tulln and Universiti Brunei Darussalam together

identified roughly 15 separate species of exploding ants, with one of them now described as new to science in the open access journal *ZooKeys*.
Aptly named *Colobopsis explodens*, previously nicknamed "Yellow Goo" for its bright yellow gland secretion, the new species has been picked as the model species of the group, after the scientists deemed it to be "particularly prone to self-sacrifice when threatened by enemy arthropods, as well as intruding researchers".

Being a "model species" means that the ant will serve as an important navigation point in future studies on exploding ants. Publications regarding their behaviour, chemical profile, microbiology, anatomy and evolution are currently in preparation, say the authors. In addition, there are several more new species expected to be described in the near future.

While minor workers exhibit the ability to "explode", the other castes have specialities of their own. For example, major workers (also called "doorkeepers") have big, plug-shaped heads used to physically barricade the nest entrances against intruders. During a sampling trip to Brunei in 2015, project members Alexey Kopchinskiy and Alice Laciny even managed to observe queens and males on a mating flight. They sampled the first males of these ants ever to be seen.

The same expedition was used to record the ants' activity schedule and conduct the first experiments on food preferences and exploding behaviour.

While the exploding ants play a dominant role in rainforests, their biology still holds a number of secrets. The observations and experiments conducted on the newly described species have laid important groundwork for future research that will uncover even more details about these enigmatic explosive insects.

Watch this video (http://explodingants.com/index.php/publications/colobopsis-explodens) to observe the behaviour of the exploding ants in various settings.

Original source:

Laciny A, Zettel H, Kopchinskiy A, Pretzer C, Pal A, Salim KA, Rahimi MJ, Hoenigsberger M, Lim L, Jaitrong W, Druzhinina IS (2018) *Colobopsis explodens* sp. n., model species for studies on "exploding ants" (Hymenoptera, Formicidae), with biological notes and first illustrations of males of the *Colobopsis cylindrica* group. *ZooKeys* 751: 1-40. https://doi.org/10.3897/zookeys.751.22661

The spotted lanternfly (*Lycorma delicatula*)

Spotted Lanternfly – *Lycorma delicatula*

Source: https://www.inspection.gc.ca/plants/plant-pests-invasive-species/insects/spotted-lanternfly/eng/1433365581428/1433365581959

Background

The spotted lanternfly (*Lycorma delicatula*, Hemiptera: Fulgoridae) is an impressive and colourful insect native to Asia, and has been recognized as a potential threat to the grape, fruit tree and forestry industries in Canada. It was first detected in North America in Pennsylvania in September 2014. As it is not known to exist in Canada, spotted lanternfly was added to the regulated pest list in 2018 in an effort to prevent the introduction from infested areas.

Early detection activities would make managing the pest easier due to the discovery of this insect in the United States and the volume of articles potentially carrying the insect arriving from Asia. It can be distinguished from all other native and naturalized insects (such as planthoppers, moths) in Canada by its unique colouration. If you believe you have found suspect specimens, please contact the Canadian Food Inspection Agency (CFIA).

Identification

Adults are approximately 25 mm long and 12 mm wide. They have uniquely-coloured wings: the front wings are light brown/grey with black spots at the front and dark speckled bands near the back. The rear wings are red in colour and have black spots near the front and white and black bands at the back. The abdomen is yellow with horizontal black stripes (Anonymous. 2014, Barringer, L. 2014) (Photos A and B).

Early stage nymphs are black and white, while later stage nymphs are black, white and red (Photos C and D).
Because of its distinctive appearance, this insect is not easily confused with any other insect known to occur in Canada.

Newly laid egg masses are brown in colour and covered in a grey, waxy coating. Older egg masses lose the coating, and look like seeds arranged in 4 to 7 vertical rows. Egg masses are approximately 25 mm long (Anonymous. 2014, Barringer, L. 2014) (Photo E).

Hosts

The spotted lanternfly feeds on various host plants throughout its development. Nymphs feed on a wide range of plant species, while adults prefer to feed and lay eggs on tree-of-heaven (*Ailanthus altissima*), also known as the Chinese or stinking sumac. Other hosts include grape (*Vitis*), apples (*Malus*), plums (*Prunus domestica*), cherries (*P. avium*), peaches and nectarines (*P. persica*), apricots (*P. armeniaca*), and pine (*Pinus)*. It also feeds on oak (*Quercus*), walnut (*Juglans*), and poplar (*Populus*) (Anonymous. 2014, Barringer, L. 2014, Lee, J.-E., Moon, S.-R., Ahn, H.-G., Cho, S.-R., Yang, J.-O., Yoon, C.-M. and Kim, G.-H. 2009, Park, J.D., Kim, M.Y., Lee, S.G., Shin, S.C., Kim, J.H., and Park, I.K. 2009).

In Pennsylvania, adult spotted lanternflies have been found feeding and laying eggs on willow (*Salix*), maple (*Acer*), poplar (*Populus*), sycamore (*Platanus*), as well as on fruit trees, such as plum, cherry, and peach. In addition, they have been found on grape, tulip tree (*Liriodendron*) and cork-tree (*Phellodendron*) (Xiao, G.R. 1992).

Location of Infestation Within Tree

Eggs are laid on smooth host plant and non-plant surfaces adjacent to host plants, such as bricks, stones, lawn furniture, vehicles and other structures (Anonymous. 2014, Barringer, L. 2014, Greig, G. 2014). Eggs hatch in spring or early summer, and nymphs then disperse from their hatching site in search of a host (Park, J.D., Kim, M.Y., Lee, S.G., Shin, S.C., Kim, J.H., and Park, I.K. 2009). Feeding is communal, and the honeydew that the insects excrete can attract other insects such as bees and wasps. Adults develop in late July and focus their feeding on tree-of-heaven and grapevine (*Vitis vinifera*). Both nymphs and adults feed by sucking sap from young stems and leaves (Ding, J., Wu, Y., Zheng, H., Fu, W., Reardon, R., and Liu, M. 2006). Nymphs and adults tend to congregate in large numbers on the host plant, either at the base of the tree or in the canopy. They are easiest to locate at dawn and dusk when they are migrating up and down the tree (Anonymous. 2014, Barringer, L. 2014).

Host Condition

There is no indication that host condition causes a plant to be more or less susceptible to attack.

Distribution

The spotted lanternfly is native to China, India, Japan, Vietnam, and has been introduced to Korea where it is considered a pest (Anonymous. 2014, Barringer, L. 2014, Park, J.D., Kim, M.Y., Lee, S.G., Shin, S.C., Kim, J.H., and Park, I.K. 2009). It was first detected in North America in Pennsylvania in September 2014 (Anonymous. 2014, Barringer, L. 2014). Once introduced, it can disperse short distances through

walking or flying, and it can be moved long distances through human-assisted transport of all life stages, especially egg masses (Anonymous. 2014, Barringer, L. 2014).

Signs and Symptoms

Adults and nymphs feed on sap that they suck from leaves and stems of host plants. This causes sap to excrete from wounds ('weeping' wounds), which appear grey or black and can occur along the stems, branches or trunk of the tree. Weeping wounds are also caused by debris (frass) and honeydew buildup from the spotted lanternfly. This can attract other insects to feed on the tree. The spotted lanternfly was first discovered in Pennsylvania because of bees that had been attracted to the honeydew (Spichiger, S.-E. 2014). These fluids can prompt fungal growth and lead to mould patches occurring at the base of the tree which may give off a fermented odour and cause the eventual death of the plant (Ding, J., Wu, Y., Zheng, H., Fu, W., Reardon, R., and Liu, M. 2006). Mould patches are yellowish-white in colour (Anonymous. 2014, Barringer, L. 2014).

Pictures

A. Adult spotted lanternfly (*L. delicatula*)

B. Adult spotted lanternfly

B. Early-stage nymph spotted lanternfly

D. Late-stage nymph spotted lanternfly

E. Spotted lanternfly egg mass, new

F. Spotted lanternfly egg mass, old

G. Weeping wound caused by spotted lanternfly

H. Mould patch caused by spotted lanternfly

Photo Credits

A. Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org
B. Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org
C. Ekkehard Wachmann, used with permission
D. itchydogimages, used with permission
E. Holly Raguza, Bugwood.org
F. Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org
G. Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org
H. Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org

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Laricobius nigrinus, (Coleoptera: Derodontidae). Predator of hemlock woolly adelgid, *Adelges tsugae*. Native to the Pacific Northwest. Photo credit: http://ohiodnr.gov/portals/0/images/hwa/Lnigrinus.jpg

July 21 BioBlitz at Stanley Park!

The ESBC and the Stanley Park Ecological Society (SPES) partnered to hold an entomology bioblitz in Stanley Park on July 21st. This event included day-time surveying, a pond dip to show aquatic insects to kids, and an evening light-trapping event. Over 20 entomologists attended, as did many eager members of public from all age groups. Nearly 100 different species were observed during the event, many of which were first records for the park and some of which are species of conservation concern. The event was such a success that SPES has expressed interest in having us back again next summer, so stay tuned!

The collaboration was organized by Dan Peach, Former ESBC Graduate Student Director. The Society Executive is grateful for Dan's initiative—it was a fun day at the park.

Tammy McMullan, ESBC President, and Dan Peach, get the display ready.
Photo Credits: Tracy Hueppelsheuser

Tammy McMullan and Dan Peach at the Stanley Park Bioblitz table.
Photo Credits: Tracy Hueppelsheuser

Teams out searching for arthropods. Photo Credits: Tracy Hueppelsheuser

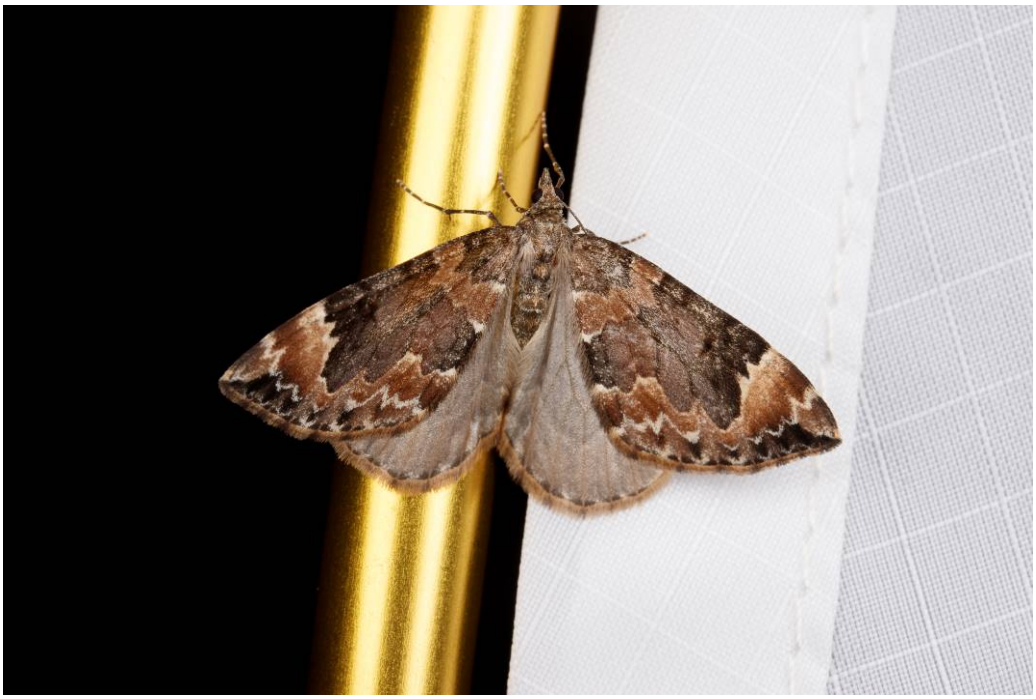
Wood boring beetle larvae and interested spectators. Photo Credits: Tracy Hueppelsheuser

What is in the water? Photo Credits: Tracy Hueppelsheuser

An intrepid entomologist which a penchant for dragonflies—look closely at his nose!
Photo Credits: Tracy Hueppelsheuser

Dan Peach setting up a light trap.
Photo Credits: Sean McCann

Bumblebee observed at the Stanley Park Bioblitz. Photo Credit: Sean McCann



Dysstroma moth observed at Stanley Park Bioblitz. Photo Credit: Sean McCann

Scientific Note-- Alien Invasion Thwarted: nest of Asian Giant Hornet, *Vespa mandarinia* extirpated in Nanaimo, BC. Conrad Bérubé

The Asian Giant Hornet (AGH), *Vespa mandarinia* is the largest eusocial wasp in the world (workers are about 3.5 cm in length and queens 4-5 cm). Nepal is the northwestern extremity of its native range, which extends, from there, east across to Japan and south to the limits of tropical southeast Asia. Like other members of the genus, *V. mandarinia* is a eusocial carnivore which preys on many insects but, in particular, on other eusocial insects, especially honey bees.

The Western honey bee, *Apis mellifera,* did not coevolve with *V. mandarinia* and has little effective defense strategies against it. A concerted attack by several dozen workers of *V. mandarinia* can destroy an entire colony of more than 25,000-30,000 *A. mellifera* in a matter of a few hours[i]. Thus, the establishment of *V. mandarinia* in British Columbia would represent a substantial threat to the beekeeping industry already beleaguered by the Varroa mite and pesticide exposure.

In addition, *V. mandarinia* will vigorously defend the area around its nest against human incursions. The sting mechanism of *V. mandarinia* is approximately 6 mm long and can penetrate through leather work gloves or multiple layers of clothing. A single sting can cause tissue necrosis for several millimeters in radius and depth—as well as the pain and swelling typically associated with hymenopteran venom. People receiving multiple stings often require medical attention and massive stinging (10+) or allergic reaction may result in serious symptoms including death. In Japan, *V. mandarinia* is responsible for approximately 40 deaths each year[ii]. Hence, aside from impacts to beekeeping and other aspects of the ecosystem, the establishment of *V. mandarinia* in suburban areas with woodland interfaces, such as Nanaimo, would result in negative public health impacts.

In early August of 2019, John Duff, a Nanaimo beekeeper, noticed two alarmingly large wasps harassing honey bees at the entrance to one of his hives. He collected the specimens and sent his unfamiliar find to the provincial apiculturist, Paul van Westendorp, who identified them as workers of *V. mandarinia* (subsequently confirmed by Dr. Graham Thurston and David Holden of the Canadian Food Inspection Agency (CFIA), Ottawa and Burnaby, respectively, and Dr. Jun-ichi Kojima of Ibaraki University, Mito, Japan)—which indicated that a nest of *V. mandarinia* had been established in Nanaimo. This was the first confirmed record of the species being found in North America. These and other subsequent finds were reported to the Invasive Species Counsel of British Columbia which was coordinating intergovernmental efforts to monitor and eradicate the hornets.

van Westendorp contacted hobby beekeepers in Nanaimo to enlist their assistance in monitoring for the hornet. On the evening of September 18, 2019, as advance work for

a systematic search being planned, John and Moufida Holubeshen roughly triangulated the most likely site for a nest to a wooded path in the south western portion of Nanaimo (49.149521, -123.943553). While walking along the path, John Holubeshen saw suspected *V. mandarinia* flying above the trail every three to five seconds. They followed the flight path and located the ground nest entrance, while still on the trail, and some five meters from it. As they observed the hornets from that distance to the otherwise undisturbed colony, John was stung through his shirt (which he described as feeling like a kick to the chest). They then contacted Peter Lange, President of the Nanaimo Beekeepers Club, of which they are also officers, and Conrad Bérubé, another local beekeeper, who has experience, and equipment for, collecting entire colonies of several species of yellow jackets for the pharmaceutical preparation of desensitization serum.

The rapidly assembled team girded themselves in standard beekeeping equipment and gathered near the nest site. Bérubé, who was to conduct the actual extraction, also bore additional protection, including a Kevlar vest and bracers of the type commonly used to guard against chainsaw injury, as well as two pairs of pants. Carbon dioxide and isopropyl alcohol (physical controls that are exempt from the provincial restrictions to the use of chemical pesticides on public land) were used to subdue and preserve the wasps during (leather gloved) hand extraction of the wasps and comb. (A domestic aerosol wasp and hornet foam--again exempt from provincial restrictions-- was applied to the base of the nest cavity before it was refilled with excavated soil.) Bérubé took at least seven “false stings”, through clothing, which, generally, prevent delivery of a full load of venom. Nonetheless, the initial pain was described as "similar to having red hot thumb tacks driven into the flesh". It is likely that individuals who are not beekeepers, like Holubeshen and Bérubé who have developed some tolerance to hymenopteran venom, would have had more severe reactions to stings of *V. mandarinia*. Four dinner-plate-sized combs, consisting of roughly 400 cells, containing brood, including developing reproductives, were removed from the nest-- along with about two hundred workers and the queen. Specimens have been distributed for study to the BC Museum of Natural History, Ministry of Agriculture, Ministry of Environment, CFIA and University of British Columbia).

Like other eusocial wasps, nests are annual, founded by a single gyne, which mates in the fall and then overwinters in a sheltered locale from which she seeks a nesting site in the spring. There is no means of ascertaining how the introduction occurred, but it is quite possible that a mated gyne arrived in a cranny of a shipping container or imported goods and, hopefully, our efforts have resulted in the extirpation, of the hornets' temporary beachheaded. Despite much media attention, the only confirmed sightings of *V. mandarinia* following the extraction were straggler workers that had returned to the original nest location (which had become much more prominent from the digging operation).

[i] Kenji Hashizoe, Alistair MacEwen, & Sue Western. 2007. Buddha, Bees and the Giant Hornet Queen, BBC Natural World (TV Series). Available from https://www.dailymotion.com/video/x6bbkeb

[ii] Yanagawa,Y., Morita, K., Sugiura, T. & Okada, Y. 2007. Cutaneous hemorrhage or necrosis findings after *Vespa mandarinia* (wasp) stings may predict the occurrence of multiple organ injury: A case repoeach rt and review of literature. *Clinical Toxicology.* **45:**7, 803-807 Available from DOI: 10.1080/15563650701664871

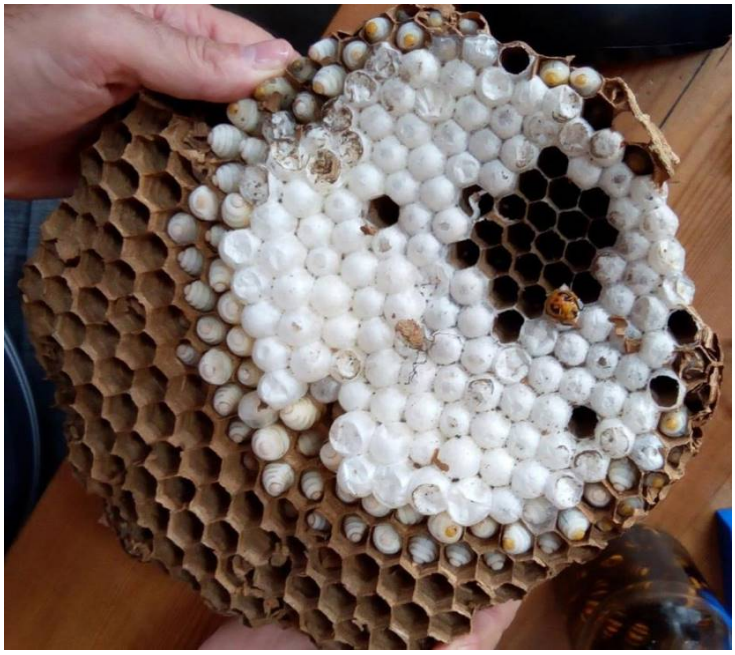
A video synopsis of the AGH extraction/extirpation exercise is available at https://youtu.be/DXZeS1g7oxM

"Slap, snap, zap & wrap" poster is available at http://beesforbabar.org/pdf/20190923slap,snap,zap&wrap_legal.pdf

Clockwise from top *V. mandarinia* worker, *V. mandarinia* queen, *Vespula germanica* worker, *Apis mellifera* worker. Photo Credit: Conrad Bérubé

From left to right, the extraction/extirpation team: John and Moufida Holubeshen, Peter Lange and Conrad Bérubé. Photo Credit: Conrad Bérubé

Conrad Bérubé extracting CO_2 anesthetized V. mandarinia from ground nest.
Photo Credit: Moufida Holubeshen



Vespula mandarinia life stages in extracted comb. Photo Credits:

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.

NORTH OKANAGAN NATURALISTS' CLUB

DATED: _____ _____

PRESIDENT

What is a Mentor? By Jocelyn R. Holt **Article came from Entomology Today (ESA)**

"A mentor is someone who allows you to see the higher part of yourself when sometimes it becomes hidden to your own view." —Oprah Winfrey

At every stage in our lives or careers, we need mentors to guide us through personal and professional milestones. A mentor can inspire new ideas on time management, studying, teaching, writing, or any other part of your professional life. Mentors provide advice on important decisions that stem from their personal experience and expertise.

Mentorship can be an official, documented interaction set up through a program such as a research advisor, or it can be a more informal interaction where you identify someone who is an expert in a particular skill and ask them for advice. An important aspect to remember is that different individuals may be great mentors for particular areas. For example, I have a research and writing mentor, a teaching mentor, and an efficiency mentor, to name a few. Each mentor provides me with insight that helps me become a more productive and successful version of myself.

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Regardless of the official title an individual has, a person who functions as your mentor or advisor should have your best interest in mind. A mentor should provide you with useful information or access to resources that allow you to grow personally or professionally in your scientific career.

Identify a Potential Mentor

First, think of areas that you would like to improve either in your personal or professional life. Then identify potential mentors that have an area of expertise that you would like to improve. Ask yourself, "How will this person allow me to become a better researcher, writer, teacher, or communicator?" Importantly, a mentor does not need to share all of the same values and perspectives that you do. In fact, differences in experiences and perspectives help us to expand our world views. Since this person will provide you with advice in areas in which you feel deficient particularly during stressful situations, it is important to select a mentor that you trust and respect.

When I look for a potential mentor, I review their expertise and ask my peers about their interactions with them. I find that asking a potential mentor if they have time to talk (either face-to-face or via email) is a good way to engage someone, especially if you do not know them well. At the end of the conversation, I often know if the interaction was positive, which allows me to follow up with future questions or a formal mentorship request. Communicating well with someone promotes a beneficial interaction during the mentoring process and may increase the likelihood that both mentor and mentee gain something from the experience.

Remember that an experienced mentor will identify possible obstacles and solutions before you do. This person may not always tell you what you would like to hear; however, constructive feedback can go a long way in developing a better skillset. And if a person is unable to serve as your mentor, do not be discouraged. People have busy lives and their plate may already be full of commitments. Identify a new potential mentor and try again.

Entomology Educational Opportunities in Canada

The Entomological Society of Canada published 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 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 Dosdall Memorial Scholarship
- Biological Survey of Canada Scholarship
- Keith Kevan Scholarship
- Entomological Society of Canada Ed Becker Conference Travel Awards

Educational Opportunities in Canada

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

Graduate Research Opportunities

MSc or PhD Student (5 Positions)
Agriculture and Agri-Food Canada (Saint-Jean-sur-Richelieu R&D Centre)
Application deadline: None listed; Start date: As soon as possible and no later than fall 2020
Details: https://drive.google.com/file/d/10WUScOB6d2IdAmN17cGamnDuz3kHFDhc/view

MSc Student – Mosquito and tick vectors of infectious disease
Brandon University (Brandon, Manitoba)
Application deadline: Open until filled; Start deadline: Spring 2020 preferred

PhD opportunities in the UK
https://www.findaphd.com/phds/biological-and-medical-sciences/?10gc00&PG=3&Keywords=insect

MSc opportunities in the UK
https://www.findamasters.com/masters-degrees/biological-sciences/?1001&Keywords=insecthttps://www.educations.com/search/masters-degrees?q=insectPost-doctoral

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/

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

Japan Coleopterists Society http://www.mus-nh.city.osaka.jp/shiyake/j-coleopt-soc.html

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

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

Croatian Entomological Society http://www.agr.unizg.hr/hed/index.htm

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

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

Butterfly Conservation of the Republic of China http://butterfly.kingnet.com.tw/

BC Butterfly Atlas

Supporting Butterfly Conservation through Collaboration: The BC Butterfly Atlas

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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 Atlas[1] and butterfly atlassing projects in other jurisdictions (e.g., Butterflies of the New Millenium (UK)[2], Maritimes Butterfly Atlas[3], and atlases in several US states), we are initiating a citizen-based survey and atlassing 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 atlassing project would seek to fill this information gap while increasing public awareness and support for butterfly conservation.

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[1] http://www.birdatlas.bc.ca

[2] http://www.butterfly-conservation.org

[3] http://www.accdc.com/butterflyatlas.html

Photo Credit: Tammy McMullan

Obituary: Margriet Dogterom

It is with considerable sadness that I write to report Margriet Dogterom passed away recently, at the age of 73. Margriet spent well over a decade in my SFU laboratory, as a Research Technician running the lab, an M.Sc. student (developing methods to mass overwinter honey bee queens), and then a Ph.D. student (studying four different species of bees as blueberry pollinators). Upon graduation, she founded a very successful company, Beediverse, providing pollination consulting and mason bee-related products.

Margriet was a person overflowing with life and energy, invariably enthusiastic and determined, and never hesitant to jump into new challenges. She was a scientist through-and-through, inquisitive and curious, but also with a knack for designing experiments and the work ethic to see them through. Two decades ago, before mason bees had become popular, she opened that door, and it is largely because of her efforts that mason bees have become an integral part of the Canadian pollination scene. She designed and sold nests, collected and sold bees, and published a readable and informative book, *Pollination with Mason Bees*, that has sold almost 30,000 copies.

Margriet was always gracious and generous to those around her, and invariably willing to give her time to individuals and communities. She loved anything outdoors, especially hiking, and was a fixture on the local Contra dancing scene for many years. “Bold” comes to mind, with a booming infectious laugh as one of her trademarks.

She was proud of her Dutch descent, and her Australian upbringing. Bees were not her first profession; she was a successful medical technologist when the call of bees drew

her into a new career. Her courage in making such a radical career change, and confidence that she could make it work, were typical; when Margriet did anything, she was all in. Yet, she made time for those around her, friends and family and the wider pollinator community, and reveled in the small moments that reveal the beauty of nature.

I encourage any of you who knew her to share your thoughts and memories. May her memory be for a blessing.

Mark L. Winston, FRSC
Professor and Senior Fellow
Morris J. Wosk Centre for Dialogue
Simon Fraser University

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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