

PROCEEDINGS OF THE 66th ANNUAL MEETING OF THE



Entomological Society of Alberta

September 27 – 29, 2018

Edmonton, Alberta

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The Entomological Society of Alberta

The Entomological Society of Alberta (ESA) was organized November 27, 1952, at a meeting held in Lethbridge, Alberta, as an affiliate of the Entomological Society of Canada. A certificate of incorporation was obtained under the *Societies Act* on February 19, 1953.

The membership of about 70 paid-up members at that time consisted mainly of Dominion (Federal) entomologists at the Science Service Laboratories in Lethbridge (now Lethbridge Research and Development Centre of Agriculture and Agri-food Canada), Suffield Research Station, the Forest Zoology Laboratory in Calgary, and students and staff from the University of Alberta.

The object of the ESA shall be to foster the advancement, exchange, and dissemination of the knowledge of insects in relation to their importance in agriculture, horticulture, forestry, public health, industry, the environment, and for its own sake, among the people of the province of Alberta.

Membership is open to anyone interested in Entomology. Annual dues are \$20.00 (\$10.00 for students). Membership application is available at <https://entsocalberta.ca/about-the-esa/become-a-member/>

Entomological Society of Alberta Board of Directors for 2018

ESA Officers

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Local Organizing Committee: Caroline Whitehouse, Lisa Lumley, Erin Campbell, Leah Flaherty, and Christina Elliot.

Registration: Carolyn Whitehouse

Session Moderators: Erin Campbell, Tyler Nelson, Lisa Lumley

Logistics assistance: Victor Shegelski, Caroline Whitehouse, Lisa Lumley, Hector Carcamo, Sunil Shivananjappa, Benjamin Thompson, Sarah McPike, Terry Eberhardt, and Brittany Wingert



66th Annual Meeting of the
Entomological Society of Alberta 27-
29 Sept 2018
Edmonton, Alberta



THURSDAY, SEPTEMBER 27, 2018	
5:00	Board of Director's Meeting
6:30-10	Mixer and Registration

FRIDAY, SEPTEMBER 28, 2018	
8:00	Coffee
8:15	Welcome
8:30	Keynote Speaker: Dr. Carol Frost , University of Alberta: Understanding links between arthropod biodiversity and ecosystem function through species interactions
SESSION 1	POLLINATORS
9:15	Worthy, S. and Acorn, J.: Preliminary survey of the pollinators (Hymenoptera: Apidae: <i>Bombus</i> spp. and Diptera: Syrphidae) at the University of Alberta Botanical Gardens
9:30	Peterson, J. and Cartar, R. : Foraging currency of alfalfa leafcutter bees: distance (not time) is the revelator
9:45	Robinson, S. , Cartar, R., Pernal, S., and Hoover, S.: Managed bee pollination and yield in commodity and seed canola
10:00	REFRESHMENT BREAK
SESSION 2	BIODIVERSITY AND SYSTEMATICS
10:30	Reid, M. : Floods have modest effects on invertebrates in the Kananaskis River
10:45	Ibsen, S. , and Naeth, A.: Soil invertebrate indicators of land reclamation success
11:00	Campbell, E. , Gage, E., Gage, R., and Sperling, F.: Out of (species) bounds: genome-wide SNPs uncover phylogenetic inconsistencies in the butterfly genus <i>Speyeria</i>
11:15	French, R. , Lebusanin, A., Brunet, B., and Sperling, F.: Taxonomic utility and genetic architecture of genitalic variation in spruce budworms (Lepidoptera: Tortricidae: <i>Choristoneura</i>)
11:30	Wingert, B. , Campbell, E., Acorn, J., and Sperling, F.: Assessing species boundaries of crescent butterflies (Nymphalidae: <i>Phyciodes</i>) in Alberta using DNA
11:45	Camola Sustainable Foods presentation

12:00	LUNCH
SESSION 3	FORESTRY and SCIENCE COMMUNICATION
1:00	Klutsch, J. , Classens, G., Whitehouse, C., Mullin, M., Cahill, J., and Erbilgin, N.: Density dependent responses of mountain pine beetle to its pheromones and host volatiles in novel habitats
1:15	Trevoy, S. , Janes, J., and Sperling, F.: A linkage map for the mountain pine beetle (<i>Dendroctonus ponderosae</i>)
1:30	Cale, J. , Ding, R., Wang, F., Rajabzadeh, R., and Erbilgin, N.: Mutualistic fungi as sources of bark beetle anti-aggregation pheromones
1:45	Shegelski, V. , Evenden, M., Huber, D., and Sperling, F.: Morphology and functional genes associated with dispersal capacity in the mountain pine beetle (<i>Dendroctonus ponderosae</i>)
2:00	Nelson, T. and Sperling, F.: Temporal isolation among spruce budworms (Lepidoptera: Tortricidae: <i>Choristoneura</i>) aids in maintaining species boundaries
2:15	Evenden, M. and Domnich, I. : Development of an Entomology Massive Open Online Course - Bugs 101

2:30-3:30	COFFEE AND POSTER SESSION
	Raithby, A. , and Velasco, F.: Does myrmecochory facilitate the seed transfer and germination of <i>Thesium ramosum</i> ?
	Snape, K. , Roe, A., and Sperling, F.: Host-associated population genetic structure of forest tent caterpillar
	Lemke, E. , Heise, B, and Catton, H.: Investigating ground beetles as predators of wireworms on the Canadian prairies
	Timonera, J. : A symbiosis between ants and an invasive plant

FRIDAY EVENING	
5:00	Cocktails and Cash Bar - Craft Beer Market
6:30	Dinner - Craft Beer Market
7:30	Banquet Speaker: Dr. Jessica Haines, MacEwan University: Using citizen science to monitor biodiversity in Alberta
8:15	In Memoriam: Dr. Bruce Heming, presented by Dr. Doug Craig
8:30	After dinner mingle

SATURDAY, SEPTEMBER 29, 2018	
8:45	Coffee
SESSION 4	AGRICULTURAL ENTOMOLOGY
9:00	Cárcamo, H. , Eudes, P., Villiard, A., Fernandez, C., Bouchier, R., Garipey, T., Laird, R., Mason, P., and Haye, T.: Enhancing biological control of lygus bugs with an exotic <i>Peristenus</i> wasp in the Prairies - will it compete with native species ?
9:15	Catton, H. : Playing to win: how crop entomology is like table tennis
9:30	Bezanson, G. , Dovell, C., and Floate, K.: The attractiveness of fresh and frozen cattle dung on the coprophagous insect community
9:45	Marshall, V. , Sjolie, D., and Evenden, M.: Monitoring pea leaf weevil <i>Sitona lineatus</i> (Coleoptera: Curculionidae) in Alberta using semiochemical-baited traps
10:00	Shivananjappa, S. , Laird, R., Floate, K., and Fields, P.: Induction and termination of diapause in the quarantine insect <i>Trogoderma granarium</i> (khapra beetle)
10:15	MacDonald, M. , and Evenden, M.: The potential use of beneficial insects for management of pea leaf weevil, <i>Sitona lineatus</i> L. (Coleoptera, Curculionidae) in Canadian prairie Fabaceae crops
10:30	Fry, K. : Introduction of the parasitoid, <i>Tetrastichus setifer</i> Thomson (Hymenoptera: Eulophidae), for managing the invasive lily leaf beetle, <i>Lilioceris lili</i> Scopoli (Coleoptera: Chrysomelidae), in Alberta
10:45	REFRESHMENT BREAK
11:00	ANNUAL GENERAL MEETING!

ORAL PRESENTATIONS

1. The attractiveness of fresh and frozen cattle dung on the coprophagous insect community

Bezanson, G.,^{1, 2}, Dovell, C. J.^{1,2}, and Floate, K.D.¹

¹Lethbridge Research and Development Centre, Agriculture and Agri-Food Canada, Lethbridge

²Department of Biological Sciences, University of Lethbridge, Lethbridge

Dung-baited pitfall traps are commonly used to collect coprophagous insects. Bait size and the animal species from which the dung derives are well-known to affect insect captures. Little if any information is available regarding the use of fresh versus frozen baits, or the duration of bait attractiveness.

To determine the most effective combination of bait type (fresh, frozen) and rebaiting period, we set out ten pairs of pitfall traps ($n = 20$ traps). On Day 1, one pair of traps was baited with a fresh and a frozen bait. Those traps were then emptied daily for the next 7 days. The process was repeated using a new pair of traps for each of the next nine days ($n = 140$ trap collections). The experiment was repeated four times over the course of two years.

Preliminary findings suggest that freezing baits prior to use is more effective than fresh baits for collecting coprophagous insects. This is thought to be due to frozen baits needing to thaw before they can dry out. It was also found that traps should be rebaited after three or four days as little difference in insect collection was noticed after this period.

2. Mutualistic fungi as sources of bark beetle anti-aggregation pheromones

Cale, J.¹, Ding, R.¹, Wang, F.¹, Rajabzadeh, R.¹, and Erbilgin, N.¹

¹ Department of Renewable Resources, University of Alberta, Edmonton, Alberta

Many bark beetle species use sophisticated pheromone systems to coordinate their colonization of host trees. While compounds that attract conspecifics (aggregation pheromones) are largely produced by the beetles themselves, some compounds that deter conspecifics (anti-aggregation pheromones) can be produced by beetle-associated yeasts. However, mutualistic ophiostomatoid fungi are the dominant group of microbes carried by bark beetles and can emit beetle semiochemicals, but whether these fungi can emit beetle pheromone components is unknown. We present findings from a laboratory experiment investigating the production of volatile chemicals from cultures of *Grosmannia clavigera* and *Ceratocystis ips* (primary symbionts of mountain pine beetle and the pine engraver beetle, respectively) grown in media amended with chemicals common in tree tissue or emitted by beetles. The anti-aggregation compound verbenone was detected at high concentrations from fungal cultures grown in media amended with the beetle aggregation pheromone *trans*- verbenol. The presence of verbenone corresponded with a reduction in *trans*-verbenol in the media. The production of other beetle semiochemicals

qualitatively and quantitatively varied with media amendment. These results indicate that beetle-mutualistic ophiostomatoid fungi may be overlooked sources of semiochemicals and contributors to the pheromone systems of bark beetles.

3. Out of (species) bounds: genome-wide SNPs uncover phylogenetic inconsistencies in the butterfly genus *Speyeria*

Campbell, E. O.¹, Gage, E., Gage, R., and Sperling, F. A. H.¹

¹Department of Biological Sciences, University of Alberta

Species delimitation in the North American genus *Speyeria* has been complicated by high variability in wing patterning within species, close evolutionary relationships between species, and the use of only a few molecular markers to infer phylogenetic relationships. Genome-wide SNPs have been useful for elucidating relationships in similarly difficult-to-characterize systems and thus represent a promising approach for clarifying species dynamics within *Speyeria*. We present a phylogenetic comparison between DNA barcoding and genomic SNPs to evaluate incongruities between markers. Our results reveal a history of complex interactions likely marked by incomplete lineage sorting, secondary contact and introgression, each of which has implications for species delimitation in this group.

4. Enhancing biological control of lygus bugs with an exotic *Peristenus* wasp in the Prairies – will it compete with native species?

Cárcamo, H.A.¹, Eudes, P.J.M.¹, Villiard, A.², Fernandez, C.³, Bouchier, R.¹, Garipey, T.⁴, Laird, R.⁵, Mason, P.⁶, Haye, T.⁷

¹Agriculture and Agri-Food Canada (AAFC), Lethbridge

²New Jersey Department of Agriculture, Trenton, NJ, USA

³Department of Biological Sciences, University of Windsor ⁴AAFC, London

⁵Department of Biological Sciences, University of Lethbridge

⁶AAFC, Ottawa

⁷CABI, Delemont, Switzerland

Lygus bugs (Miridae) are native pests of numerous crops in North America. In the NE USA, a nymphal parasitoid from Europe, *P. digoneutis* has reduced populations and is now adventive in Quebec and Ontario. In the Prairies *P. mellipes* (formerly *P. carcamo*) is the dominant native parasitoid, but parasitism levels are too low and biocontrol might be enhanced by relocation of *P. digoneutis*. Our objective was to investigate the potential for competition between these two species. Native western *P. mellipes* were reared from nymphs collected in the field near Lethbridge. *Peristenus digoneutis* were sourced from New Jersey. Individual females were allowed to compete for 20 nymphs simultaneously or sequentially. In the sequential test, the nymphs were exposed to one species on day 1 and exposed to the second species after approximately 24 hours. Insects were reared under summer photoperiod conditions to allow the progeny of *P. digoneutis* to emerge as adults, but *P. mellipes* remain in diapause as cocoons. Preliminary results suggest that very few adult *P. digoneutis* emerge when the native species attacked first or in the simultaneous competition test. It appears that the risk for competitive displacement for this native species by *P. digoneutis* might be low.

5. Foraging currency of alfalfa leafcutter bees: distance (not time) is the revelatory

Peterson, J.¹ and Cartar, R.²

¹Augustana Campus, University of Alberta, Camrose, AB

²Department of Biological Sciences, University of Calgary, Calgary, AB

Foraging social bees appear to maximize efficiency (net gains/costs), rather than the seemingly more lucrative rate-based currency net rate of energy intake (NREI; [net gains - costs] /time). But what about solitary bees? Do solitary females, who must fully provision an offspring before that offspring “counts” in her fitness, also forage in a manner that is most responsive to foraging costs (efficiency), rather than to rate of food acquisition (NREI)? We address this question using Alfalfa leafcutter bees, a livestock who provide pollination services to alfalfa seed farmers. Females provision their offspring with pollen and nectar obtained from nearby alfalfa flowers. To test foraging currencies, we measured trip lengths of bees whose nests were set out near (5 m) and far (150 m) from an alfalfa field, and measured details of their flower handling and flight times. By comparing observed bee trip lengths with predictions from foraging models, bees were closer fit to efficiency maximizing than to NREI maximizing. Hence, this solitary bee seems not unlike its social brethren: getting the most food from any energy expenditure seems to matter more than getting the most food per unit time. Foraging efficiency claims another true believer, in a solitary form.

6. Playing to win: how crop entomology is like table tennis

Catton, H. A.¹

¹Agriculture and Agri-Food Canada, Lethbridge Research and Development Centre, Lethbridge, Alberta, Canada

Pest insects are a major threat to food production, and farmers in all cropping systems battle problem species each year. Table tennis is a sport played worldwide all the way up to the Olympic level. At first glance, these concepts seem unrelated, but if you picture a farmer as a player on one side of the net, and a pest insect as the opponent, surprisingly, the two activities start to converge.

Both pursuits require strategy, preparation, and anticipation. To win, players must know their opponents well, attack weaknesses, and withstand counterattacks. They must use a variety of techniques to knock their opponents off balance. Both battles are ever-changing as opponents respond to each other and try new strategies. A "smash" shot like insecticide might work great for a while, but when used too often, the opponent adapts and defends, returning the ball at dangerously high speeds. Teamwork is vital in both challenges. Competitive players need coaches, training partners etc. to be their best, while farmers need crop scouts, researchers, engineers, chemists, among others.

This presentation will use examples from prairie cropping systems to explain how science is a gold-medal coach for farmers in their face-off against these formidable six-legged opponents.

7. Development of an Entomology Massive Open Online Course-Bugs 101

Evenden, M.L.¹, and Domnich, I.¹

¹Department of Biological Sciences, University of Alberta

Bugs 101 is a Massive Open Online Course (MOOC) that will be launched on the Coursera platform in early 2019. The content of the course focuses on insect-human interactions, and also introduces learners to insect evolution, biology and ecology. The course will be available for free to a wide range of learners from around the world. Subsequently, a University of Alberta version of the course will be offered as a first year, for-credit course. In this presentation, we explain the process of building a MOOC, highlight the course content and delivery methods and introduce the learning tools that will be used to reinforce and assess student learning.

8. Taxonomic utility and genetic architecture of genitalic variation in spruce budworms (Lepidoptera: Tortricidae: *Choristoneura*)

French, R.¹, Lebunasin, A. P.¹, Brunet, B.¹, and Sperling, F. A. H.¹

¹Department of Biological Sciences, University of Alberta

Spruce budworms of the *Choristoneura fumiferana* species complex are economically important defoliators of conifers in North America, but are difficult to identify using external morphology. Internal genitalic characters may be more informative, particularly for *C. fumiferana*, *C. occidentalis occidentalis* and *C. o. biennis*. Among those taxa, the presence or absence of spicules, or spine-like projections, on the male phallus (intromittent organ) has shown promise as a species diagnostic. However, the value of that character in a zone of interaction in Alberta, Canada remains uncertain. To assess the taxonomic utility of spicules, we dissected, photographed, and counted spicules on the phalluses of *C. fumiferana*, *C. o. occidentalis*, and *C. o. biennis* specimens from western and central Alberta. The count data were analyzed using multi-species genome wide association studies of over 6000 single-nucleotide polymorphisms (SNPs) and over 150 specimens, and a recently published genetic linkage map for *C. fumiferana* was used to identify the chromosomal locations of significant SNPs. Our analyses identify candidate genes that may contribute to morphological variation in a reproductively important trait.

KEYNOTE SPEAKER: Dr. Carol Frost

9. Title: Understanding links between arthropod biodiversity and ecosystem function through species interactions

Frost, C.¹

¹Department of Renewable Resources - University of Alberta

All species are involved in complex networks of interactions that collectively influence how ecosystems function. This talk will present past and current work looking at how anthropogenic changes to arthropod biodiversity and interactions change ecosystem function. Prey species sharing an enemy (predator or parasitoid) can be linked by apparent competition, and I investigated whether this process is strong enough to be a community-wide structuring mechanism, including across a habitat edge. I found, using a large field experiment in New Zealand, that predicted apparent competitive effects between herbivore species, mediated via shared parasitoids, could significantly explain future parasitism rates and caterpillar abundances at the community level. Furthermore, movement of parasitoids across a habitat edge between exotic plantation forest and natural forest coupled caterpillar populations on either side of the edge in apparent competition. Back in Alberta, we are beginning projects looking at how non-native and invasive species in rangelands and linear disturbances in forests affect pollinator biodiversity, plant-pollinator interaction network structure, and native plant seed production. Future work will include looking at generalist predator and omnivore (spider and ant) trophic interactions and how these change through forest succession and under land use intensification.

10. Introduction of the parasitoid, *Tetrastichus setifer* Thomson (Hymenoptera: Eulophidae), for managing the invasive lily leaf beetle, *Lilioceris lili* Scopoli (Coleoptera: Chrysomelidae), in Alberta

Fry, K.M.¹

¹School of Animal Science & Horticulture, Olds College, Alberta

The lily leaf beetle, *Lilioceris lili* Scopoli (Coleoptera: Chrysomelidae) was detected in Airdrie, Alberta in 2004 and has spread northward and southward in the province. The larval parasitoid, *Tetrastichus setifer* Thomson (Hymenoptera: Eulophidae) was released beginning in 2013 to suppress the lily leaf beetle. The parasitoid has been recovered in successive years, indicating establishment in central Alberta. There was an average of 9.2 parasitoid larvae per lily beetle larva. Parasitism rates at the release site were recorded to be as high as 59%. Dispersal from the original release site has been slow to occur with lily plots 500m away not colonized until 3 years post-release. This parasitoid shows promise for suppressing the lily leaf beetle in Alberta.

BANQUET SPEAKER: Dr. Jessica Haines

11. Using citizen science to monitor biodiversity in Alberta

Haines, J. A.¹, Bell, J.², and Narwani, T.²

¹Department of Biological Sciences, MacEwan University, Edmonton, AB

²Alberta Biodiversity Monitoring Institute, Biological Sciences Building, University of Alberta, Edmonton, AB

Citizen science is a partnership between scientists and members of the public to collect data. It is becoming increasingly popular as a research tool, and data collection in many established projects occurs at a scale that would otherwise require significant investment by professional scientists. There is also evidence that it can be an effective tool for science education. Thus, engaging the public in scientific projects has the potential to benefit both scientists and the participants. However, citizen science is not fully accepted by the scientific community, one of the main concerns being data quality. Likely in part because of concerns about data quality, many citizen science projects also have limited scope and thus limited utility for broader scientific questions. In my talk, I will review the evidence for using citizen science and public engagement as a tool in scientific projects, as well as the potential limitations. I will also discuss the recently released citizen science app NatureLynx, which was created by the Alberta Biodiversity Monitoring Institute. My goal is to assess the quality of data being contributed to this app by citizen scientists in order to understand how Albertans can contribute to biodiversity monitoring in the province.

12. Soil invertebrate indicators of land reclamation success

Ibsen, S.¹ and Naeth, A.¹

¹Department of Renewable Resources, Future Energy Systems, Land Reclamation International Graduate School, University of Alberta

Current reclamation criteria focus on soil physical and chemical properties and vegetation cover without considering indicators of diversity and resilience. The recent global interest in maintaining sustainable ecosystems high in biodiversity, means reclamation must lead to a complex ecosystem supporting diverse organisms and trophic levels. Composition of the soil biological community is linked to ecosystem health, biodiversity, function, and influences ecosystem recovery.

The objective of this research is to advance the definition, understanding, and debate surrounding reclamation success indicators and contribute to comprehensive reclamation and ecosystem health assessments. Vegetation cover and health will be assessed. Soil will be sampled and analyzed for chemical and physical properties. Soil invertebrates will be collected using pitfall traps, leaf litter, and soil cores. Analysis of variance will be used to compare reclamation sites with natural analogs. Indicator species and relationships will be assessed using regression analysis.

We hypothesize soil invertebrates will be a sensitive and significant parameter and that Mesostigmatid soil mites will be useful indicators of reclamation success. Currently, there are no methods for evaluating reclamation indicators soil invertebrates that do not require extensive knowledge and resources. There is a need for practical methods that can be incorporated into reclamation success indicator protocols.

13. Density dependent responses of mountain pine beetle to its pheromones and host volatiles in novel habitats

Klutsch, J.¹, Classens, G.¹, Whitehouse, C.², Mullin M.¹, Cahill, J.F.³, Erbilgin, N.¹

¹MSc Student in Forest Biology and Management

²Department of Biological Sciences, University of Alberta

³Department of Renewable Resources, University of Alberta

Mountain pine beetle (*Dendroctonus ponderosae* Hopkins) has expanded into the naïve lodgepole pine (*Pinus contorta* Douglas var. *latifolia* (Engelm.) Critchfield) forests in Alberta, causing substantial ecological change and economic loss. Synthetic lures composed of beetle pheromones plus a host volatile attached to traps are typically used to monitor beetle activities in its both historical and expanded range; however, less is known whether density of beetles influences their responses to the lures. In 2017 and 2018, we tested the efficacy of four lures, which varied in release rates of beetle pheromones (*trans*-verbenol, *exo*-brevicomin) and two host volatiles (terpinolene, myrcene), in both low and high density beetle sites in Alberta. We compare the catches of beetles from both trapping years and provide initial evidence that mountain pine beetles elicit a density dependent response to pheromones and host volatiles during host colonization.

14. The Potential use of Beneficial Insects for Management of Pea Leaf Weevil, *Sitona lineatus* L. (Coleoptera, Curculionidae) in Canadian Prairie Fabaceae Crops

MacDonald, M.¹, Evenden, M.¹

¹Department of Biological Science, University of Alberta, Edmonton, Alberta

The pea leaf weevil (PLW), *Sitona lineatus* L. (Coleoptera, Curculionidae), is a significant pest of field pea, *Pisum sativum* L. (Fabaceae), and faba bean, *Vicia faba* L. (Fabaceae), that has recently invaded the Canadian Prairie Provinces. Current PLW management strategies consist of adult population monitoring, insecticide application, and insecticidal seed treatments. Semiochemical based monitoring has been successful to detect the population spread of PLW in the Prairie Provinces, but a well-developed integrated pest management (IPM) program does not exist. Obstacles consist of single strategy approaches and potential insecticidal resistance. Ground beetles (Coleoptera, Carabidae) have been successful in predation and management of pest populations in arable land systems. Although their contribution is not fully understood, their predatory behaviour is crucial for pest management in sustainable agricultural systems. The research objectives are to identify which predator species are present at study sites, investigate their potential for biological control, and to examine at which life stages they will predate PLW. These objectives will be accomplished by trapping beneficial arthropods, laboratory bioassays, and assessment of potential PLW predation. Results from this research project will provide information on biological control options for PLW and will contribute to a multi-step IPM program for PLW pest management.

15. Monitoring Pea Leaf Weevil *Sitona lineatus* (Coleoptera: Curculionidae) In Alberta Using Semiochemical-Baited Traps

Marshall, V.¹, Sjolie, D.², Evenden, M.¹

¹ CW 405, Biological Sciences Bldg., Edmonton, Alberta

² Rollins Urban and Structural Entomology Facility, 2143 TAMU, College Station, Texas

Pea leaf weevil, *Sitona lineatus* (Coleoptera: Curculionidae) is an invasive pest of pulse crops, in particular field peas and faba beans. Since its introduction to Alberta in 1997, the pea leaf weevil has spread north throughout the province's pulse-growing regions. Most of the damage to crops comes from larval feeding on *Rhizobium*-containing root nodules; however the most visible damage comes from adult feeding in the form of leaf notches. The pea leaf weevil aggregation pheromone is commercially available; however current monitoring still relies on labour-intensive leaf notch assessments. The goal of this study is to determine pea leaf weevil distribution using semiochemical-baited traps.

16. Temporal isolation among spruce budworms (Lepidoptera: Tortricidae: *Choristoneura*) aids in maintaining species boundaries

Nelson, T.¹ and Sperling, F. A. H.¹

¹Department of Biological Sciences, University of Alberta

The spruce budworm species complex contains 8-11 insect defoliators of significant economic importance. In the Rocky Mountains, three taxa exist in sympatry: the eastern spruce budworm (*Choristoneura fumiferana*), the western spruce budworm (*Choristoneura occidentalis occidentalis*), and the two-year-cycle spruce budworm (*Choristoneura occidentalis biennis*).

Laboratory crosses between these taxa have produced fertile offspring, yet natural hybrids are rarely discovered. Previous work has shown that the flight period of *C. fumiferana* is nearly isolated from *C. o. occidentalis* in the Cypress Hills of Alberta. Further, *C. o. biennis* has an obligate two-year life cycle that limits contact with the other taxa. Therefore, we hypothesize that within-season and between-year temporal isolation aids in maintaining the species boundaries of *C. fumiferana*, *C. o. occidentalis*, and *C. o. biennis*. In 2017 and 2018, we used pheromone traps to capture adult budworm in sites with known range overlap throughout the Canadian Rockies. Genetic analysis revealed near-isolated flight periods between these taxa in 2017. Preliminary findings from 2018 suggest a similar trend, though we observed an additional unexpected peak of putative *C. o. biennis* flight in British Columbia. Our results demonstrate the importance of multi-year studies for understanding spruce budworm activity.

17. Floods have modest effects on invertebrates in the Kananaskis River

Reid, M.L.¹

¹University of Calgary, Biological Sciences

Extreme flooding events are expected to cause large changes in aquatic macroinvertebrate populations and communities. Using 17 years of invertebrate data from the Kananaskis River collected by an annual field course, I examined whether the floods of 2005 and 2013 changed the abundance, taxonomic composition and body size of invertebrates. Mayflies

(Ephemeroptera) dominated the community, especially the family Heptageniidae. Total abundance and % Heptageniidae differed between two collection sites and among years, but 2005 and 2013 were not unusual. Average body size of four families of invertebrates also did not appear to change after the floods. The resilience of invertebrates to flooding may be related to daily and seasonal fluctuations in river discharge in this flow-regulated river.

18. Managed bee pollination and yield in commodity and seed canola

Robinson, S.¹, Cartar, R.¹, Pernal, S.², and Hoover, S.³

¹Biological Sciences, University of Calgary

²Agriculture and Agri-Food Canada

³Alberta Agriculture and Forestry

Pollination by insects, both wild and managed, contributes to a large proportion of yield in agroecosystems. Canola (*Brassica napus* L.) is an important oilseed crop, both in Canada and abroad, and insect pollination is known to be somewhat beneficial. However, these benefits appear to be highly context- and variety-dependent, and are known mainly from European varieties of *B. napus*, meaning that the benefit of stocking fields with honey bees (*Apis mellifera* L.) in North America is unclear. We surveyed 60 stocked and unstocked commodity canola fields and 35 hybrid seed fields in southern and central Alberta during the summers of 2014-2016, and found that pollination and yield in commodity canola is unaltered by honey bee visitation, while both leafcutter bees (*Megachile rotundata* Fab.) and honey bees directly contribute to increased pod survival and seed count in hybrid seed canola by increasing pollen deposition. While the benefits of stocking honey bees on seed canola production are clear, our results show that honey bee stocking causes no consistent yield increases in commodity canola.

19. Morphology and functional genes associated with dispersal capacity in the mountain pine beetle (*Dendroctonus ponderosae*)

Shegelski, V.¹, Evenden, M.¹, Huber, D.,² Sperling, F.A.H¹

¹Department of Biological Sciences, University of Alberta

²Ecosystem Science & Management Program, University of Northern British Columbia

Dispersal by mountain pine beetle (*Dendroctonus ponderosae*) is poorly understood and increasing our knowledge of its dispersal capabilities could allow for more efficient allocation of management resources. While some flight morphology (primarily wing size and body mass) has been found to be correlated with flight capacity, there is still a large amount of unexplained variation in flight performance that is likely genetic. This study aims to identify genes associated with flight capacity in mountain pine beetle. Beetles were flown on flight mills to collect flight data, and RNA-seq was used to analyze gene expression levels relating to flight. So far, patterns of differential gene expression indicate a reallocation of resources to maximize flight capacity in strong fliers. Some systems associated with these differentially expressed genes include: muscle function, metabolism, pheromone detection, immune response, detoxification, and reproduction.

20. Induction and termination of diapause in the quarantine insect *Trogoderma granarium* (khapra beetle)

Shivananjappa, S.^{1, 2}, Laird, R.², Floate, K.¹, and Fields, P.³

¹Lethbridge Research and Development Centre, Agriculture and Agri-Food Canada, Lethbridge, AB T1J 4B1, Canada

²Department of Biological Sciences, University of Lethbridge, Lethbridge, AB T1K 3M4, Canada ³Morden Research and Development Centre, Agriculture and Agri-Food Canada, Winnipeg, MB R3T 2M9, Canada

Khapra beetle, *Trogoderma granarium* Everts (Coleoptera: Dermestidae) is a highly destructive pest of stored agricultural commodities in Africa, Asia, and parts of Europe. It is a quarantine insect (not established) in North and South America, Australia and several other countries.

Unlike most stored-product insects, khapra beetle is capable of entering diapause. This allows it to survive for several years as a diapausing larva with little to no food, and increases its resistance to insecticides and extreme temperatures. Thus, knowledge on mechanisms of diapause termination may help enhance control of this pest. We assessed the effect of duration in diapause and diet quality on diapause termination. Diapausing larvae from cultures that were 3, 10, or 14 months old were provided with diets with different percentages of fresh (F) or old (O) diets; 100F, 75F:25O, 50F:50O, 25F:75O, 100O. Mortality and pupation (diapause termination) were noted every 3 days for 56 days and at 15 days interval thereafter. No larvae on old diet terminated diapause, whereas 62.3% of larvae on fresh diet terminated diapause. Diets with greater amounts of old diet saw a reduction in diapause termination. The effect of age of culture was complex and mortality increased with percentage of old diet.

21. A linkage map for the mountain pine beetle (*Dendroctonus ponderosae*)

Trevoy, S.¹, Janes, J.^{2,3}, and Sperling, F. A. H.¹

¹University of Alberta, Edmonton, AB, Canada

²Vancouver Island University, Nanaimo, BC, Canada

³University of New England, Armidale, Australia

The mountain pine beetle, *Dendroctonus ponderosae*, shows substantial regional genetic difference across western North America, including a north-south divide in Canadian populations in specific parts of the beetle's genome. We used two approaches to locate these genomic islands of differentiation. First, we developed an intuitive and accessible method for finding linked cohorts of markers from population genetics surveys, using a combination of principle components analysis and linkage network analysis. Second, we applied classical linkage mapping to F2 families from crosses between northern (Grande Prairie) and southern (Canmore) beetles to create a full linkage map of the beetle genome. Integration of these approaches is allowing new insight into the genomic architecture of adaptation in a major forest pest.

22. Assessing species boundaries of crescent butterflies (Nymphalidae: *Phyciodes*) in Alberta using DNA

Wingert, B.D.¹, Campbell, E.O.¹, Acorn, J.H.², and Sperling, F.A.H.¹

¹Biological Sciences Building, University of Alberta, Edmonton, AB

² General Services Building, University of Alberta, Edmonton, AB

Delimitation of the four species of the *Phyciodes tharos* group is challenging. Where the ranges of these butterflies overlap in North America, traditional morphological taxonomy often fails; wing patterning is highly variable within species making diagnostic characters largely unreliable. Previous studies have demonstrated that mitochondrial COI does not successfully resolve species boundaries in this group, particularly for *P. cocyta* and *P. batesii*, the two species exhibiting the greatest geographic overlap. In this study, we use an integrative phylogenetic approach to explore species boundaries of this group within Alberta by analyzing both COI sequences and genomic single nucleotide polymorphisms (SNPs). The province is an appropriate area of study as all four species overlap to some extent and no other species of the genus are present. Preliminary results show that all four species form distinct genetic clusters but have some intermediate specimens suggesting occasional hybridization. By combining these molecular approaches with morphological and natural history information, we hope to shed new light on the evolution of *Phyciodes* and produce improved identification tools.

23. Preliminary survey of the pollinators (Hymenoptera: Apidae: *Bombus* spp. and Diptera: Syrphidae) at the University of Alberta Botanical Gardens

Worthy, S.¹ and Acorn, J.¹

¹Dept. of Renewable Resources, University of Alberta, Edmonton, Alberta

The University of Alberta Botanic Garden is a cultured garden, of plants both native and non-native to Alberta. The site has refrained from using pesticides for the past 40 years, which may increase the diversity of pollinators present. This preliminary study was intended to look into the evidence for this hypothesis, and whether it is worthwhile to pursue further research.

Hymenoptera and Diptera samples collected by hand netting over four days in 2013 were analyzed through plant-pollinator network diagrams. Twenty-five species of hover flies were caught at the botanic gardens, which is approximately 50% of the known diversity in Alberta. Likewise, the nine species of bumblebees found at the botanic garden represent approximately 35% of the species of bumblebees found in Alberta, and include an IUCN red-listed species *B. terricola*. Despite low sampling effort, there appeared to be high diversity present at the site. Considering the diversity documented, it would be valuable to pursue further research in this system.

POSTER PRESENTATIONS

24. Investigating ground beetles as predators of wireworms on the Canadian prairies

Lemke, E.^{1,2}, Heise, B.², Catton, H.A.¹

¹Agriculture and Agri-Food Canada, Lethbridge Research and Development Centre

²Thompson Rivers University, Department of Natural Resource Sciences

Many species of wireworm (Coleoptera: Elateridae) are known to be root-feeding crop pests around the world. On the Canadian prairies, several native wireworm species damage cereal, pulse, and oilseed crops. With the de-registration of effective pesticides, no lasting control methods are currently available for these long-lived, soil-dwelling pests, leading to economic losses and frustration for producers. Biological control is an important tool for many other crop pests, but little is known of its potential for controlling wireworm on the prairies. Ground beetles (Coleoptera: Carabidae) are ground-dwelling and digging generalist predators that provide natural control of other crop pests, but their potential as biocontrol agents on prairie wireworms is unknown. Here, we present the results of lab bioassays testing the proclivity of prairie ground beetle species to feed on wireworms. We enclosed beetles and wireworms (one of each) in 1-litre containers with either no soil, or with soil depths of 2 cm or 10 cm, where wireworms could hide. For each depth, we present data on how often wireworms were predated, and the time to predation. This preliminary study will provide information to guide future research into beneficial insects that may contribute to wireworm control on the Canadian prairies.

25. Does myrmecochory facilitate the seed transfer and germination of *Thesium ramosum*?

Raithby, A.¹, and Velasco, F.¹

¹ St. Mary's University, Calgary, AB, Canada

Myrmecochory is mediated by elaiosomes, nutrient-rich appendages of seeds which attract ants and facilitate seed dispersal. The invasive plant *Thesium ramosum*, in Fish Creek Park, AB, grows elaiosomes, and ants have been observed carrying these seeds to colonies which could harbor favorable microsites for germination. Mechanisms by which ants use the elaiosome have been shown to increase seed permeability to water and nutrients, which promotes germination. We investigated whether ants preferentially remove *Thesium* seeds in comparison to other seeds. Additionally, we are testing whether the elaiosome plays a role in facilitating the germination of the *Thesium* seeds. Our results indicate that four ant species, *Formica obscuriventris*, *F. argentea*, *F. podzolica*, and *F. aserva* effectively removed the *Thesium* seeds in food preference trials and seed removal trials, afterwards discarding them in the arena or within their nest. Additionally, these four-ant species were given the choice of mealworms and three seed types; all the species preferred mealworms over seeds, and of the seeds *Formica obscuriventris* showed the strongest preference for *Thesium*. We are continuing germination trials to investigate differences between artificial and ant elaiosome consumption/removal in facilitating seed germination; we recovered the most *Thesium* seeds from *F. argentea* nests.

26. Host-associated population genetic structure of forest tent caterpillar

Snape, K.¹, Roe, A.D.², and Sperling, F.A.H.¹

¹ Department of Biological Sciences, University of Alberta, Edmonton, AB

² Natural Resources Canada, Canadian Forest Service, Great Lakes Forestry Centre, Sault Ste. Marie, ON

The forest tent caterpillar (FTC, *Malacosoma disstria*) is a common forest pest throughout Canada, but we lack a clear understanding of regional variation in host use and population structure in this species. In Ontario for example, FTC is commonly associated with sugar maple and aspen, but the relationship between FTC and these hosts has been understudied as FTC is considered a relatively minor pest in this region. Several earlier studies have suggested that there are fitness and life history differences between maple feeding and aspen feeding FTC, but the underlying genetic structure of these two groups is unknown. The objectives of our study are to determine if: 1) sugar maple feeding populations of FTC differ genetically from aspen feeding populations; and 2) morphological differences in larvae correspond with genetic differences. Our preliminary work extends a recent mtDNA barcoding study of large-scale phylogeographic structure, and sets the stage for a more extensive survey of genome-wide single nucleotide polymorphism (ddRAD) variation associated with host trees at regional scales.

27. A Symbiosis Between Ants and an Invasive Plant

Timonera, J.¹

¹ Calgary, Alberta, Canada

The invasive plant *Thesium ramosum* was discovered in Fish Creek Park in 2001, and since then has been spreading and parasitizing plants in the park. Though the mechanism of the plant's spread was unclear, based on earlier field observations we hypothesized that ants might be carrying the seeds. We investigated any association between ants and *Thesium* plants through observations in Fish Creek Park. Over three months, we observed ant activity in small observation plots looking for species carrying seeds, average distances traveled for seeds, and frequency of workers to carry seeds. Our results show that not one but multiple species of ants from different genera (*Myrmica*, *Lasius*, *Formica*, and *Leptothorax*) carry *Thesium* seeds. Most of the seed carriers were *Formica* with 43 ants from this genus carrying seeds, some of which were observed on ant trails. *Formica obscuriventris* made these trails and around 12% of the 330 ants observed carried *Thesium* seeds. Additionally, 26 *Myrmica* ants, five *Lasius*, and one *Leptothorax* were seen to carry the seeds. Larger ants, for example some *Formica* species, carried seeds at least 14 meters whilst *Myrmica* species carried seeds at least a meter.

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2018 Summer Executive Board Meeting

Entomological Society of Alberta



Conference Call Meeting held on 14 August 2018

Participants: Bette Beswick , H. Carcamo, H. Catton, M. Reid, R. Cartar, D. Wilches, M.Ahn. L. Lumler.

Regrets: Caroline Whitehouse. Absent: Tonya Mousseau

1. Meeting called to order by president Bette at 1:37
2. Agenda: see appended from Bette's email
3. Additions to Agenda: Facebook page updates, added by Hector
4. Approval of Minutes of the 2018 Spring Board Meeting, moved by Wilches, seconded by Ahn, passed unanimously.
5. Website update (Micky Ahn):
 - a. 26 responded to survey. There is need for the website to cater both member and the public
 - b. Needs a gallery for images
 - c. Integration with social media
 - d. Showcase current events
 - e. Frequent updates to front page in lieu of a newsletter
 - f. Breakdown of survey results to be shared with executive and presented at the AGM
 - g. Outreach an important component of the website
 - h. Wordpress will likely not be the platform as it prevents keeping our domain name
 - i. Haley suggested Weevevly as another option but this may also require new name
 - j. Godaddy might be a better option;
 - k. Micky will explore and report to executive; will include a sample page keeping .ca domain consistent with other provincial entomological societies
6. ESC report request: Bette will forward note to Haley for action
7. AGM notice deadline, 21 days before meeting required by Societies Act, will include:
 - a. time and place of AGM (Bette and Lisa)

- b. Agenda (Bette and Hector) will include update from Haley and request for LOC members. Also, update on the Cypress Hills meeting update JAM with ESM (Hector?)
 - c. Draft Resolution to change bylaws to add SOCIAL MEDIA DIRECTOR (Bette)
- 8. OUTREACH director position,
 - a. some discussion suggested that there is not enough interest or need for a formal board position due to our level of engagement and difficulty in filling permanent positions.
 - b. Also, this role is filled by Regional Director on a needs basis

or by volunteer members at large (e.g. added by Hector post meeting: Insect Discovery Days - a very successful outreach event held annually for several years now; coordinators change as needed). A presentation will be made on the topic of OUTREACH by Robin McQueen.
- 9. PROCEEDINGS: 2016 draft pdf available in facebook page
 - a. Bette to contact Tonya Mousseau to get a status of 2017 proceedings
 - b. Haley to forward abstract for Tonya to prepare proceedings once she hears from Bette (may need other information from local organizers, for example after dinner speakers, local committee, etc.)
- 10. Merchandise: no enthusiasm to have souvenir items at the AGM, Bette to contact Megan to thank her for her work so far and indicate we do not wish to proceed to buy any at this time
- 11. Honorary Members:
 - a. Hector to determine if there is room for more members (5% of total membership).
 - b. Bette to draft resolution to change bylaws to 10%? for 2018 AGM?
- 12. Fee increase? Not discussed?
- 13. Slate of Board Candidates
 - a. Ralph will determine positions that require nominations and will contact potential candidates (duty of past president)
- 14. FACEBOOK updates; recent notices have not been added to page. Hector to contact Jenn to see if she needs help.

15. PUBLICIZING OUR CONFERENCE, Bette reminded our members to inform other societies about our conference, including:

AB Lepidopterist Guild (Lisa), Bow Valley Conservation ? (Mary), Forestry societies (Caroline), BC and SK Ent Soc (Bette), Native Bee Society (Megan), AB Native Plant Council (Bette).

16. Adjourned around 2:40 pm.

Agenda:

- Website update: Micky can bring us up to speed on what's happening.

AGM details:

- The ESC has asked if we would like the ESC President to attend our AGM. Our response?
- AGM meeting arrangements -- time/place/materials -- is that all in hand with the conference committee or is there something more that needs to be done?
- Robin McQueen has been doing some planning for ESA outreach. Shall we ask her to make a presentation at the AGM about what she has found from her survey, and her thoughts for going forward?
- Conference proceedings for the last couple of years are Missing in Action. How can we address this?
- Merchandise for the conference. I'll ask Megan if she needs any decisions from us.
- Bylaw revisions: last year's AGM called for revisions to board membership. We need to discuss and prepare a resolution.
- Honorary member: do we have any candidate(s) in mind?
- Nomination Committee: we should think about candidates for the slate

Upcoming Events

- The 2020 Joint Annual Meeting -- is there anything we need to do in the next few months for this event?
- The 2019 joint meeting with Saskatchewan in Cypress Hills -- we need to make sure we have someone to lead this collaboration.

We'll deal with the approval of our last call's minutes at our next gathering.

Minutes of the Entomological Society of Alberta

66th Annual General Meeting

Queen Alexandria Community League, Edmonton, Alberta

September 29, 2018

Minutes prepared by Héctor Cárcamo, ESA Secretary

Attendees:

Beswick, Bette
Bezanson, Giselle
Carcamo, Hector
Cartar, Ralph
Catton, Haley
Connor, Nelson
Eberhardt, Terry
Evenden, Maya
French, Rowan
Frost, Carol
Fry, Ken
Klutsch, Jennifer
Lumley, Lisa
Marshall, Valerie

McPike, Sarah
Mousseau, Tonya
Pittel, Hilary
Pohl, Greg
Reid, Mary
Robinson, Samuel
Shegelski, Victor
Shivananjappa, Sunil
Sperling, Felix
Sperling, Janet
Thompson, Benjamin
Thorsen, Ashley
Whitehouse, Caroline
Wingert, Brittany

Meeting called to order at 12:20 PM by Bette Beswick (President)

1. Approval of Agenda

MOVED to accept, Ken Fry; seconded, Tonya Mousseau: Carried

2. Approval of minutes as circulated from the 2017 AGM

MOVED to accept, Mary Reid; seconded Lisa Lumley; Carried

3. President's Report (Bette Beswick)

- see appended report

4. Secretary's Report (Hector Carcamo)

- see appended report

5. Treasurer's Report (Caroline Whitehouse)

- See appended report
- 74 current members
- 67 "delinquent members" unpaid kept for 3 years
- 2017: 31 registrants; grossed ~ \$8500 and net loss around \$3,000
- 2018: 45 at meeting and 55 at banquet

MOVED to accept, Felix Sperling; seconded, Ken Fry; Carried

6. Appointment of society financial auditors

- Carol Frost and Jennifer Klutsch, accepted.

MOVED to accept, Tonya Mousseau; seconded, Sarah McPike; Carried

7. Webmasters' Report (Micky Ahn, presented by Bette Beswick)

- See appended report
- survey of membership completed, 26 responded
- received excellent feedback on expected website content and style
- public outreach will be a major component
- will use WordPress to re-design our website
- will have a sample in a few months

8. Report from Regional Directors:

a) Director to the Entomological Society of Canada (Haley Catton)

- See appended report
- 2018 JAM with ESA (America) expect 3500+ participants
- 2019 JAM with the Acadian Entomological Society and the Canadian Society for Ecology and Evolution in Fredericton 18-21 August
- 2020 JAM in Calgary, Carriage House Inn, 18-21 October
- ESC has started an outreach initiative to increase membership; customized video message from the President, Pat Bouchard – 10 min video shown to attendees, reviewing the ESC's activities and advantages of membership
- ESC AGM on 13 November 2:30-3:30

- Gold Medal address, 1-2:30 (Jacques Brodeur)
- 2020 JAM planning underway
 - \$8,000 loan received from ESC
 - General Chair is Haley Catton, Scientific Chair to be determined, for suggestions contact Haley
 - Other Committee Chairs to be filled over the next few months

b) Northern Director's Report (Sarah McPike).

- see appended report

c) Central Director's Report (Mary Reid).

- see appended report

d) Southern Director's Report (Diana Wilches).

- see appended report

9. Proceedings Editor's Report (Tonya Mousseau)

- 2016 Proceedings are complete and a draft has been posted to the society's Facebook page
- 2017 will follow now that the Minutes have been approved

10. Business arising from previous meetings

a) Proposed bylaw changes (Bette Beswick)

- **(i) MOVED** that article 2c be revised as follows: "The total number of honorary life members shall not exceed **ten** percent of the total membership at the time of election", Sarah McPike; seconded, Mary Reid; Carried.
- **(ii) MOVED** that article 4a be revised as follows: "The Board shall consist of **five** officers and **eight** council members, and herein shall be referred to as the "Board"". Any six members shall constitute a quorum, and meetings shall be held without notice if a quorum of the Board is present, or in communication by remote access, provided however, that any business at such meeting shall be ratified at the next regularly called meeting of the Board; otherwise they shall be null and void.

- and article 4b be revised as follows: “The officers of the Society shall consist of a President, Vice-President, Past President, Secretary, **and** Treasurer. These officers shall constitute the Executive of the Society with full power to act on behalf of the society within the bounds of the Society's By-laws and Rules and Regulations, to appoint committees as necessary, and to meet expenses required in the normal operation of the Society,
- The current article 4c (relating to terms of office for the President, Vice President, Secretary, Treasurer and Webmaster) shall be deleted, and subsequent clause numbers adjusted.
- and article 4 d becomes 4c and revised thus: “The council shall consist of **eight** directors each of whom shall act in one of the following roles: Regional Director to the Entomological Society of Canada, Northern Director, Central Director, Southern Director, Editor, **Webmaster, Social Media Director and Outreach Director.** The Northern-, Central-, and Southern Directors shall represent the various fields of entomology and the geographical areas of Alberta as much as possible.
- And article 4 e becomes 4d and revised thus:: The term of office for all Board positions shall commence at the beginning of the calendar year immediately following election. The terms of office for Board members shall be:
 - The term of office for the Past-President shall be one year.
 - The term of office for President shall be one year and not normally be held by the same person for two consecutive years.
 - The Vice-President shall normally follow his/her term of office with a term as President.
 - The terms of office for the Secretary, Treasurer, Webmaster, Editor, Social Media Director and Outreach Director shall be one year and eligible for immediate re-election.
 - The terms of office for the Regional Director to the Entomological Society of Canada and the Northern-, Central-, and Southern directors shall be three years and not normally eligible for immediate re-election.
- And Article 5 be expanded to include the duties of the two new Director positions as follows:
 - 5f: The duties of the Social Media Director shall be: to develop and monitor ESA social media platforms (e.g., Facebook, Twitter).
 - 5g: The duties of the Outreach Director shall be: to provide leadership in the development and delivery of resources and activities to engage Albertans in entomology, liaise with the Entomological Society of Canada to create national programming and promote provincial outreach accomplishments; foster partnerships

with relevant organizations that share similar objectives and target audiences; monitor communications with ESA members about potential and ongoing outreach opportunities; prepare a budget for each outreach proposal, and prepare grant applications as necessary; present outreach submissions to the ESA Board for approval.

- Above motion (ii) **MOVED** by Samuel Robinson; seconded, Sarah McPike; Carried.

- (iii) To withdraw suggested changes to Article 8 to accept representation by Proxy, **MOVED** by Haley Catton; seconded, Samuel Robinson; Carried. (article 8 remains unchanged)

b) **Casino application** (Bette Beswick)

- Our society may be eligible for a gaming license, but wide membership across society expected
- 25 volunteers required to run casino, funds must be spent within 24 months, could be large amount around \$60,000 or more
- Board was not overly enthusiastic given the time commitments to run the casino and designing and running programs to spend the large funds
- It was suggested to wait for Outreach Director to consider further and determine level of membership engagement
- Potentially partner with Alberta Native Bee Council

11. Nominations and Elections (Ralph Cartar)

The following slate for the 2019 Board was presented by the Chair of the Nominations Committee, Ralph Cartar, with candidates for open positions in bold:

Officers (1 year terms)

President – Lisa Lumley
Past President – Bette Beswick
Vice President – Sara McPike
Treasurer – Caroline Whitehouse
Secretary – Hector Carcamo

Directors (3 year terms)

Southern Director – Diana Wilches (2017-2019?)
Central Director – Mary Reid (2017-2019?)

Northern Director – Carol Frost (2019-2021)
Proceedings Editor – Tonya Mousseau (2017-2019?)
Webmaster – Micky Ahn (2018-2020?)
Regional Director to ESC - Haley Catton (2017-2019?)
Outreach Director – Robin McQueen (2019-2021)
Social Media Director – Jennifer Retzlaff (2019-2021)

MOVED that nominations cease, Ken Fry; seconded, Samuel Robinson; Carried.

Nominated slate Acclaimed.

12. Resolutions: the following resolution was prepared and read by Samuel Robinson;

We would like to thank all the fine folks who made the 2018 meeting of the Entomological Society of Alberta possible. Personally, I really enjoy going to conferences like this, because it helps me to really see the breadth of the field we're in. It's very easy to get caught up in the details of your own research, so it's really refreshing to learn about things that you know nothing about! First off, we would like thank the organizing committee for their hard work: Caroline Whitehouse, Lisa Lumley, Erin Campbell, Leah Flaherty, and Christina Elliot. Thanks to Carolyn Whitehouse for organizing the registration. Thanks to all the session moderators, including Erin Campbell, Tyler Nelson, Lisa Lumley, and our official table-pusher, Victor Shegelski. Thank you to Dr. Carol Frost for her keynote lecture on apparent competition and its link to biodiversity and ecosystem function, and Dr. Jessica Haines, for her closing lecture on citizen science contributions to invertebrate biology. Finally, we thank Caroline Whitehouse, Lisa Lumley, Hector Carcamo, Sunil Shivananjappa, Benjamin Thompson, Sarah McPike, Terry Eberhardt, Brittany Wingert, , Erin Campbell, Leah Flaherty, Christina Elliot, Tyler Nelson, and Victor Shegleski for organizing the conference, hosting the venue, serving us food, and doing our dishes! We extend a round of applause for them, and we resolve that the President will write letters of thanks to our funders.

MOVED that the resolution be accepted, Tonya Mousseau; seconded, Hilary Pittel ; Carried.

13. 2019 Meeting Venue:

- a. Hector Carcamo announced that the Boards of our society and the Entomological Society of Saskatchewan have agreed to have a joint meeting in Elkwater in 2019
- b. Our two societies have met five times (once per decade) in the past and we are overdue for a fun mini-JAM (last one was in 2004 in Lloydminster)
- c. Stay tuned for more news and plan to come to Elkwater in the beautiful Cypress Hills

14. President's Address (Bette Beswick):

- a. See appended
- b. Bette presented a most moving account of her experience as our president drawing on her personal journey as one interested in the fascinating world of entomology
- c. The audience was clearly moved and we were all reminded of one of our fundamental missions as a society: to promote the science of entomology for the benefit of all Albertans
- d. There is clearly a lot our members do in terms of outreach as she noted from the Regional Reports but there is still a lot more we can do in support of amateur entomology

15. Motion to Adjourn at 2:00 pm.

Report from the President

Entomological Society of Alberta 2018 Annual General Meeting

Thank you for the opportunity to preside over the Entomological Society of Alberta for 2018.

I would like to start this address by thanking the individuals who organized our conference and the logistics for this AGM. This event has progressed very smoothly and that is a credit to the efforts of the Lisa Lumley, Caroline Whitehouse, Erin Campbell, Leah Flaherty and Christina Elliot.

So far in 2018, the ESA Board has met three times: twice by conference call and once in person. Each of the regional directors will provide reports on the activities in their regions, so I will only mention a few highlights.

Micky Ahn took on the responsibility of updating the ESA website. He could not be here today, so I will attempt to provide the highlights of his work. Micky is well-advanced in assessing the mechanics of the transition of our website to a new platform. To help determine the website content, he developed a survey that 26 members responded to. In addition to website questions, the survey also asked questions about members' interest in Outreach which will assist Robin McQueen in her role as Outreach director.

The Board is proposing a number of revisions to the Bylaws, dealing with increasing the number of honorary members, adding two director positions to the Board (Social Media and Outreach) and the housekeeping to a number of clauses to deal with that, and adding the ability to use proxies to vote at the AGM. We will be dealing with those proposals shortly.

Bette Beswick
President
Entomological Society of Alberta

Secretary's Report to the AGM of the Entomological Society of Alberta

This report covers the period of 1 January 2018 to 26 September 2018. The gmail account of the society (esalberta@gmail.com) was transferred to me by Ken Fry in early March. First, let us reiterate our sincere gratitude to Ken for his 10 years of service as Secretary, many thanks Ken! The majority of the correspondence up to now has dealt with internal society matters related to our Board of Directors and related meetings, enquiries about membership, awards, or the annual meeting presentations or logistics. There were about 25 such contacts. The other category has to do with Community Outreach - about 14 communications. Half of them were from other related societies such as the ESC or the Entomological Society of America or public requests for entomological presentations and a couple requests for consultants such as Pest Management for Cannabis plantations. The other 7 were specific queries about insects: giant ant hills, wasps, bed bugs, where to report honey bee deaths, maple bugs being misidentified for lily leaf beetles and information for the health risks associated with insect wings used in art. Overall, the amount of correspondence is not overwhelming and the job is manageable, so far.

Submitted by Hector Carcamo on 29 September 2018.

The following Facebook page report was submitted by Jennifer Retzlaff by email after the meeting:

The Facebook membership has 202 members up from 175 members as reported last year by Ken. My criteria for accepting members has been to accept anyone who has mention of entomology on their Facebook page (photos, links, group membership with ESC, etc). I also have 8 pending membership requests that I am leaving alone for now as there is no mention of insects in their pages that I can see.

Activity wise there has been 55 postings (not including follow-ups to individual postings) were made to the group since September 29, 2017, or 50 since January 1, 2017 up from 45 last year between January 1 and the meetings.

As far as I can tell, last year the abstracts from the previous year (2016) were posted with the 2016 proceedings documents. This was done by Tonya. Nothing has been shared yet this year, if you have something you would like posted, feel free to pass it on to me and I can do that.

I hope all is well for all of you!

Jenn Retzlaff

Website redesign report, submitted by Micky Ahn

Current Issues	Required Change	Current Progress
<p>The aesthetics of the current website is outdated, potentially resulting in an unprofessional perception of the organization. This is critical as the website is the first point-of-contact for most new members</p>	<p>A major overhaul of the website aesthetic is required. This will likely be done through WordPress installed onto the cPanel.</p>	<p>Contrary to the last board meeting, I realize that I was still misinformed about the capabilities of our hosting service. Currently the hosting service we are using is Blacksun Webhosting – which is the service that allows our information to be accessed on the internet while also storing our information. This means that we should be able to integrate WordPress onto our current website itself. I have spent the last week trying to figure out how to do this, but there seems to be errors preventing me from following through.</p> <p>However, this approach will likely be the approach as it allows us to use the same domain name (entsocab.ca) while also being able to integrate WordPress themes. For the integration of PayPal and other features, the society may choose to opt in for the Premium WordPress option, which is \$10 per month, billed yearly.</p> <p>I was hoping to have a sample of a website ready, but the error has been delaying me. I will work on this the coming weeks and send an update once a sample site is actually up. When working on the redesign, the results of the survey will be taken into consideration to make sure it reflects the desires of the members well.</p>
<p>The current website does not meet modern requirements for accepting or adding members to the organization. This extends particularly to the Annual General Meeting, which is</p>	<p>After speaking with Caroline (treasurer), the new website will require PayPal integration and some sort of form integration. Wordpress is able to</p>	<p>This issue will only be able to be addressed when the redesign is physically in progress</p>

<p>currently handled through personal communications between the treasurer and the participant for payment, registration, and membership – all which is done separately.</p>	<p>handle these tasks using plug-ins.</p>	
<p>The organization has the social responsibility to supply resources for its members as well as interested members of the public. With the current design of the website, there is difficulty in accessing information, and no consistent portal for members to gain updated information about the society. This may leads to much communication through emails to the webmaster, treasurer, or secretary independently – leading to potential inefficiencies in communication to members/public.</p>	<p>Ensure the website has a much more easily accessible layout</p>	<p>This issue will only be able to be addressed when the redesign is physically in progress</p>
<p>There is a lack of resources or pages for public outreach, based on the survey conducted by the committee, we have recognized that many members of the organization believe public is an important aspect of the organization. Therefore the website is in need of</p>	<p>Dedicate a whole new section on the public outreach portion</p> <ul style="list-style-type: none"> • This will focus on public resources and links to useful information 	<p>This issue will only be able to be addressed when the redesign is physically in progress</p> <ul style="list-style-type: none"> • However, it would be useful to start collecting sites and resources that we will display on the website.

a dedicated and updated section for outreach.		
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2018

Entomological Society of Alberta

Regional Director to the Entomological Society of Canada (ESC) Report

September 27, 2018

The ESC Board of Directors met in person in October 2017 in Winnipeg, and by phone in December 2017 and June 2018. In February 2018 a phone meeting occurred between the ESC Executive Council (President, 1st Vice-President, 2nd Vice-President, Past-President), ESC Treasurer and Secretary, the Presidents of Regional Societies, and Regional Directors from each society. The purpose of this meeting was to explore strengthening the bonds between the national society and regional societies.

1) Joint Annual Meetings (JAM)

- a) The 2017 JAM was 22-25 October in Winnipeg, with ESMB. Theme = "Small is beautiful"
- b) The 2018 JAM will be held in conjunction with the Entomological Society of America on 11-14 November in Vancouver, BC. Theme = "Crossing Borders: Entomology in a Changing World"
- c) The 2019 JAM will be held on 18-21 August in conjunction with the Canadian Society of Ecology and Evolution in Fredericton, NB. Theme = "Naturally Connected"
- d) The 2020 JAM will be held on 18-21 October in Calgary, AB at the Carriage House Inn. General Chair is Haley Catton. Scientific Chair to be determined. Local organizing committee will be formed this fall, Haley is looking for volunteers.

2) Strategic Planning

- a) ESC conducted a brainstorming session with a professional facilitator at the 2017 JAM in Winnipeg to define the direction and purpose of the society. Session included BOD, Officers, and selected invitees. Comments submitted by Regional Societies were also considered in the outcome.
- b) 4 priorities were identified: Governance, Membership, Financial Sustainability, Communication
 - i) ESC is concerned with declining membership and is exploring ways to recruit and retain members.
 - ii) ESC is considering launching a national communication strategy, including a National Insect Day. No details available yet.
 - iii) ESC wants to strengthen the bonds between the national society and regional societies (see point #3).
- c) Strategic plan will be reviewed every 2-3 years

3) Strengthening relationship between ESC and Regional Societies

- a) ESC has taken several actions to pursue this goal:
 - i) ESC President, presidents and regional directors of societies will meet by phone once per year, and once in person at the JAM. First meeting was in Feb 2018.
 - ii) Logos of all societies to be included on all regional websites and the ESC website.
 - iii) Regional activities are now highlighted in ESC bulletin.
 - iv) ESC President will give custom address to each provincial society AGM (starting with ours today!)

4) ESC Board of Directors & Officers (2017-2018)

Board of Directors:

- a) President: Patrice Bouchard (ON)
- b) 1st Vice-President: Kevin Floate (AB) (to become President in fall 2018)
- c) 2nd Vice-President: Gail Anderson (BC)
- d) Past-President: Neil Holliday (MB)
- e) Directors-At-Large: Véronique Martel (2018, QC), Laura Timms (2019, ON), Deepa Pureswaran (2020, QC)
- f) Regional Directors: Bill Riel (ESBC), Haley Catton (ESAB), Boyd Mori (ESS), Kateryn Rochon (ESMB), Sophie Cardinal (ESO), Étienne Normandin (SEQ), Suzanne Blatt (AES)

Officers:

- g) Student and Early Professional Representative: Rachel Rix (NS)
- h) Treasurer: Joel Kits (ON)
- i) Secretary: Vincent Herve (AB)
- j) Bulletin Editor: Cedric Gillott (SK)
- k) Assistant Bulletin Editor: Donna Giberson (PEI)
- l) Webmaster: Jordan Bannerman (MB)
- m) The Canadian Entomologist Editor-in-Chief: Dezene Huber (BC)
- n) Social Media Administrators: Morgan Jackson (ON), Angela Gradish (ON)

Submitted by Haley Catton

Regional Director ESC

September 27, 2018

Northern Director's Report, September 26, 2018

Compiled by Sarah McPike

Entomological Grads:

February 13, 2018: **Sarah McPike** (Evenden Lab, University of Alberta) defended her Master's thesis. Title: Enhancing parasitism of the introduced ash tree pest, *Caloptilia fraxinella* by native parasitoid, *Apanteles polychrosidis* in Edmonton, Alberta

May 9, 2018: **Chaminda Weeraddana** (Evenden Lab, University of Alberta) defended his PhD thesis. Title: Abiotic and Biotic factors influencing host-plant use of a generalist herbivore through plant-mediated interaction: oviposition and larval performance of the bertha armyworm, *Mamestra configurata* Walker (Lepidoptera: Noctuidae)

September 4, 2018: **Jared Amos** (Spence Lab, University of Alberta) defended his Master's thesis. Title: Habitat Use in Undisturbed Forest and the Effect of Variable Retention Harvesting on Pollinator Assemblages (Apoidea, Syrphidae) in the Boreal Forest of Alberta.

Sept. 25, 2018: **Ronald Batallas** (Evenden Lab, University of Alberta) defended his PhD thesis. Title: The Basis for Cutworm (Lepidoptera: Noctuidae) Integrated Pest Management: Understanding crop-pest interaction and Moth Community Structure in Prairie Agroecosystems

Happenings:

Canadian Forest Service entomologists published 2 significant books:

Bousquet, Y, Laplante, S, Hammond, HEJ, and Langor, DW. 2017. Cerambycidae (Coleoptera) of Canada and Alaska. 300pp.

Pohl, G.R., Landry, J.-F., Schmidt, B.C., Lafontaine, J.D., Troubridge, J.T., Macaulay, A.D., van Nieukerken, E.J., deWaard, J.R., Dombroskie, J.J., Klymko, J., Nazari, V., and Stead, K. 2018. Annotated checklist of the moths and butterflies (Lepidoptera) of Canada and Alaska. Pensoft Series Faunistica No. 118. Sofia, Bulgaria. 580 pp.

Evenden lab Alumni news:

Former PhD student, Joelle Lemmen-Lechelt is now a sessional instructor at Red Deer College. Former PhD student, Chaminda Weeraddana is now working at Syngenta.

Retirements:

Dr. Andrew Keddie has retired from Associate Professorship with the Biological Sciences Department University of Alberta.

Passings:

Dr. Bruce Heming, Professor Emeritus at the University of Alberta, passed away July 22, 2018.

Central Director's Report September 2018
Entomological Society of Alberta
Submitted by Mary Reid (University of Calgary)

Pollinator Projects: Busy Bees!

The Alberta Native Bee Council has been very busy. Alex Farmer (Mount Royal University) and Megan Evans (AB Environment & Parks) have a bumble bee monitoring program underway that involves building and distributing bee nest boxes - more than 600 boxes have been distributed with a goal of 1000 boxes <http://www.albertanativebeecouncil.ca/bumblebee-box-program-1>. Alex secured a \$10,000 research grant through MRU Institute for Environmental Sustainability which was sufficient to pay for materials and employ a student to help with harvesting boxes this fall and aid in upcoming bee identification (worker bee!) workshops. Megan Evans initiated a province-wide bee survey in which blue-vane traps were distributed to wildfire lookout stations, supported by the University of Calgary, the Alberta Conservation Association (to Ralph Cartar), and Alberta Agriculture and Forestry (<https://blog.wildfire.alberta.ca/2018/08/31/for-the-love-of-wild-bees/>). Alex Farmer also worked on developing bee habitat in the Calgary Native Bee Boulevard on Canyon Meadows Drive SW <https://www.cbc.ca/news/canada/calgary/calgary-pollinator-program-1.4315205> which is one of the largest initiatives in Canada and she obtained \$2000 to seed a newly-developed pollinator corridor in Turner Valley.

In conjunction with the Alberta Native Bee Council, Alex Farmer and Megan Evans were active in outreach in 2018:

- Friends of Kananaskis Speaker Series, University of Calgary, Calgary, Alberta, January 25
- Living in the Natural Environment, MD of Bighorn, Cochrane, Alberta, February 2
- Cabin Fever (Permaculture conference), Calgary, Alberta, March 3
- Rosedale Community Association and Activate YYC, Bee Box Building Workshop, Calgary, Alberta, April 4
- Starland County Gardening Workshop, Bee Box Building Event, Delia, Alberta, April 14
- Glenbow Ranch Provincial Park, assisted with box installation for Wildlife Preservation Canada, April 30
- McKenzie Lake Elementary School, presentation on wild bees, May 2
- Communities in Bloom Speaker Series, Pincher Creek, Alberta, May 9
- Parkdale Community Hall, Gardening Speaker Series, May 9
- Science Odyssey – Promo Science MRU, Bumble Bee Nest Box Building Blitz, May 12
- Native Bee Workshop and Nest Box Building Blitz, Turner Valley, Alberta, May 15
- Native Bee Workshop and Nest Box Building Blitz, Capital Hill, Calgary, Alberta, May 17
- Alberta Parks and the Conservation Corps Speaker Series, Crowsnest Pass, Alberta May 17
- Native Bee Workshop and Nest Box Building Blitz, High River, Alberta, May 22

- Wild bee presentation and bumble bee nest box building/placement for grade 3, Westmount Elementary School, Okotoks, Alberta, May 30
- Mayor's Expo, Presentation on Native Bees, City Hall, Calgary, Alberta, June 6
- Horace Allen School Fundraising Event, Crowsnest Pass, Alberta, June 25
- Calgary Zoo, National Pollinator Week presentation to Zoo staff, Calgary, Alberta, June 21
- Parks Environmental Education, Predator/Prey for 10-12 year olds, Calgary, Alberta, July 12
- Calgary Chapter of the Wildlife Society, Bumble Bee Box Building Event, Miquelon Lake, Alberta, July 28
- Alberta Parks Speaker Series, Beauvais Lake Provincial Park, August 11
- Alberta Parks Speaker Series, Writing-on-Stone Provincial Park, August 17
- Grand Opening of City of Calgary Native Bee Boulevard, Calgary Alberta, Fall 2018 (Date TBD)

In summer 2018, Glenbow Ranch Provincial Park, northwest of Calgary, hosted a citizen-science bumblebee project led by Sarah Johnson, lead biologist with the Native Pollinator Initiative at Wildlife Preservation Canada (headquarters at Guelph). Volunteers were trained to catch, photograph and identify bumblebees and were organized to sample along four survey routes. Among the bees sampled, two declining bee species were observed: *Bombus occidentalis* (western bumblebee) and *B. terricola* (yellow-banded bumblebee). Volunteer interest was high this year.

Olds College (reported by Ken Fry)

Olds College has increased its Horticulture program intake from 30 to 50 students per year and it has added continuing education programming addressing cannabis production. All students in these programs will be provided with instruction in Integrated Pest Management.

Province-wide surveillance of invasive alien species affecting trees and elm bark beetles was continued in cooperation with the CFIA and StopDED.

The Ellis Bird Farm Bug Jamboree was held Saturday, August 11 at the Ellis Bird Farm. Several entomologists from around the province, as well as representatives from ABMI and the Red Deer Naturalists, educated attendees on all things arthropodan. The days events included construction of bumble bee boxes, demonstrations of insects, catch and release of aquatic invertebrates, and a butterfly count. The day ended with a presentation on the Reproductive Way of Insects at the evening Speaker Series event, by Ken Fry.

Several grade school classes and the Boys and Girls Club of Olds were hosted for tours of the Olds College Insect Collection.

University of Calgary

William Murphy (M. Reid) completed his MSc "Tree Diameter Effects on Mountain Pine Beetle Success"

Haydeé Peralta-Vázquez completed her PhD, " Ecology of Mite Phoresy on Mountain Pine

Beetles"

Jennifer Retzlaff (R. Cartar/ P. Galpern), completed her MSc "How landscape filters local abundance: a test of the body size-foraging range hypothesis in bumble bees"

Richard Kwafo began his PhD with Ralph Cartar and Paul Galpern at University of Calgary. He'll study pollinators in blueberry fields in SW British Columbia.

2018
Entomological Society of Alberta
Southern Director's Report, September 2018

Events and Outreach

The Alberta Birds of Prey Foundation in Coaldale, Alberta, hosted the 8th Insect Discovery Day. The attendance of hundreds of people of all ages attested to its success. Activities included catching and identifying aquatic and terrestrial insects, demonstrations of beneficial insects, and displays detailing parasites transmitted by insects. The stick bugs drew the attention of the crowds and the few brave ones in attendance handled the hissing cockroaches. Entomologists from the Entomological Society of Alberta collaborated with the Alberta Birds of Prey Foundation to organize the event. Many thanks go out to the 12 plus volunteers without whom the event would not have been possible.

Environment Lethbridge in collaboration with Go eat bugs Alberta organized a Bugs and Beer tasting on June 9th, 2018 at Theorically Brewing. Lethbridge, AB.

People

Telsa Willsey from the University of Lethbridge defended her MSc thesis: Interactions of root rot pathogens and pea leaf weevil in field pea. Supervisors: James Thomas (University of Lethbridge), Syama Chatterton (AAFC-Lethbridge).

Xia, Qing from the University of Lethbridge defended her MSc thesis: Analysis of historical and current distribution of potato psyllids (*Bactericera cockerelli*) and the induced plant disease psyllids yellows, in relation to standard climate indices. Supervisor: Dan Johnson.

Diana Wilches presented her MSc thesis titled in the Graduate Students Showcase of the Entomological Society of Canada meeting in November 2017. The Graduate Students Showcase selects recent graduates or graduate students near the completion of their degrees to present a more in depth overview of their research.

Submitted by Diana Wilches
Southern Director ESA
September 2018

Changes proposed to Bylaws which were approved at the 66th AGM

Existing Bylaw	Proposed Revision	Reason for change
<p>Article 2 – Membership c. Honorary life membership may be conferred on anyone who has performed long and distinguished service in the field of entomology. Honorary life members shall be exempt from payment of the annual membership fee. All members in good standing are entitled to propose the names of prospective honorary life members, provided each such proposal is supported by two other members, and documentation is submitted in writing to the Secretary at least 30 days prior to the Annual Meeting. Such honorary life members shall be elected at an Annual Meeting. The total number of honorary life members shall not exceed five percent of the total membership at the time of election.</p>	<p>c. Honorary life membership may be conferred on anyone who has performed long and distinguished service in the field of entomology. Honorary life members shall be exempt from payment of the annual membership fee. All members in good standing are entitled to propose the names of prospective honorary life members, provided each such proposal is supported by two other members, and documentation is submitted in writing to the Secretary at least 30 days prior to the Annual Meeting. Such honorary life members shall be elected at an Annual Meeting. The total number of honorary life members shall not exceed five ten percent of the total membership at the time of election.</p>	<p>Change requested at the 2017 AGM.</p> <p>10% of full membership is a common limit for other societies.</p>
<p>Article 4 - Board of Directors a. The Board shall consist of five officers and six council members, and herein shall be referred to as the "Board". Any six members shall constitute a quorum, and meetings shall be held without notice if a quorum of the Board is present, or in communication by remote access, provided however, that any business at such meeting shall be ratified at the next</p>	<p>a. The Board shall consist of five five officers and six eight council members, and herein shall be referred to as the "Board". Any six members shall constitute a quorum, and meetings shall be held without notice if a quorum of the Board is present, or in communication by remote access, provided however, that any business at such</p>	<ul style="list-style-type: none"> • Change required to accommodate shift of Webmaster to the Council and the increased number of council members as listed in (d)

Existing Bylaw	Proposed Revision	Reason for change
regularly called meeting of the Board; otherwise they shall be null and void.	meeting shall be ratified at the next regularly called meeting of the Board; otherwise they shall be null and void.	
<p>b. The officers of the Society shall consist of a President, Vice-President, Secretary, Treasurer, and Webmaster. These officers shall constitute the Executive of the Society with full power to act on behalf of the Society within the bounds of the Society's By-laws and Rules and Regulations, to appoint committees as necessary, and to meet expenses required in the normal operation of the Society. The term of office for officers shall be one year, and commence at the beginning of the calendar year immediately following election.</p>	<p>b. The officers of the Society shall consist of a President, Vice-President, Past President, Secretary, and Treasurer., and Webmaster. These officers shall constitute the Executive of the Society with full power to act on behalf of the society within the bounds of the Society's By-laws and Rules and Regulations, to appoint committees as necessary, and to meet expenses required in the normal operation of the Society. The term of office for officers shall be one year, and commence at the beginning of the calendar year immediately following election.</p>	<ul style="list-style-type: none"> The position of Webmaster has been shifted to the Council to bring it into line with the proposed Social Media and Outreach directors. <p>References to the term of office have been consolidated into 4(e).</p>
<p>c. The office of President shall not normally be held by the same person for two consecutive years. The Vice-President shall normally follow his/her term of office with a term as President. The Secretary, Treasurer, and Webmaster shall be eligible for immediate re-election.</p>	<p>e. The office of President shall not normally be held by the same person for two consecutive years. The Vice-President shall normally follow his/her term of office with a term as President. The Secretary and Treasurer, and Webmaster shall be eligible for immediate re-election.</p>	<p>The terms of office for all Board positions have been consolidated into 4(e).</p>

Existing Bylaw	Proposed Revision	Reason for change
<p>d. The council shall consist of the Immediate Past-President and five directors each of whom shall act in one of the following roles: Regional Director to the Entomological Society of Canada, Northern Director, Central Director, Southern Director, and Editor. The Northern-, Central-, and Southern Directors shall represent the various fields of entomology and the geographical areas of Alberta as much as possible. The term of office for the Past-President shall be one year. The term of office for directors shall be three years.</p>	<p>d c The council shall consist of five eight directors each of whom shall act in one of the following roles: Regional Director to the Entomological Society of Canada, Northern Director, Central Director, Southern Director, Editor, Webmaster, Social Media Director and Outreach Director. The Northern-, Central-, and Southern Directors shall represent the various fields of entomology and the geographical areas of Alberta as much as possible. The term of office for the Past-President shall be one year. The term of office for directors shall be three years.</p>	<p>The change in number of council members is required to accommodate the shift of the Webmaster to the Council, and the addition of two new council positions.</p> <p>When the Bylaws were approved in 2004, social media was not an important communication tool. Since then, it has become a key method of linking people. The ESA would benefit from having a presence on social media platforms.</p> <p>Reference to term of office has been consolidated into 4(e).</p> <p>Since “the object of the Society shall be to foster the advancement, exchange, and dissemination of the knowledge of insects in relation to their importance in agriculture, horticulture, forestry, public health, industry and for its own sake, among the people of the</p>

Existing Bylaw	Proposed Revision	Reason for change
		Province of Alberta”, a director’s position promoting the ESA’s activities to the public is being suggested.
<p>e. The term of office for the Immediate Past-President, the Regional Director to the Entomological Society of Canada, the Northern-, Central-, and Southern Directors, and Editor shall commence at the beginning of the calendar year immediately following election. The Regional Director to the Entomological Society of Canada and the Northern-, Central-, and Southern Directors shall not normally be eligible for immediate re-election. The Editor shall be eligible for immediate re-election.</p>	<p>e d The term of office for all Board positions shall commence at the beginning of the calendar year immediately following election.</p> <p>The terms of office for Board members shall be:</p> <ul style="list-style-type: none"> • The term of office for the Past-President shall be one year. • The term of office for President shall be one year and not normally be held by the same person for two consecutive years. • The Vice-President shall normally follow his/her term of office with a term as President. • The terms of office for the Secretary, Treasurer, Webmaster, Editor, Social Media Director and Outreach Director shall be one year and eligible for immediate re-election. • The terms of office for the Regional Director to the Entomological Society of Canada and the Northern-, Central-, and Southern directors shall be three years and not normally eligible for immediate re-election. 	<p>All of the terms of office descriptions have been consolidated into this section.</p> <p>Terms of office have been suggested for the new positions of Social Media Director and Outreach Director.</p> <p>The term of office for Editor has been shifted to one year to bring it into alignment with the other directors who are not regional representatives.</p>

Existing Bylaw	Proposed Revision	Reason for change
<p>Article 5 - Duties of Board and Council Members</p> <p>a. The duties of the President shall be: to be charged with the general management and supervision of the Society; to preside at all meetings of the Society and the Board; to be ex-officio a member of all committees; to deliver a President's report at all Annual-, General- and Board Meetings; and to perform other duties as provided for in the Society's Rules and Regulations.</p> <p>b. The duties of the Vice-President shall be: to perform the duties and exercise the powers of the President in the temporary absence or disability of the President; to chair committees as provided for in the Society's Rules and Regulations; and to perform such other duties as shall from time to time be imposed upon the Vice-President by the Board.</p> <p>c. The duties of the Secretary shall be: to attend all meetings of the Society and Board, and record accurate minutes of same; to send all notices of the various meetings as required; to be the custodian of all current books, papers, records, correspondence, contracts and other documents belonging to the Society, and to forward appropriate material to the Society's archives for storage; and to file the Annual Report</p>	<p>No changes proposed to 5(a)-(e)</p>	

Existing Bylaw	Proposed Revision	Reason for change
<p>as required by the Societies Act.</p> <p>d. The duties of the Treasurer shall be: to receive all money due or otherwise belonging to the Society, and deposit all monies or other valuable effects in the name and to the credit of the Society in a financial institution selected by the Board; to keep a full and accurate account of all receipts and disbursements of the Society and proper books of account; to disburse the funds of the Society as necessary under the direction of the Board, and render to the Board at their meetings or whenever required, an account of all transactions as Treasurer and of the financial position of the Society; to deliver a Treasurer's report to all Annual-, General-, and Board Meetings; to ensure that a full and complete annual report covering all financial transactions of the Society during the previous year is submitted at the Annual Meeting; to receive and process all correspondence and documents relating to membership in the Society; and keep an accurate register of Society members.</p> <p>e. The duties of the Webmaster shall be: to obtain and prepare material for and about the Society, and to make it available on a world wide web site, for access by Society</p>		

Existing Bylaw	Proposed Revision	Reason for change
members and the general public.		
	f. The duties of the Social Media Director shall be: to develop and monitor ESA social media platforms (e.g., Facebook, Twitter).	Role descriptions provided for the new Director positions.
	g. The duties of the Outreach Director shall be: to provide leadership in promoting ESA activities to non-ESA members.	
<p>f. The duties of the Editor shall be: to prepare material to be included in, and to publish, the Proceedings as directed by the Board; to distribute to each eligible member, organization or other such entity one copy of the current year's Proceedings; and to forward to the Society's archives for storage one copy of the current year's Proceedings.</p> <p>g. Members of the council shall attend meetings of the Board and Society, and shall have other duties as may be determined from time to time by the Board. A member of council, in the absence of the President, may chair an Annual-, General-, Special- or Board Meeting as directed by the Board.</p>	No changes proposed for 5 (f) – (g) other than section numbering and typo correction.	
<p>Article 9 - Elections</p> <p>a. At the Annual Meeting there shall be elected a President, Vice-President, Secretary, Treasurer, Webmaster, and up to five directors as required.</p>	a. At the Annual Meeting there shall be elected a President, Vice-President, Secretary, Treasurer, Webmaster, and up to five eight directors as required.	Change in director numbers to make consistent with changes proposed to Articles 4 and 5

President's Address
Entomological Society of Alberta
September 2018

Let me introduce myself and tell you a bit about my background in entomology because it will lead into the message I want to tell. My name is Bette Beswick. I am currently the President of the Entomological Society of Alberta.

My first brush with entomology (known as bug collecting in my family) was when I was 7 or 8 years old, watching my much older brother pin beetles which were the thing that interested him. I think he got started with this hobby with some encouragement of someone from the Agriculture Research Station in Lethbridge in the early 1960s.

Fast forward about 10 years to my experience at the University of Lethbridge in the early 1970s where I took a course in Invertebrate Biology (mostly squirmy things in formaldehyde which were of limited interest to me). I followed this with a course in Parasitology (even squirmier and worse things that we dug out of frog livers and I discovered in raw fish in the days before sushi became the “in” thing). The discussion of parasitoids was never raised. The things that I was actually interested in – insects and spiders – were peripheral side bars in both courses.

I graduated, life went on and my career didn't take me into the world of six- or eight-legged things. In time, however, I thought I would like to spend more time learning about spiders. The late Robin Leech, who was a mentor to many of us, encouraged me from afar in this idea but I found it a daunting task to figure out how to move forward in this hobby. It seemed my choices in identifying spiders were either an insect ID guide with pictures of four spiders or *Spiders of North America* which, if I recall correctly, jumps immediately from “does it have eight legs” to “what does its genitalia look like?” I was discouraged and my interest waned.

More time passed and I retired. This gave me the time and opportunity to take the University of Calgary's summer field course at the Kananaskis Research Station in Insect Biodiversity. This gave me a huge leap forward in learning how to collect and discovering the world of insects with a microscope. I would go to sleep at night with images of leafcutter mandibles and the textures of weevil elytra dancing in my dreams. I left the course with high enthusiasm but then came up against the learning curve in where to get the equipment and materials to furnish my “lab”.

If you're not involved with the people who are in the entomology field, finding out where to purchase supplies like insect pins, spreading boards and vials is a challenge. Microscopes abound on eBay, but how can you figure out what type you need if you don't have microscope experience? And chemicals – that's a whole other story. If you walk in to see your local druggist and ask for cyanide, you don't get a positive response and no chemical supply house that I found will ship nasty things to a residential address. It was a number of months before I discovered that some types of fingernail polish remover worked just fine for the task. After months of trying to find a source for ethanol I finally tracked down a supplier – a janitorial supply house which would sell me a 20-litre pail of the stuff – a bit of an overkill for filling the box of vials that I

had, but it's what I could get. The bottom line to this tale of woe is that if you're an interested amateur but have no connections, you need to be determined to get very far with entomology.

After limping along with this hobby for a couple of years, I finally struck gold when I got John Swann's name and got up the courage to call him. He welcomed me to his office at the U of C and he opened doors for me that I didn't know existed. He suggested I join this organization, provided me with an unbelievable amount of help in establishing an insect collecting program at Beauvais Lake Provincial Park that has provided thousands of specimens for the U of C invertebrate collection, and helped me understand what I was collecting.

So, you're asking yourself, "What's her point?" It's this: if entomology isn't in your academic background or you don't have connections in the field, it's a pretty challenging subject to pursue.

This past year, I have been contacted by a number of organizations and people who are interested in getting involved in entomology but they have no idea where to start. Just giving them a half dozen website addresses for key organizations, telling them where to get equipment, and showing them the most basic of field techniques makes them feel like a whole world of opportunity has opened up to them.

The Entomological Society of Alberta was organized in November 1952. At the time, one of the prime motives for establishing the Society was to encourage interest in amateur entomology.

The object of the Society shall be to foster the advancement, exchange, and dissemination of the knowledge of insects in relation to their importance in agriculture, horticulture, forestry, public health, industry and for its own sake, among the people of the Province of Alberta.

As I look out at the group today, I see mostly people who are here because they are working or studying in the field of entomology. I don't see a robust contingent of people who are here simply for the joy of knowing more about insects. Given how amazing, interesting and available insects are, why are insect-watching clubs not as ubiquitous as bird-watching clubs? Why are there Wildflower Festivals but not Fly Frolics or Spider Sneaks? I think there are many reasons. One is, simply, that people don't actually see the insects that are around them. Another is that even if they do see them, they don't have a clue where to start to find out about them and learn about them.

However, I find it encouraging to hear the regional directors' reports of activities around the province that are targeted at bringing people into the field. The Bugs 101 initiative builds in that direction and Dr. Haines' presentation shows the value of bringing citizens to science.

So, this is my challenge to you. Give some thought about how can we achieve the Entomological Society of Alberta's objective of advancing knowledge about insects with the people of Alberta, simply for its own sake and for the joy of knowing more about the world where we live.

Thank you for participating in this meeting.

Bette Beswick
President

**Entomological Society of Alberta
2018 Membership**

Last Name	First Name	Organization	Location
Honorary Members			
Ball	George	University of Alberta	Edmonton, AB
Byers	Bob	Agriculture and Agri-Food Canada	Lethbridge, AB
Shemanchuk	Joseph		Lethbridge, AB
Regular Members			
Acorn	John	University of Alberta	Edmonton, AB
Bahreini	Rassol	Alberta Agriculture and Forestry	Edmonton, AB
Barkley	Shelley	Alberta Agriculture	Brooks, AB
Barr	William	City of Edmonton	
Bercha	Robert		Calgary, AB
Best	Lincoln		
Beswick	Bette		Calgary, AB
Brant	Randall	Agriculture and Agri-Food Canada	Lethbridge, AB
Briere	Charity		Red Deer
Brumec	Vesna		
Cárcamo	Héctor	Agriculture and Agri-Food Canada	Lethbridge, AB
Cartar	Ralph	University of Calgary	Calgary, AB
Catton	Haley	Agriculture and Agri-Food Canada	Lethbridge, AB
Coker	Alex		
Cuny	Robert	Lakeland College	Lloydminster, AB
Daniels	Sheree	Agriculture and Agri-Food Canada	Lethbridge, AB
DeClerck-Floate	Rosemarie	Agriculture and Agri-Food Canada	Lethbridge, AB
Evans	Megan	University of Calgary	Calgary, AB
Evenden	Maya	University of Alberta	
Flaherty	Leah	Grant MacEwan University	St. Albert
Floate	Kevin	Agriculture and Agri-Food Canada	Lethbridge, AB
Friesen	Kevin	Grant MacEwan University	Edmonton
Fry	Ken	Olds College	Olds, AB
Fulkerth	Christine	Olds College	Olds, AB
Gabert	Keith	Canola Council	Innisfail, AB
Galpern	Paul		
Gavin	Michael		
Giacobbo	Victoria	Royal Alberta Museum	Edmonton, AB
Gomez	Christina		
Heming	Bruce	University of Alberta	Edmonton, AB
Hilchie	Gerald	University of Alberta	Edmonton, AB
Hoover	Shelley	Agriculture and Rural Development	
Hossain	Mohammad		
Judge	Kevin		
Kristalovich	Myles		Calgary
Longair	Robert	University of Calgary	Calgary, AB
Lumley	Lisa	Royal Alberta Museum	Edmonton, AB

Last Name	First Name	Organization	Location
McClay	Alec	McClay Ecoscience	Sherwood Park, AB
Meers	Scott	Alberta Agriculture	Brooks, AB
Mousseau	Tonya	Mount Royal University	Calgary, AB
Oliver	Mark		Calgary, AB
Pohl	Greg	Canadian Forest Service	Edmonton, AB
Proctor	Heather	University of Alberta	Edmonton, AB
Reid	Mary	University of Calgary	Calgary, AB
Retzlaff	Philip		
Schwarzfeld	Marla		Edmonton
Sheffied	Cory		
Sjolie	Dylan	University of Alberta	Edmonton, AB
Smith	Alexander		Edmonton, AB
Sperling	Felix	University of Alberta	Edmonton, AB
Swann	John	University of Calgary	Calgary, AB
Thomson	Don		Calgary
Thorsen	Ashley	Royal Alberta Museum	Edmonton, AB
Thyssen	Adrian	University of Alberta	Edmonton, AB
Vickruck	Jess	University of Calgary	Calgary, AB
Walter	Dave	University of Alberta	
Whitehouse	Caroline	Alberta Agriculture and Forestry	Edmonton, AB
Williams	Daryl	University of Lethbridge	
Retired Members			
Dolinski	Michael		Edmonton, AB
Holmberg	Robert	Centre for Science	Athabasca, AB
Student Members			
Ahn	Micky	University of Alberta	Calgary, AB
Balcaen	Martine		
Batallas	Ronald	University of Alberta	Edmonton, AB
Batista	Philip	University of Alberta	Edmonton, AB
Bezanson	Giselle	University of Lethbridge	Lethbridge, AB
Canuel	Maddison	University of Calgary	Calgary, AB
Correal Wilches	Diana Maria	Agriculture and Agri-Food Canada	Lethbridge, AB
Domnich	Ilan		
Dufton	Shelby		
Dupuis	Julian Rowe		
Fernandez	Diana Catalina	University of Lethbridge	Lethbridge, AB
Fjordbotten	Krista	University of Lethbridge	Lethbridge, AB
French	Rowan	University of Alberta	Sherwood Park, AB
Ghavami	Hadi		
Glass	Haley		
Goulding	Megan		
Grocock	Nicholas		
Guevara Roza	Sydne	University of Alberta	
Hervet	Vincent	University of Lethbridge	Lethbridge, AB
Hoefele	Danielle	University of Alberta	
Holmes	Gregory	University of Athabasca	Lethbridge, AB

Last Name	First Name	Organization	Location
Ivanova	Mariya		Calgary, AB
Jones	Kelsey		
Jorgensen	Amanda		
Kutby	Rola	University of Calgary	
Lachowsky	Leanna	University of Calgary	Calgary, AB
Lebunasin Arachchige	Pasan		
Leo	Sarah	University of Lethbridge	Lethbridge, AB
MacDonald	Zachary	University of Alberta	Edmonton, AB
Mader	Caitlin		
Marshall	Valerie		
Mcpike	Sarah	University of Alberta	
Meehan	Matthew		
Murphy	William	University of Calgary	
Musso	Antonia	University of Alberta	
Nelson	Tyler	University of Alberta	Edmonton, AB
Oliver	Tom		Calgary, AB
Pain	Rebecca		
Perry	Alexander		
Punko	Rosanna	University of Manitoba	Westlock, AB
Retzlaff	Jennifer	University of Calgary	Calgary, AB
Robinson	Samuel	University of Calgary	Calgary, AB
Ross	Michael		
Schmitke	Michaela	University of Lethbridge	Lethbridge, AB
Shegelski	Victor	University of Alberta	
Shivananjappa	Sunil	University of Lethbridge	Lethbridge, AB
Sosiak	Christine	Department of Renewable Resources	
Sperling	Janet	University of Alberta	Edmonton, AB
St. Onge	Amanda	University of Alberta	Edmonton, AB
Trevoy	Stephen	University of Calgary	Edmonton, AB
Waytes	Riley	University of Calgary	
Wingert	Brittany	University of Alberta	Edmonton, AB

Libraries	Institution	Location
Archives, Entomological Society of Alberta	Agriculture and Agri-Food Canada	Lethbridge, AB
Athabasca University College Library	Athabasca University College	Athabasca, AB
Augustana University College Library	Augustana University College	Camrose, AB
Cameron Library	Cameron Library	Edmonton, AB
Colorado State University Libraries	Colorado State University Libraries	Fort Collins, CO
Concordia University College Library	Concordia University College	Edmonton, AB
Glenbow Alberta Institute	Glenbow Alberta Institute	Calgary, AB
Grande Prairie Regional College Library	Grande Prairie Regional College	Grande Prairie, AB
Lakeland College Library	Augustana University College	
Lethbridge Research Centre	Agriculture and Agri-Food Canada	Lethbridge, AB
Medicine Hat College Library	Medicine Hat College	Medicine Hat, AB

Libraries	Institution	Location
N.A.I.T. Library	Northern Alberta Institute of Technology	Edmonton, AB
National Library of Canada	National Library of Canada	Ottawa, ON
Northern Forestry Centre Library	Canadian Forest Service, Northern Forestry Centre	Edmonton, AB
Olds College Library	Olds College	Olds, AB
Provincial Museum and Archives	Provincial Museum and Archives	Edmonton, AB
Red Deer College Library	Red Deer College	Red Deer, AB
S.A.I.T. Library	Southern Alberta Institute of Technology	Calgary, AB
Strickland Library	University of Alberta	Edmonton, AB
University of Calgary Library	University of Calgary	Calgary, AB
University of Lethbridge Library	University of Lethbridge	Lethbridge, AB