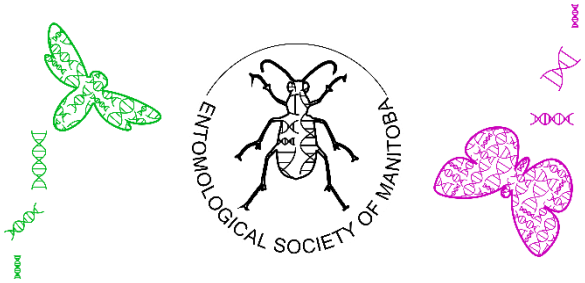
79TH ANNUAL MEETING



Innovations in Entomology

27 October 2023
SMARTpark Innovation Hub (Room MPR 1), 100 Innovation Drive, University of Manitoba, Winnipeg, Manitoba, Canada

28 October 2023
Department of Entomology (Room 219)
12 Dafoe Road, University of Manitoba

DAY 1, 27 OCTOBER

8:15 Parking, registration, refreshments

8:40 Welcome
Justis Henault, Scientific Chair

8:50 Greetings from ESM President
Alberto Civetta

8:55 Greetings from ESC President
Colin Favret

Keynote address
Chair: Justis Henault

9:00 MEASURING BIODIVERSITY FROM INTERACTIONS TO LANDSCAPES. **Dr. Elizabeth L. Clare,** Department of Biology, York University, Toronto, Ontario, Canada

10:00 Refreshment break and Poster session

Posters

WILLOW POLLEN COLLECTION BY A BLUEBERRY SPECIALIST. **J.B. Watson**, **K.G. Bartel,** J. Gibbs; Department of Entomology, University of Manitoba [SC]

BLACKLEGGED TICKS, *IXODES SCAPULARIS* SAY, ABUNDANCE AND DISTRIBUTION ON PASTURES IN MANITOBA, CANADA. **C. Madden[1]**, D. Wood[1], D. Walker[2], and K. Rochon[1]; [1]Department of Entomology and [2]Department of Environment and Geography, University of Manitoba [SC]

Submitted papers
Chair: Terry Galloway

10:30 PLANT NUTRITION DO NOT EFFECT OVIPOSITION OF ORANGE WHEAT BLOSSOM MIDGE, *SITODIPLOSIS MOSELLANA* (GÉHIN) (DIPTERA: CECIDOMYIIDAE). **C.D.S. Weeraddana**[1], R. Wijesundara[1], S. Wolfe[2] and A.C. Costamagna[1]; [1]Department of Entomology, University of Manitoba, [2]Morden Research and Development Centre, Agriculture and Agri-food Canada

10:45 INVESTIGATING THE HISTORICAL IMPACT OF WEATHER AND THE POTENTIAL IMPACTS OF CLIMATE CHANGE ON THREE ENDANGERED HESPERIIDAE SPECIES IN MANITOBA, CANADA. **A. Thorkelson**, K. Dearborn, and R. Westwood; Department of Environmental Studies and Sciences, University of Winnipeg [SC]

11:00 EARLY DETECTION OF DUTCH ELM DISEASE INFECTIONS IN URBAN FORESTS IN WINNIPEG, MANITOBA USING AERIAL DRONE TECHNOLOGY. **J. Ehn**, K. Dearborn, and R. Westwood; Department of Environmental Studies and Sciences, University of Winnipeg [SC]

11:15 FLORAL ENHANCEMENTS ADJACENT TO MANITOBA CROP FIELDS INCREASE BENEFICIAL INSECT ABUNDANCE. **M. Killewald**[1], A. Costamagna[1], R. Gulden[2], Y. Lawley[2], and J. Gibbs[1]; [1]Department of Entomology and [2]Department of Plant Science, University of Manitoba [SC]

11:30 COMBINED EFFECTS OF PLANT DENSITY AND CHEMICAL MANAGEMENT STRATEGIES ON FLEA BEETLE ABUNDANCES, PLANT DEFOLIATION AND YIELD OF CANOLA ACROSS CANADIAN PRAIRIES. **S. Woodland**[1], M. Damien[1], H. Cárcamo[2], J. Otani[2], T. Wist[2], R. Duncan[1], J. Gavloski[3], A.C. Costamagna[1]; [1]University of Manitoba, [2]Agriculture and Agri-food Canada/Agriculture et Agroalimentaire Canada, [3] Agriculture and Resource Development, Government of Manitoba [SC]

11:45 TWO NEW SPECIES OF *LASIOGLOSSUM* (*HEMIHALICTUS*) AND THE STATUS OF THE BIZARRE, MACROCEPHALIC *L. ABSURDICEPS* (HYMENOPTERA: HALICTIDAE). **T. Hettiarachchi** and J. Gibbs; Department of Entomology, University of Manitoba [SC]

12:00 Lunch on your own

Submitted papers continued
Chair: Sheila Wolfe

13:30 CONTRIBUTIONS OF DISTURBANCE-BASED PRAIRIE MANAGEMENT ACTIVITIES SUCCESS TOWARDS POPULATION RECOVERY OF TWO ENDANGERED SKIPPER BUTTERFLIES IN MANITOBA. **J.M. Sánchez-Jasso**[1], N. Koper[2], and R. Westwood[3]; [1]Natural Resources Institute, University of Manitoba, [2]Faculty of Environment, University of Northern British Columbia, [3]Department of Biology, University of Winnipeg [SC]

13:45 EVALUATION OF THE ATTRACTION OF DIFFERENT FLOWER MIXTURES TO NATURAL ENEMIES AND POLLINATORS. **C. Montemayor**[1], A.C. Costamagna[1], Y. Lawley[2], and J. Gibbs[1]; [1]Department of Entomology and [2]Department of Plant Science, University of Manitoba [SC]

Bolded – presenting author; [SC] – Student competition participant; Please see abstracts for detailed affiliations

14:00 BIOGEOGRAPHY AND GENETIC VARIATION IN A HIGH-ALTITUDE BUTTERFLY FROM THE ANDES MOUNTAINS: *JUNONIA VESTINA* (LEPIDOPTERA: NYMPHALIDAE). **N. Kopchak** and J.M. Marcus Department of Biological Sciences, University of Manitoba [SC]

14:15 FIRST RECORD OF DION SKIPPER (LEPIDOPTERA: HESPERIIDAE) IN MANITOBA, CANADA. **K. Eckhardt**; Department of Entomology, University of Manitoba

14:30 Refreshment break and Poster session

Submitted papers continued
Chair: Justis Henault

15:00 ASSESSING THE ABUNDANCE OF AMERICAN DOG TICKS, *DERMACENTOR VARIABILIS* (SAY), ON CATTLE PASTURES AND CATTLE IN SOUTHERN MANITOBA, CANADA: ENVIRONMENTAL FACTORS AND IMPLICATIONS FOR TICK-BORNE DISEASE. **D. Wood**[1], C. Madden[1], N. Chilton[2], D. Walker[3], and K. Rochon[1]; [1]Department of Entomology, University of Manitoba, [2]Department of Biology, University of Saskatchewan, [3]Department of Environment and Geography, University of Manitoba [SC]

15:15 ASSOCIATION BETWEEN INFESTATION PARAMETERS OF NASAL MITES (ACARI: RHINONYSSIDAE: *TINAMINYSSUS* SPP.) AND HOST BODY CONDITION IN ROCK PIGEONS (AVES: COLUMBIDAE: *COLUMBA LIVIA*) IN MANITOBA. **M. Dupuis**, T.D. Galloway, and K. Rochon; Department of Entomology, University of Manitoba [SC]

15:30 A PRICKLY PROBLEM: ASSESSING CHEWING LOUSE (PSOCODEA: ISCHNOCERA: TRICHODECTIDAE: EUTRICHOPHILUS SETOSUS) POPULATIONS ON AMERICAN PORCUPINE (RODENTIA: ERETHIZONTIDAE: ERETHIZON DORSATUM) IN MANITOBA, CANADA. **T.D. Galloway** Department of Entomology, University of Manitoba

Mixer

20:00 You are invited to our mixer at Pat MacKay and Bob Lamb's home, where we can socialize and announce the winners of the student competition! Directions to their home are provided at the registration desk.

DAY 2, 28 OCTOBER

8:00 Parking, registration, refreshments

8:30 Welcome
Justis Henault, Scientific Chair

Symposium
Chair: Justis Henault

8:45 USING UAS IN BIOLOGICAL CONTROL FOR THE RELEASE OF EGG PARASITOIDS: A CASE STUDY IN FORESTRY. **V. Martel**[1] and F. Jean[2]; [1]Natural Resources Canada, Canadian Forest Service, [2]Canopée Dronautique Inc.

9:30 REMOTE FIELD MONITORING OF INSECT PRESSURE SAVES TIME AND OPTIMIZES USE OF RESOURCES – USING iSCOUT AND iSCOUT MOBILE (COMBINING iSCOUT® TRAPS WITH COMMONLY USED MANUAL TRAP DEVICES). **G. Ash;** Vice President Metos North America, Training and Key Accounts Manager, METOS North America/Canada

10:15 Refreshment break

10:35 THE ATK SUBCOMMITTEE OF COSEWIC: OUR PROCESSES, LIMITATIONS AND OPPORTUNITIES. **D. Benoit**; COSEWIC Aboriginal Traditional Knowledge Subcommittee

11:20 RNA-BASED BIOTECHNOLOGIES TO CONTROL PEST INSECTS. **S. Whyard**, A. Singh, A. Tayler, M. Wood, E. Jonson, and N. Amanat; Department of Biological Sciences, University of Manitoba

12:05 Adjournment
Justis Henault

12:10 Catered lunch

Annual Business Meeting (Room 219, Entomology)
13:30 ESM Annual Business Meeting

REGISTRATION
Annual Membership Dues
Member - Regular: $25.00
Member - Student: $10.00

Conference Fees
Member - Regular: $30.00
Member - Student: $10.00
Non-member - Regular: $60.00
Non-member - Student: $25.00
Fees for online participants are the same.

Donations
We welcome donations to the Society, particularly to increase the value of student scholarships. Receipts are available upon request for tax purposes.

The ESM Thanks the following Sponsors for their Generous Support of the Meeting
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2023 Organising Committee: Justis Henault (Chair), Jade Tanner (Member affairs), Kathy Cano (Finances), Sheila Wolfe and Lavanya Ganesan (Social, refreshments), Terry Galloway (Student Competition)

Bolded – presenting author; [SC] – Student competition participant; Please see abstracts for detailed affiliations

Abstracts in order of presentation
(bolded – presenting author)

Day 1 – October 27
Keynote

MEASURING BIODIVERSITY FROM INTERACTIONS TO LANDSCAPES

E.L. Clare
Department of Biology, York University, Toronto, Ontario, Canada

The accelerating loss of biodiversity is threatening the functioning of ecosystems on a global scale. Estimates suggest a 69% decline in wild populations since 1970. International agreements ask countries to quantify their biodiversity and monitor shifts in community composition to try and gauge species decline and the effect of interventions to mitigate loss. However, despite emerging trends of large scale drops in insect biodiversity and quantifiable risks all habitats, quantifying biodiversity anywhere is a challenge and monitoring continual change is impossible at almost any scale. Going beyond basic counts to understanding how an individual organism interacts with other species in the environment can be painfully challenging. In this presentation I will describe three case studies which look at how my research group is addressing these challenges from the smallest interactions in an ecosystem to the the larges scales of biomonitoring. In part one I will talk about "symbiomes" and how genetic tools are making it possible measure the finest scale interactions using native Canadian pollinators as or developing model. In part 2 I will talk about the use of eDNA as a species at risk indicator in bee hives, bat roosts and bird boxes. Finally in part 3 we scale up with a risky plan to measure all terrestrial life on earth. All three example fall under the BIOSCAN project. A Canadian led national and international project to try to understand life on earth.

Student Competition - Poster

WILLOW POLLEN COLLECTION BY A BLUEBERRY SPECIALIST

J.B. Watson, K.G. Bartel, J. Gibbs
Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada

Andrena (Conandrena) bradleyi Viereck (Hymenoptera: Andrenidae) is widely regarded as a Ericaceae specialist bee due to its elongate head, plant records, and common collection in commercial blueberry fields. We provide evidence of *A. bradleyi* collecting pollen from willow (*Salix*, Salicaceae) L. in southeastern Manitoba. This indicates the bee is not obligately specialized on Ericaceae pollens and that early blooming plants may contribute to its early nutritional requirements.

Student Competition - Poster

BLACKLEGGED TICKS, *IXODES SCAPULARIS* SAY, ABUNDANCE AND DISTRIBUTION ON PASTURES IN MANITOBA, CANADA.

C. Madden[1], D. Wood[1], D. Walker[2], and K. Rochon[1]
[1]Department of Entomology, University of Manitoba, R3T 2N2, Winnipeg, Manitoba, Canada; [2]Department of Environment and Geography, University of Manitoba

Blacklegged ticks (BLT) (*Ixodes scapularis* Say, Acari: Ixodidae) are hard ticks known for transmitting tick-borne pathogens, including *Borrelia burgdorferi*, *Anaplasma phagocytophilum*, and *Babesia microti*, which can affect humans and other animals. Over the last two decades, BLTs have expanded their distribution into the Canadian Prairies. Little is known about the habitat suitability of pastures for BLTs in Manitoba, and cattle producers were concerned about the risk BLTs could pose for their cattle, their horses, and themselves.
In this two-year study conducted at seven sites in southern Manitoba, we established the abundance of BLTs on pastures; the biting pressure of BLTs on cattle and horses; the interaction between tick-environment-cattle; and the presence of pathogens in collected BLTs. We collected a total of 70 BLTs from pastures, cattle, and horses that grazed those pastures. To analyze relationships between tick-cattle-environment, we gathered data on cattle movement in the pastures using GPS collars and mapped-out tick presence using GPS units during drag sampling. Pathogens were detected in 28 BLTs using PCR. Overall, the abundance of BLTs on cattle pastures was low. Weather conditions in both years delayed the start of the grazing season which may have led to a mismatch between animal grazing and peak tick activity in the pastures.

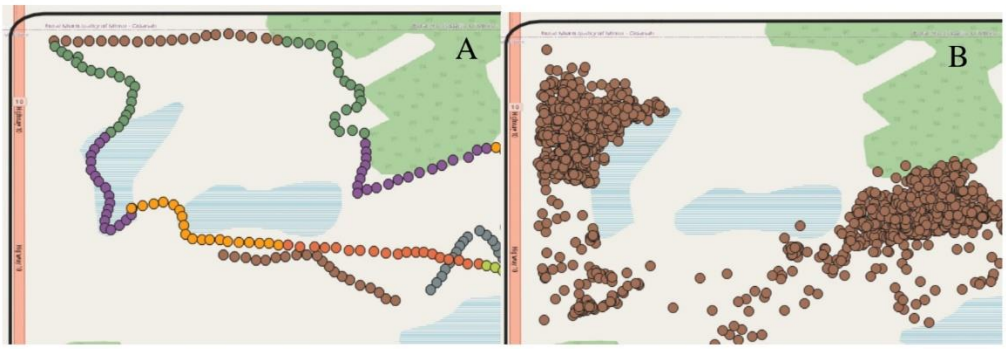

Figure 1: Point location data collected from GPS units (A) and GPS collars (B) at one site in 2021. A) Each point represents a 10-m quadrat within a 200 m transect along which ticks were collected using the tick drag technique. B) Each point represents the location of the same cow every 10 minutes for a 7-day period in 2021.

Submitted Paper

PLANT NUTRITION DO NOT EFFECT OVIPOSITION OF ORANGE WHEAT BLOSSOM MIDGE, *SITODIPLOSIS MOSELLANA* (GÉHIN) (DIPTERA: CECIDOMYIIDAE)

C.D.S. Weeraddana[1], R. Wijesundara[1], S. Wolfe[2] and A.C. Costamagna[1]
[1]Department of Entomology, University of Manitoba, 217 Animal Science/Entomology Bldg, 12 Dafoe Road, R3T 2N2, Winnipeg, Manitoba, Canada; [2]Morden Research and Development Centre, Agriculture and Agri-food Canada, 195 Dafoe Road, R3T 2M9, Winnipeg

The wheat midge, *Sitodiplosis mosellana* (Géhin) (Diptera: Cecidomyiidae), causes damage to wheat crops estimated at millions of dollars per year in Canada. Host plant nutrition has directly influenced insect oviposition or indirectly by attracting natural enemies due to their higher quality of food. Therefore, we tested the effect of a range of fertilizer rates (0.5, 1.5, 2.5 g/pot) on wheat midge oviposition and plant growth parameters in susceptible wheat cv. Roblin. Fertilizer treatments did not influence oviposition preference and performances in wheat midge. The highest plant biomass and spike numbers were observed in moderate and high fertilizers-treated plants compared to low. Highly fertilized plants, however, had similar plant growth to moderately fertilized plants. Future experiments focus on analyzing VOC profiles from fertilized plants to test whether fertilizer applications could alter VOC emissions.

Student Competition – Oral Presentation

INVESTIGATING THE HISTORICAL IMPACT OF WEATHER AND THE POTENTIAL IMPACTS OF CLIMATE CHANGE ON THREE ENDANGERED HESPERIIDAE SPECIES IN MANITOBA, CANADA

A. Thorkelson, K. Dearborn, and R. Westwood
Department of Environmental Studies and Sciences, University of Winnipeg, R3B 2E9, Winnipeg, Manitoba, Canada

Poweshiek skipperling (*Oarisma poweshiek*), Dakota skipper (*Hesperia dacotae*), and Mottled duskywing (*Erynnis martialis*) are three federally listed critically endangered butterflies found within the province of Manitoba. In recent decades each species has experienced substantial declines in both abundance and range, and there exists considerable uncertainty as to why, presenting a challenge for conservation efforts. The rapidly changing climate could be contributing to these declines, but relationships between climate and population dynamics in Manitoba have not been formally investigated. My research aims to 1) determine the relationship, or lack of relationship, between past weather and species abundance and emergence date, and 2) investigate whether future climate change will inhibit the ability of the species to survive in their current geographic ranges. I will address objective 1 by relating yearly species population estimates to monthly temperature and precipitation averages and extremes experienced over the complete life cycle of one generation. Objective 2 will be achieved through the creation of correlative climate envelope models (CEMs) for the three species, which use species occurrence locations to derive the suitable climatic range of the species and then map the change in this distribution under a changing climate through the incorporation of climate change model projections. The CEMs will yield an estimation as to whether the current restricted ranges of the species will become climatically unsuitable, and identify potentially climatically suitable areas that can aid in reintroduction and habitat management or restoration planning in the future.

Student Competition – Oral Presentation

EARLY DETECTION OF DUTCH ELM DISEASE INFECTIONS IN URBAN FORESTS IN WINNIPEG, MANITOBA USING AERIAL DRONE TECHNOLOGY.

J. Ehn, K. Dearborn, and R. Westwood
Department of Environmental Studies and Sciences, University of Winnipeg, R3B 1E9, Winnipeg, Manitoba, Canada

Dutch elm disease (DED) is an ongoing threat to Winnipeg's urban forest. Research advancements and development of new strategies to manage DED are necessary to protect the city's elm population and prevent mass tree mortality. My research focuses on using drone technology to assess tree health and determine if non-visible symptoms of DED can be detected at earlier stages to reduce the time of diagnosis in diseased trees. Combining early detection and rapid removal of diseased trees to decrease the presence of elm bark beetle disease vectors may significantly decrease the spread of disease. My research involves flying aerial drones equipped with multi-spectral sensors over selected study neighbourhoods in Winnipeg and using imagery to examine DED development throughout the summer. I will also be comparing the imagery to comprehensive ground surveys to analyze the accuracy of disease detection using drones. The aim of my work is to increase the efficacy of rapid diseased tree removal, thereby reducing elm bark beetle populations in Winnipeg.

Student Competition – Oral Presentation

FLORAL ENHANCEMENTS ADJACENT TO MANITOBA CROP FIELDS INCREASE BENEFICIAL INSECT ABUNDANCE

M. Killewald[1], A. Costamagna[1], R. Gulden[2], Y. Lawley[2], and J. Gibbs[1]
[1]Department of Entomology, University of Manitoba, R3T 2N2, Winnipeg, Manitoba, Canada; [2]Department of Plant Science, University of Manitoba

Beneficial insects such as bees, syrphid flies, and ground beetles provide valuable ecosystem services to agriculture including pollination and biological control of pests. However, in areas with intense agriculture, populations of these beneficial insects are in decline. Floral strips have proven effective at increasing populations of beneficial insects in other areas of the world. Although, this practice has not been adequately studied in areas with rotational crops, such as Manitoba. In the summer of 2019, we installed fifteen floral strips at multiple farms across Manitoba and used multiple collection techniques to monitor abundances of beneficial insects at strip, control, and natural sites for subsequent years. We found significantly more beetles and bees in strips than the control treatment. Syrphids collected with nets were more abundant in strip sites than control sites, but syrphids collected with bluevane traps were similar between treatments. We found no interaction between treatment and year for bees and syrphids, but beetles did show a significant interaction. Beetle abundances were highest in 2020 strip sites, but abundances in 2021 strip sites were significantly lower. Increases in bee and beetle abundance at strip sites should provide more pollination and pest control services to agriculture- which may increase the yield of adjacent crops. These results support the use of floral strips in rotationally managed agricultural systems to increase abundances of beneficial insects.

Student Competition – Oral Presentation

COMBINED EFFECTS OF PLANT DENSITY AND CHEMICAL MANAGEMENT STRATEGIES ON FLEA BEETLE ABUNDANCES, PLANT DEFOLIATION AND YIELD OF CANOLA ACROSS CANADIAN PRAIRIES

S. Woodland[1], M. Damien[1], H. Cárcamo[2], J. Otani[2], T. Wist[2], R. Duncan[1], J. Gavloski[3], A.C. Costamagna[1]
[1]University of Manitoba, R3T 2N2, Winnipeg, Manitoba, Canada; [2]Agriculture and Agri-food Canada/Agriculture et Agroalimentaire Canada; [3] Agriculture and Resource Development, Government of Manitoba

Crucifer flea beetles, *Phyllotreta cruciferae* (Goeze) (Coleoptera: Chrysomelidae), and striped flea beetles, *Phyllotreta striolata* (Fabricius) (Coleoptera: Chrysomelidae), are devastating pests in Canadian canola. Currently, flea beetles are managed by prophylactic application of insecticides on seeds and foliar sprays. We investigated the effect of increasing canola density as an alternative method to reduce defoliation and insecticide use in canola. We conducted field trials in four regions of the Canadian prairies testing the effects of three planting densities combined with two management treatments (seed treatment and foliar spray) and two controls (flea beetle-free treatment and untreated) from 2018-2021. We found that flea beetles increase aggregation as plant density increased, but their numbers per plant and defoliation levels decreased. Yield increased with increased plant density regardless of the management treatment or region. We conclude that increasing plant density as an alternative or complementary strategy to chemical control is effective to protect canola yield.

Student Competition – Oral Presentation

TWO NEW SPECIES OF *LASIOGLOSSUM* (*HEMIHALICTUS*) AND THE STATUS OF THE BIZARRE, MACROCEPHALIC *L. ABSURDICEPS* (HYMENOPTERA: HALICTIDAE).

T. Hettiarachchi and J. Gibbs
Department of Entomology, University of Manitoba, 12 Dafoe Road, R3T 2N2, Winnipeg, Manitoba, Canada

The bee genus *Lasioglossum* is renowned for its taxonomic complexities. The unusually macrocephalic male *L. absurdiceps* was known only from the holotype. While considering this unusual specimen we determined a close association with the beautiful, desert bee *L. arizonense*. Ultimately, two new species in this complex were discovered from the Colorado River lower basin to the Coachella Valley, California, and another from Washington County, Utah. These two species are described based on morphometric analysis and geographical distribution patterns.

Keywords: Apoidea, classification, cryptic species, new species, taxonomy

Left: A new species named in honour of the indigenous Cocopah tribe

Below: Macrocephalic male *L. absurdiceps,* holotype

Student Competition – Oral Presentation

CONTRIBUTIONS OF DISTURBANCE-BASED PRAIRIE MANAGEMENT ACTIVITIES SUCCESS TOWARDS POPULATION RECOVERY OF TWO ENDANGERED SKIPPER BUTTERFLIES IN MANITOBA

J.M. Sánchez-Jasso[1], N. Koper[2], and R. Westwood[3]
[1]Natural Resources Institute, University of Manitoba, R3T 2M6, Winnipeg, Manitoba, Canada; [2]Faculty of Environment, University of Northern British Columbia, V2N 4Z9, Prince George, British Columbia, Canada; [3]Department of Biology, University of Winnipeg, R3B 1E9, Winnipeg, Manitoba, Canada

The tall-grass prairies in North America stand as one of the most depleted and least protected ecosystems. Only 1% of the original tall-grass prairies persist in Canada, with the majority found in Manitoba. The loss of these prairies has resulted in numerous prairie species becoming at risk of extinction, such as Dakota skipper (*Hesperia dacotae*, Skinner 1911) and Poweshiek skipperling (*Oarisma poweshiek*, Parker 1870). The research focuses on studying how specific management practices, applied to maintain and recover prairie habitat for both skippers, have shaped grass-prairie structure, composition, and function. It will specifically assess the effectiveness of management practices in various scenarios through three main specific objectives: comparing habitat structure and composition between occupied and formerly occupied; analyze the cumulative effects of past disturbance and disturbance-based prairie management activities; and quantify the short-term effects of disturbance-based prairie management activities on the skippers abundance, as well as plant community suitability. The study will be conducted at various sites within the tall-grass prairie in Manitoba, where the remaining populations of the Poweshiek skipperling and Dakota skipper exist in Canada. Surveys will be conducted in both occupied and formerly occupied sites, encompassing various management regimes, such as idle, prescribed burns, grazing, haying, and mowing, at different temporal scales. Historical data of past management and natural disturbances will be compiled. Spatial landscape analyses and statistical modeling will be conducted. The research will contribute to identify potential improvements or alternatives to current management practices to preserve prairie habitats for these two endangered butterfly species.

PWSK, Sánchez-Jasso, 2022

DAKS, Sánchez-Jasso, 2022

Student Competition – Oral Presentation

EVALUATION OF THE ATTRACTION OF DIFFERENT FLOWER MIXTURES TO NATURAL ENEMIES AND POLLINATORS

C. Montemayor[1], A.C. Costamagna[1], Y. Lawley[2], and J. Gibbs[1]
[1]Department of Entomology, University of Manitoba, R3T 2N2, Winnipeg, Manitoba, Canada; [2]Department of Plant Science, University of Manitoba

Strips with flowering plant mixtures can be important refuges and floral resources for beneficial arthropods beside crops. Establishment of flowering plants in field borders can be challenging and little is known on how different plant mixtures function to establish a community that attracts beneficial insects. In this study, pollinators, and natural enemies, were evaluated in three flowering plant mixtures treatments: domesticated annuals mix, native perennials mix, and tame perennials/annuals mix in replicated experimental plots. Each treatment was evaluated with and without oats as a nurse crop. Rye perennial grass was established as the control plot treatment. Blue vane and bee bowls were used to capture pollinators. Sweep nets, D-vac, clear sticky traps, and pitfall traps were used capture predators. Samples were collected four times every two weeks starting from the blooming period. First year preliminary results of bee bowls and pitfall traps are presented.

Student Competition – Oral Presentation

BIOGEOGRAPHY AND GENETIC VARIATION IN A HIGH-ALTITUDE BUTTERFLY FROM THE ANDES MOUNTAINS: *JUNONIA VESTINA* (LEPIDOPTERA: NYMPHALIDAE)

N. Kopchak and J.M. Marcus
Department of Biological Sciences, University of Manitoba, R3T 2N2, Winnipeg, Manitoba, Canada

Nymphalid butterflies in the genus *Junonia*, is known for their nearly worldwide distribution, including thriving on remote oceanic islands, highlighting their exceptional ability to disperse and diversify. The New World *Junonia* carry three common major mitochondrial haplotype groups, shared between species and polymorphic within species, suggesting a possible history of hybridization and mitochondrial introgression. Haplotype group A subgroups A1 and A2 are most common across all *Junonia* species in South America (>80%), with haplotype group B occurring at much lower frequency (15%). *Junonia vestina* is found in the Andes (1900m-3500m) with documented populations in Peru, Ecuador, and Bolivia. Prior studies of few specimens indicate that Peruvian populations of *J. vestina* are the sole known source of the rare mitochondrial haplotype group C, while conspecifics from other regions exhibited different haplotype groups (mostly A1). Mitochondrial haplotype group C is closely related to haplotypes found in *J. villida* from the Indo-Pacific region, hinting at potential long-distance gene flow across the Pacific Ocean. South American *J. vestina* butterfly specimens from museums and personal collections were examined. DNA from 64 samples was isolated, quantified, and PCR amplified, before being genotyped by restriction digests at haplotype group-specific diagnostic cut sites in COX1, COX3, and ND5. Based on data from this and previous studies, we have provisionally assigned 41 *J. vestina* specimens (from populations ranging from Colombia to Argentina and Chile) to haplotypes A1 (49%), A2 (20%), B (17%), and C (15%). Haplotype C remains restricted to populations from Peru.

Submitted Paper

FIRST RECORD OF DION SKIPPER (LEPIDOPTERA: HESPERIIDAE) IN MANITOBA, CANADA

K. Eckhardt
Department of Entomology, University of Manitoba, R3T 2N2, Winnipeg, Manitoba, Canada

The Dion skipper, *Euphyes dion* W.H. Edwards, 1879 (Lepidoptera: Hesperiidae) is associated with sedge meadows and bog fen habitats. They use *Carex lacustris* (Cyperaceae) and other sedges as larval host plants and have also been associated with the exotic *Carex acutiformis* (Cyperaceae). The butterfly's known range extends north to northwestern Ontario, northern Minnesota, and southeastern North Dakota, but they have never been reported from Manitoba. I describe the first occurrence of *Euphyes dion* in Manitoba from observations made 70 km northeast of Winnipeg.

Student Competition – Oral Presentation

ASSESSING THE ABUNDANCE OF AMERICAN DOG TICKS, *DERMACENTOR VARIABILIS* (SAY), ON CATTLE PASTURES AND CATTLE IN SOUTHERN MANITOBA, CANADA: ENVIRONMENTAL FACTORS AND IMPLICATIONS FOR TICK-BORNE DISEASE.

D. Wood[1], C. Madden[1], N. Chilton[2], D. Walker[3], and K. Rochon[1]

[1]Department of Entomology, University of Manitoba, R3T 2N2, Winnipeg, Manitoba, Canada; [2]Department of Biology, University of Saskatchewan, S7N 5A2, Saskatoon, Saskatchewan, Canada; [3]Department of Environment and Geography, University of Manitoba

In recent decades, American dog ticks, *Dermacentor variabilis* (Say), have been spreading north and west within the Canadian Prairies. This range expansion poses potential risks to both beef cattle and production workers in these regions. The increased presence of ticks may lead to more interactions between ticks and cattle in pastures, which raises concerns about the transmission of tick-borne diseases like bovine anaplasmosis caused by the *Anaplasma marginale* bacteria. We selected four cow-calf operations in Southern Manitoba and assessed tick abundance and biting pressure by sampling pastures and cattle. Tick abundance was estimated by using tick drags and habitat variables were recorded. The cattle grazing the pastures were checked for ticks during tick activity periods, and GPS collars were fitted on individual cows from each herd to monitor their movements. Ticks are more abundant in cooler and more humid microhabitats. As areas with these features within pastures are typically also attractive to cattle, landscape features can influence tick encounters. Understanding what pasture features increase the risk for tick interactions can help producers better understand what they can do to protect their livestock and themselves from tick bites. Although no ticks collected tested positive for *Anaplasma marginale* through Polymerase Chain Reaction (PCR) assays, it's important for producers to recognize the potential risks associated with the presence and high numbers of ticks in their regions for the well-being of their animals.

Student Competition – Oral Presentation

ASSOCIATION BETWEEN INFESTATION PARAMETERS OF NASAL MITES (ACARI: RHINONYSSIDAE: *TINAMINYSSUS* SPP.) AND HOST BODY CONDITION IN ROCK PIGEONS (AVES: COLUMBIDAE: *COLUMBA LIVIA*) IN MANITOBA

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Rock pigeons (*Columba livia* Gmelin) are host to a variety of parasites including nasal mites (Rhinonyssidae: *Tinaminyssus* spp.). While distribution and host association have been studied through surveys in Canada, little is known about the ecology of these parasites. We salvaged pigeons to determine nasal mite prevalence and mean intensity as well as to examine the relationship between host body condition and infestation parameters. Seventy-five pigeons salvaged from Manitoba Wildlife Haven (2016-2022) were given a body condition score (BCS) of 1-5, with 1 being emaciated and 5 being obese. Their respiratory turbinates were flushed using a curved 12 ml Monojet ™ 412 syringe with soapy water so that it ran out of the mouth onto a 90 µm sieve. The sample was preserved in 95% ethanol until the mites were counted and identified. Data were analyzed using Quantitative Parasitology (QPWeb). Pigeons were infested with nasal mites, *Tinaminyssus melloi* (Castro) and *T. columbae* (Crossley). Prevalence and mean intensity were 52.4% and 14.9 mites per bird, respectively (n=615). There was an association between host condition and increased prevalence, with the hosts in the BCS 1-2.5 category being more likely to be infested than the hosts in the BCS 3 and BCS 3.5-4.5 categories. There were no differences in intensity based on host body condition.

Submitted Paper

A PRICKLY PROBLEM: ASSESSING CHEWING LOUSE (PSOCODEA: ISCHNOCERA: TRICHODECTIDAE: EUTRICHOPHILUS SETOSUS) POPULATIONS ON AMERICAN PORCUPINE (RODENTIA: ERETHIZONTIDAE: ERETHIZON DORSATUM) IN MANITOBA, CANADA

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Porcupines (*Erethizon dorsatum*) are particularly difficult to examine for ectoparasites, especially for the host specific chewing louse (*Eutrichophilus setosus*). Four porcupines were salvaged from wildlife rehabilitation hospitals in Manitoba for this study. Each animal was washed twice in warm, soapy water and once in clean water to remove ectoparasites. Wash water was passed through a 90µ screen and the residue preserved in 95% ethanol. Samples were sorted under a dissecting microscope and lice were enumerated, sexed, and aged (nymphs versus adults). *Eutrichophilus setosus* was the only species of chewing louse collected. Each animal was infested (prevalence = 100%) with the following number of specimens, respectively: 39♂, 29♀, 25 nymphs; 19♂, 50♀, 183 nymphs; 1♂, 6♀, 2 nymphs; 56♂, 27♀, 67 nymphs. The total number of lice collected was 504. Mean intensity of infestation was 126 (Bootstrap BCa, 95% confidence limits, 2000 bootstrap replications = 32.5 to 201). Although there are numerous records of this species of louse in North America, this is the first attempt to assess total louse populations. Specific challenges in assessing louse populations infesting porcupines will be discussed.

Day 2 – October 28
Symposium

USING UAS IN BIOLOGICAL CONTROL FOR THE RELEASE OF EGG PARASITOIDS: A CASE STUDY IN FORESTRY

V. Martel[1] and F. Jean[2]
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The use of Uninhabited Aerial Systems (UAS) has recently increased, for hobbies as well as for professional uses. Entomology is no exception. It is used for image acquisition for detection and for pest management, opening new possibilities for precise management. In spite of their obvious benefits, there are also some challenges and barriers to their use (financial cost, federal restrictions, authorizations, etc.) and all these factors must be taken into account when deciding which technique to use. In this talk, I will present the different uses, current or potential, of UAS in entomology. I will also present a case study of biological control using UAS: the release of the egg parasitoid *Trichogramma minutum* against the spruce budworm, *Choristoneura fumiferana*. During that study, two release methods were compared (UAS and trichocards) and their efficacy will be discussed. Benefits and challenges will be discussed in light of my own experience.

Symposium

REMOTE FIELD MONITORING OF INSECT PRESSURE SAVES TIME AND OPTIMIZES USE OF RESOURCES – USING iSCOUT AND iSCOUT MOBILE (COMBINING iSCOUT® TRAPS WITH COMMONLY USED MANUAL TRAP DEVICES)

G. Ash
Vice President Metos North America, Training and Key Accounts Manager, METOS North America/Canada

The use of in-field IoT devices for digital agriculture continues to provide additional solutions that have the potential to save time, optimize resources and reduce environmental impact. Two such solutions are iSCOUT and iSCOUT Mobile for insect monitoring within fields. iSCOUT is a digital insect trap (pheromone, food, flying or color trap) with a high-resolution camera, modem, battery, and solar panel that captures pictures of insects on a sticky plate that are sent to software via LTE, where the insects are visualized (rectangle squares), counted, and graphed by date/time. Sophisticated software using AI aids in the insect identification process. The user can go back in time and view all images and graphs of insect dynamics. iSCOUT Mobile combines iSCOUT hardware devices with commonly used manual trap devices (delta traps, sticky traps etc.). The user can create digitalized images associated with the manual traps. Pictures are taken with your phone, and the identified insects are automatically counted and identified in the app. Both solutions can view on desktop software. A look at how these automated and digitalized manual traps can be used for field crop insect identification to save time, optimize resources, and reduce environmental impact will be discussed.

Symposium

THE ATK SUBCOMMITTEE OF COSEWIC: OUR PROCESSES, LIMITATIONS AND OPPORTUNITIES

D. Benoit
COSEWIC Aboriginal Traditional Knowledge Subcommittee

Symposium

RNA-BASED BIOTECHNOLOGIES TO CONTROL PEST INSECTS

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Controlling pest insects is still largely achieved using broad-spectrum insecticides, but these chemicals can adversely harm many non-target species. Double-stranded RNA (dsRNA)-based pesticides are now being regarded as a new generation of pesticides, as they have the potential to act in a species-limited manner. To control crop pest insects, we have been developing different methods of dsRNA delivery to plants, including transgenic technologies, whereby the plants produce protective dsRNAs, and non-GM technologies such as foliar sprays, root treatments, and topical insecticides. In most applications, the dsRNA must be ingested by the insect to be effective, and given that the gut is a hostile environment for dsRNA molecules, we have also been developing modified dsRNAs that are both more robust than conventional dsRNAs. Here, I will report on our progress to develop RNA-based insecticides, highlighting both the benefits and the potential challenges that lie ahead, as we strive to provide effective methods of pest insect control without adversely harming non-target or beneficial species.