

Volume 28 | Issue 1 | June 6, 2023 ENTOMOLOGICAL SOCIETY OF ONTARIO SPRING NEWSLETTER

Photo: Robert Guimont (BugEye 2022 Best Ontario Insect)

From the board

Officers of the ESO	2
President's address	3-4
Nominations	5-12

Events

2023 ESO AGM	. 13
TEA East Toronto Butterfly Count	. 14

Outreach & BugEye

Guelph Bug Day	15-16
BugEye photo contest	17-18

Featured article

Temporal analysis of genetic diversity in an isolated population of Bog Copper butterflies 19-21

Society & Postings

Student opportunities	22
Job postings	23
Call for outreach funding applications	24
Message from ESO the Communications Team	25
Join the ESO board	26
Publish in JESO	27
ESO membership info	28

IN THIS ISSUE



PRESIDENT

Laura Timms Credit Valley Conservation PRESIDENT-ELECT Justin Renkema

AAFC

Alex Smith University of Guelph



SECRETARY Samm Reynolds University of Guelph



TREASURER Alan Macnaughton University of Waterloo



ESO REP TO ESC **Roselyn Labbé** AAFC



WEBMASTER **Kaitlyn Fleming Trent University**



DIRECTOR ('21-23)

Andrew Young University of Guelph



Christi Jaegar AAFC



JESO CO-EDITOR

Catherine Scott

McGill University



DIRECTOR (²²⁻²⁴) Shannon McCauley University of Toronto



DIRECTOR ('23-25) Lauren Des Marteaux AAFC



NEWSLETTER CO-EDITORS Kruti Shukla / Lauren Des Marteaux Toronto Metropolitan U. / AAFC



STUDENT REP ('21-24) Matthew Muzzatti **Carleton University**



NRCAN

JESO EDITOR

Chris MacQuarrie



JESO CO-EDITOR

Morgan Jackson McGill University



DIRECTOR ('23-25)

Heath MacMillan

Carleton University

JESO ASSOC. EDITOR

Jocelyn Smith University of Guelph



JESO ASSOC. EDITOR Andrew Bennett AAFC



JESO TECH. EDITOR Thomas Onuferko

York University

OFFICERS OF THE ESO





Zen and the art of butterfly hunting

For a few days this spring and last spring, I have gone out with groups of CVC colleagues to look for a rare butterfly. We have not been successful in our hunts, but you'll probably find me out there again next year.

Looking for rare species has its challenges. This is mostly because, by definition, they are not common. If you don't see them, you're never quite sure if its because you're not looking in the right place, at the right time, in the right way – or if they're just truly not there. I sometimes imagine the butterflies have been hiding from me, emerging just after I've walked by, feeling smug at having avoided me yet again.

The species we've been looking for, the West Virginia White, has not been seen in the Credit River Watershed since the 1990s. It has been seen nearby in Halton though, and there are several areas of suitable habitat here, so it is not completely unreasonable to expect that there might be West Virginia White butterflies somewhere out there in the watershed.

West Virginia White butterflies live in large, rich, deciduous forests. Their life cycle is closely tied to spring ephemerals – woodland wildflowers that bloom before the trees fully leaf out. Adult butterflies feed on the nectar of these spring forest flowers, and their caterpillars eat the leaves of two species of toothwort – spring ephemerals in the mustard family.

PRESIDENT'S ADDRESS



West Virginia White is currently a <u>provincial species of Special Concern</u>. It was designated as Endangered in 1976 – the first insect listed as a Species at Risk in Ontario, only five years after the passing of the first provincial *Endangered Species Act*. The species listing was the result of <u>studies and lobbying</u> by the Toronto Entomologists Association, who were concerned about a quarry application affecting the only known population at the time. Surveys the 1990s located several new populations, and the species was downlisted.

Though we know now of several West Virginia White populations in Ontario, threats to the species are ongoing. Major threats include habitat fragmentation, overabundant deer, and the spread of Garlic Mustard. Garlic Mustard is closely related to toothwort, and female West Virginia Whites will get fooled into laying eggs on them. Unfortunately, their caterpillars don't grow well when they eat Garlic Mustard and eggs laid on these plants won't successfully develop into adult butterflies.

Some of the sites we've surveyed have had evidence of many of these issues, with Garlic Mustard and signs of deer browse everywhere. Others have seemed relatively untouched, begging the question – why aren't the butterflies there?!

The phrase *absence of evidence is not evidence of absence* is a good one to remember when you're looking for something that's hard to find. So even though we haven't seen any West Virginia White butterflies, I remain optimistic. The surveys have allowed us to collect data on many other animal and plant species, including several Species at Risk. And to spend several lovely spring days walking around the forest chatting with colleagues. So maybe we have been successful after all.

I hope to see many of you this fall at the Annual General Meeting in Guelph. I'd love to hear about your successes – big and small. Until then, happy bug hunting!

Laura Timms ESO President

PRESIDENT'S ADDRESS



Angela Gradish

President-elect

I grew up in Tillsonburg, Ontario, where I spent many hours outside exploring in the forests along the Big Otter Creek and on my family's farm. Although I've always loved nature and animals, my fascination with insects didn't start until I took an insect physiology class in my last semester of my BSc in Zoology at Western University. After my undergrad, I did my MSc at the University of Guelph with Dr. Cynthia Scott-Dupree on the non-target effects of pesticides on beneficial arthropods used in greenhouse vegetable production. For my PhD, I moved to the lab next door to work with Dr. Gard Otis on the population genetics and conservation of Arctic butterflies (Oeneis spp.). I then went back to Cynthia's lab for a post doc on pesticide risk assessment methods for non-Apis bees. Finally, I moved next door again (to the left

this time) for my current position as a research associate in Dr. Rebecca Hallett's lab, where I'm working on projects related to integrated pest management. So far in my career I've worked with 22 species of insects and mites (but who's counting?).

The first conference I ever attended was the 2006 ESO AGM in Guelph, and I've been an active member of the ESO ever since. I've served as newsletter editor (2010–2013) and on various awards and outreach committees, and I helped to organize the 2013 ESC/ESO JAM and 2017 ESO AGM. Through these positions and by attending the AGMs, I have learned how valuable the ESO is for staying informed of the latest insect research and connecting with other entomologists. I have met many wonderful insect enthusiasts and developed relationships that have been instrumental to my professional and personal development. I would be honored and proud to serve as President, and I would work diligently to promote the ESO and entomology in Ontario, and ensure members benefit from the society as much as I have!

NOMINATIONS – PRESIDENT



Scott Maclvor

Director

I am an ecologist, melittologist, and assistant professor in the Department of Biological Sciences at the University of Toronto Scarborough. I completed my undergraduate degree at the University of Guelph, my Masters at Saint Mary's University in Halifax, and my PhD at York University in Toronto. Prior to joining UTSC, I taught in the Daniels Faculty of Architecture, Landscape, and Design at UofT, and at Toronto Metropolitan University.

I have presented my research worldwide and published over 60 scientific articles and book chapters on topics including urban ecology, green infrastructure, and biodiversity conservation. Most notably, my work has led to the understanding of how green roofs and other constructed green infrastructure support urban wildlife (and especially bees!), stormwater management, temperature cooling, and food security. I was awarded the 2022 Sustainability Science Award from the Ecological Society of America, the largest professional organization of ecologists in the US and one of the largest ecological societies in the world.

At UTSC, I lead the Biodiversity of Urban Green Spaces (or 'BUGS') lab where the aim is to balance trade-offs and find synergies in urban planning that supports people and nature. This has led to leadership and collaborations at national and international levels to characterize urban biodiversity, promote its conservation, and integrate its ecosystem services contributions into green infrastructure. Locally in Toronto, I work with city planners, policymakers, community members and other stakeholders to promote and celebrate urban biodiversity to connect people to nature.

NOMINATIONS – DIRECTOR



Kruti Shukla

Director

My foray into the entomological world came at the University of Guelph during my undergraduate thesis and continued into my Master's. Much of my insect exposure has been from an agricultural perspective. During my undergrad, I worked on two major projects. First, with Drs. Johnathan Newman and Geraldine Ryan, I studied how bird-cherry-oat aphid populations responded to elevated CO_2 and N fertilization in fungal-infected agricultural grasses. Second, with Dr. Rebecca Hallett, I tested different staining methods to detect larval parasitic wasps in soybean aphids. For my Master's, I continued to work on fungal-infected grasses but shifted my focus to how these grasses may affect the biodiversity of insect and plant communities. Through this MSc, I had the opportunity to learn insect identification from entomologists in the Marshall lab (University of Guelph) and grew to appreciate how incredibly diverse insects/arthropod communities are. I have met the most amazing people that I am happy to call colleagues and friends to this day.

Currently, I'm working as a post-doctoral fellow (as an Ecologist) on a Mitacs-funded project at Toronto Metropolitan University. Although my research has shifted away from insects, I continue to dabble in the arthropod world. I've been part of the Entomological Society of Ontario since 2015 as a co-editor for the newsletter and recently joined the ESO outreach committee (since 2020). I play an active lab-teaching role as part of the zoology courses offered at Toronto Metropolitan University and am always interested in incorporating an insect-related aspect into any project!

NOMINATIONS – DIRECTOR



10

Cara McCreary

Director

I am the greenhouse vegetable integrated pest management specialist at the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). I am extremely passionate about all things IPM. I was first exposed to greenhouse production when I landed a job as a scout in a 52-acre tomato greenhouse while I was in post-secondary school. The more I learned about biological control agents, the greater my passion grew.

I have an eclectic compilation of post-secondary education, including a B.Comm from the University of Windsor, an Associate Diploma in Horticulture from the University of Guelph Ridgetown Campus, a slew of undergrad science/entomology and statistics courses followed by an M.Sc. in Environmental Biology at the University of Guelph. During my Masters, I studied the life cycle, temperature-dependent development, and economic impact of the bean leaf beetle.

Throughout and in between my studies, I was employed as a Research Assistant in a few different programs at the University of Guelph. From 2011-2012, I was Acting Field Crop Entomologist at OMAFRA, after which I entered a position as a Research Associate for the Edible Bean Program at the University of Guelph. I 've been in my current position with the ministry in January of 2015. My portfolio includes working with researchers, producers, and industry allies to solve pest problems in greenhouse vegetables and soft fruit, indoor and vertical farms, and indoor cannabis. I have worked extensively on emerging pest issues, such as pepper weevil.

In addition to my work, I am a wife and a mom to three young kids (who also love bugs), two cats, two dogs and a fish! I love gardening, camping, and hiking.

NOMINATIONS – DIRECTOR



Alex Rimmer Student representative

Hello ESO, my name is Alex Rimmer. I have had a love of all invertebrates, but insects especially, since I was very young. I pursued this love into a Bachelor of Science at Toronto Metropolitan University where I focused my studies and research on invertebrate ecology, doing research under the co-supervision of Dr. Janet Koprivnikar and Dr. Lesley Campbell studying the effects of cannabinoids on *Daphnia* behaviour. I am currently a PhD student at the University of Toronto in Dr. Sandy Smith's forest health lab. My research is focused on integrated pest management of the invasive box tree moth studying the plant-insect interactions of the box tree moth and its host plant boxwood as well as joining my love of parasite ecology and entomology studying the potential for North American *Trichogramma* spp. as biocontrol agents for this invasive insect.

I have been a member of the ESO since 2019, however due to COVID restrictions I have not had the opportunity to join a meeting in person. I am very excited to attend my first ESO AGM in 2023 and would love the opportunity to be a larger part of ESO as a student representative. Through my TA work at the University of Toronto I have enjoyed helping to nurture young scientists and instill a love of entomology into all those who cross my path by sharing my own enthusiasm and knowledge. Studying entomology for me has been as much about insects and the natural systems they inhabit as it is about the people who study them. Those who study entomology are as unique, diverse, and fascinating as the class Insecta. It has been a true pleasure connecting and interacting with fellow entomologists. I would be extremely grateful and excited for the opportunity to bring that same enthusiasm to this new role and serve the ESO community. My priorities as a student representative would be to continue to foster a nurturing environment for students to share their research and promote peer-networking and opportunities for connecting passionate entomologists from around the province.

NOMINATIONS – STUDENT REP.



Stefane Saruhashi Student representative

I am passionate about animals and how they interact with the environment. I acquire my degree in biology (BSc and teaching) in University of Sao Paulo, Brazil. During my undergrad I studied the ecophysiology of spiders. I spent a year studying abroad an did an internship measuring the colors of gliding lizards at University of New South Wales, Australia and did my honours thesis on metabolism and daily rhythms of toads at University of Sao Paulo (USP). Despite not working directly with insects during my undergraduate studies, I had multiple classes about their physiology and was aways fascinated by the diversity of this group. During my MSc in Brazil I worked with the complex of cryptic species *Anastrepha fraterculus* and felt in love by their complex reproductive behavior and potential to be a model to study evolutionary physiology. Before I finish my MSc I met my current supervisor Dr. Sinclair in a conference in Argentina got invited to research the mechanisms underlying insect freeze tolerance using the cricket *Gryllus veletis* as model.

During my undergrad, I maintained my teaching roots by volunteering in outreach events such as the Biology day, I did internships in private and public schools and participated in the student lead projects "Estacao biologia" in which we created activities teach biology and excursions for students from public schools in Sao Paulo, Brazil. During my MSc I helped organizing "Curso de inverno" in 2018 and 2019, a two-week course opened to graduate students from Brazil to discuss and learn basic concepts of comparative physiology. Here in Canada, I was happy and luck to work as co-chair in the resurrection of the London Bug Day after the two years break due to COVID-19, co-chair of the 53rd Ontario Ecology, Ethology and Evolution Colloquium at Western University and I also volunteer as a coach in a local volleyball girls' team in my free time.

My aim as representative student is to build a close relationship between students, members of the ESO, and the non-scientific community.

NOMINATIONS – STUDENT REP.



11

Janean Sharkey (she/hers) Student representative

Hello ESO! I am a PhD student in the Department of Physical and Environmental Sciences at the University of Toronto Scarborough, where I'm co-supervised by Drs. Scott Maclvor and Marc Cadotte in their urban ecology labs. My graduate research focuses on the biodiversity, conservation, and ecology of wild bees in Canada. I'm interested in how pressures from urbanization and habitat management impact wild bee communities, especially in rare habitats. I recently completed a MSc in Environmental Science (2022) at the University of Guelph with Dr. Nigel Raine where I studied bee communities in restored and managed tallgrass prairie and oak savanna in southern Ontario. During this time, I documented several new bee species records for Canada including a range expansion and first Canadian genus record of the specialist Hibiscus

Bee, (*Ptilothrix bombiformis*). I also have a BSc in Biology, with an emphasis in Conservation Biology (2006) from Trent University, where I took my first entomology course and made my first insect collection! In between my BSc and MSc, I worked primarily in BC as an environmental consultant on a broad range of projects involving biodiversity monitoring, including terrestrial arthropods, as well as habitat restoration and measuring change in disturbed habitats.

I am a member of the Toronto Entomologist's Association, Entomological Society of Ontario, and the Entomological Society of Canada and have been a member of one of these societies and/or the Entomological Society of BC for 10 years. I feel strongly about mentoring junior researchers and participating in science communication, outreach and education events. I'm excited about this opportunity to serve on the board of ESO as a student representative, both to learn more about how societies function and to support entomology students and their research in Ontario.

NOMINATIONS – STUDENT REP.



Cynthia Scott-Dupree ESO FELLOW

Cynthia has recently retired after serving as a faculty member at the University of Guelph for over 37 years. She was the first woman hired on as faculty in the Environmental Biology Department at the University of Guelph in 1986. She paved the way for future generations of women faculty and students. Over her career, Cynthia's research has spanned apiculture, pollinator health, toxicology, and integrated pest management generating over 100 publications. Her research has had a very applied and academic nature, she often brings tangible solutions to growers and other stakeholders. You don't have to look hard to find vegetable or floriculture growers using knowledge generated by Cynthia's lab in their pest

management programs. She has continued to push ideas into action, with novel research into sterile insect technique and RNAi (RNA interference) as sustainable management options. Cynthia's contribution to entomology extends beyond just the research that has come out of her lab. In 2022, she was awarded the G.P. McRostie Faculty Award by the Ontario Agricultural College for her dedication to mentoring. Over her career, Cynthia has supervised more than 60 graduate students, many of whom have gone on to provide significant advancements to entomology through government, academia, and industry positions. Cynthia has always encouraged her students to engage in knowledge mobilization, supporting students with opportunities to present at conferences, and to write both scientific and popular press articles. She is an outstanding researcher, mentor and entomologist and is highly deserving of the honour of being a Fellow to the Entomological Society of Ontario.

NOMINATIONS – ESO FELLOW

2023 ESO AGM

Backyard bugs: Community Science in Entomology

Date: October 27-29, 2023

This year we are excited to announce that our Annual General Meeting (AGM) will be taking place at the Arboretum in Guelph, Ontario! The venue is surrounded by 400 acres of gorgeous gardens, walking trails, natural woodland and wetlands. This is a perfect spot to reflect on how important the pockets of nature in our backyard can be for research and community science.

Throughout the pandemic, we saw an uptick in research scientists relying on help from community scientists across Canada as travel became more difficult. This experience illuminated how important it is to spark excitement for science in our communities and to understand the important role that anyone can play in science and conservation. We look forward to exploring these themes and connecting insect lovers across the province at this year's AGM!

Registration will have the option for in person attendance as well as a hybrid option. For those in person, the cost will include a social on Friday night, lunch and dinner on Saturday and snacks throughout the weekend. We can't wait to see you there!

Check the <u>ESO website</u> for more details on registration and programming, coming soon!

be taking place at the Arboretum in Guel , natural woodland and wetlands. This is research and community science.





DEADLINES

Early registration:September 15Abstract submission:October 6Poster pdf submission:October 16Final Registration:October 16

EAST TORONTO BUTTERFLY COUNT

Saturday, July 1, 2023. 9:00 AM Coordinator: Carolyn King

Bone up on your ID skills and help count butterflies in the Rouge or Don Valley. This is an official NABA count, with a participation fee; the TEA will pay the fee for members. For those counting in the Rouge, meet Tom Mason at 9AM at the Pearse House. From Sheppard Ave go north on Meadowvale Rd; take the exit to the Toronto Zoo but turn RIGHT at the first turn and park along the side of the road. Bring nets, containers, lunch and water. No collecting in the Rouge.

Want to participate or have a question? Contact Carolyn King (905-720-2784, <u>cking8000@gmail.com</u>)





TEA EAST TORONTO BUTTERFLY COUNT



Guelph Bug Day 2023

 Guelph Bug Day (GBD) is organized and run by graduate and undergraduate students to celebrate insects

Date: Sunday, August 13, 2023 Location: Arboretum Centre, 200 Arboretum Rd, Guelph, ON Time: 10 am- 5 pm Guelph Bug Day (GBD) is organized and run by graduate students to celebrate insects in the natural and human world. This one-day event is targeted at families and students but attracts a diverse community of insect enthusiasts. It aims to instil a love, curiosity, and appreciation for insects through a variety of activities, including guided insect hikes, aquatic insect pools, insect-themed craft tables, information and display booths, live insect zoos, and other insect-themed events and workshops. Guelph Bug Day provides hands-on experiential learning and helps people develop skills in insect collection and identification.

Guelph Bug Day relies on volunteers from multiple colleges and disciplines at the university. The University of Guelph has a dedicated community of professional and semi-professional entomologists who help run the event, providing enthusiasm and support for GBD. Guelph Bug Day allows student volunteers to develop their communication and public speaking skills, transfer and encourage scientific literacy within the community, and engage with the public to support knowledge translation. Undergraduate volunteers helping with this event will gain critical skills to encourage their future in science, research, and outreach. They will also make valuable connections and contacts with the passionate entomologists that our event attracts. Based on the attendance of previous years, we estimate attendance to be around 1500-1800 people.

2023 GUELPH BUG DAY

Activities

- 1) Kids Hike (11am 12pm, 3pm 4pm)
- 2) Pollinator Hike (1pm 2pm)
- 3) Forest Hike (2pm 3pm)
- 4) Pinning Workshop (11am 12pm, 3pm 4pm)
- 5) Honey Bee Research Centre Tour (10:30am 12:15pm, 2pm 3:45pm)

Booth information

- a. Cockroach Races
- b. Edible Insects
- c. Aquatic Insects
- d. Integrative Biology Invertebrate Collection
- e. Cambridge Butterfly Conservatory
- f. Craft Table
- g. Insect Obstacle Course
- h. U of G Insect Collection
- i. Amazing Arachnids
- j. Monarchs!
- k. What Eats My Food?
- I. Face painting/temporary tattoos



MOSEY ON OVER AND VOLUNTEER FOR GUELPH BUG Day

Booth leads, graphic designers, and organizer needed Contact **guelphbugday@gmail.com** for more information

Details on our <u>website</u>!



2023 GUELPH BUG DAY

SUBMIT A PHOTOGRAPH TO THE BUGEYE PHOTO CONTEST!

All Ontario residents, including international students living in Ontario, are eligible

You may submit <u>up to 3 unique images</u>, but can only win one prize plus the People's Choice Award. The best pictures submitted will be selected by judges and entered into the People's Choice Award competition. People's Choice entries will be posted on the ESO website, ESO social media, and/or on a photo sharing website such as flickr for the community to vote on, in addition to being displayed at the ESO Annual Meeting. If you do not wish for your photo to be posted publicly, you can choose to not participate in the People's Choice Award. Copyright for the photo remains with the photographer, but use must be granted for ESO promotional material.

Instructions:

- Images must be of insects or closely related arthropod species (mites, spiders, etc).
- All submissions must be digital files, and may be either 'landscape' or 'portrait' in orientation.
- Submit the image file by creating a digital file that is the equivalent of 7.5 inch by 10 inch (19.5 cm by 25.4 cm), at 300 dpi, formatted as a jpg. Images from film must be digitally scanned and then edited to 7.5 inch by 10 inch, at 300 dpi.
- Create a filename using an appropriate title, underscore, your last name, underscore, first initial (e.g. dragonfly_smith_j.jpg).
- Include a short description of your entries (where they were taken, why you like them, etc.)
- Indicate whether:
 - 1. your photo is of an Ontario insect
 - 2. you are a child under the age of 13
 - 3. you would like to be considered for the People's Choice Award.
- Photographic enhancement is allowed as long as it is something that could also be achieved in a real darkroom with a color or black & white negative (e.g. adjustment of contrast, color enhancement, cropping, etc.). However, very dubious enhancements will be negatively scored.

2023 BUGEYE PHOTO CONTEST



Judging criteria is based on

a) image composition
b) visual impact of image
c) subject interest
d) sharpness of subject
e) difficulty of image acquisition
f) lighting

BugEye prize categories

Best photo (\$50) Best photo of an Ontario insect (\$50) Best photo by a junior entomologist under 13 (1st \$25, 2nd \$20, 3rd \$10) People's Choice Award (\$50)



Open to all Ontario residents, no entry fee Submission deadline: September 30, 2023 Submit photos to: esophotos@gmail.com Winners announced at the upcoming ESO AGM



2020 Best Ontario Insect & People's Choice: Rory Wills

2023 BUGEYE PHOTO CONTEST

Temporal analysis of genetic diversity in an isolated population of Bog Copper butterflies, Tharsalea epixanthe

Michela Contursi and Nusha Keyghobadi. Biology Department, The University of Western Ontario

Due to many factors, fragmented habitats are common for many species. Species will exist in patches of suitable habitat surrounded by areas of unsuitable habitat, which can act as barriers to movement, reduce the flow of genetic information, and reinforce genetic isolation of the populations living within those patches. Additionally, smaller populations surviving in those habitat patches are at increased risk of extinction due to demographic and genetic stochasticity. A stochastic (or random) event like a fire can cause losses in not only the number of individuals, but also in the amount of genetic diversity present in the population left over. Decreased population size and decreased genetic diversity is associated with decreased population resiliency and adaptability when faced with environmental change, which is a growing problem today.

The Bog Copper, *Tharsalea epixanthe* (Fig. 1) is such a species restricted to having small population numbers living in fragmented habitat patches. Bog Coppers are found in eastern North America and can only live in acidic peat bog ecosystems. These butterflies are restricted to bog habitats because they exclusively feed on their host plant, native wild cranberry, *Vaccinium macrocarpon* and *Vaccinium oxycoccos*, which only grow naturally in bogs.

There is a small population of Bog Coppers in Sifton Bog, in London, Ontario (Fig. 2). Sifton Bog, the southernmost bog ecosystem in Canada, is an Environmentally Significant Area in the city, and houses many unique species. This bog is surrounded on all sides by the city and the butterfly population is highly isolated, as the next closest known population of Bog Coppers is in the Cambridge region of Ontario, 100 km away.



Figure 1. Bog Copper (*T. epixanthe*) butterfly adults. Photo credits: Michela Contursi

19 GENETIC DIVERSITY IN BOG COPPER BUTTERFLIES

Bog Coppers are not strong fliers and cannot travel long distances, so the transfer of genetic information between populations is very limited, which reinforces population isolation. The degree of geographic isolation of the Bog Copper population in Sifton Bog brought me to ask several questions including, (1) how has genetic diversity changed over time, and (2) how much genetic isolation is this population experiencing compared to other butterfly populations (Fig. 3).

My study involved the amplification of 10 microsatellite loci from the Sifton Bog population of Bog Coppers and analysis across three sampling years: 2009, 2014, and 2022. Microsatellites are repetitive sections within genomes, and they are highly variable, which makes them great for differentiating between individuals within a single population. The data from 2009 and 2014 was already available for my use, but I fully processed the 2022 samples. I took non-lethal wing clip samples from 30 Bog Copper individuals in the Sifton Bog in June of 2022. From there, I extracted the DNA from those samples, combined the data with that of 2009 and 2014, and then ran a series of tests to quantify the amount of genetic variation present and how it has changed over time.



Figure 2. Aerial view of Sifton Bog, London, Ontario, Canada located at 42°58'17" N 81°19'29" W. All sides of the bog are surrounded by anthropogenic land use. The inner bog ecosystem where Bog Coppers are found (red circle) is accessible via a raised boardwalk and platform for viewing. Image modified from Google Earth v.9.185.0.0. Source: Google, 2023



Figure 3. Map displaying the geographic isolation of the Sifton Bog population of Bog Coppers, with approximate London and Cambridge populations in red. Source: iNaturalist, 2023.

GENETIC DIVERSITY IN BOG COPPER BUTTERFLIES

All the analyses I completed for this study supplement each other to answer the same question; how is this Bog Copper population doing conservation-wise, from a genetic standpoint. The amount of geographic isolation this population is subjected to is resulting in drastically reduced gene flow and no introduction of new genetic information into the population, ultimately resulting in the progressive erosion of genetic diversity. The amount of genetic diversity in this population is not only lower when compared to other butterfly species, but also to other populations of Bog Coppers. The declining genetic diversity leaves the Sifton Bog population vulnerable to random events and changes to their environment. Though there is the possibility that this small population has some resistance mechanisms to combat low genetic diversity and persist, a higher genetic diversity is always better.



Bog Copper butterfly (*T. epixanthe*) individual perched on my finger for size reference. Photo credit: Shayla Kroeze.



Butterfly catching at the Sifton Bog. Photo credit: Shayla Kroeze.

The Sifton Bog is a beloved natural ecosystem nested in the city of London, and within it, this Bog Copper population is incredibly important and charismatic. The bog itself is unique and acts as a spot for locals to walk and enjoy native wildlife, an opportunity that has its own intrinsic value. The Bog Coppers are important pollinators in the ecosystem as well! Even though this population does not seem to be doing well genetically, I hope that this study helps inform the potential need for regular monitoring of the population or genetic rescue efforts, especially if these trends of lowered genetic diversity continue. Additionally, this study highlights the importance of urban natural landscapes and the unique wildlife they house. It acts as just one example of why we should work to conserve and protect small populations.

GENETIC DIVERSITY IN BOG COPPER BUTTERFLIES

GRADUATE STUDENT POSITIONS



Drawing by David Beresford

MSc & PhD – Molecular Physiology of Insect Freeze Tolerance

University of Western Ontario London, Ontario Deadline: None Listed (Anticipated Start Date: Fall 2024)

MSc & PhD – Insect Plant / Microbe Interaction (fully funded)

Louisiana State University Baton Rouge, Louisiana, USA Deadline: June 15, 2023

STUDENT OPPORTUNITIES

JOB POSTINGS



FORMULA

Entomology Technician

GoldBloom Inc., Toronto, Ontario Deadline: None listed Company Website: https://goldbloominc.com/

Research Assistant/Technician

University of British Columbia, Vancouver, BC Deadline: July 2, 2023

Field Station Development Representative FMC – An Agricultural Sciences Company, Alberta, Canada Deadline: None Listed

Precision Agriculture Project Manager

CropVue Technologies Inc Surrey, British Columbia Deadline: None listed (Anticipated Start Date: July 3, 2023)

For more postings, visit the <u>ESC-SEC opportunities</u>, <u>ESA careers</u>, and <u>CSEE</u> pages.

JOB POSTINGS

ESO CAN SUPPORT YOUR ENTO OUTREACH EVENT

Outreach is one of the most important ways to communicate and promote public awareness of science, entomology, and an appreciation of nature in general. It is also a great way to inspire future entomologists. The ESO has especially focused on insectrelated outreach over the last 10 years, supporting the province's largest entomology events such as Bug Days in Ottawa, Guelph, and London, in addition to smaller, one-time events.

If you are planning an ento-related public outreach event in Ontario, the ESO can provide some financial support! Let us know your intent to apply by emailing <u>entsocont.newsletter@gmail.com</u> with the subject "Outreach application". We will then send you a 1-page application form. Because funding allocation must be decided early, application forms submitted after the deadline may not be eligible for support.



Guelph Bug Day 2017 – outdoor collecting

Outreach Application deadline: March 15, 2024

OUTREACH EVENT PLANNING

Looking for ESO Communication Members

Hello all members of the ESO! Do you love sharing insect memes and updates about bug related events? Consider joining our Communications Committee! Our team is looking for individuals to collaborate and contribute to our social media pages and inform members of job opportunities, society information, and general insect updates. You will work alongside an established team to keep our social media up and running and work with our Webmaster to keep the website updated. This is a critical role for the society and would look great on a CV! If you're interested in learning more about this role, <u>email us</u>. If you know someone who might be interested and is not on our mailing list feel free to forward this along!





Follow ESO on Instagram! @ent_soc_ontario

Entomological Society now has Instagram. Visit our page to learn about upcoming contests, events, and members' research! Follow, like, and share!

Interested in showcasing your work on our Instagram?

We are looking to showcase some work from entomologists in our community! If you're interested in having your work shared to our media accounts, please submit a blurb to the Comms. Chair, <u>Shannon McCauley</u>. Example content:

- A recent paper that's come out (include the title, a short blurb, and a picture)
- Other ento-related work or events, e.g. projects in restoration, agriculture/forestry, community that highlight the work people in the society are doing (include a blurb about the project and a picture)

ESO COMMUNICATIONS TEAM

JOIN THE ESO BOARD!

The ESO society functions thanks to the help of the board. There are many different positions, and joining is a great way to make a difference to the society, work in a team, and gain public service experience in a relaxed, friendly atmosphere. Within the board you will also get the opportunity to join various committees for outreach, meeting planning, and more. Perhaps you have some new ideas or expertise that you'd like to bring to the society!

Each summer, the ESO members elect an incoming president, two directors, and a student representative. The duration of these positions is as follows:

President: 3 years (incoming, current, outgoing) Director: 2 years Student representative: 2 years

Interested members can send their photo and a short bio to Samm Reynolds: sreyno08@uoguelph.ca



Some of the past ESO board

BECOME A BOARD MEMBER



PUBLISH IN JESO!

The Journal of the Entomological Society (JESO) is the second oldest entomological journal in North America.

Papers on any aspect of entomology are accepted, and do not need to be restricted to Ontario! Both French and English manuscripts are welcome. At least one author must be a member of the ESO. To submit, please see the Instructions for Authors page.



JOURNAL OF THE ESO

JOURNAL

of the **ENTOMOLOGICAL** SOCIETY OF **ONTARIO**

Volume One Hundred and Fifty One 2020

13521 1713-7845

27

THE ENTOMOLOGICAL SOCIETY OF ONTARIO



Just fill out this form (+ cheque or money order if required) and send to the send to the

Michelle Locke Entomological Society of Ontario

Vista Centre, 1830 Bank St P.O. Box 83025 Ottawa, ON, K1V 1A3

Student / Amateur (free)

(International) (\$10)

Student / Amateur

Type of membership requested

\Box	Retired (free)
	Regular (\$30)

 Regular 5-year (\$150)

130)		

Affiliation

Street Address

Name

City, Province/State, Country

Postal Code/Zip Code Telephone Number

Email Address

(Optional) Background Information

Employment (Location/Subject area)

Entomological Interest

Check if you would like to get more involved with ESO activities If so, how?

JOIN THE ESO!

For ESO membership, complete the <u>Membership form</u> (also available on the <u>ESO website</u>)

Student, amateur, and retiree memberships are FREE!

Regular members: A one-time payment of \$150 secures you a 5 year membership! For payment options, including PayPal, please visit <u>www.entsocont.ca</u>, or mail your invoice and payment to:



ESO Membership Committee

Entomological Society of Ontario Stone Road Post Office, P.O. Box 25021 17-370 Stone Road W. Guelph, Ontario N1G 4T4

Have questions? Email the ESO membership committee at: entsocont.membership@gmail.com

ESO MEMBERSHIP