

2026 JOINT ANNUAL MEETING OF THE ENTOMOLOGICAL
SOCIETIES OF CANADA AND MANITOBA
WINNIPEG, MANITOBA

SUNDAY 4 OCTOBER – WEDNESDAY 7 OCTOBER 2026



REUNION ANNUELLE CONJOINTE DES SOCIETES
D'ENTOMOLOGIE DU CANADA ET DU MANITOBA
WINNIPEG, MANITOBA

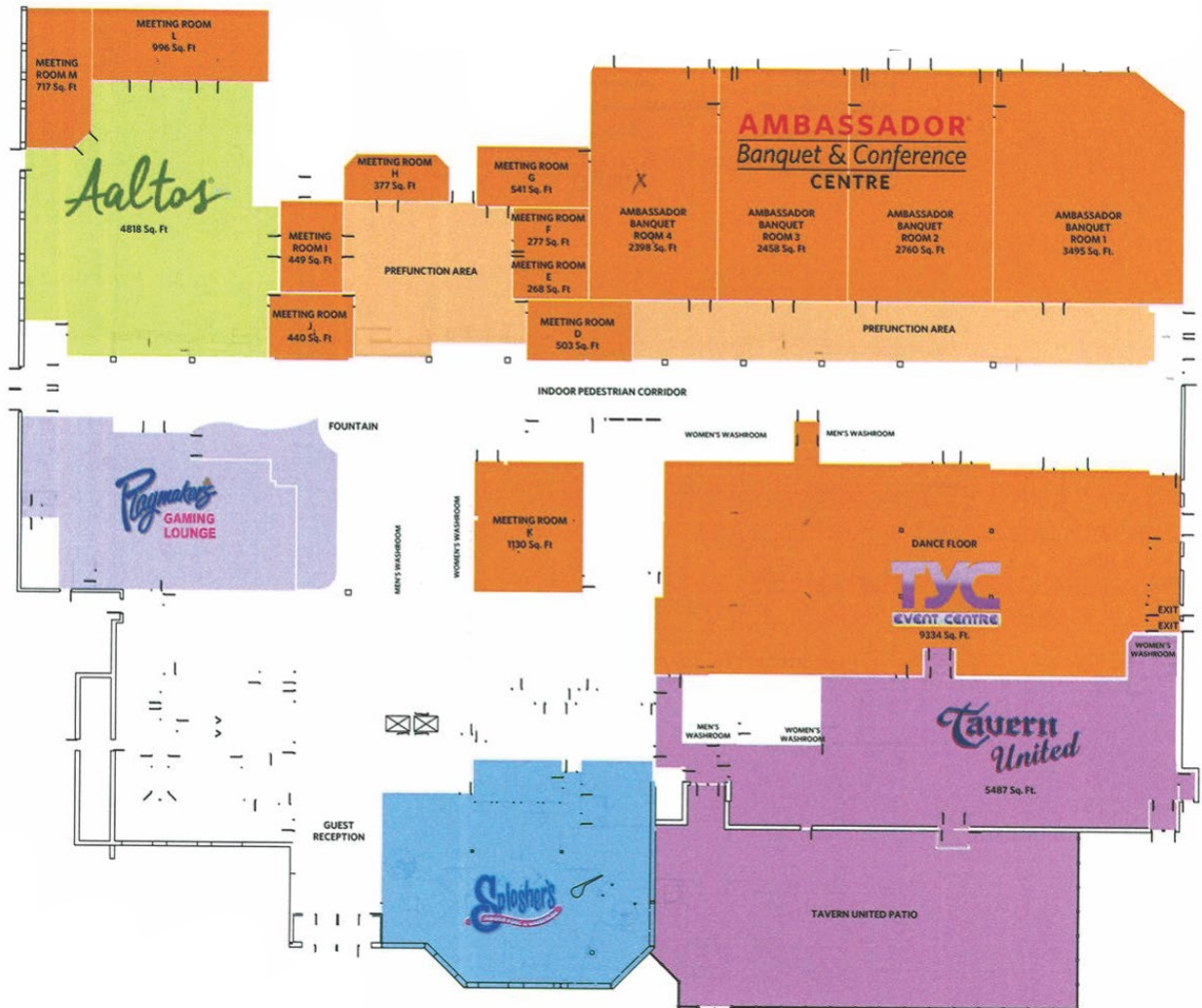
DIMANCHE 4 OCTOBRE – MERCREDI 7 OCTOBRE 2026

CANAD INNS DESTINATION CENTRE POLO PARK
1405 ST. MATTHEWS AVENUE, WINNIPEG, MB

[LINK TO PROGRAM-AT-A-GLANCE](#)

FACILITY PLAN

ALL EVENTS WILL TAKE PLACE IN THE AMBASSADOR BANQUET AND CONFERENCE CENTRE OR THE TYC EVENT CENTRE.,



TERRITORIAL ACKNOWLEDGEMENT

The Joint Annual Meeting of the Entomological Societies of Canada and Manitoba is taking place on original lands of Anishinaabeg, Ininiwak, Anisininewuk, Dakota Oyate, Dene and Inuit, and on the National Homeland of the Red River Métis. Our water is sourced from Shoal Lake 40 First Nation.

We are grateful to the traditional caretakers of this land. We recognize that the treaties signed on these lands are a lifelong, enduring relationship, and we are dedicated to upholding their spirit and intent. We commit to active reconciliation, meaningful change, and the creation of an environment where everyone can thrive.

DONOR ACKNOWLEDGEMENT

A SPECIAL THANKS TO OUR SPONSORS

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WELCOME FROM THE ENTOMOLOGICAL SOCIETY OF CANADA

Dear Friends and Colleagues,

It is my pleasure to welcome you all to this year's Joint Annual Meeting of the Entomological Society of Canada in beautiful Winnipeg. These meetings offer a rare chance to reconnect with old colleagues, meet new ones, and see what labs across the country are working on. For those attending for the first time, whether professionals or students, this is your moment to build relationships that may very well become career-defining.

I'd also like to congratulate the local organizing committee, co-chaired by Kateryn Rochon and Brent Elliott, along with the many volunteers who made this meeting possible. If you've never helped organize one of these events, it can be hard to appreciate just how much work goes into pulling them off. Be sure to thank a volunteer every chance you get.

Finally, on behalf of the executive, I invite you to grab any one of us at the mixers and coffee breaks—to ask questions, offer feedback, explore ways to volunteer, or simply make a new connection. We're here in the service of the ESC, and we welcome every opportunity to make the society a more useful and welcoming space for all its members.

We wish you the best of luck in your chats and presentations, and we thank you for helping make this another successful meeting. Enjoy Winnipeg.

Rob Johns

President, Entomological Society of Canada

MESSAGE DE BIENVENUE DE LA SOCIÉTÉ ENTOMOLOGIQUE DU CANADA

Aux proches et collègues,

C'est avec grand plaisir que je vous souhaite la bienvenue à la réunion annuelle conjointe de la Société d'entomologie du Canada, qui se tient cette année dans la magnifique ville de Winnipeg. Ces réunions offrent une occasion rare de renouer avec d'anciens collègues, d'en rencontrer de nouveaux et de découvrir les travaux menés par les laboratoires à travers le pays. Pour ceux qui y participent pour la première fois, qu'il s'agisse de professionnels ou de membres de la communauté étudiante, c'est l'occasion idéale de nouer des relations qui pourraient bien s'avérer déterminantes pour votre carrière.

Je tiens également à féliciter le comité d'organisation local, coprésidé par Kateryn Rochon et Brent Elliot, ainsi que les nombreux bénévoles qui ont rendu cette réunion possible. Si vous n'avez jamais participé à l'organisation d'un tel événement, il peut être difficile de se rendre compte de l'ampleur du travail que cela représente. N'hésitez pas à remercier un bénévole dès que l'occasion se présente.

Enfin, au nom du comité exécutif, je vous invite à venir nous voir lors des rencontres informelles et des pauses-café — que ce soit pour poser des questions, faire part de vos remarques, découvrir comment vous impliquer bénévolement ou simplement nouer de nouveaux contacts. Nous sommes au service de la SEC, et nous saisissons avec plaisir chaque occasion de faire de cette association un espace plus utile et plus accueillant pour tous ses membres.

Nous vous souhaitons bonne chance pour vos discussions et vos présentations, et nous vous remercions d'avoir contribué à faire de cette réunion un nouveau succès. Profitez bien de Winnipeg.

Rob Johns

Président, Société d'entomologie du Canada

WELCOME FROM THE ENTOMOLOGICAL SOCIETY OF MANITOBA

Dear Friends and Colleagues,

It is my pleasure to welcome you to the Joint Annual Meeting of the Entomological Societies of Canada and Manitoba. On behalf of the Entomological Society of Manitoba, we are excited to host you at the longitudinal centre of Canada. Our theme explores the idea of the 'Insect Apocalypse' in its many facets, the threats insects face, the threats they pose, and the public perception of insects in the media.

This meeting could not have happened without the efforts of a dedicated group of volunteers that comprise the organizing and scientific committees. The opportunity to meet and exchange knowledge with our friends and colleagues from across the country is only possible because of their efforts. On behalf of the ESM, we thank them for taking the time to put this meeting together. As more experienced members of these committees pass on their wisdom, I look forward to future JAMs led by the next generation of volunteers.

During the meeting, I encourage you to fully engage with the sessions and to take the opportunity to expand your knowledge and networks. We all share a passion for entomology and it's too rare to have so many insect-lovers in one space.

If time allows, I hope you have the chance to enjoy what Winnipeg has to offer and explore the rich history and diverse insects of our province.

Welcome to Winnipeg, and I look forward to seeing you all.

Best wishes,

Jason Gibbs

President, Entomological Society of Manitoba

MESSAGE DE BIENVENUE DE LA SOCIÉTÉ ENTOMOLOGIQUE DU MANITOBA

À mes ami-e-s et collègues,

C'est avec grand plaisir que je vous souhaite la bienvenue à la réunion annuelle conjointe des sociétés d'entomologie du Canada et du Manitoba. Au nom de la Société d'entomologie du Manitoba, c'est un plaisir de vous accueillir au cœur du Canada. Notre thème explore la notion de « l'apocalypse des insectes » sous ses multiples facettes : les menaces auxquelles les insectes sont confrontés, celles qu'ils représentent, ainsi que la perception du public par les médias.

Cette réunion ne pourrait avoir lieu sans les efforts de bénévoles dévoués composant les comités d'organisation et scientifique. C'est grâce à eux que nous avons l'occasion de rencontrer nos collègues de tout le pays et d'échanger avec eux. Au nom de la SEM, nous les remercions d'avoir consacré leur temps à la mise en place de cette réunion. Alors que les membres les plus expérimentés de ces comités transmettent leur savoir, j'attends avec impatience les prochaines éditions de la réunion annuelle conjointe organisées par la prochaine génération de bénévoles.

Je vous encourage à participer activement aux différentes sessions et à profiter de cette occasion pour approfondir vos connaissances et élargir votre réseau. Nous partageons une passion commune pour l'entomologie, et il est trop rare de voir autant d'amateurs d'insectes réunis.

Si vous en avez le temps, j'espère que vous aurez l'occasion de profiter de tout ce que Winnipeg a à offrir et de découvrir la riche histoire et la grande diversité d'insectes de notre province.

Bienvenue à Winnipeg, et j'ai hâte de vous y retrouver.

Jason Gibbs, Président, Société d'entomologie du Manitoba

MEETING THEME AND LOGO

The theme of the meeting “Insect Apocalypse” was conceived because of its dual meaning.

Most entomologists are aware of the precipitous decline in insect numbers, both in abundance of species that were formerly common, and in the loss of species, many of which have yet to be described. The public and media have largely focussed on the loss of pollinators and its significance for crop production and ecosystem health. However, we are losing natural enemies, decomposing arthropods, links in food chains, and other vital ecosystem services—effects of which are unappreciated until they no longer occur. In Mauritius, the extinction of large frugivores, including the dodo bird, terminated seed dispersal of many tree species, leading to the second-highest proportion of endangered tree species on the planet (Heinen *et al.* 2023). Ecosystem interactions involving insects are numerous and largely unknown, even for described species. No doubt the future holds many unanticipated dodoesque effects of loss of insects. To explore the insect decline aspects of “Insect Apocalypse” our opening plenary symposium features two distinguished experts in the field, Dr. May Berenbaum and Dr. David L. Wagner, both members of the “Status of Insects in North America” Committee of the U.S. National Academies of Sciences, Engineering, and Medicine.

The second interpretation of “Insect Apocalypse” is that in popular culture, notably science fiction works depicting destructive monster arthropods wreaking havoc on humans. Killer bug movies are a popular film genre, and their success may be indicative of the underlying entomophobia of many people. Our meeting features a symposium on the role of arthropods in the cultural imagination. We are pleased that Dr. Berenbaum will present in this symposium too. She pens “Buzzwords” in the *American Entomologist*, a feature that takes a light-hearted approach to human-insect interactions. Dr Berenbaum is the founder of the annual Insect Fear Film Festival which this year featured insect-human hybrids.

Our logo was conceived and produced by Mabel Currie, a graduate student in the Department of Entomology at the University of Manitoba. The hour-glass depicts the filtering effect of the apocalypse resulting in no living insects where previously there were many. The hour-glass motif also communicates the temporal element: time is running out for many species. The colour change from yellow to red symbolizes a major cause of the apocalypse, the rising temperatures associated with climate change.

Heinen *et al.* 2023. Novel plant–frugivore network on Mauritius is unlikely to compensate for the extinction of seed dispersers. *Nature Communications* 14:1019. <https://doi.org/10.1038/s41467-023-36669-9>

THEME ET LOGO DE LA REUNION

Le thème de la réunion, « L’apocalypse des insectes », a été choisi pour sa double signification.

La plupart des entomologistes ont conscience du déclin vertigineux du nombre d’insectes, tant en termes d’abondance d’espèces autrefois communes que de disparition d’espèces, dont beaucoup n’ont pas encore été décrites. Le grand public et les médias se sont largement concentrés sur la disparition des pollinisateurs et son importance pour la production agricole et la santé des écosystèmes. Cependant, nous perdons également des ennemis naturels, des arthropodes décomposeurs, des maillons des chaînes alimentaires et d’autres services écosystémiques essentiels — dont les effets ne sont pas appréciés à leur juste valeur tant qu’ils ne disparaissent pas. À l’île Maurice, l’extinction des grands frugivores, notamment le dodo, a mis fin à la dispersion des graines de nombreuses espèces d’arbres, ce qui a conduit à la deuxième plus forte proportion d’espèces d’arbres menacées de la planète (Heinen *et al.* 2023). Les interactions au sein des écosystèmes impliquant les insectes sont nombreuses et largement méconnues, même pour les espèces déjà décrites. Il ne fait aucun doute que l’avenir réserve de nombreux effets dodoesques imprévus liés à la disparition des insectes. Afin d’explorer les aspects du déclin des insectes abordés dans « L’apocalypse des insectes », notre conférence plénière d’ouverture mettra à l’honneur deux spécialistes de renom dans ce domaine, la Dre May Berenbaum et le Dr David L. Wagner, tous deux membres du comité « Situation des insectes en Amérique du Nord » des Académies nationales des sciences, de l’ingénierie et de la médecine des États-Unis.

La deuxième interprétation du thème « Apocalypse des insectes » concerne la culture populaire, notamment les œuvres de science-fiction mettant en scène des arthropodes monstrueux et destructeurs qui sèment le chaos parmi les humains. Les films mettant en scène des insectes tueurs constituent un genre cinématographique populaire, et leur succès pourrait être révélateur de l’entomophobie sous-jacente chez de nombreuses personnes. Notre réunion comprend un colloque consacré au rôle des arthropodes dans l’imaginaire culturel. Nous sommes ravis que la Dre Berenbaum intervienne également lors de ce symposium. Elle rédige la rubrique « Buzzwords » dans l’*American Entomologist*, une chronique qui aborde avec humour les interactions entre les humains et les insectes. La Dre Berenbaum est la fondatrice du festival annuel *Insect Fear Film Festival*, qui a mis à l’honneur cette année les hybrides insectes-humains.

Notre logo a été conçu et réalisé par Mabel Currie, étudiante des cycles supérieurs au département d’entomologie de l’université du Manitoba. Le sablier illustre l’effet de « filtrage » de l’apocalypse, qui a pour conséquence la disparition totale des insectes là où ils étaient autrefois nombreux. Le motif du sablier évoque également la dimension temporelle : le temps presse pour de nombreuses espèces. Le passage du jaune au rouge symbolise l’une des principales causes de l’apocalypse, à savoir la hausse des températures liée au changement climatique.

Heinen *et al.* 2023. Novel plant–frugivore network on Mauritius is unlikely to compensate for the extinction of seed dispersers. *Nature Communications* 14:1019. <https://doi.org/10.1038/s41467-023-36669-9>

ENTOMOLOGICAL SOCIETY OF CANADA MEETING CODE OF CONDUCT

[Date code adopted: 21 April 2020]

This Code of Conduct applies to all meetings and events of the Entomological Society of Canada (ESC).

By attending any ESC meeting or event you agree to abide by this Code of Conduct. This Code applies to all participants including, but not limited to: attendees, speakers, guests, staff, service providers, vendors and sponsors.

Authorship

All authors listed on a presentation or abstract must agree with all information that is contained in the presentation. Failure to agree will result in the presentation being withdrawn.

Submission of a presentation to an ESC Joint Annual Meeting (JAM) indicates the intent of one of the listed authors to attend the meeting. Repeated or consecutive last-minute cancellations may result in the denial of future submissions.

Photography

The ESC requests that there be no photography or videography of presentations or posters without the explicit permission of the presenter.

Expected Behaviour

- Treat all other participants with kindness, respect and consideration.
- Communicate openly and with respect for others, and in the language of your choice.
- Personal attacks are not acceptable. Critique ideas, not people.
- Alert the meeting organizers or staff if you notice a dangerous situation or someone in distress.
- Respect the rules and policies of the venue.

Unacceptable behaviour

Violent or discriminatory behaviour or harassment in any form will not be tolerated. Harassment means engaging in a course of vexatious comment or conduct against another person that is known or ought reasonably to be known to be unwelcome. Note that it is possible for a single incident, if sufficiently serious, to constitute harassment.

Harassment includes, but is not limited to: offensive gestures or comments (verbal or written) related to a person's race, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, gender identity, gender expression, age, marital status, family status, or disability; deliberate intimidation; unwanted photography or recording; sustained disruption of presentations and events; or any form of unwelcome attention, including physical contact. Participants asked to stop harassing behaviour are expected to comply immediately.

Other examples of unacceptable behaviour include:

- Physical or verbal abuse of any participant.
- Use of sexual or discriminatory images in public spaces or in presentations.
- Bullying behaviour.
- Retaliation for reporting of unacceptable behaviour.

Immediate serious threat to personal or public safety

Anyone experiencing or witnessing behaviour that is an immediate threat to personal or public safety should contact local law enforcement (by calling 911) and immediately notify venue security.

Reporting Unacceptable Behaviour

If you are the subject of unacceptable behaviour or have witnessed such behaviour, please immediately notify a Code of Conduct Advocate. Code of Conduct Advocates will be wearing identification so as to assist you in identifying them.

Notification may be done on-site, by emailing your concern to coconduct.escsec@gmail.com, or by completing the online form at <https://forms.gle/EMreZz2paPHQxYWt6>. Reporting should never be done via social media to protect the confidentiality and fairness of the reporting process, and to ensure that reports are received in a timely manner.

Regardless of whether a notification is made, you are encouraged to document the unacceptable behaviour in writing as soon as possible in the event that further investigation is required.

ESC Investigation and Response to Complaints

Investigations into alleged unacceptable behaviour pursuant to this Code of Conduct shall be the responsibility of a person or committee appointed by the ESC Board of Directors.

The person assigned to conduct the investigation may be internal or external to the organization. The investigator will interview and collect documents from the person who allegedly experienced the violence or harassment, the alleged harasser(s), and any other relevant witnesses.

Information that is provided about an incident or complaint will not be disclosed, except as necessary to investigate the complaint / incident, to take corrective action, or as otherwise required by law. While the investigation is ongoing, the person who has allegedly experienced harassment, the alleged harasser(s), and any witnesses should not discuss the incident or complaint or the investigation with each other or with other ESC members unless necessary to obtain advice about their rights.

Depending on the severity of the alleged incident(s), ESC may impose interim measures to ensure the health and safety of its members, staff and volunteers, including but not limited to suspension from employment with pay or suspension from board/committee duties, pending completion of an investigation.

At the conclusion of the investigation, ESC's Board of Directors will reach a decision as to whether there was violence or harassment and will report its findings, including any corrective action that

will be taken, to the person who allegedly experienced the violence or harassment and to the alleged harasser.

In addition to any interim measures taken, violators of this Code of Conduct will receive a written summary of actions taken in response to an investigation or incident report.

The ESC Board of Directors shall be responsible for implementing all responses and sanctions that may result from an investigation of a complaint.

ESC shall maintain all records relating to the investigation for at least one year from its conclusion.

Consequences

The ESC reserves the right to remove an individual from any meeting without warning or refund, prohibit attendance at future meetings and suspend or rescind membership in the ESC for failing to abide by this Code of Conduct

LIST OF ADVOCATES

Lauren Desmarteaux
Hadil Elsayed
Morgan Jackson
Zoe Rempel
Catherine Scott

ICONS SIGNIFYING WHETHER PHOTOGRAPHY OF SLIDES OR POSTERS IS PERMITTED

Copy and paste if you wish to use them!



MEETING INFORMATION

REGISTRATION DESK

The registration desk is located in the Prefunction Area of the Ambassador Banquet and Conference Centre. Hours of operation:

Sunday 4 October	10:00 – 20:00
Monday 5 October	08:00 – 18:30
Tuesday 6 October	08:00 – 18:30
Wednesday 7 October	07:30 – 14:00

REFRESHMENT BREAKS AND LUNCHES

The schedule of refreshment breaks and is indicated in Program-at-a-Glance. Boxed lunches will be provided on Monday and Tuesday. Refreshments and lunch boxes will be available in the Prefunction Area of the Ambassador Banquet and Conference Centre.

SAFE SPACE ROOM

Ambassador D is the safe space ‘quiet’ room and/or family room and is available each day as follows:

Sunday 4 October	09:00 – 20:00
Monday 5 October	08:00 – 16:00
Tuesday 6 October	08:00 – 16:00
Wednesday 7 October	08:00 – 16:30

OFFICE

The meeting office location and times are listed below. Enquiries about lost property or other matters can be addressed here. If the office is closed, please contact the registration desk.

Sunday 4 October	08:00 – 16:30	Ambassador D
Monday 5 October	08:00 – 16:30	Ambassador J
Tuesday 6 October	08:00 – 16:30	Ambassador K
Wednesday 7 October	08:00 – 13:00	Ambassador K

SOCIAL FUNCTIONS

Welcome Reception	Sunday 4 October	19:30 – 22:00	Ambassador 1–2
Student Reception	Monday 5 October	19:30 – 22:00	Torque Brewing (830 King Edward St #330)
Banquet and Student Awards	Tuesday 6 October	18:30 – 21:30	Ambassador 1–2

BUSINESS MEETINGS

ESC Outgoing Board Meeting	Sunday 4 October	8:00 – 13:00	Ambassador J
Canadian Entomologist Editorial Board	Monday 5 October	12:00 – 13:30	Ambassador K
ESC Annual Business Meeting	Tuesday 6 October	15:30 – 16:30	Ambassador 1–2
ESC Incoming Board Meeting	Tuesday 6 October	16:30 – 17:30	Ambassador K



INFORMATION FOR PRESENTERS

POSTERS

Posters will be displayed in the TYC Event Centre. The maximum size for each poster is 1.2 × 1.2 m (4 × 4 feet). Posters are assigned a number (see list of posters later in this program) and should be set up in the space with that number. Tacks will be provided for attaching posters to the boards.

Posters can be set up after 12:00 noon on Monday 5 October, and should be in place no later than the beginning of the Monday Poster Session, which runs from 16:00 to 17:30 on Monday 5 October. Presenters should be in attendance at their poster throughout the Poster Session. In particular, students in the President's Prize Poster Competition should be by their posters at this time, which is when judging will occur. Posters may also be viewed on Tuesday 6 October from 08:30–16:00 but must be taken down by 16:00 on Tuesday.

ORAL PRESENTATIONS

Presentations in the Contributed Talks sessions and President's Prize Oral sessions will be limited to 12 minutes plus 3 minutes for questions. Symposium presentations may be longer, and their duration will be communicated by the symposium organizer. Moderators will be asked to adhere strictly to the time limit for each speaker as there will be concurrent sessions.

UPLOADING OF PRESENTATIONS

Presenters will need to upload their presentations (preferred in PPTX format) to a conference laptop. Slide presentations should be in wide screen format. Files should be uploaded **no later than the day before the presentation**. Files can be uploaded in Ambassador E, or by using the link: https://umanitoba-my.sharepoint.com/:f/g/personal/kateryn_rochon_umanitoba_ca/IgBWClI5yHAZQYSzyj9uqmoLAUcoaTDRCV0w5Rn_lvgcOfA

Please ensure that you follow the naming convention described below.

Files should be named with the session ID (see Program-at-a Glance) followed by the presenter's last name then first name with underscores between the ID and the two names. Thus: "MON_PM_2_CURRIE_ROB". Presenters are responsible for ensuring that their presentation works on the conference laptops; in particular, files with embedded video should be tested on a conference laptop.

Ambassador E will be open for uploading and previewing at the following times:

Sunday 4 October	8:00 – 16:00
Monday 5 October	8:00 – 16:00
Tuesday 6 October	8:00 – 16:00

Presenters for the **Wednesday symposia** who cannot upload on Tuesday at the prescribed times and are unable to upload online should bring their presentation on a USB stick to the symposium room a 1/2 hour prior to the scheduled start time for the symposium.

It is highly recommended that all presenters maintain a back up copy of their presentation on a USB stick in their possession in the event that there are technical difficulties.

GENERAL INFORMATION		
SELECTED RESTAURANTS AND BARS NEAR THE MEETING VENUE		
Aaltos	In the conference hotel	Coffee shop and restaurant
Tavern United	In the conference hotel	Bar with pub food
Uptown Alley Restaurant	350 m https://uptownalley.ca/	Bowling alley and amusement centre with restaurant
Seven Café	1.1 km https://www.sevencafe.ca/	Coffee, tea, pastries
Moxie's Bar and Grill, Polo Park	1.2 km https://moxies.ca/restaurants/winnipeg-polo-park/?utm_source=GMB&utm_medium=google-location-listing&utm_campaign=organic	Steaks, ribs, burgers, salads, etc
Original Pancake House Polo Park	1.2 km https://www.originalpancakehouse.ca/	All day breakfast, pancakes, waffles, sandwiches
Chop	1.3 km https://chop.ca/locations/winnipeg-airport	Steakhouse and bar
Damecca Lounge	1.5 km. No website, see https://dameccalounge.restaurants-info.com	Asian fusion restaurant, wide range of beverages.
One Great City Brewing Co	1.5 km https://www.ogcbrewingco.com/	Brewpub and restaurant
Rae & Jerry's Steakhouse	1.5 km https://www.raeandjerrys.com/	A Winnipeg institution; good food, 1950s ambiance
Tony Roma's Famous for Ribs	1.5 km https://www.tonyromas.com/locations/tony-romas-st-james-2/	Ribs, steak, and more
Barn Hammer Brewing Co	1.6 km https://barnhammerbrewing.ca/	Brewpub. No mention of food.
Cilantro's	2.0 km https://www.cilantrosrestaurant.ca/	Indian restaurant
Chicago Joe's	2.3 km https://winnipeg.vicinn.com/dining/	Hotel restaurant and sports bar
Yafa Cafe	2.3 km https://www.yafacafe.com/	Small coffee house serving middle-eastern street food

WINNIPEG ATTRACTIONS

Polo Park Shopping Mall	1.3 km https://shops.cadillacfairview.com/property/cf-polo-park	Shopping mall with many stores and 16 (mainly fast food) eateries
Royal Aviation Museum of Western Canada	3.1 km https://www.royalaviationmuseum.com/	Interactive and static exhibits, including 90 historic aircraft
Canadian Museum for Human Rights	5 km https://humanrights.ca/	Dedicated to the evolution, celebration and future of human rights, with a Canadian emphasis
The Forks Market	5.4 km https://www.theforks.com	Historical site with outdoor attractions and food and shopping market.
Assiniboine Park	6.6 km https://www.assiniboinepark.ca/	Large park with zoo, indoor and outdoor horticultural exhibits, butterfly garden, sculpture garden
Royal Canadian Mint	14.1 km https://www.mint.ca/en/visit-the-mint/winnipeg-mint	Manufacturing site of all Canada's coins and many for other nations. Guided tours.



ENTOMOLOGICAL SOCIETY OF CANADA AWARD RECIPIENTS

LAUREATS DES PRIX DE LA SOCIÉTÉ D'ENTOMOLOGIE DU CANADA

ESC GOLD MEDAL



The **ESC Gold Medal** recognizes outstanding achievement in Canadian entomology. The recipient of the 2026 ESC Gold Medal is **Dr Sandy M. Smith**, Full Professor and Director of Forestry Programs in the Institute of Forestry & Conservation and the Daniels Faculty of Architecture, Landscape & Design at the University of Toronto.

Doctor Smith has made an outstanding and sustained contribution to entomology in Canada through exceptional research achievement, scholarly leadership, and practical application. Her internationally recognized research program has produced a cohesive and influential body of work in forest and urban entomology, particularly in

biological control, invasive species ecology, and natural enemy conservation. Landmark publications, including her definitive Annual Review of Entomology synthesis on *Trichogramma* biological control and high-impact papers in Science and Nature Genetics, have reshaped understanding of host–herbivore–enemy interactions and insect resistance mechanisms. These contributions are not only academically exceptional but have had direct and enduring consequences for entomology in Canada, informing national responses to major pests such as spruce budworm, emerald ash borer, and invasive urban insects and plants. With over 148 peer-reviewed papers, thousands of citations, and a sustained record of competitive funding, Dr. Smith's scholarship represents one of the most substantial Canadian contributions to entomological literature and theory in the past several decades.

Equally compelling is Dr. Smith's dedicated service to education, administration, and the advancement of others. She has mentored more than 335 trainees, including 92 graduate students and 36 postdoctoral fellows, many of whom now hold influential leadership roles in government, academia, and conservation, thereby shaping the future of Canadian and international entomology. Dr. Smith's administrative leadership as Dean of Forestry and in multiple academic coordination roles has strengthened institutional capacity for entomological research and training. Her advisory and extension work with federal and provincial agencies, municipalities, non-government organizations, and industry has ensured that entomological science is translated into policy, regulation, and sustainable forest management practices. Finally, her long and meritorious service to the Entomological Society of Canada, including her term as President, along with leadership roles in national and international biological control organizations, has significantly enhanced the stature, influence, and cohesion of the discipline in Canada. Collectively, these accomplishments exemplify the very highest ideals of the Gold Medal Award.

LA MÉDAILLE D'OR

La **médaille d'or de la SEC** récompense des réalisations exceptionnelles dans le domaine de l'entomologie canadienne. La lauréate de la médaille d'or de la SEC 2026 est la **Dre Sandy M. Smith**, professeure titulaire et directrice des programmes de sylviculture à l'Institut de sylviculture et de conservation ainsi qu'à la Faculté Daniels d'architecture, d'aménagement paysager et de design de l'Université de Toronto.

La docteure Smith a apporté une contribution remarquable et durable à l'entomologie au Canada grâce à ses réalisations exceptionnelles en matière de recherche, à son leadership académique et à ses applications pratiques. Son programme de recherche, reconnu à l'échelle internationale, a donné lieu à un corpus de travaux cohérent et influent dans les domaines de l'entomologie forestière et urbaine, notamment en matière de lutte biologique, d'écologie des espèces envahissantes et de conservation des ennemis naturels. Des publications phares, notamment sa synthèse de référence parue dans *Annual Review of Entomology* sur la lutte biologique par les Trichogramma et des articles à fort impact publiés dans *Science* et *Nature Genetics*, ont redéfini la compréhension des interactions hôte-herbivore-ennemi ainsi que des mécanismes de résistance des insectes. Ces contributions sont non seulement exceptionnelles sur le plan académique, mais elles ont également eu des répercussions directes et durables sur l'entomologie au Canada, en orientant les réponses nationales face à des ravageurs majeurs tels que la tordeuse des bourgeons de l'épinette, l'agrile du frêne et les insectes et plantes envahissants en milieu urbain. Avec plus de 148 articles évalués par des pairs, des milliers de citations et un palmarès soutenu en matière de financements compétitifs, les travaux de la Dre Smith représentent l'une des contributions canadiennes les plus substantielles à la littérature et à la théorie entomologiques au cours des dernières décennies.

Tout aussi remarquable est l'engagement sans faille de la Dre Smith en faveur de l'éducation, de l'administration et de l'épanouissement d'autrui. Elle a encadré plus de 335 stagiaires, dont 92 étudiants et étudiantes des cycles supérieurs et 36 membres associés, dont beaucoup occupent aujourd'hui des postes de leadership influents au sein du gouvernement, du monde universitaire et dans le domaine de la conservation, façonnant ainsi l'avenir de l'entomologie au Canada et à l'échelle internationale. Le leadership administratif de la Dre Smith, en tant que doyenne de la faculté de foresterie et dans le cadre de multiples fonctions de coordination universitaire, a renforcé les capacités institutionnelles en matière de recherche et de formation en entomologie. Son travail de conseil et de vulgarisation auprès des agences fédérales et provinciales, des municipalités, des organisations non gouvernementales et de l'industrie a permis de garantir que les connaissances en entomologie se traduisent par des politiques, des réglementations et des pratiques de gestion forestière durable. Enfin, ses longues et méritoires années au service de la Société d'entomologie du Canada, notamment en tant que présidente, ainsi que son leadership au sein d'organisations nationales et internationales de lutte biologique, ont considérablement renforcé le rayonnement, l'influence et la cohésion de la discipline au Canada. Dans leur ensemble, ces réalisations incarnent les idéaux les plus élevés de la Médaille d'or.

C. GORDON HEWITT AWARD



Dr. Tyler Wist is the 2026 recipient of the Entomological Society of Canada's **C. Gordon Hewitt Award**. This award is given annually to an individual judged to have made an outstanding contribution to entomology in Canada, and who received their PhD within the preceding 12 years.

His research program demonstrates strong scientific accomplishment and valuable practical application particularly in field-crop entomology and integrated pest management. Since earning his PhD in 2014, Dr. Wist has produced a focused and influential body of work on cereal aphids, wheat midge, flea beetles, leafhoppers and emerging crop systems. His development of dynamic action thresholds that incorporate natural enemy effects represents a major advance in applied entomology and directly benefits Canadian agriculture. This work culminated in the creation of the Cereal Aphid Manager mobile app, AAFC's first app, which has been downloaded over 3,000 times and is now a nationally recognized IPM tool. His innovative use of molecular diagnostics for aster yellows, stable isotope techniques to trace insect migration, and artificial intelligence for automated pest monitoring further illustrates his ability to translate cutting-edge science into solutions of immediate relevance to growers, agronomists and regulators.

In addition to his research impact, Dr. Wist has made outstanding contributions through education, extension, administration, and service to the Entomological Society of Canada and its affiliates. He has delivered more than 110 invited outreach presentations to agricultural stakeholders, co-authored a widely used field guide now embedded in multiple Canadian post-secondary curricula, and trained a new generation of entomologists through extensive supervision of undergraduate, graduate and postgraduate students. His editorial leadership, including guest-editing a national special issue of the Canadian Journal of Plant Science, has further strengthened Canadian entomological scholarship. Dr. Wist's service record to professional societies is exceptional for his career stage, including sustained leadership roles within the Entomological Society of Saskatchewan and multiple national ESC committees, chairing the ESC Student Awards Committee since 2019, and leading the 2023 Joint ESC–ESS Annual Meeting. Collectively, Dr. Wist's scientific innovation, dedication to education and public engagement and long-standing service to the Society exemplify the spirit of the C. Gordon Hewitt Award and mark him as one of Canada's most impactful emerging leaders in entomology.

PRIX C. GORDON HEWITT

Le **Dr Tyler Wist** est le lauréat 2026 du **prix C. Gordon Hewitt** décerné par la Société d'entomologie du Canada. Ce prix est attribué chaque année à une personne reconnue pour avoir apporté une contribution exceptionnelle à l'entomologie au Canada et ayant obtenu son doctorat au cours des douze dernières années.

Son programme de recherche témoigne de solides réalisations scientifiques et d'applications pratiques précieuses, notamment dans les domaines de l'entomologie des grandes cultures et de la gestion des ravageurs. Depuis l'obtention de son doctorat en 2014, le Dr Wist a produit un ensemble de travaux ciblés et influents sur les pucerons des céréales, la cécidomyie du blé, les altises, les cicadelles et les nouveaux systèmes de culture. La mise au point par ses soins de seuils d'intervention dynamiques intégrant les effets des ennemis naturels représente une avancée majeure en entomologie appliquée et profite directement à l'agriculture canadienne. Ces travaux ont abouti à la création de l'application mobile « Cereal Aphid Manager », la première application d'AAC, qui a été téléchargée plus de 3 000 fois et est désormais un outil de lutte intégrée contre les ravageurs reconnu à l'échelle nationale. Son utilisation innovante du diagnostic moléculaire pour la jaunisse de l'aster, des techniques d'isotopes stables pour suivre la migration des insectes et de l'intelligence artificielle pour la surveillance automatisée des ravageurs illustre encore davantage sa capacité à traduire la science de pointe en solutions présentant un intérêt immédiat pour les agriculteurs, les agronomes et les autorités de régulation.

Outre l'impact de ses travaux de recherche, le Dr Wist a apporté des contributions exceptionnelles dans les domaines de l'enseignement, de la vulgarisation, de l'administration et de son engagement au sein de la Société d'entomologie du Canada et de ses organisations affiliées. Il a donné plus de 110 conférences de vulgarisation à l'invitation d'acteurs du secteur agricole, a coécrit un guide de terrain largement utilisé et désormais intégré à de nombreux programmes d'enseignement supérieur canadiens, et a formé une nouvelle génération d'entomologistes grâce à un encadrement approfondi autant au premier cycle, qu'aux cycles supérieurs et de diplômés. Son leadership éditorial, notamment en tant qu'éditeur invité d'un numéro spécial national du *Canadian Journal of Plant Science*, a encore renforcé la recherche entomologique canadienne. Le parcours du Dr Wist au sein des associations professionnelles est exceptionnel compte tenu de son stade de carrière : il a notamment occupé des postes de direction de longue date au sein de la Société d'entomologie de Saskatchewan et de plusieurs comités nationaux de la SEC, préside le comité des bourses d'études de la SEC depuis 2019 et dirige la réunion annuelle conjointe SEC-ESS de 2023. Dans leur ensemble, l'innovation scientifique du Dr Wist, son dévouement à l'enseignement et à l'engagement public, ainsi que son engagement de longue date au sein de la Société, incarnent l'esprit du prix C. Gordon Hewitt et font de lui l'un des leaders émergents les plus influents du Canada en entomologie.

NORMAN CRIDDLE AWARD



The annual **Norman Criddle Award** recognizes the contribution of an outstanding non-professional entomologist to the furtherance of entomology in Canada. The 2026 recipient is **Katrina Froese**.

Katrina has been a part of FortWhyte Alive's Education Team for more than a decade. She is currently the Education Manager, a role that involves overall coordination of educational programs for K - 12. Her special focus is on delivery and development programming and teacher support in environmental sciences. Katrina has a Bachelor's of Science in Ecology from the University of Manitoba with entomology, botany, and limnology as specialties. Growing up in rural Manitoba, Katrina understands how she was shaped by consistent access to nature and encouragement of her curiosity about the natural world by teachers, professors and mentors. She aims to increase opportunities for Manitoba teachers and students to access environmental science resources, and hands-on experiences help develop young scientists. Outside of FortWhyte Alive, Katrina volunteers with Manitoba Envirothon as a Plant Ecology Discipline Chair, and enjoys teaching cross-country skiing and coordinating wilderness canoe trips.

PRIX NORMAN CRIDDLE

Le **Prix Norman Criddle**, décerné chaque année, récompense la contribution d'un entomologiste amateur exceptionnel à l'avancement de l'entomologie au Canada. La lauréate de l'édition 2026 est **Katrina Froese**.

Katrina fait partie de l'équipe pédagogique de FortWhyte Alive depuis plus d'une décennie. Elle occupe actuellement le poste de responsable pédagogique, un rôle qui implique la coordination générale des programmes éducatifs destinés aux élèves de la maternelle à la terminale. Elle se consacre tout particulièrement à la mise en œuvre et au développement des programmes, ainsi qu'au soutien du corps enseignant dans le domaine des sciences de l'environnement. Katrina est titulaire d'une licence en sciences de l'écologie de l'Université du Manitoba, avec pour spécialités l'entomologie, la botanique et la limnologie. Ayant grandi dans une région rurale du Manitoba, Katrina comprend à quel point son accès constant à la nature et l'encouragement de sa curiosité pour le monde naturel par les enseignants et enseignante, le corps professoral et les mentors l'ont façonnée. Elle s'efforce d'accroître les possibilités offertes à la communauté étudiante du Manitoba d'accéder à des ressources en sciences de l'environnement, ainsi qu'à des expériences pratiques qui contribuent à former de jeunes scientifiques. En dehors de FortWhyte Alive, Katrina est bénévole au sein de Manitoba Envirothon en tant que responsable de la discipline « Écologie végétale », et elle aime enseigner le ski de fond et coordonner des excursions en canot en pleine nature.

PROGRAM-AT-A-GLANCE
SUNDAY 4 OCTOBER 2026

OPENING CEREMONIES AND ENTOMOLOGICAL SOCIETY OF CANADA ACHIEVEMENT AWARDS

Ambassador 1–2	13:30–15:00	Chair: Rob Johns	Session ID: SUN_PM_1
13:30	Welcome to the Joint Annual Meeting — Kateryn Rochon		
13:50	Greetings from ESC, Achievement Awards Presentation — Rob Johns		
14:00	Gold Medal Address — Sandy Smith		

15:00–15:30 Refreshment Break

PLENARY SYMPOSIUM: INSECT APOCALYPSE

Ambassador 1–2	15:30–17:30	Chair: Jason Gibbs	Session ID: SUN_PM_1
15:30	David Wagner: Status update on North America’s insect biodiversity		
16:30	May Berenbaum: Insect apocalypse redux—Silent springs, summers, and falls?		

WELCOME RECEPTION

Ambassador 1–2 19:30–22:00



MONDAY 5 OCTOBER 2026

STUDENT COMPETITION: PHYSIOLOGY AND GENETICS

Ambassador K	08:30–11:30	Chair: Sheila Wolfe	Session ID: MON_AM_1
08:30	Poudel, Ajay	Virome characterisation of <i>Tropilaelaps mercedesae</i> parasitising <i>Apis mellifera</i> and <i>Apis dorsata</i> in Thailand: A comparative metatranscriptomic analysis	
08:45	Wickramasinghe, Yashoda	Evaluating the coinfection dynamics of atypical and typical <i>Melissococcus plutonius</i> strains in honey bee larvae and adults	
09:00	Bilton, Bree	Evaluating the safety and efficacy of fenbendazole as a treatment for nosema disease in Saskatchewan honey bees	
09:15	Strelaeff, Danika	Cage trials of the DWV honey bee vaccine	
09:30	Rosa-Teijeiro, Chloe	<i>Tenebrio molitor</i> as an insect model for the toxicopathological effects of microplastic ingestion	
09:45	Currie, Mabel	The proof is in the midgut: Sanger sequencing reveals mammal hosts of Tabanidae near Manitoba cattle operations	
10:00–10:30	Refreshment Break		
10:30	Colman, Olivia	Assessing the vector potential of bitinfor filarial nematodes in the Canadian Arctic	
10:45	Slobodian, Hunter	Feasibility of using deoxynivalenol-contaminated barley as a feed source for yellow mealworms	
11:00	Pickett, James	Antixenosis and antibiosis to the aphid vector <i>Ericaphis fimbriata</i> in highbush blueberry: Progress toward resistant cultivars for blueberry scorch virus management	
11:15	Correa Ramos, Jose	Ground beetle diversity and community composition in pea-canola intercrops	
12:00–13:30	Lunch — Prefunction Area		

MONDAY 5 OCTOBER 2026

STUDENT COMPETITION: PEST MANAGEMENT

Ambassador 4 08:30–12:00 Chair: Neil Holliday Session ID: MON_AM_2

08:30	Rack, Sydney Entomopathogenic nematodes and fungi as biological control agents for plum curculio (<i>Conotrachelus nenuphar</i>)
08:45	Mackeil, Janelle Two ways to see a fly: thermal forecasting and computer vision in wild blueberry IPM
09:00	Mantel, Margaret (Peggy) Transmission of grapevine red blotch virus by <i>Stictiocephala bisonia</i>
09:15	Donker, Dominic The impact of pea (<i>Lathyrus oleraceus</i>)-canola (<i>Brassica napus</i>) intercropping on flea beetle (<i>Phyllotreta</i> spp.) host location, feeding behaviour and crop yield
09:30	Irvine, Jeremy Sweep-net detection limits and sequential sampling for lesser clover leaf weevil larvae in Prairie red clover seed fields
09:45	Woolaver, Amelia Quit bugging me: Indigenous pest management practices in agriculture
10:00–10:30	Refreshment Break
10:30	Liber, Alexandra Development of a kairomone-based monitoring tool for flea beetles, <i>Phyllotreta</i> spp., in canola
10:45	El Hani, Chloe Scents and sensibilities: Assessing the attraction of <i>Coleomegilla maculata</i> to Solanaceae plant volatiles for conservation biological control
11:00	Burgess-Akitt, Zachary Surveying pyrethroid-resistant alfalfa weevil populations across western Canada
11:15	Vieira Santos, Leonardo Late to the party: Predator peaks lag behind alfalfa weevil
11:30	Gao, Yanchen Climate change reshapes global migration pathways of the diamondback moth (<i>Plutella xylostella</i>)
11:45	Ceesay, Sainey Effects of aster yellows phytoplasma infection on the fitness and microbiome of the aster leafhopper, <i>Macrosteles quadrilineatus</i> (Hemiptera: Cicadellidae)

12:00–13:30 Lunch — Prefunction Area

MONDAY 5 OCTOBER 2026

STUDENT COMPETITION: SYSTEMATICS AND BIODIVERSITY

Ambassador 3	08:30–12:00	Chair: Suzie Blatt	Session ID: MON_AM_3
08:30	Krongold, Benjamin	An updated checklist of the ants in Manitoba	
08:45	Freeth, Ellen	Taxonomic study of the halictid bee genus <i>Lasioglossum</i> of the Leeward Islands, Lesser Antilles leads to the delimitation of nine new species.	
09:00	Rojas-Arias, Laura Alexandra	Two gynandromorphs in <i>Heriades cressoni</i> and <i>Heriades timberlakei</i> (Hymenoptera: Megachilidae: Osmiini), first records for the species	
09:15	Jackson, Leah	Updating the Alberta mosquito species list with an accompanying DNA barcode database	
09:30	Chiu, Hou Wai Colin	Are sex chromosomes the key to species trees? Phylogenetic inference amidst rampant discordance in the spruce budworm species complex (Tortricidae: <i>Choristoneura</i>)	
09:45	Hettiarachchi, Thilina	Linking bee diversity, plant use, landscape context, and phylogenomics in southern Manitoba grasslands	
10:00–10:30 Refreshment Break			
10:30	Rowland, Rowan	Associations between soil disturbance in cereal agricultural systems and carabid diversity in Southern Alberta	
10:45	Lechshenko, Veronika	Syrphid fly bycatch from prairie bee surveys across southern Manitoba grasslands: Diversity, dominance, and comparison with bees	
11:00	Giesbrecht, Lesa Shea	A review of how floral abundance and specialist bee species influence the interpretability of passive pollinator trap data	
11:15	Mills, Jennie	Evaluating truck-based aerial insect sampling as a tool for insect surveillance in Nova Scotia	
11:30	Boddez, Ivy	Wood-inhabiting insect communities following forest fire in Alberta	
11:45	Thompson, Ang	The effect of mountain pine beetle (<i>Dendroctonus ponderosae</i> Hopkins) disturbance to spider (Araneae) communities	
12:00–13:30 Lunch — Prefunction Area			

MONDAY 5 OCTOBER 2026

STUDENT COMPETITION: CONSERVATION AND BENEFICIAL INSECTS

Ambassador 1–2 08:30–12:00 Chair: Nuria Morfin Session ID: MON_AM_4

08:30	Ott, Ethan Analysis of the effects of different cropping systems on carabid (Coleoptera: Carabidae) abundance, size, and wing morphology
08:45	Aguiar-Cordero, Teresa Winners and losers: Do environmental conditions favour pests and beneficial insects differently?
09:00	Wynn-Williams, Sydney Natural enemy responses to perennialization in prairie agroecosystems
09:15	Elsayed, Hadil A multifaceted dilemma: The impacts of anthropogenic threats on insects in protected areas since the 1990s
09:30	Flynn, Sylvain Successional trajectory and recovery of ground beetles among stand ages of black spruce (<i>Picea mariana</i>) following clearcut harvesting using a chronosequence approach
09:45	Shiuly Khan, Ummey Honey Effects of biomass harvest and herbicide application on carabid beetle communities: A 13th-year post-harvest assessment
10:00–10:30	Refreshment Break
10:30	Sanchez Jasso, Jessica Mariana Management influences plant species associated with suitable habitat for Dakota skipper (<i>Hesperia dacotae</i>) in Manitoba
10:45	Athanas, Sophia Developing long-term pollinator habitat in prairie agriculture
11:00	Cullen, Emmelyn Effects of agricultural perennialization on wild bee diversity in Manitoba and Saskatchewan
11:15	Watson, James Impact of bison grazing on wild bee abundance and diversity in Manitoba
11:30	Rajala, Brooke Pollinating insect responses to alternative herbicide treatments in power transmission corridors
11:45	Pollock, Nicola Predictors of habitat use by wild bees across natural and agricultural habitats in Southern Saskatchewan

12:00–13:30 Lunch — Prefunction Area

MONDAY 5 OCTOBER 2026

SYMPOSIUM: GRADUATE STUDENT SHOWCASE

Ambassador 1–2	13:30–15:30	Chair: Berenice Romero	Session ID: MON_PM_1
13:30	Chinchin, Raquel Spatial ecology of flea beetles in canola fields: Relationships with damage and natural enemies to inform management		
14:00	Stainforth, Emma What's happening in Nova Scotia? Leafhoppers, their potential biological control agents, and blueberry stunt phytoplasma in Nova Scotia lowbush blueberry agroecosystems		
14:30	Peters, Kira Understanding potential mechanisms for managing virus spillover to wild bees		
15:00	Vadboncoeur, Émile Resource availability and physiological demand shape resilience in the house cricket <i>Acheta domesticus</i>		

15:30–16:00 Refreshment Break

POSTER SESSION

TYC Event Centre 16:00–17:30

16:00–17:30 See later in the program for list of posters and abstracts

STUDENT RECEPTION

Torque Brewing (830 King Edward St #330)

19:30–22:00



TUESDAY 6 OCTOBER 2026

POSTER SESSION

TYC Event Centre 08:30–16:00

08:30–16:00 See later in the program for list of posters and abstracts

SYMPOSIUM: BORN TO BE WILD

Ambassador 3	09:00–11:45	Chair: Jason Gibbs	Session ID: TUE_AM_1
9:00	Frost, Carol	How to use agricultural field border vegetation to support specific pollinator species in the Aspen Parkland region of Alberta	
9:30	Domnich, Ilan	Monitoring Alberta’s native bees: Province-wide sampling, DNA metabarcoding, and community stewardship	
10:00–10:30	Refreshment Break		
10:30	Gibbs, Jason	Working with nightmare bees is a dream come true	
11:00	Sheffield, Cory	The identity of <i>Megachile vidua</i> Smith, 1853 with implications on the status of <i>Megachile (Xanthosarus)</i> Robertson, 1903 sensu lato (Hymenoptera: Megachilidae)	
11:30	Delano Lewis	The illusion of stability: Traditional metrics fail to capture butterfly declines in central Alberta	

12:00–13:30 Lunch — Prefunction Area



SYMPOSIUM: ARTHROPODS AND CULTURAL IMAGINATION

Ambassador 1 08:30–12:00 Chair: Ang Thompson Session ID: TUE_AM_2

08:30 **Berenbaum, May**
Insects in animated films—Or not all bugs are bunnies

09:00 **Acorn, Benjamin**
Lepidochromy: The forgotten method of butterfly and moth preservation, circa 1665

09:30 **Petrov, Julia**
Creepy-crawly couture: Arthropods in fashion

10:00–10:30 Refreshment Break

10:30 **Thompson, Ang**
Man-bug or bug-man? A look at historical insect artwork from 19th century Britain and France

11:00 **Bissette, Stephen**
Atom Ants, Black Scorpions and Arachnophobia: Insect and arachnid archetypes in pop culture

11:30 **Domnich, Ilan**
From phobia to fascination: Approaches for entomological outreach

12:00–13:30 Lunch — Prefunction Area



TUESDAY 6 OCTOBER 2026

SUBMITTED PAPERS: INSECT VECTORS AND PESTS

Ambassador 2 08:30–12:00 Chair: Andi Fischer Session ID: TUE_AM_3

08:30	Krokovsky, Larissa Detection of West Nile virus and canine heartworm (<i>Dirofilaria immitis</i>) in <i>Ochlerotatus trivittatus</i> mosquitoes in southern Ontario
08:45	Drahun, Ivan Mosquito birth control: Synthetic steroids disrupt reproduction in <i>Aedes aegypti</i>
09:00	Spicer, Kathryn Early developmental exposure to low temperatures reduces juvenile survival of fungal infection in the mosquito <i>Aedes aegypti</i>
09:15	MacNeil, Madeline Investigating potential drivers of tick abundance and pathogen prevalence in Nova Scotia
09:30	Cutler, Chris Insect hormesis: Patterns, responses, and trade-offs
09:45	Hervet, Vincent What's bugging farmers' stored grain
10:00–10:30	Refreshment Break
10:30	Sylvestre, Florent Genomics of Nearctic leafhoppers and their symbionts to advance sustainable crop protection
10:45	Perez-Lopez, Edel Establishing the potato leafhopper as a new model for sustainable agriculture
11:00	Rodensky, Teramene Dissecting pea aphid resistance in lentil
11:15	Castro-Torres, Ricardo Can oil residues act like sticky traps? The case of the prickly pear cochineal (Hemiptera: Dactylopiidae)
11:30	Ullah, Aziz Tracking the movement of flea beetles across the Canadian Prairies
11:45	Renkema, Justin Bad news for local beer drinkers: A new invasive flea beetle (<i>Psylliodes attenuata</i>) threatens Ontario and Quebec hops

12:00–13:30	Lunch — Prefunction Area
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TUESDAY 6 OCTOBER 2026

BIOLOGICAL SURVEY OF CANADA SYMPOSIUM

Ambassador 4	08:30–12:00	Chair: Morgan Jackson	Session ID: TUE_AM_4
8:30	Jackson, Morgan	Welcome & introduction to the Biological Survey of Canada	
08:45	Galloway, Terry	The "Familiarity Gap": A pitfall in the long-term survey of ectoparasites infesting wildlife in Manitoba	
9:00	Proctor, Heather	Bigger birds, more mites? Relationships between host size and feather mite prevalence, abundance and species richness.	
9:15	Douglas, Hume	Targeted detection of new non-native beetles on non-native weeds	
9:30	Scott, Catherine	The future of conferences: Beyond the status quo	
9:45	Jackson, Morgan	Current trends in Canadian entomology: Insects in undergraduate education	
10:00–10:30		Refreshment Break	
10:30	Biological Survey of Canada Workshop	The future of Canadian entomology is now	

BIOLOGICAL SURVEY OF CANADA MEET AND GREET

Ambassador 4
12:00–13:30

12:00–13:30 Lunch — Prefunction Area



TUESDAY 6 OCTOBER 2026

SYMPOSIUM: ARTHROPODS AND VECTOR-BORNE DISEASES

Ambassador 1–2	13:00–15:00	Chair: David Wade	Session ID: TUE_PM_1
13:00	Voordouw, Maarten	The ecology of ticks that transmit Lyme disease—A tale of mast, mice, and time lags	
13:20	Faraone, Nicoletta	Tick management and tick chemical ecology: New frontiers at the Canadian Tick Research and Innovation Centre	
13:40	Bouchard, Catherine	From outbreak to One Health action: Emergence of anaplasmosis in Québec, Canada	
14:00	Vidya, Elva	Investigating the role of microRNAs on behavioural shifts in <i>Aedes aegypti</i> mosquitoes	
14:20	Soghigian, John	Vector and pathogen: Genomics <i>Culex pipiens</i> and West Nile virus in Alberta	
14:40	Hunter, Fiona	25 Years of mosquito surveillance in Ontario: Discoveries and "never in my lifetime" moments	

SUBMITTED PAPERS: BEHAVIOUR AND ECOLOGY

Ambassador 3	13:30–15:00	Chair: Boyd Mori	Session ID: TUE_PM_2
13:30	Owens, Avalon	Moths are more day-active following a night of flight-to-light	
13:45	Fischer, Andreas	Vulnerability of chemical sexual signals to urbanization: Pollutants impair pheromone signalling in <i>Araneus diadematus</i>	
14:00	Holliday, Neil	Finding a place on the beach: Within-habitat movement in <i>Chlaenius cordicollis</i> (Coleoptera: Carabidae)	
14:15	Pacheco, Ammy	Exploring co-infection dynamics between chronic bee paralysis virus (CBPV) and Israeli acute paralysis virus (IAPV) in <i>Apis mellifera</i> .	
14:30	Kochar, Hargun	Identification of possible genotype dependent virulence of black queen cell virus in honey bees (<i>Apis mellifera</i>)	
14:45	Symak, Brianne	Uncharted territory: exploring Cicadellidae (Hemiptera) communities in Canadian Prairie canola fields.	

TUESDAY 6 OCTOBER 2026

SUBMITTED PAPERS: EVOLUTION AND SYSTEMATICS

Ambassador 4 **13:30–15:00** **Chair: Aziz Ullah** **Session ID: TUE_PM_3**

- 13:30 **Brunet, Bryan**
Illuminating a cryptic species complex through morphometric analysis of the poplar leaf aphid, *Chaitophorus populicola* (Hemiptera: Aphididae)
- 13:45 **Marcus, Jeffrey**
Mistakes were made: Cryptic species among melanic *Junonia* butterfly lineages
- 14:00 **Stormer, Hannah**
Developing a portable, in-field eDNA metabarcoding protocol for surveying wetland invertebrate diversity
- 14:15 **Oram, Ryan**
Natural history collections: A second life to your specimens
- 14:30 **Pan, Tiffany**
Investigating the evolution of the loss of blood-feeding in Sabethini mosquitoes
- 14:45 **Bowden, Joseph**
The natural enemies of the eastern spruce budworm (Lepidoptera: Tortricidae) during the epidemic phase in Newfoundland

15:00–15:30 Refreshment Break

ENTOMOLOGICAL SOCIETY OF CANADA ANNUAL BUSINESS MEETING

Ambassador 4

15:30–16:30

BANQUET AND STUDENT AWARDS

Ambassador 1–2 **Chair: Kateryn Rochon**

- 18:30 Cocktails
- 19:00 Dinner
- 20:30 Heritage Lecture
- 21:00 Awards

WEDNESDAY 7 OCTOBER 2026

SYMPOSIUM: MANAGED POLLINATORS

Ambassador 1–2		08:30–12:00	Chairs: Nuria Morfin & Derek Micholson	Session ID: WED_AM_1
8:30		Morfin, Nuria	Introduction	
08:35		Pernal, Steve	Evaluation of a novel acaricide against <i>Varroa destructor</i>	
08:50		Bahreini, Rassol	Evaluating delivery systems for novel acaricide to control <i>Varroa destructor</i> mites in honey bee (<i>Apis mellifera</i>) colonies	
09:05		Tokach, Rogan	<i>Tropilaelaps mercedesae</i> : An emerging threat to global apiculture	
09:20		Broccard-Bell, Heather	Finding solutions: Recent field trials using formic pro to combat <i>Tropilaelaps</i> in Asia and Europe	
09:35		Foster, Leonard	Bringing new technology to bear on honey bee (<i>Apis mellifera</i>) pheromones —We've only seen the tip of the iceberg	
10:00–10:30		Refreshment Break		
10:30		Romero, Berenice	Using the honey bee as an invertebrate model for studying Fetal Alcohol Spectrum Disorder (FASD)	
10:45		Newman, Kiera	Milkweed cardenolides as a potential natural resource for supporting honey bee health	
11:00		Retzlaff, Jenn	Advancing alfalfa leafcutting bee (<i>Megachile rotundata</i>) health and management through applied research on the Canadian Prairies	
11:15		Watt, Caitlin	Turn up the heat: Management of the alfalfa leafcutter bee parasitoid <i>Pteromalus apum</i>	
11:30		Van Nest, Byron	From dogma to data: Rethinking honey bee behaviour	
11:45		Smid, Deanna	The Last Beekeeper x3: Imagining the future of pollinator health	

WEDNESDAY 7 OCTOBER 2026

SYMPOSIUM: APOCALYPSE PLOWED

Ambassador 3	08:40–12:00	Chair: Tyler Wist	Session ID: WED_AM_2
08:40	Mori, Boyd	Insecticide susceptibility of flea beetles varies by species and insecticide class in Canadian canola	
9:00	Costamagna, Alejandro	Cover crops as a control strategy for flea beetle herbivory in canola crops	
9:20	Vankosky, Meghan	Integrated pest management of <i>Delia</i> spp. root maggots in Saskatchewan	
9:40	Saguez, Julien	Beyond ear damage: The hidden impact of western bean cutworm on mycotoxins and livestock health and productivity.	
10:00–10:30	Refreshment Break		
10:30	Wist, Tyler	Wheat the heck!? Leafhopper vectored aster yellows disease in wheat?	
10:50	De Silva Weeraddana, Chaminda	Factors influencing oviposition and larval performance of wheat midge	
11:10	Evenden, Maya	Underground interactions between field pea and larval pea leaf weevils, <i>Sitona lineatus</i> (Coleoptera: Curculionidae), mediated by a pea-rhizobia symbiosis	
11:30	Carcamo, Hector	Towards a dynamic action threshold for aphids and lygus in lentils	

SUBMITTED PAPERS: FORESTRY AND ECOLOGY:

Ambassador 4	09:00–11:30	Chair: Neil Holliday	Session ID: WED_AM_3
09:00	Campbell, Erin	Comparative genomics and population structure of the emerald ash borer (<i>Agrilus planipennis</i> Fairmaire) in North America	
09:15	Stockdale, Sammy	Evaluating cold tolerance of <i>Laricobius nigrinus</i> for biological control of the hemlock woolly adelgid (<i>Adelges tsugae</i>) in Nova Scotia	
09:30	Byeon, Ui-Joung	Responses of Flying Beetle Diversity and Assemblages to Biomass Harvesting Intensity	
09:45	Lee, Seung-Il	Exploring forest entomology at Lakehead University: Arthropod biodiversity and sustainable forest management	
10:00–10:30	Refreshment Break		
10:30	Mackay, Pat	Population dynamics of a native aphid: Colony structure and abundance	

WEDNESDAY 7 OCTOBER 2026

10:45	Lamb, Robert J. Population dynamics of a native aphid: Impact of predation
11:00	Kasdorf, Sophie Chronic exposure of crickets (<i>Acheta domesticus</i>) to simulated hypergravity
11:15	Friesen, Margaret There ought to be a law: Protections needed for insects from anthropogenic non-ionizing electromagnetic fields such as emissions from wireless telecommunications infrastructure

12:00–13:30	Lunch (on your own)
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SYMPOSIUM: EXTENSION APICULTURE

Ambassador 1–2	13:30–16:30	Chairs: Derek Micholson & Nuria Morfin	Session ID: WED_PM_1
13:30	Micholson, Derek Introduction		
13:35	Smid, Deanna Talking to and about honeybees: the history and necessity of beekeeping dialogue		
13:50	Broccard-Bell, Heather The effect of timing and application method on efficacy and colony performance of a slow-release formic acid mite treatment		
14:05	Tokach, Rogan Managing <i>Varroa</i> : Evaluating treatments from California almonds through North Dakota honey production		
14:20	Wickramasinghe, Yashoda Evaluating the coinfection dynamics of atypical and typical <i>Melissococcus plutonius</i> strains in honey bee larvae and adults		
14:35–15:00	Refreshment Break		
15:00	Vickers, Maren Investigating three pad materials with oxalic acid and glycerin for varroa mite control		
15:15	Sharma, Charu Effects of oxalic acid trickle and vapor treatments on varroa mites, virus dynamics, and honey bee colony performance		
15:30	Pernal, Stephen Evaluating a new vaccine against American foulbrood disease		
15:45	Strelaeff, Danika Cage trials of the DWV honey bee vaccine		
16:00	Polinsky, Matthew KRTP overview and updates		
16:15	Micholson, Derek Final remarks		

LIST OF POSTERS

Poster number	Presenting author and title * after the author's name indicates an entry in the President's Prize Competition
1	Lilja Anderson * Effects of a synthetic queen mandibular pheromone on emergency queen rearing in the honey bee (<i>Apis mellifera</i>)
2	Declan McKelvy Electric bees: Appetitive conditioning to electric field signals in honey bees
3	Sam Bennett * How does organic farming and the landscape context impact pollination services for soybean?
4	Madeleine Dupuis * Mites behind bars: Meta-analysis comparing poultry red mite (Mesostigmata: Dermanyssidae: <i>Dermanyssus gallinae</i>) abundance in cage-free and caged laying-hen (Galliformes: Phasianidae: <i>Gallus gallus domesticus</i>) housing systems
5	Ian M. Scott Bioconversion of Canadian crop residues by black soldier fly (<i>Hermetia illucens</i>) for poultry feed: efficiency and contaminant safety
6	Ophelia K. Carter * Optimizing electrophysiological recording techniques for chemosensory responses of ixodid ticks to volatile organic compounds
7	Natalie Savoia * Evaluation of synthetic plant semiochemicals for Colorado potato beetle (<i>Leptinotarsa decemlineata</i>) management
8	Serena Page Developing pheromone traps to manage riceworm (<i>Apamea apamiformis</i>) infestations in North American wild rice (<i>Zizania</i> spp.)
9	Ahmed Ben Hassine * Understanding and evaluating strategies for controlling leafhoppers using both synthetic insecticides and biopesticides
10	Suzanne Blatt Strategies to improve pesticide efficacy for <i>Delia radicum</i> L. control in Brassicas
11	Kanishka M. Senevirathna Genomic insights into pea aphid biotypes and pyrethroid resistance across the Canadian Prairies
12	Sébastien Boquel Cabbage seedpod weevil in Quebec: Parasitism rate and action thresholds for sustainable management
13	Roselyne Labbé Integrating steam treatment and biological control for management of cyclamen mite (<i>Phytonemus pallidus</i>) in greenhouse strawberry

Poster number	Presenting author and title * after the author's name indicates an entry in the President's Prize Competition
14	Anita Feng * Exploring silver flies (<i>Leucotaraxis argenticollis</i> , <i>Leucotaraxis piniperda</i>) as biocontrol agents of hemlock woolly adelgid in Nova Scotia
15	Sara Edwards Monitoring and management of beech leaf-mining weevil in its invasive range
16	Lauren Des Marteaux New open-source software to rapidly quantify leaf area and insect feeding damage from standardized images
17	Rob C. Johns Adaptive area-wide management for controlling spruce budworm outbreaks: Insights from an early intervention strategy case study
18	Lydia Jocius Evaluating hybridization between the native <i>Laricobius rubidus</i> and the introduced <i>Laricobius nigrinus</i> following biological control releases against hemlock woolly adelgid (<i>Adelges tsugae</i>) in eastern Canada
19	Daniel Z. Lowe Patterns of parasitoid functional diversity and relative parasitism in a spruce budworm (<i>Choristoneura fumiferana</i>) community along Quebec's North Shore
20	Carys McMurray Small pest, big problem: Impact of hemlock woolly adelgid (Hemiptera: Adelgidae) infestations and neonicotinoid insecticide treatments on native insect biodiversity
21	Kristina Wall Effects of herbicide treatments after biomass harvesting on flying beetle diversity and assemblage structure
22	Jacqueline Bowles * Dung beetle and canopy response to grazing by bison on a ranch near Pine River, Manitoba
23	Jaden L. E. Kovacs Diversity and assemblage structure of carabid beetles in beaver habitat
24	Jordanne Jacques Developing an illustrated identification guide to the leafhopper genera of Quebec
25	Daniel J. Erasmus Biodiversity of Ephemeroptera, Plecoptera, and Trichoptera in the Bowron River, BC
26	Yang Liu Functional morphology and kinematics across clicking beetles: a shared jumping mechanism achieved by diverse latching apparatus (Coleoptera: Elateroidea)
27	Yanchen Gao Climate change reshapes global migration pathways of the diamondback moth (<i>Plutella xylostella</i>)

ABSTRACTS

PLENARY SYMPOSIUM PAPERS

May R. Berenbaum

Professor, Department of Entomology, University of Illinois at Urbana-Champaign

Insect apocalypse redux—silent springs, summers, and falls?

There is nothing even remotely scientific about the word “apocalypse”—it derives from an Ancient Greek word *apokálypsis* (ἀποκάλυψις), meaning “lifting of the veil” and it’s associated with New Testament prophecy about the End Times. In 2018, however, the word acquired a scientific connotation in a New York Times Magazine article by journalist Brooke Jarvis titled, “The Insect Apocalypse Is Here.” Demonstrating the power of metaphor, the phrase “insect apocalypse” continues to appear in 2026, most recently in news stories, e.g., about studies linking widespread declines in insect abundances to concomitant increases in food insecurity for vulnerable human populations. The metaphor does break down, however, in an important way; biblical apocalypses were believed to take place on an unspecified timeline, but insect decline demands immediate attention because evidence of the phenomenon is compelling. Raising public awareness and concern about the status of insects should be a high priority for entomologists at least partly because insect decline is a challenge well beyond the capacity of the entomological community to address without buy-in from the public at large.

David L. Wagner

Professor, Ecology and Evolutionary Biology, University of Connecticut

Status update on North America’s insect biodiversity

I will review the global status of insects, emphasizing the what, when and where of insect population trends from North America with special emphasis on the American Southwest and snow-dominated ecosystems. While conservative estimates of annual losses of insect abundance for all terrestrial ecosystems commonly fall between 1–2%, some locations are experiencing annual rates of decline as high as 5% or greater; other regions that are warming or receiving increased rainfall—away from agriculture and urbanization—have reported increasing insect numbers. Data for freshwater insects are highly variable, underscoring that insect populations numbers are frequently spatially, temporally, and taxonomically heterogeneous. Clean water legislation and local conservation efforts to restore habitats or support pollinator diversity have been successful and demonstrate that local actions can reverse downward population trends. I will conclude with the mention of data gaps that may be used to prioritize research and policy agendas, and actions that individuals could embrace to promote invertebrate biodiversity.

ABSTRACTS OF SYMPOSIUM AND SUBMITTED ORAL PRESENTATIONS

Abstracts are ordered alphabetically by family name (underlined) of the presenting author.

Benjamin Acorn

University of Alberta, Edmonton, Alberta, Canada

Lepidochromy: The forgotten method of butterfly and moth preservation, circa 1665

Pinned insect specimens are the standard for the physical preservation of many insect taxa, and are among the most recognizable objects associated with entomology as a discipline. Entomologists have been pinning insects since the early 1700s, but earlier techniques existed to preserve specimens in the young years of science. Lepidochromy (also known as “nature printing”) was a process first performed in 1665, wherein the scales of a butterfly or moth were transferred from wing to paper near-flawlessly. Although primarily used by amateur naturalists, lepidochromy has been utilized across the globe to diverse ends. Spanning a history including African safaris, Dutch painting, field guide creation, and Serbian organized crime, this presentation aims to review the tumultuous history of this remarkable method which spans the gap between art and science with one question in mind: could lepidochromy have a place in modern entomology?

Teresa Aguiar-Cordero¹, Sean Prager¹, Tyler Wist²

¹Department of Plant Sciences, University of Saskatchewan, Saskatoon, Saskatchewan, Canada,

²Agriculture and Agri-Food Canada, Saskatoon Research and Development Centre, Saskatoon, Saskatchewan, Canada

Winners and losers: Do environmental conditions favour pests and beneficial insects differently?

Environmental conditions can strongly influence insect population dynamics in agroecosystems, but pest species and their natural enemies may not respond to these conditions in the same way. Understanding these differences is important for anticipating periods of increased pest pressure while recognizing environmental conditions that support beneficial arthropods and their potential contribution to biological control. During the 2025 and 2026 growing seasons, insect communities were monitored in lentil fields at multiple sites in Saskatchewan using repeated sweep-net sampling throughout crop development. Insects were classified into major pest and beneficial groups, with analyses focusing on the most abundant taxa. We will evaluate associations between insect occurrence and abundance and environmental and seasonal variables, including temperature, precipitation, accumulated degree days, and crop growth stage. Comparisons between pest and beneficial groups will be used to determine whether environmental conditions favour these functional groups differently and to identify periods when pest abundance may become less synchronized with the occurrence of natural enemies. By examining pest and beneficial insects simultaneously rather than considering pest populations in isolation, this study aims to improve our understanding of insect community dynamics in prairie lentil agroecosystems. These relationships may ultimately contribute to more ecologically informed monitoring and integrated pest management strategies that balance crop protection with the conservation of beneficial arthropods.

Sophia Athanas, Jason Gibbs

Department of Entomology, University of Manitoba

Developing long-term pollinator habitat in prairie agriculture

Worldwide, growers and governments are taking the initiative to implement long-term pollinator habitat in agricultural areas to promote ecosystem health in the face of insect decline due to climate change and conventional agriculture. In the prairies, habitats are often placed in unproductive land or along crop margins to promote diversity in a monoculture system that would otherwise be unsupportive to the over 400 species of wild bees with varying nesting and floral needs. The efficacy of perennials in the development of these habitats was investigated using different seed mixes across a perennality gradient. Here, we report the bee abundance and diversity in each long-term habitat treatment, as well as bee preferences for individual floral species. We identified over 2000 bees in two years of experimental habitat collection. Preliminary data shows that annual mixes contribute more to abundance than is expected for their floral area; perennial plants contribute an expected amount, and annual monocultures contribute less to overall bee attraction and diversity. We explain the benefits of incorporating annuals like *Phacelia* and *Helianthus* into pollinator plantings, as well as the drawbacks of perennial establishment. We also find that given two years after planting, native perennial habitat will attract and maintain higher bee diversity and abundance compared to exotic domesticated perennials such as alfalfa. |

Rassol Bahreini, Alyssa Turnbull, Carina Lai, Olav Rueppell

Department of Biological Sciences, University of Alberta, Edmonton, Alberta, Canada

Evaluating delivery systems for novel acaricide to control *Varroa destructor* mites in honey bee (*Apis mellifera*) colonies

The widespread prevalence of ectoparasitic mites, *Varroa destructor* remains a critical threat to maintaining healthy, productive honey bee (*Apis mellifera*) colonies, particularly as resistance to conventional acaricides undermines treatment efficacy. Consequently, developing novel chemical compounds that control mite populations with minimal host toxicity is essential. Based on active ingredient properties, pesticides are administered via contact, oral, sublimation, trickling, dusting, or misting methods in bee colonies. Following laboratory and field screening that confirmed high acaricidal efficacy and safety to host bees for two candidate compounds, we evaluated their delivery in colonies using slow-release contact and systemic methods. For contact delivery, compounds were incorporated into synthetic polymers and polysaccharide-based hydrogels. For systemic delivery targeting mites in sealed brood cells, chitosan and microgel carriers were assessed. In single-box colonies, treatments with one candidate compound yielded substantial reductions in *V. destructor* infestation with minimal adverse effects on honey bees. Combined laboratory and field findings demonstrate the promise of these targeted delivery systems for *V. destructor* control. Further refinement of dosages and delivery matrix optimization will support their integration into integrated pest management (IPM) strategies for sustainable *Varroa* mite control in apiculture.

Bree Bilton¹, Belarmino Lopes Neto¹, Berenice Romero¹, Alvaro De la Mora¹, Midhun S. Jose¹, Serhii Kondratiuk¹, Marina C. Bezerra da Silva¹, Maria Janser¹, Julia Tregobov¹, Oleksii Obshta¹, Vladyslav Katrii¹, Yashoda Wickramasinghe¹, Jessica Webb¹, Juan Arias Marmolejo¹, Ryan Merkl¹, Igor Moshynskyy¹, Alan Chicoine², Elemir Simko¹, Sarah C. Wood¹

¹Western College of Veterinary Medicine; Department of Veterinary Pathology, ²Western College of Veterinary Medicine; Department of Veterinary Biomedical Sciences

Evaluating the safety and efficacy of fenbendazole as a treatment for nosema disease in Saskatchewan honey bees

Nosemosis (*Vairimorpha ceranae* and/or *Vairimorpha apis*) is a microsporidian disease affecting the health of honey bees (*Apis mellifera*) across Canada, negatively impacting overall colony strength, productivity, and winter survival. Concerns regarding the efficacy of the approved antibiotic fumagillin to control nosema has sparked investigations to discovering alternative treatments such as fenbendazole, a benzimidazole anthelmintic broadly used in veterinary medicine. Our study determined whether the Panacur® Aquasol™ Fenbendazole suspension is safe and effective by analyzing spore load and survival in treated honey bees infected with nosemosis. We found that a dose of 10 mg/mL fenbendazole significantly increased bee mortality by 49.8% across 15 days of daily treatment compared to other groups, with no differences in survival observed between the negative control (no treatment), positive control (fumagillin), 1 mg/mL, and 0.1 mg/mL fenbendazole doses. Investigation of fenbendazole on nosema spore load is underway. Completion of this study will potentially propose an alternative for beekeepers to control nosemosis in their colonies, reducing colony loss and successfully maintaining honey and pollination production.

Stephen R. Bissette

¹Center for Cartoon Studies, White River Junction, Vermont, USA

Atom Ants, Black Scorpions and Arachnophobia: Insect and arachnid archetypes in pop culture

In the wake of the 1859 publication of Charles Darwin's *On the Origin of Species*, attendant controversy and backlash fueled nightmarish imagery and fantasies in 19th century pop referred to as 'topsy-turvy,' in which human beings were placed at the bottom of an inverted food chain, beneath often-giant-sized insects and arachnids. Exotic exploration fiction, children's literature, early 'scientific romances,' and comic strips codified these into frightening new pop archetypes popularized in early 20th century 'scientifiction' and imaginative literature such as Franz Kafka's *The Metamorphosis*. These archetypes were reinvigorated and (literally) expanded in post-Hiroshima/Nagasaki WWII 'atomic-age' sf-digest fiction and 1950s cinema, mutating from outsized ants, locusts, spiders, scorpions, and insect-human-hybrids into fresh permutations reflecting environmental concerns, invasive species migration, and even heroic hybrids (e.g., *The Amazing Spider-Man*) by the late 20th century.

Ivy Boddez^{1,2}, Carol Frost¹, Cyriac Mvolo², Jennifer Klutsch²

¹ University of Alberta, ² Natural Resources Canada (Canadian Forest Service)

Wood-inhabiting insect communities following forest fire in Alberta

Wildfire is a significant forest disturbance in North American forests. While the impact of fire can substantially alter forest structure and function, some insect species opportunistically colonize burned trees. Our objective was to see how saproxylic insect species composition is affected by tree species, burn severity, and tree diameter. Bolts from trees burned in a 2023 Alberta wildfire were collected during the first two post-fire years (n=162), and wood-inhabiting insects were reared for two years. Within each of three tree species, trees represented three burn severity classes and three diameter classes, with three replicates per combination. Overall insect species abundance was greatest in trees with moderate burn severity. Low burn severity trees had a low proportion of woodborer beetles but had a relatively high proportion of scolytid bark beetles. Furthermore, bark beetles and woodborers favoured coniferous trees above aspen. This information can help show what wood is being utilized by native insects following boreal wildfires to help inform management decisions regarding salvage logging and insect community assemblages.

Catherine Bouchard^{1,2,3}, Cécile Aenishaenslin^{1,2,4}, Raphaëlle Audet-Legault^{1,2}, Geneviève Baron^{5,6}, Kirsten Crandall⁷, Marion Desmarchelier¹, Carol-Ann Desrochers-Plourde^{1,2}, Ariane Dumas^{1,2,3}, Elizabeth Dyer^{1,2}, Sabrina Faubert^{1,2}, Vanessa Gabriele-Rivet^{2,3}, Anaïs Gasse⁸, Jessica Hainault^{1,2}, Patrick A. Leighton^{1,2,4}, Nicholas H. Ogden^{1,2,3}, Jérôme Pelletier^{1,2}, Jean-Philippe Rocheleau^{1,2,9}, Jean I. Tsao¹⁰, Heather Coatsworth¹¹

¹Département de pathologie et microbiologie, Faculté de médecine vétérinaire, Université de Montréal, Saint-Hyacinthe, ²Groupe de recherche en épidémiologie des zoonoses et santé publique (GREZOSP), Faculté de médecine vétérinaire, Université de Montréal, Saint-Hyacinthe, ³Modelling Hub Division, Applied Public Health Sciences Directorate, Science and Policy Integration Branch, Public Health Agency of Canada, ⁴Centre de recherche en santé publique de l'Université de Montréal et du CIUSSS du Centre-Sud-de-l'Île-de-Montréal (CReSP), ⁵Direction de santé publique du CIUSSS de l'Estrie-CHUS, Sherbrooke, ⁶Faculté de médecine et des sciences de la santé, Université de Sherbrooke, ⁷Unité Maladies infectieuses en communauté, Direction des risques biologiques, Institut national de santé publique du Québec (INSPQ), ⁸Direction de la gestion de la faune de l'Estrie, de Montréal, de la Montérégie et de Laval, Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP), ⁹Département de santé animale, Cégep de Saint-Hyacinthe, ¹⁰Department of Fisheries and Wildlife, Michigan State University, ¹¹Mycobacteriology, Vector-Borne and Prions Diseases Division, National Microbiology Laboratory, Public Health Agency of Canada

From outbreak to One Health action: Emergence of anaplasmosis in Québec, Canada

Human granulocytic anaplasmosis (HGA), caused by the zoonotic Ap-ha variant of *Anaplasma phagocytophilum*, is rapidly emerging in southeastern Canada. In 2021, Québec experienced an unprecedented outbreak, with 35 of 47 provincial cases reported in the Eastern Townships and a marked concentration around Bromont. This emergence prompted two complementary wildlife studies designed to move from outbreak detection toward One Health action. First, we investigated the wildlife hosts amplifying Ap-ha within the outbreak area. Among 547 small mammals sampled

in 2022–2023, Ap-ha accounted for 90% of genotyped infections. *Peromyscus* mice and eastern chipmunks (*Tamias striatus*) transmitted infection to an average of 36.8% and 52.9% of feeding *Ixodes scapularis* larvae, respectively, demonstrating their direct contribution to the production of infected immature ticks. Second, we evaluated white-tailed deer (*Odocoileus virginianus*) as sentinels of local Ap-ha circulation. Among 476 hunter-harvested deer sampled in 2023–2024, Ap-ha DNA was detected in blood from 13 animals and in ear biopsies from ten additional deer. Of 207 tick-infested deer, 68 carried at least one Ap-ha-positive tick, with clear spatial clustering. Seven Ap-ha-positive deer, including three blood-positive animals, concurrently carried Ap-ha-positive ticks. Together, these studies distinguish complementary wildlife roles within the emerging Ap-ha transmission system: small mammals amplify infection, whereas white-tailed deer can support scalable detection and spatial characterization of Ap-ha circulation. Linking an outbreak, reservoir competence and deer-based sentinel evidence provides a One Health framework for understanding and improving surveillance of emerging anaplasmosis risk in Canada.

J.J. Bowden¹, E.R.D. Moise¹, T. Swanburg², B. van der Meer², J. Warren¹, M. Williams²

¹Natural Resources Canada, Canadian Forest Service, Atlantic Forestry Centre, Corner Brook, Canada, ²Natural Resources Canada, Canadian Forest Service, Atlantic Forestry Centre, Fredericton

The natural enemies of the eastern spruce budworm (Lepidoptera: Tortricidae) during the epidemic phase in Newfoundland

The eastern spruce budworm (SBW, *Choristoneura fumiferana* (Clem.)) is one of the most important defoliating insects in North American spruce–fir forests. As with many irruptive forest insects, natural enemies play an important role in population regulation. During the rising phase of an SBW outbreak, we collected larvae and pupae from spring to summer in western Newfoundland, Canada, to assess whether parasitism rates differed among Btk-treated and untreated stands, elevations, and stand compositions. Between 2021 and 2024, we estimated parasitism rates and identified parasitoid species from 7,527 larvae and pupae using rearing, molecular sorting, and DNA barcoding. At the end of each season, branches were sampled to assess cumulative defoliation and estimate second-instar (L2) densities. Parasitism rates did not differ significantly between Btk-treated and untreated stands or between conifer-dominated and mixed stands but were significantly higher at low elevations. Mean parasitism per site was $7.2 \pm 0.6\%$ (SE), lower than rates reported elsewhere in Canada. We confirmed eleven parasitoid species predicted by Otvos and Moody (1978) to parasitize SBW in Newfoundland and documented at least six additional species not previously recognized as part of the province’s SBW parasitoid complex. Mean L2 density was 21.4 ± 1.7 caterpillars per branch. Elevation was also the only significant factor affecting L2 densities and annual defoliation. These findings suggest that elevation is a stronger driver of SBW parasitism, population density, and defoliation dynamics than forest management or stand composition in western Newfoundland. Our results also demonstrate the effectiveness of molecular sorting for assessing parasitism and characterizing parasitoid assemblages across host life stages.

Heather Broccard-Bell

NOD Apiary Products Ltd.

The effect of timing and application method on efficacy and colony performance of a slow-release formic acid mite treatment

Effective management of *Varroa destructor* requires the alignment of treatment timing with environmental conditions. For formic acid treatments, application strategy must also be considered. We tested a commercially available slow-release formic acid treatment, Formic Pro. In North America, the product is registered under two application protocols: (1) simultaneous application of two strips, and (2) sequential application of single strips over two consecutive 10-day periods. During the 2025 beekeeping season, we conducted a field experiment at our research apiary in Quinte West, Ontario, Canada (N = 35, k = 5). Varroa treatments were applied either in the spring (May 20), or in summer (July 5). We evaluated the interaction between treatment timing and application method on mite control efficacy and colony performance. Colony-level outcomes, including mite drop and performance indicators, were monitored throughout the active season. We found an interaction between treatment timing and application method, indicating that the relative efficacy of each protocol is context-dependent. Earlier in the season, the two methods performed identically; however, at the July timepoint, the two simultaneous strip method outperformed the sequential single strip method. Our findings highlight the importance of integrating both timing and application strategy when deploying formic acid treatments, and provide guidance for beekeepers seeking to optimize their Varroa control strategies.

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Finding solutions: Recent field trials using Formic Pro to combat *Tropilaelaps* in Asia and Europe

Tropilaelaps mites are a major emerging threat to global apiculture. Although absent from North America, their rapid reproduction and close association with honey bee brood make them a significant biosecurity concern. We evaluated Formic Pro in complementary field trials conducted in Chiang Mai, Thailand (October–December 2025) and Senaki, Georgia (April–July 2026). The Thai study, conducted in modified Thai hives with architecture similar to Langstroth equipment, compared a single-strip treatment (n = 23) with complete brood removal (n = 11), brood removal + single-strip (n = 8), and untreated controls (n = 11). Building on these results, the Georgian study evaluated three doses (half, one, or two strips) and two application schedules (April only or April plus June) over three months (n = 56 colonies). Georgia provides a valuable temperate model because colony management and seasonal brood dynamics closely resemble those in North America, and *Tropilaelaps* has only recently been detected there. Worker brood biopsies collected 4–5 days after treatment showed efficacy varied with dose, location, and treatment date. The lowest mite mortality occurred with the half-strip June treatment in Georgia (17.8 ± 16.0%), whereas all double-strip treatments achieved complete mite mortality. Single-strip treatments achieved near-complete mortality in Thailand and in April in Georgia, but only 42.8 ± 37.8% in June.

Elevated queen loss occurred following the Thai treatment and April applications in Georgia, but not after June treatments. No other adverse colony effects were observed.

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Illuminating a cryptic species complex through morphometric analysis of the poplar leaf aphid, *Chaitophorus populicola* (Hemiptera: Aphididae)

Chaitophorus populicola Thomas, 1878 is an aphid species associated poplar, aspen and cottonwood trees across Canada and the United States. Variation in the shape of dorsal abdominal hairs, colour, and chromosome numbers across its geographic range indicate that *C. populicola* may represent a complex of species. Furthermore, molecular species delimitation based on the mitochondrial cytochrome c oxidase subunit I DNA barcode region suggests the presence of multiple host or geographically restricted populations. To assess whether there are morphologically distinct populations across its range, slide-mounted apterous viviparous female adults were measured for 27 discrete and continuous morphological characters and then analyzed in conjunction with *a priori* information (host, geography, and two hypothetical species partitioning schemes delineated by DNA barcoding) using principal component analyses, canonical discriminant analyses, and multivariate analysis of variance. Despite a moderate level of within species sequence divergence, we find support for morphologically distinct populations of *C. populicola*. Namely, populations associated with *P. deltoides*, the type host, appear to be distinct from other populations with respect to both morphology and molecular variation. We also find that geography and species partitioning scheme each had a statistically significant effect on the clustering of specimens on the basis of morphological characters. The effect of host species was non-significant but was significantly correlated with species partitions. These results suggest that *C. populicola* is comprised of at least two distinct species which vary in both host use and morphological characters, and that revision of its description is needed.

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Surveying pyrethroid-resistant alfalfa weevil populations across western Canada

The alfalfa weevil, *Hypera postica* Gyllenhal (Coleoptera: Curculionidae), is a key pest of alfalfa, *Medicago sativa* L. (Fabaceae), especially in crops grown for seed production. Management of alfalfa weevil relies heavily on insecticides, especially pyrethroids. In southern Alberta, pyrethroid resistance has been documented. However, the distribution of this resistance across western Canada is unknown. In crops grown for forage production, insecticide applications are less frequent, but it is uncertain whether alfalfa weevil populations from different crop types differ in susceptibility to pyrethroids. The objective of this study was to determine the distribution of alfalfa weevil pyrethroid resistance across western Canada. Alfalfa weevils were collected from alfalfa seed production fields across Alberta, Saskatchewan, and Manitoba during 2025 and 2026. Vial bioassays were used to determine pyrethroid susceptibility. The results of this survey enable

producers to make informed pest management decisions accounting for regional population differences.

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Responses of flying beetle diversity and assemblages to biomass harvesting intensity

The growing demand for renewable energy to address climate change has increased interest in forest-based bioenergy resources. To satisfy this demand, non-merchantable residual biomass is increasingly being harvested alongside tree stems as an additional resource. Evaluating the complex impacts of these activities on forest ecosystems has become increasingly important. In this study, we evaluated the effects of intensified biomass harvesting on the diversity and community structure of flying beetles, one of the most diverse insect taxa. The research was conducted at Island Lake Biomass Harvest Experiment in Chapleau, Ontario, Canada. Study sites included different intensities of biomass removal treatments, along with mature forests originating from harvest and young and mature forests originating from wildfire. Flying beetles were collected using window traps at two-week intervals from June to August in 2026. As a results, 3,594 individuals representing 269 species were collected. Both Hill diversities (¹D and ²D) and sample coverage-based iNEXT analysis showed similar patterns, with the highest diversity observed in wildfire-origin mature and young forests and the lowest in the full-tree harvesting treatment. However, beetle abundance showed the opposite pattern, with the lowest abundance in wildfire-origin mature and young forests. Furthermore, PERMANOVA results indicated that beetle assemblages differed significantly across all treatments, except between the stump harvesting and tree-length harvesting treatments. Non-metric multidimensional scaling ordination also revealed substantial differences in species composition between blading and fire-origin mature forests.

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Comparative genomics and population structure of the emerald ash borer (*Agrilus planipennis* Fairemaire) in North America

Agrilus planipennis is a highly destructive, wood-boring beetle invasive to Europe and North America which feeds under the bark of ash trees (*Fraxinus* spp.). It was first detected in the Michigan and Ontario in 2002 and has since spread rapidly across North America, including into northern Canada where populations experience severe winter temperatures as well as the southern United States where the climate is much warmer. Unlike some other wood-boring species, *A. planipennis* can attack and kill healthy trees, an ability which has likely facilitated rapid establishment throughout much of the native ash extent in Canada and the United States. Despite the devastating impact of *A. planipennis*, little work has focused on characterizing the genomic underpinnings or consequences of its invasive success. Here, we present a comparative genomic and population genomic study of *A. planipennis* with an emphasis on sampling across its North American range. We attempt to answer questions about the adaptive strategies underlying the

invasive success of this species, and to identify corridors of spread in support of genomic biosurveillance as this species continues to spread in both North America and Europe.

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Agriculture and Agri-Food Canada, Lethbridge Research and Development Centre

Towards a dynamic action threshold for aphids and lygus in lentils

Aphids and lygus are intermittent, emerging pests of lentils in southern Alberta. Action thresholds that include the role of predators in managing these pests are required for sustainable pest management. To this end, we are conducting farm level insecticide trials, field cage and laboratory studies to develop Economic Injury Levels and Dynamic Action Thresholds which require the identification of key predators. In 2025, caging lentils during the entire flowering period resulted in massive aphid outbreaks, excessive shading and reduced yields by 50% relative to uncaged plants. In 2026, plants were caged during late flower only. Preliminary results suggest that the treatment with predators (adult and larval coccinellids, damsel bugs, minute pirate bugs, lacewings) had lower abundance of aphids and lygus than cages without this treatment. This result agrees with our controlled laboratory and field studies showing that these predators consume lygus bugs even when aphids are present, particularly for damsel bugs. Selection of insecticides that spare natural enemies will be a key component of an IPM program for these pests.

Ricardo Castro-Torres

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Can oil residues act like sticky traps? The case of the prickly pear cochineal (Hemiptera: Dactylopiidae)

Oils and surfactant-based products have been used as insecticides against several pests; however, the effects and modes of action of their residues remain poorly characterized. We evaluated neem, soybean, and mineral oils, dishwashing detergent, and Tween 20 residues against first-instar nymphs of the prickly pear cochineal, *Dactylopius opuntiae*. We subsequently examined the mode of action, effects of simulated rainfall, and persistence of neem and soybean oils, their potential phytotoxicity to prickly pear pads, and their effects on the cochineal predator *Hyperaspis trifurcata*. Prickly pear pads were sprayed before infestation with concentrations ranging from 0.1 to 5%. Only the oils were effective at 1–5%, whereas dishwashing detergent and Tween 20 did not cause mortality. Light and Scanning Electron Microscopy showed that insects became trapped in the oil residues and that they spread extensively across the nymphal cuticle, covering the body, mouthparts and antennae. Nymphal mortality remained above 87% after simulated rainfall. Mortality following treatment with neem and soybean oils exceeded 94% through 3 days, remained approximately 74% after 7 days, and declined to approximately 21% after 14 days. No statistical differences were found between both oils. Dried residues of both oils did not increase *H. trifurcata* mortality relative to the water control. No visible phytotoxic symptoms or histological alterations were detected in prickly pear stems. These results indicate that oil residues act mainly through a mechanical mode of action and can provide rain-tolerant control of *D. opuntiae*, residual activity for at least 7 days, and selectivity toward *H. trifurcata*.

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Effects of aster yellows phytoplasma infection on the fitness and microbiome of the aster leafhopper, *Macrostelus quadrilineatus* (Hemiptera: Cicadellidae)

The aster leafhopper, *Macrostelus quadrilineatus* (Forbes) (Hemiptera: Cicadellidae), is the principal vector of aster yellows phytoplasma (*Candidatus* Phytoplasma asteris; AYp). Phytoplasmas may influence vector biology through persistent-propagative infection in the insect and plant-mediated changes in host quality and attractiveness. However, the effects of AYp infection on leafhopper fitness and associated bacterial communities remain insufficiently understood. Under controlled conditions, infection status was confirmed using probe-based quantitative polymerase chain reaction (qPCR), and pre-sexed infected or uninfected pairs were confined to individual barley plants for 7 days. Nymph production was recorded at 3-day intervals throughout the confinement period, and developmental progression was summarized using a growth index (GI). Bacterial communities from pooled adults were characterized through 16S ribosomal RNA gene sequencing and a standardized QIIME 2 pipeline to assess taxonomic richness, alpha diversity, beta diversity, and genus-level composition. AYp infection significantly increased nymph production, whereas GI did not differ between treatments. When treatments were pooled, infected leafhoppers contained more unique taxa across hierarchical ranks, although alpha diversity tended to be higher in uninfected insects. This pattern was consistent with stronger dominance by a few abundant symbionts in infected individuals. Beta diversity analyses across multiple distance metrics did not support separation between infected and uninfected communities, and dispersions were homogeneous. Infected leafhoppers were dominated by the obligate nutritional symbionts *Candidatus* Nasuia and *Candidatus* Sulcia, whereas uninfected leafhoppers had higher proportions of facultative associates, particularly *Candidatus* Berkella, *Arsenophonus*, and *Cardinium*. Overall, AYp infection enhanced reproductive output and rebalanced dominant symbionts rather than broadly replacing microbiome members.

Raquel Chinchin

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Spatial ecology of flea beetles in canola fields: relationships with damage and natural enemies to inform management

The crucifer (*Phyllotreta cruciferae* Goeze, 1777) and striped (*P. striolata* Fabricius, 1803) flea beetles are considered severe insect pests of early growth stages of canola (*Brassica napus* L. and *B. rapa* L.) in North America. They overwinter as adults, emerge and colonize crops during spring and summer. Male-produced aggregation pheromones are suggested to drive clustering behaviors that can influence the impact of their damage and management, but their spatial distribution within fields remains unknown. We examined the spatial distribution and association of flea beetles and their damage in grids of 9 × 5 sampling points (n = 45 sampling points per date) in six canola fields over 2–3 weeks during the susceptible period. In five fields, a grid near the border was compared to a grid towards the center of the field. Flea beetles were collected with yellow sticky traps renewed weekly and defoliation was assessed visually on transects of 10 continuous plants per sampling point. Insect and damage distributions and associations between distributions were

analyzed using Spatial Analysis by Distance Indices (SADIE). Flea beetle (FB) abundance and damage showed patterns of aggregation and were significantly higher in border than in center grids. A greater number of spatial aggregations and associations between damage in consecutive weeks (temporal associations) and between damage and flea beetle abundance (functional associations) were detected in fields with higher flea beetle abundance and damage. Understanding the spatial patterns of flea beetles will result in more effective control measures.

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Are sex chromosomes the key to species trees? Phylogenetic inference amidst rampant discordance in the spruce budworm species complex (Tortricidae: *Choristoneura*)

Economically important insect pests succeed through a diverse armoury of traits, including host plant utilization, insecticide resistance and diapausing behaviour. Understanding how these traits evolved requires accurate species trees depicting the history of speciation. Yet, species tree inference is often misled by gene tree discordance, a pervasive feature of large genomic datasets where individual gene trees deviate from the species tree. To combat this, evolutionary biologists need reliable markers that can cut through the noise. Sex-linked genes are hypothesized to reliably reproduce the species tree, owing to the accumulation of barrier loci (large X-effect), faster differentiation (faster-X effect) and lower recombination on sex chromosomes. Alternatively, mitogenomes are widely used to infer evolutionary relationships despite pervasive discordance with nuclear phylogenies. Such discordance has plagued the study of the spruce budworm species complex (Lepidoptera: Tortricidae: *Choristoneura*), an adaptive radiation of economically important forest pest, hampering species delimitation and phylogenetic inference within the group. My research aims to infer an accurate species tree by accounting for incomplete lineage sorting and introgression. I then assess the discordance across data types (autosomes, sex chromosome or mitogenome) to evaluate their utility for species tree inference.

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Assessing the vector potential of bitinfor filarial nematodes in the Canadian Arctic

Mosquitoes (Culicidae) and black flies (Simuliidae) are potential vectors of filarial nematodes in Arctic ecosystems, yet little is known about their diversity, seasonal activity, or role in parasite transmission. Throughout August 2026, we investigated mosquito and black fly communities near Cambridge Bay (Iqaluktuutiaq), Nunavut, and evaluated their potential role as vectors of *Onchocerca* and *Setaria* spp. These genera of filarioids are major concerns for caribou (*Rangifer tarandus/tuktu*) health. We collected adult mosquitoes and black flies at 11 sites using sweep nets and opportunistic human landing catches, and documented environmental variables, including temperature and habitat characteristics. We transported female flies to the University of Calgary, where we dissected and stained them with 7% lactopropionic orcein to detect filarioid larvae and determine the parasite's developmental stage. Following staining, molecular verification of tissue infected with filarioid larvae was conducted. We will then characterize vector diversity and parasite

prevalence, identify potential vector species, and determine whether infective L3 larvae are present. These data will establish which Arctic biting insects support filarioid development and when they may become capable of parasite transmission to caribou during the short northern summer.

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Ground beetle diversity and community composition in pea-canola intercrops

Agricultural intensification is a major driver of global biodiversity decline. Intercropping, the agricultural practice of growing two or more crops together, is a sustainable approach shown to increase biodiversity and insect species diversity. In agroecosystems, ground beetles are diverse and important biological agents of insect pests. Our research aims to understand how pea-canola intercropping influences the community composition and diversity of ground beetles. We conducted pitfall sampling in commercial fields and plot studies in Alberta from 2023 to 2025 and identified the ground beetles captured. There was no difference in ground beetle community composition between crop assemblages. We observed differences in community composition across the sampling season in all years, suggesting changes in ground beetle composition during different crop phenological stages. Trap catch in commercial fields, but not in plot studies, was dominated by the generalist predator, *Pterostichus melanarius*. Understanding how intercropping influences the community of ground beetles at different landscape scales is important for assessing the sustainability of intercropping in the management of insect pests.

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Cover crops as a control strategy for flea beetle herbivory in canola crops

The crucifer (*Phyllotreta cruciferae*) and the striped flea beetles (*P. striolata*) are the most important insect pests of canola in the Canadian prairies. Current control strategies rely heavily on prophylactic chemical seed treatments and follow-up foliar sprays, and there is a need to find alternative, ecologically based cultural control methods. We evaluated the effect of two cover crop systems in canola: fall rye and spring oat on flea beetle abundance, canola defoliation, ground predator activity-density (carabids and spiders), and crop yield in field experiments conducted in Manitoba between 2022 and 2025. Our results show that fall rye terminated at the canola cotyledon or two-leaf stage significantly reduced flea beetle abundance and canola defoliation increased the activity-density of spiders compared to earlier termination or control treatments. However, late-terminated fall rye resulted in significant canola yield penalties in three out of four site-years. On the contrary, spring oat failed to reduce flea beetle abundance and canola defoliation and did not affect ground predator abundance and canola yield. We conclude established overwintering cover crops like fall rye offer strong potential for integrating into flea beetle management. Future studies should investigate cover crops that can be seeded

simultaneously with canola, grow fast enough to protect seedlings, and then be terminated quickly to prevent negative competitive interactions.

Emmelyn Cullen, Jason Gibbs

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Effects of agricultural perennialization on wild bee diversity in Manitoba and Saskatchewan

Wild bee diversity is important for crop pollination and biodiversity, though current agricultural intensification in the Canadian prairies negatively affects wild bee communities through habitat loss and fragmentation. Perennialization, or the practice of using perennial plants and/or alternatives to annual cropping systems, may increase wild bee diversity and benefit their communities through limited disturbance and higher landscape diversity. During summer 2025, bees were collected in 21 agricultural fields categorized as annual (n=8), intermediate (n=8), or perennial (n=5) in southern Manitoba and Saskatchewan. Collection consisted of passive methods (bee bowls) and netting transects in both field edges and field interiors to determine wild bee diversity. These sampling efforts yielded approximately 6700 bees. Landscape analysis will help us determine if agricultural perennialization has an observable effect on local wild bee diversity and abundance in agricultural landscapes and how effectively perennialization supports these critical pollinators. The findings of this study will contribute to our knowledge of wild bee diversity in areas dominated by agriculture.

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The proof is in the midgut: Sanger sequencing reveals mammal hosts of Tabanidae near Manitoba cattle operations

Anaplasma marginale is a blood-borne bacterium and the causal agent of bovine anaplasmosis, a disease that negatively affects beef production. The first Canadian case was detected in Manitoba in 1968, and most occurrences since have occurred in the province. Tabanids may play a role in the mechanical transmission of this pathogen. We detected *A. marginale* in the dissected guts of blood-fed flies using PCR. Because the flies were collected in cattle pastures, they were assumed to have fed on infected cattle, but verification was necessary, as other ruminants can be infected with this pathogen. Multiple primer sets were used to identify the vertebrate source of the bloodmeals, while also discriminating against fly tissues. Testing showed that many flies had fed on white-tailed deer. However, all the *A. marginale*-positive flies had fed exclusively on cattle. This indicates that wild ruminants were not the source of *A. marginale* and that the bacteria we detected in tabanids came from infected cattle. Most *A. marginale*-negative flies had fed on deer despite being trapped beside a cattle pasture, suggesting that cattle may be a less preferred food source for tabanids than previously thought.

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Insect hormesis: Patterns, responses, and trade-offs

Exposure to mild stress can induce hormetic (stimulatory) effects in insects, with implications for insect management and agroecosystems. Research on hormesis in insects has grown rapidly, but its scope, biological significance, and ecological relevance remain unevenly understood. We compiled a database of experimental studies to identify broad patterns and deficiencies in the insect hormesis literature. Research has been dominated by laboratory studies of agricultural pests from a limited number of orders, exposed to insecticides, with comparatively little work under field conditions or across many insect taxa and stressors. Reproduction and population growth are the traits most consistently measured and stimulated, whereas responses among other traits are more variable. Stimulation of one fitness-related trait is frequently accompanied by inhibition of another, and such trade-offs become especially apparent in multigenerational studies. Mechanistic studies implicate diverse, interacting stress-response pathways rather than a single underlying process. Future research should move beyond simply documenting low-dose stimulation toward determining when hormesis occurs, its biological costs and persistence, and whether individual-level responses translate into meaningful ecological and evolutionary consequences.

Ilan Dominich

University of Alberta

From Phobia to Fascination: Approaches for Entomological Outreach

Public aversion to insects and arachnids ranges from mild discomfort to severe phobias that keep people indoors, and can even lead to dangerous panic responses in everyday situations. Overcoming these barriers is essential for helping the public connect with nature and appreciate the vital role arthropods play. This presentation explores practical, down-to-earth strategies for public engagement, showing how we can shift audiences from fear or aversion to genuine curiosity through gradual exposure, framing, and creative storytelling. Stepwise exposure, moving from photos and videos to observation behind glass, and eventually to handling harmless creatures like harvestmen, helps familiarize people with arthropods by replacing the unknown with familiar, fascinating details. Highlighting endearing behaviors, such as parental care or complex courtship, provides an entry point for appreciation. Additionally, I will share some of my process for creating insect art designed to highlight the beauty and intricate details of bugs, using visual art as another creative tool to win over skeptical audiences. We will also look at outreach opportunities, including schools, workshops, summer camps, massive open online courses (like Bugs 101), radio, and budget-friendly community pollinator walks. Finally, we will discuss how entomological societies and conservation groups can expand their reach by inviting volunteers with non-scientific skill sets so that anyone with passion can help drive public outreach.

Ilan Domnich, Sydney Worthy, Megan Evans

Alberta Native Bee Council

Monitoring Alberta's native bees: Province-wide sampling, DNA metabarcoding, and community stewardship

Native bees are essential pollinators within Alberta's natural and agronomic ecosystems, yet critical data regarding their diversity, distribution, and population health remain limited. The Alberta Native Bee Council (ANBC) works to fill this knowledge gap through a multi-year, province-wide monitoring and stewardship program focused on wild bee conservation through research, outreach, and advocacy. By coordinating large-scale sampling alongside diverse partners, ranging from municipalities to private industry, ANBC establishes vital baseline data across the province. To scale program efficiency, we recently integrated DNA metabarcoding into our workflow, using these samples to expand the public DNA reference library for Alberta's bees and streamline future monitoring efforts. This presentation will share key findings, explore how genomic tools and collaborative networks enhance large-scale monitoring, and highlight how integrated stewardship empowers long-term wild bee conservation across the province.

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The impact of pea (*Lathyrus oleraceus*)-canola (*Brassica napus*) intercropping on flea beetle (*Phyllotreta* spp.) host location, feeding behaviour and crop yield

Intercropping, the practice of growing two or more crops together in the same space, is gaining attention for its potential to enhance agricultural sustainability and pest management. Pulse and oilseed crops contribute significantly to the economy of Western Canada. Flea beetles (*Phyllotreta* spp.) feed on the cotyledon stage of canola and can cause significant damage leading to yield loss. We hypothesize that pea–canola intercropping can disrupt the host location and feeding behaviour of specialist herbivore pests, and alter the crop yield. We assessed flea beetle feeding damage and abundance, in both commercial farm and plot studies in Alberta. We measured crop yield in plot studies that compared intercrops to monoculture plantings with and without fertilizer. Results to date indicate significant reductions in flea beetle feeding damage and abundance in intercropped systems compared to canola monoculture in both commercial and plot studies. In the plot studies, crop yield varied with cropping systems and fertilizer treatments, with intercrops showing some yield advantage. These findings suggest that pea–canola intercropping can contribute to flea beetle management while improving crop yield with reduced fertilizer input.

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Targeted detection of new non-native beetles on non-native weeds

We developed an approach to combine information from iNaturalist and the scientific literature to search for adventive herbivorous beetles more effectively. These methods allowed us to find eight new beetle species for North America during two five-day collecting trips to Halifax Nova Scotia. We summarize the approach, its effectiveness, and the beetles that we found.

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Mosquito birth control: Synthetic steroids disrupt reproduction in *Aedes aegypti*

Synthetic steroid hormones are widespread environmental contaminants that disrupt reproduction and development in vertebrates. Their effects on insects, however, remain poorly characterized. For example, the synthetic estrogen 17 α -ethinylestradiol (EE2) interferes with steroid and metabolic pathways in fruit flies, impairing vitellogenesis and reproductive success. This study investigated whether synthetic steroids similarly affect reproduction in the *Aedes aegypti* mosquito (Diptera: Culicidae), a major vector of several arthropod-borne viruses. Female mosquitoes were exposed to steroids in two ways: daily ingestion of EE2 and a synthetic progestin via a sugar meal, or a single intrathoracic injection of EE2. Across exposure methods, steroid treatment significantly reduced multiple measures of reproductive performance, including oviposition success, fecundity, and offspring viability. These effects were associated with either apparent sterilization or delayed egg development. RNA sequencing demonstrated that blood feeding acts as a physiological stressor, causing extensive gene regulatory changes in steroid-exposed individuals. Steroid exposure suppressed fertility-associated pathways and altered genes involved in hormonal signalling, energy metabolism, and cellular stress responses. Moreover, the steroids appear to act as xenobiotic stressors that interfere with hormonal signalling, increase energy production, and induce protective, survival-oriented maintenance genes (e.g., cytochrome P450s and heat shock proteins). Collectively, these findings indicate that synthetic steroid hormones can substantially suppress mosquito reproduction while disrupting endocrine, metabolic, and stress-response pathways. This study provides novel insights into the impact of EE2 and progestin exposure on mosquito reproduction, which could be used to identify potential steroid-responsive pathway targets for future mosquito management strategies.

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Scents and Sensibilities: Assessing the attraction of *Coleomegilla maculata* to Solanaceae plant volatiles for conservation biological control

The Colorado potato beetle (CPB) (*Leptinotarsa decemlineata*) is a major pest of solanaceous crops and has demonstrated an exceptional capacity to evolve resistance to insecticides, necessitating the need for alternative and sustainable management strategies. This study evaluates whether synthetic solanaceous plant volatiles and the CPB male aggregation pheromone (S-CPB-I) can attract the predatory lady beetle, *Coleomegilla maculata*, a commonly occurring natural enemy of CPB. Adult lady beetles were tested individually in a four-arm olfactometer. Seven plant volatiles and S-CPB-I were evaluated, with first choice responses analyzed using GLMMs and chi-square tests. Results showed that 2-phenylethanol, methyl salicylate, nonanal, hexanal and S-CPB-I, but not linalool nor 2-(E)-hexenal, were attractive to *C. maculata* compared with controls. β -caryophyllene was attractive to only male *C. maculata*. These findings provide

insight into semiochemical-mediated predator attraction and support development of lures to enhance biological control of CPB in potato and tomato agroecosystems.

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A multifaceted dilemma: The impacts of anthropogenic threats on insects in protected areas since the 1990s

Rapid global declines in insect biomass and diversity are threatening essential ecological functions and many ecosystem services that humans rely on. This global decline is a multifaceted dilemma that is impacted by many threats including land-use change and climate change. Protected areas act as important habitat refugia for insects in highly human-affected landscapes. With the increasing impacts of anthropogenic threats, these areas are important for the long-term conservation of insects and wildlife biodiversity at large. In the early 1990s, insects were collected using malaise traps at various sites in protected areas within the Long Point World Biosphere Reserve, ON. To assess the impacts of anthropogenic threats such as climate change and landscape changes on insects in protected areas, this sampling was replicated from 2021–2023 for a comparative analysis of changes in both insect biomass and diversity between the two time periods. An overall decline in insect biomass and diversity was observed between the two periods, mainly driven by climate change. This study shows that even within protected areas, insects are facing large declines as a cause of the increasing impacts of anthropogenic threats.

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Underground interactions between field pea and larval pea leaf weevils, *Sitona lineatus* (Coleoptera: Curculionidae), mediated by a pea-rhizobia symbiosis

Legumes depend on symbiotic rhizobia nitrogen-fixing bacteria to acquire nitrogen for plant growth and reproduction. Nitrogen dynamics can also impact host plant quality and chemical defense against herbivores. The pea leaf weevil (*Sitona lineatus* L.), is an oligophagous herbivore of legumes that relies on nutritious foliage and root nodules as a food source in different parts of its lifecycle. We tested the hypothesis that *Rhizobium*-field pea interactions influence *S. lineatus* larval herbivory and development in root nodules. Field pea plants were treated with different *Rhizobium* strains (Wild-Type and Mutant Type) and compared to nitrogen-treated plants without *Rhizobium*, and a water-treatment control. Treatments significantly affected the plant metabolites produced in belowground tissues. Field pea plants treated with the wild-type *Rhizobium* supported *S. lineatus* larval host preference and development from egg to adult stage compared to the mutant-type, and other treated plants. Reduced development of *S. lineatus* on plants inoculated with the mutant *Rhizobium* could be due to smaller nodule size and a lack of fixed nitrogen compared to the wild-type treatment.

Nicoletta Faraone

Chemistry Department, Acadia University

Tick management and tick chemical ecology: New frontiers at the Canadian Tick Research and Innovation Centre.

Ticks and tick-borne diseases are an increasing concern in Canada, highlighting the need for effective approaches to understand tick behaviour and reduce human and animal exposure. Our research integrates chemical ecology, sensory physiology, and natural product chemistry to investigate how ticks perceive their environment and to translate this knowledge into novel tools for tick management. A major focus of our program is understanding the tick chemosensory system and the mechanisms underlying responses to host-associated chemical cues and repellents. Using behavioural and electrophysiological approaches, we investigate the roles of key sensory structures, including the Haller's organ and pedipalps, in the detection of volatile and contact chemical cues. This mechanistic knowledge complements our applied research on the discovery, formulation, and evaluation of natural products with repellent and acaricidal activity. Formulation strategies are being explored to improve stability, persistence, and practical delivery, supporting the development of effective products for personal protection and tick management. These research directions are now integrated within the Canadian Tick Research and Innovation Centre (CTRIC) at Acadia University. CTRIC provides specialized infrastructure for tick rearing, pathogen testing, product evaluation, and collaborative research. By connecting fundamental tick chemical ecology with formulation science and translational research, CTRIC aims to accelerate innovation in tick management while expanding Canadian capacity for tick and tick-borne disease research.

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Vulnerability of chemical sexual signals to urbanization: pollutants impair pheromone signalling in *Araneus diadematus*

Urbanization drives the biodiversity crisis, which will be amplified as over 70% of humans live in cities by 2050. Biodiversity loss arises partly from disrupted animal communication. Little is known about how anthropogenic pollutants affect the pheromones of exposed arthropods. Orb weaver spiders are promising biomonitors for terrestrial air quality, as their daily-built adhesive webs trap pollutants and are ingested at dusk. We sampled webs of *Araneus diadematus* in urban Berlin, Germany, and at a rural control site. Spiders were taken to the lab and subsequently built another web within 24h that was sampled. All web extracts were analyzed by liquid chromatography–orbitrap mass spectrometry. Untargeted metabolomic comparisons revealed presence of anthropogenic pollutants. Targeted metabolomics of pheromone titre revealed substantial signal impairment in urban compared to lab- or rural-built webs. Our pilot study demonstrates the utility of spiders as terrestrial biomonitors and the burden pollution places on pheromonal communication. We discuss implications of future broad-scale investigations, whose findings can guide urban ecosystem development to maintain the ecosystem services arthropods provide.

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Successional trajectory and recovery of ground beetles among stand ages of black spruce (*Picea mariana*) following clearcut harvesting using a chronosequence approach

Ground beetles (Coleoptera: Carabidae) are informative bioindicators of environmental change and forest succession, particularly in black spruce (*Picea mariana*) dominated stands. A chronosequence provides an opportunity to examine a series of spatially independent sites that primarily differ in age since disturbance (e.g., same disturbance type and post-disturbance regeneration strategy), representing a short-term alternative to long-term repeated sampling at the same site. With the latter approach, most arthropod studies have only been able to report on early responses following disturbance, leaving gaps in our understanding of long-term successional change. To address these limitations, we examined carabid biodiversity among different stand ages in northwestern Ontario. Specific objectives were to: 1) compare patterns in abundance, species richness, and community structure across different stand ages, and 2) determine the key microhabitat drivers influencing carabid community composition along the chronosequence. To achieve this, pitfall traps were installed across a chronosequence comprising 2-, 17-, 34-, 50-, and 64-year-old plantations established following clearcutting. The results indicated that species richness and composition progressed predictably along the chronosequence, with disturbance-adapted species dominating early to mid successional stands, and mature forest specialists increasing with time since disturbance. Standardized catch increased significantly across stand ages, reaching its highest abundance in the 64-year plantation relative to the 2-year clearcut. Furthermore, microhabitat variables, driven primarily by canopy closure and plant cover, explained 86.1% of the variation in carabid community structure.

Leonard Foster

Centre for Proteomics, Department of Biochemistry and Molecular Biology, University of British Columbia

Bringing new technology to bear on honey bee (*Apis mellifera*) pheromones—we've only seen the tip of the iceberg

Mass spectrometry technology has come an enormous way since the 80's and 90's, when most of the work on bee pheromones was done. We are using a few different paradigms to see what else we can find what may be previously undescribed pheromones for honey bees. One of these is the honest signal hypothesis, which posits that social insect queens emit pheromonal signals that convey information about fecundity, which workers use to make decisions around investing in direct or indirect fitness. We used liquid chromatography-tandem mass spectrometry to measure honeybee (*Apis mellifera*) queen retinue pheromone (QRP) in relation to age, laying status, and acceptance using a protocol that enables concurrent metabolomic and lipidomic analyses. Older queens produced higher levels of the QRP components 9-R-hydroxydec-2(E)-enoic acid (9(R)-HDA), linolenic acid (LEA), and 4-hydroxy-3-methoxyphenylethanol (HVA) compared to younger queens, with HVA also correlating with ovary mass. Another aspect of this is how infections may

impact the queen's honest signals, including the role that methyl oleate likely plays in conveying fecundity information.

Ellen Freeth, Jason Gibbs

Department of Entomology, University of Manitoba

Taxonomic study of the halictid bee genus *Lasioglossum* of the Leeward Islands, Lesser Antilles leads to the delimitation of nine new species.

The sweat bee genus *Lasioglossum* (Halictidae) is documented globally but remains poorly studied in the Caribbean. Twenty-two species are recorded from the Lesser Antilles, but many islands have no known sweat bees. Nine new species of *Lasioglossum* are described from the Leeward Islands, Lesser Antilles. Eight species from the subgenus *Dialictus* and one *Lasioglossum* (*Hemihalictus*). Five species are recorded from Montserrat, two from Saint Kitts, four from Antigua, and two from Barbuda. This is the first time *Lasioglossum* species have been described from Antigua and Barbuda, Saint Kitts and Montserrat. Climate change has increased the frequency and intensity of storms globally, creating unpredictable conditions that insects cannot readily adapt to. There is concern that ground-nesting bees that prefer to build nests in sandy coastal areas may be flooded out by sea levels rising, and these isolated island populations may be the most vulnerable. Remaining bees of these species may move inward to possibly unsuitable conditions. Additionally, sweat bees inhabiting islands with active volcanoes are at risk of habitat destruction and extirpation, such as one species found from Montserrat that has not been collected anywhere else on the island since the Soufrière Hills volcanic eruption in 1995. The present study contributes to understanding sweat bee diversity of the Caribbean, their phylogenetic lineages and to general conservation efforts.

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There ought to be a law: Protections needed for insects from anthropogenic non-ionizing electromagnetic fields such as emissions from wireless telecommunications infrastructure

Strong evidence supports the hypothesis that non-ionizing electromagnetic fields (EMFs) are a contributing factor or “driver” in the worldwide decline of insect populations. There are no Canadian laws, guidelines, regulations nor policies protecting non-human species from electromagnetic exposures related to telecommunications, nor to extremely low frequency fields for electrical power. Human exposure limits for radiofrequencies (3 kHz to 300 GHz), established by Health Canada in Safety Code 6, are based on excessive heating of tissue and peripheral nerve stimulation; limits do not apply to non-human species. EMFs have been found to induce oxidative stress, DNA damage and other biochemical changes that impair the physiology and behaviour of insects and other taxa, at common exposure levels. Chemists report accelerated chemical reactions with low level microwave radiation at ambient temperatures; a phenomenon named “microwave catalysis.” 5G (fifth generation) and upcoming technologies using higher frequencies (6 to 30+ GHz) and shorter wavelengths may further stress insects, with resonance and heating. Modelling reveals that peak energy absorption occurs in the 6 to 120 GHz range where wavelengths match the dimensions of some insects' bodies, or body parts. This presentation will discuss the

evidence of harmful effects of EMFs at realistic everyday exposure levels, and touch on the concept of airspace as 'habitat' and air ecology (aeroecology) described in comprehensive reviews by Levitt, Lai and Manville (2021), and subsequent research. We will also discuss a proposal to regulate EMFs in the radiofrequency range under the *Canadian Environmental Protection Act, 1999*.

Carol Frost, Rachel Pizante, I. Pilar Jiménez, L. Shea Giesbrecht

University of Alberta, Department of Renewable Resources

How to use agricultural field border vegetation to support specific pollinator species in the Aspen Parkland region of Alberta

Generic recommendations for actions to support pollinators abound, but at the species level, pollinators respond distinctly to different types of vegetation. To use non-crop vegetation in agricultural landscapes to intentionally support specific pollinator species, whether for conservation or to maximize their agricultural function, we need taxon-specific information on how they respond to different types of non-crop vegetation. We conducted observational studies using two-headed Malaise traps to measure bee, social wasp, and hoverfly movement between canola crops and treed versus herbaceous non-crop vegetation in agricultural field borders. We also measured bee movement between treed versus herbaceous field borders and highway verges. We coupled this with sampling of flower visitation to understand pollinators' species-specific flower use, including experimentally testing whether certain flower species were significantly preferred or avoided by the entire flower visitor assemblage. We found that for most nesting species and hoverflies, treed field borders supported more pollinator activity than herbaceous borders, though this differed by species and shifted throughout the growing season. However, treed field borders were associated with more bees flying towards highways than herbaceous borders, and flower abundance in the road verge did not mitigate this. Some flower species were significantly preferred by the whole flower-visitor assemblage. Herbaceous field borders had some different flower species, and supported some different pollinator species compared to treed borders. To maximize pollinator diversity around crop fields, land owners should maintain some herbaceous and some treed border vegetation, though ideally the treed border should not be adjacent to a busy highway.

Terry D. Galloway

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The “Familiarity Gap”: a pitfall in the long-term survey of ectoparasites infesting wildlife in Manitoba

Long-term surveys can provide valuable information about biodiversity, population ecology and conservation. In a long-term study on ectoparasites of wildlife in Manitoba, examinations were stopped when sample sizes for some common and/or introduced species were considered sufficient, and at some point, all likely species of ectoparasites had presumably been adequately recorded. For rock pigeon (*Columba livia* Gmelin) and eastern cottontail (*Sylvilagus floridanus* (J.A. Allen)), this turned out to be an unfortunate mistake. After a significant interruption in sampling, additional hosts were examined for reasons entirely unrelated to initial objectives for these species, and important new records were discovered. For pigeons, it was a chewing louse (*Coloceras tovernika* Tendeiro), previously known from this host from only one female from

Croatia. For cottontail rabbits, the fleas, *Spilopsyllus simplex* (Baker) and *Euhoplopsyllus glacialis affinis* (Baker), were recorded for the first time in western Canada. Infestation parameters are presented as evidence of their current residency. Details about how these species emerged in their new homes were lost in the familiarity gap.

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Climate change reshapes global migration pathways of the diamondback moth (*Plutella xylostella*)

The diamondback moth (*Plutella xylostella*) threatens global food security through long-distance, wind-assisted migration, yet how atmospheric circulation governs its dispersal has been poorly quantified by conventional distribution models. This research developed a framework that couples PSO-CNN ensemble habitat modelling with anisotropic Circuit Theory to simulate directional migratory flux under two CMIP6 scenarios (SSP2-4.5 and SSP5-8.5), using a three-model climate ensemble (EC-Earth3-Veg, MPI-ESM1-2-HR and UKESM1-0-LL) and seasonally stratified 850-925 hPa wind fields rather than static habitat suitability alone. Under SSP5-8.5, the poleward shift of overwintering limits transforms the Canadian Prairies and Northern Europe from seasonal migration sinks into persistent source populations, while intensified atmospheric circulation strengthens transoceanic corridor connectivity between North America and Eurasia. Twenty years (2006-2025) of pheromone-trap monitoring in Manitoba provides independent phenological context: adult captures begin on average in early May and peak in early June, a timing consistent with the modelled spring immigration window, and the predicted corridors converge on orographic bottlenecks such as the Peace River Valley. Reanalysis of 532 published genomes further shows a latitudinal gradient in the diamide-resistance-associated RyR allele that is consistent with migration contributing to the redistribution of resistance-associated variation into high-latitude canola regions, although local selection and temporal sampling heterogeneity cannot be excluded. These results indicate that climate change is restructuring the architecture of global pest migration and accelerating the spread of pests into high-latitude cropping regions, which face increasingly persistent pest pressure. This shift threatens the yield stability of key oilseed crops such as Canada's canola and points to an urgent need for cross-border migration surveillance and coordinated management.

Jason Gibbs

Department of Entomology, University of Manitoba

Working with nightmare bees is a dream come true

Bees are a charismatic group of insects that are widely regarded as important. However, many large genera have poor taxonomic resources leading to challenges in identification. Among melittologists, certain taxa are understood to be a 'nightmare' to deal with. In North America, the

subgenus *Lasioglossum* (*Dialictus*) is among the most hated for its numerical dominance and subtle characteristics for identification. However, two decades of study of these nightmare bees has been fruitful on both professional and personal levels. I will summarize past success with this challenging group, persistent issues and pathways forward, new insights into the phylogeny, and prospects for the classification of the largest bee genus. The dream of unravelling the tangled mess of this 'nightmare' taxa is slowly becoming reality.

L. Shea Giesbrecht, Tyler Cobb, Carol Frost

University of Alberta

A review of how floral abundance and specialist bee species influence the interpretability of passive pollinator trap data

Pan traps and vane traps are standard passive foraging bee biodiversity sampling methods. However, these traps may be biased via two mechanisms: 1) flowers may outcompete traps for pollinators; 2) these traps often fail to catch specialists. If flowers outcompete passive traps, then we would expect a less positive correlation between the number of bees passively trapped and flower abundance than would be seen between hand netted number of bees and flower abundance. Indeed, literature comparing passive sampling and hand netting found negative and positive relationships to floral abundance respectively. Failing to collect specialists may influence richness, evenness, and diversity indices. We ran four simulations comparing rare versus abundant specialists in relatively even versus uneven communities to see how failing to catch specialists may change indices' interpretations. We found that it does not have a significant impact on biodiversity indices unless the hypothetical specialist is extremely dominant. Researchers interested in pollinator community ecology should consider pairing hand netting with passive traps, namely vane traps, for the most robust data.

Vincent Hervet

Agriculture and Agri-Food Canada

What's bugging farmers' stored grain

In Canada, the presence of insects in stored grain is assessed in every truckload brought to primary elevators. The Canadian Grain Commission reports detection of insect grain pests in elevators to be about 95% rusty grain beetles (*Cryptolestes ferrugineus*) and 5% red flour beetles (*Tribolium castaneum*). However, research has shown that many insects do not survive transits through augers and grain vacs, particularly soft bodied insects, so it was hypothesized that the insect community composition would be different in grain bins before the grain is moved. In an attempt to assess this, as well as to better understand the insect community composition and grain management practices that affect it, a survey was conducted in farm grain bins in the Prairie Provinces of Canada between 2020 and 2024. Preliminary results showed that mould feeders, particularly the foreign grain beetle (*Ahasverus advena*), were the most common insects in farm grain bins. However, these are not technically grain pests. The main grain pests captured were the rusty grain beetle and the red flour beetle, representing about 95% and 5% of all grain pests captured, respectively, which nicely correlates with elevator detections. Results also showed that larger bins, bins equipped with fans and with temperature cables, the running of fans, dryer and

cooler climatic conditions in the fall, all played important roles in reducing the incidence of insect infestations.

Thilina Hettiarachchi, Jason Gibbs, Kyle Bobiwash

Department of Entomology, University of Manitoba

Linking bee diversity, plant use, landscape context, and phylogenomics in southern Manitoba grasslands

Grasslands support diverse bee communities, but these landscapes are under threat. We seek to measure how bee diversity is structured across sites, plants, landscapes, and evolutionary history to provide a stronger framework for assessing prairie pollinator communities. In this study, we sampled bee communities in southern Manitoba grasslands using passive bee bowls and active netting, and combined community data with floral visitation records, landscape-cover data, and phylogenomic resources. Bee diversity and abundance varied strongly among sampling sites. Preliminary single-predictor models suggest that landscape cover may help explain variation in bee richness and abundance, although these relationships remain weak and require further testing. Bee bowls captured a high proportion of Halictidae, while netting captured a more varied community. Floral visitation records showed that bees were concentrated on several key plant taxa, with *Dalea purpurea* standing out as an important native prairie plant supporting both high visitation and high bee species richness. Bee-plant interaction data were highly connected, highlighting the need for network-based approaches to identify important floral resources and interaction structure. In parallel, we implemented an ultraconserved element phylogenomics workflow to build an evolutionary framework for prairie bees. In addition to our own UCE-enriched samples, we successfully recovered UCE loci from whole-genome sequence data and incorporated publicly available sequence resources. These data include field-collected samples, NCBI-derived data, and WGS-derived taxa across multiple bee groups, supporting an integrated phylogenomic dataset. These phylogenomic data will be used to assess phylogenetic diversity across our grassland sites and to create a public dataset for future studies of bee diversity. Together, these results provide the foundation for linking prairie bee diversity, plant associations, landscape context, and evolutionary history in southern Manitoba grasslands.

N. J. Holliday

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Finding a place on the beach: within-habitat movement in *Chlaenius cordicollis* (Coleoptera: Carabidae)

Chlaenius cordicollis is common on stoney beaches of the south basin of Lake Winnipeg, Manitoba. Adults overwinter at the top of beaches and move down the beach in May; they reproduce in June and July and then die. New-generation adults begin appearing in July, and in September move up the beach to overwinter. On any day of sampling, most adults are confined to a narrow range of distances from the water's edge, but location of this range differs considerably from day to day. A mark-release-recapture experiment was conducted to examine the influences on movement within the beach habitat that results in the observed distributions of beetles. The rate of movement of most adult beetles was quite small, but a few individuals exhibited higher rates.

Rates of movement were lowest in overwintered beetles before the reproductive period. Variation among movement rates was greatest during the reproductive period, a time when some overwintered beetles fly and there is a mixture of overwintered and new generation beetles. Rates of movement were related to environment conditions in the interval between release and recapture dates: rates were higher when the beach was narrow because of high lake levels, were higher when there was little rain, and were higher when beach width diminished between release and recapture. Beetles tended to move down the beach when there was little rain and up the beach when beach width diminished.

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25 years of mosquito surveillance in Ontario: Discoveries and "never in my lifetime" moments.

Mosquito surveillance in Ontario began in response to the arrival of West Nile virus (WNV) in 2001. Early efforts focused on developing systematic trapping methods and identifying enzootic and bridge vectors, which became particularly important during the 2002 WNV epidemic. Over 25 years, sustained surveillance has documented remarkable changes in Ontario's mosquito fauna, including several events once considered unlikely to occur: the invasive *Aedes japonicus*, first detected in 2001, spread so rapidly that it soon became one of the most commonly collected species in Ontario. Subsequent surveillance documented incursions of *Culex erraticus*, *Aedes albopictus* and *Aedes aegypti* (remarkable as that might seem!) as well as *Psorophora howardii*. Recently, substantial increases in *Aedes trivittatus* have been noted as large rain events become more common. A strong relationship between WNV-positive mosquito pools and human cases, initially demonstrated using the first 12 years of surveillance data, remains robust after 25 years. I argue that sustained mosquito monitoring is essential for detecting ecological change, emerging vector risks, and predicting human disease.

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Sweep-net detection limits and sequential sampling for lesser clover leaf weevil larvae in Prairie red clover seed fields

Red clover (*Trifolium pratense* L.) seed growers have economic thresholds for the lesser clover leaf weevil, *Hypera nigrostris* (Fabricius), but no validated way to count larvae that develop inside stems and buds. We surveyed larvae across commercial seed fields over two growing seasons to ask how they are distributed at the scale agronomists use, and whether a sweep net can stand in for destructive plant inspection. Sweep netting did not hold up as a substitute: catches tracked plant-inspection densities only moderately, and sweeps returned no larvae at 59% of stops where inspection found them. Catch improved later in the season as larvae moved into accessible flower heads, though position alone did not account for the seasonal rise in detection probability. Plant inspection counts fit Taylor's power law with a slope near one, indicating larvae close to randomly distributed among stops rather than aggregated. That distribution supports a sequential sampling plan that reaches a treatment decision after five to six stops on average, against ten under fixed sampling, cutting scouting effort by 45–48% with no loss of classification accuracy. Growers gain a

threshold-compatible plan that halves field time, along with a stated limit on the cheaper method: sweep nets miss the early infestations that drive seed loss. We use these results to discuss what makes a concealed-feeding pest monitorable at all.

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Updating the Alberta mosquito species list with an accompanying DNA barcode database

Mosquitoes are a significant concern because they can vector pathogens to vertebrate hosts. The ranges of many disease-vectoring mosquitoes in Canada are rapidly expanding due to anthropogenic effects, including climate change. Current surveillance does not detect new mosquitoes in novel regions in time to prevent invasion and establishment. Surveillance relies on morphological identification, which requires expertise and intact specimens, and in Alberta, relies on the last published Alberta species list from 1979. Subsequently, the invasive *Culex pipiens* was not detected after it was already established in Edmonton. This highlights the need for improved approaches to surveillance methods. Molecular methods are useful, since specimens are collected in large numbers and are often damaged during trapping. However, a species list, distributions, and DNA barcodes need to be curated in the form of a database. Here we present an updated Alberta species list with an accompanying DNA barcode database of ITS2 and mtDNA COI. We have identified 48 species—a seven-species increase from the last published list of Alberta species.

Morgan Jackson

McGill University

Current trends in Canadian entomology: Insects in undergraduate education

Insects and other terrestrial invertebrates are critical components of every ecological system from coast to coast to coast, and Canada's entomofauna is a major contributor of both ecological services and economic costs. Yet despite the vital importance of these 40,000+ species, much of their biology remains poorly understood. With growing evidence that terrestrial arthropod populations are declining globally, we are at a critical juncture where we can affect change. To do so, Canada will need a diverse and invested community of scientists and advocates capable of untangling the complexity of these challenges, and an educational foundation that includes exposure to entomological training will be vital. Current trends in post-graduate education related to entomology will be explored, and the potential implications of reductions in entomological education at the university level will be discussed.

Sophie Y. Kasdorf, Émile Vadboncoeur, Susan M. Bertram, Heath A. MacMillan

Carleton University

Chronic exposure of crickets (*Acheta domesticus*) to simulated hypergravity

Altered gravity is a key feature of spaceflight, yet its long-term physiological effects remain poorly understood. Insects are valuable models for gravitational studies, but *Drosophila* sp. remain the only insect studied under altered gravity across their entire lifecycle. Therefore, it is critical to develop a comprehensive understanding of the impact of altered gravity on insect physiology and

fitness. Farmed species, like crickets, are particularly relevant because they intersect fundamental gravitational biology with applied questions of food production. Using a custom centrifuge, we exposed *Acheta domesticus* crickets to increased gravity (~2, 3, and 4 times Earth's gravity) throughout development. Crickets were extremely tolerant of increased gravity, with no observed effects on survival, feed efficiency or metabolic rate. However, growth rate declined progressively with increasing gravitational load, suggesting that altered gravity influences resource allocation and development. Our study provides the first comprehensive assessment of how sustained hypergravity affects insect life history and bioenergetics, helping build a predictive model linking gravitational load to physiological responses.

Hargun Kochar, Chenoa Kaufman, Olav Rueppell

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Identification of possible genotype dependent virulence of black queen cell virus in honey bees (*Apis mellifera*)

Black queen cell virus (BQCV) is a common honey bee pathogen with variable disease outcomes. From other systems, it is known that virulence, or the damage experienced by a host during infection, differs with viral genotype. Previous research has hypothesized, but not intensively investigated, that the different disease outcomes observed in BQCV infection may be due to strains of BQCV varying in their virulence. Understanding this relationship is essential to characterize this pathogen and its effects on honey bees. We isolated nine pure BQCV inocula from western Canada and infected *in vitro* reared worker larvae for assessment of their virulence. Mortality was monitored, and live larvae were collected 1 and 2 days after inoculation for measurements of BQCV titre using RT-qPCR. While very little mortality was observed, our preliminary qPCR results show significant differences in virus titre, and interaction with time, between our different BQCV isolates. These results are the first experimental contributions to understanding BQCV virulence through viral genotype. Further plans for analysis and interpretation are discussed.

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Detection of West Nile virus and canine heartworm (*Dirofilaria immitis*) in *Ochlerotatus trivittatus* mosquitoes in southern Ontario

Ochlerotatus trivittatus is a floodwater mosquito native to North America, common in southern Ontario. An aggressive daytime biter, it has been linked to transmitting West Nile virus (WNV) and *Dirofilaria immitis*. Surveillance in Ontario shows its abundance has increased over two decades, raising public health concerns. This study examines changes in *Oc. trivittatus* abundance using data from 2004, 2014, and 2024. We also investigated pathogen occurrence in *Oc. trivittatus* collected during the 2023 and 2024 mosquito surveillance seasons. We screened 1,694 mosquito pools (N=24,464) for WNV, Jamestown Canyon virus (JCV), and *D. immitis* using molecular assays. WNV was detected in nine pools and *D. immitis* in 16 pools, while no pools tested positive for JCV. Positive pools were detected across nine Health Units, including areas with substantial human activity. Together, our results show a marked increase in the *Oc. trivittatus* population and confirm

the presence of pathogens of both human and veterinary importance in field-collected mosquitoes. These findings emphasize the importance of tracking changes in bridge vector mosquitoes and indicate that *Oc. trivittatus* warrants increased focus in Canada's mosquito surveillance efforts.

Benjamin Krongold

University of Manitoba

An updated checklist of the ants of Manitoba

Ants (family Formicidae) are among the most ubiquitous and dominant components of Manitoba's insect fauna, yet surprisingly little work has been done on this group in recent decades, with the last full provincial checklist having been published back in 1989. Here I provide a much-needed update on the diversity of this group in Manitoba, including the documentation of 18 new species records for the province, 3 of which represent new records for Canada as a whole. Intensive collecting efforts were conducted across the province targeting rare species and novel habitats, and records were assessed based on material deposited in the J.B. Wallis/R.E. Roughley Museum of Entomology as well as data uploaded to AntWeb and iNaturalist among other sources. Images of all species are provided and the broader implications for biodiversity are discussed.

Bob Lamb, Pat MacKay

Department of Entomology, University of Manitoba

Population dynamics of a native aphid: Impact of predation

The impact of predation on native aphid populations feeding on naturally distributed host plants is little understood. Over 20 years, we documented predation and aphid abundance in populations of *Uroleucon rudbeckiae* on its wildflower host. When predators are excluded, aphid colonies on individual flowering stems expand to levels not observed in nature. At least 25 species of predators from 8 orders of invertebrates, and some bird species, feed on this aphid. Prevalence of predation increases with aphid abundance. The longevity of colonies declines exponentially with their age: almost half survive for a week or less. Prevalence of predation is confirmed for 25% of 1-week colonies, 60% of 2–4-week colonies, and >85% in longer-lived colonies. The number of predator taxa present increases with colony longevity. The rapid disappearance of colonies attests to the high impact of predation, but uncertain host specificity of predators among the many species in a local aphid community makes the annual impact of predation on any one species difficult to predict.

Veronika Lechshenko¹, Rashmi Kalia¹, Isabel Koch-Schulte¹, Abisola Ayorinde¹, Thilina Hettiarachchi², and Jason Gibbs²

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Syrphid fly bycatch from prairie bee surveys across southern Manitoba grasslands: Diversity, dominance, and comparison with bees

Syrphid flies are diverse flower-visiting insects that contribute to pollination as adults and include important predators as larvae. Yet, they remain less frequently studied than bees in Canadian

grasslands. As part of bee-focused surveys across southern Manitoba, syrphid flies were collected from bee bowl traps and by active netting from flowers alongside bees and aculeate wasps. We examined syrphid abundance, diversity, dominance, community composition, and their relationship with bee diversity across 38 grassland sites. We captured 15,306 syrphid specimens. Samples from 2024 included 3,963 individuals representing 63 identified taxa, whereas samples from 2025 included 11,343 individuals representing 31 taxa. Because the two years included largely different sets of sites, these differences should not be interpreted as direct temporal change. Syrphid abundance was strongly dominated by *Toxomerus marginatus* (Say), which accounted for 72.5% of individuals in 2024 and 96.3% in 2025, representing approximately 90% of all specimens. Consequently, sites with high total syrphid abundance did not necessarily support high overall diversity. Community analyses indicated substantial variation in syrphid assemblage composition among sampled sites. Preliminary comparisons of sampling methods suggest that bowl traps and netting may capture different components of the syrphid community, with bowl-trap samples contributing strongly to observed dominance patterns. We compared syrphid patterns with bee communities collected at the same sites. Bee richness, abundance, and effective diversity were not consistently associated with corresponding syrphid measures, indicating that bee-rich grasslands were not necessarily syrphid-rich. These results show that syrphid flies collected during bee-focused surveys can provide valuable information about an understudied group of flower-visiting insects. They also show that specimen abundance alone may provide a misleading representation of syrphid biodiversity when collections are dominated by a single species. Retaining and identifying non-target insects from standardized bee surveys, especially bowl-trap samples, can improve assessments of grassland biodiversity and reveal sites or community patterns that may be overlooked when conservation decisions rely primarily on bees.

Seung-Il Lee, Dzhamal Amishev, Brigitte Leblon

Faculty of Natural Resources Management, Lakehead University

Exploring forest entomology at Lakehead University: Arthropod biodiversity and sustainable forest management

Entomological research in the Faculty of Natural Resources Management at Lakehead University has evolved significantly in recent years, expanding from a historically limited focus on pest dynamics to a broader research program addressing forest insect ecology, arthropod biodiversity conservation, and sustainable forest management. This presentation provides an overview of ongoing entomological research at Lakehead University, examining how forest arthropods respond to various types of forest harvesting, herbicide application, forest succession, and other natural and human-caused disturbances. I will summarize five main research themes. Theme 1 examines responses of diverse arthropod groups to intensive biomass harvesting. Theme 2 explores the effects of commercial thinning on both ground-dwelling and flying beetles in northwestern Ontario. Theme 3 investigates pollinating insect responses to different herbicide treatments in power transmission corridors. Theme 4 examines the role of insect biodiversity in fine-wood decomposition in managed and natural forests. Theme 5 introduces student research on insect biodiversity in mixedwood stands in northwestern Ontario undertaken as part of the Field School in

the Faculty of Natural Resources Management. The presentation will also highlight additional ongoing entomological research collaborations at the national and international levels.

Natalia Lifshitz^{1,2}, Delano Lewis^{1,2}

¹Burman University, ²Ellis Nature Centre

The illusion of stability: Traditional metrics fail to capture butterfly declines in central Alberta

This study analyzed 21 years (2000–2025) of butterfly count data from Central Alberta, integrated with intensive 5-year (2021–2025) high-resolution intra-seasonal sampling. Long-term macro-scale analysis revealed a significant decline in Shannon Diversity, despite the stability of overall species richness and evenness. The diversity decline was primarily driven by the severe, long-term collapse of the native Common Ringlet (*Coenonympha tullia*). Four other dominant species—Cabbage White (*Pieris rapae*), Clouded Sulphur (*Colias eriphyle*), European Skipper (*Thymelicus lineola*), and Common Wood Nymph (*Cercyonis pegala*)—maintained long-term population stability, though their abundances were significantly constrained by extreme winter minimum temperatures and rapid spring warming. High-resolution intra-seasonal analysis (2021–2025) demonstrated that community indices and species-specific abundances were strongly limited by daily weather, particularly wind velocity and temperature. These findings indicate that long-term diversity loss in temperate ecosystems can be effectively masked by stable metrics of species abundance and evenness. This study highlights the necessity of coupling multi-decadal historical datasets with high-frequency, fine-scale sampling to accurately identify mechanisms of community turnover. The results underscore the critical importance of standardized citizen science monitoring in quantifying environmental impacts and establishing conservation priorities for terrestrial insect groups.

Alexandra Liber, Maya Evenden

Department of Biological Sciences, University of Alberta

Development of a kairomone-based monitoring tool for flea beetles, *Phyllotreta* spp., in canola

Flea beetles (*Phyllotreta* spp.) are major pests of canola (*Brassica napus*). Monitoring flea beetle populations is necessary early in the season, as most damage occurs at the cotyledon stage. Allyl isothiocyanate (AITC) is a compound released by damaged *Brassica* plants that attracts several specialist *Brassica* feeders, including flea beetles. Allyl isothiocyanate lures and traps to attract and retain flea beetles are available from several commercial sources but have not been compared for attraction or capture efficacy. The aim of this research is to compare the attractiveness of commercially available lures and beetle retention in different trap types. We also test for lure longevity and release rate of two types of lures (circle, tube), and spectral reflectance of two types of traps (yellow sticky card, KLP+). Both lures caught an equal number of beetles and the KLP+ caught and retained more beetles. Over five weeks, the tube AITC lure consistently captured flea beetles as expected, based on the phenology of the flea beetles in central Alberta. The circle AITC lure lasted ~3 weeks before catches declined more than expected based on phenology. The tube lure had a linear decline in weight over five weeks. The circle lure had a sharp decline in weight within the first week, then maintained that weight. Peak reflectance varied between trap types with

a range of 560 nm to 1300 nm. The sustainable management of flea beetles is achievable through the development of an accurate and reliable monitoring system within an integrated pest management framework.

Patricia A. MacKay, Robert J. Lamb

Department of Entomology, University of Manitoba

Population dynamics of a native aphid: Colony structure and abundance

Colonies of the native aphid *Uroleucon rudbeckiae* on its only host, the native wildflower *Rudbeckia laciniata*, have been followed in Riding Mountain National Park and Winnipeg since 1998. In Winnipeg, colonies were assessed approximately weekly during the growing season in five patches comprising 29 m². For most of the season, the aphids are found in groups on the flowering stems of the plant. From 1998–2009, sampling design and intensity varied year to year, providing much data but making comparisons among years sometimes problematic. In Winnipeg from 2010–2022, all flowering stems were observed approximately weekly to determine aphid numbers, morphs, and life-stages. This provided annual data on number of flower stems, number of aphids per stem (measured as abundance or prevalence and intensity), number of colonies, longevity of colonies, morph of colony founders, number of winged immigrants, number of colonies surviving long enough to produce non-winged adults versus winged adults. The relationships among these parameters are analysed to elucidate which factors are most important in determining the sometimes-wide differences among years.

Janelle MacKeil, G. Christopher Cutler

Dalhousie University, Faculty of Agriculture

Two ways to see a fly: Thermal forecasting and computer vision in wild blueberry IPM

Blueberry fruit fly (*Rhagoletis mendax*) lays its eggs inside developing blueberries, and infestations can restrict access to export markets. Along with an increased need to reduce insecticide use while maintaining effective control, more targeted and efficient pest management tools are needed. Because control depends on detecting adults before oviposition, and emergence varies across seasons and fields, growers must monitor widely dispersed sites with limited predictive guidance. We built two complementary tools to predict and detect *R. mendax* adult emergence in fields. First, we modeled multi-year trap-capture data from commercial Nova Scotia fields with on-site air and soil temperature data to develop and validate a degree-day (DD) phenology model. Adult emergence began near 545 DD (base 4.7 °C; $R^2 = 0.83$). Second, we trained a YOLO11 object detection model to identify and count adult *R. mendax* in photographs of monitoring traps amid non-target bycatch (92.5% precision, 86.4% recall) and deployed it in a public web application. Integrating thermal forecasting with deep-learning vision brings precision monitoring to wild blueberry production, guiding growers when to scout and what they detect.

Madeline MacNeil¹, Mason Stothart², Laura Ferguson¹

¹Acadia University, ²Department of Natural Resources

Investigating potential drivers of tick abundance and pathogen prevalence in Nova Scotia

Ixodes scapularis, the black-legged tick, has invaded many regions of Canada and caused a drastic increase in the incidence of several tick-borne diseases, including Lyme disease. There are several potential drivers of this increase in the abundance of ticks and subsequent disease prevalence; however, tick populations in the Maritime provinces are poorly characterized, which limits our ability to evaluate many of these drivers, and subsequently inform risk and management. To first gain a better understanding of Nova Scotia's tick populations, we began by conducting province-wide surveillance for multiple life stages of *I. scapularis*. We collected over 4,500 ticks from May to July across 13 provincial counties, with *I. scapularis* comprising over half of these collections. Next, we will test all *I. scapularis* for a range of pathogens, including *Borrelia burgdorferi*, *Anaplasma phagocytophilum*, and other common pathogens, to provide insight on their prevalence across different ecoregions and counties in Nova Scotia. To explore host use as a driver of tick abundance, we will identify the host DNA remaining from the last bloodmeal in nymphal and adult stages of *I. scapularis*. Overall, we aim to determine if host use, land type, and climate are significant contributors to the abundance of ticks and pathogen prevalence across the province.

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Transmission of grapevine red blotch virus by *Stictocephala bisonia*

Grapevine Red Blotch Virus (GRBV) is a single stranded DNA Geminivirus in the family Geminiviridae, which affects wine quality by causing uneven ripening, yield reductions, reduced sugar content, and altered acidity to grapes. Buffalo treehoppers (*Stictocephala* spp.) have tested positive for GRBV, but it is not clear if they can transmit GRBV between grape plants. The objective for this study was to determine if *Stictocephala bisonia* is a competent vector of GRBV between grapes. *Stictocephala bisonia* were collected from edge habitats around vineyards in Niagara, Ontario. They were placed in groups of 6–8 insects for a 14-day GRBV acquisition period on a GRBV+ grapevine, a 2-day gut clearing period on alfalfa or fava bean, and a 4-day inoculation period on a GRBV- grapevine. Grapevine Red Blotch Virus was detected in 75% of GRBV- grapevines at 8 months post-inoculation in 2024, but not in any GRBV- grapevines in 2025. Grapevine Red Blotch Virus was observed in *S. bisonia* salivary glands in 0/20 insects in 2024 and 4/20 insects in 2025. Virus titer is often at its peak during autumn harvest, thus GRBV was likely not found in 2025 grapevines due to early spring DNA sampling. Post-transmission assay grapevine DNA will continue to be sampled to verify GRBV presence or absence. Salivary glands containing GRBV is indicative of viral transfer from grapevine to *S. bisonia* in a circulative, non-propagative mode. Together, these findings document *S. bisonia* as a novel insect vector of GRBV in Niagara, Ontario.

Jeffrey M. Marcus

Department of Biological Sciences, University of Manitoba

Mistakes were made: Cryptic species among melanic *Junonia* butterfly lineages

The conventional view, largely based on arguments laid out by Torben Larsen (2005) in his “Butterflies of West Africa”, is that there are three melanic *Junonia* species in the forest dwelling *chorimene* clade. As part my laboratory's effort to develop a comprehensive phylogeny for the

genus *Junonia*, we have obtained geographically diverse specimens from each of those recognized species: *J. chorimene*, *J. gregorii*, and *J. stygia*. However, molecular phylogenetic analysis of these specimens based on next generation sequencing data sets reveals multiple cryptic lineages showing lack of monophyly and substantial evolutionary divergence from one another. One of these lineages maps onto described species such as *J. schmiedeli* (a taxon last treated seriously by Berger (1981)), while others may represent undescribed species. This speciation without obvious colour pattern evolution in this lineage appears to be distinct from other *Junonia* lineages, including melanic lineages in other parts of the world. I will conclude with a discussion of how contrasting patterns of speciation may shed light on the underlying evolutionary processes at play.

Carys McMurray¹, N. Kirk Hillier¹, Christopher Edge²

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Small pest, big problem: Impact of hemlock woolly adelgid (Hemiptera: Adelgidae) infestations and neonicotinoid insecticide treatments on native insect biodiversity

Hemlock woolly adelgid (HWA, *Adelges tsugae* Annand) is an invasive insect pest attacking Eastern Hemlock (*Tsuga canadensis*) forests in Nova Scotia. Once infested with HWA, trees die within 7-10 years - posing a significant and immediate threat to hemlock forests and the species they support, as loss of hemlocks will result in major changes to forest ecosystems. Currently two neonicotinoid insecticides - imidacloprid and dinotefuran – are applied as basal bark sprays to manage HWA in Nova Scotia. Insecticide treatments show efficacy in controlling HWA but may pose a risk to non-target forest insect communities. To examine non-target effects, we trapped insects at 9 hemlock stand sites (6 insecticide-treated, 3 untreated controls) across Nova Scotia and collected environmental data from each stand. Our goal is to compare insect biodiversity and environmental metrics among treatments to determine how insecticide treatments, and forest change caused by HWA, are affecting insect communities. Results from this study will help to inform future decisions about management of HWA in Canada.

Jennie E. Mills, Laura V. Ferguson

Acadia University

Evaluating truck-based aerial insect sampling as a tool for insect surveillance in Nova Scotia

Over the past few decades, insect populations have been declining dramatically across the globe. As insects play integral roles as nutrient cyclers, prey, pollinators, and more, losses to their biodiversity and biomass will have compounding effects throughout ecosystems. To determine the root causes of decline, identify areas of conservation need, and to monitor the efficacy of conservation efforts, we need widespread, coordinated insect surveillance across more geographic regions, which remains challenging to implement. We sought to harness the “windshield phenomenon” as a method of collection that could cover large geographic spaces and make use of already ill-fated insects by installing standardized collection filters to the fronts of transport trucks travelling repeatable routes throughout Nova Scotia. In tandem, we installed malaise traps in counties intersecting the routes of the transport trucks from May–August, 2026. Thus far, malaise traps continue to outperform sampling from trucks in terms of biomass; we are now working to compare the richness and diversity of samples between the methods to determine

if truck sampling is a viable collection technique. As a second objective, we are providing a modern snapshot of the biomass and biodiversity of aerial insects across 9 sampling sites in Nova Scotia.

Aziz Ullah, Kristen Guelly, Priyanka Mittapelly, Boyd A. Mori

Department of Agricultural, Food and Nutritional Science, University of Alberta

Insecticide susceptibility of flea beetles varies by species and insecticide class in Canadian canola

Crucifer (*Phyllotreta cruciferae*) and striped (*P. striolata*) flea beetles are the most important insect pests of canola (*Brassica napus* and *B. rapa*) in Canada. Management relies heavily on insecticides, including neonicotinoid seed treatments and foliar applications of pyrethroids. Laboratory bioassays were used to evaluate susceptibility of flea beetle populations collected across Canada to deltamethrin and to compare responses of *P. cruciferae* and *P. striolata* to neonicotinoid seed treatments. Behavioural choice experiments also examined responses of both species to treated and untreated seedlings. Flea beetle populations remained highly susceptible to deltamethrin across Canada, with little evidence of reduced susceptibility despite its use commonly occurring. In contrast, responses to neonicotinoids differed considerably between species. Feeding damage by *P. cruciferae* was reduced to $\leq 18.9\%$ on treated seedlings, below the 25% action threshold, whereas damage by *P. striolata* remained as high as 60.5%. *Phyllotreta cruciferae* avoided treated seedlings, whereas *P. striolata* showed no preference between treated and untreated seedlings. These results demonstrate that insecticide susceptibility in Canadian flea beetles depends on both insecticide class and flea beetle species. Continued susceptibility to deltamethrin is encouraging for flea beetle management, while the physiological and behavioural differences between species may help explain reduced neonicotinoid efficacy against *P. striolata*.

Kiera Newman, Nigel Raine, Ernesto Guzman

School of Environmental Sciences, University of Guelph

Milkweed cardenolides as a potential natural resource for supporting honey bee health

Floral resources can support pollinators not only through nutrition, but also by providing secondary metabolites with medicinal properties. In honey bees (*Apis mellifera*), the microsporidian pathogen *Nosema ceranae* can negatively affect health and survival. Milkweeds (*Asclepias* spp.), widely planted for monarch butterfly conservation, contain cardenolides in their nectar that may provide additional health benefits to floral visitors. We experimentally tested how ecologically relevant concentrations of cardenolides influence *N. ceranae* infection, survival, and weight change in honey bees by crossing infection status with four dietary cardenolide concentrations. Cardenolide exposure significantly reduced pathogen loads in infected bees, with moderate concentrations also associated with improved survival and reduced weight loss. Although high concentrations produced some negative effects, our results indicate that cardenolides can provide meaningful benefits to infected honey bees. These findings suggest that access to milkweed near apiaries could provide honey bees with naturally occurring phytochemicals that help mitigate disease. Incorporating milkweed into apiary-adjacent habitat may therefore complement existing pollinator-health strategies while simultaneously providing essential habitat for monarch butterflies

Ryan Oram

Royal Saskatchewan Museum

Natural history collections: A second “life” to your specimens

Natural history collections, which can be found in museums or universities, show snapshots of the world’s biodiversity. These collections are permanent records of species, ecosystems and environmental changes over time and are vital for understanding the natural world by supporting research, education and conservation efforts, providing unique, invaluable data not found elsewhere. These collections are also used in exhibits and by public programs to inspire curiosity and nurture an appreciation of nature for the public. One way that institutions obtain specimens to expand their collections is through donations from professionals or the public. Occasionally when specimen-based research projects are completed, specimens may be discarded, ending the “life” of the specimen and its associated data (if not captured and made available) despite the need to maintain voucher collections. However, if specimens are not prepared properly, or data isn’t collected in a way that is usable to an institute, they may not be able to accept the collection. By having researchers reach out and co-ordinate with an institution, even prior to the project starting, about having their specimens incorporated into the collection, the two parties can come to an agreement, and make sure the specimens, and their data, are handled in a way that the collection can use. This ensures that specimens/data will continue to be useful in future research projects, conservation efforts, and public outreach, for years to come. The purpose of this talk is to highlight why maintaining these collections is in the best interests of the scientific community.

Ethan Ott, Shayla Woodland , Sydney Wynn-Williams , Alejandro C. Costamagna

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Analysis of the effects of different cropping systems on carabid (Coleoptera: Carabidae) abundance, size, and wing morphology.

Adult size of carabid beetles (Coleoptera: Carabidae) are dependent on the food acquired during the larval stage. Therefore, analyzing the variation in size of carabids across different cropping systems can be used as a proxy to indicate the success of carabid larvae in regard to their predation. During 2025, 22 fields were sampled with pitfall traps to collect carabid beetles under three cropping systems on a gradient of perennialization (annual, intermediate, and perennial crops) located across Manitoba and Saskatchewan. To date, 3840 carabids were identified to 44 species or morphospecies. In each sample, 5 males and 5 females of each species or morphospecies were randomly selected to be measured and examined for wing morphology. The most abundant carabid was the non-native species *Pterostichus melanarius* (n= 3284), followed by *Bembidion quadrimaculatum* (n=211), *Agonum placidum* (n=59), and *Agonum cupreum* (n=40). *Pterostichus melanarius* was predominantly brachypterous (69.96%). However, most other species were solely macropterous, except for some species such as *Syntomus americanus* (58.82% brachypterous, n = 17) and *Agonum cupreum* (5% brachypterous, n = 40). We will discuss the effects of different cropping systems on carabid abundance, wing morphology, and size, in the context of conservation biological control of carabids. Additionally, wing morphology ratios of *P. melanarius* can illustrate how this alien species is adapting to agricultural fields.

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Moths are more day-active following a night of flight-to-light

Artificial light at night can profoundly alter the behavior of nocturnal species, yet the fitness costs of these alterations are mostly unknown. To understand whether the flight-to-light impulse diverts individuals away from fitness-related behaviors such as foraging, we presented *Plutella xylostella* (L.) moths with both a sugar water feeder and a UV LED, then recorded their activity at each over several days and nights. We found that moths of both sexes overwhelmingly preferred to visit the LED at night and subsequently fed more during the day than did moths in control conditions. These behavioral alternations culminated in a significantly shortened average lifespan. By documenting sublethal effects of artificial light on foraging, and their lethal consequences, we add to the body of evidence demonstrating that light pollution poses a threat to the conservation of populations and species.

Ammy Pacheco, Prabashi Wickramasinghe, Olav Rueppell

Department of Biological Sciences, University of Alberta

Exploring co-infection dynamics between chronic bee paralysis virus (CBPV) and Israeli acute paralysis virus (IAPV) in *Apis mellifera*

Apis mellifera (honey bees) are major agricultural pollinators facing an ongoing health crisis due to a multitude of stressors. Among these, viruses are a growing threat. Honey bees often harbor multiple viral infections making it crucial to understand potential pathogen interactions. Dynamics between Israeli acute paralysis virus (IAPV) and chronic bee paralysis virus (CBPV), and their combined effect on host health, remain poorly explored. Hosts with disrupted gut microbiomes are more susceptible to IAPV infections, and CBPV has shown to weaken gut barriers. This prompts the question of whether CBPV-induced changes to gut microbiome composition, barrier integrity, and host immune response alter IAPV infection dynamics in honey bees. To test this, newly emerged workers were first sprayed with a pure CBPV inoculum. After 48 hours, two previously evolved IAPV strains (virulent and benign) were administered either by spraying or via injection. Survival was monitored over 7 days, and dead bees were collected every 8 hours. Monitoring survival/mortality revealed high variability among single and mixed infections, with the latter showing increased virulence during viral interaction analysis. Regardless of IAPV strain or infection route, CBPV reduced IAPV's impact, and vice versa. This showcases potential virus competition for host cellular resources or immune priming of the host. Overall, this study provides new insights into virus-virus interactions in honey bees and contributes knowledge that may support viral disease management.

Tiffany Pan, John Soghigian

University of Calgary, Faculty of Veterinary Medicine

Investigating the Evolution of the Loss of Blood-Feeding in Sabethini Mosquitoes

One of the most well-known traits of mosquitoes is their ability to blood-feed. However, across the mosquito family, Culicidae, there are a number of species that exhibit some level of autogeny, or the ability to reproduce without a blood meal. The level of autogeny varies across the family; some

can only autogenously reproduce with the first clutch of eggs and then require to blood-feed thereafter. Others do not require a blood meal at all. Even within one species, autogeny levels can vary depending on the environment. However, the evolution of the loss of blood-feeding is not well understood and to date, no comprehensive analysis of how these autogenous mosquitoes are related has been published. By better understanding the evolution of the loss of blood-feeding, we can also better understand blood-feeding. The Sabethini tribe contains two genera that have completely lost the ability to blood-feed. This makes this tribe unique and a good candidate to investigate the loss of blood-feeding behavior. Additionally, current understanding of the Sabethini phylogenetic relationships are based on only morphology. This is novel research into an understudied population of the mosquito family and specifically examines the relationships among non-biting mosquitoes. I have reconstructed evolutionary relationships among these mosquito lineages using genomic data and phylogenetic software. The resulting tree of evolutionary relationships has been analyzed using quantitative methods to determine the number of times the loss of blood feeding has evolved within the Sabethini tribe and resolve the phylogenetic relationships between the genera within the tribe.

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Establishing the potato leafhopper as a new model for sustainable agriculture

The potato leafhopper, *Empoasca fabae* (Harris, 1841), is a migratory agricultural pest that feeds on more than 200 plant species across eastern North America. Despite its economic importance, the ecological and molecular factors underlying its migration, broad host range, and adaptation to changing environments remain poorly understood. This knowledge is essential for targeted management. We integrated field ecology, genomics, metagenomics, and evolutionary analyses to establish *E. fabae* as a model for sustainable pest research. Field observations combined with degree-day and CLIMEX models showed that *E. fabae* completes one to two generations annually in Québec. Adults arrive from late May to early June, populations peak in June–July, and warmer southeastern regions support earlier development and greater generational potential. To provide a genomic framework for investigating these patterns, we assembled its 14,873-bp mitochondrial genome and first chromosome-level nuclear genome. The 908-Mb assembly places 99.8% of the sequence on ten chromosomes, supports an XO sex-determination system, and contains 31,406 predicted protein-coding genes. We then examined whether associated bacteria contribute to its exceptional dietary breadth. Metagenomics recovered four recurrent plant-pathogenic Enterobacterales carrying complementary carbohydrate-degrading functions. Among 614 glycoside hydrolases, a secreted *Kosakonia* GH5-25 enzyme degraded cellulose under acidic conditions. Comparative analysis of 24 leafhopper genomes also identified 87 GH5-40 genes across 23 species, revealing a single bacterial acquisition followed by extensive duplication and functional diversification. Together, these studies connect seasonal dynamics with genomic and microbial

innovations, positioning *E. fabae* as a powerful model for understanding pest evolution and developing climate-informed surveillance and more sustainable crop-protection strategies.

Stephen F. Pernal, David Ostermann, Amanda Gregoris, Abdullah Ibrahim

Agriculture and Agri-Food Canada, Beaverlodge Research Farm

Evaluating a new vaccine against American foulbrood disease

American foulbrood disease (AFB) is a lethal disease of honey bee colonies caused by the bacterium *Paenibacillus larvae*. Recently, Dalan Animal Health received conditional approval from CFIA for their vaccine “Paenibacillus Larvae Bacterin” designed to prevent *P. larvae* infection of honey bees. Most data supporting the registration of this product has been based on *in vitro* infections comparing larvae produced by vaccinated versus non-vaccinated queens. To understand the vaccine’s utility in a real-world setting, we conducted a field study comparing bee colonies inoculated with AFB scale. Colonies were regularly inspected for clinical symptoms of AFB, and *P. larvae* spores were cultivated to characterize the development of active and subclinical infections. We also quantified levels of DWV, as suppression of the virus is an additional claim made for the product. Colonies with vaccinated queens had fewer AFB symptoms than non-vaccinated colonies, though disease expression was not eliminated. Implications for management of AFB in commercial beekeeping will be discussed.

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Evaluation of a novel acaricide against *Varroa destructor*

Infestation of honey bees by *Varroa destructor* is a significant cause of colony loss, particularly during winter months in Canada. Currently, beekeepers have limited options available to treat bee colonies for varroosis. *Varroa* mites have quickly developed resistance to a number of registered compounds (i.e. fluvalinate, coumaphos, amitraz), while remaining treatment options often pose health hazards to beekeepers or have variable efficacy. As such, alternative control strategies are urgently required, particularly those that involve new active compounds. Based on previous laboratory screening assays, we discovered a new acaricidal substance, 1-allyloxy-4-propoxybenzene, referred to as 3c {3,6}, which causes disruption of host-finding behaviour, paralysis and death of mites. From 2019–2024, field trials were conducted in British Columbia and Alberta to evaluate the effectiveness of this acaricide under a range of environmental conditions. These experiments showed efficacy of up to $94.6 \pm 1.2\%$, using a 6-week treatment period with release devices containing 8–10 g of 3c {3,6} applied to wooden applicators in glycerol and isopropanol. Our findings show 3c {3,6} as being generally safe for honey bees, having limited effects on adult bee populations and minimal impacts on the development of brood at 5 and 10 g per colony under OECD 75 testing. Nevertheless, some colony-level trials have shown elevated risks to queens at high doses. Overall, the data produced to date support the registration of this novel active for control of *V. destructor*.

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Understanding potential mechanisms for managing virus spillover to wild bees

Bees are important pollinators contributing to both agricultural production and ecosystem function, and a combination of stressors negatively impact their health. Recent honey bee colony losses have been partially attributed to the ectoparasitic *Varroa* mite, which acts as a vector for viruses. Viruses in honey bees have been extensively studied, but there is still much unknown about their impact on other bee species, where they have also been detected. We studied virus spillover from honey bees to wild, unmanaged bees to better understand the drivers and transfer pathways of viruses within bee communities. We sampled wild bees, honey bees, and pollen from bumble bees from twenty sites varying in agricultural intensity and honey bee density across Manitoba. Bee and pollen samples were individually tested for five common honey bee viruses. We found that virus detections in wild bees are influenced by multiple factors, and we also found evidence suggesting that virus spillover between honey bees and wild bees is occurring. Virus presence in wild bees was associated with higher honey bee virus abundance, increased agricultural intensity, later collection dates, greater floral abundance, kleptoparasitism, and a closer phylogenetic relation to honey bees. We also found that bumble bees are collecting pollen with viruses present, which appear to be deposited by other bees present at the same site, and that some viruses may be transferred through different pollen-associated pathways. There are a variety of potential mechanisms involved with virus spillover, and this project begins to give us insight into this complex system.

Julia Petrov

Royal Alberta Museum

Creepy-crawly couture: Arthropods in fashion

As the largest animal phylum, arthropods have inevitably been deeply intertwined with human history and culture, including in clothing and textile production. While some uses are well-known (such as cochineal beetles ground up for textile dyes), and some threats apparent (for example, clothes moths as the scourge of wool wearers), this talk will investigate a lesser-known phenomenon: the fad for invertebrate motifs in early-twentieth century textiles and clothing for the fashionable Western market. As the practical uses of arthropods in fashion declined and synthetic technologies became more prevalent, they instead became symbolic and decorative. Perhaps unsurprisingly, the most popular class of arthropods is arachnids: as symbols of weaving, spiders are seen with and without their webs on gowns, handbags, and brooches for decades, starting in the 1880s. However, this talk will also present examples of insects, such as bees, beetles and butterflies, and speculate on the evolving popular understanding of arthropods from material to metaphor.

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Antixenosis and antibiosis to the aphid vector *Ericaphis fimbriata* in highbush blueberry: Progress toward resistant cultivars for blueberry scorch virus management

Highbush blueberry is one of Canada's highest production value fruit crops, with most of the production coming from British Columbia's (BC) Fraser Valley. *Ericaphis fimbriata* Richards, 1959, is a blueberry-feeding aphid and the primary vector of Blueberry Scorch Virus (BIScV) in BC. The virus causes blighting and plant death, resulting in compounding yield losses. Blueberry aphids are currently managed through prophylactic calendar-based sprays, with no sustainable Integrated Pest Management (IPM) approach for aphids and BIScV implemented. Host plant resistance is an underexplored aspect of blueberry IPM that can reduce aphid densities in the field to minimize BIScV spread. Using a binomial aphid density screening assay from 2023–2025, we found experimental cultivars showing potential aphid resistance, which was determined to be either antixenosis, antibiosis, or both, through choice and no-choice assays using several growth stages of the blueberry cultivars. Select cultivars had their aphid resistance verified in the field via a randomized block trial in 2026. An investigation of potential defense traits found no correlation between trichomes, vascular bundle physiology, and aphid resistance; however, further investigations into the direct mechanisms of host plant resistance through Electric Penetration Graph feeding analysis and secondary metabolite analysis are required. Our results will be used to inform the long-term breeding program of aphid resistant blueberry cultivars that can be bred into existing elite cultivars to contribute to a sustainable IPM plan for BIScV and blueberry aphids in BC.

Matthew Polinsky

Knowledge and Research transfer Program

KRTP overview and updates

The Manitoba Knowledge and Research Transfer Program for apiculture (KRTP) was established in 2020 by the Manitoba Beekeepers' Association (MBA). As a program of the MBA, the KRTP serves as an industry-led research and extension arm that sets research and outreach priorities based on the needs of regional commercial beekeepers. Built around four pillars – education, services, demonstrative research, and communication – the KRTP works with beekeepers, researchers, government, and other industry stakeholders. Over the past five years, beekeepers in Manitoba and other regions have faced increasingly difficult operating conditions, including rising winter losses, miticide resistance, and widespread disease pressure³. The goal of the KRTP is to address locally relevant issues, contribute local evidence and interpretation to research, and build trust through sustained relationships. The KRTP works to support and inform beekeepers through field trials, one-to-one support, community outreach, digital media, and in-person events. Beekeeping extension has not turned out to be simpler in an era of abundant access to information, the KRTP addresses today's communication challenges by combining time-tested extension approaches with new ways of sharing knowledge.

Nicola Pollock^{1,2}, Cory Sheffield², Andrew Cameron¹

¹ University of Regina, ² Royal Saskatchewan Museum

Predictors of habitat use by wild bees across natural and agricultural habitats in southern Saskatchewan

Saskatchewan is the leading province in agricultural crop production, accounting for approximately 25% of Canada's net farmer crop income. The province's 300+ wild bee species help provide pollination to many of the animal pollinated crops produced, however, many of these species are not being utilized to their full potential due to low wild pollinator numbers in agricultural systems. Saskatchewan is one of the main provinces that could benefit from conserving and restoring wild pollinators, as there is significant unrealized crop potential, which has the potential to generate an additional \$1.5 billion in farmer income. The main cause of low pollinator numbers is habitat quality, as wild bee fecundity is negatively affected by lack of floral resources. In this study, we aim to analyze how patterns of bee diversity and abundance are influenced by habitat quality and proximity to agricultural landscapes in the prairies ecozone of Saskatchewan. Pollinators were sampled at canola (*Brassica napus*) field borders using pan traps to measure pollinator diversity. Canola flowers were also collected to analyze pollinator eDNA to determine which species are visiting canola. Additionally, pollination analysis and crop yield samples were taken in canola fields to determine how distance from field borders impacts pollinator visitation. Finally, trap nests (bee condos) were used to analyze the fecundity of wild cavity nesting bees. Preliminary results will be shared in this presentation.

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Virome characterisation of *Tropilaelaps mercedesae* parasitising *Apis mellifera* and *Apis dorsata* in Thailand: A comparative metatranscriptomic analysis

Tropilaelaps mites, ectoparasites of honey bees, play a key role in the honey bee virome. Upon infestation, these mites facilitate dissemination of destructive *Apis*-associated virus families like Iflaviridae and Dicistroviridae. Experts anticipate their arrival in North America in near future. Despite the urgency, the diversity of the *Tropilaelaps* virome remains insufficiently characterized in many regions. This study characterizes the virome of *Tropilaelaps* mites collected from Thai *Apis mellifera* and *Apis dorsata* colonies using a metatranscriptomic approach integrating Oxford Nanopore Technologies (ONT) and Illumina sequencing. Forty-nine and forty-six mites from 4 *A. dorsata* and 1 *A. mellifera* colonies were sampled respectively. Ten RNA extraction pools for each host species were allocated for Illumina sequencing. And one RNA extraction pool for each host species for ONT sequencing. Reads were quality-controlled, assembled de novo, and screened for viral candidates using protein-blast and HMM-based hallmark domains detection. ORF annotation and read mapping estimated viral detection and relative abundance. Conserved viral domains were used for preliminary phylogenetic placement of identified viral contigs. Preliminary results suggest high abundance of Iflaviridae in *A. mellifera* associated mites, and higher virome diversity in *A. dorsata* associated mites. Genomes of two previously unidentified viruses in the Iflaviridae and Flaviviridae family were assembled and their presence were verified.

Heather Proctor¹, Terry Galloway², Sergey Mironov³

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Bigger birds, more mites? Relationships between host size and feather mite prevalence, abundance and species richness

Feather mites (Acariformes: Analgoidea, Pterolichoidea) are obligatory ectosymbionts of birds. Depending on species, they occupy the surfaces of feathers, the interior of quills, or the skin of their hosts. Recorded feather mite species richness per host species ranges from 0 to >20 spp. Larger-bodied bird species may provide more microhabitats for ectosymbionts, and hence would be predicted to host more mite species. Existing explorations of this idea have the drawback of lacking information on number of individuals/bird species examined for mites (= sampling effort). Given that it's well-known in biodiversity surveys that 'the more you look, the more you find', not knowing sampling effort is a major problem. Here we explore a dataset of 113 bird species in 16 orders in which sampling effort can be controlled for. Most bird specimens were mortalities from Manitoba with a small number from other provinces. We test whether host size is correlated with prevalence, abundance, or species richness of feather mites. Prevalence of mites/host sp. ranged from 0–100%, mean abundance from 0 to >40,000, and species richness from 0 to 9. For most bird groups we found no relationship between size and these mite parameters. We discuss ecological and historical factors that may influence feather mite prevalence, abundance and species richness.

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Entomopathogenic nematodes and fungi as biological control agents for plum curculio (*Conotrachelus nenuphar*)

Plum curculio (*Conotrachelus nenuphar*) is a pest of stone and pome fruit native to eastern North America. Larvae feed on unripe fruit and then pupate in the soil. Our objective was to determine the efficacy of soil-applied entomopathogenic nematodes and fungi against plum curculio larvae using adult emergence as an indicator of efficacy. In a 2025 greenhouse experiment, split-rate applications of *Steinernema feltiae* and *Beauveria bassiana* reduced adult emergence by 76% and 31% respectively when compared to the control. In 2026, single applications of *S. feltiae* and *Steinernema carpocapsae* at the start of the experiment reduced emergence by 57% and 52% respectively, but applications a week later were ineffective. In field plots, *B. bassiana* reduced adult emergence by 27% in split-rate applications and 19% in a single application, however, in a later field experiment *S. feltiae* and *B. bassiana* did not reduce emergence. Entomopathogenic nematodes are promising tools to reduce summer emergence of plum curculio adults and could be used to steer management away from reliance on chemical insecticides.

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¹Lakehead University, ²Hydro One

Pollinating insect responses to alternative herbicide treatments in power transmission corridors

Vegetation management is essential for maintaining transmission corridors and ensuring the safe delivery of power to residents. In Canada, intensive herbicide application is effectively used to control vegetation threatening this critical infrastructure, although its potential ecological effects remain an important consideration. To balance the need for vegetation suppression with improved ecological sustainability, we examined 12 alternative herbicide treatments in power transmission corridors in Thunder Bay and Haliburton, Ontario. One blue vane trap was installed in the centre of each treatment, for a total of 120 traps, and monitored before and after application to assess changes in pollinating insect abundance and diversity. Pre-treatment sampling yielded 22,483 specimens across all 120 sites, including substantial numbers of Hymenoptera (4,277) and Diptera (9,059). Preliminary results showed an overall reduction in pollinating insect abundance following herbicide application, with total specimens declining to 3,032 in Thunder Bay and 8,659 in Haliburton. Responses varied among treatments and regions. Sites treated with foliar herbicide experienced the greatest decrease in pollinating insect abundance in both Thunder Bay and Haliburton. In Thunder Bay, cut/snap herbicide application to 50% of stems resulted in the least deviation in pollinating insect abundance among herbicide treatments. In contrast, Haliburton sites treated with herbicide application to two frill cuts demonstrated an increase in overall insect pollinator abundance, outperforming all other treatments, including the untreated control. These preliminary findings suggest that herbicide application methods may result in the abundance and diversity of insect pollinators differing substantially between treatments and regions.

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Bad news for local beer drinkers: a new invasive flea beetle (*Psylliodes attenuata*) threatens Ontario and Quebec hops

A new, invasive hop flea beetle (*Psylliodes attenuata*) was detected in Canada in 2022 and is now widely distributed in Ontario and Quebec. In August 2024 and 2025, we found *P. attenuata* in 11 of 15 and 14 of 16 hopyards, respectively. Adults are first active in southern Ontario in mid-April when hop plants emerge, and they feed on the hop growing point and basal leaves. The summer generation of adults also feeds on hop cones, the harvestable part of the plant. Control relies on insecticide use, but efficacy of cyantraniliprole (Exirel®), the only registered insecticide for flea beetles in hops, was low (10–40%) in multiple laboratory leaf-dip assays. Imidacloprid (Admire®240) is registered in hops for aphids, but efficacy against hop flea beetle was variable (30–80%) across assays. Insecticides that consistently performed well in laboratory assays were spinetoram (Delegate™), spinosad (Entrust®), and permethrin (Pounce®384 EC). Further field testing of insecticides is needed to validate laboratory results.

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Advancing alfalfa leafcutting bee (*Megachile rotundata*) health and management through applied research on the Canadian Prairies

The alfalfa leafcutting bee (ALB), *Megachile rotundata* (F.), is an integral part of crop pollination across the Prairies and Canada for alfalfa, hybrid canola seed, and blueberry crops. ALB producers carefully manage pest and disease pressure in their bee populations with best management practices and pesticidal tools. In recent years, there has been industry concern over reportedly growing levels of disease and pests. Producers are seeking improved alternatives to traditional pesticides that are safer, more effective and easier to deploy. We evaluated 17 years of Alberta ALB data from the Canadian Cocoon Testing Centre for bee health trends and to determine whether pest and disease is trending upwards in ALB populations. We also outline ongoing research trials to generate and evaluate a new non-conventional pesticide for chalcid parasitoid wasp, *Pteromalus apum*, control in ALB populations. We also outline ongoing research trials aiming to generate and evaluate a new non-conventional pesticide for chalcid parasitoid wasp, *Pteromalus apum*, control in ALB populations.

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Alfalfa leafcutting bees (*Megachile rotundata*): Long-term pest and disease trends, management gaps, and emerging solutions

Alfalfa leafcutting bees (ALB), *Megachile rotundata* (F.), are managed and used for pollination across Canada for the pollination of alfalfa seed, hybrid canola production, and specialty crops such as blueberries. This non-social bee will nest gregariously in producer-provided nesting cavities, allowing for perpetuation of populations on a yearly basis. This aggregative nesting also contributes to the risk of disease and pest exposure due to close proximity and shared nesting materials. Managing ALBs requires regular surveillance, cleanliness, and ingenuity to maintain healthy populations year over year. Here we review 17 years of pest and disease data from Alberta to determine current shortfalls in management and introduce current research projects addressing management gaps. Projects introduced include a storage temperature manipulation study and the development of a biopesticide for the chalcid parasitoid wasp, *Pteromalus apum*.

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Two gynandromorphs in *Heriades cressoni* and *Heriades timberlakei* (Hymenoptera: Megachilidae: Osmiini), first records for the species

Gynandromorphs are rare sexual anomalies in which male and female morphological traits are simultaneously expressed in a single individual. In bees, such cases have been reported across

most families, with Megachilidae representing a significant proportion of documented records. We report two transversal gynandromorphs of the genus *Heriades* Spinola, 1808 (Osmiini): one specimen of *Heriades cressoni* Michener, 1938 and two of *Heriades timberlakei* Michener, 1938. External morphology was documented using high-resolution imaging and compared with male and female specimens of each species. These are the first documented cases of gynandromorphy for *H. cressoni* and *H. timberlakei*. The specimens exhibit a bilateral symmetry with distribution of sexually dimorphic traits across different body regions. Male characteristics include shape and pubescence of the face, and mandibles, among other secondary sexual features of the mesosoma. Female traits are expressed particularly in metasoma, including the presence of a developed sting apparatus, not specialized sterna (typical of males). The distribution of cross-sex characters does not follow a clear bilateral pattern, nor patches, consistent with transversal gynandromorphy. The discovery of these individuals expands the known occurrence of gynandromorphy in Osmiini and contributes to the documentation of sexual developmental anomalies in Megachilidae, and bees.

Berenice Romero, Vanessa Numedahl, Maria Janser, Bree Bilton, Juan Pablo Arias Marmolejo, Marina C. Bezerra da Silva, Belarmino E. Lopes N., Alvaro De la Mora, Julia Tregobov, Ryan Merkl, Oleksii Obshta, Serhii Kondratiuk, Yashoda Wickramasinghe, Midhun S. Jose, Igor Moshynskyy, Elemir Simko, Sarah C. Wood

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Using the honey bee as an invertebrate model for studying Fetal Alcohol Spectrum Disorder (FASD)

The Western honey bee (*Apis mellifera*) is a fundamental species involved in food crop pollination. Due to its complex social organization, it has also been proposed as a suitable animal model for studying human diseases affecting behaviour, morphology, and cognition. One example of such a disease is the Fetal Alcohol Spectrum Disorder (FASD), which has been estimated to affect 4% of the Canadian population. Individuals with FASD often experience difficulties with cognitive reasoning and behaviour that can impair their daily activities. To examine the effects of early ethanol exposure on honey bee social behaviours, trophallaxis and aggression assays were conducted. Honey bee larvae were grafted and reared following standard practices. Ethanol-exposed individuals were fed diets containing 1.5%, 3%, or 6% ethanol. For the trophallaxis assay, lab-reared bees (“donors”) were fed a sucrose solution containing red food dye and allowed to interact with 15 worker bees (“receivers”) for one hour. Following this time, bees were dissected to determine the presence of food dye in their digestive system. For the aggression assay, a non-related worker bee (“intruder”) was introduced into an arena containing three lab-reared bees. Behavioural responses towards the intruder were monitored and recorded for five minutes. Ethanol-exposed bees were less likely to engage in trophallaxis with receivers and more aggressive towards intruders compared to groups of control bees. Understanding how larval ethanol exposure alters honey bee social behaviour may contribute to the development of standardized assays for social behaviour in humans and help improve the diagnostic sensitivity for FASD.

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***Tenebrio molitor* as an insect model for the toxicopathological effects of microplastic ingestion**

Microplastics (MPs) are persistent environmental contaminants that threaten terrestrial ecosystems, driving interest in biological approaches to plastic degradation, including insects capable of ingesting polystyrene (PS). *Tenebrio molitor* has demonstrated the ability to consume PS and has therefore been proposed as a potential organism for plastic bioremediation. However, the toxicological effects of MPs exposure, including immune and antioxidant responses, as well as the fate of ingested MPs, remain poorly characterized. This study aims to investigate the toxicodynamics and toxicokinetics of prolonged exposure to four commonly used PS formulations, each containing distinct additives: general-purpose PS, expanded PS, extruded PS, and high-impact PS. Adult *T. molitor* will be exposed for 14 days, followed by assessment of tissue-level effects through histopathology and evaluation of immune and antioxidant responses through gene expression analyses. The absorption and tissue distribution of MPs and their additives will be investigated using quantitative autoradiography and gas chromatography–mass spectrometry. MP elimination will be assessed through characterization of digestive residues using μ FTIR spectroscopy. Preliminary observations in *T. molitor* exposed to 5- μ m red PS microspheres for seven days revealed dehydration, digestive obstruction associated with dried red frass, and abundant microspheres with apparently unchanged morphology in fecal smears. PS microspheres were also visualized histologically within the digestive tract. This project will improve understanding of the toxicological and immunological effects and biological fate of MPs in terrestrial invertebrates and contribute to assessing *T. molitor* as a model for environmental contaminant research and plastic bioremediation.

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Associations between soil disturbance in cereal agricultural systems and carabid diversity in southern Alberta

The intensity of soil disturbance caused by modern agriculture can vary between field management systems and crops, but which systems enhance soil arthropod biodiversity? A well-studied group of soil arthropods commonly used as indicators of disturbance are carabid beetles, some of which are dominant contributors to pest predation in agricultural landscapes. One particularly significant predator is *Pterostichus melanarius* (Illiger 1798), an introduced European species that often outcompetes native carabid species in disturbed landscapes. Here we assessed the dominance of *P. melanarius* in relation to agricultural systems with different levels of disturbance intensity. We expected the abundance of other carabid species to be lower in fields dominated by *P. melanarius*,

which we expected to occur in systems that create more soil disturbance. We used pitfall traps to collect carabids from 18 cereal fields in Southern Alberta under four different farming systems: no-tillage dryland (NTD), no-tillage irrigated (NTI), tillage irrigated (TI), and organic irrigated with tillage (OT). From samples taken in June and July, 2026, the total number of carabids was 7039, with the highest number found in OT fields and the lowest number found in NTD fields. NTD fields also had the lowest proportion of *P. melanarius*, with a proportion of 0.12 compared to the overall proportion of 0.57. These preliminary results suggest that no-tillage dryland systems are less prone to invasion by *P. melanarius* than other systems, which is hypothesized to correlate with higher biodiversity of soil-dwelling arthropods.

Julien Saguez, Tanya Copley

CÉROM – Centre de recherche sur les grains

Beyond ear damage: the hidden impact of western bean cutworm on mycotoxins and livestock health and productivity.

The western bean cutworm (*Striacosta albicosta*, WBC) is an important corn pest that can cause direct ear damage and create entry points for fungal pathogens, potentially increasing the risk of mycotoxin contamination. However, the relationships among WBC injury, *Fusarium* infection, mycotoxin production, and subsequent risks to livestock health and productivity remain poorly understood. This project aims to investigate these relationships and determine whether effective WBC management can contribute to improved feed safety. Corn ears are collected from fields and evaluated for WBC injury and fungal contamination. The damaged and *Fusarium*-infected areas are quantified to assess the relationship between insect injury and fungal colonization. Grain samples are also analyzed for major mycotoxins of concern in livestock feed, including deoxynivalenol (DON), zearalenone (ZEA), and T-2/HT-2 toxins. Mycotoxin concentrations are used to evaluate potential risks to animal health, performance, and productivity. The project also compares several WBC management strategies, including Bt Viptera hybrids, insecticide applications, and biological control using *Trichogramma* spp., to determine their effectiveness in reducing WBC injury and their potential contribution to pesticide-use reduction. Ultimately, this research will determine whether WBC control can reduce fungal contamination and mycotoxin accumulation in maize. The results will provide agronomists and growers with practical knowledge to improve WBC management, reduce pesticide use, and develop integrated strategies to mitigate mycotoxin risks and improve the safety of maize intended for livestock feed.

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Management influences plant species associated with suitable habitat for Dakota skipper (*Hesperia dacotae*) in Manitoba

Dakota skipper is an endangered prairie-obligate species whose persistence in Manitoba may depend on maintaining suitable plant communities under distinct disturbance-based management regimes. We assessed plant diversity and community composition across different management practices such as haying and grazing, at sites with varying Dakota skipper occupancy status in the western and central Manitoba, using diversity indices and multivariate analysis. Central Manitoba

sites supported higher plant richness and diversity. Management significantly explained variation in community composition in both regions, with stronger pairwise differentiation among management regimes in the southwest region. Annual-hayed sites in both regions supported diverse native plant species, particularly Dakota skipper preferred host grasses and nectar plants, whereas grazed sites in the southwest region had lower occurrence of preferred plants and higher occurrence of invasive species. In both regions, annual haying was closely associated with preferred nectar plants, including Harebell, Purple prairie clover, and White prairie clover. There were no particular woody plant species associated with annually hayed sites while in occasionally hayed sites woody species such as Willow and Trembling aspen were more dominant. Idle sites showed stronger associations with preferred host grasses like Prairie dropseed and Porcupine grass but little associations with nectar plants, and greater woody species dominance including species such as Shrubby cinquefoil and Wolf willow. The results suggest that disturbance-based management practices shapes plant communities and may influence habitat condition relevant to Dakota skipper. These findings can be used to tailor search criteria for new Dakota skipper sites, and for ranking potential reintroduction sites.

Catherine Scott

Memorial University

The future of conferences: beyond the status quo

Why do we have conferences, and why do we organize ESC meetings the way that we do? Is the current model fit for purpose? For whom does it work well and who does it exclude? What are the costs and benefits to individuals and our Society? What are the direct and indirect societal and environmental impacts of yearly in-person meetings? I will review some of the history of conferences, report on evidence and case studies related to alternative meeting models, and imagine a future where we do things differently and with purpose.

Charu Sharma, Rob W. Currie

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Effects of oxalic acid trickle and vapor treatments on *Varroa* mites, virus dynamics, and honey bee colony performance

This study examined the efficacy of oxalic acid (OA) treatments for controlling *Varroa* mites and their impacts on colony performance and virus dynamics. Colonies were treated once in early fall with a 3.5% OA trickle. The daily mite mortality of *Varroa* increased post-treatment. Surviving colonies treated with OA showed lower levels of DWV-A and sac brood virus (SBV) in the spring. Cage experiments revealed that OA alone increased DWV-B in the absence of mites. Although it may have had some suppressive effect on black queen cell virus (BQCV), the buffer used for virus inoculation also suppressed the virus independently. In another experiment, we evaluated the frequency, timing, and interval between OA vapor applications in late fall and colony performance under different wintering environments. Colonies received zero, one, or four treatments at 2–5 day variable intervals in November in one experiment, and were treated four times either at 5-day or 12-day intervals, spanning from September to November or concentrated at the end of the treatment window. Colonies treated at 5-day intervals showed better survival than controls when initial mite

levels were low. While both one and four applications caused mite mortality, only four applications significantly reduced *Varroa* populations by spring, as measured by alcohol wash. Colonies with low initial mite loads had reduced DWV-B levels when treated. Indoor wintered colonies had consistently lower DWV levels than outdoor ones. Overall, repeated OA vapor application in late fall helped reduce *Varroa*, but its effectiveness depended heavily on initial infestation levels and treatment timing.

Cory S. Sheffield

Royal Saskatchewan Museum

The identity of *Megachile vidua* Smith, 1853 with implications on the status of *Megachile (Xanthosarus)* Robertson, 1903 *sensu lato* (Hymenoptera: Megachilidae)

Confusion exists on the identity of *Megachile vidua* Smith, 1853, the type species for *Megachile (Delomegachile)* Viereck, 1916. Prior to the early 1960s *M. vidua* was considered conspecific with *M. frigida* Smith, 1853 but was subsequently placed it into synonymy under *M. latimanus* Say, 1823, the type species of *Xanthosarus* Robertson, 1903; this should have resulted in *M. (Delomegachile)* being considered a junior synonym of *M. (Xanthosarus)*. However, *Delomegachile* continued to be recognized as a Nearctic subgenus of *Megachile* until 2000. Though *M. (Delomegachile)* is currently treated as a junior synonym of *M. (Xanthosarus)*, the true identity of *M. vidua* has important implications for the potential recognition of *Delomegachile* as a subgenus of *Megachile* as the concept of *Xanthosarus* globally is far from resolved. To address these issues, the type material for *M. vidua* was examined and its identity confirmed. To help address the latter issue, a more comprehensive molecular phylogeny of *Xanthosarus sensu* Michener (2007) was completed that included taxa now considered part of the *Xanthosarus* and the *Megachiloides* groups of Gonzalez *et al.* (2019). The results will be discussed.

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Effects of biomass harvest and herbicide application on carabid beetle communities: A 13-year post-harvest Assessment

Residual forest biomass harvesting provides renewable energy but may reduce biodiversity by disrupting deadwood and forest-floor structure, potentially delaying ecological recovery. We used pitfall traps to collect ground-dwelling arthropods at three jack pine sites in northeastern Ontario: (i) harvested (13 years old) and unharvested (62 years old) plots, (ii) a 12-year-old post-fire stand, and (iii) a reference (103-year-old wildfire-origin) stand. The trial consisted of five replicates of four biomass removal levels (tree-length harvest, full-tree harvest, stump removal, and blading) applied in 2011 with harvested plots divided into herbicide and non-herbicide subplots that were further split and planted with either jack pine or black spruce seedlings. We examined carabid beetle abundance, richness, diversity, and community composition 13 years post-harvest. A total of 2,574 carabid beetles representing 34 species were collected. Carabid abundance was significantly lower in harvested than in reference stands and varied among harvest treatments, with the highest

abundance in stump removal and tree-length harvest and the lowest in blading. Herbicide-treated subplots showed lower abundance, particularly in black spruce subplots. In contrast, species richness and diversity showed little variation among harvest treatments and did not differ substantially between harvested and reference stands. Community composition differed significantly among biomass harvest treatments, with blading exhibiting the most distinct carabid assemblage, while community structure was similar between harvested and reference stands. Tree species and herbicide application also influenced community composition, indicating that harvest intensity and post-harvest stand conditions contributed to variation in carabid assemblages.

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Feasibility of using deoxynivalenol-contaminated barley as a feed source for yellow mealworms

Deoxynivalenol (DON) contamination in barley, caused by *Fusarium* spp., poses a persistent challenge to grain quality, livestock health, and global food systems. As regulatory limits restrict the use of highly DON contaminated grain in livestock feed and malting, economic losses occur, emphasizing the need for alternative valorization strategies. Edible insects such as the yellow mealworm (*Tenebrio molitor*) have emerged as a sustainable bioconversion agent capable of transforming this low-value substrate into a protein source. This literature review examines the current research on the potential use of DON-contaminated barley as a feed substrate for mealworms, focusing on mycotoxin metabolism, insect performance, and feed safety. Studies indicate that *T. molitor* can tolerate and potentially metabolize and/or excrete DON, although detoxification efficiency and the risk of toxin accumulation in insect tissues remain unclear. Additionally, dietary exposure to DON has been shown to influence growth performance, survival, and nutritional composition, including lipid, protein and carbohydrate contents, with effects varying by concentration and experimental conditions. Key literature gaps include limited understanding of DON biotransformation pathways of insects and data on the safety of including DON-fed insects in livestock feed. Integrating findings across the fields of entomology, food science and agricultural engineering, this review evaluates the feasibility of incorporating contaminated barley into insect production systems. Addressing these gaps is essential to support insect-based bioconversion as a circular and sustainable solution for contaminated grain utilization.

Deanna Smid

Brandon University

The Last Beekeeper x3: Imagining the future of pollinator health

In 2021, Jared Julian published a dystopian story about a world in a “global bee crisis,” a science fiction novel entitled *The Last Beekeeper*. In 2022, Pablo Cartaya released a children’s science fiction story about a post-apocalyptic world without bees, entitled *The Last Beekeeper*. In 2023, Julie Carrick Dalton published a post-apocalyptic novel of speculative fiction about a world without bees, entitled *The Last Beekeeper*. Three consecutive years, three novels about the horrors of a

world without bees, all with the same title. The novels, two written for adults, and one for middle-school readers, all use the genre of speculative or science fiction, and each uses the “last man” trope to imagine what it would look like to be the “last” of something. In each novel, the ecological disaster of absent bees is imagined as a deeply personal—even familial—crisis. Finally, and remarkably, each novel contains hope in the face of disaster and die off. This talk will take these three, identically titled novels as a starting point to consider the future of beekeeping as imagined in literature. In other words, how have the three authors speculated about our ecological future, and why do so using the literary trope of “the last man”? Even more broadly, how might speculation, imagination, and fantasy in literature influence current honeybee research and health?

Justin Cruz, Deanna Smid

Brandon University

Talking to and about honeybees: the history and necessity of beekeeping dialogue

Beekeeping demands conversations. Novice beekeepers are usually and rightly advised to find a mentor who will guide them, advise them, talk to them. Successful beekeeping also demands communication with other farmers and neighbours: if beekeepers do not know if and when a local farmer is applying pesticides, all their hives could be destroyed. Beekeepers also have a long tradition of talking to the bees, telling them of notable events in the beekeeper’s life. Honeybees are remarkable conversationalists themselves: the sound of their buzzing can tell a beekeeper about their mood and their intentions. Bees also buzz, hoot, pipe, and of course, dance. This talk will examine the history and importance of dialogue between beekeepers in Manitoba, particularly through two newsletters: the publications of the Manitoba Beekeepers’ Association (The Manitoba Beekeeper) and the Red River Apiarist Association (The Bee Cause). The newsletters include regular contributions from commercial beekeepers, hobbyists, university researchers, extension services, and the provincial apiarist. The conversation between such voices is an essential tool for bee health, for beekeeper health, and for a healthy relationship between multiple voices invested in the success of beekeeping in the province. This talk will not only discuss the origins and purpose of local beekeeping newsletters but will also imagine and propose expanded avenues for healthy and productive dialogue.

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Vector and pathogen: Genomics of *Culex pipiens* and West Nile virus in Alberta

Culex pipiens (Diptera: Culicidae), the northern house mosquito, is an invasive species first detected in Alberta in Edmonton in 2018. This mosquito is considered one of the most problematic invasive species globally, as it is a vector for many pathogens. Since 2018, this species has become established across much of central and southern Alberta, particularly in urban areas. Until this finding in Alberta, *Cx. pipiens* was thought to be confined to western British Columbia and eastern Canada, and so how it arrived in Alberta, and from where, is of particular interest. Further, although this species was involved in the initial establishment of West Nile virus (WNV) in North America, what role this species may play in pathogen transmission in Alberta relative to native

mosquitoes remains unclear. To address these gaps, we used samples from routine mosquito surveillance to test *Cx. pipiens* for WNV, and to use whole genome sequencing to evaluate invasion pathways and origins of this species in Alberta. Our genomic results suggest that Alberta *Cx. pipiens* are distinct from populations in the United States, including relatively close populations. Further, we find evidence that *Cx. pipiens* is involved in the transmission of WNV in Alberta. We discuss both results in context of this species' invasive success in Alberta, and potential implications for public and veterinary health.

Kathryn Spicer, Laura V. Ferguson

Acadia University

Early developmental exposure to low temperatures reduces juvenile survival of fungal infection in the mosquito *Aedes aegypti*

The ability to survive exposure to low temperatures drives population sizes, invasions, and range expansions of insects in temperate regions, but survival of this stressor does not guarantee the success of a species. Sublethal physiological injury or stress responses triggered by cold may also influence both the short- and long-term responses to the multiple stressors that insects face throughout their lives. Here we sought to determine if cold exposure in the egg stage of the invasive, cold-sensitive mosquito *Aedes aegypti* would modify their ability to respond to infection in the larval stage. We exposed eggs to either 12°C or 25°C for two or three weeks before hatching at 25°C, and subsequently infected larvae with the entomopathogenic fungus *Metarhizium anisopliae*. We monitored survival of both infected and uninfected larvae every 12 h until death or pupation. Two weeks of cold exposure in the egg stage reduced survival of fungal infection in larvae (17.6% survival) relative to those that did not experience cold (57.6% survival). Three weeks of cold exposure reduced overall survival, regardless of infection. Overall, these results suggest that cold exposure can influence responses to subsequent, unrelated environmental stressors across life stages, thereby extending our understanding of how cold modifies the success of a species.

Emma Stainforth¹, Paul Manning¹, Edel Pérez-López²

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What's Hopping in Nova Scotia? Leafhoppers, their potential biological control agents, and blueberry stunt phytoplasma in Nova Scotia lowbush blueberry agroecosystems

Leafhoppers (Hemiptera: Cicadellidae) are small phloem-feeding insects capable of damaging plant health both directly and through the transmission of plant pathogens. Despite their potential impact, leafhoppers remain poorly studied in lowbush blueberries (*Vaccinium angustifolium*), Nova Scotia's largest agricultural export. To address this gap, I deployed yellow sticky traps in 19 lowbush blueberry fields between May and October of 2025 and 2026. This resulted in the capture and identification of over 47,000 leafhoppers. To date, 81 species have been documented, including 17 new records for Nova Scotia. To better understand the natural enemies of leafhoppers in this system, I conducted sweep-net sampling of spiders throughout the 2026 growing season. Of the over 400 spiders collected to date, approximately half are predatory hunters and half are web-builders. At the beginning of the season when there is no plant cover, wolf spiders (Araneae: Lycosidae) dominate. Later in the season, crab spiders (Araneae: Thomisidae) are most abundant.

Identification to genus and species, and the analysis of spider gut contents for leafhopper DNA is ongoing. Lastly, I sampled 32 lowbush blueberry plants exhibiting potential symptoms of blueberry stunt phytoplasma (BBSP; *Candidatus Phytoplasma asteris*), a leafhopper-vectored disease documented in highbush blueberry (*Vaccinium corymbosum*) but not yet confirmed to infect lowbush blueberry, and am currently in the process of testing the plants for this pathogen using PCR. My project seeks to further the understanding of leafhoppers in lowbush blueberry fields, which will allow for better monitoring and control of these agricultural pests in the future.

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Evaluating cold tolerance of *Laricobius nigrinus* for biological control of the hemlock woolly adelgid (*Adelges tsugae*) in Nova Scotia

The invasive hemlock woolly adelgid (*Adelges tsugae*; HWA) poses a severe threat to Eastern Hemlock (*Tsuga canadensis*) across Nova Scotia. Biological control using introduced predators, such as *Laricobius nigrinus* (Coleoptera: Derodontidae), is a promising strategy for long-term HWA management. However, successful establishment in Nova Scotia depends on the ability of predators to survive longer, colder, and more variable winters compared to their native habitat. To assess how Nova Scotian winters will influence the establishment of *L. nigrinus*, we characterized the thermal tolerance of overwintering adults. Beetles were collected from their native coastal range in British Columbia and exposed to lab-simulated overwintering regimes based on temperatures in either British Columbia or Nova Scotia. These regimes were designed to mimic the contrasting thermal conditions experienced across their native and introduced ranges. We measured winter survival, supercooling points, and lower lethal temperatures. No beetles survived the simulated Nova Scotia winter, despite temperatures remaining above their measured thermal limits. Furthermore, their thermal limits were above minimum winter temperatures recorded in Nova Scotia. However, there is evidence of new generations of beetles that have already established in the field at release sites across the province. These results suggest that factors beyond cold exposure to sub-zero temperatures may contribute to overall winter survival and population establishment, as additional environmental factors, such as access to thermal refugia, were not captured under laboratory conditions. With these outcomes, we aim to provide critical insight into climate-matching for future predator releases.

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Developing a portable, in-field eDNA metabarcoding protocol for surveying wetland invertebrate diversity

Environmental DNA (eDNA) metabarcoding can be a powerful tool for surveying invertebrate biodiversity in freshwater habitats. Amplifying a barcode region (e.g., COI) from concentrated DNA

in a water sample yields a “snapshot” of the invertebrate diversity present in a waterbody without the need for labour-intensive specimen collection and identification. However, standard eDNA metabarcoding protocols require samples to be brought to a laboratory for processing, typically resulting in several weeks between sample collection and results. This delays the detection of species of interest, necessitating an additional trip to the field site if any action is needed (e.g., controlling invasive species, conducting further surveys for rare species). We are developing a rapid eDNA metabarcoding protocol that combines a modified DNA extraction method with a portable lab (Bento Lab) and a small high throughput DNA sequencer (Oxford Nanopore MinION). The entire protocol can be deployed in the field (e.g., trailer or field house), enabling collection of metabarcoding data from invertebrates, plants, and vertebrates within four days after eDNA sample collection from a waterbody. We collected eDNA samples from 92 prairie pothole wetlands across 15 sites in 2025 and 2026. Early results from implementation of our metabarcoding protocol with these samples have been unexpected and have revealed challenges to be addressed prior to more widespread application.

Danika Strelaeff, Nuria Morfin

Department of Entomology, University of Manitoba

Cage trials of the DWV honey bee vaccine

The *Varroa destructor* mite and the viruses it vectors are contributors to high colony mortality in honey bees (*Apis mellifera*). There exist several treatments against the *Varroa* mite but no commercial treatments against the viruses it transmits, leaving a gap in current treatment options. With a focus on the deformed wing virus (DWV), a lab safe strain of *Escherichia coli* was manipulated to present DWV antigens on its surface. This *E. coli* can be fed to honey bees as a preventative treatment to boost their immune systems. With three main goals, this study looked to explore whether the treatment (1) elicits an immune response, (2) affects health and survival, and (3) increases survival of bees exposed to DWV. Looking at preliminary cage trial data, we will discuss the impacts of the treatment doses, effects against the deformed wing virus, and gene regulation in treated bees.

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Genomics of Nearctic leafhoppers and their symbionts to advance sustainable crop protection

Climate change is altering the geographic distribution, seasonal dynamics, and abundance of insect populations, increasing the risk of biological invasions and outbreaks of insect-transmitted plant diseases. Leafhoppers (Hemiptera: Cicadellidae) include numerous economically important vectors of bacterial and viral plant pathogens. In Canada, the prevalence of leafhopper-transmitted diseases has increased approximately 15-fold in recent years, raising concerns for crop production. However, major knowledge gaps remain regarding the identity of vector species, the

microorganisms they carry, and the mechanisms underlying their adaptation to host plants. Moreover, few available pest-control strategies provide consistent protection under field conditions. Our objective is to establish a comprehensive catalog of high-quality reference genomes and associated microbiomes from Nearctic leafhopper species. Leafhoppers are being collected from agricultural and natural environments across Canada, and single-insect PacBio HiFi sequencing is being used to generate reference genomes for both the insects and their associated microbial communities. Genome annotation and comparative analyses will characterize the metabolic functions contributed by bacterial symbionts, detect potential plant pathogens, and identify horizontal gene transfers that may have shaped leafhopper nutrition, adaptation to plant feeding, and ecological diversification. By connecting leafhopper genomic diversity with microbial functions and vector potential, this catalog will improve the detection of emerging or previously unrecognized vectors and strengthen biosurveillance and risk assessment. It will also support the identification of species-specific biological targets for more effective biocontrol strategies. Ultimately, this resource will contribute to reducing pesticide use, improving the sustainable management of insect-transmitted plant diseases, and increasing the overall resilience of Canadian agroecosystems.

Brianne Symak, Sean Prager

University of Saskatchewan

Uncharted territory: Exploring Cicadellidae (Hemiptera: Cicadellidae) communities in Canadian Prairie canola fields

Leafhoppers (Cicadellidae) compose a diverse family of true bugs (Hemiptera), with over 1,214 described species in Canada alone. As vectors of destructive phytopathogens, like phytoplasmas, cicadellids can become problematic. In Canadian Prairie field crops, like canola, *Macrostelus quadrilineatus* (F.) is considered the primary vector of Aster Yellows phytoplasma (AYp), the causal agent of Aster Yellows disease. Nevertheless, AYp has been detected in over 20 other species of cicadellids. Incidence of insect-transmitted diseases in crop fields is thought to largely be determined by vector populations. Except, while *M. quadrilineatus* are frequently found in canola fields and adults readily feed on canola, complete development on canola has yet to be observed. Furthermore, despite canola's high susceptibility to AYp, disease outbreaks are only an occasional problem. Therefore, external factors likely pressure *M. quadrilineatus* into canola and/or influences the abundance of infected individuals. In 2025 and 2026, over 50 commercial canola fields across the Canadian Prairies were surveyed to monitor weekly Cicadellidae occurrence from seeding to harvest. Specimens collected are identified to species. Cicadellid communities in Manitoba and Saskatchewan were strongly dominated by *M. quadrilineatus* (91% and 78%, respectively), but not in Alberta (20%). Diversity and total abundance also varied between sites, suggesting components of the surrounding environment shape Cicadellidae communities. This large-scale survey provides the first comprehensive record of cicadellid species present in Canadian Prairie canola fields, as well as data on movement throughout the growing season. With more years of sampling, climate variables could be incorporated to explain population dynamics.

Rodensky Téramène, Sean Prager, Kirstin Bett, Ana Vargas Palacios

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Dissecting pea aphid resistance in lentil

Lentil *Lens culinaris* Medik. (Fabaceae) is a vital pulse crop rich in protein and micronutrients, but its production is threatened by the pea aphid, *Acyrtosiphon pisum* Harris (Hemiptera: Aphididae), which reduces yields through direct feeding and virus transmission. While host-plant resistance offers a sustainable management strategy, the underlying mechanisms in lentil remain poorly understood. This study identifies resistant lentil germplasm and characterizes the behavioural, physiological, and genetic mechanisms driving this resistance. A subset of 126 accessions randomly selected from the AGILE Lentil Diversity Panel was screened under controlled conditions to evaluate antibiosis. Ward's cluster analysis of total aphid abundance seven days post-infestation with a single apterous aphid classified eight genotypes as resistant, 54 as moderately resistant, 39 as moderately susceptible, and 25 as susceptible, with accession PI 432000 LSP AGL exhibiting the strongest resistance. To uncover the mechanisms underlying these differences, contrasting genotypes were characterized using a multi-disciplinary approach: life-table analyses to determine demographic performance, multi-choice antixenosis assays to assess settling preferences, and electrical penetration graph (EPG) analysis to monitor probing behaviour and phloem ingestion. Concurrently, genome-wide association studies (GWAS) using genotyping-by-sequencing-derived single nucleotide polymorphisms (SNPs) are identifying genomic regions linked to reduced aphid abundance, revealing significant chromosome 3 associations. By integrating phenotypic screening, demographic performance, host preference, feeding behaviour, and genomics, this research provides a comprehensive understanding of pea aphid resistance, offering crucial germplasm and genomic targets to accelerate the breeding of aphid-resistant lentil cultivars.

Ang Thompson

University of Alberta

Man-bug or bug-man? A look at historical insect artwork from 19th century Britain and France

During the nineteenth century, Britain and France witnessed several intersecting cultural developments: the growing popularization of entomology as a discipline; a fascination with animals depicted in human clothing and/or engaged in human activities; and a niche women's fashion trend incorporating animal materials, including taxidermy and live animals worn as jewelry. Together, these phenomena contributed to a diverse array of anthropomorphized insect artwork. These artworks varied widely both in the degree of human likeness attributed to insects and in the purposes for which they were created. This talk categorizes nineteenth-century anthropomorphized insect imagery into five discrete visual types based on the ways human and insect features are combined. It then examines how these visual choices relate to the intended function of the image, including whimsy, humor, satire, aesthetic appeal, and the differentiation of human and nonhuman characters.

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The effect of mountain pine beetle (*Dendroctonus ponderosae* Hopkins) disturbance to spider (Araneae) communities.

Range expansion by mountain pine beetle (*Dendroctonus ponderosae*) into northwestern Alberta has changed habitat in disturbed areas due to effects on canopy cover, coarse woody debris, and forest understory growth. Spiders are important generalist predators in forested ecosystems that respond to other forest disturbance regimes. This study examines the influence of mountain pine beetle disturbance on the diversity, abundance, and community composition of ground-dwelling spiders (Araneae) in lodgepole pine (*Pinus contorta* var. *latifolia*) stands of western Alberta. Approximately 5,000 spiders across 15 families were collected over two field seasons, with the most abundant families being the Linyphiidae, Lycosidae, and Gnaphosidae. Species identification is on-going and community composition results and implications will be presented. This research will improve understanding of long-term arthropod responses to mountain pine beetle disturbance and inform biodiversity conservation and forest management in boreal ecosystems.

Rogan Tokach

School of Natural Resource Sciences, North Dakota State University

***Tropilaelaps mercedesae*: An emerging threat to global apiculture**

Tropilaelaps mercedesae is an invasive parasitic mite of *Apis mellifera* (Western honey bee) that is increasingly recognized as a significant threat to apiculture. Originally a parasite of the giant honey bee species *Apis dorsata* and *Apis laboriosa*, *T. mercedesae* successfully shifted to *A. mellifera* more than 60 years ago. Although historically associated with southern and eastern Asia, the mite has recently expanded into parts of Eastern Europe, raising concerns about its continued spread beyond its traditional range. This presentation will review the biology and life history of *T. mercedesae*, summarize its current distribution, and discuss regions that may be at risk of future invasion. Comparisons with *Varroa destructor*, the parasitic mite most strongly associated with honey bee colony losses worldwide, will highlight important differences in reproduction, host interactions, and disease transmission. In particular, the mechanisms by which *T. mercedesae* damages honey bee colonies and its potential reproduction rate will be addressed. As the geographic range of *T. mercedesae* continues to expand, concerns regarding its potential introduction into additional regions, including North America, are increasing. Continued research, surveillance, and education will be critical for assessing risk, improving preparedness, and supporting early detection and response efforts should this mite be introduced.

Rogan Tokach¹, Katie Lee²

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Managing *Varroa*: Evaluating treatments from California almonds through North Dakota honey production

Varroa destructor mites continue to be the primary driver of colony loss for commercial beekeepers. Exacerbating this issue is continued increases in amitraz resistance, one of the most

commonly applied miticides, leading to reduced amitraz treatment effectiveness and the need for new, full-year *Varroa* treatment management strategies that incorporate various modes of action. Our research followed a commercial beekeeper's colonies from almonds in California through honey production in North Dakota determining various treatment's impacts on *Varroa* infestation and honey production. In this study, we compared the effectiveness of Norroa[®], VarroSan[®], and Apivar 2.0[®] where colonies were treated in January and again in May primarily to determine if Norroa[®] could successfully keep *Varroa* infestations low throughout the entire year while also determining if Norroa[®] remained effective in colonies split after a Norroa[®] application. Results indicated that Norroa[®] was effective at limiting *Varroa* infestation from January to May, and colonies in the other treatment groups had to receive an additional treatment of FormicPro[®] due to high *Varroa* infestation in May which led to some queen loss. However, it was also determined that the second Norroa[®] treatment was insufficient for *Varroa* control throughout the honey production season, and *Varroa* infestation rates increased through August. Overall, this research provides important insights into when various treatments can be effective in the commercial beekeeping season, and it further informs of potential alternatives to amitraz within commercial operations.

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Tracking the movement of flea beetles across the Canadian Prairies

Crucifer (*Phyllotreta cruciferae*) flea beetles are chronic pests of canola across the Canadian Prairies. Their movement among canola fields and surrounding non-crop habitats has important implications for pest management and the potential spread of insecticide resistance. This study used population genomics to examine flea beetle connectivity across the Prairies and at finer spatial scales. Flea beetles were collected from 29 locations across Alberta, Saskatchewan, and Manitoba, with additional fine-scale sampling in Alberta that included focal canola fields, adjacent non-crop hosts, and canola fields approximately 5 and 10 km away. Prairie-wide analyses showed generally weak genetic differentiation among *P. cruciferae* populations, indicating extensive connectivity, although genetic differentiation increased with geographic distance. At the fine scale, little genetic differentiation was detected among beetles from focal fields, adjacent non-crop hosts, and canola fields approximately 5 km away, whereas weak differentiation became more detectable at 10 km. These results demonstrate substantial connectivity among *P. cruciferae* populations and suggest that beetles occupying non-crop hosts and adjacent canola fields broadly form part of a single connected population.

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Resource availability and physiological demand shape resilience in the house cricket *Acheta domesticus*

Rising temperatures threaten insects by increasing energy demand while simultaneously altering available resources. Thermal biology and nutritional ecology are both well established in insect research, yet they are rarely integrated within a common mechanistic framework, and nutrition remains largely overlooked when modelling insect responses to climate change. We tested

whether impaired thermal performance in a model insect emerges from imbalance in energy acquisition and physiological demand, and whether behavioural and digestive compensation for a poor diet can underlie climate resilience. Using the house cricket, *Acheta domesticus*, we quantified growth, development, food intake, assimilation, metabolic rate, survival, and thermal tolerance across short- and long-term temperature exposures. We first manipulated dietary protein-to-carbohydrate ratio and found that temperature strongly shaped performance, regardless of diet. Growth was better explained by total energy consumed than by protein intake. We then reduced dietary nutrient density to 25% while providing food *ad libitum*. Contrary to resource-limitation model predictions, crickets maintained ~70% of the energy acquisition observed on the undiluted diet and buffered against performance declines by increasing both consumption and apparent nutrient assimilation. Having tested compensation for reduced energy supply, we now test the complementary prediction that increased physiological demand constrains performance and compensation, using paraquat as a dietary pro-oxidant. Together, these experiments show that diet quality does not directly determine thermal performance, and that thermal performance depends on both effective acquisition and the physiological costs competing for that energy. Compensatory capacity represents a key, but often overlooked, determinant of insect resilience to environmental change.

Byron N. Van Nest

Department of Biological Sciences, University of Manitoba

From dogma to data: Rethinking honey bee behaviour

Honey bee (*Apis mellifera*) behaviour is among the most intensively studied areas of insect biology, yet some of its most familiar ideas have become so deeply embedded in the literature that their empirical foundations are rarely revisited. In this talk, I examine how several long-standing assumptions about honey bee behaviour hold up when they are subjected to new observations, experiments, and quantitative analyses. Drawing on examples from foraging, spatial organization within the hive, and waggle-dance communication, I show how seemingly settled descriptions can obscure substantial behavioural flexibility, temporal structure, or mechanisms that remain poorly understood. In some cases, the conventional view is largely supported but requires greater precision; in others, new data suggest that familiar interpretations should be reconsidered. These examples illustrate a broader problem in behavioural biology: useful generalizations can gradually become treated as established facts, even when the evidence supporting them is limited or indirect. Progress therefore depends not only on collecting new data, but also on periodically returning to old questions with new tools and asking whether what we “know” is actually what the evidence shows.

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Integrated pest management of *Delia* spp. root maggots in Saskatchewan

Growing marketable brassica root (e.g., radish, turnip, rutabaga) and leafy vegetable crops (e.g., broccoli, cabbage) can be particularly difficult where *Delia* spp. root maggots are present in Canada. Successful production was made more challenging in 2023, when the registration chlorpyrifos in Canada ended. From 2022–2025, we conducted field plot trials at Outlook, Saskatchewan to determine if different combinations of pest management tactics for *Delia* spp. could be implemented to replace chlorpyrifos. Tactics included intercropping brassica vegetables with wheat, use of an alternative insecticide product (cyantraniliprole), and planting different commercial varieties of rutabaga. Broccoli seedlings treated with cyantraniliprole before transplanting were protected from *Delia* spp. and other pests (i.e., flea beetles) during seedling establishment and early season growth. A promising finding was that well-established plants yields despite some damage to their roots. In contrast, significant damage to rutabaga tubers was observed in all experimental treatments (alone and in combination), illustrating the need for novel insecticide active ingredients, that can be applied at multiple times in the growing season, to prevent *Delia* spp. damage to rutabaga plantings.

Maren Vickers¹, Isabela Bernsdorf¹, Claudia Garcia-Figueroa², Olav Rueppell²

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Investigating three pad materials with oxalic acid and glycerin for *Varroa* mite control

Varroa mites are honey bee ectoparasites that threaten colony health and survival directly through feeding and indirectly through virus transmission. Because new varroacides options are continually needed to combat these challenges, Canada has approved both commercial and homemade treatments utilizing oxalic acid saturated in glycerin (OA/Gly) slow-release strips for beekeeping use. However, this application method has not been tested under commercial conditions in Albea's unique climate. This study assessed the performance of one commercial product and two homemade OA/Gly strips made with different materials on *Varroa* and virus levels, across four beekeeping operations in Alberta. Oxalic acid residue in honey and on the pads were also quantified. Results suggest that treatment efficiency varied by beekeeping operation, while *Varroa*-related virus levels were not immediately impacted by any treatment. Chemical residue levels in honey were not elevated despite treatment use during the honey flow, suggesting this method is a viable summer management option. While our current results call for operation-specific *Varroa* management plans (precision apiculture), further research is necessary to investigate which factors affected the operational differences in our treatments' efficacy.

Elva Vidya, Benjamin Matthews

University of British Columbia, Zoology Department

Investigating the role of microRNAs on behavioural shifts in *Aedes aegypti* mosquitoes

Female *Aedes aegypti* mosquitoes undergo precisely timed behavioural transitions across their reproductive cycle. They actively seek humans for a blood meal, then strongly suppress host-seeking while searching for water to lay eggs, after which their host-seeking drive is regained. Previous studies have shown that blood-feeding triggers gene expression changes in mosquito brains, but the origin of these changes and their impact on behaviour remain unclear. In other animals, including *Drosophila*, microRNAs (miRNAs) regulate behavioural transitions by silencing

specific messenger RNA (mRNA) targets. In *A. aegypti*, a few miRNAs have been shown to influence aspects of the reproductive cycle, such as blood digestion and egg production. However, their potential roles in behavioural control, particularly in the brain where sensory information is integrated, has not been systematically characterized. Here, we are testing the hypothesis that miRNAs coordinate behavioural state transitions in *A. aegypti* brains. Currently, I am profiling brain miRNAs and mRNAs across the blood-feeding cycle to identify candidate regulatory interactions. I am also developing a genetic system to assess how neuronal depletion of the miRNA pathway affects host-seeking, water-seeking, and egg-laying behaviours. These behaviours will be measured using assays that measure attraction to human odour and humidity cues, blood feeding success, egg production, and egg-laying site selection. By integrating transcriptome profiling with genetic perturbations, this work could uncover posttranscriptional regulatory programs that orchestrate behavioural switching in mosquitoes.

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Late to the party: Predator peaks lag behind alfalfa weevil

Alfalfa (*Medicago sativa* L.) seed production in the Canadian Prairies faces persistent pressure from the alfalfa weevil (*Hypera postica* Gyllenhal), a key defoliator whose larval feeding can substantially reduce yield. Historically, management has relied heavily on insecticides, increasing the risk of insecticide resistance and disrupting beneficial arthropod communities. To support this goal, we examined predator activity and seasonal dynamics of predators and *H. postica* in commercial alfalfa seed fields in southern Alberta and evaluated how insecticide use may influence predator–weevil interactions. Using sweep-net sampling across fifteen sites over three years, we characterized predator communities and evaluated how their temporal patterns relate to periods of weevil pressure. Early results reveal substantial spatial and temporal variability in predator activity, with a general tendency for predators to be active outside critical *H. postica* developmental windows. Insecticide applications temporarily reduced predator abundance and appeared to shift seasonal timing, though their broader effects on predator–weevil synchrony require further analysis. By improving our understanding of predator phenology and community structure, this work aims to inform integrated pest management strategies that effectively suppress *H. postica* while conserving beneficial arthropods in Prairie alfalfa seed production systems.

Maarten J. Voordouw

Department of Veterinary Microbiology, Western College of Veterinary Medicine, University of Saskatchewan

The ecology of ticks that transmit Lyme disease – a tale of mast, mice, and time lags

Ticks are blood-sucking arthropods that have a negative impact on human and animal health via the transmission of tick-borne diseases. To predict the risk of tick-borne disease, it is critical to understand the ecological factors that determine the abundance of ticks. In Europe, the sheep tick

(*Ixodes ricinus*) transmits several important diseases including Lyme borreliosis. We analyzed the results of a long-term study to determine the abiotic and biotic factors driving the annual abundance of *I. ricinus* at a location in Switzerland where Lyme borreliosis is endemic. We found that masting by beech trees was a critical predictor of the density of nymphal ticks with a time lag of 2 years. Our study shows the importance of doing long-term field studies to identify the ecological factors that determine the abundance of medically important arthropods, and hence the risk of vector-borne disease.

James Watson, Jason Gibbs

Department of Entomology, University of Manitoba

Impact of bison grazing on wild bee abundance and diversity in Manitoba

The American bison, *Bison bison* (L.) was once the most abundant large herbivore in North America and played a vital role in maintaining the prairie ecosystem by modulating plant communities. There is a general lack of understanding on how bison activity may have broad-reaching ecosystem impacts, especially amongst insects. Wild bees' (Hymenoptera: Anthophila) rich species diversity and interdependence with floral communities makes them an ideal model for studying the impact of bison introduction on prairie ecosystems. In this study, we collected wild bees using elevated pan traps and active netting on a private bison conservation ranch spanning 100 000 acres in South-Western Manitoba. Bees were collected from ungrazed grasslands and pastures that had a range of bison-grazing histories and had been fenced off at different points over a 15-year period. By comparing bee communities across and between different amounts of bison exposure we aim to quantify change in bee communities over time. We additionally aim to compare functional diversity between and amongst different pastures and ungrazed areas. Results from this study will further our understanding of the ecological ties linking pollinator communities and large herbivores, especially in light of widespread bee population declines driven in part by habitat loss and degradation.

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Turn up the heat: Management of the alfalfa leafcutter bee parasitoid *Pteromalus apum*

The parasitoid *Pteromalus apum* is a primary threat to alfalfa leafcutter bees (*Megachile rotundata* (Fabricius)), which are key pollinators for alfalfa seed and hybrid canola production in Canada. The deregistration of dichlorvos products in Canada is putting pressure on producers to find alternatives for *P. apum* control. Utilizing differences between the diapause and development of pollinator and parasitoid, we tested three temperatures (20, 25, 30 °C) and durations (3, 6, 8 days) during the fall on the development and survival of both organisms. A subset of cocoons were dissected after incubation, all other cocoons kept at 6 °C for three months then reared. At all temperatures and durations, except for 20 °C for 3 days, a portion of *P. apum* developed and survival was reduced. Temperature pulses reduced *P. apum* emergence by up to 62% compared to cold-storage controls. These incubations had limited to no impact on *M. rotundata* emergence,

suggesting this may be a promising management practice. Future work will explore parasitoid diapause and scaling of temperature manipulations.

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Factors influencing oviposition and larval performance of wheat midge

The wheat midge, *Sitodiplosis mosellana* (Géhin) (Diptera: Cecidomyiidae), is a serious pest of wheat-growing regions in Canada and across the Northern Hemisphere. Abiotic and biotic factors could directly or indirectly influence wheat midge oviposition and larval performance. We examined the effects of abiotic (short-term flooding and drought) and biotic (oviposition on egg- and larvae-occupied plants) factors on oviposition and larval performance of wheat midge. Due to changes in weather patterns, wheat growers have been facing increasing challenges from extreme drought and flooding. Plants exposed to drought treatment had fewer eggs, resulting in smaller larvae with a lower survival rate. Wheat midge females preferred to lay eggs on flooded plants and had a higher larval survival rate. The presence of eggs and larvae in wheat plants could induce plant defences, thereby deterring oviposition by wheat midge females. However, we found that wheat midge females could not distinguish between plants with eggs and larvae and those without. Wheat midge adults are short-lived insects, and there is limited information on how adult nutrition could influence wheat midge longevity. Wheat midge adults had nearly double their lifespan when fed sugar, honey, or a mix of honey and sugar solutions compared to the water treatment. Altogether, these results indicate that various abiotic and biotic factors could differentially influence wheat midge behaviour.

Yashoda Wickramasinghe¹, Jessica Webb², Marina C. Bezerra da Silva¹, Julia Tregobov¹, Maria Jenser¹, Serhii Kondratiuk¹, Oleksii Obshta¹, Alvaro De la Mora¹, Bree Bilton¹, Belarmino Lopes Neto¹, Berenice Romero¹, Vladyslav Katrui¹, Juan Arias Marmolejo¹, Ryan Merkel¹, Igor Moshynsky¹, Elemir Simko¹, Midhun S. Jose¹, Sarah C. Wood¹

¹Department of Veterinary Pathology, Western college of Veterinary Medicine, University of Saskatchewan, ²Department of Entomology, Cornell University

Evaluating the coinfection dynamics of atypical and typical *Melissococcus plutonius* strains in honey bee larvae and adults

European foulbrood (EFB) is an economically important, unpredictable and stress-associated brood disease of honey bees (*Apis mellifera*) caused by *Melissococcus plutonius*. Two major strain types, highly virulent atypical and fastidious typical strain, are commonly associated with EFB diseased colonies. However, their interactions are poorly understood. This study investigated whether atypical and typical strains compete during larval co-infection and assessed their abilities to colonize, persist and survive through host development. Honey bee larvae were reared in vitro and inoculated on the day of grafting (D0) with 50 colony forming units (CFUs) of either strain alone or both combined. Survival, larval health, bacterial load, and strain dominance were evaluated using culture-based methods and quantitative PCR. Preliminary results showed significantly higher

survival in larvae infected with the typical strain (75%) than with the atypical strain (21.2%) or co-infection (27.2%). During co-infection, the atypical strain dominated early stages (3.7×10^7 vs 7.4×10^4 CFU/larvae), whereas the typical strain predominated in emerging adults (3.8×10^7 vs 6.3×10^3 CFU/bee). These findings provide new insights into EFB strain interactions and help explain variation in disease severity and persistence.

Tyler Wist

Agriculture and Agri-Food Canada, Saskatoon Research and Development Centre

Wheat the heck!? Aster leafhopper, *Macrostelus quadrilineatus*, (Cicadellidae) vectored aster yellows disease in wheat?

Aster yellows is a recognized disease in canola and other broadleaf crops and insecticides to control its leafhopper vector, *Macrostelus quadrilineatus*, are only registered for use in canola. Several outbreaks of this migratory leafhopper, however, suggest that aster yellows disease might be a prevalent but vastly unreported disease of wheat in Canada.

Amelia Woolaver, G. Christopher Cutler

Dalhousie University

Quit bugging me: Indigenous pest management practices in agriculture

The presentation summarises a review of insect pest management practices employed by Indigenous farmers across the globe, using documented techniques from 24 countries. The practices discussed include plant-derived, animal-derived, and physical or cultural controls, with variation in method depending on culture, region of the world, target pest, and impacted crop. The benefits and challenges of using these methods as opposed to conventional insecticides are explained. Common themes of Indigenous agriculture are discussed, such as use of local resources and emphasis on environmental stewardship. The potential for Indigenous methods to be used in integrated pest management programs is suggested, as is the importance of respecting the perspectives and cultural histories of Indigenous communities.

Sydney Wynn-Williams¹, Shayla Woodland¹, Ashly Dyck², Alejandro C. Costamagna¹

¹Department of Entomology, University of Manitoba, ²Department of Soil Science. University of Saskatchewan

Natural enemy responses to perennialization in prairie agroecosystems

Annual monocultures are the dominant cropping system in the Canadian prairies. Annual cropping systems reduce the diversity and abundance of natural enemies on the field. Perennialization and crop diversification methods, such as intercropping and under-seeding, can counteract some of the negative effects of annual crops and increase natural enemy populations. Generalist and specialist natural enemies both play important roles in biological control but are affected differently by perennialization and crop diversification. Perennialization may affect generalists more than specialists by providing more consistent prey availability and decreasing field disturbances. Understanding how these communities are differently affected by field management strategies could provide insight on how to increase effectiveness of biological control methods. We sampled 21 fields in 2025. Fields sites were located across Manitoba and Saskatchewan and were

sorted into categories of annual, intermediate and perennial crops. We used active (sweep nets) and passive (pitfalls, sticky cards, and sentinel prey) sampling on the border, 25 and 50 metres into the field to assess populations of generalist and specialist arthropods. Effect of perennialization on spiders, carabids, parasitoids and lady beetles will be discussed.

ABSTRACTS OF POSTERS

Abstracts are ordered alphabetically by family name (underlined) of the presenting author.

Poster 1 (President's Prize Competition)

Lilja Anderson¹, Katie Lee²

¹University of Manitoba, ²University of Minnesota Twin Cities

Effects of a synthetic queen mandibular pheromone on emergency queen rearing in the honey bee (*Apis mellifera*)

This study aimed to investigate the effectiveness of an artificial queen pheromone in honey bee (*Apis mellifera*) colonies that lack a queen to ensure that beekeepers are not using a product that is an unnecessary expense. Honey bee queens signal their presence in a colony via a specialized chemical signal known as Queen Mandibular Pheromone (QMP). In the absence of this signal, honey bee workers will initiate emergency queen rearing, in which they raise a large number of queen cells to increase the chance that one will be viable. This process can take a month before a new queen begins laying eggs, which can inhibit pollination services and honey production. To avoid this, Beekeepers may use an artificially synthesized QMP, a product called "TempQueen," as a false signal of queen presence. However, there is no data supporting the claims TempQueen advertises. This study demonstrates that TempQueen does not stop a colony from raising queen cells in the claimed product exposure time of three weeks due to a lack of other queen-presence signals. Queenless colonies provided with TempQueen did raise queen cells, however, TempQueen did significantly lower the number of queen cells a queenless colony built. The results of this study indicate that queens have an additional signal that indicates her presence to worker bees that is not yet discovered or understood. Furthering knowledge of honey bee queens and their essential role in colony regulation may help in decreasing the drastic colony loss American beekeepers are experiencing.

Poster 9 (President's Prize Competition)

Ahmed Ben Hassine^{1,2,3,4,5}, Nicolas Plante^{1,2,3,4,5}, Abraão Almeida Santos^{1,2,3,4,5}, Valérie Fournier^{1,2,3,4,5}, Edel Pérez-López^{1,2,3,4,5}

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Understanding and evaluating strategies for controlling leafhoppers using both synthetic insecticides and biopesticides.

The potato leafhopper (PLH), *Empoasca fabae* (Harris) (Hemiptera: Cicadellidae), is a migratory pest of vegetable and small fruit crops in North America. Management relies heavily on synthetic insecticides, raising concerns about resistance development. Despite extensive research on resistance in other leafhopper and planthopper species, little is known about PLH susceptibility and insecticide resistance. This study aims to characterize insecticide susceptibility in Québec populations, examine the evolution and molecular basis of resistance, and evaluate biological alternatives for sustainable management. Commercial entomopathogenic fungi were evaluated

against PLH adults using the IRAC leaf-dip bioassay. After 168 h, LALGUARD M52 OD (*Metarhizium brunneum*) caused the highest mortality (77.5%), followed by BIOCERES G EC (*Beauveria bassiana*; 67.5%) and BOTANIGARD ES (*Beauveria bassiana*; 60%). Baseline susceptibility of a laboratory reference colony was established for five insecticides, with LC₅₀ values of 0.102, 0.934, 2.118, 0.211, and 2.452 µg a.i./mL for thiamethoxam, imidacloprid, acetamiprid, lambda-cyhalothrin, and malathion, respectively. These results provide a baseline for evaluating resistance in Québec PLH populations and support sustainable integrated pest management.

Poster 3 (President's Prize Competition)

Sam Bennett¹, Amanda Martin^{1,2}, Lenore Fahrig¹

¹Carleton University, ²Environment and Climate Change Canada.

How does organic farming and the landscape context impact pollination services for soybean?

Previous research suggests that pollinator populations are larger around organic fields. Landscapes with more semi-natural habitat and smaller field sizes have also been shown to support larger pollinator populations. However, the benefits of larger pollinator populations for crop yield are often assumed rather than demonstrated. As a first step to address this knowledge gap, we examined the frequency of insect visits to potted soybean plants placed beside organic and conventional soybean fields in landscapes that varied in the amount of semi-natural habitat and crop field sizes. As expected, we found insects were more likely to visit soybean plants, and there were more total visits in landscapes with more semi-natural habitat. Surprisingly, the probability of insect visits was higher at conventional than organic sites, and in landscapes with larger field sizes. Future analysis of plant yields will provide more information on how observed and unseen visits may affect soybean yields. However, our initial findings suggest that pollination services may be higher in large conventional fields adjacent to extensive seminatural habitat.

Poster 10

Renee Prasad¹, Terisha Bailey², Suzanne Blatt³, Wim van Herk²

¹University of the Fraser Valley, Chilliwack, ²Agriculture and Agri-Food Canada, Agassiz,

³Agriculture and Agri-Food Canada, Kentville

Strategies to improve pesticide efficacy for *Delia radicum* L. control in Brassicas

Cabbage root maggot (*Delia radicum*) is key pest of brassica vegetable production. For head and stem brassicas (broccoli, cauliflower, cabbage) transplanted crops are vulnerable until roots are well established (approximately 3 to 6-weeks post transplant). Trials studied two separate strategies to enhance insecticide efficacy to protect transplants: modification of substrate and application timing. Substrate trials were conducted in BC (2023–2026) and NS (2026) using 3 blends of perlite, media peat and coir on napa cabbage and broccoli and Cimegra®, Verimark® and Plinazolin®. Assessment of damage at harvest showed substrate to influence plant growth and severity of *D. radicum* damage. Application timing trials evaluated at transplant tray drench and post-transplant drench over 2-years using Verimark®. Results indicate that applications to transplant trays provided better protection against cabbage root maggot than at plant drenches.

Poster 12

Sébastien Boquel¹, Marie D'Ottavio², Jennifer De Almeida¹, Alexis Latraverse¹, Geneviève Labrie³, Eric Lucas²

¹Centre de recherche sur les grains (CÉROM) Inc., ²Université du Québec à Montréal, ³CETAB+

Cabbage seedpod weevil in Quebec: Parasitism rate and action thresholds for sustainable management

The cabbage seedpod weevil (*Ceutorhynchus obstrictus*; CSW) has been present in Quebec canola fields since 2000. From 2012 to 2020, a study was conducted to document its population dynamics, associated damage, and parasitism by natural enemies. CSW was detected at 82% of 235 monitored sites, but damage exceeded the economic threshold at only three sites in 2019. Parasitoids were present in 62% of surveyed fields. Most parasitoids (95.7%) belonged to the family Pteromalidae, with nearly 80% identified as *Trichomalus perfectus*. The average parasitism rate of CSW larvae was 43.1%, including 26.1% attributable to *T. perfectus*. Parasitoid presence reduced seed damage within infested pods by nearly half, highlighting their important role in biological control. CSW captures at the bud and flowering stages showed a strong linear relationship, indicating that bud-stage sampling can effectively predict whether the action threshold is likely to be exceeded later in the season. These results support revising Quebec's decision thresholds while conserving natural enemies and promoting integrated CSW management.

Poster 22 (President's Prize Competition)

Jacqueline Bowles, Jason Gibbs, Kateryn Rochon

Department of Entomology, University of Manitoba

Dung beetle and canopy response to grazing by bison on a ranch near Pine River, Manitoba

Dung beetles play an essential role in large mammal grazing systems, cycling nutrients and preventing dung buildup. Bison rewilding has been part of efforts to restore North American prairie ecosystems, however the impacts of bison reintroduction on dung beetles remains understudied. On a bison ranch near Piner River, Manitoba, it has been hypothesized that years of bison grazing have begun to suppress the encroachment of aspen trees into grasslands. This study aimed to evaluate canopy openness and populations of dung beetles across three grazing treatments on the Pine River ranch: > 10 years under bison grazing, < 7 years under bison grazing, and no recent bison grazing. Bison dung pats were placed in pastures of each of these three treatments, in forests, along forest margins, and in open grasslands. The pats were collected after three days, and the beetles within were extracted. Initial count and diversity data will be presented for dung beetles collected along forest margins, and compared with initial canopy openness data taken from each pasture.

Poster 6 (President's Prize Competition)

Ophelia K. Carter¹, N. Kirk Hillier¹, Nicoletta Faraone²

¹Department of Biology, Acadia University, ²Department of Chemistry, Acadia University

Optimizing electrophysiological recording techniques for chemosensory responses of ixodid ticks to volatile organic compounds

Tick-borne diseases are rapidly increasing in incidence across North America, posing growing threats to patient quality of life and imposing substantial economic burdens on both hospitals and veterinary practices. Tick chemosensation is an often-overlooked avenue for understanding the increasing incidence of tick bites and tick-borne disease throughout North America. Prior studies demonstrate that ticks detect chemical cues primarily through the Haller's organ, a specialized sensory structure on the first foreleg. Characterizing the chemosensory responses of this organ is important for understanding host-seeking behaviour and informing the development and curation of effective repellents. Tick olfaction is fundamentally different from the well-documented olfactory systems of insects, including the absence of antennae and comparatively fewer olfactory sensilla. This study evaluates and refines methodologies for recording tick chemosensory responses to various behaviourally-relevant compounds (i.e. attractants, repellents, and host volatiles) while minimizing artefacts. The chemosensory structures of two medically and veterinary-important North American tick species, *Dermacentor variabilis* and *Ixodes scapularis*, were examined using ETG and gas chromatography-linked ETG (GC-ETG) using different configurations, mounts, and stimuli. Single-sensillum recording (SSR) was also used comparatively to characterize responses at the individual sensory sensilla level. Comparing and optimizing methodologies for tick electrophysiological recording will enable new opportunities to investigate mechanisms for detection, mode of action, and novel repellent development, and support fundamental advances in our understanding of chemosensation in ticks and other acarines.

Poster 16

Lauren Des Marteaux¹, Andrew Frewin², Catherine Kadar¹

¹Agriculture and Agri-Food Canada, ²University of Guelph

New open-source software to rapidly quantify leaf area and insect feeding damage from standardized images

Accurately measuring leaf area and foliar damage is important for quantifying the impact of crop pests. However, leaf shapes can be complex, and conventional visual assessments for plant herbivory (e.g. damage severity rankings) are often subjective and labour-intensive, particularly when damage must be measured across large numbers of leaves. We have drastically improved the accuracy and throughput of these leaf measurements using a standardized imaging method and Python-based computer vision pipeline. The function of this approach is demonstrated (and developed) using cereal leaf beetle (*Oulema melanopus*), which chew characteristic strips in winter wheat leaf tissue. First, wheat leaves are photographed on an illuminated lightboard with scale bar and orientation guides, and the images are then labeled, cropped, and edited to maximize contrast. All images can then be batch-processed with the software pipeline; and OpenCV-based workflow that rectifies image orientation, identifies the leaf, measures total leaf area, detects and measures feeding-damaged tissue (as well as senesced leaf areas), and calculates the proportion of leaf area damaged. A training dataset of ~200 unique images was used to assess the accuracy of the software relative to manual measurements of leaf and damage area using ImageJ. The software was able to quantify thousands of images within minutes, at an accuracy of >95%. We are now working on a user interface component for the software to improve ease of use and parameter customization.

Poster 4 (President's Prize Competition)

Madeleine Dupuis, Kateryn Rochon

Department of Entomology, University of Manitoba

Mites behind bars: Meta-analysis comparing poultry red mite (Mesostigmata: Dermanyssidae: *Dermanyssus gallinae*) abundance in cage-free and caged laying-hen (Galliformes: Phasianidae: *Gallus gallus domesticus*) housing systems

Egg Farmers of Canada pledged to eliminate conventional cage housing by 2036 in favour of enriched cages or alternative cage-free systems. Poultry red mite (PRM) (*Dermanyssus gallinae*) is a pest of egg production thought to be more severe when hens are housed in cage-free settings. This hypothesis was tested through a meta-analysis comparing PRM abundance between cage-free and cage housing, with the measure of effect as natural log-transformed response ratio. Systematic searches yielded 1298 unique results. Screening identified 15 studies eligible for inclusion in the meta-analysis. There was no difference in PRM abundance between treatments (random-effects meta-analysis: $n=15$, $\ln RR = -0.248$, $p=0.638$, 95% C.I. = -1.278 to 0.783). Heterogeneity between studies was 48.08 ($H^2 = 48.08$) times more than expected from sampling error, suggesting studies differed substantially in other management factors (ex. biosecurity, manure management, hygiene). Some studies reported severe infestations when flocks were housed in conventional cages. Adopters of cage-free housing are not at increased risk of losses from PRM when compared to farms with cage housing.

Poster 15

Sara Edwards, Rob Johns, Jon Sweeney, and Emily Owens

Canadian Forest Service, Atlantic Forestry Centre, Natural Resources Canada

Monitoring and management of beech leaf-mining weevil in its invasive range

The beech leaf-mining weevil, *Orchestes fagi* L. (Coleoptera: Curculionidae), first detected in Nova Scotia in 2011, has expanded its range and caused extensive damage to American beech (*Fagus grandifolia*). Outbreaks of this invasive pest result in severe leaf necrosis and can lead to tree mortality. Field studies in 2014 and 2016 established pest density-leaf damage relationships, showing that adult feeding and early mine initiation were strongly associated with end-of-season leaf necrosis, explaining approximately 70–80% of its variation. These results suggest that leaf necrosis may be linked to damage caused by adults or by mine initiation rather than larval mine expansion and gallery development. Successful management of this pest will therefore require tactics that target adult populations. These findings provide essential tools for monitoring and guiding the development of integrated pest management strategies for *O. fagi* in its invasive North American range.

Poster 25

Daniel J. Erasmus, Victoria Balson

Department of Chemistry and Biochemistry, University of Northern British Columbia

Biodiversity of Ephemeroptera, Plecoptera, and Trichoptera in the Bowron River, BC

Three major aquatic taxa Ephemeroptera, Plecoptera, and Trichoptera (EPTs) are in sharp decline in abundance and diversity world-wide. The Bowron River (northern British Columbia) connects the

Bowron Lakes with the Fraser River. This study aims to determine the biodiversity of the EPTs by capturing larval and adult specimens over a two-year period (2025–2026) using kick netting and Malaise traps. In 2025, kick netting produced 793 individual EPT specimens (573 Ephemeroptera, 144 Plecoptera, and 76 Trichoptera). DNA barcoding of larvae revealed a total of 42 EPT species: 17 Ephemeroptera, 11 Plecoptera, and 14 Trichoptera. Rarefaction curve analysis revealed that most Ephemeroptera species were captured in year 2025, but additional sampling is required for Plecoptera and Trichoptera species. The 2026 sampling season will continue to collect the EPTs by kick netting and Malaise trapping, followed by DNA barcoding of larvae and adults for species identification.

Poster 14 (President's Prize Competition)

Anita Feng¹, Neil K. Hillier¹, Martin Williams², Lucas Roscoe², Jeff Fidgen²

¹Acadia University, ²Natural Resources Canada – Canadian Forest Service

Exploring silver flies (*Leucotaraxis argenticollis*, *Leucotaraxis piniperda*) as biocontrol agents of hemlock woolly adelgid in Nova Scotia

Adelges tsugae (Hemlock woolly adelgid) is an invasive pest species introduced to Eastern North America from Japan, first documented in Nova Scotia in 2017. *Tsuga canadensis* (Eastern Hemlock) is a foundation species in Eastern North America experiencing significant mortality due to HWA invasion. Two species of silver flies (*Leucotaraxis argenticollis* and *Le. piniperda*) feed on hemlock woolly adelgid in British Columbia (BC). There are eastern biotypes of both species in eastern North America, where they attack the pine bark adelgid, *Pineus strobi* (PBA). To expand the knowledge in silver fly ecology and development, this study investigated oviposition preference of western biotype (BC) *Le. argenticollis* and *Le. piniperda* silver flies. A key objective was to understand the difference in innate prey preference by eastern and western biotypes for HWA versus PBA as a baseline for monitoring potential non-target impacts over time. We have conducted oviposition choice assays and observed that BC *Le. piniperda* have some preference to oviposit on PBA over HWA whereas BC *Le. argenticollis* has no preference between HWA and PBA under laboratory conditions. Additionally, we are developing an eDNA method to track the native Nova Scotia population of silver flies. Field samples of adelgid infested pine branches have been collected and filtered for testing the designed qPCR primer. The result of the eDNA sample will provide knowledge on the phenology and host preference of the native silver flies in the field, and the method may be useful for post-release monitoring of silver flies in the future.

Poster 27

Yanchen Gao¹, John Gavloski², Xiaoyan Yang¹, Vincent Hervet^{1,3}, Tyler Wist⁴, Kyle Bobiwash¹, Kateryn Rochon¹, David Lobb⁵, Dilshan Benaragama⁶, Yang Liu^{1,7}, Hailong He^{5,8}

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College of Natural Resources and Environment, State Key Laboratory of Soil and Water Conservation and Desertification Control, Northwest A&F University

Movement, phenology and life-history strategies shape agricultural pest risk under climate change

Climate warming can alter agricultural pest risk through changes in dispersal, seasonal timing and life-history composition, rather than habitat suitability alone. We integrated species distribution models, wind-assisted connectivity, degree-day phenology, overwintering strategies, population genomic evidence and crop exposure across three complementary pest systems: diamondback moth, Brassica flea beetles and six North American cutworm species. Diamondback moth migration corridors extended poleward under future climates, increasing connectivity with high-latitude production regions. In North America, corridors traversing both source and sink regions increased from 25% under current conditions to 52% under SSP5-8.5 by the 2050s. Flea beetle emergence advanced faster than the frost-constrained Brassica seedling period, producing species- and region-specific changes in crop overlap. Under SSP5-8.5, overlap for *Phyllotreta striolata* increased from 4.4 to 5.6 days, while European overlap declined from 10.0 to 9.2 days. In cutworms, climatic support shifted from egg-overwintering residents, declining from 41% to 22%, toward migratory species, increasing from 24% to 42%. Management priority consequently moved toward the northern Great Plains and Canadian Prairies. These results show that future pest surveillance should combine migration connectivity, crop-stage synchrony and life-history composition to identify emerging agricultural risk.

Poster 24

Jordanne Jacques^{1,2,3}, Nicolas Plante^{1,2,3}, Alain Gareau⁴, Edel Pérez-Lopez^{1,2,3}

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Developing an illustrated identification guide to the leafhopper genera of Quebec

Leafhoppers (Hemiptera: Cicadellidae) are a diverse and abundant group of insects found in a wide range of ecosystems throughout Quebec. Although many species have little economic impact, others are important agricultural pests and some are known vectors of plant pathogens. Despite their importance, accurately identifying leafhoppers remains a challenge due to the group's high diversity and the limited availability of modern, illustrated identification resources. To help address this gap, we are developing a freely accessible, illustrated guide to the leafhopper genera known from the province. Designed for entomologists, agronomists, students, agricultural professionals, and producers, the guide aims to facilitate genus-level identification while serving as a reference for regional leafhopper diversity. Each genus will be illustrated using photographs of a representative species and accompanied by descriptions of key morphological characteristics, with emphasis on the most distinctive diagnostic features. The guide will also include a list of species associated with each genus, along with information on their host plants, typical habitats, and, when relevant, their role as vectors of plant diseases. By bringing together identification tools and ecological information in a single resource, this guide seeks to support research, monitoring,

and knowledge transfer related to leafhoppers and their impacts on agroecosystems. As an open-access and evolving project, it is intended to be continuously updated and expanded, with the long-term goal of becoming a comprehensive and up-to-date reference for leafhopper diversity in Québec.

Poster 18

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Evaluating hybridization between the native *Laricobius rubidus* and the introduced *Laricobius nigrinus* following biological control releases against hemlock woolly adelgid (*Adelges tsugae*) in eastern Canada

Laricobius nigrinus (Coleoptera: Derodontidae) has been released in Nova Scotia as a biological control agent for the hemlock woolly adelgid (*Adelges tsugae*; Hemiptera: Adelgidae), an invasive sap-feeding insect that threatens eastern hemlock (*Tsuga canadensis*) forests. In eastern Canada, *L. nigrinus* may hybridize with the native predator *Laricobius rubidus* (Coleoptera: Derodontidae), which is associated with pine bark adelgid (*Pineus strobi*; Hemiptera: Adelgidae). Hybridization could alleviate inbreeding depression and enhance population fitness; however, hybrids may exhibit altered prey preferences, potentially reducing the host specificity and biocontrol efficacy of *L. nigrinus*. Using genotyping-by-sequencing (GBS), we assessed hybridization between *L. nigrinus* and *L. rubidus*. Preliminary analyses demonstrated that GBS can reliably discriminate between the two congeners. Additional larval specimens were collected from multiple release sites across southwestern Nova Scotia to investigate larval phenology and evaluate the frequency of hybridization in the field. We present larval phenology across sampling sites and the proportion of hybrids detected and discuss the potential implications of hybridization for biological control programs. Understanding the extent and consequences of introgression between these species will help assess its potential influence on the long-term success of this biocontrol agent for managing hemlock woolly adelgid.

Poster 17

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Adaptive area-wide management for controlling spruce budworm outbreaks: Insights from an early intervention strategy case study

Spruce budworm (*Choristoneura fumiferana*) outbreaks are managed mainly through two insecticide-based strategies: the foliage protection strategy (FPS) and the early intervention

strategy (EIS). FPS suppresses defoliation and associated mortality in high-value stands, whereas EIS is an adaptive, area-wide approach aimed at suppressing low-density populations (aka hotspots) to limit outbreak rise and spread. We present results from a 10-year case study (2015–2024) evaluating EIS in New Brunswick alongside a contemporaneous FPS program in neighboring Quebec. EIS treatments suppressed population growth annually, reducing hotspots by 10–65% relative to surrounding untreated areas, and generally suppressed outbreak expansion. In contrast, FPS had a limited impact on population trends and the outbreak continued to grow and expand in the FPS management area. EIS required substantially less insecticide and fewer retreatments. Outcomes align with each strategy’s objectives, and our findings highlight EIS as a proactive, effective approach when applied under appropriate conditions.

Poster 23

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Diversity and assemblage structure of carabid beetles in beaver habitat

Many invertebrates are associated with mammals and have been collected in the nests and burrows they construct. The North American beaver (*Castor canadensis*) is a well-known ecosystem engineer, but comparatively little is known about the invertebrates that cohabitate beaver lodges. Lodges offer unique microhabitats that support a diverse assemblage of poorly-known beetles, including several species that are found nowhere else, such as *Platypatrobus lacustris* (Coleoptera: Carabidae) and *Platypsyllus castoris* (Coleoptera: Leiodidae). We sampled 17 lodges across three sites within the Boreal Plain and Prairie Ecozones using subterranean pitfall traps. These traps were designed to be buried into the outer wall of the lodge and were operated continuously from June to September in 2024. Lodges were characterized based on size, activity, and vegetation coverage. Our objectives were to 1) characterize the assemblage and diversity of beetles located on the beaver lodge and adjacent riparian habitats, 2) compare beetle assemblages on beaver lodges between different ecozones found in Saskatchewan, and 3) evaluate the sensitivity of beetle assemblages inhabiting beaver lodges to changes in local riparian habitat characteristics. Approximately 5100 beetle specimens were collected in our study. We are presenting our preliminary findings based on a subset of 1100 specimens belonging to the family Carabidae.

Poster 13

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Integrating steam treatment and biological control for management of cyclamen mite (*Phytonemus pallidus*) in greenhouse strawberry

Cyclamen mite (*Phytonemus pallidus*) is a challenging pest of strawberry due to its cryptic lifestyle and limited management options. This study evaluated the effectiveness of transplant steam

treatment and post-planting biological and chemical controls for suppressing cyclamen mites in greenhouse-grown strawberry. Strawberry transplants (cv. Albion) inoculated with cyclamen mites were assigned to steam or non-steam treatments and subsequently received predatory mites, *Amblyseius limonicus* or *Amblyseius cucumeris*, the miticide Avid® (abamectin), or no post-treatment control. Cyclamen mite abundance and visual damage ratings were assessed weekly for eight weeks, and plant biomass was measured at the end of the trial. Steam treatment resulted in near-complete suppression of mite populations. Post-treatment also affected mite abundance, with *A. cucumeris* providing the greatest suppression among non-steamed plants. Visual damage ratings increased with cyclamen mite abundance (Spearman's $\rho = 0.71$, $P < 0.001$), and median mite counts differed significantly among damage ratings (Kruskal-Wallis $\chi^2 = 251.3$, $P < 0.001$). Steam treatment increased strawberry biomass by approximately 22%, from 127 to 155 g plant⁻¹. These results demonstrate that steam treatment is the most effective tool for cyclamen mite management, but *A. cucumeris* is recommended when steam treatment is not an option.

Poster 26

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Functional morphology and kinematics across clicking beetles: a shared jumping mechanism achieved by diverse latching apparatus (Coleoptera: Elateroidea)

Latch-mediated spring actuation (LaMSA) enables rapid movement by storing muscular work as elastic energy before latch release. Clicking beetles of the superfamily Elateroidea use a specialised pro-mesothoracic latching apparatus, yet its variation across elateroid lineages remains poorly understood. We used micro-computed tomography, three-dimensional reconstruction, muscle measurements, and high-speed videography to examine representatives of Eucnemidae, Throscidae, and Sinopyrophoridae, and incorporated previously published anatomical data from Elateridae and Cerophytidae. Sampled representatives of the five recognised clicking lineages shared a broadly corresponding skeletal and muscular organisation, whereas the prosternal process, friction hold, prosternal rest of the mesoventrite, and mesoventral cavity differed markedly in geometry among taxa. Among the quantified clicking-related muscles, *M. pronoti quartus* (M4) consistently had the greatest relative volume and physiological cross-sectional area (PCSA) in all reconstructed specimens. High-speed recordings across all three sampled taxa showed a four-phase clicking sequence consistent with that described in Elateridae. The highest individual mean effective acceleration reached 9,071 ms⁻² in Eucnemidae and 2,737 ms⁻² in Throscidae, with take-off completed within sub-millisecond intervals, highlighting the rapid

power release characteristic of the clicking system. Together, these findings identify latching-interface geometry as a major dimension of structural variation within a broadly corresponding thoracic clicking system.

Poster 19

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Institute of Forestry and Conservation, John H. Daniels Faculty of Architecture, Landscape, and Design, University of Toronto

Patterns of parasitoid functional diversity and relative parasitism in a spruce budworm (*Choristoneura fumiferana*) community along Quebec's North Shore

Spruce budworm (*Choristoneura fumiferana*) outbreaks cause large-scale defoliation and mortality in fir and spruce forests, with important ecological and economic consequences. Outbreak dynamics are shaped by both bottom up (host) and top-down (parasitism) processes. The *enemies' hypothesis* predicts that more diverse forests will support more abundant and diverse natural-enemy communities, thereby increasing top-down control of budworm outbreaks. However, it remains unclear whether greater parasitoid diversity actually translates into higher parasitism rates. We investigated the relationship between parasitoid diversity and relative parasitism at three developmental stages during the early rising phase of the current outbreak in Quebec in 2014. Over 50,000 spruce budworm larvae and pupae collected from approximately 40 locations were reared, producing approximately 5,000 parasitoids identified to species. Using multivariate and spatial analyses, we characterize spatial and within-season variation in parasitoid community composition and test whether differences in diversity and composition were associated with variation in parasitism rates. By linking parasitoid community structure to realized parasitism, this study will clarify whether diverse natural-enemy communities translate into stronger top-down control of spruce budworm at landscape scales.

Poster 2

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Electric bees: Appetitive conditioning to electric field signals in honey bees

Despite its importance in honey bee life history, the forager recruitment mechanisms of the western honey bee (*Apis mellifera*) have not been fully described. Previous studies suggest that electric fields produced during the waggle dance may contribute to forager recruitment by providing nonvisual cues that may help recruits locate dancing foragers within the hive's dark environment. Current research provides evidence that foragers can detect and respond to these electric fields. Here, we investigate whether honey bees can discriminate between electric field signals of different frequencies. In addition, we investigate whether age influences bees' ability to learn an association with the previously recorded electric field frequency produced during the waggle dance. Both experiments use restrained bees testing a proboscis extension response classical conditioning paradigm.

Poster 20

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Small pest, big problem: Impact of hemlock woolly adelgid (Hemiptera: Adelgidae) infestations and neonicotinoid insecticide treatments on native insect biodiversity

Hemlock woolly adelgid (HWA, *Adelges tsugae* Annand) is an invasive insect pest attacking Eastern Hemlock (*Tsuga canadensis*) forests in Nova Scotia. Once infested with HWA, trees die within 7–10 years—posing a significant and immediate threat to hemlock forests and the species they support, as loss of hemlocks will result in major changes to forest ecosystems. Currently two neonicotinoid insecticides—imidacloprid and dinotefuran—are applied as basal bark sprays to manage HWA in Nova Scotia. Insecticide treatments show efficacy in controlling HWA but may pose a risk to non-target forest insect communities. To examine non-target effects, we trapped insects at 9 hemlock stand sites (6 insecticide-treated, 3 untreated controls) across Nova Scotia and collected environmental data from each stand. Our goal is to compare insect biodiversity and environmental metrics among treatments to determine how insecticide treatments, and forest change caused by HWA, are affecting insect communities. Results from this study will help to inform future decisions about management of HWA in Canada.

Poster 8

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Developing pheromone traps to manage riceworm (*Apamea apamiformis*) infestations in North American wild rice (*Zizania* spp.)

North American wild rice (*Zizania* spp.; NWR) is an annual aquatic grain that is native to eastern North America and has been a staple part of the diet and trade routes of Indigenous Peoples. Saskatchewan is the leading producer of organically grown wild rice, and it is a crucial part of the economy for northern First Nations and Métis Communities. The main insect pest for NWR is riceworm (*Apamea apamiformis*); the larval stage of a noctuid moth that feeds exclusively on wild rice grain. While riceworm infestations have been reported in eastern Canada since the 1950s, riceworms are relatively new to Saskatchewan. Within the last 2 years, riceworm infestations have become more aggressive with some harvesters reporting $\leq 95\%$ yield loss from grain damage. Additionally, this damage impacts natural reseeding causing further expense to harvesters who must manually reseed their lakes. Since wild rice is grown in lakes and rivers, methods for controlling the riceworm must be certified organic to protect the surrounding aquatic habitat. In 2025, a preliminary trial tested 4 pheromone blends and 2 plant volatile blends on 3 lakes in The Pas, Manitoba. This summer we have tested 2 pheromone and plant volatile trials (Experiment A with 7 blends and Experiment B with 9 blends) across 6 locations with 50 traps per location. Trials are ongoing to develop an effective pheromone trap that reduces the riceworm population with minimal bycatch.

Poster 7 (President's Prize Competition)

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Evaluation of synthetic plant semiochemicals for Colorado potato beetle (*Leptinotarsa decemlineata*) management

The Colorado potato beetle (CPB), *Leptinotarsa decemlineata* (Say) (Coleoptera: Chrysomelidae), is a major pest of solanaceous crops, with potato being its preferred host. Insecticides are the main CPB control tactic, but both the deregistration of insecticides and increasing insecticide resistance have limited control measures. Potato plant volatiles are known to attract CPBs, but a synthetic plant volatile lure has not yet been developed. Headspace volatile extracts of intact potato plants and of plants during and after feeding by CPB adults and larvae were analyzed by gas chromatographic-electroantennographic detection (GC-EAD), revealing 17 volatiles that elicit antennal responses from males and females. These volatiles were identified by GC-mass spectrometry, and synthetic volatiles were prepared for olfactometer bioassays, which are in progress. Ultimately, this work aims to identify an attractive semiochemical blend to use as a lure for mass-trapping CPBs in solanaceous crops, with the potential to reduce insecticide use and improve crop yield.

Poster 5

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Bioconversion of Canadian crop residues by black soldier fly (*Hermetia illucens*) for poultry feed: efficiency and contaminant safety

In Canada, mass-reared black soldier fly (BSF) *Hermetia illucens* L. (Diptera: Stratiomyidae) are used for the bioconversion of food waste into insect protein for livestock feed. Current regulations restrict feedstocks to food-grade, meat-excluded waste, yet crop residues accumulating at processing plants represent an abundant, underutilized alternative. Concerns remain over contaminants, such as pesticides, mycotoxins, and heavy metals, that can accumulate in BSF meal. This study evaluated substrate reduction, bioconversion efficiency, nutritional value and contaminant accumulation in BSF reared on selected crop residues to identify feedstock-fed BSF suitable for poultry feed. Crop residues tested were corn red dog (a milling by-product), soybean hulls, and edible bean pods/stems from a Southern Ontario processing plant, with Gainesville diet and buckwheat seed as controls. Feeding trials (4 replicates/treatment, 200 larvae/replicate) showed 100% larval survival to pre-pupae (day 11) across all treatments. Pre-pupal weights ranged from 163–198 mg, with buckwheat seed- and soybean hull-fed larvae having the highest total fat as triglyceride levels. Bioconversion efficiency ranged from 15–21% and substrate reduction from 49–56% for the crop residues. Lead (Pb) was lowest in BSF fed Gainesville diet, buckwheat, and soybean hulls; but Pb, arsenic (As), cadmium (Cd), and mercury (Hg) levels were below CFIA regulatory standards in all BSF sampled. These results indicate that soybean hulls, and potentially corn red dog and edible bean residues blended with buckwheat seed, are suitable BSF feedstocks that produce safe protein for poultry feed.

Poster 11

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Genomic insights into pea aphid biotypes and pyrethroid resistance across the Canadian Prairies

Pea aphid (*Acyrtosiphon pisum*) is an economically important pest of pulse crops in Western Canada, where concerns are increasing over reduced efficacy of pyrethroid insecticides. Pea aphid populations may also comprise genetically distinct, host-associated biotypes, but their genomic structure and relationship with insecticide resistance remain poorly understood across the Canadian Prairies. This study uses double-digest RAD sequencing (ddRAD-seq) to generate genome-wide SNP data from pea aphid populations collected across Alberta, Saskatchewan, and Manitoba. We aim to characterize host-associated population structure and geographic connectivity, assess genetic differentiation among populations with contrasting pyrethroid susceptibility, and determine whether aphid-resistant pulse varieties perform consistently across different biotypes. By integrating population genomics with resistance phenotypes and host associations, this research will provide a prairie-wide framework for understanding pea aphid diversity and movement, predicting the spread of insecticide resistance, and supporting more effective, biotype-informed integrated pest management strategies for Western Canadian pulse production.

Poster 21

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Effects of herbicide treatments after biomass harvesting on flying beetle diversity and assemblage structure

As global demand of renewable energy increases, the demand for forest biomass resources is also increasing, leading to an expansion of biomass harvesting. During biomass harvesting, herbicide treatments are commonly applied to remove understory vegetation and increase tree growth and productivity. Although such herbicide treatment may benefit productivity, their effects on biodiversity remain poorly understood. In this study, we evaluated how herbicide treatments in biomass harvesting affect flying beetle diversity and assemblage structure. The study was conducted in jack pine (*Pinus banksiana* Lamb.) stands at the Island Lake Biomass Harvest experimental site near Chapleau, Ontario, Canada, where four different intensities of biomass harvesting were applied: tree-length harvest, full-tree harvest, stump removal, and blading. After biomass harvesting, half of each treatment plot (70 m × 70 m) was sprayed with herbicide in 2011, 2014, and 2018, while the other half area was left untreated. Flying beetles were collected using window traps at two-week intervals from June to August 2026. A total of 80 traps were installed across the study sites. A total of 2,414 individuals representing 156 beetle species were collected. Abundance, species richness, exponential Shannon diversity, inverse Simpson index, and sample coverage-based iNEXT all showed no significant difference between herbicide and non-herbicide

area. Diversity indices also showed no herbicide effects among different intensities of biomass harvesting. Furthermore, both NMDS and PERMANOVA showed no significant difference in beetle assemblage structure between herbicide-treated and non-herbicide areas.