BeeCon 2026 Program

Centre for Bee Ecology, Evolution & Conservation

YORK UNIVERSITÉ UNIVERSITY

BeeCon

www.yorku.ca/bees/beecon-2026

BeeCon 2026 Program: Location, Schedule, Abstracts, and More

Welcome!
Welcome to #BeeCon 2026! BeeCon was originally the Southern Ontario Bee Researchers' Symposium, an event organized and hosted by York University researchers usually annually since 2011. The Centre for Bee Ecology, Evolution and Conservation at York University (BEEc) is now the host, and has helped grow BeeCon from a small, local symposium, aimed at sharing the recent findings of southern Ontario bee researchers, to an international one, connecting melittologists (bee biologists), industry professionals, and other researchers on a global scale!

In 2026, BeeCon returns to York University's campus as part of a two-day hybrid event. Thursday, October 15, 2026, will be a virtual-only event hosted on Zoom, while Friday, October 16, 2026, will be both virtual and in-person. We have over 40 presenters scheduled to participate, and we look forward to being able to network in-person over the breaks and the post-conference social!

We would like to give a big thank-you to our funders, the Faculty of Science, the Faculty of Environmental and Urban Change, and the Office of the VPRI at York University. We would also like to thank the many volunteers who will help make the event run smoothly, from moderating sessions both virtually and in-person to handling the registration table and food for the in-person aspect of the event.

Are you on social media? We encourage you to share notable quotes, interesting findings, or general comments about the event with your followers, to help us achieve an even greater impact. Follow and tag us on Twitter @BeesYork or on Instagram @BeesAtYork. Use #BeeCon.

About BEEc
BEEc (pronounced bee-see) is an initiative that strives to advance research in the fields of bee ecology, evolution and conservation. The mission of BEEc is to foster interdisciplinary, innovative, collaborative, and cutting-edge research. This research is used for the advancement of knowledge and implementation of policy changes to help sustain pollinators globally. Ultimately, our goal is to apply our collaborative efforts to the development of policies and environmental management for the long-term sustainability of bees and the vital ecosystem services they provide.

Interested in joining us? There are numerous ways in which researchers, students and community members can be part of the work that we do. Visit https://www.yorku.ca/bees/about-us/membership/ for more information or to apply to become an Associate.

If you are not currently working or collaborating with someone in BEEc at York University but want to stay informed on BEEc's research activities and events, you can also join our Global listserv. Send an email to LISTSERV@YORKU.CA with the following command in the body of the email:
SUBSCRIBE BEES YourFirstName YourLastName. Note you do not need a subject line and please do not include any other text in your message (e.g. signature line).

Check out our website at https://www.yorku.ca/bees/ for more information and resources, such as upcoming events, publications, and projects. Don’t forget to follow our YouTube Channel at https://www.youtube.com/c/BeeEcologyEvolutionandConservation/, and engage with us on Twitter (aka X) @BeesYork or on Instagram @BeesAtYork.

Land acknowledgement

First Nations peoples have lived on this part of Turtle Island for millennia, stewarding the land, the water and all that contributes to life in this region. Today, the culture and presence of First Nations, Inuit and Métis peoples enrich the lands and people of this territory.

More than two centuries ago, the Mississauga people welcomed settlers to this territory, providing sustenance and engaging in trade and commerce.

Today, York University campuses are located on the Toronto Purchase Treaty No. 13 lands and territory of the Mississaugas of the Credit First Nation and the lands of the Anishinabek of the Williams Treaties First Nations. Our campuses are also situated on the traditional territories of the Huron-Wendat and the Haudenosaunee.

Treaty history is foundational, and it is our collective responsibility to honour the land, as we honour and respect those who have gone before us, those who are here and those who have yet to come. We are grateful for the opportunity to be learning, working and thriving on this land, and we commit to learn the truth and be active in the process of reconciliation.

This statement was written for the areas occupied by York University, in Toronto, Ontario. We encourage everyone to watch the following video that gives more background to this land acknowledgement, including a brief history of the traditional territory of the Indigenous Peoples who called this area home, the treaty involved, definitions and pronunciations, and suggestions on how to listen and reflect on what these teachings mean to you and how they can apply to your life and work. Associated article and video at https://yfile.news.yorku.ca/2019/01/14/new-video-explores-the-importance-of-understanding-the-land-acknowledgement/.

Not in Toronto? It is important for all of us, particularly those who are colonists/settlers, to understand our connections to the land we work and live on. To find out the Indigenous Peoples in your area of the world, visit www.native-land.ca.

Webinar Access Details – Thursday, October 15 and Friday, October 16

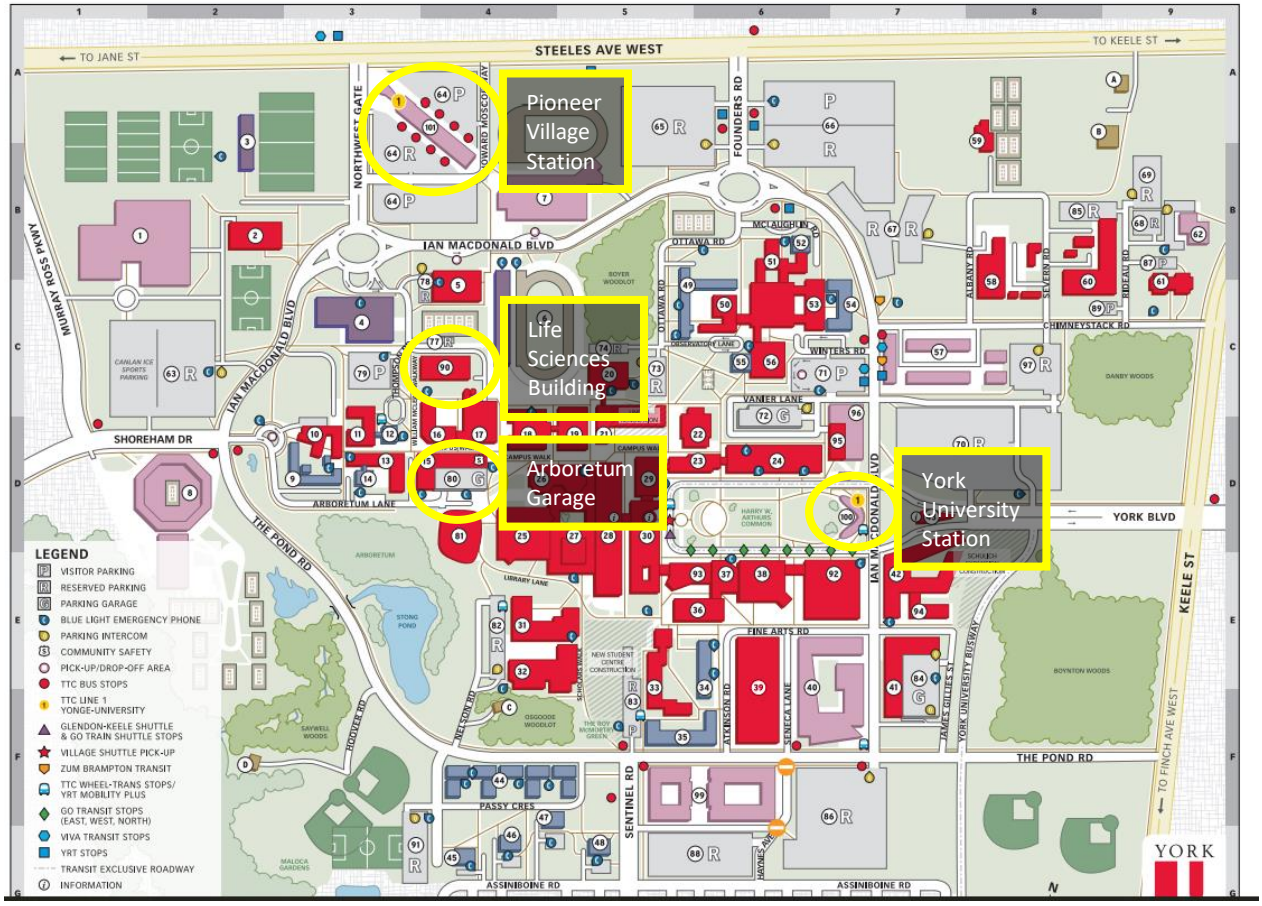
- Registered attendees should have already gotten the Zoom webinar link from beec@yorku.ca
- By joining by Zoom as an attendee, you will NOT be able to turn on your video or microphone. However, you can use the Q&A function in Zoom to ask questions of the speakers.
- You can join by telephone to hear audio only, or by the Internet to see the presentation slides as well as the presenter. See the e-mail noted above for these connection details.

Directions to In-Person Venue at York University - Friday, October 17

- **Building & Room:** The in-person portion of BeeCon will be held in the Life Sciences Building at York University's Keele Campus (#90 on the map below). Specifically, the first-floor foyer and room 105 (LSB 105).
- **Public Transit directions** can be found online at https://maps.info.yorku.ca/transit-driving-directions/
    - For the majority of guests taking the Subway to York University Station (#100 on the map below) is the best option. TTC has two subway stations at the Keele campus – York

University (#100 on the map) and Pioneer Village Subway Stations (#101 on the map). All local TTC transit buses now service the Pioneer Village Station.

- **Driving directions** can be found at https://maps.info.yorku.ca/transit-driving-directions/ or use your favourite mapping app.
  - **Parking:** The Arboretum Parking Garage (#80 on the map below) would be the best lot to park in. From Pond Rd/Ian MacDonald Blvd, turn east onto Arboretum Lane. The parking garage will be on your left. Parking in this location is $2.50/half-hour ($20.00 max).
  - Note that you must pay using the app – there is no attendant on site.
  - For other parking locations and information on campus visit http://www.yorku.ca/parking/ or see the interactive map linked below; prices vary.
- **Interactive Campus Map**
  - The online interactive map linked below can show you parking locations (including EV charging stations), building names/locations, and other campus locations. It also has a wayfinding option, where you can enter your start and end locations and it'll give you a walking route: https://map.concept3d.com/?id=1200#!ce/34557?s/?ct/29101,29093



BYOS! Bring your own Snacks on Friday

We will be providing a lunch for everyone who is registered for in person attendance on Friday, you will be able to enjoy lunch with your colleagues at the tables in the lobby of LSB or in the outdoor seating area. However, we will not be providing snacks during breaks this year, only coffee/tea at the beginning of the day.

BYOB! - Bring Your Own Bottle for Water and Coffee

- Please bring your own water bottle/coffee mug to help reduce waste.
- We will not be providing bottled water but there are water bottle refill stations in the building near the conference room.
- Paper cups will be provided for coffee but why not show off your favourite insect mug!

Free Wi-Fi Access on Campus

- There are three options for accessing wi-fi on campus, depending on your status: see https://www.yorku.ca/uit/faculty-staff-services/internet-access/wireless-access/
    - *YorkU Students/Staff/Faculty* – select the AirYorkPlus wireless network and login with your Passport York credentials
    - *Eduroam participating institutions* (e.g. Universities of Guelph, Toronto, Western, many others – see https://www.canarie.ca/identity/eduroam/): select the Eduoroam wireless network and log in with the credentials provided by your institution
    - *Anyone:* select the AirYorkGuest wireless network, complete the free registration form on the splash page, receive and confirm the verification message by e-mail, and then proceed with using the internet: https://www.yorku.ca/uit/faculty-staff-services/internet-access/wireless-access/airyork-guest/

Questions? Concerns? Feedback? Ideas for Future Events?

If you have any questions, concerns, feedback, or ideas for future BEEc events, please contact Laura at beec@yorku.ca. We hope that you'll enjoy BeeCon 2026 and join us again in the future.

Keep reading for the schedule and abstracts.

Schedule With Abstracts:

Day 1 – Thursday, October 15, 2026 (Virtual Presentations and Attendance Only)

Day 1 - #1: 8:30 AM. Introducing BEEc and BeeCon - Day 1
Laura Newburn, (she/her), BEEc Coordinator, York University, Ontario, Canada
Twitter: @BeesYork Instagram: @BeesAtYork

Abstract: Welcome to day one of BeeCon 2026. I'll give a brief background to the Centre for Bee Ecology, Evolution and Ecology (BEEc) and the BeeCon conferences, thank our sponsors, and go over logistics for the day.

Day 1 - #2: 8:45 AM. Bees feeling the burn
Kit Prendergast, (she/her), Postdoctoral Researcher, University of Southern Queensland, Western Australia, Australia
Co-Authors: Bill Bateman (Curtin University) and Joshua Campbell (USDAR)
Twitter: @BeeBabette Instagram: @dr.beebabette

Abstract: Fire is a major form of environmental disturbance, and in recent years, due to anthropogenic climate change and anthropogenic land management, we are seeing increases in the frequency and intensity of fires. We conducted a review, involving 148 studies, to better understand how bees respond to fires, which is critical in the face of global bee declines. Bee responses to fire were extremely variable, with no consistent pattern in abundance or species richness increasing, decreasing, or showing no significant change under fire. Different families and taxa responded differently and to different aspects of fire regimes. Andrenids and colletids were vulnerable to fire, whereas halictids responded favourably. Ground-nesting generalists responded favourably, whereas cavity-nesting specialists were most vulnerable to fire. We revealed major gaps in research in the Southern Hemisphere and in tropical landscapes dominated by flowering trees, with most studies conducted in pine-forested, fire-prone landscapes in the Northern Hemisphere. Additionally, only a few studies used manipulative experiments, or have considered how to maximise bee recovery after fires. Overall, fire is an important disturbance affecting bee communities, and management to preserve fire-sensitive species under predictions of increasingly frequent and severe fires is required.

Day 1 - #3: 9:00 AM. Exploring the temperature-lifecycle relationship of a Japanese small carpenter bee for social polymorphism in various scales of time and space.
Yujiro Kisu, (he/him), MSc Student, Tokyo Metropolitan University, Tokyo, Japan
Co-Authors: Lucas R. Hearn (School of Agriculture, Food and Wine Adelaide University), Adam L. Cronin
Twitter: @yuyu_lab_tmu Instagram: @yujirokisu1

Abstract: Socially polymorphic bees have been thought to modify the tendency to form social nests depending on their lifecycles influenced by the environment such as latitudinal differences. One of the primary environmental factors is “temperature” since bees are ectothermic. In my study, focus is on a species called *Ceratina japonica* which is socially polymorphic – the number of social nests seems always no more than a quarter of a population. *C. japonica* lives all over latitudinally elongating Japan mainland, and its lifecycle has been studied about 50 years ago. Thus, the current study can incorporate both long-term climatic change as well as the current regional climatic differences. First, estimating the lifecycle event timing was possible by “a cumulative degree-day model”, which essentially shows the amount of

heat energy available throughout a year. Subsequently, however, the output of the model did not explain the proportion of social nests in three latitudinally distanced regions in Japan. And that led to explore the other environmental factors on social behaviours across regions wherein an environmental variance like a coefficient of variance in annual temperature can be introduced as a candidate factor, while the other environmental factors need further considerations.

Day 1 - #4: 9:15 AM. A cross-species population genomic analysis of solitary bees
Dean Hodapp, (he/they), PhD student, Colgan Group, Institute of Organismic and Molecular Evolutionary Biology, Johannes Gutenberg University Mainz, Rheinland-Palatinate, Germany
Co-Authors: Safira Moog, Dr. Jannik Möllmann (JGU Mainz), Dr. Thomas Joseph Colgan

Abstract: Understanding the capacity of organisms to respond to ongoing and future environmental challenges is a central goal of evolutionary and conservation biology. Solitary bees, which comprise over 75% of global bee diversity, are ecologically and economically important pollinators, yet are experiencing declines. Due to aspects of their life-history, including prolonged dormancy periods and lack of colony-level buffering, they may be more vulnerable to environmental stressors. Despite their importance, solitary bees remain understudied, with information on their genetic variation, demographic history, and adaptive potential currently limited. To address this gap, we are applying whole-genome resequencing and population genomic-based analyses to determine the adaptive potential of solitary bees using species from three of the seven bee families. To provide insights into how these species adapt to changing local environments we are investigating genomic signatures of selection, population structure and genetic variation harboured in contemporary populations to understand extent of gene flow. This study will represent one of the first cross-species population genomic analyses of solitary bees and thus greatly improve our understanding of their biology to help protect this valuable, but vulnerable group of wild pollinators.

Day 1 - #5: 9:30 AM. Developing functional profiles and comparative analyses for wild and managed pollinator gut microbiomes
Christian Gostout, (he/him), Predoctoral Researcher, BC3 Basque Centre for Climate Change, Bizkaia, Spain
Co-Authors: Luis J. Chueca, Estefanía Tobajas, Xabier Salgado-Irazabal, Jennifer Rose, Brais Hermosilla, Montserrat Muriana, Celia Baigorri, Jon Poza, Ainhoa Magrach (IKERBASQUE, Basque Foundation for Science, Bilbao, Spain)

Abstract: Gut microbiota diversity has been characterized using metabarcoding, and more recently, metagenomic approaches for a limited number bee species. These approaches have allowed the observation of changes in the composition of the gut microbiome in response to certain environmental factors, but the implications of these changes for gene expression, and in turn, bee health, are virtually unknown. We move beyond studies focused on the composition of gut microbiomes to examine their functions using metatranscriptomic analyses of RNA extracted from *Bombus pascuorum* and *Apis mellifera*. We introduced *Apis mellifera* hives in long term pollinator sampling locations to observe for effects of managed species introductions on microbiome function in wild bees. Our analysis probes for potential exchange not only of microbiota, but also function. We detect an overrepresentation of gene expression transcripts linked to metabolic pathways for key gut microbiome functions, including metabolism and transport of carbohydrates, defense mechanisms, and immune responses. Comparison of results with previous metagenomics analyses also allows identification of the top contributing taxa involved in microbiome metabolism. Our research expands the study of metabolic expression in gut

microbiomes to wild pollinators, and creates new commentary on their interactions with managed species.

Day 1 - #6: 9:45 AM. Bee microbiomes across phylogeny and functional traits: examining host-cleptoparasite associations
Katherine Chau, Research Associate, York University, ON, Canada
Co-Authors: Trevor J.L. Sless, Phuong N. Nguyen, Sandra M. Rehan
Twitter: @evolkate

Abstract: Studies on microbiomes are essential for understanding the various roles microbes play in the health of bees, yet many wild bees including cleptoparasitic species and their microbiomes continue to be underexplored. To alleviate this gap, we analyzed bacterial and fungal microbiomes of cleptoparasitic species with 16S rRNA and ITS1 metabarcoding and compared results to the microbiomes of their hosts and other wild bees across families and functional traits. We found that a parasitic lifestyle was associated with a significantly more diverse bacterial microbiome compared to other social or dietary traits, and that ground-nesting bees have a richer bacterial microbiome than stem-nesting bees. Fungal diversity was only found to be greater in solitary bees compared to eusocial species. Hosts and cleptoparasites had broadly similar bacterial and fungal microbiomes, with a few exceptions. *N. articulata* had a significantly more diverse bacterial microbiome compared to its hosts *Agapostemon virescens* and *A. sericeus*, and *H. calliopsidis* boasted greater bacterial diversity compared to its host *Calliopsis andreniformis*. Fungal communities were also different for N. illinoensis – *Andrena crataegi* and for *N. articulata – A. virescens*, whereas several host-cleptoparasite pairs harboured distinct bacterial communities. Individual cleptoparasites were also uniquely associated with several understudied bacterial microbes. Our study is the first to assess the microbiomes of six cleptoparasitic species and reveals important insight into the unique and shared microbes in wild bees and host-cleptoparasite pairs.

Day 1 - #7: 9:45 AM. Wildlife Preservation Establishing Sheila Colla Pollinator Research Conservation Fund
Lance Woolaver, Executive Director, Wildlife Preservation Canada, ON, Canada
Instagram: @wildlife_preservation_canada

Abstract: To honour her extraordinary legacy, Wildlife Preservation Canada has established the Sheila Colla Pollinator Research Conservation Fund, a permanent annual scholarship supporting graduate students enrolled in Canadian post-secondary institutions studying at-risk pollinators across Canada.

Day 1: 10:05 AM. BREAK.
We will take a short break and return at 10:30 AM.

Day 1 - #8: 10:30 AM. Toward novel probiotic supplements for honey bees: selection of compatible water kefir microbial consortia
Maria Agustina Rodriguez, (she/her), Postdoctoral fellow, Laboratorio de Estudios Apícolas (LabEA-CIC), Departamento de Agronomía, Universidad Nacional del Sur (UNS), Bahía Blanca, Buenos Aires, Argentina; Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Buenos Aires, Argentina
Co-Authors: Francisco J. Reynaldi (CONICET; Centro de Microbiología Básica y Aplicada, Facultad de Ciencias Veterinarias, Universidad Nacional de La Plata, La Plata, Buenos Aires, Argentina), Leticia A. Fernández (LabEA-CIC; CONICET; Departamento de Biología, Bioquímica y Farmacia, Universidad Nacional del Sur, Bahía Blanca, Buenos Aires, Argentina)

Abstract: Building upon our previous work demonstrating the probiotic potential of *Lacticaseibacillus paracasei* B2 for honey bees, this study aimed to develop compatible microbial consortia from water kefir isolates for future nutritional supplementation strategies. Lactic acid bacteria and yeast strains, previously characterized as probiotic candidates, were combined in groups of three, generating ten bacterial and ten yeast consortia. Two inhibition assays and co-culture experiments in 96-well microplates were performed to determine synergistic or antagonistic interactions. No inhibition was observed among bacterial or yeast strains in either inhibition assay. In co-culture experiments, two bacterial consortia showed lower optical density (OD) values ($p < 0.05$) than the remaining combinations, whereas no significant differences were detected among the others. For yeasts, no significant differences ($p > 0.1$) were observed among the ten combinations tested. The bacterial consortium composed of *Lacticaseibacillus paracasei* B2, *L. paracasei* S6, and *Lentilactobacillus hilgardii* B12, and the yeast consortium consisting of *Saccharomyces cerevisiae* FAS, *S. cerevisiae* WKY1, and *Pichia kluyveri* LK3, exhibited the highest OD values and showed no inhibitory interactions when evaluated together. These findings identified compatible bacterial and yeast consortia suitable for further evaluation as probiotic supplements on honey bees under laboratory conditions and in the field.

Day 1 - #9: 10:45 AM. Meliponiculture's resurgence and emerging ways of 'meliponiculturing': a discursive analysis from Brazil.

Ana Carolina Isepan-Motta, (she/her), PhD Student in Sustainability, Escola de Artes, Ciências e Humanidades da Universidade de São Paulo, São Paulo, Brasil
Co-Authors: Celso Barbieri, Cayo Matheus de Amorim Scot, Tiago Mauricio Francoy
Instagram: @labbeesusp @anaaisepan

Abstract: This study examines the contemporary reemergence of meliponiculture in Brazil in the twenty-first century. Historically practiced by traditional communities, the activity was marginalized with the predominance of apiculture but has recently reentered public debate, shaped by contemporary and historical discourses. The study investigates the historical and discursive conditions underlying this reemergence, focusing on how practitioners position themselves as meliponists, how the memory of apiculture is reactivated, and how these dynamics may inform public policies. Grounded in the French tradition of Discourse Analysis, the study analyzes 38 series of discursive sequences derived from nine interviews with meliponists, complemented by 25 additional materials. Contemporary meliponiculture is interpreted as a discursive event enabled by environmental agendas, the pollinator crisis, and the circulation of sustainability discourses. Findings reveal the emergence of a technical–scientific–regulatory discursive formation that reorganizes power–knowledge relations, produces new subject positions such as the "modern meliponist," and reshapes ways of practicing and understanding meliponiculture. Although the memory of apiculture remains influential, meliponiculture follows a distinct trajectory increasingly aligned with socio-environmental concerns. Despite discursive disputes, practitioners claim participation in knowledge production and regulatory processes, creating opportunities for participatory public policies and institutional arrangements that support the continuity of the activity.

Day 1 - #10: 11:00 AM. *Understanding Native Pollinator–Wildflower Interactions Through Environmental DNA*

Willow Cooper, (she/her), MSc Student, Laurentian University, Ontario, Canada
Co-Authors: Willow Cooper, Isabel Fredette, Rachel Bosley, Jenny Fortier, Nicole Luciani, Sarah Barnard, Mateus Pepinelli

Abstract: Plant and pollinator communities have a symbiotic relationship as flowering plants provide essential nutritional resources for pollinators, while pollinators act as a means for plant reproduction. Unfortunately, recent studies suggest that pollinators are experiencing population decline, which over time also affects flowering plant populations. This study aims to investigate the interactions between wildflowers native to northern Ontario and their pollinators. We achieved this by collecting 90 samples of 4 different native wildflower species from a local wildflower farm over 12 weeks. Environmental DNA (eDNA) was extracted, and the COI target gene was amplified. All samples were sequenced and compared to reference databases to identify species present. Within the phylum Arthropoda, we identified 13 orders and 146 species. The relative abundance of each order revealed five orders (Diptera, Lepidoptera, Hymenoptera, Coleoptera, and Hemiptera) accounted for 81% of all species identified. We found that the relationship between pollinators and associated wildflowers was highly interconnected. This provides us with insight into plant-pollinator networks, informing future flower-planting decisions for pollinator conservation efforts.

Day 1 - #11: 11:15 AM. Assessing the Extinction Risk of Specialist Oil-Collecting Rediviva Bees Using Species Distribution Models and Spatial Overlays

Annalie Melin, (She), Research Associate, Nelson Mandela University, Western Cape province, South Africa
Co-Authors: Jonathan F. Colville (Statistics in Ecology, Environment and Conservation, Department of Statistical Sciences, University of Cape Town, Cape Town, South Africa), John C. Manning (Compton Herbarium, South African National Biodiversity Institute, Claremont, South Africa AND Research Centre for Plant Growth and Development, School of Life Sciences, University of KwaZulu-Natal, Scottsville, South Africa) and Colin M. Beale (Department of Biology, University of York, York, UK AND Leverhulme Centre for Anthropocene Biodiversity, Department of Biology, University of York, York, UK AND York Environmental Sustainability Institute, University of York, York, UK)
Instagram: @annaliemelin

Abstract: Regions with exceptional bee diversity and high levels of endemism, such as South Africa, lack IUCN Red List assessments. However, Red List assessments of bees are challenging because species' geographic range data are sparse, requiring methods such as species distribution models (SDMs) that leverage available data to improve range estimates. Using data from revised and re-surveyed Rediviva species, we estimated range sizes using both the IUCN-approach and SDMs, together with national spatial overlays to assess habitat loss, threats and protected area coverage. This integrative approach resulted in the first quantitative Red List assessment of South African bees. We found that agriculture and forestry were the main threats, accounting for approximately 40% of habitat loss. Incorporating SDMs resulted in lower extinction risk estimates than the IUCN-approach and suggested that a greater proportion of species' ranges may occur within protected areas. By highlighting suitable habitat within protected areas where species are likely to occur but have not yet been recorded, this approach can direct future surveys and improve conservation priorities. Although demonstrated using a subset of specialist bees, this framework is broadly applicable to improving extinction risk assessments for other data-limited insect taxa.

Day 1 - #12: 11:30 AM. Body size as universal organizing principle of division of labor in social insect colonies: Experimental evidence from honey bee workers

Olav Rueppell, (he/him), Professor, University of Alberta, Alberta, Canada
Co-Authors: Jacob J. Herman

Abstract: Many social insects display body size variation between reproductive and non-reproductive castes and within the non-reproductive workers. In species where it evolved, this body size variation determines division of labor, while other species with monomorphic workers, such as *Apis mellifera*, predominantly exhibit temporal division of labor. It is unclear whether body size can also influence division of labor in species that never evolved worker polymorphism. We used 3D-printed comb with variable cell sizes to produce worker honey bees of different sizes. These workers were RFID-labeled and introduced into a single-cohort colony. Large workers demonstrated a bias for foraging, in line with naturally evolved patterns observed in other species. This result indicates that variation in body size can organize division of labor even in species in which it has not evolved, suggesting innate principles of division of labor. Proximately, this observation may be explained by lower stress resistance in larger individuals which we confirmed by finding that larger workers succumb earliest to the general oxidative stressor paraquat. Thus, our study not only reports the importance of body size in the organization of division of labor but also links it to our recently developed weak worker hypothesis.

Day 1 - #13: 11:45 AM. Hidden diversity in western North American sweat bees: revising Lasioglossum (Hemihalictus)

Thilina Hettiarachchi, (he/him), PhD student, Department of Entomology, University of Manitoba, Manitoba, Canada
Co-Authors: Jason Gibbs
Twitter: @ThilinaHA Instagram: @bugsnapz

Abstract: Accurate species identification is essential for documenting bee diversity and understanding evolutionary and ecological patterns, yet many commonly collected bee groups remain taxonomically challenging. The sweat bee subgenus Lasioglossum (Hemihalictus) has never been comprehensively revised in western North America. We examined type material and additional museum specimens, evaluated diagnostic morphology and geographic variation, and used multivariate analyses to reassess species boundaries. Twenty-two species are recognized, including five newly described species: *L. angusticulum, L. engleri, L. opata, L. pathiranae,* and *L. tomentosum. Lasioglossum vanduzeei* is restored from synonymy with *L. arizonense*, two Palaearctic species are documented from North America, the male of *L. subobscurum* is described for the first time, and several new synonymies are proposed. Updated identification keys are provided for species occurring north of Mexico. Building on this revised taxonomic framework, an ultraconserved element phylogenomic study is underway using representatives of all recognized species. This study will test species boundaries, evaluate relationships within the subgenus, and examine whether currently recognized morphological groups reflect evolutionary history. Together, the taxonomic revision and phylogenomic analysis will provide a stronger foundation for identification, biodiversity research, biogeography, and conservation of western North American sweat bees.

Day 1: 12:00 PM. LUNCH.
We will take a lunch break and return at 1:00 PM.

Day 1 - #14: 1:00 PM. Independent and combined effects of winter warming and soil pesticide exposure on diapausing bumblebee queens

Sabrina Rondeau, (she/her), Postdoctoral Fellow, University of Ottawa, ON, Canada
Co-Authors: Jessica Forrest, Nigel E. Raine (University of Guelph)
Twitter: @SabRondeau

Abstract: In temperate regions, bumblebee (*Bombus spp.*) queens overwinter underground, where they can be simultaneously exposed to pesticide-contaminated soils and warming winter temperatures. Soil insecticide exposure might affect post-hibernation performance and colony establishment, while warmer overwintering temperatures increase energetic demands and could alter temperature-dependent pesticide detoxification processes. This study assesses the direct and combined effects of these stressors on overwintering bumblebee queens. We exposed common eastern bumblebee (*Bombus impatiens*) queens (n=286) to field-relevant soil concentrations of the neonicotinoid insecticide imidacloprid (0, 20, 400 ng/g) across three overwintering temperatures (4, 7, 9 °C) for 26 weeks. Overwintering temperature strongly influenced queen performance, with survival declining and weight loss increasing at warmer temperatures. Queens overwintered at higher temperatures also produced brood that emerged earlier. In contrast, imidacloprid exposure did not affect survival or colony initiation but reduced brood production by ~12%, with similar effects at both concentrations, regardless of temperature. Together, our results indicate that winter warming poses a major threat to overwintering survival, while imidacloprid exposure constrains reproductive output, with no evidence of interactive effects during diapause.

Day 1 - #15: 1:15 PM. Recent changes in the ecological dynamics of the bee fauna of the Motagua Valley Thorn Scrub

Natalia Escobedo-Kenefic, (she/her), Research coordinator, investigator, Centro de Estudios Conservacionistas, Universidad de San Carlos de Guatemala, Guatemala, Guatemala
Co-Authors: Quebin Bosbely Casiá-Ajché, Edson Cardona, Alfredo Mejía-Coroy, Werner Rodrigo Molina Soto, Eunice Enríquez
Twitter: @EscobedoKenefic Instagram: @n_escobedokenefic

Abstract: Dry forests have been identified as high bee diversity ecosystems. Despite their vulnerability to climate change, their potential as buffers against desertification make dry forests key ecosystems for climate change resilience. Tropical seasonally dry forests are especially interesting from the biological perspective, due to their high species endemism. This study aimed to identify changes in bee ecological dynamics within the Motagua Valley Thorn Scrub, in Guatemala, based on two systematic bee monitoring surveys conducted during distinct periods (2004–2005 and 2021–2022). A total of 4,430 bee specimens were examined. For each period, alpha and beta diversity were calculated. No significant changes in alpha or beta diversity were observed in the overall yearly values between surveys. Although, intra-annual patterns, both in alpha and beta diversity, showed interesting differences between surveys. This suggests possible temporal shifts that may be driven by changes in rain patterns and thus, in plant phenology. This study is a first approach for Thorn Scrubs in Central America. In the context of global climate change, further research is needed to understand how climate changes could be affecting the ecological dynamics in native bee communities, and to propose actions for their conservation.

Day 1 - #16: 1:30 PM. Bees of the Ngäbe-Buglé Indigenous Territory: Preliminary Finds

Danny Hernandez Cuadra, (she/her), Research Fellow, Smithsonian Tropical Research Institute, PANAMA, Panamá
Instagram: @DannyHontas

Abstract: Despite Panama's biological richness, the wild bee fauna of the Ngäbe-Buglé Indigenous Territory remains virtually undocumented. This presentation reports the preliminary results from ongoing surveys conducted within a multidisciplinary ecosystem restoration initiative. In a geographically restricted and highly disturbed area, the surveys recovered an unexpectedly high diversity of wild bees, including taxa rarely, if ever, reported from Panama. These observations challenge

prevailing assumptions regarding the comparatively low documented bee diversity of Panama and the expected impoverishment of pollinator assemblages in disturbed tropical ecosystems.

Beyond documenting species occurrences, this work provides a baseline for future ecological, taxonomic, and conservation research in one of the least-studied regions of the Neotropics. It also demonstrates the scientific value of integrating data inventories with long-term restoration efforts through collaborative partnerships with Indigenous communities.

Day 1 - #17: 1:45 PM. The European Red List of Bees (2026): Updated assessment of extinction risk, threats, and conservation priorities

Denis Michez (he/him), Professor, University of Mons, Brussels, Belgium

Abstract: Wild bees are essential pollinators that sustain ecosystem functioning, biodiversity, and food production, yet evidence indicates that many species are under increasing pressure. We present the 2026 update of the European Red List of Bees, the most comprehensive continental assessment of wild bee conservation status to date. Using the IUCN Red List Categories and Criteria, we assessed 1,928 native and long-established bee species across Europe and the EU27, supported by a database exceeding 4.3 million occurrence records and contributions from more than 200 experts. Overall, 172 species (10.4%) are classified as threatened with extinction in Europe, while 25 species are Critically Endangered, including 14 considered Possibly Extinct. In addition, 14.3% of species remain Data Deficient, highlighting persistent taxonomic and distributional knowledge gaps. Agricultural intensification, climate change, habitat loss and fragmentation, invasive species, and pollution emerged as the principal drivers of extinction risk. The assessment identifies Mediterranean islands, mountain systems, and other centres of endemism as conservation priorities and provides a robust scientific baseline for monitoring pollinator trends and informing the implementation of the EU Biodiversity Strategy, the revised EU Pollinators Initiative, and the Nature Restoration Regulation. These results provide an essential framework for evidence-based conservation planning and policy across Europe.

Day 1 - #18: 2:00 PM. Colombia's bee fauna unveiled: novel assemblage, overlooked diversity, and extensive sampling gaps in the Neotropics.

Ruben Dario Martin-Rojas, (he/him), PhD student, Penn State, Pennsylvania, United state of America
Co-Authors: Margarita M. López-Uribe

Bee biodiversity is expected to be lower in tropical than in subtropical areas, yet this pattern is confounded by significant data gaps. Here, we present the first comprehensive bee checklist for Colombia, an understudied Neotropical fauna. We compiled data from 18 entomological collections, public databases, and taxonomic literature to characterize bee diversity at the departmental level using species richness, Shannon diversity index, and weighted endemism, and compared phylogenetic diversity (Faith's PD, sesMPD, sesMNTD) with other South and North American countries (Brazil, Chile, USA). We found 738 species in 123 genera across five families, based on 69,565 records, including 246 new country records and 140 endemic species (19%). The assemblage was dominated by Apidae (69%). Solitary species (57%) and above-ground nesting (57%) predominated; eusocial species reached 25% and below-ground nesting only 34%, reversing the global pattern in which most bees nest underground. The Andean region harbors the highest richness and endemism; however, data availability was highly uneven, with 41% of records concentrated there, while xeric lowlands remain severely undersampled. Accumulation curves suggest ~26% of species remain to be described or reported. This study establishes

a baseline for ecological, taxonomic, and conservation research and highlights unique features of Neotropical bee faunas.

Day 1 - #19: 2:15 PM. The role of bee cognition in the evolution of intersexual mimicry in Begoniaceae
Kaitlyn Pankratz, (She/her), Graduate student, Missouri State University, Missouri, United States
Co-Authors: Co-Authors: Savannah McCabe, Tyson Hollifield, Oscar Peterson, Avery Russell

Abstract: Pollinators, including bees, are frequently implicated in driving floral evolution. In intersexual floral mimicry, rewardless female flowers mimic rewarding male flowers of the same species. Successful mimicry depends on pollinators failing to detect mimics, which may select for mimics to better resemble models. In the plant family Begoniaceae, the extent to which unrewarding female flowers resemble pollen rewarding male flowers varies across species, but whether bee cognition might drive the evolution of imperfect intersexual mimicry is unknown. Here we asked how bumble bee decisions are affected by the accuracy of intersexual mimicry. We presented each bee with one of three artificial flower arrays, differing in terms of the accuracy of the female mimicry to the common rewarding male form. We recorded whether a bee landed on or rejected a given flower in the array. When mimicry was perfect, bees did not learn to make more correct decisions with experience. When offered bilateral female flowers, bees initially made fewer correct decisions, but eventually learned to make more correct decisions. In contrast, when offered radial female flowers, bees made more mistakes with experience. Our results thus suggest that bee cognition may help drive the evolution of imperfect intersexual mimicry in Begonia.

Day 1 - #20: 2:30 PM. Estimating population size and its relationship to floral resources using mark-release-recapture in the rare bee *Colletes andrewsi* (Hymenoptera: Colletidae)
Marissa Chase, (she/her), Assistant Professor, Villanova University, University of Minnesota, Pennsylvania, United States
Co-Authors: Zachary M. Portman (University of Minnesota), Jessica D. Petersen (Minnesota Department of Natural Resources), Nicole Gerjets (Minnesota Department of Natural Resources), Rachel Kranz (Minnesota Department of Natural Resources), Danielle Hudson (University of Minnesota, Minnesota Department of Natural Resources), Ian G. Lane (United States Fish and Wildlife Service), Daniel P. Cariveau (University of Minnesota)
Instagram: @pollenloaf

Abstract: Populations are a fundamental unit of biology, yet most bee studies do not assess population metrics and instead measure community-wide relative abundance and species richness. Out of the ~26,000 bee species known worldwide, there are only ~24 species with estimated population sizes, with a bias towards common, generalist, and social species. Fundamental questions about bee biology, such as “how big is a population” or “which factors contribute to population size variability” are virtually unknown. We focused on *Colletes andrewsi*, a rare Heuchera spp. specialist, and addressed the following questions across 18 sites over two years: 1) Can we use mark-release-recapture to estimate bee population size?; and 2) How does host plant abundance from the current and previous year affect bee population size? We estimated the population size of *C. andrewsi* with high certainty across 18 sites, which spanned the range of *C. andrewsi* in Minnesota. We found significant support for floral resource tracking. The current year’s host plant abundance had a strong relationship with population estimates, not the previous year’s abundance, and we documented extirpations at two smaller populations from 2025 to 2026. Mark-release-recapture should be employed to investigate population-level questions for rare and specialized bee species and beyond.

Day 1 - #21: 2:45 PM. Do bumble bees differ in their sensitivity to dry conditions?
Samantha Underhill, (she/her), MSc Student, Austin Peay State University, Tennessee, United States
Co-Authors: Dr. Jamieson Botsch Assistant Professor, Katie Davis MSc Student

Abstract: Bumble bees are among insects of concern, with climate change as a major driver of decline. However, bumble bee species do not exhibit a universal pattern, with contrasting population trajectories. This contrast suggests that there may be physiological differences in their sensitivity to environmental conditions. Bumble bees may be prone to desiccation due to climate-driven increases in temperatures and altered precipitation patterns. In addition to interspecific differences, we assessed the importance of intraspecific variation in body size in shaping desiccation sensitivity. Because water loss relates to surface area to volume ratios, body size may drive intraspecific patterns in water loss. In this study, we assessed the interspecific variation in water balance traits among five species of bumble bees: *Bombus auricomus, B. bimaculatus, B. griseocollis, B. impatiens,* and *B. pensylvanicus*. We measured traits associated with desiccation sensitivity in wild bumble bees from seven sites in Middle Tennessee in the 2026 growing season. From these physiologically based assays, we may better predict variation in species responses to desiccation and climate change.

Day 1: 3:00 PM. BREAK.
We will take a short break and return at 3:30 PM.

Day 1 - #22: 3:30 PM. Replicating and evaluating historic bumble bee triangulation tracking methods for locating wild bumble bee nests
Sami Dolan, (she/her), Researcher, University of Minnesota, Minnesota, United States
Co-Authors: Elise Bernstein, Zachary Portman, Elaine Evans

Abstract: Understanding the nesting biology of bumble bees (Bombus) is crucial to ensuring their conservation. However, bumble bee nests are cryptic and require a large time investment to locate using current nest searching methods. To develop methods to efficiently locate nests, we adapted a historic bumble bee nest locating method from Webb 1961 to triangulate bumble bee homing flights and inform nest searching locations. In July 2026, we spent 12 person hours collecting directional bearings of homing flights on 52 bumble bees, in addition to 15 opportunistic bearings outside of survey time. Using these bearings, we identified areas where at least three homing flights intersected (regardless of species) and created a 38 x 38 meter (1444 m2) plot to search for bumble bee nests. Five plots were created and surveyed for nesting bumble bees for one hour four times. We spent 20 person hours searching for nests and located eight nests in four plots placed via triangulation, in addition to two incidental nests outside of surveys but also in the vicinity of intersections. The nest discovery rate using these methods was high (0.4 nests/hour) relative to other methods, warranting further development of these methods to efficiently locate nests.

Day 1 - #23: 3:45 PM. I like your style: how bees are duped by multicomponent displays of an intersexual floral mimic
Avery Russell, (he/him), Associate Professor, Missouri State University, Missouri, United States
Co-Authors: Thomas Eltz, Liam A. Wilson, Stephanie R. Sanders, Abilene R. Mosher, Rachel Wilkins, and Daniel R. Papaj
Bluesky: @draverbee.bsky.social

Abstract: To maximize foraging success, bees learn to assess complex multicomponent floral displays. Producing floral rewards is energetically costly, so plants often use floral displays to attract bees without

offering rewards, often by mimicking other, rewarding flower types. Although flowers are composite signals composed of multiple structures differing in biological function and the information they provide to bees, it is unclear how signal components contribute to successful mimicry. In this laboratory study we investigated how signal components of floral reproductive structures (styles and stamens) and the sterile perianth contribute to successful intersexual floral mimicry. Bumble bees consistently prefer female over male perianth as they learn, but male and female reproductive structures contribute the most to learned responses and discrimination. Via gas-chromatography mass spectrometry we also find close chemical mimicry between female and male perianth and between female and male reproductive structures, but not of the pollen reward. Chemical mimicry of the pollen rewarding male stamens by the unrewarding female styles resulted in bees being unable to discriminate male from female flowers. We discuss when mimicry of different flower signal components should be expected and the role of bee cognition in learning to discriminate unrewarding mimics from food rewarding models.

Day 1 - #24: 4:00 PM. Large flower-sonicating bee pollinators support the division of labor hypothesis in heterantherous *Cochlospermum palmatifidum* (Bixaceae)

Stephen Buchmann, (he/him), Adjunct Professor, The University of Arizona, Dept. of Ecology and Evolutionary Biology, Arizona, United States of America
Co-Authors: Clemens Schlindwein, Federal University of Minas Gerais, Belo Horizonte, Brazil, Reisla Oliveira, Federal University of Minas Gerais, Belo Horizonte, Brazil, Minjung Baek, University of California, Davis, Kay Richter, Tucson, AZ, Daniel Papaj, University of Arizona

Abstract: Heteranthery—the presence of distinct stamen types within a flower—may reduce conflict between pollen as a male function and as a pollinator reward. Although the division-of-labor hypothesis is widely accepted, it has been tested in only a few heterantherous families. We evaluated it in *Cochlospermum palmatifidum* (Bixaceae), an herbaceous Sonoran Desert species. We described floral morphology, quantified stamen types and pollen allocation, and documented bee visitation and intrafloral behavior. Flowers bore centrally positioned yellow poricidal anthers and lateral dark-red anther bundles, with red petal spots forming a ring around the yellow anthers. Yellow and red pollen did not differ in morphology, but yellow anthers produced 13.8% more pollen. Large sonicating bees, mainly Xylocopa, were the only effective pollinators and always contacted the stigma. They landed on yellow anthers, buzzed the flower, and ejected pollen from both anther types. Pollen from yellow anthers was collected in the scopae, whereas pollen from red anthers contacted the dorsal thorax. These results indicate that yellow anthers function as feeding anthers and red anthers as pollinating anthers, supporting division of labor. Our findings add Bixaceae to the few families in which heteranthery clearly mediates functional pollen partitioning.

Day 1 - #25: 4:15 PM. Pollinators in a pickle: Bumble bee behavior under fluctuating temperatures and diverse pesticide exposure scenarios

Anupreksha Jain, (she/her), PhD Candidate, University of Wisconsin-Madison, Wisconsin, United States
Co-Authors: Anupreksha Jain, Olivia Bernauer, Rafael Salas, Olivia Siebert, Megan Humphrey, Andrzej Affek (Institute of Geography and Spatial Organization, Polish Academy of Sciences, Warsaw, Poland) and James Crall

Abstract: Pesticides pose significant lethal and sublethal risks to pollinators, including disrupting critical behaviors such as nursing, foraging, and thermoregulation. While these impacts are increasingly well-studied in controlled conditions, how behavioral disruptions lead to adverse outcomes in naturalistic environments is not well-understood.

We conducted a field experiment in seven cucumber farms using *Bombus impatiens* colonies and computer vision-based automated tracking. At each site, we deployed three rounds of queenright colonies for approximately ten days, and captured within-nest and foraging behaviors of individually tagged bees using overhead cameras in the nest box. We also collected bee samples at the end of the deployment, and screened them for a comprehensive suite of pesticide residues. We evaluated the impacts of field-realistic exposure on within-nest and foraging activity under naturally fluctuating temperatures.
We found that within-nest activity declined with increasing pesticide exposure, but only under cool temperatures, while foraging activity followed a strong diurnal pattern, and was not modified by pesticide exposure or temperature. Our results reinforce the context-dependency of pesticide impacts on bees. This work advances our understanding of pollinator health and pollination services under combined pesticide and temperature stress, and could further inform sustainable agricultural practices and pollinator conservation efforts."

Day 1 - #26: 4:30 PM. Non-crop flora in urban landscapes provide persistent glyphosate exposure pathways for honey bees

Hongmei Li-Byarlay, (she/her), Full Professor, Central State University, Ohio, USA
Co-Authors: Changsheng Ma (Hunan Academy of Agricultural Sciences, China), Sihao Chen (Southwest University, China) , Xiaoyu Shi (Institute of Zoology, Chinese Academy of Sciences, China), Jiahao Wu (Xi'an-Jiaotong Liverpool University, China) , Lianyang Bai (Human Academy of Agricultural Sciences, China), Zuren Li (Human Academy of Agricultural Sciences, China)
Twitter: @Insect_Sciences Instagram: @hmlibee

Abstract: Glyphosate, the world’s most widely used herbicide, is primarily applied for weed control. Although its effects on honey bees have been widely studied in agricultural landscapes, exposure through non-crop plants in urban environments remains poorly understood. We assessed glyphosate residues in pollen collected by honey bee foragers across an urbanization gradient in Suzhou, China, throughout an entire growing season. DNA metabarcoding and LC-MS/MS were used to identify pollen sources and quantify residues in 71 composite samples from 11 sites, where built-up land coverage ranged from approximately 10% to 70%. Glyphosate was detected in 83.1% of samples, reaching concentrations of 880 μg/kg. Residue concentrations showed a nonlinear relationship with urbanization, initially decreasing and then increasing with greater built-up coverage. Neither glyphosate detection frequency nor concentration was significantly associated with pollen diversity. These findings identify non-crop flora in urban greenspaces as a season-long pathway of glyphosate exposure for honey bees and highlight the need to incorporate pollinator health into urban vegetation and herbicide-management strategies.

Day 1 - #27: 4:45 PM. Concluding Remarks.

Laura Newburn, BEEc Coordinator, York University, Ontario, Canada
Twitter: @BeesYork Instagram: @BeesAtYork

Abstract: Thanks for attending day one of BeeCon 2026. Reminders will be mentioned, and sponsors and organizers thanked.

Day 2 – Friday, October 16, 2026 (In-Person Presentations, In-Person or Virtual Attendance)

Day 2 - #28: 8:30 AM. Introducing BEEc and BeeCon - Day 2
Laura Newburn, BEEc Coordinator, York University, Ontario, Canada
Twitter: @BeesYork Instagram: @BeesAtYork

Abstract: Welcome to day two of BeeCon 2026. I'll give a brief background to the Centre for Bee Ecology, Evolution and Ecology (BEEc) and the BeeCon conferences, thank our sponsors, and go over logistics for the day.

Day 2 - #29: 8:45 AM. Can honey bee transcriptomes reveal the stressors they have experienced?
Chris Allen, (he/him), Postdoctoral Visitor, York U, Zayed Lab, Ontario, Canada
Co-Authors: Aidan Jamieson, Amro Zayed

Abstract: Managed honey bees encounter numerous biological and nutritional stressors, yet determining which stressors contributed to colony decline remains difficult. The BeeCSI initiative experimentally exposed honey bees to nine stressors, including viruses, parasites, microbial pathogens, and altered pollen availability, and characterized dose-dependent transcriptional responses in the head, gut, and abdomen. Differential-expression analyses revealed striking heterogeneity among stressors, tissues, and doses, with responses ranging from no detectable differentially expressed transcripts to more than 2,400. Some stressors produced strong, tissue-specific signatures, including a pronounced gut response to Nosema, whereas others elicited comparatively subtle or limited transcriptional effects. Ongoing analyses are testing whether stressors recruit common or distinct genes within immune, metabolic, and cellular stress-response pathways, and whether co-expression modules are preserved across treatments. Preliminary patterns suggest that, although many responses are context-specific, shared transcriptional architecture among some stressors may reveal convergent biological signals despite limited overlap at the individual-gene level.

Day 2 - #30: 9:00 AM. From Nectar to Gut: The Digestive Fate of Floral Monoterpenes in Bumble Bees
Fatemeh Shirshahi, (She/her), MSc Student, York University, The Fitch Lab, Ontario, Canada
Co-Authors: Dr. Gordon Fitch

Abstract: Nectar often contains plant secondary metabolites that can affect pollinator health, but little is known about what happens to these compounds after they are consumed. We investigated the digestive fate of three monoterpenes, thymol, carvacrol, and linalool, found in the nectar of wild bergamot (*Monarda fistulosa*) and consumed by the common eastern bumble bee (*Bombus impatiens*). Our study combined field comparisons of floral nectar and nectar crop contents with a laboratory feeding experiment that measured each compound in the nectar crop, midgut, and hindgut. In the laboratory experiment, compound concentrations were strongly affected by tissue type and by the interaction between compound and tissue type. For all three compounds, concentrations declined significantly from the nectar crop to the midgut but did not differ between the midgut and hindgut. Linalool was present at much lower concentrations in the nectar crop than thymol or carvacrol, while thymol remained at higher concentrations than the other compounds in the midgut and hindgut. Together with our field results, these findings show that nectar monoterpenes are processed rapidly and differently within the bumble bee digestive tract, with the largest decline in concentration occurring between the nectar crop and midgut.

Day 2 - #31: 9:15 AM. Desiccation Tolerance Among Andean Bumblebees

Aliza Newton, (she/her), Research Technician, UMass Amherst (recent graduate), Amherst, Massachusetts, United States of America
Co-Authors: Victor H. Gonzalez -- Biodiversity Institute, Division of Entomology, University of Kansas, Lawrence, KS. Michael E. Dillon -- Department of Zoology and Physiology, University of Wyoming, Laramie, WY
Instagram: @aliza_aleezee

Abstract: Bumblebees in Colombia play a vital role in pollinating agriculturally significant crops like potatoes, tomatoes and passionfruit, and in maintaining water-regulating ecosystems such as páramos or cloud forests. Growing evidence suggests that changing weather patterns involving temperature, precipitation, and drought are impacting pollinator habitats worldwide. Many studies focus on the effects of temperature on pollinators, but there remains a gap in the literature regarding desiccation. Thus, this study examined the desiccation tolerance of five native bumblebee species in Colombia (*Bombus excellens, B. funebris, B. hortulanus, B. paoloensis* and *B. rubicundus*) and utilized metrics such as survival time, water loss rate (g/hr), and critical water content to explore bees' individual responses. We also assessed cuticular water loss. We found differences among species in the analyzed water balanced traits, which might be related to adaptations to their natural habitats or morphological traits, such as body size or hairiness. Examining the behavioral and/or physiological adaptations of pollinators may provide crucial insight into how bees will respond to changing weather patterns and can therefore aid in influencing conservation practices.

Day 2 - #32: 9:30 AM. What do producers know about pollinators - and does it matter for conservation?

Samm Reynolds, (she/her), PhD candidate, University of Guelph, ON, Canada
Co-Authors: Joel Becker (no affiliation), Dr. Carolyn Callaghan (Canadian Wildlife Federation), Dr. Nigel Raine (University of Guelph)

Abstract: Wild pollinator biodiversity is declining globally with agricultural intensification cited as a primary threat. Despite expert recommendations to increase the availability of nesting and foraging resources and reduce pesticide use in farmland, there has been a significant lack of input from the primary agro-ecosystem stakeholders, the producers. This study bridges that gap by surveying 492 Canadian producers to understand: (i) their knowledge and perceptions about pollinators and crop pollination, (ii) the conservation practices they have implemented for pollinators or would most likely implement with financial incentive, and (iii) the compensation required to increase implementation rates of pollinator-related conservation practices. Results revealed generally low knowledge levels about pollinators, significant knowledge gaps in producers' understanding of their own crop-pollination needs, and a stark lack of awareness of cost-share programs available in Ontario. While producers acknowledged the underlying importance of pollinators for crop production, a distinct knowledge-behaviour gap existed between that understanding and on-farm action that points to a need for financial incentives and improved awareness programming. Notably, an acceptable level of compensation for producers to implement conservation practices aligns with existing government cost-share programs, suggesting that limited awareness rather than limited funding could be a major barrier to implementation.

Day 2 - #33: 9:45 AM. Vibrational responses to nest disturbance in the small carpenter bee (*Ceratina calcarata*)

Alexandre Craft, (he/him), MSc student, York University, Rehan Lab, Ontario, Canada
Co-Authors: Andrew C. Mason & Sandra M. Rehan
Instagram: @alex_and_crafts

Abstract: Communication for social insects is incredibly important for not only maintaining their social structure but also coordinating the defence of the colony. Vibrational communication has been estimated to be prevalent in many insects; however most individual species have not been assessed. Solitary nesting bees are particularly susceptible to predators and parasites and often defend their nests furiously to protect their reproductive investment as many only produce a single nest. The small carpenter bee *Ceratina calcarata* is a well-established a model species for facultatively sociality in bees yet has not been examined for vibrational signaling. In this study, *C. calcarata* were examined during their active reproductive phase and vibrations were measured across inanimate nest disturbances and conspecific intruders. Our findings indicate there is a significant difference in the frequency of five distinct behaviours when comparing inanimate disturbances and conspecifics intruders to the control groups. In addition, *C. calcarata* responded to inanimate disturbances faster and for longer durations than to control nests or conspecific intruders. Taken together, this study is the first to document vibrational communication in a small carpenter bee with distinct sound profiles across control, conspecific and non-specific nest disturbances.

Day 2: 10:00 AM. BREAK.
We will take a short break and return at 10:30 AM.

Day 2 - #34: 10:30 AM. Immune Challenge and Thermal Tolerance in Bumble Bees

Adi Beniluz, (she/her), ScB Biology: Ecology and Evolutionary Biology; BA: Middle East Studies, Brown University, Providence RI; NSF, New Jersey, United States of America
Co-Authors: Ilima Beattie (Swarthmore College, Swarthmore, PA) & Victor H. Gonzalez (Biodiversity Institute, Division of Entomology, University of Kansas, Lawrence, KS)
Instagram: @adi_beniluz, @kubiology

Abstract: Pollinators are increasingly exposed to multiple environmental stressors in conjunction that interact to influence their survival. This study assesses the survivorship of immunocompromised workers of *Bombus pauloensis* exposed to thermal stress. To generate an immune challenge, we implanted sterilized nylon filaments in bees' abdomens and incubated them for 24 hours in groups of 3 at 25°C. We then exposed both treatment and control bees to a simulated acute heat stress event at 40°C for 5 hours, recording their survival every hour. Bees were weighed following death, and filaments were removed and analyzed for melanization. We developed survival curves for bees that completed the experiment with the filament, rejected the filament, and never received filament (control). While bees with filament began with a higher initial mortality rate, fewer died during the heat trial as compared to control. Bees that rejected the filament generally matched the control curve, but exhibited a higher initial mortality rate. These findings suggest a hormetic effect, in which a low level stressor produces a stimulatory or beneficial effect in the short term. Our study gives insights into how environmental stressors may influence the physiology and survival of tropical bees as temperatures rise globally.

Day 2 - #35: 10:45 AM. Modelling the impact of parasite influenced bee behaviour on evolution and structure in populations of *Monarda fistulosa*

Santiago Arango, (he/him), MSc Student, York University, Ontario, Canada
Co-Authors: Gordon Fitch

Abstract: One of the main things we study in community ecology is how interactions in one area of a system of species can have far reaching impacts across the network. An example of this is the phenomenon of parasite induced self-medication, where infection by parasites affects the way their host species interacts with other species in the community. While this phenomenon is an area of increasing interest, one area that remains unexplored is whether these kinds of interactions can have an impact on the evolution and composition of medicinal benefit-providing species. I am interested in using existing mathematical theory in epidemiology and mutualistic relationships to attempt to describe a common three-species system of *Crithidia-Bombus-Monarda*. My goal is to gain an understanding of the conditions under which providing a medicinal benefit may provide a selective advantage for certain chemotypes of *Monarda fistulosa*, and how these may or may not produce a change in the population.

Day 2 - #36: 11:00 AM. Air pollution effects on honey bees (*Apis mellifera*) health.

Mariana Rodriguez Lopez, (She/Her), PhD Candidate, York University, Ontario, Canada
Co-Authors: Judy Saka-Amini, Isooda Vahid Vahdattalab, Amro Zayed

Abstract: Several urban projects have focused on the inclusion of native bees in cities, as well as an increased interest in urban beekeeping. However, there is not much information on how urban challenges such as dealing with air pollution can affect bees.
Therefore, using honey bees, this project investigates how ozone, a highly oxidative air pollutant that is particularly prevalent during summer, influences honey bee behavior, health, and colony performance. At the colony level, we examine whether chronic ozone exposure affects colony health and growth. At the individual level, we assess worker bee traits including learning and memory, foraging behavior, and larval development. Finally, we investigate the molecular responses associated with oxidative stress to better understand the mechanisms underlying the observed effects.
So far, no significant differences have been detected in the learning and memory of nurse or forager bees following short-term ozone exposure. However, chronic exposure may induce measurable changes, which will be evaluated in the remaining experiments currently underway.

Day 2 - #37: 11:15 AM. Winter heatwaves in the Southern Great Plains disproportionately impact halictid bees

Keng-Lou James Hung, (he/him), Assistant Professor, Toronto Metropolitan University; University of Oklahoma, Ontario, Canada
Co-Authors: Austin Hill (U Oklahoma), Samuel O'Dell III (U Oklahoma), Benjamin Turnley (U Oklahoma), Jackson Wingert (U Oklahoma, University of Louisiana at Lafayette)

Abstract: Global climate change is causing extreme and unseasonable climate events to occur more frequently. These events may directly impact organism physiology, or may additionally disrupt ecological interactions between organisms by interfering with their phenology. For flower-visiting insects, heatwaves occurring in the winter may cause them to break dormancy prematurely and suffer from subsequent freezing events and lack of food resources. However, few studies have reported on this phenomenon. To address this data gap, we deployed fluorescent bowl and vane traps in central Oklahoma during four heatwave events in January and February, 2024, to investigate which pollinators became active during times when no floral resources were available. We collected primarily flies in the earliest rounds of trapping, with bees and butterflies becoming increasingly common in later rounds.

Unexpectedly, many quintessential “spring bees” such as members of genera *Andrena, Colletes,* and *Osmia* were conspicuously rare or absent. Instead, most collected bees were females of presumably eusocial halictid genera *Lasioglossum, Halictus*, and *Augochlorella*. If winter heatwaves disproportionately disadvantage certain pollinator taxa, there may be downstream impacts on the composition of pollinator assemblages for the remainder of the growing season, and, by extension, the nature of pollination services rendered to the plant community.

Day 2 - #38: 11:30 AM. Tripartite interactions between bee, flower and soil microbiomes across an urban gradient
Naira Woo, (she/her), MSc Student, York University, ON, Canada
Co-Authors: Trevor Sless

Abstract: Microbiomes are important to bee health, aiding in metabolism and pathogen resistance; hence, studying them could assist in the conservation of declining bee populations. Despite their importance, we do not understand how bees obtain microbes from their environment, such as the flowers they forage on, or how alterations to these environments, like urbanization, affect these microbiomes. We collected bees, flowers and soil samples across southern Ontario and sequenced the 16S and ITS regions to determine whether the red belted bumble bee (*Bombus rufocinctus*) and small carpenter bee (*Ceratina calcarata*) share bacterial and fungal associates from local flowers and soil across an urbanization gradient. The *B. rufocinctus* microbiome primarily contained bacteria commonly found in other bumble bees, but also included plant and soil-associated microbes. Bees, flowers and soil shared up to 19% and 18% of bacterial and fungal genera respectively, with soil having the most diverse microbiome of the three. Both bee species showed higher bacterial diversity with higher urbanization. However, fungal diversity showed different relationships between *B. rufocinctus* and *C. calcarata*. These findings support that bees obtain microbes from flowers, and that the diversity and composition of bee microbiomes can be altered by urbanization.

Day 2 - #39: 11:45 AM. The honey bee as the pacesetter in the biology of social insects
Christopher Starr, Professor of Entomology (ret.), University of the West Indies, Ontario, Trinidad & Tobago

Abstract: Honey bees (genus *Apis*) comprise about 12 species with a combined native range encompassing the Old World continental tropics and sub-tropics. They also have substantial presence in the temperate zone of Eurasia. One species, the western honey bee *A. mellifera*, is native to Europe, where it has been admired, prized and cultivated since before recorded history. This one circumstance has given it a central place in the scientific study of social insects as a whole.
A timeline is presented of 40 important concepts or discoveries, each pertaining to more than one of the major groups of social insects (social wasps, social bees, ants, and termites). This shows how *A. mellifera* has served as the pioneer species throughout the history of insect sociobiology. It is only in about the last century that other taxa have assumed a substantial role as foci of new concepts and discoveries.

Day 2: 12:00 PM. LUNCH.
We will take a 1-hour lunch break and return at 1:00 PM.

Day 2 - #40: 1:00 PM. *KEYNOTE PRESENTATION *
Time, flexibility, and the importance of plant-pollinator interactions
Paul CaraDonna, Chicago Botanic Garden, Northwestern University, & The Rocky Mountain Biological Laboratory, Illinois, United States of America
Instagram: @total_ecology_network

Abstract: This seminar will explore the ecology of plant-pollinator interactions. We will consider how these systems respond to rapid environmental change, the extent to which plant-pollinator interactions are flexible, and what it all means when you look closely.

Day 2 - #41: 2:00 PM. Jinkies! What do we do now? Investigating brood parasitic bee response when interacting with their ground nesting hosts
Katherine Odanaka, Postdoctoral fellow, Cornell University, New York, USA
Co-Authors: Bryan Danforth

Abstract: Approximately 13% of all bee species are brood parasites, in which the parasitic female lays eggs in the nests of other bees. Despite this incredible diversity little is known regarding how brood parasites locate nests and evade host defenses, beyond the assumption that chemical cues are heavily involved with these interactions. Using the host-parasite pair *Andrena regularis* and *Nomada imbricata* as a model system, we performed 60 timed behavioral assays using circle tubes and live individuals. Because Nomada females have been observed displaying slight territorial behavior in the field, we first determined baseline aggression between *N. imbricata* females and then observed *A. regularis* behavior towards *N. imbricata* individuals. Results from this project offer a valuable snapshot of how Nomada and Andrena react to each other within the confines of a nest and ultimately allows for greater understanding of the relationship between brood parasitic bees and their hosts.

Day 2 - #42: 2:15 PM. Understanding the molecular machinery in xenobiotic detoxification in honey bees
Aidan Jamieson, PhD Candidate, York University, Ontario, Canada
Co-Authors: Mateus Peppinneli, Laura Newburn, Amro Zayed

Abstract: Honey bees are crucial for agriculture and food security, but their health is threatened by a growing number of agricultural pesticides. Pollination is required for the reproduction of flowering plants and therefore is a critical process in agricultural systems. Insect pollinators are utilized to facilitate pollination and the western honey bee, *Apis mellifera*, is the most commonly managed pollinator in the world. It can be difficult to disentangle and identify specific stressors that affect a particular colony. Studies directly linking exposure to agrochemicals and the elicited changes in gene expression are needed to improve our comprehension of the honey bee detoxification system. We are presenting the largest RNA-Seq study on honey bee toxicology, including the effect of 18 different agrochemicals from 5 classes, across 3 tissue types totalling 99 experimental contrasts. Using differential gene expression analysis and gene co-expression networks we show that each chemical produces both common and unique patterns of gene expression. Furthermore, detox gene regulation occurred in all tissue types and was present in all chemical classes, e.g., insecticides and herbicides. Our research addresses several outstanding questions and provides important knowledge that can be mobilized to improve honey bee health and potentially the health of native pollinators.

Day 2 - #43: 2:30 PM. Maternal and Developmental Influences on Thermal Tolerance in Small Carpenter Bees

Joe Armstrong, hHe/him), PhD Student, Brock University, Ontario, Canada
Co-Authors: Miriam Richards, Molly Nethercrott

Abstract: Thermal tolerance is an important determinant of bee fitness in increasingly variable climates, yet the relative contributions of maternal inheritance and developmental temperature to thermal tolerance in small carpenter bees (*Ceratina spp*.) remain poorly understood. During the spring and summer of 2026, local Ceratina were provided with nesting substrates of raspberry (*Rubus spp*.), teasel (*Dipsacus spp*.), and rose (*Rosa spp*.), resulting in the establishment of 242 nests. Nest development was monitored in the field until harvest, and 64 nests were selected for study. Ceratina foundresses were assessed for critical thermal maximum (CTmax) as a measure of adult thermal tolerance. Offspring from each nest were reared under standardized laboratory conditions until pupation, after which they were randomly assigned to one of two developmental thermal regimes: a constant-temperature treatment or a daily fluctuating-temperature treatment. Following adult emergence, offspring CTmax was measured to evaluate the effects of pupal thermal environment on thermal tolerance. By comparing CTmax between foundresses and their offspring, we examined the relative contributions of maternal phenotype and developmental thermal environment to thermal tolerance in Ceratina. These findings provide insight into the capacity of solitary bees to respond to changing climatic conditions.

Day 2 - #44: 2:45 PM. Building a Cold-Adapted Honey Bee

Xin Zhou, (he/him), Professor, University of Guelph, Ontario, Canada

Abstract: The expansion of honey bees into temperate regions required the evolution of mechanisms that maintain colony function under prolonged cold stress. Our recent studies show that this adaptation is not explained by a single evolutionary innovation, but by coordinated changes operating across multiple biological levels. Comparative genomics across the genus Apis revealed convergent evolution of mitochondrial thermogenesis in the independently temperate lineages of the Western honey bee (*Apis mellifera*) and the Eastern honey bee (*A. cerana*). Parallel changes in the mitochondrial gene Ptcd1 increased proton leak and heat production without compromising oxidative phosphorylation, providing a mechanism for active thermogenesis. Additional adaptation involved repeated selection on ebony, which regulates both constitutive body pigmentation and phenotypic plasticity in response to temperature. We further demonstrate that the gut microbiota contributes to energy homeostasis, cold acclimation and systemic immunity, highlighting the role of host–microbiota interactions in supporting environmental adaptation. Together, these findings support a multi-level model of cold adaptation in which mitochondrial physiology, developmental plasticity and symbiotic microbial functions interact to enhance resilience in cold environments. This framework illustrates how complex adaptations emerge through coordinated evolutionary changes across genes, physiology and biological interactions, providing new insights into the evolution of social insects under environmental change.

Day 2: 3:00 PM. BREAK.
We will take a short break and return at 3:30 PM.

Day 2 - #45: 3:30 PM. Urban impacts on microbial associations in a solitary pollen-specialist bee
Trevor Sless, (he/him), Postdoctoral Researcher, York University, ON, Canada
Co-Authors: Anthony Ayers, Katherine Chau, Phuong Nguyen, Sandra Rehan

Abstract: The health and wellbeing of pollinators in the face of anthropogenic pressures is an area of major conservation concern. Urbanized landscapes can impact the biodiversity of wild pollinators at the community level, but may also affect the health of populations and individuals. In considering pollinator health from a holistic perspective, increasing research attention has focused on the microbiome of these important species, which plays a significant role in development, nutrition, behaviour, and pathogen defence. Building on our previous work characterizing wild bee microbiomes, we conducted a focused study of the microbial communities of the dietary specialist long-horned bee *Melissodes druriellus* through metabarcode sequencing of bacterial (16S) and fungal (ITS1) associates across an urbanization gradient. As the first such study of this species, our results identified the predominant microbial taxa in *M. druriellus*, which included common environmentally acquired taxa as well as a high prevalence of potentially pathogenic fungi. We found that environmental variables including urbanization were significantly associated with differences in the taxon composition of both bacterial and fungal communities in this common solitary bee. Overall, these findings highlight the marked impacts of urbanization on wild bee microbiota as well as the importance of considering specialist pollinators in wild bee conservation and land use management.

Day 2 - #46: 3:45 PM. Impact of plant chemotypes on pollinator health and community composition
Rylee Fitzgerald, (she/they), Masters student, York University, Toronto, Canada
Co-Authors: Gordon Fitch

Abstract: Pollinators provide essential services that sustain global food crops. In recent years, bees have undergone significant population declines and behaviour changes due to parasitism. When infected, a bee will be unable to forage efficiently, resulting in significantly lower resource collection. Lab studies have shown that bees may selectively forage on flowers with chemical variations (chemotype) that reduce these behavioural changes, but such dynamics remain unclear in a natural field setting. My research will be looking at how chemotype diversity impacts the effects of parasitism and pollinator community composition in the field. To analyze its impact on parasitism, I will be collecting bumblebees (Genus *Bombus*) in *Monarda fistulosa* plots (considered as medicinal plots), each containing a different chemotype (linalool, carvacrol, eucalyptol, and thymol), I will use a plot of surrounding natural flowers to serve as a non-medicinal control. Bees will be screened for infection status and level via qPCR, and pollen load and species level composition will be analyzed through PCR tests. To analyze pollinator community composition, each plot will be filmed for 10 minutes to record pollinator visitation, and then run through machine learning softwares, YOLOv8 and deepSORT, to generate metrics on pollinator diversity, foraging behaviour and duration, and flower visitation sequences. These results will be analyzed through R-studio to determine the strength of chemotype as a diversity driver. This research will clarify if chemotype variation can mitigate parasitism impacts and foster stronger pollinator community composition in a natural ecosystem, allowing for improved conservation efforts that target pollinator resilience.

Day 2 - #47: 4:00 PM. Genetics of Tolerance in Honey Bees to the Anthranilic Diamide Pesticide Cyantraniliprole
Madeline Blanco, (she/her), MSc Student, York University, Ontario, Canada
Co-Authors: Aiden Jamieson, Amro Zayed
Instagram: @madeline16_

Abstract: Honey bee pollination is integral to the economic and agricultural sectors in Canada and around the globe. Honey bees are also frequently exposed to pesticides such as neonicotinoids and anthranilic diamide pesticides (ADPs), which may negatively impact these bees. Certain ADPs, like cyantraniliprole, may represent a safer alternative to neonicotinoids due to lower selective toxicity towards honey bees. However, there still remains variable evidence in support of ADPs, with some studies citing little to no harmful effects on honey bees and others citing significant risk to honey bees. This study aims to explore how variance in the phenotypic trait of cyantraniliprole tolerance may be explained by genetic variance. 482 honey bees were exposed to an acute dose of cyantraniliprole, and then their mortality was assessed 24 hours post-exposure. Worker survival after the exposure to the cyantraniliprole dose was found to be heritable (H2 = 70%), indicating a large proportion of the phenotypic variance is due to genetic variance. These findings are important for informing proper assessment of pesticide risk in honey bees

Day 2 - #48: 4:15 PM. Investigating juvenile hormone effects on aggression and seasonal flight timing in male eastern carpenter bees

Lyllian Corbin, (she/her), PhD Candidate, Brock University, Ontario, Canada
Co-Authors: James Mesich, Miriam Richards

Abstract: Males of the eastern carpenter bee aggressively defend territories at nesting sites to maximise their mating access to females. We investigated male aggression with circle tube assays, hypothesising that juvenile hormones influence territorial behaviour. Thus, males treated with a juvenile hormone analog, methoprene, should be more aggressive than water-treated (control) males. Males flying early in the spring, waiting for females to emerge, should have higher juvenile hormone titres than late males flying after most females have begun flying.

In 2024 and 2025, we captured males flying at nesting aggregations near campus, then observed male aggression in circle tube arenas before and after treatment. Methoprene-treated males showed lower latencies to aggression than water-treated males, indicating that methoprene increased males' tendency to act aggressive towards conspecifics. In 2025, we captured newly emerged males from their nests and males flying throughout the spring, then quantified juvenile hormone titres from their hemolymph. Males' hormone titres were high before females emerged then declined after females began flying. Thus, variation in juvenile hormone titres might explain differences in male territoriality.

Day 2 - #49: 4:30 PM. Polyandry reshapes selection on linked loci in eusocial colonies

Brock Harpur, (he/him), Associate Professor, Purdue University, Indiana, USA

Abstract: Eusocial organisms often exhibit high levels of polyandry, with queens mating multiply despite the potential costs of promiscuity. The evolution of polyandry has therefore been widely discussed, particularly in the context of genetic diversity, disease resistance, and colony performance. However, comparatively little is known about its longer-term evolutionary consequences for linked loci and multilocus adaptation under colony-level selection. Here, I develop an individual-based simulation model of colonies to investigate how polyandry interacts with recombination and selection to shape the dynamics of linked alleles. I consider a beneficial locus that enhances colony performance and a linked locus that reduces fitness, both contributing to colony phenotype via a shared genotype–phenotype mapping. I find that deleterious alleles can persist at high frequency via hitchhiking when linkage is strong, even under substantial fitness costs. Increasing polyandry reduces the persistence of deleterious alleles in a way similar to increasing recombination rates. These effects generate nonlinear interactions

among recombination, polyandry, and selection strength. This work highlights how social organization can shape the evolutionary dynamics of linked genes, with implications for the evolution of complex traits in eusocial systems.

Day 2 - #50: 4:45 PM. Effect of Insecticides Used to Control Hemlock Woolly Adelgid on Bumble Bee Learning Under Heatwave Conditions

Jane Vurdela, (she/her), MSc Student, Acadia University, Nova Scotia, Canada
Co-Authors: Christopher Edge (Canadian Forest Service), N. Kirk Hillier (Acadia University)

Abstract: Hemlock forests are unique and ecologically important environments that are threatened by the invasive hemlock woolly adelgid (HWA). The hemlock forests of eastern Canada are the last vestiges of old growth forest and provide habitat for a variety of native pollinators, including bumble bees. Currently, HWA infestations are controlled with two neonicotinoid insecticides, dinotefuran and imidacloprid, applied as basal bark sprays. Neonicotinoid insecticides have been shown to have both lethal and sub-lethal effects on bees, including effects on motor functions, reproduction, thermoregulation, as well as learning and memory, with the majority of research being conducted on western honey bees (*Apis mellifera*). High temperatures, which are becoming more common with climate change, have been shown to affect bumble bee learning and memory when in concert with other stressors. I am using free-moving proboscis extension response assays on the common eastern bumblebee (Bombus impatiens) to evaluate the effects of imidacloprid, dinotefuran and their combination on learning and memory retention under normal summer temperatures (25ºC) and heatwave temperatures (32ºC). My research will improve our understanding of how neonicotinoid insecticides and heat stress interact to influence cognitive performance in native pollinators and inform assessments of the ecological risks associated with HWA management.

Day 2 - #51: 5:00 PM. Concluding Remarks.

Laura Newburn, BEEc Coordinator, York University, Ontario, Canada
Twitter: @BeesYork Instagram: @BeesAtYork

Abstract: Thanks for attending day two of BeeCon 2026. Reminders will be given and sponsors and organizers thanked.

That's It for BeeCon 2026!

If you have any feedback on this event, please contact the BEEc Coordinator at beec@yorku.ca. We hope that you enjoyed BeeCon 2026 and will join us again in the future. Visit us online at https://www.yorku.ca/bees/.

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