

Titles and abstracts for the TEA Student Symposium 2025

Aaya Aboulnaga, MSc Western Supervisor Nusha Keyghobadi

The effect of species reintroduction on the genetic diversity of the mottled duskywing (*Erynnis martialis*)

Abstract

The mottled duskywing butterfly (*Erynnis martialis*) was recently reintroduced to Pinery Provincial Park, from which it had been extirpated, over a multiple year program. Between 2019 and 2023, individuals of the species were sampled from a source site in Ontario and their offspring were captively reared. These captively reared individuals were then released to Pinery or back to the source site as demographic compensation. These actions could have affected the genetic diversity of both the source and the reintroduced populations through founder effects and elevated genetic drift. I investigated the effect of the reintroduction on genetic diversity in both populations, using microsatellites to estimate different metrics of genetic diversity and view trends in both populations over time, and to compare the reintroduced population to naturally occurring populations of mottled duskywing. The source population showed no change in genetic diversity over the course of the reintroduction, and the Pinery population's genetic diversity eventually matched that of naturally occurring populations. The reintroduction strategy was found to be effective in establishing a population with a high level of genetic diversity without causing a negative effect on the source population.

Hannah Bodmer, PhD U of T Mississauga co-authors Rosalind Murray, Muiz Roslihuddin, Olivia Toth, Shannon McCauley. Supervisor Rosalind Murray and Shannon McCauley

Dragonfly nymphs eat less and emerge sooner with road salt exposure: Implications for urban freshwater ecosystems

Abstract

Temperate cities use deicing road salts to keep roads and sidewalks ice free in winter. Although road salt improves public safety, it also significantly increases freshwater salt pollution. Salt pollution is harmful for aquatic life by reducing individual survivorship and reproduction, as well as community abundance and diversity. Many urban waterbodies already surpass Canadian salt concentration guidelines to protect aquatic life (120mg/L), with some urban streams and ponds regularly exceeding salt concentrations of 1000mg/L. Previous studies have shown salt pollution negatively impacts survivorship and community diversity of aquatic taxa, including amphibians, zooplankton, and aquatic insects. However, few studies have investigated the carry-over effects of salt pollution from aquatic juvenile to terrestrial adult life stages in semi-

aquatic insects. We used *Erythemis simplicicollis* (Odonata: Libellulidae) as model organisms to study the effects of salt exposure on nymphs (growth rate, foraging activity, immune health) as well carry-over effects on adults (emergence phenology, morphology, immune health). We found high salt exposure reduced *E. simplicicollis* nymph foraging rates and accelerated adult emergence timing. Our results demonstrate one of the first examples of road salt pollution on aquatic juveniles carrying-over to impact terrestrial adults. Changes in nymph foraging behavior and adult emergence in this key predator species may have widespread impacts on freshwater food webs. We emphasize the need for further research on salt pollution to understand sublethal and carry-over effects on diverse aquatic taxa.

Emma Dickson, PhD University of Huddersfield. Supervisors Esta Bostock and Dr. Katie Addinall

Overcoming challenges in research and academia (provisional title)

Abstract

The ability to adapt to, and overcome challenges is a key skill in research and academia. This presentation will discuss these phenomena through the lens of a second year PhD student, with a research focus in entomology. The identification of insect species present is the first key hurdle for any entomologist, and with some species appearing visually identical to the naked eye, it can be a time consuming and crucial process. With this in mind, a research aim that starts with a single species experiment can quickly evolve into the study of cohabitation of several species. With more than species comes several variables- all of which are valuable data to the understanding of insect colonisation. Such variables such as deprivation in competing species and the morphological effects this may have is paramount to true understanding of insect species- and so what may have been introduced into research as a 'challenge', can sometimes turn out to be pivotal!

Tessa Kathleen Fortnum, MSc Western. Supervisors Chris Guglielmo and Keith Hobson

Migratory Patterns of North American Hoverflies (Diptera: Syrphidae) inferred through Stable Hydrogen Isotope Analysis

Abstract

Hoverflies (Diptera: Syrphidae) are globally important pollinators and pest managers, yet their life history is largely unexamined. There is evidence for mass Palearctic syrphid migration but little has been done to study Nearctic migration. Conventional tracking methods are unsuitable for Syrphidae due to their small size, but stable hydrogen isotopes offer a reliable alternative for studying their movement. Stable hydrogen

isotope analysis of inert tissues can be used to approximate a place of origin, allowing for the determination of migratory patterns. Stable hydrogen analyses have been previously used extensively to reliably determine the migratory behaviour of lepidopterans and anisopterans, among others. An understanding of syrphid movement patterns has implications in syrphid management, as well as plant conservation and agriculture. This study aims to designate Syrphidae species as residents to, or migrants and partial migrants through southwestern Ontario through stable hydrogen analysis.

Joel Goodwin, PhD University of Toronto Faculty of Forestry. co-authors MacQuarrie CJK, Kerr, JL, O'Connor, BC, Smith SM, Allison JD. Supervisor Jeremy Allison

Investigating morphological characteristics contributing to the chemical and visual ecology of forest insects

Abstract

Active space, the area over which a stimulus elicits a behavioural reaction in a receiving individual, is an important yet seldom investigated aspect of insect behaviour. Active defines the spatial scale over which insects interact with a stimulus and can influence mating success and population dynamics. From an applied perspective, active space is an important component of the effective range of semiochemical-baited traps used for surveillance of forest and agricultural insects. This study used wingfanning assays, competitive trapping, and portable electroantennography to investigate the active space of spruce budworm, *Choristoneura fumiferana* Clemens (Lepidoptera: Tortricidae) and spongy moth, *Lymantria dispar dispar* L. (Lepidoptera: Erebidae) pheromone-baited traps. Wingfanning assays and competitive trapping had similar outcomes for active space distance for both species. For spruce budworm, wingfanning assay results suggest an active space of 18.4 m and competitive trapping experiments showed interference at distances less than 20 m. For spongy moth, wingfanning assays suggest an active space of 81.5 m and trap interference has been estimated to occur at 80 m. Portable electroantennography displayed an increase in neural depolarization amplitude at distances less than 30 m for spruce budworm and 130 m for spongy moth. Overall, the three methods used showed similar results for the active space distance of each species.

Spencer Kielar, B.Sc. Trent University

Species abundance of grasshoppers (Orthoptera: Acrididae) from an interprovincial survey compared to an iNaturalist dataset

Abstract

We compared species' relative abundances of grasshoppers (Orthoptera: Acrididae) collected through an opportunistic survey, with data from a citizen science database

(iNaturalist). Using sweep netting, we caught 53 specimens, from 16 species during a survey conducted along a driving route from British Columbia to Ontario. The iNaturalist data matching the area surveyed and within a three year period around our survey was further filtered temporally and geographically to create three data sets. Our data were significantly correlated with all three datasets, but the iNaturalist data had higher relative abundance of the larger easy to identify species compared to our collections. I will discuss these results in terms of the effectiveness and biases of both data sets.

Wynne Reichheld, MSc Brock University

The Many Marvelous Mayflies of DeCew Falls

Abstract

Mayflies (order Ephemeroptera) are often used as an indicator species for general ecosystem health but changes in Ephemeroptera populations are often overlooked due to their perceived abundance. Since 2012, flying insects around DeCew falls, St Catharines have been monitored using a non-attractive active-sampling Rothamsted trap, collecting countless insects throughout its annual operation from May to September, yielding a staggering total of 14 745 Ephemeropterans. Each of these nearly fifteen-thousand individuals have now been preserved and identified to assess trends in population size, composition, and emergence timing. For every year observed, *Stenonema femoratum* (family Heptageniidae) was the single most abundant species with a staggering 2500 individuals captured in 2024 alone. Other prominent species at DeCew include *Caenis amica* and *Caenis latipennis* (family Caenidae), as well as *Callibaetis ferrugineus* and an as-of-yet unidentified species of Procloeon (family Baetidae). The giant burrowing mayfly *Hexagenia limbata* (family Ephemeridae) is also regularly observed, but its preference for low-altitude flight results in unreliable capture using the Rothamsted trap. This talk will focus on observed population fluctuations among these key species and phenotypic diversity of all Ephemeroptera observed at DeCew Falls. In the coming months, these mayfly observations will be analyzed alongside water data provided by Niagara Region and the Niagara Peninsula Conservation Authority in order to shed light on possible causes of these population changes.

Nora Romero, PhD York. Supervisor Laurence Packer

Reclassification and description of new taxa in the Protandrenini: resolving the *Incasarus-Liphanthus* group (Hymenoptera:Andrenidae)

Abstract

The Protandrenini is one of the seven tribes in the Panurginae, exclusively distributed in the Western Hemisphere. South American Protandrenini remains understudied, partly

due to its morphological similarity among genera and limited exploration in many regions. Among the enigmatic taxa in this tribe is *Incasarus* González, Rasmussen & Engel, described from the Peruvian Andes. Similarly, six species previously assigned to *Liphanthus* were recently discovered in high-altitude Andean regions but exhibit distinct morphological traits.

This study reassesses the subgeneric classification of *Liphanthus* and its broader relationships within the Protandrenini through expanded taxon sampling and a comprehensive outgroup. We employ two phylogenetic approaches: (1) a morphological analysis using maximum parsimony and (2) a molecular phylogenetic analysis utilizing Ultra Conserved Elements (UCEs). Our results show that the six *Liphanthus* species cluster more closely with *Incasarus* than with *Liphanthus*, prompting a taxonomic reclassification. We present our findings and propose a revised classification, including the description of new genera and several new species within this group. These results refine the taxonomy of *Liphanthus* and Protandrenini and offer broader insights into the evolutionary history of Panurginae. Both morphological and molecular analyses and results are presented here.

Amanda Sabatino, undergraduate student, York University. Supervisor Eryn McFarlane

Urbanization and Hybridization in *Colias eurytheme* and *Colias philodice* butterflies in Toronto

Abstract

Hybridization, or breeding between two previously diverged populations, is growing due to human impacts, with urbanization contributing to increased pressures and impacts. Understanding how urbanization affects butterflies is critical, however its effects are poorly known. As butterflies are sensitive indicators, they are crucial to understanding changing species assemblages and the effects of urbanization on hybridization. *Colias* is a specious genus found throughout the Holarctic and varies in rates of hybridization with the changing environment. *C. philodice* and *C. eurytheme* hybridize when their ranges are in contact or overlap. However, it is an open question how variation in urbanization might affect variation in hybridization. Using wild *Colias* across a gradient of urbanization in Toronto, Ontario we tested how the variation in *Colias* color, as an indicator of hybridization, relates to human disturbance and urbanization. We created an objective numeric classification for both *C. eurytheme* and *C. philodice*, against which we categorized *Colias* samples. We found that some of the urbanization metrics, including distance to road, Julian date, and the number of pedestrians affect the variation in *Colias* colour, showing that urbanization affects *Colias* colouration, and potentially rates of hybridization, in Toronto.