The Entomological Society of Alberta Annual Meeting October 15-16, 2021

Friday Oct. 15, 2021	**event/speaker**	**Talk #**	**Poster #**
09:00-09:30	President's opening remarks	N/A	
09:30-09:45	Local organizing committee opening remarks	N/A	
9:45-10:00	Jimenez & Frost	1	
10:00-10:15	Brownoff, et al.	2	
10:15-10:30	Jackson, et al.	3	
10:30-10:45	BREAK	N/A	
10:45-11:00	Pizante, et al.	4	
11:00-11:15	Punko, et al.	5	
11:15-11:30	Robinson, et al.	6	
11:30-11:45	Domnich & Evenden	7	
11:45-13:00	**Lunch and poster session**		
	Stormer & Proctor		1
	Neame, et al.		2
	Vermaak, et al.		3
	Aquatics Symposium		
13:00-13:15	Abraham, et al.	8	
13:15-13:30	Grams & Proctor	9	
13:30-13:45	Moore & Ciborowski	10	
13:45-14:00	Sutherland, et al.	11	
14:00-14:30	BREAK	N/A	
14:30-15:30	**Plenary Address** Dr. H.C. Proctor	12	
15:30-15:50	Lapierre, et al.	13	
15:50-16:10	Acorn & Cerezke-Riemer	14	
16:10-16:25	Vercruysse & Ciborowski	15	
16:25-16:45	Swann, et al.	16	
End of Day 1			
Saturday Oct. 16, 2021			
9:00-9:05	**Call to order**	N/A	
9:05-9:20	Fry, et al.	17	
9:25-9:40	Senevirathna & Mori	18	
9:40-9:55	LaForest & Mori	19	
9:55-10:10	Musso, et al.	20	
10:10-10:25	Summers, et al.	21	
10:25-10:40	BREAK/Final Prize Draws	N/A	
10:40-until we're done…	**AGM**		

Regular Oral Papers Friday October 15, 2021 09:45-11:45

Talk #1 Title: Effects of herbaceous versus treed field margins on abundance and movement of ground beetles and spiders between canola fields and their non-crop margins in Aspen Parkland.
Presentation type: Oral
Authors: Jimenez, I.P.[1], and Frost, C.[1]
1. University of Alberta- Department of Renewable Resources, Edmonton

Predatory ground beetles (Carabidae) and Spiders (Araneae) contribute positively to agricultural ecosystems by consuming herbivores. Different field margin types can increase predator abundance by the provision of suitable habitat. I investigated the effects of herbaceous versus treed field margins on spider and ground beetle diversity, abundance and movement into and out of canola fields. I installed paired directional pitfall traps along transects adjacent to and within canola fields at both herbaceous and treed margins on eleven canola fields. The pitfall traps had plastic shields that allowed me to measure movement in the margin-to-crop direction and in the crop-to-margin direction. I collected trapped arthropods every two weeks between May - October 2021 in the Aspen Parkland Region around Edmonton, Alberta. Preliminary results show that the abundance of spiders was higher in margins than in field interiors early in the growing season across all sites in both types of margins (herbaceous and treed), being slightly more abundant in treed margins. Carabid abundance was highest in treed margins. However, there was no significant effect of margin type or location (field margin vs. interior) on beetle abundance. Early in the season, spiders tended to move from the canola crop towards the herbaceous margin, while carabids moved most from the treed margin to the crop, though these movement patterns were also not statistically significant. Knowledge about how different types of margin vegetation sustain ground dwelling predators and how they move into canola fields will allow farmers to manage field margin vegetation to provide the most beneficial arthropods to crops.

Talk #2 Title: Contributions to the spider fauna of New Caledonia with a description of a new species and new genus and family records
Presentation type: Oral
Authors: Brownoff, F.[1], Pinzon, J.[1,2], and Frost, C.[1]
[1] University of Alberta, Department of Renewable Resources
[2] Natural Resources Canada, Northern Forestry Centre, Edmonton

The current state of New Caledonian spider fauna is likely a gross underestimate of the diversity that exists within its borders. This contrasts with the extensive amount of taxonomic reference material for spiders in nearby locations, such as Australia and New Zealand. Unfortunately, very few keys exist for a limited number of New Caledonian spider taxa and more comprehensive taxonomic literature is lacking in detail for identification. From fieldwork carried out in late 2015, I identified specimens to the lowest taxonomic level possible. From this, I am in the process of describing a new species in the family Zodariidae Thorell,1881, provisionally assigning it to the genus *Neostorena* Rainbow, 1914. I have also provided six additional records for genera (*Episinus* and *Phycosoma*) and families (Hahniidae, Mimetidae, Theridiosomatidae, and Symphytognathidae) previously unreported in New Caledonia. I will also discuss several interesting specimens in this same collection, though their taxonomic placement requires further study. This dataset offers many opportunities to increase our knowledge of the spider fauna in New Caledonia.

Talk 3 Title: Using morphometric software to quantify variation in the great spangled fritillary (Lepidoptera: *Speyeria cybele*)

Presentation type: Oral

Authors: Jackson, L.G.[1], Campbell, E.[2], and Sperling, F.A.H.[1]

1. University of Alberta, Department of Biological Sciences, Edmonton, Alberta, T6G 2R3 Canada
2. Canadian Food Inspection Agency, Ottawa, Ontario

Morphological identification of the great spangled fritillary butterfly (*Speyeria cybele*) has been a challenge due to substantial variation in size, colour, and wing patterning across the eastern and western North American portions of its range. This morphological complexity makes this species of interest to biologists and citizen scientists alike. Recent work has additionally revealed potentially substantial genomic divergences within this species that correspond to broad morphological differences between eastern and western-distributed subspecies, however this variation has not been explicitly assessed. In this project, wing shape of *S. cybele* was analyzed to determine whether morphological clusters of *S. cybele* are consistent with genetic clusters, and to assess which wing characters exhibit the most variation between subspecies. This project will further our understanding of morphological variation in *S. cybele* and other non-model organisms.

Talk #4 Title: Effects of canola bloom, floral availability, and field margin type on hover fly abundance in the Aspen Parkland

Presentation type: Oral

Authors: Pizante, R.[1], Acorn, J.[1], and Frost, C.[1]

1. University of Alberta, Department of Renewable Resources

Hover flies (Diptera: Syrphidae) are important pollinators for flowering crops such as canola. However, crops cannot provide all the resources a hover fly will need during its life cycle. In agricultural landscapes, field margins are often the only non-crop habitats available, and they provide larval and floral resources when the crop is not in bloom. The objective of this study is to examine how hover fly abundance, species richness, and species composition change with canola bloom, field margin type, and floral availability. At ten sites, I established four 30m transects: one in an herbaceous margin, one in a treed margin, and two 100m into the canola field from each marginal transect. With another observer, I walked each transect for 30 minutes and collected all insects that visited flowers. We also counted and identified flowers along each transect. I found that overall hover fly abundance decreased during canola bloom and that hover fly abundance was highest in herbaceous margins. After species-level identifications are complete, this study will provide a better idea of which hover fly species are potentially pollinating canola and which species use which wildflowers, providing both an agricultural and conservation perspective on hover flies in canola in Aspen Parkland.

Talk #5 Title: Epidemiology of *Nosema* spp. and the effect of indoor and outdoor wintering on honey bee colony population and survival in the Canadian Prairies

Presentation type: Oral

Authors: Punko, R.N.[1], Currie, R.W.[1], Nasr, M.E.[2], and Hoover, S.E.[3]

1. Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada
2. Alberta Agriculture and Forestry, Government of Alberta, Edmonton, Alberta, Canada (retired)
3. Department of Biological Sciences, University of Lethbridge, Lethbridge, Alberta, Canada

The epidemiology of *Nosema* spp. in honey bees, *Apis mellifera,* may be affected by winter conditions as cold temperatures and differing wintering methods (indoor and outdoor) provide varying levels of temperature stress and defecation flight opportunities. Across the Canadian Prairies, including Alberta, the length and severity of winter vary among geographic locations. This study investigates the seasonal pattern of *Nosema* abundance in two Alberta locations using indoor and outdoor wintering methods and its impact on bee population, survival, and commercial viability. This study found that *N. ceranae* had a distinct seasonal pattern in Alberta, with high spore abundance in spring, declining to low levels in the summer and fall. The results showed that fall *Nosema* monitoring might not be the best indicator of treatment needs or future colony health outcomes. There was no clear pattern for differences in *N. ceranae* abundance by location or wintering method. However, wintering method affected survival with colonies wintered indoors having lower mortality and more rapid spring population build-up than outdoor-wintered colonies. The results suggest that the existing *Nosema* threshold should be reinvestigated with wintering method in mind to provide more favorable outcomes for beekeepers. Average *Nosema* abundance in the spring was a significant predictor of end-of-study winter colony mortality, highlighting the importance of spring *Nosema* monitoring and treatments.

Talk #6 Title: Livin' on the edge: precision yield data shows evidence of ecosystem services from field boundaries

Presentation Type: Oral

Authors: Robinson, S.V.J. [1], Nguyen, L.H.[1], and Galpern, P.[1]

1. Biological Sciences, University of Calgary

Field boundaries can improve crop yields by creating better conditions for crop growth (moisture, temperature), and can act as refuges for beneficial arthropods. This suggests that beneficial crop boundaries may create an intermediate hump-shaped increase in crop yield, where negative edge effects are cancelled out by increased ecosystem services (pollination or pest control) from the field boundary. Precision yield data represents a huge potential source of data to answer this question, as the equipment is commonly measured by growers. In this study, we used 252 field-years of yield monitor data from three crops – wheat (*Triticum aestivum*), canola (*Brassica napus*), and peas (*Pisum sativum*) – recorded across Alberta, Canada, and modelled how yield varied with distances from common crop boundary types. Average yield tended to increase with distance from boundaries before plateauing at about 50 m, and yield variability tended to decrease with distance. There was evidence of an intermediate increase in yield for wheat away from shelterbelts, and a weak increase in canola, but this was not seen for other crop types or boundary types. This study represents one of the first uses of precision yield data to measure ecosystem service provision at large spatial scales.

Talk #7 Title: Assessment of current and future needs for entomological extension in agriculture in Alberta
Presentation type: Oral
Authors: Domnich, I.[1] and Evenden, M.[1]
1. University of Alberta

Recent discussions around extension activities in Alberta have demonstrated that a major challenge agricultural producers face today is to get new the knowledge and technology from researchers and extension entomologists. In order to improve the coordination of extension activities, it is necessary to understand the needs of producers and evaluate the effectiveness of current extension efforts. This project will involve the design and implementation of scientific surveys that target agricultural producers to better understand their use of agricultural extension tools and resources. These surveys will evaluate the various modes of communication used by producers to acquire and exchange new knowledge, as well as the priorities and needs of producers in terms of extension education. The questionnaires will assess producer's views on the effectiveness of current extension strategies, their preferred mode of information exchange, and the most pressing entomological issues that they face. The aim of this research is to develop a template that can be adopted for a variety of extension purposes.

Regular Posters Friday October 15, 2021, 11:45-13:00

Poster #1 Title: Distribution and Diversity of Terrestrial Isopods (Oniscidea) and their Symbionts in Alberta
Presentation type: Poster
Authors: Stormer, H.G.[1], Proctor, H.C.[1]
1. Department of Biological Sciences, University of Alberta, Edmonton, AB

Woodlice (Isopoda: Oniscidea) have been introduced to North America from Europe throughout the past several centuries. Woodlice have symbiotic associations with a variety of organisms, including parasites that have vertebrates as final hosts (Acanthocephala), and many species of woodlice inhabit urban environments. Although woodlice are undeniably present in Alberta, there are no published records of woodlice from Alberta or other Canadian prairie province as of this date. It is also not known whether any woodlouse-associated symbiotic species have been introduced to the province. Our preliminary collections have revealed four terrestrial isopod species in the Edmonton area (*Cylisticus convexus* (De Geer)*, Trachelipus rathkii* (Brandt), *Porcellio spinicornis* Say*, Porcellio scaber* Latreille). The two potentially symbiotic taxa we have seen so far (Acari and Nematoda) likely represent phoretic and trophic relationships respectively. Future work includes broader surveys of the province to determine if other woodlouse species are present in Alberta, and to evaluate whether woodlice in Alberta are restricted to urban environments. Collected woodlice will be examined for symbionts to determine whether any non-native symbiotic species are present, and whether woodlice may be acting as hosts for any native symbiont species.

Poster #2 Title: Bumble bees of Calgary: A key and illustrated guide for identification of the bumble bee species found in Calgary, Alberta
Presentation type: Poster Presentation
Authors: Neame, T. [1], Ritchie, S., and Summers, M. [1]
1. Department of Biological Sciences, University of Calgary

Bumble bees of Calgary is a new illustrated guide to introduce students and citizen-scientists to bumble bee identification. Our work includes an overview of bumble bee natural history, conservation considerations, how to photograph bumble bees for identification, and a step-by-step process for identifying bumble bees from other insects and sexing bumble bees. Using 2765 specimens collected in Calgary, we created a matrix key with annotated illustrations for bumble bee identification. We also created pages for 15 species and 22 morphotypes that include distribution maps and known plant associations. To encourage wide-spread use, ***Bumble bees of Calgary*** is an open-educational resource with illustrations licensed under creative-commons available through the University of Calgary invertebrate digital collections. The full guide has been downloaded >1000 times since its publication in June 2021. This guide is intended to support future citizen-science and educational projects, with the goal of increasing data collection and our understanding of Calgary's bees.

Poster #3 Title: Insect Pollinator Diversity and Native Plant Associations in the City of Calgary, Alberta
Presentation Type: Poster Presentation
Authors: Vermaak, S.K.[1], Seal, M.[1], Ford-Sahibzada, T.D.[1], and Summers, M.[1]
1. Department of Biological Sciences, University of Calgary

Insects pollinate roughly 75% of Earth's flowering plants**,** and while Calgary hosts a large number of diverse insect pollinators, its insect diversity and plant associations had not yet been cataloged. This study sought to document the diversity of Calgary's insect pollinators and determine which native plants support them.

We observed and combined observations of plant-pollinator relationships collected through iNaturalist (3168 observations) from 2008-2021, physical collections and observations from specific plants in 2020 (1840 observations), and observations of insects visiting flowers during transect (294 observations) and quadrat (225 observations) surveys in 2021. We compared the number and association type for 59 native plants, and nine major insect groups (flies, beetles, true bugs, wasps, solitary bees, butterflies, ants, bumble bees, and honey bees). We identified 63 families, 148 genera, and 194 species of insects. We found the greatest number of species and plant-pollinator associations for flies and solitary bees, followed by bumble bees and butterflies. We also identified ten native plants that were associated with the greatest number of major insect groups.

The results of this project will aid conservation and restoration efforts by providing guidance to city planners, landscape designers, and gardeners on which plants best support our city's pollinators.

Aquatics Symposium Oral Papers, Friday October 15, 2021, 13:00-17:00

Talk #8 Title: Adaptive Evolution and Phylogenomics of shore flies (Diptera: Ephydridae)
Presentation type: Oral Presentation
Authors: Abraham, S.M[1], Flynn, M.R. [2], and Sperling, F.A.H.[1]
1. Dept. Biological Sciences, University of Alberta, Edmonton, AB.
2. Dept. Mechanical Engineering, University of Alberta, Edmonton, AB.

Shore flies (Ephydridae) are a diverse, taxonomically challenging group of higher flies that often inhabit extreme aquatic environments such as hot springs and hypersaline lakes. Shore fly lifestyles range from fully terrestrial to diving and foraging underwater as adults, and their morphological adaptations have generated multidisciplinary interest (e.g. mechanical engineering of life in hot water). Consequently, there is potential utility in developing a genetic framework to study shore fly evolution. I will develop a reference genome for the species *Paracoenia bisetosa*, and then use whole genome resequencing of specimens from other locations to examine population differences in *P. bisetosa* from high stress environments compared to more typical semiaquatic locations. This should reveal genetic clues to adaptive evolution, as well as providing environmental bioindicators and insight into the conservation ramifications of natural fragmentation of stress tolerant species' ranges. My work will also expand the taxonomic diversity of sequenced genomes to include maximal representation of western Canadian Ephydridae. From these data, I will perform phylogenomic analyses to determine evolutionary relationships within the family Ephydridae, which will be the first large scale molecular assessment of this ecologically diverse, extraordinarily adaptable group of insects.

Talk #9 Title: Impacts of an annelid cleaning-symbiont on crayfish fecundity and range expansion
Presentation type: Oral presentation
Authors: Grams, C.S.[1], and Proctor, H.C.[1]
1. Department of Biological Sciences, University of Alberta, Edmonton AB

Branchiobdellid worms are common symbionts of freshwater crayfish. These tiny, leech-like clitellates rely on their host's cuticle to provide a secure surface on which to live and deposit eggs. Although the advantages branchiobdellids gain from this arrangement are well understood, the effect of branchiobdellid presence on crayfish fitness has been more difficult to quantify. Recent progress has been made by measuring the rate of crayfish growth under different worm loads. Results suggest that branchiobdellids are mutualists that remove fouling organisms from the host's cuticle and gills. However, this partnership is highly sensitive to host and symbiont species and environmental context, and may transition to parasitism if branchiobdellids resort to consuming host tissue. Although crayfish growth is an informative metric, it is not a comprehensive measure of host fitness, and additional variables should be considered to clarify the nature of this complicated symbiosis. We plan to expand on previous studies by measuring the influence of the branchiobdellid worm *Cambarincola vitreus* on the reproductive output of the northern crayfish, *Faxonius virilis*. Preliminary field work has shown that *C. vitreus* is an abundant symbiont of *F. virilis* in numerous water bodies in Alberta. Additionally, *C. vitreus* populations survive well under laboratory conditions, persisting on crayfish hosts several months after collection from the field. These features make *F. virilis* and *C. vitreus* a useful study system for laboratory experiments. We plan to directly measure the effect of *C. vitreus* on *F. virilis* reproductive fitness by quantifying gamete production and offspring survival under varying worm loads. This research will contribute not only to our limited knowledge of this freshwater symbiosis, but also to our understanding of the role branchiobdellids have played in the recent range expansion of northern crayfish into Alberta.

Talk #10 Title: Successional and disturbance controls on macroinvertebrate community composition in young boreal wetlands
Presentation type: Oral
Authors: Moore, E [1,2], and Ciborowski, J.J.H.[1]
1. Department of Biological Sciences , University of Calgary
2. Present Address: Department of Earth and Environmental Sciences, University of British Columbia (Okanagan)

The identification of environmental thresholds at which species composition begins to change has important implications for developing reclamation strategies in areas experiencing intensive disturbance, such as Alberta's oil sands region. After mining is complete, oil sands companies are required to reclaim the landscape to the equivalent ecological capabilities that existed pre-mining disturbance. Despite this, reclaimed sites often contain residual constituents of tailings such as salts, naphthenic acids and polycyclic aromatic compounds, whose potential toxicity may limit reclamation success. Aquatic invertebrates are excellent indicators of ecosystem health and their relative diversity and abundance can therefore be used to assess the trajectory of newly reclaimed wetlands. To identify the thresholds at which invertebrate communities experience differences in composition, I analyzed aquatic invertebrate community data previously collected from boreal wetlands surrounding Fort McMurray, AB, using Threshold Indicator Taxon Analysis (TITAN). The response of macroinvertebrate communities to the parameters of wetland age, conductivity (a measure of salinity), pH, and concentrations of naphthenic acids and sulfate were investigated for the presence of thresholds. Thresholds above which multiple (sensitive) species did not occur were identified for two parameters: conductivity (1200 µS/cm) and pH (8.1). Similar thresholds were observed in data from another invertebrate study in the Prairie Pothole Region which experiences similar types of disturbance (Preston et al. 2018), validating the occurrence of community change at these locations along a conductivity and pH gradient. Overall, elevated conductivity may influence the composition of aquatic invertebrate communities in young wetlands forming in reclaimed landscapes.

Talk #11 Title: Aquatic Invertebrate Field Sampling Comparison: Developing Adaptive Methods
Presentation type: Oral
Authors: Sutherland, A., Wrona, F., and Barrett, D.
(All University of Calgary)

Developing responsive environmental monitoring programs for river systems often reveals tensions surrounding implementation of conventional versus experimental field methods. Early stages of adaptive monitoring programs aim to maximize use of techniques that are targeted, efficient, and feasible through comprehensive method testing. Method testing, with the intention of forming a robust toolbox, is integral to a current multi-year project aiming to develop an environmental monitoring program for the Bow River. One important outcome of the program's development has been identified as characterizing changes in benthic communities and basal food web structures in the Bow River around anthropogenic wastewater inputs (primarily of stormwater and treated sewage effluent). This will include a methods comparison for three to four different aquatic invertebrate sampling techniques performed in both the Bow River and the Advancing Canadian Wastewater Assets (ACWA) experimental streams. A comparison of the communities established through these methods, alongside a food web analysis, will provide relevant information to the establishment of a Bow River specific adaptive environmental monitoring program. The goal of this presentation will be to share the experimental set-up for this comparison as an example of the early stages of an adaptive monitoring program, through the lens of aquatic invertebrate sampling.

Talk #12 Title: Water mites: gateway drugs to Acarology.
Presentation type: Oral **(plenary for the aquatic entomology symposium)**
Authors: Proctor, H.C.[1]
1. Department of Biological Sciences, University of Alberta, Edmonton, AB

Water mites (Acariformes: Parasitengona: Hydrachnidia) are the most species-rich group of arachnids to return to an aquatic lifestyle. There are more than 6000 described species of water mites in 57 families. They occupy all aquatic habitats ranging from torrential waterfalls to temporary pools; some water mites have even invaded the ocean. Like their terrestrial relatives, velvet mites and chiggers, water mites have a complex life cycle involving parasitic larvae and predatory nymphs and adults. They are unusual among freshwater arthropods in often being brightly coloured - this attractive colouration together with relatively large size and sprightly activity make the Hydrachnidia one of the most accessible groups of mites for budding acarologists to study. In this talk I will review what is known of the diversity of water mites in Alberta, discuss interesting aspects of their morphology and behaviour, and point out gaps in our knowledge of their biology that provide many research opportunities for academics of all ages.

Talk #13 Title: Beyond Biomonitoring – How the ABMI Supports Entomological Research
Presentation type: Oral
Authors: Lapierre, A.[1], Hinchliffe, R.[1], Tebby, C.[1], and Cobb, T.[1]
1. Alberta Biodiversity Monitoring Institute, CW 405 Biological Sciences, University of Alberta, Edmonton AB, T6G 2E9

The Alberta Biodiversity Monitoring Institute (ABMI) is a large-scale biodiversity monitoring program that evaluates ecosystem intactness and long-term trends in biodiversity across Alberta. Datasets required to meet the ABMI's ambitious ecological goals require strong taxonomic support and generating these datasets simultaneously advances taxonomic understanding. Through our wetland monitoring activities over the past 13 years, we show how the ABMI effort has already enhanced our knowledge of aquatic insect biodiversity through the expansion of research collections, the discovery of new species records for Alberta, and the development of updated regional identification keys.

Talk #14 Title: Aquatic insect sounds: established natural history or baffling new frontier?
Presentation type: Oral
Authors: Acorn, J. H.[1], and Cerezke-Riemer, Y.[1]
1. Dept. of Renewable Resources, University of Alberta

Aquatic insect stridulations have been recognized since the mid 1800s, and they are increasingly of interest to aquatic biologists pursuing soundscape ecology, e.g., in the context of fisheries biology. However, while the sounds of some insects were characterized decades ago, most species' calls (if they call at all) are still unknown, and recordings that are carefully associated with particular species are scarce. Thus, this aspect of descriptive natural history is unfinished work. Fortunately, high quality hydrophones, recording equipment, and analytical freeware are now readily available, and affordable. Using such gear, we documented the sounds of only three species of local corixid bugs, along with extensive field recordings that cannot be confidently assigned to particular species. As well, we documented, for the first time, corixid stridulations under thick ice in late winter. While making these recordings, we also encountered two rather prominent sounds, neither of which seems to have been recognized by other workers: 1) localized but dramatic sounds produced by fine bubble streams emanating from tissue damage in photosynthesizing macrophytes, and 2) loud, snapping-shrimp-like sounds under the ice in Lake Wabamun, the source of which is still unclear to us. Apparently, much work remains before we can confidently characterize the diversity of sound production in Alberta freshwater environments.

Talk #15 Title: Implications of Salinity in Influencing the Macroinvertebrate Community in Natural Wetlands of the Alberta Oil Sands Region
Presentation type: Oral
Authors: Vercruysse, B[1], and Ciborowski, J.J.H.[1]
1. Department of Biological Sciences, University of Calgary

Before the onset of oil sands mining in northern Alberta, wetlands accounted for nearly 65% of Alberta's northern boreal landscape, with peatlands comprising about 90% of those wetlands. In recent decades, reclaimed wetland projects have been successful (Sandhill fen watershed, Nikanotee Fen), however, due to sodic shale in the overburden, and the use of Sodium Hydroxide during extraction, conductivity continues to be a concern for reclaimed landscapes. While many naturally occurring peatland ecosystems in the region contain freshwater, saline fen systems are not uncommon. In order to understand how conductivity influences macroinvertebrate community composition in natural systems, a saline fen complex containing a gradient of conductivity ranging from 3000 μS/cm to 20000 μS/cm was used as a study site. Triplicate macroinvertebrate samples were collected from 52 unique wetted areas evenly distributed along the log transformed conductivity gradient, ranging from 3757 μS/cm to 20170 μS/cm using a D-net sweep sampler and the community composition of each sample was then analyzed. Threshold Indicator Taxon Analysis (TITAN) identified 20 indicator taxa, with 10 taxa decreasing along the conductivity gradient and 10 taxa increasing, yielding a community level threshold occurring between 6 300 and 9 300 μS/cm. Taxa identified as tolerant indicators include Culicidae and Corixidae, while the sensitive indicators include members of Odonata, Gastropoda and *Dixella*. Thus, increased levels of conductivity in reclaimed landscapes may influence the resulting invertebrate community composition within these landscapes.

Talk #16 Title: The Odonata of Beauvais Lake Provincial Park: A model for accurate odonate surveys?
Presentation type: Oral
Authors: Swann, J.E.[1], Swann, C.C.H. [1], Beswick, B.[2]
1. ABI Environmental Services Ltd., 3911 Varsity Drive NW, Calgary, AB
2. bette.beswick@gmail.com, Calgary, AB

Odonata — dragonflies and damselflies – are a distinctive and taxonomically relatively well-defined group of insects which are excellent bio-indicators of wetland water quality and are important in biodiversity conservation of wetland habitats. The literature lists 52 species of dragonflies and 25 species of damselflies as occurring in Alberta, with several listed as endangered or species of concern. From our Beauvais collection, we have identified 24 species of dragonflies and 11 species of damselflies. Traditional surveys for odonates in Alberta provincial parks have consisted of single season aerial netting of taxa while the collector(s) walked transects spring and late summer/fall in one season. We will present the results we have found over multiple seasons collecting with aerial nets and the non-traditional use of Malaise traps at Beauvais Lake which has resulted in a much more comprehensive list than from any other Alberta provincial park. Our list includes species at risk/of concern and one species that indicates a particular site within Beauvais Lake Park boundaries merits more protection from occasional 'cattle forays' into the park.

Regular Oral Papers Saturday October 16, 2021 09:05-11:45

Talk #17 Title: Alien Invasive Species Surveillance in Alberta - A Review
Presentation type: Oral
Authors: Fry, K.M[1]., Feddes-Calpas, J.[2], and Kimoto, T.[3]
[1]School of Life Sciences & Business, Olds College, Olds, Alberta
[2]Society to Prevent Dutch Elm Disease
[3]Canadian Food Inspection Agency

The establishment and expansion of the global marketplace has resulted in an increased risk of introduction to Canada of alien invasive species threatening our urban forests. The Society to Prevent Dutch Elm Disease has collaborated with the Canadian Food Inspection Agency to establish an invasive alien species surveillance network in Alberta over the past 10 years to detect introductions that may be harmful to urban, rural, and unmanaged stands of trees. Up to fifteen trapping sites identified as highest risk introduction sites for alien invasive species each had four separate Lindgren funnel traps set up and serviced bi-weekly from May 1 to September 30 of each year for a total of one hundred and fifty trap dates and six hundred total trap collections. The four traps were baited as follows; Ipsenol, Ethanol, α-pinene, or a Sirex lure (2010-2014), or Monochamol + Ipsenol, α-pinene, and Ethanol on one pair of traps and Fuscamol, Fuscamol Acetate, and Ultra High Release Ethanol on another pair of traps per site (2015-2021). This suite of lures specifically targets *Monochamus* species, a group of significant concern, all while also providing a broad spectrum of attraction so as to lure in as many wood-boring species as possible. Traps residues were processed and specimens in the following taxa were extracted and identified to Genus or species; Cerambycidae, Buprestidae, Siricidae, and Scolytinae. The results of the trapping will be described, including total number of taxa, abundance of selected taxa, and lure efficacy/selectivity. No alien invasive species were detected.

Talk #18 Title: Assessing genetic structure and reconstructing invasion routes of insect pests on the Canadian prairies

Presentation type: Oral

Authors: Senevirathna, K.M.[1] and Mori, B.A.[1]

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Population genomics can be an important tool to help identify patterns of movement and potential routes of invasion of agricultural pests. Identifying potential corridors of movement and population interconnections can help develop strategies to prevent further invasions or movement of these pests. In recent years, significant damage by wheat midges (*Sitodiplosis mosellana*), a pest of wheat (*Triticum aestivum*), has been reported in Alberta, Saskatchewan, Manitoba, Minnesota, North Dakota, and Idaho. Long-range dispersal events through wind or anthropogenic activities may have contributed to the current wheat midge distribution on the Prairies. However, understanding the movement of the wheat midge is difficult as several different processes may dictate their movement (e.g., short-range, stepwise, wind-mediated). In this study, we will reconstruct the route(s) of invasion of wheat midge on the Prairies and determine the origin of wheat midge in North America by assessing genome-wide population structure using a restriction site-associated DNA sequencing (RADSeq) approach. In addition, we will compare wheat midge populations to identify possible signatures of selection between invaded (North America) and native (Europe) regions, and areas of recently introduced (the Peace Region of Alberta) and established (Central Alberta) populations. Overall, this work will provide essential genomic resources for future researchers working on wheat midge. Understanding how diverse wheat midge populations are in North America and their interconnectedness may contribute to the management of this pest species using wheat midge tolerant wheat and insecticides as both can create high levels of selection pressure on midge populations. The ultimate goals of these studies are to use this knowledge to mitigate wheat midge damage through integrated pest management and enhance both the quality and quantity of wheat production in the Canadian Prairies.

Talk #19 Title: A multiplex PCR approach to identify weed seed predation by carabids in hemp and wheat in central Alberta

Presentation type: Oral

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Each year Canadian producers spend thousands of dollars on herbicides to reduce severe crop losses caused by weeds. As a result of herbicide use, the number of herbicide resistant weed species continues to increase. Due to resistance and potential harmful environmental effects of herbicide usage, alternative options are needed to suppress weeds. Ground beetles (Coleoptera: Carabidae) have a continuum of diets which range from specialist to generalist, and carnivore to omnivore to herbivore. There are hundreds of carabid species in Canada, and previous research has shown weed seed consumption in laboratory trials, and an increased presence of carabids near weed patches. However, there is a lack of research demonstrating if weed seed predation is occurring in the field. To investigate the feeding behaviour of carabids in hemp and wheat, molecular gut content analysis will be used to identify plant DNA within field captured carabids. To identify plant material within carabids, PCR will be performed with plant-specific primers designed using the rbcL and matK regions. The results of this study will contribute to the understanding the role of carabids in agroecosystems as weeds seeds predators.

Talk #20 Title: Lodgepole and jack pine terpene response at different stages of mountain pine beetle mass attack.
Presentation type: Oral
Authors: Musso A.E.[1], Huber D.P.W.[2], Carroll A.L.[3], Evenden M.L.[1]
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Insect herbivores must contend with constitutive and induced plant defences. The mountain pine beetle (*Dendroctonus ponderosae* Hopkins; MPB) has expanded its range east of the Rocky Mountains into the boreal forest in Alberta and is encountering evolutionarily naïve lodgepole and jack pines. Previous studies have examined terpene profiles prior to (constitutive) and just after (induced) mass attack but the terpene profile of trees post-overwintering is unknown. We manipulated mass attack densities in lodgepole and jack pines in the field and measured individual and total terpene amounts and diversity in phloem pre-attack, post-attack, and post-overwintering. Total terpenes as well as many individual terpenes increased at the post-attack stage and were significantly higher post-overwintering in both lodgepole and jack pines. Chemical diversity was not different at the different stages of attack, but individual trees had distinct chemical communities. Lodgepole pines had greater amounts of total constitutive terpenes compared to jack pine, but jack pine had higher induced terpenes compared to lodgepole pine. Since phloem terpene content is increased post-overwintering, trees that survive minor attacks or are "strip attacked" could be more toxic to MPB that try to colonize in the subsequent year.

Talk #21 Title: A collaboration in creating digital natural history collections: A case study of Alberta native bees
Presentation type: Oral
Authors: Summers, M.[1], Alexander, R.[2], Demarse, A.[3], Eggermont, M.[4], Galpern, P.[1], Hurrell, C.[2], Kaing, E.[5], McLernon, D., Ranjit, K.[2], Theodor, J.[1], and Vamosi, J.[1]

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At the University of Calgary, a collaboration among staff and students in the Department of Biological Sciences, Department of Mechanical Engineering, and Libraries and Cultural Resources, sought to explore how we could make our Biological Sciences natural history collections (invertebrate, vertebrate, and herbarium) accessible to a range of diverse stakeholders interested in biodiversity conservation. Using native bees as a case study, we digitized over 230 species of bee, producing 368 public records that includes three photographs of each bee specimen: lateral, anterior, and dorsal, along with associated metadata. This work involved the launch of a biodiversity website and digital collections where these photographs and student-created natural history illustrations are now available as open-educational resources. Our digitization work is continuing for bees as well as other insect groups, and we are currently expanding our digitization capabilities to create 3D models. These 3D models will be annotated for students in biology and engineering courses, and used to train both students and citizen scientists in insect identification. Our collaboration has generated campus-wide interest in bees, with recent collaborations with the Office of Sustainability leading to the University of Calgary becoming a BeeUniversity and the start of the Calgary Pollinator Count citizen-science initiative.