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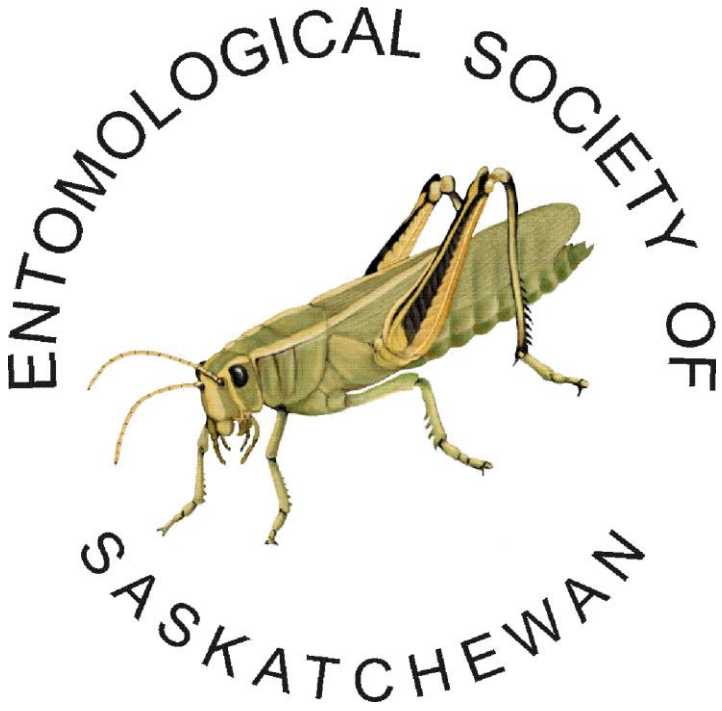

Volume 65
2017

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Proceedings of the Entomological Society of Saskatchewan

Volume 65 Editor: Iain Phillips

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Editor's comments

The Society had 78 members (48 full members and 30 students) including 20 Life Members in 2017. A copy of the Proceedings of the Entomological Society of Saskatchewan for 2016 was given to the Saskatchewan Archives.

Executive, Officers and Committee Members 2017

Executive:

President ..... Cory Sheffield
Vice-President ..... Danielle Stephens
Past President ..... Tyler Wist
Secretary ..... Iain Phillips
Treasurer ..... Dwayne Hegedus

Committee Chairs:

Youth and Amateur Encouragement ..... Chrystel Olivier
Newsletter Editor ..... David Halstead
Proceedings Editor ..... Iain Phillips
Honours and Awards ..... Tyler Wist
Microscope ..... Iain Phillips
ESS Website ..... Jeff Boone
Archives and Heritage……Martin Erlandson
Nominations……..Doug Baldwin

Regional Director to the ESC ..... Boyd Mori

Auditors: Wayne Goerzen and Owen Olfert

Minutes of the 2017 Spring Meeting of
the Entomological Society of Saskatchewan
Agriculture Canada Research Station, Saskatoon
2nd Floor Conference Room
13:30, April 21, 2017

PRESENT: Nicole Pillipow, Dwayne Hegedus, Martin Erlandson, Keith Moore, Cedric Gillott, Tyler Wist, Meghan Vankosky, Stephen Srayko, Joel Houston, Doug Baldwin, Bryan Ulmer, Patricia Okorie, Boyd Mori, Danielle Stephens, Dan Wiens, Marianna Horn, Inger Pors, Jeff Boone, Iain Phillips

SCIENTIFIC PROGRAM

Guest Presentation – Sean Prager

1:30-2:15 Presentation by Dr. Sean Prager on the following: "Choice and Preference in Arthropods. AKA, Choosy Critters Prefer…"

BUSINESS MEETING

14:15 Call to Order – Cory Sheffield

1) Introduction of the Members
2) Approval of Agenda
- Bioblitz added in Item 10
- Greetings from the Entomological Society of Canada right after agenda

Motion: Martin Erlandson/Tyler Wist. THAT the proposed agenda be adopted.

CARRIED.

3) Minutes of the fall meeting – December 9th, 2016
   a. Minutes not yet prepared.

4) Treasurer's Report - Dwayne Hegedus (Appendix A**)**
   a. ESS membership is strong and ESS is financially strong
   b. The ESS currently has 76 members, 46 of which are students
   c. 20 life members, and Tyler Wist is now a new life member.
   d. Sean Prager is the newest member of the society
   e. General activities – see the Treasurer's Report

MOTION: Tyler Wist/Cedric Gillott. THAT the ESS accept the Treasurer's Report.

CARRIED.

5) **Secretary's Report** – Iain Phillips (Secretary)
    a. No report to submit.
    b. Little activity since the fall meeting.

MOTION: Tyler Wist/ Meghan Vankosky. THAT the ESS accept the Secretary's Report.

CARRIED

6) **Newsletter Editor's Report – Nicole Pillipow**
    a. May edition will be coming out in late May
    b. Nicole asks if there is a preference for the release date of the fall newsletter.
    c. Jeff Boone suggests that a newsletter coinciding with the fall award announcements would be good.

MOTION: Danielle Stephens/Cedric Gillott. THAT the ESS accept the Newsletter Report.

CARRIED

7) **Regional Director's Report – Boyd Mori and Jeff Boone**
    a. Boyd Mori and Jeff Boone will be participating in a meeting on this coming Monday
    b. The ESC is looking at ways to improve membership and revenue streams.

MOTION: Tyler Wist/Marianna Horn. THAT the ESS accept the Regional Director's report.

CARRIED

8) **Committee Reports**
    a. **Amateur Encouragement** – Tyler Wist (Youth and Amateur Encouragement Report; Appendix B)
        - Thanks to the volunteers who manned the Gardenscape volunteers who manned the booth at the function.
        - Next years is March 23rd-25th and will be called the Blue Cross Gardenscape
        - Over 22K people passed through
        - Good-bugs bad bugs done on March 21st, and went well.

- Because ESS does the Gardenscape event GBBB, we get registration to Gardenscape for free.

b. **Archives and Heritage** – Martin Erlandson
   - Nothing to report on archives
   - Dr. Chris Hinks passed away in November, and his obituary was in the ESC March Bulletin.

c. **ESS Website** – Jeff Boone

d. **Microscope** – Iain Phillips
   - Microscope has been returned and an article has been requested for the newsletter.

e. **Honours and Awards** – Tyler Wist
   - Charlie Bailey received the Entomological Activities Award. Tyler Wist requested that she contribute a note on what the resources were used for to the newsletter.
   - Tyler Wist requests that students and members submit applications for the Brooks and travel awards.

f. **Nominations Committee**
   - Nothing to report

MOTION: Jeff Boone/Boyd Mori. THAT the ESS accept the Committee Reports.

CARRIED.

9) New Business

a. **Nature City Festival** – 7 days to apply for hosting

b. **Bugs on the Menu** - There was a showing of "bugs on the menu" in Saskatoon – Cory Sheffield.

c. **Bio Bioblitzes** – 2 of them for the Canada 150
   - **i.** Bioblitz Regina – they want to keep track of registration
   - **ii.** In these bioblitzes the organizers want the iNaturalist App involved in order to record occurrences of species.
   - **iii.** Regina bioblitz is going on over 24 hours – June 9th at Friday at the Wascana Marsh area, focused near the Science Centre in Regina.
   - **iv.** Cypress Hills bioblitz – 5 day bioblitz July 27th to the 31st.
   - **v.** Register for the bioblitz through Canada 150? Tyler Wist asks how to register. Cory Sheffield will provide instructions to Iain Phillips to circulate to the membership.

10) Date of the Fall AGM

a. December 1st, 2017

11) Adjournment

MOTION: Cedric Gillott. THAT the ESS adjourns the spring meeting 2017.

CARRIED.

Appendix A: Treasurer's Report

ENTOMOLOGICAL SOCIETY OF SASKATCHEWAN
MEMBERSHIP AND INTERIM FINANCIAL REPORT

01 September 2016 – 31 March 2017

MEMBERSHIP

- To this point in 2016-2017 the ESS has 76 members (46 Full and 30 Students – 20 are Life Members) of which 44 are in good standing. Tyler Wist is a new Life Member of the Society.

ESS GENERAL ACTIVITIES

- The main sources of income to date were from membership dues with $600.00 collected and interest income of $0.20.

FINANCE

- The ESS total assets are as follows:

Term Deposits (balance plus accrued interest)			
	#007	12,102.64	
	#009	15,774.64	
	#011	12,262.81	
	#012	10,547.10	
Checking		3,376.27	
Outstanding deposits		25.00	
Outstanding liabilities		(0.00)	
Total		**54,088.46**	**(55,516.98 in 2016)**

- Registered Charity and Non-Profit Corporations status was renewed*.
- Registered Charity Tax Return was filed in December.

Please refer to the enclosed financial statement for further details.

Financial Statement – Entomological Society of Saskatchewan
01 September 2016 – 31 March 2017

MAXIMIZER ACCOUNT (ESS)

Receipts:

Memberships	$	595.00
Outstanding deposits		25.00 (memberships)
Interest (CU Maximizer and Term Deposit)		0.20
ESC Amateur Encouragement Allowance		600.00
TOTAL		**1220.20**

Expenditures:

Printing	0.00
Information Services Corp	25.00
Brooks Award	500.00 (S. Srayko)
Travel Award	500.00 (C. Bailey)
Student Award	100.00 (R. Parkinson)
Meeting Expenses	55.67
Postage	0
Bank Charges	0
Misc. (PayPal Fees)	19.87
TOTAL	**1200.54**

Excess of Receipts over Expenditures $ **19.66**

Appendix B: Youth and Amateur Encouragement Report

Entomological Society of Saskatchewan Inc.

Saskatoon Research Centre

107 Science Place

Saskatoon, Saskatchewan S7N 0X2

April 21st 2017 ESS Spring Meeting

Youth and Amateur Encouragement Report

Saskatchewan Blue Cross Gardenscape 2017 (March 24th- 26th)

Thanks to our ESS volunteers who manned the booth over the Gardenscape weekend!

Our booth volunteers were: Nina Mohr, Shane Hladun, Daniel Wiens, Ruwandi and Sam Andrahennadi, Nancy Tyler, Cedric Gillott, Owen Olfert, Leila Benmerrouche, Dave Halstead, Martin Erlandson, Art Davis, Meghan Vankosky and Tyler Wist. Thanks as always to Ruwandi Andrahennadi, for providing live insects.

The attendance at this year's Gardenscape show was 22, 047. Next year's Saskatchewan Blue Cross Gardenscape will be on 2018, March 23 - 25. Our display was in Hall C and we shared with the massive Plant Sciences display and one of the speaker's stages.

Good bugs/Bad Bugs (in Agriculture in the Classroom)

Wed March 21st to Thursday March 23rd 2017

This event is run by the Agriculture in the Classroom provincial program and ties into the Grade three curriculum. Each session, and there are three per day x 3 days, includes five 15 minute presentations to one grade three classroom at a time = a total of 45 grade three classrooms that get to hear our Good Bugs/Bad Bugs presentation. We do about seven minutes of talking per session (depending upon who's talking!) followed by eight minutes of showing the insect display and answering questions. One of the sessions was cancelled though due to freezing rain

preventing the Warman school from busing in for the second morning session. This event allows us free entrance into Gardenscape (a $700 value). The venue changed from Hall B with a nice carpeted floor and soft curtains separating the speaker's booths to cement walled and floored "classrooms" in the Hall E Foyer which made the noise level of a group of grade threes "difficult". We hope that they move the event back to where it was in future years.

This year we had a personal reply from Kirsten Falzarano, Program Coordinator

"On behalf of Agriculture in the Classroom and Prairieland Park, I want to thank you very much for participating in this year's Garden Experience! If you could pass on my thanks to your volunteers, I'd really appreciate it! I've had a chance to go through all of the teacher evaluations and the reviews and comments were very positive! 93% of teachers (26 out of 28) rated the event as excellent (the other 2 indicated good). Based on the teacher feedback, the Good Bugs/Bad Bugs station was the favourite, by far! Teachers and students really enjoyed learning about the bugs and the only complaint was that they wanted more time at your station! In your presenter survey, you indicated that it was hard to find volunteers to commit to the three day program during the work week, so I wanted to make sure you knew just how much the kids loved your session!!"

I hope you enjoyed your experience this year and if there are any additional comments or suggestions you'd like to make in order to improve future events, please don't hesitate to let me know!

Thank you again and I look forward to working with you next year!
Kirsten
Thank you to our ESS members for volunteering and making this event a success:, Dwayne Hegedus, Julie Soroka, Owen Olfert, Meghan Vankosky, Marianna Horn, Boyd Mori, Doug Baldwin and Tyler Wist.

Best student feedback that I could remember: "I never want to leave!" "Good bugs are like superheroes and bad bugs are like supervillains", I was making wing motions behind me to help the students guess what else was attached to an insect thorax beside legs and one boy yelled out "Their butts!" and then passed gas on cue. Amazing. One student mused that her dog must be a bad bug because its eats the plants in their garden. Another girl called Doug an insect killer. One girl said to the pinned insects "I love you bugs". One said to us "This is my favorite session!".

No one cried again this year when they were moved on from the insect display like in 2013 but the Composting Group told us that students were often disappointed when they arrived at their Composting session because it wasn't our insect session.

Rotary Club speaking engagement: Feb 8th 2017 7:00 PM

Tyler Wist presented to the Rotary Club of Saskatoon Riversdale (c/o Gerry Kraay, Rotary Club of Saskatoon Riverside) about insect olfaction, parasitism and insect vectoring of diseases at the Smitty's Restaurant in Market Mall.

Ag in the City: Saturday April 8th 2017 at Lawson Heights Mall 10:00-4:00 PM

This event didn't coincide with Gardenscape this year which freed up our volunteer and insect resources!

We used the items that AAFC Communications purchased for this event: a briefcase with acrylic encased insects, arachnids and others and added our Saskatchewan insects pinned drawers, the "pest in your house" pinned display and some of the exotic pinned beetles and butterflies.

Thanks to Owen Olfert, Tyler Wist and new ESS members Boyd Mori and Meghan Vankosky for manning the booth this year and to Ruwandi Andrahennadi for providing live insects for the display.

ESC Public Education Committee update: We have received $600 for outreach ($200 x three years) from the ESC.

Respectfully submitted,

Tyler Wist ESS Youth and Amateur Encouragement Committee Chair

Minutes of the 2017 Fall Meeting of
the Entomological Society of Saskatchewan
Agriculture Canada Research Station, Saskatoon
2nd Floor Conference Room
13:30, December 15th, 2017

PRESENT: Chrystel Olivier, Ruwandi Andrahennadi, David Halstead, Leila Benmerrouche, Kirsten Palmier, Sean Prager, Danielle Stephens, Julie Soroka, Lorraine Braun, Boyd Mori, Cedric Gillott, Owen Olfert, Art Davis, Wayne Goerzen, Keith Moore, Branimir Gjetvaj, Martin Erlandson, Meghan Vankosky, Doug Baldwin, Zach Balzer, Jessica Thoroughgood, Chulantha Diyes, Matt Yunik, Stephen Srayko, Aaron Bell, Daniel Wiens, Dwayne Hegedus, Iain Phillips

SCIENTIFIC PROGRAM

Student presentations presented below, with full abstracts following the agenda.

Student Presentations (for abstracts see Appendix A)

1:30-1:45 **Maloney, Erin M**., Christy A. Morrissey, John V. Headley, Kerry M. Peru, and Karsten Liber

Neonicotinoid Mixtures: Characterizing Joint Toxicity to Non-Target Insects under Laboratory and Field Conditions

1:45-2:00 **Thoroughgood, Jessica**, and Neil Chilton

Fleas and their associated *Wolbachia* endosymbionts.

2:00-2:15 **Balzer, Zach**, and Art R. Davies

Prevalence and Orientation of *Stylops* (Strepsiptera: Stylopidae) within its host, *Andrena milwaukeensis* (Hymenoptera: Andrenidae).

2:15-2:30 **Palmier, Kirsten**, Andrew Cameron, and Cory S. Sheffield

Determining the Presence of Bumble Bee Pathogens (Nosema bombi, Deformed Wing Virus) in Native Saskatchewan Bumble Bees (Bombus spp.).

2:30-2:45 **Yunik, Matt E. M.**, Terry D. Galloway, L.R. Lindsay, and Neil B. Chilton

The Obligate Parasites Obligate Mutualists: Potential role of microbial communities in the life history of the American Dog tick.

2:45-3:00 **Diyes, Chulantha**, W.A. Inoka P. Karunaratne, S. H. P. Parakrama Karunaratne, and Rupika Subashini Rajakaruna

Life history, insecticide susceptibility and biological control of spinose ear tick *Otobius megnini* associated with horse otoacariasis in Sri Lanka.

COFFEE BREAK

3:30 Presentation of Awards

1) Brooks Award
    a. No award this year.
2) Travel Awards
    a. Jeff Boone awarded $500 for travel to the Entomological Society of Canada meeting 2017
3) Student Presentation Award
    a. Jessica Thoroughgood
4) Gold Harvest Award
    a. Owen Olfert
5) Lifetime Achievement Award from Agriculture Canada
    a. Owen Olfert

BUSINESS MEETING

3:45 Call to Order – Cory Sheffield

1) Introduction of the members and distribution of sign in sheet
2) Approval of Agenda
    a. Doug Baldwin provided edits of the agenda
        i. Meghan misspelled, needs an ‘a’ in the present section and the motion line in section 5
        ii. Cory misspelled in section 9b
        iii. Section 7c Neil Holliday comment incomplete.

Motion: Sean Prager/Martin Erlandson. THAT the proposed agenda be adopted.

CARRIED.

3) Minutes of the Spring Meeting – April 21st, 2017
   a. Doug Baldwin provided edits of the minutes.

Motion: Sean Prager/ Chrystel Olivier. THAT the minutes of the spring meeting April 21st, 2017, be adopted.

CARRIED.

4) Business Arising from the Minutes

5) Treasurer's Report – Dwayne Hegedus (See Appendix B)
   a. Dwayne is resigning as Treasurer
   b. Only 20 years ago Julie Soroka asked Dwayne Hegedus to take up the position.
   c. Membership very strong.
      i. Student membership increasing steadily
      ii. Membership has been decreasing slightly on account of the ESC conference a few years ago.
   d. Main source of income is from membership dues.
   e. ESC gave us $600 for youth and amateur encouragement
   f. Owen Olfert and Wayne Goertzen audited the books.
   g. Tax return filed in December (last week)
   h. Matrin Erlandson thanks Dwayne Hegedus
   i. Tyler Wist taking over as Treasurer.

MOTION: Iain Phillips/Owen Olfert. THAT the ESS accept the Treasurer's Report.

CARRIED.

6) Secretary's Report and Proceedings – Iain Phillips
   a. Agendas and minutes prepared for 2017

MOTION: Aaron Bell/Sean Prager. THAT the ESS accept the Secretary's Report.

CARRIED.

7) Newsletter Editor's Report – Nicole Pillipow
   a. No report.
   b. Aaron Bell will reach out and help.

8) Regional Director's Report – Boyd Mori (See Appendix C)
   a. Next meeting will be huge, in Vancouver 2018.

b. Executive has agreed to swap with Entomological Society of British Columbia and will host in 2025 here in Saskatchewan

MOTION: Tyler Wist/Danielle Stephens. THAT the ESS accept the Regional Director's report.

CARRIED.

9) Committee Reports

a. Amateur Encouragement – Tyler Wist
   i. Tyler is also on the Entomological Society of Canada Amateur Encouragement committee.
      - There is talk about a new student scholarship.
   ii. The Bioblitzes this past summer 2017 were successful.
b. Archives/Heritage – Cedric Gillott and Martin Erlandson
   i. Nothing to report.
   ii. Dwayne asked if the financial records for the ESS could be archived with the University of Saskatchewan? Cedric Gillott says he will look into it.
   iii. Meghan Vankosky found old booklets on the Entomologists of Saskatchewan and asked if we could produce it again.
   iv. Meghan Vankosky asked if we could have a 65-year special publication.
c. ESS Website – Jeff Boone
   i. No report
d. Microscope – Iain Phillips
   i. Being used at Toxicology Centre right now by Stephen Srayko.
   ii. Iain will look at putting assets on the website for future bioblitzes.
e. Honors & Awards – Tyler Wist
   i. ESS Travel Award to Jeff Boone
   ii. Brooks Prize not awarded this year
   iii. Student Presentation prize to Jessica Thoroughgood
f. Nominations Committee – Dave Halstead

President	Danielle Stephens
Past-President	Cory Sheffield
Vice-President	Daniel Wiens
Regional Director to ESC	Boyd Mori
Treasurer	Tyler Wist
Secretary	Iain Phillips
Auditors	Owen Olfert
	Wayne Goerzen

MOTION: Tyler Wist/Danielle Stephens. THAT the Committee Reports be adopted

CARRIED.

10) New Business

a. Brad Muir – Nature Saskatchewan – NS has a graduate student scholarship available that he is encouraging students to apply for. Iain Phillips asks Jeff Boone if there could be a link created on the website to apply.
    i. Brad Muir is looking for applicants to the scholarship and collaboration with the ESS. (See Appendix D)

11) Installation of the new executive

a. Spring Meeting – April 13th is suggested.

12) Adjournment

MOTION: Danielle Stephens. THAT the ESS adjourns the fall meeting 2017.

CARRIED.

Appendix A: Student Abstracts

Prevalence and Orientation of *Stylops* (Strepsiptera: Stylopidae) within its host, *Andrena milwaukeensis* (Hymenoptera: Andrenidae).

Balzer, Zach[1], and A.R. Davis[1]

[1]Department of Biology, University of Saskatchewan, 112 Science Place, Saskatoon, SK S7N 5E2, Canada

Abstract:
Strepsiptera is a unique, yet often overlooked, order of endoparasitic insects. Their extreme sexual dimorphism, as well as complex life cycle, make strepsipterans an incredibly interesting group. However, many things remain unknown due to the difficulty in collecting them. My project aims to contribute to the understanding of the life cycle of Strepsiptera, specifically *Stylops*, in Saskatoon and the relationship with its solitary bee host, *Andrena milwaukeensis*. Prevalence data of female *Stylops* gathered over two years showed that less than 25% of bees were infected by at least one female. Male *Stylops* acquisition remains elusive, so the number of bees with *Stylops* is expected to be higher. The anatomy of infected bees has also been studied, and will be compared to bees without *Stylops* to understand any structural and physiological impact of stylopization, as well as the orientation of *Stylops* within the host bee's abdomen. Anatomical sections confirm the macroscopic observations that in bees parasitized by a single female *Stylops*, the parasite protrudes from the tergites and inhabits the bee abdomen laterally, rather than along the bee's midline.

Life history, insecticide susceptibility and biological control of spinose ear tick *Otobius megnini* associated with horse otoacariasis in Sri Lanka.

Diyes, G.C.P. [1,2], W.A.I.P. Karunaratne[2], S.H.P.P. Karunaratne[2], and R.S. Rajakaruna[2]

[1]Department of Biology, University of Saskatchewan, 112 Science Place, Saskatoon, SK S7N 5E2, Canada

[2]Department of Zoology, Faculty of Science, University of Peradeniya, Peradeniya 20400, Sri Lanka

Abstract:

Otobius megnini (Argasidae) has been identified as an agent of human and animal otoacariasis in Sri Lanka. We determined the life history, biological control agents and insecticide susceptibility of *O. megnini* under laboratory conditions. Juvenile ticks fed on rabbits and completed the life cycle successfully within 123 days. Female ticks survived longer (369.8±128.3 days) than males (210.4±54.1 days). Susceptibility of *O. megnini* was assessed for permethrin, DDT, malathion and flumethrin using the Larval Packet Test (FAO). *Otobius megnini* was fully susceptible to the pyrethroid flumethrin but highly resistant to the organochlorine DDT. Parasitoid scuttle fly (*Megaselia scalaris*) and five predatory ant species: *Tapinoma melanocephalum* (as the best predator of both eggs and adults of *O. megnini*), two species of *Monomorium*, one species of *Pheidole* and *Crematogaster* were identified as potential biological control agents. Currently, *O. megnini* is a serious problem in Sri Lanka and there is concern of it spreading to dairy farms.

Neonicotinoid Mixtures: Characterizing Joint Toxicity to Non-Target Insects under Laboratory and Field Conditions

Maloney, Erin M.[1], Christy A. Morrissey[2,3], John V. Headley[4], Kerry M. Peru[4], and Karsten Liber[1,3]

[1]Toxicology Centre, University of Saskatchewan, 112 Science Place, Saskatoon, SK S7N 5E2, Canada

[2]Department of Biology, University of Saskatchewan, 112 Science Place, Saskatoon, SK S7N 5E2, Canada

[3]School of Environment and Sustainability, University of Saskatchewan, 112 Science Place, Saskatoon, SK S7N 5E2, Canada

[4]Watershed Hydrology and Ecology Research Division, Water Science and Technology, Environment and Climate Change Canada, 11 Innovation Blvd., Saskatoon, SK, S7N 3H5, Canada

Abstract:
Neonicotinoid insecticides are currently the most widely used pesticides worldwide. Often applied as seed treatments, these compounds act systemically to protect young plants against biting-sucking pests. Due to unique physicochemical properties (e.g. extremely high water solubility) and agricultural application processes (e.g. field rotation), neonicotinoid residues are often found as mixtures in aquatic environments. Current risk assessment and regulatory practices focus on single-compound toxicity, and primarily estimate mixture toxicity through direct addition of neonicotinoid concentrations (i.e. concentration addition). However, this assumption of directly additive toxicity has not been validated for commonly applied neonicotinoid compounds, especially for sensitive, non-target insects likely to inhabit these contaminated aquatic areas. Therefore, we evaluated the cumulative toxicity of three commonly used compounds (imidacloprid, clothianidin, thiamethoxam) under laboratory and field conditions using *Chironomus dilutus* as a representative aquatic insect species. Acute (96-h, endpoint: mortality) and chronic (28-d, endpoint: emergence) mixture toxicity tests were conducted in an environmentally controlled chamber. Under acute exposure scenarios, all neonicotinoid mixtures were found to exert greater-than-additive toxicity. However, this trend did not continue under chronic exposure scenarios, with only imidacloprid-clothianidin and clothianidin-thiamethoxam mixtures found to exert greater-than-additive toxicity. These mixtures were then tested in the field, using experimental limnocorrals (56-d, endpoints: Chironomidae abundance, biomass, sex-ratios). We found that laboratory-based results did not accurately predict effects of single compounds or neonicotinoid mixtures on Chironomidae

populations. Indeed, the environmental relevance of laboratory-based risk assessment should be reconsidered, to ensure non-target aquatic insects are adequately protected against neonicotinoid mixture residues in aquatic environments.

Determining the Presence of Bumble Bee Pathogens (Nosema bombi, Deformed Wing Virus) in Native Saskatchewan Bumble Bees (Bombus spp.).

Palmier, Kirsten [1,2], Andrew Cameron[1], and Cory S. Sheffield[2]

[1]Biology, University of Regina 3737 Wascana Parkway, Regina, SK S4S 0A2

[2]Royal Saskatchewan Museum 2340 Albert Street, Regina, SK S4P 2V7

Abstract:
The introduction and subsequent establishment of non-native bumble bee species can have negative consequences that can contribute to rapid declines for some native bumble bees, and possible extinctions of others. The distribution of two sister species, Bombus terricola and Bombus occidentalis, overlaps in Saskatchewan, and both have experienced dramatic declines in parts of their ranges across North America, though not yet in Saskatchewan. Loss of native habitats rich in flowering plants, pesticide use, climate change, competition, and increased pathogen load all have likely contributed to these declines. Although some of these factors have been extensively studied, there is a shortage of research regarding bumble bee pathogens, particularly in the Canadian Prairies Ecozone. The historic and current status of pathogen prevalence in native bumble bee populations has not been studied in Saskatchewan, and there is a looming threat that pathogen spillover from commercial bumble bee introductions may occur. This project aims to determine the potential threat of two pathogens (Nosema bombi and Iflavirus [Deformed Wing Virus]) on native prairie bumble bees in relation to the presence and establishment of the introduced managed species, Bombus impatiens.

Fleas and their associated *Wolbachia* endosymbionts.

Thoroughgood, Jessica [1], and Neil Chilton[1]

[1]Department of Biology, University of Saskatchewan, 112 Science Place, Saskatoon, SK S7N 5E2, Canada

Abstract:
Insects including fleas, flies, and wasps, are known to be infected by bacteria of the genus *Wolbachia*. These obligate intracellular bacteria cause cytoplasmic incompatibility, male killing, speciation, and local adaptations within the insect host. *Wolbachia* may also affect the composition of an insect's bacterial community. Fleas are vectors of a variety of bacterial pathogens that are transmitted to humans, wildlife, and/or domestic animals. However, little is known about fleas and their associated bacteria in Saskatchewan. In this study, fleas parasitizing Richardson's ground squirrels from Southern Saskatchewan were identified and screened for *Wolbachia* using PCR-based techniques. Flea identification was conducted using DNA-sequencing and single stranded conformation polymorphism (SSCP) analysis on the nuclear 28S rRNA gene. *Wolbachia* infections were assessed using a surface protein and the 16S rDNA gene. Two distinct *Wolbachia* species were found within different flea species. This study allows for future studies in comparing bacterial communities in these fleas.

The Obligate Parasites Obligate Mutualists: Potential role of microbial communities in the life history of the American Dog tick.

Yunik, Matt E. M. [*1], Terry D. Galloway[2], L. Robin Lindsay[2,3] and Neil B. Chilton[1]

[1]Department of Biology, University of Saskatchewan, 112 Science Place, Saskatoon, SK S7N 5E2, Canada

[2]Department of Entomology, University of Manitoba, 214 Animal Science/Entomology Bldg., 12 Dafoe Road, Winnipeg, Manitoba, R3T 2N2, Canada

[3]Public Health Agency of Canada, National Microbiology Laboratory, 1015 Arlington Street, Winnipeg, Manitoba, R3E 3R2, Canada

Abstract:
The American dog tick (*Dermacentor variabilis* (Say)) is of significant medical and veterinary importance because of the pathogenic bacteria it carries. These ticks are also hosts for a diverse range of mutualistic bacterial endosymbionts. *Dermacentor variabilis* is common in Saskatchewan and Manitoba, and its distribution is expanding both to the north and west. During my M.Sc., it was shown that twenty percent of adult dog ticks are capable of surviving off-host through multiple winters if they are unsuccessful in finding a final blood meal, a trait not observed in ticks from more temperate climates. Given that some tick associated bacteria are known to produce ice-structuring proteins, I will, for my Ph.D. research, determine whether bacterial species composition in different populations of *D. variabilis* change over the course of the winter, particularly in those ticks that have extended survival.

Appendix B: Membership and Year End Financial Report

ENTOMOLOGICAL SOCIETY OF SASKATCHEWAN
MEMBERSHIP AND YEAR END FINANCIAL REPORT

01 September 2016 – August 30, 2017

MEMBERSHIP

- In 2016-2017 the ESS had 78 members (48 full members and 30 students – 20 Life Members) of which 49 were in good standing. The ESS welcomed 1 new Life member (Tyler Wist).
- The ESS had 88 members in 2014-2015 and 83 members in 2015-2016. The decreasing membership reflects individuals who became members to take advantage of the reduced fees for the ESC-ESS Joint Annual meeting. Members who are not in good standing for 2+ consecutive years are culled from the membership list.

ESS GENERAL ACTIVITIES

- The main sources of income were from membership dues with $740.00 collected and interest income of $619.43. The ESC provided $600 in funding to support Amateur Encouragement activities.

FINANCE

- The ESS total assets are as follows:

Term Deposits (balance plus accrued interest)			
	#007	12,036.59	
	#009	15,702.78	
	#011	12,352.33	
	#012	10,624.10	
Checking		4,865.66	
Outstanding deposits		75.00	
Outstanding liabilities		(0.00)	
Total		**55,656.46**	**(54,998.33 in 2016)**

- The ESS accounts were audited by M. Erlandson and W. Goerzen.
- Registered Charity and Non-Profit Corporations status was renewed.
- Registered Charity Tax Return was filed in December.

Please refer to the enclosed financial statement for further details.

Financial Statement – Entomological Society of Saskatchewan
01 September 2016 – August 30, 2017

MAXIMIZER ACCOUNT (ESS)

Receipts:

Memberships	$ 665.00	
Outstanding deposits	75.00	(memberships)
Interest (CU Maximizer and Term Deposit)	619.43	
Misc. (ESC Amateur Encouragement)	600.00	
TOTAL	**1959.43**	

Expenditures:

Minister of Finance	25.00	
Brooks Award	500.00	(S. Srayko)
Travel Award	500.00	(C. Bailey)
Student Award	100.00	(R. Parkinson)
Meeting Expenses	116.44	
Postage	0	
Bank Charges	0	
Misc. (Accounting Book)	19.60	
Misc. (PayPal Fees)	19.87	
TOTAL	**1280.91**	

Excess of Receipts over Expenditures $ **678.52**

Appendix C: Regional Director's Report

13 December 2017

Regional Director Report:

2017 Annual Meeting:

The Entomological Society of Canada and Entomological Society of Manitoba held their Joint Annual Meeting (JAM) 22-25, 2017 with the theme "Small is Beautiful". The meeting was attended by over 200 registrants who gave a variety of oral and poster presentations.

The next JAM will be held in Vancouver from the 11-14th November 2018 and will be co-organized by the Entomological Society of America, Canada and British Columbia. You are all highly encouraged to attend.

In regards to the next ESS-ESC JAM which was supposed to be in 2022, the ESS Executive voted in favour of switching with the ESBC as the ESA will be hosting their meeting in Vancouver again in 2022. The likelihood of attracting many attendees to an ESS-ESC JAM the same year as an ESA meeting in Vancouver didn't seem high. Thus, the ESS will next host the ESC JAM in 2025. ESBC has agreed in principle to co-hosting the 2022 meeting with ESC and ESA.

News from the Board:

Dr. Joel Kitts (AAFC-Ottawa) has been ratified as the incoming Treasurer beginning in February 2018. Joel will be tasked with helping to increase the financial stability of the Society. Along those lines, the Society is looking at ways in to increase revenue (as we are currently running a risk of a deficit in most years), to that end, they are discussing a few options:

1. Bringing back page charges to The Canadian Entomologist for non-members, and creating an Open Access option.
2. Increasing membership numbers. Membership has dwindled in recent years and it is hoped that we can increase membership to ~400 per year, if not more. You are all encouraged to join.
3. Modifying registration fees to meetings. Currently, many Local Organizing Committees (LOC) base their estimates for JAMs on attendees paying the early-bird full membership price, in reality this occurs less than 50% of the time. Most attendees qualify for some kind of reduced rate (e.g. students, early professional, emeriti) which severely impacts that bottom line of the Society. This will be taken more into consideration when organizing and setting rates for future meetings.
4. To help reduce the workload on the LOCs, the ESC will take over finding national level sponsorship for all upcoming meetings. This will help to ease the pressure on the LOC so they can focus on local sponsorship and organizing the meeting.

A new strategic plan has been drafted for the ESC which includes an updated Mission and Vision statement and outlines priorities for the next 3 years. It will be available on the website shortly.

Finally, there is a new ESC website. I highly encourage you to check it out, it is much more intuitive and user-friendly than the old site.

Respectfully submitted,

Boyd Mori
ESS Regional Director

Appendix D: Margaret Skeel Scholarship

Call for Applications for the
Margaret Skeel Graduate Student Scholarship

The Nature Saskatchewan Margaret Skeel Graduate Student Scholarship in the amount of $2,000 will be awarded in 2018, to assist a graduate student attending a post-secondary institution in Saskatchewan in the fields of biology, ecology, wildlife management, environmental education and environmental studies including social sciences applied to advancement of conservation and sustainable use of natural resources.

The scholarship is awarded to a student pursuing studies in a field that complements the goals of Nature Saskatchewan: to promote appreciation and understanding of our natural environment, and support research to protect and conserve natural ecosystems and their biodiversity. We work for sustainable use of Saskatchewan's natural heritage, ensuring survival of all native species and representative natural areas, as well as maintenance of healthy and diverse wildlife populations throughout the province. We aim to educate and to stimulate research to increase knowledge of all aspects of the natural world. Research that will contribute to resolving current conservation problems have a special priority.

The Margaret Skeel Graduate Student Scholarship must be applied to tuition and associated costs at the named institution. For more information, contact our office by email info@naturesask.ca or phone (306) 780-9273 (in Regina) or 1-800-667-4668 (SK only).

Application Guidelines

Please include the following documents:

- An updated resume with a cover letter
- A full description of your present and/or proposed research
- A transcript of the undergraduate and graduate courses completed so far and those currently enrolled in
- An indication of what other source(s) of funding you hope to rely on to complete your studies
- Letter of References are optional

Application Deadline: February 28, 2018
Winner Announced: March 31, 2018

Please submit your completed application to the Scholarship Committee: info@naturesask.ca
or Nature Saskatchewan, 206-1860 Lorne Street, Regina, SK S4P 2L7

Humanity in Harmony with Nature

www.naturesask.ca