

PROCEEDINGS OF THE 61ST ANNUAL MEETING OF THE



Entomological Society of Alberta

October 10 – 11, 2013

Olds College, Olds, 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 2013

ESA Officers

President	Felix Sperling
Vice-President	Mike Dolinski
Past President	Lloyd Dosdall
Secretary	Ken Fry
Treasurer	Caroline Whitehouse
Webmaster	Alec McClay

ESA Council

Northern Region Director	Kevin Judge
Central Region Director	Tonya Mousseau
Southern Region Director	Vincent Hervet
Regional Director to ESC	Kevin Floate
Proceedings Editor	Megan Evans

Annual Meeting Committees for 2013

Conference Chairs	Ken Fry and Felix Sperling
Local arrangements.....	Ken Fry
Scientific programme	Felix Sperling
Registration and finance	Caroline Whitehouse

President's Address

Olds College has once again been a superb place to hold the annual meeting of the Entomological Society of Alberta, not just for its excellent facilities and location, but also for the incredibly hard work by our host Ken Fry and his colleagues. It is of course especially appropriate that we should be here at Olds for the 100th anniversary of the college. And Ken has worn many hats to pull off this meeting so well. Thank you also to our treasurer, Caroline Whitehouse, and our wonderful society executives and directors, who have kept things active and well.

Thanks to all for staying for the business meeting. I'm glad that we were able to fit it in today (Friday), which will allow us to devote more of the Thanksgiving weekend for the things we traditionally do on this weekend. This year's meeting has been a bit smaller than usual, for a variety of reasons including its timing a year after the big JAM in Edmonton as well as the recent (and very shortsighted) restrictions that have been placed on travel by any federal government employees. But the fact that we nonetheless had such a vibrant array of presentations, both as posters and orally, is a testament to the long term viability and sustainability of our Entomological Society of Alberta. In this context I'd particular like to thank our plenary speaker, John Acorn, who is himself a past president of our society. John's insightful portrait of our inspiring founder, E.H. Strickland, was exactly what we needed to remind us of our roots as entomologists, a century ago.

Finally, I'd like to say how proud I am to have had the opportunity to serve as president of our society myself, and also to have Lloyd Dosdall here in such improved health as past president. But now I really need to let us all have a chance to take a brief break before our banquet and the events of the evening. And after that, I hope to see you all at our next annual meeting in Lethbridge in 2014!

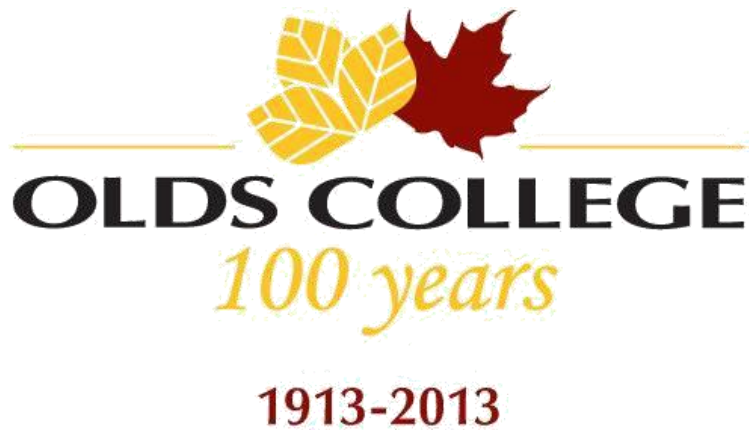
Felix Sperling
ESA President
11 October 2013

Entomological Society of Alberta



**61st Annual Meeting Olds College October 10th – 11th
2013**

PROGRAM



Welcome to Olds College!

Olds College welcomes you to our campus in this, our 100th year. We began back in 1913 as an agriculture and home economics school. First known as the Olds School of Agriculture and Home Economics, it became Olds Agricultural and Vocational College in 1963 and finally, Olds College, in 1971, to reflect our broader course offerings. Today our programming ranges from agricultural mechanics to fashion design to veterinary technician.

Entomology has a long tradition at Olds College, beginning with inclusion in the agricultural production curriculum through to stand alone courses in the horticultural programmes. Entomological interests on campus have culminated in the amassing of >65,000 specimens in the invertebrate collection started by Buck Godwin in 1974, greatly enlarged by Ernest Mengersen in the 80's and 90's, and with continued contributions in the 21st century.

Please enjoy our beautiful campus, especially the Botanic Gardens and Managed Wetlands (unique in Canada), during your visit. We hope your time on campus and at the conference is interesting and rewarding.

Sincerely,

Ken Fry
Local Organising Chair

PROGRAM OF EVENTS

Thursday, October 10 All sessions in Land Sciences Building (LSC)

17:30 Executive Meeting (LSC 1023)

19:30 Registration open (LSC Atrium)

19:30 – 22:00 Reception (LSC Atrium)

Friday, October 11 All sessions in Land Sciences Building (LSC)

08:30 Registration open (LSC Atrium)

9:00 – 10:00 **COFFEE AND POSTER VIEWING** (LSC 1024)

POSTER PRESENTATIONS

Floate, K.D., and Coghlin, P.C.

Invasion dynamics of *Wolbachia* bacteria in populations of the wasp, *Trichomalopsis sarcophagae* (Pteromalidae)

Lachowsky, L.E. and Reid, M.L.

Environmental determinants of emergence and sex ratio in natural populations of mountain pine beetles

Larson, D., Diehl, L., Leslie, M., Schoenknecht, A., Zembal, T.

Black Light and Night Life: Moths in Tropical Wet Costa Rica Forest

Li, Y.Y., Floate, K.D., Fields, P.G., and Pang, B.P.

Effect of antibiotics on *Wolbachia* infections in *Tribolium confusum* and on host reproduction

Sjolie, D.M., Evenden, M.L.

Distribution of willow leaf blotch miner (*Micrupteryx salicifoliella*) on different willow trees (*Salix spp.*)

CONTRIBUTED PAPERS SESSION 1 (LSC 1027)

Moderator – Felix Sperling

10:00 **Opening and Welcome**

Felix Sperling, President, ESAB

10:15 Batallas, Ronald, Evenden, M

Activity and abundance of redbacked cutworm, *Euxoa ochrogaster* (Lepidoptera: Noctuidae), on multiple crops in Central Alberta

10:30 Hervet, Vincent, Floate, K, and Laird, R

Assessment of a hymenopteran parasitoid's potential as biological control agent of cutworms

10:45 Weeraddana, Chaminda DS, Pearson, V, and Evenden, M

The effects of insecticide-coated canola seeds on larval development of bertha armyworm, *Mamestra configurata*

11:00 Wilches, Diana, Borrero, F, Molina, J, Cotes, A

Mating disruption in *Tecia solanivora* (Lepidoptera: Gelichiidae) using pheromone dispensers in potato storage conditions.

11:15 St.Onge, Amanda, Evenden, MA, Carcamo, HA, Meers, S, Barkley, S, and Herle, CE

Development of a semiochemical lure to monitor the invasion of *Sitona lineatus* (Coleoptera: Cuculionidae) in the prairie provinces

11:30 Sekhon, Jag, and Reid, M.

The energetic costs of toxicity from tree monoterpenes on mountain pine beetle

11:45 Piitz, M.A. and Cartar Ralph V

Shapely bumble bees: Wings and limbs of visitors differ among flower species

12:00 **LUNCH** (provided) (LSC 1024)

CONTRIBUTED PAPERS SESSION 2 (LSC 1027)

Moderator – Bryan Brunet

13:30 Brunet, Bryan M.T. and F.A.H. Sperling

Genomic analysis of hybridization in the spruce budworm species complex in southwestern Alberta

13:45 Bird, Heather, Brunet, B., Lumley, L., Cusson, M., Boyle, B., Lévesque, R., and Sperling, F.

Putative adaptive traits of the jack pine budworm *Choristoneura pinus* (Lepidoptera: Tortricidae)

14:00 Fagua, Giovanni, Sperling, F

Phylogeny, mitochondrial diversification and genetic correspondence in mate attraction by species of the genus *Choristoneura* Lederer, 1859, a problem at three scales

14:15 Swan, John E.

Trouble in the Tropics: Generic Concepts of Southern Hemisphere Milichiidae (Diptera)

14:30 Piekarski, Patrick, Longair, R., and Rogers, S.

Monophyly of the eusocial wasps (Hymenoptera: Vespidae): molecules and morphology tell opposing histories

14:45 McDonald, C.M., Acorn, J.H., and Sperling, F.A.H.

Molecular species delimitation and phylogeny of the genus *Polygonia*

15:00 **COFFEE AND POSTER VIEWING** (LSC 1024)

15:30 **PLENARY PRESENTATION** (LSC 1027)

Acorn, John

One hundred years of Strickland

16:30 **ENTOMOLOGICAL SOCIETY OF ALBERTA**

ANNUAL GENERAL MEETING

18:30 **BANQUET** (LSC Atrium)

Cocktails at 18:30

Dinner at 19:00

After Dinner Speaker: **Gordon Gilchrist, Olds College** “Education, Culture and their Influence on Change”

Awards Presentations

Student Travel Grants, Undergraduate Award in Entomology

ORAL AND POSTER PRESENTATION ABSTRACTS

(Alphabetically by presenting author; Oral presentation unless indicated as poster)

1 One Hundred Years of Strickland. Invited Plenary Presentation

Acorn, John

Dept. of Renewable Resources, University of Alberta

One hundred years ago, in 1913, Edgar Harold Strickland became the first professional entomologist to work in the province of Alberta, sent to establish the Dominion Department of Agriculture field laboratory, in Lethbridge, and to focus on control of the pale western cutworm. Nine years later, he was offered a professorial position at the University of Alberta, where he founded the Department of Entomology, and continued to do superb work on agricultural pests, morphology, and faunistics, as well as entomological teaching and extension. During WW1 he served in the 1st Battalion, Canadian Machine Gun Corp, and in WW2 he was again seconded from his university position in order to supervise military training in central Alberta, and serve as aide-de-camp to the Lieutenant Governor. He thereby attained the rank of Colonel, and was known thereafter as Colonel Strickland. In 1952, he became the first president of the Entomological Society of Alberta, and in his presidential address he focused on “the early history of entomology in Alberta” and the importance of amateurs, who he thought were disappearing from Alberta at the time. Colonel Strickland retired in 1954, having spent 41 years as an entomologist in Alberta (which is impressive, but not a record, since George Ball has now been professionally active in Alberta for 57 years). We celebrate Strickland for a number of reasons. First, he set the tone for entomology in the province, as a highly competent, cooperative professional, concerned about the science of entomology, but also about the good of society in general. Second, we are still building on, and frequently reminded of, Strickland’s foundational work. And finally, we celebrate Strickland because his story is now something of a legend. It is a shared narrative that serves to unite those working at the Lethbridge Experimental Station, those involved in pest control entomology and extension, those at the University of Alberta, those interested in Alberta history in general, and of course, the Entomological Society of Alberta itself.

2 Activity and abundance of redbacked cutworm, *Euxoa ochrogaster* (Lepidoptera: Noctuidae), on multiple crops in Central Alberta

Batallas, Ronald, Evenden, M.

Department of Biological Sciences, University of Alberta.

The redbacked cutworm (RBC), *Euxoa ochrogaster* (Lepidoptera: Noctuidae), is an agricultural pest regarded as the most destructive cutworm in Canada. Late instar larvae chew stems and sever seedlings. Outbreak infestations can cause complete destruction of extensive crops in the Prairie Provinces. Despite the generalist feeding behaviour of RBC larvae, there are indications that it may prefer cereals and rape-seed crops. The objective of this study is to assess RBC abundance and activity on different crops grown in central Alberta, and establish a hierarchical feeding preference. Larval relative abundance and spatial distribution were monitored with Modified Missouri Cutworm Traps baited with different seedlings to assess larval feeding preference. Adult flight activity and relative abundance were monitored with traps baited with

sex pheromone lures or feeding attractant baits (Acetic Acid: 3-Methyl-1-Butanol) in three crops: canola, barley and wheat. We found low numbers of captured larvae, possibly caused by high predation from carabid beetles. Adult flight activity peaked from the fourth week of August to second week of September. Results will discuss the relationship of adult moth abundance present on each crop. Understanding RBC activity in the field will improve integrated pest management programs, and estimates of breeding populations and their dynamics.

3 Putative adaptive traits of the jack pine budworm *Choristoneura pinus* (Lepidoptera: Tortricidae)

Bird, Heather¹, Brunet, B.¹, Lumley, L.², Cusson, M.², Boyle, B.³, Lévesque, R.⁴, and Sperling, F.¹.

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

Natural Resources Canada, Canadian Forest Service, Laurentian Forestry Centre, Stn. Ste-Foy, Québec

² Département de biochimie, Université Laval, Québec

³ Institut de Biologie Intégrative et des Systèmes (IBIS), Université Laval, Québec

The jack pine budworm (*Choristoneura pinus*) defoliates jack pine trees in Canada and is a member of the destructive spruce budworm species complex (*Choristoneura fumiferana*). We searched for genetic characters that reliably distinguish the jack pine budworm from the other species in the spruce budworm complex. Using a genotyping-by-sequencing method we characterized over 100 000 single nucleotide polymorphisms (SNPs) in greater than 75% of the 99 specimens (ApeKI restriction enzyme digest), and the 144 specimens (PstI-MspI digest). Of the 100 000 SNPs, 945 were fixed with an allele found only in jack pine budworm specimens. The spruce budworm sequences surrounding 278 of the 945 jack pine budworm SNP loci were homologous to genes in the NCBI non-redundant database. The functions of these genes include wing disc and eye development, odorant receptor and courtship behavior, detoxification, various cellular processes, and sequence-specific gene expression controls. It is possible that these genes influence adaptive traits involved in the species differences of the spruce budworm complex.

4 Genomic analysis of hybridization in the spruce budworm species complex in southwestern Alberta

Brunet, Bryan M.T. and F.A.H. Sperling

Department of Biological Sciences, University of Alberta, Edmonton, Alberta, Canada

Hybrid zones are important “natural laboratories” that provide evolutionary biologists with a glimpse into the processes involved in the divergence of species. However, much of the early work done to characterize reproductive barriers was been facilitated *ex situ* without confirmation from natural populations. This is especially true for the Abietoideae feeding spruce budworm species, *Choristoneura fumiferana*, *C. occidentalis*, and *C. biennis*, whose ranges meet along the Rocky Mountain foothills of Alberta. Barriers to gene flow between these species are limited and hybrids in nature have only recently been identified. Here, I employ next-generation molecular approaches to characterize genetic variation within this hybrid zone, delimit hybrid zone boundaries, and determine the extent of gene flow between these species. Contrary to expectations, distinctions between *C. biennis* and *C. occidentalis* populations were obscured by low genetic differentiation among western populations. Evidence for recent hybridization between these species and *C. fumiferana* was scarce but the presence of advanced generation

backcrosses and high migration rates between species, especially between *C. biennis* and *C. occidentalis*, suggests recurrent and widespread gene flow between these species. The next step is to elucidate the genetic basis of differences among these species by mapping candidate loci under natural selection.

5 Shapely bumble bees: Wings and limbs of visitors differ among flower species

Piitz, M.A. and Cartar Ralph V.

Department of Biological Sciences, University of Calgary

Body shape typically reflects the environment in which the body is adapted. But the level of environmental fit is sometimes unappreciated. This study considers intraspecific variation in wing shape and limb shape of a social insect: the noble bumble bee. We digitized wing landmarks and measured leg and tongue dimensions of individuals of a single bumble bee species (*Bombus terricola*) in northern Alberta feeding on four different flower species, whose flight behaviour was timed before their collection. We applied geometric morphometrics to these measurements. We found that both wing and limb shape differed between individuals feeding on different plant species, with wing shape being particularly important. We conclude that a bumble bee's choice of flower depends in part upon the shape of its wings and limbs, traits that are fixed at emergence! It seems that subtle differences in the traits that bees are born with can strongly influence their foraging choices in the field.

6 Phylogeny, mitochondrial diversification and genetic correspondence in mate attraction by species of the genus *Choristoneura* Lederer, 1859, a problem at three scales

Fagua, Giovanny, Sperling, F.

Department of Biological Sciences, University of Alberta

Choristoneura is a genus of mainly Northern Hemisphere tortricid moths that is known for its pest species. Recent work on the systematics, genomics and ecological characterization of the North American coniferophagous species of *Choristoneura* (the spruce budworm complex) provides strong incentive to delimit its species and conduct a complete revision of the genus. Rigorous evaluation of a prior taxonomic proposal to include *Cacoecia occidentalis* Walsingham 1886 in *Choristoneura* is a high priority because it may necessitate renaming *Choristoneura occidentalis* Freeman 1967. Mitochondrial coalescence in the coniferophagous species indicates recent radiations in North America but surveys of a greater proportion of the genome are needed to obtain a more complete understanding of their speciation. The species phylogeny must then be mapped with reproductive behavior like male attraction to pheromones, since these traits constitute the most frequent basis for species delimitation and identification in the group. Here, we present progress toward an analysis at three different scales: at the genus level to define *Choristoneura*, at the species complex level to estimate the effect of environmental factors in the diversification of the American coniferophagous species, and at the level of genetic correspondence between females and the males attracted to them in the field.

7 Invasion dynamics of *Wolbachia* bacteria in populations of the wasp, *Trichomalopsis sarcophagae* (Pteromalidae) Poster

Floate, Kevin D., and Coghlin, P.C.

Lethbridge Research Centre, Agriculture and Agri-Food Canada, Lethbridge, AB

Wolbachia are obligate intracellular bacteria that are common in insects. Infections are passed via egg cytoplasm from mothers to offspring and can alter host reproduction to facilitate the spread of the bacteria in the host population. Infections in the wasp *Trichomalopsis sarcophagae* (Hymenoptera: Pteromalidae) cause 100% cytoplasmic incompatibility (CI); i.e., crosses between infected males and uninfected females ($\sigma^w \times \varnothing$) only produce male offspring. All other crosses ($\sigma \times \varnothing^w$, $\sigma \times \varnothing$, $\sigma^w \times \varnothing^w$) produce a F_1 sex ratio of about 1.8♀: 1♂. We examined the effect of CI on the spread of infections in laboratory colonies of *T. sarcophagae*.

Each colony was initiated with about 500 ♀♀ + 300 ♂♂ wasps. Starting infection levels were 5, 10, 25 or 50% with three colonies per treatment (T). Each generation, 15 wasps per colony were tested to assess infection prevalence. For T5, infections could not be detected in two colonies after 2 and 4 generations, but low level infections persisted in the third colony for at least 23 generations. For T50, T25 and T10, infections approached fixation after 5, 10 and 15 generations, respectively. These results identify an invasion threshold of 5-10 percent in this system.

8 Assessment of a hymenopteran parasitoid's potential as biological control agent of cutworms.

Hervet, Vincent¹, Floate, K.², and Laird, R.¹.

¹ Biological Sciences, University of Lethbridge.

² Agriculture and Agri-Food Canada, Lethbridge, Alberta.

We discovered the parasitoid species *Cotesia vanessae* (Hymenoptera: Braconidae) in south-eastern and western Canada in 2012. This species has likely been accidentally introduced from the old world, where it had already been widely reported. We tested the potential of this parasitoid as a biological control agent of crop pest caterpillars in North America. In laboratory conditions, several species of cutworms, armyworms and loopers (Lepidoptera: Noctuidae) were found to be good hosts for the parasitoid. Unfortunately, non-target species of Noctuidae and Nymphalidae were also parasitized by this parasitoid species. We predict this parasitoid species to become more widespread throughout North America in the near future and it may be a potential threat to non-pest species of Noctuidae and Nymphalidae.

9 Environmental determinants of emergence and sex ratio in natural populations of mountain pine beetles Poster

Lachowsky, Leanna E. and Reid, M. L.

Department of Biological Sciences, University of Calgary

Female mountain pine beetles (MPB, *Dendroctonus ponderosae*) initiate attacks on pine trees and a higher proportion of females increases both the attack success and rate of population growth. We studied emergence of naturally breeding populations of MPB in eastern Banff, Kootenay and

Yoho National Parks as well as in Parson (B.C.) to determine ecological correlates of sex ratio. Although MPB are endemic to these locations, they differ in both historical and recent outbreak levels, in the application of management strategies and in environmental, stand and tree conditions. We examined how these environmental characteristics affect the emerging population of MPB in terms of productivity, sex ratio and body size in two stands at each of the above locations. Sex ratio varied greatly between stands, from male-biased to female-biased (45-63% female). Total number of beetles that emerged and mean body size were related to location and host tree characteristics. Banff populations, from relatively naive hosts, were the most productive and had the largest mean body size of all areas, but had comparable sex ratios.

10 Black Light and Night Life: Moths in Tropical Wet Costa Rica Forest

Poster

Larson, David, Diehl, L., Leslie, M., Schoenknecht, A., Zembal, T.

Augustana Campus, University of Alberta

The biodiversity and abundance differences in light responsive insect orders and moths in primary, secondary and gallery forests during mid-dry season at Osa Conservation Piro Field Station.

11 Effect of antibiotics on *Wolbachia* infections in *Tribolium confusum* and on host reproduction

Poster

Li, Yanyan^{1,3}, Floate, K. D. ¹, Fields, P. G. ², and Pang, B. P. ³.

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

² Cereal Research Centre, Agriculture and Agri-Food Canada, Winnipeg, MB, Canada

³ College of Agriculture, Inner Mongolia Agricultural University, Hohhot, Inner Mongolia, China.

Tribolium confusum (Coleoptera: Tenebrionidae) is a pest of stored grain products worldwide. Beetles carry infections of *Wolbachia* bacteria, which can affect their host's reproduction. Here we examine infections of *Wolbachia* bacteria in *T. confusum* as a possible method to control this pest. In the present study, colonies of beetles treated with tetracycline (0.1 mg/g flour) and rifampicin (0.05 mg/g flour) were cured in 4 and 1 generation, respectively. These results correspond with findings of previous studies on this insect. To assess the effect of infection on the host, four types of crosses were performed; ♀^w x ♂^w, ♀ x ♂, ♀^w x ♂, ♀ x ♂^w. The incompatible crosses, occurs when uninfected females (♀) mate with infected males (♂^w), cause egg mortality. Uninfected males (♂) were compatible with all females (♀^w, ♀), whether infected or not.

12 Molecular species delimitation and phylogeny of the genus *Polygonia*

McDonald, Christianne M., Acorn, J.H., Sperling, F.A.H.

Department of Biological Sciences, University of Alberta

Resolving species boundaries is essential for effective study and conservation of species. We use molecular characters (single nucleotide polymorphisms – SNPs) to cluster individuals and populations within the genus *Polygonia* into taxonomic units, with focus on the species known from Alberta. Phylogenetic relationships were reconstructed using approximately 23,000

concatenated SNPs per individual. These SNPs were identified using high throughput Illumina sequencing and a complexity reduction approach called genotyping by sequencing (GBS). Prior phylogenies for *Polygonia* have been constructed using mitochondrial and nuclear DNA sequences. Our preliminary results gave a phylogeny from SNPs that more closely resembled the topologies for nuclear than the mitochondrial genes that were reconstructed by previous researchers. Further analyses are needed with expanded geographic sampling, especially from southern and western Alberta and also the rest of the species ranges. Our molecular results will be compared with a geometric morphometric approach to species delimitation, using digital imaging software and multivariate analyses to cluster individuals into taxonomic units for a comprehensive phylogeny of the *Polygonia* species of Alberta.

13 Monophyly of the eusocial wasps (Hymenoptera: Vespidae): molecules and morphology tell opposing histories

Piekarski, Patrick, Longair, R. and Rogers, S.

Department of Biological Sciences, University of Calgary, Calgary, Canada

Simultaneous analysis of phenotypic characters (269 morphological and 66 behavioral) and molecular data (CO1, 28S, 16S, 12S) for 74 taxa was performed to elucidate the Vespidae phylogeny. Phylogenetic constructions were performed with and without behavioral characters in order to test whether eusocial monophyly depended on inclusion of behavioral data. DNA sequences for taxa not incorporated in previous studies were obtained and included for analysis. All three reconstructions (Parsimony, Likelihood, Bayesian) that solely utilize molecular evidence suggest two origins of eusociality, supporting the findings of Hines *et al.* (2007). Simultaneous analysis of all data supports a single origin of eusociality and is similar to the phylogeny of Pickett and Carpenter (2010). We advocate the phylogeny drawn from all evidence. A perspective, mainly influenced by recent findings pertaining to the presocial *Zethus miniatus* (Kelstrup *et al.*, in press), regarding the evolution of eusociality is discussed. It is concluded that simultaneous progressive provisioning (SPP) and re-use of nest cells played a central role in surpassing the threshold of eusociality. SPP may have provided a novel social context that exploited pre-existing behavioral flexibility, resulting in exaptation of maternal care into cooperative allomaternal care and the emergence of a rudimentary worker-phenotype without any genotypic change.

14 The energetic costs of toxicity from tree monoterpenes on mountain pine beetle

Sekhon, Jag, Reid, M.

Department of Biological Sciences, University of Calgary

Pine trees have a variety of defences that can help them survive when they experience an attack by predators such as mountain pine beetle (MPB, *Dendroctonus ponderosae* Hopkins). Monoterpenes, one of the chemical defences, are found at different concentrations among trees of the same species. As well, a variety of monoterpenes exist in each individual tree, and the composition of these chemicals varies between species. We tested some of the monoterpenes commonly found in lodgepole (*Pinus contorta*) and jack pine (*Pinus banksiana* Lamb.) on individual MPB's. MPB have successfully attacked a large number of lodgepole pine stands and have recently been found in the zone of hybrids of these two tree species. Each MPB was treated with one of four monoterpenes to test for differences in mass loss and survival rates. Variation in the level of

toxicity of each monoterpene could help us understand if some trees have stronger defences than others.

15 Distribution of willow leaf blotch miner (*Micruptyx salicifoliella*) on different willow trees (*Salix* spp.)

Poster

Sjolie, Dylan M., Evenden, M.L.

Department of Biological Sciences, University of Alberta.

Micruptyx salicifoliella (Lepidoptera: Gracillariidae) is a native leaf miner pest to several different species of willow trees (*Salix* spp.) in the North West regions of North America causing aesthetic damage for recreational facilities. Larval feeding damage ranges from small linear mines by young instar larvae to large brown blotches caused by late instar larvae. The objective of the study was to study the preference of *M. salicifoliella* oviposition on three species of willow trees (*S. discolor*, *S. alba* x *S. luxina*, *S. luxina* x *S. partandra*). This was achieved by monitoring the number of incidences of *M. salicifoliella* on three trees of each species at a common site. Eggs, larval mines, and pupae were counted on leaves from randomly sampled branches from May to August in 2012 and 2013. The highest instances of *M. salicifoliella* activity occurred on *S. discolor*. These results suggest a preference of female *M. salicifoliella* to oviposit on *S. discolor* primarily over the other two species sampled.

16 Development of a semiochemical lure to monitor the invasion of *Sitona lineatus* (Coleoptera: Cuculionidae) in the prairie provinces

St. Onge, Amanda¹, Evenden, M.A.¹, Carcamo, H.A.², Meers, S.³, Barkley, S.³, and Herle, C.E.²

¹Department of Biological Sciences, University of Alberta

²Agriculture and Agri-Food Canada, Lethbridge Research Centre, Lethbridge, Alberta

³Alberta Agriculture and Rural Development, Crop Diversification Centre South, Brooks, Alberta, T1R 1E6

Sitona lineatus (Coleoptera: Cuculionidae) is an invasive pest of legumes (Fabaceae) in Alberta and Saskatchewan. The primary hosts of *S. lineatus* are field peas and faba beans which are grown in Alberta for human and animal consumption and for soil improvement in crop rotations. Adult feeding on foliage and larval feeding on root nodules can cause yield loss and reduce nitrogen input into the soil. The aggregation pheromone (3-methyl-3,5-heptanedione) of *S. lineatus* has successfully been used as a monitoring tool throughout its European native range. A refined monitoring tool specific to North American populations of *S. lineatus* would allow producers to track the invasion of this pest as it continues to spread. In the present study, we determine if *S. lineatus* is preferentially attracted to a combined lure that utilizes both aggregation pheromone and bean plant volatiles (linalool, (Z)-3-hexen-1-yl acetate, and (Z)-3-hexen-1-ol). Pitfall traps baited with various lures were used to monitor adult *S. lineatus* activity in southern Alberta throughout the spring and fall flight periods. Four different release rates of aggregation pheromone were tested with and without the addition of bean volatiles. The results of this experiment and future directions will be discussed.

17 Trouble in the Tropics: Generic Concepts of Southern Hemisphere Milichiidae (Diptera)

Swann, John E.

Department of Biological Sciences, University of Calgary

The generic level concepts of milichiid flies have been relatively static for about 100 years. In the year 2000 there was a higher phylogenetic analysis published that caused a significant shake-up in higher level taxonomic units of the family. With the more recent 2010 publication of the Central American Diptera Manual and the upcoming Afrotropical Diptera Manual numerous taxa have come to light which seem to cloud the generic concepts and relationships within this family even further. The suites of morphological characters of these southern hemisphere taxa and their potential impact on generic limits and higher phylogenetics in the Milichiidae will be discussed.

18 The effects of insecticide-coated canola seeds on larval development of bertha armyworm, *Mamestra configurata*

Weeraddana, Chaminda D.S.¹, Pearson, V.², and Evenden, M.¹

¹University of Alberta, Edmonton, Alberta

²St. Francis Xavier High School, Edmonton, Alberta

Bertha armyworm, *Mamestra configurata*, is a major pest found throughout canola fields across the Prairie Provinces. Bertha armyworm larvae feed on canola plants resulting in significant yield losses. Use of insecticide-coated canola seeds might be a good option to reduce the larval damage. However, there is no scientific evidence on how insecticide-coated seeds effect larvae. We used three different canola varieties; treated and untreated 6060RR and 5535CL and an untreated Q2 variety as a control. The first experiment was conducted using five week old canola plants whereas six week old plants were used in the second experiment. Each plant was infested with five second instar larvae for ten days. Larval weight gain, larval damage and plant biomass were measured. A third experiment was conducted using leaf discs instead of whole canola plants. Results showed that insecticide-coated seeds have little to no effect on either larval development or plant damage. However, the leaf disc experiment clearly showed that Q2 variety had the lowest larval weight gain and also less leaf damage as compared to other varieties. Future experiments will focus on use of younger canola plants because in which the insecticide might be more concentrated.

19 Mating disruption in *Tecia solanivora* (Lepidoptera: Gelichiidae) using pheromone dispensers in potato storage conditions.

Wilches, Diana¹, Borrero, F. ², Molina, J.³, Cotes, A².

¹ Universidad de Los Andes, Bogota, Colombia

² Biological Control Laboratory– CBB. Corpoica. Parque Central Bavaria Las Palmas, Bogota

³ Centro de Investigaciones Microbiológicas y Parasitología Tropical. (CIMPAT). Dep. Ciencias Biológicas. Universidad de los Andes. Carrera. Bogotá, Colombia

The moth *Tecia solanivora* is a pest of potato tubers that can causes losses of up to 50% in field and storage conditions. The use of pheromone mating disruption (MD) has been proposed for the control of this pest. With this objective, the Chemical Ecology Group at Corpoica developed the female pheromone blend (12 Ac-E3 12 BC-12 BC Z3) in the proportion 30:50:20. The current study assessed the effect of this blend in reducing levels of damage and *T. solanivora* larval densities under simulated storage bins conditions into which virgin *T. solanivora* adults had been released. Efficacy was evaluated for treatments of 0, 1 and 5 pheromone dispensers, by measuring the incidence of larvae in tubers, the size of the final larval population, and mating success. With the use of five dispensers, the incidence of attach was reduced by 33% with larval populations reduced by 92%. Mating frequency also was reduced. These overall results identify pheromone mating disruption as a promising strategy to control *T. solanivora* in potato storage facilities.

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**Minutes of the Entomological Society of Alberta
Executive/Board of Directors Fall Meeting
Olds October 10 2013**

Meeting called to order at 17:42

Chair: Felix Sperling (President)

In Attendance: Mike Dolinski (Vice-President), Lloyd Dosdall (Past-President), Ken Fry (Secretary), Kevin Judge (Northern Director)(via Skype), Caroline Whitehouse (Treasurer), Vincent Hervet (Southern Director), Kevin Floate (Regional Director to ESC)

Regrets: Alec McClay (Webmaster), Tonya Mousseau (Central Director), Megan Evans (Proceedings Editor)

1 Additions to Agenda as amended and approval

MOVED by Kevin Floate, Seconded by Caroline Whitehouse that the agenda, as amended be approved; Carried

2 Approval of Spring Executive Meeting Minutes

MOVED by Mike Dolinski, Seconded by Lloyd Dosdall that the minutes as amended be approved; Carried

3. Report from the Treasurer (Caroline Whitehouse)

- See attached report
- Talking with Alec to have memberships online and automated
- Difficulty in balancing due to merchandise revenues
- Only \$16,000 received from ESC JAM, with ~\$10K given to ESC
 - o Therefore only \$6K to tide us over for next 7 years
 - o Already committed \$5K to web redesign
- Need to maintain about \$25K after a JAM to draw down on in subsequent years
- This year there will be \$1500 in awards in addition to meeting expenses
- Do we need to break out PayPal service fees – yes, despite the difficulty

MOVED by Caroline Whitehouse, Seconded by Kevin Judge that the Treasurer's report be received; Carried

4. Report from Secretary (Ken Fry)

- See attached report
- How to screen FaceBook applications?
 - o Err on the side of inclusiveness and exclude if necessary
- Felix receiving material/solicitations regarding the society or its activities
 - o Anything related to society activities should be cc'd to the secretary

MOVED by Ken Fry, Seconded by Vincent Hervet that the Secretary's report be accepted; Carried

5. Regional Reports

- a. Report from Northern Director (Kevin Judge)
 - See attached report
 - Discussion about including spring and fall executive reports in the Proceedings.
 - U. of A. expecting major changes as a result of budget cuts and enrolment to be reduced, profs to teach more
 - MacEwan has increased enrolment, to get a replacement ecologist
- b. Report from Central Director (Tonya Mousseau)
 - No report
 - Ken Fry with Olds College update
- c. Report from Southern Director (Vincent Hervet)
 - See attached report
 - Vincent took the lead in organizing the Insect Discovery Day
 - Two paper articles and a tv interview to popularize the event
 - Question about Science in School programme in southern Alberta
 - Mostly elementary schools
- d. Regional Director to the ESC (Kevin Floate)
 - See attached report
 - Ent Soc of Canada will have a Board of Directors who elect directors
 - A fix is the ESA submits a name and the Board votes
 - Must be in place by Oct 1 2014
 - In the past it has been indicated from the ESC that the regional director serves at the pleasure of the ESC and not as a result of what the regional society may wish
 - Kevin has agreed to stay on until the new system is implemented
 - We need to know how long the term is and when the nomination from the provincial societies is required
 - The national society solicits names for the regional directors
 - We have to send a note to the ESC to nominate our choice
 - We have to come up with a name to give to the ESC this year

MOVED by Ken Fry, seconded by Caroline Whitehouse, to accept the reports as submitted; Carried

- 6. Report from Webmaster (Alec McClay, provided report electronically)
 - See attached report
 - Kevin Judge and Alec McClay met and discussed the redesign
 - I mentioned my conversations with a designer contracted by the college to design educational web content
 - Estimates of costs were in excess of \$10,000
 - Felix also commented about two examples of site design that were expensive
 - Kevin Floate mentioned that we could approach educational institutions and offer the project up as a class project
 - Funding of re-design discussed and reaffirmed
 - Mike Dolinski stated that his programmer son says a very important item is to commit to a specific design because changes are prohibitively difficult and expensive

- FaceBook to serve media needs and can relieve the website of some of the functionality

MOVED by Ken Fry, Seconded by Mike Dolinski to accept the Webmaster's report; Carried

7. Fall Meeting Plans Update

- a. costs declared and banquet speaker identified
- b. awards update from Lloyd
 - o Undergraduate award (\$500) well deserved
 - o 5 travel awards issued
 - Considered an item to add to their c.v.s
 - Notified at the banquet and presented with a certificate by Lloyd

8. Old Business

- a. Disbursement of JAM funds
 - a. Dealt with under treasurer's report
- b. Archives
 - Felix Sperling followed up with Hector
 - i. Doubt any museum will be interested in taking the archives, a view shared by Bob
 - ii. Need a champion to take this forward, Hector has declined
 - iii. One suggestion is to ship it all off to the Provincial Archives for curation
 - iv. Kevin Floate to serve as contact in Lethbridge and to contact the Provincial Archives to facilitate delivery
 - 1. Mike Dolinski to assist

MOVED that the Society archives be transferred to the Provincial Archives if acceptable to the Provincial Archivist and that a general inventory be prepared to facilitate negotiations with the Archives and to record what the archives of the Society contain by Kevin Floate, Seconded by Mike Dolinski, Carried

9. New Business

- a. 2014 Meeting Location
 - Meeting would normally be in the south
 - proposed to have it with the Western Forum on Pest Management

Moved that the Southern Regional Director investigate the possibility of hosting the 2014 meeting with the Western Forum on Pest Management and to pursue hosting it in Lethbridge by Kevin Floate, seconded by Vincent Hervet, carried.

- b. Funds in the bank
 - \$5000.00 to be put into a term deposit.

Adjournment

MOVED by Kevin Floate, Adjourn the meeting at 8:33pm

**Interim Financial Report
Fall Executive Meeting
Entomological Society of Alberta
October 9, 2013**

Memberships:

Total Memberships (on the books / in good standing)

Regular	88 / 60
Student	61 / 33
Honourary	5
Free Library	20
Subscription Library	4 / 3

Opening Balance January 1, 2013:

Assets

Cash (bank account)	\$11,548.02	
Term deposits	\$15,000.00	
Common shares (Credit Union shares)	\$653.49	
Total Assets		<u>\$27,201.51</u>

Liabilities & Equity

Total Liabilities	\$0.00	
Equity	\$27,201.51	
Liabilities plus Equity		<u>\$27,201.51</u>

Olds, AB -- ESAB Annual Meeting 2013

No revenue or expenses from the meeting have yet been deposited or withdrawn from the account.

Other Transactions

Credits:

Investment Interest	\$202.50
Membership Renewals	\$240.00
Paypal balance from 2013 joint meeting (merchandise, banquet tickets, etc.)	\$443.06
ESAB share of the remaining balance of 2013 joint meeting account	\$16,201.02

Merchandise purchase	\$10.00
Total Credits	<u>\$17,096.58</u>

Debits:

Lloyd Dosdall (JAM 2012 reimbursement)	\$350.00
Greg Courtney (JAM 2012 reimbursement)	\$350.00
Krisztina Mosdossy (travel award)	\$300.00
JAM seed money reimbursement	\$4,000.00
2012 Proceedings printing cost	\$285.55
ESC – scholarship donation	\$9,972.59
Service fees	\$14.50
Total Debits	<u>\$15,272.64</u>
Total Credits plus Debits	\$1,823.94

Closing Balance October 9, 2013:

Assets

Cash (bank account)	\$13,371.96
Term deposits	\$15,000.00
Common shares (Credit Union shares)	\$653.49
Total Assets	<u>\$29,025.45</u>

Liabilities & Equity

Total Liabilities	\$0.00
Equity	<u>\$29,025.45</u>
Liabilities plus Equity	<u>\$29,025.45</u>

**Entomological Society of Alberta
Secretary's Report
Fall Executive Meeting
Olds October 10, 2013**

Report for the Period November 1, 2012 – October 9, 2013

I received/tracked four (4) items in my capacity as ESA Secretary:

1. JAM Final Report
2. Copyright Infringement
3. Society Annual Return and Audit
4. ESC Regional Director Changes

I retained discussions and correspondence conducted via email totaling five hundred seventeen (517) messages.

As Secretary I issued twelve (12) email notices to the executive or membership (all member notices also posted to the ESA FaceBook group):

1. Pritchard Obituary Dec 28 2012
2. Copyright Request (Executive only) Jan 28 2013
3. Strickland Lecture Announcement Jan 28 2013
4. COSEWIC Call for Committee Participation Jan 28 2013
5. Strickland Lecture Second Announcement Mar 4 2013
6. ESC Meeting Announcement Aug 8 2013
7. ESA Meeting First Announcement Aug 8 2013
8. ESA Meeting Second Announcement Sep 10 2013
9. ESA Meeting Announcement Update Sep 16 2013
10. ESA Awards Announcement Sep 23 2013
11. ESA Abstract Deadline Extension Announcement Sep 30 2013
12. ESA Meeting Schedule Update Oct 9 2013

Letters/items retained

1. First Data Account Statements (3)
2. Society's Annual Return to the Province
3. Entomology Outreach Newspaper Articles (2)
4. Letter from Minister Ritz
5. Letter to Regional Societies
6. ESC/ESA JAM Final Report
7. ESC Notice of Motion at AGM

Caretaking items:

The FaceBook membership has 91 members up from 71 members. 45 postings were made to the group since June 28.

Respectfully submitted,

Ken Fry

ESC REGIONAL DIRECTOR'S REPORT
For presentation to ESA Executive and AGM,
Annual Meeting of the Entomological Society of Alberta
Olds, AB, October 10-12, 2013

The Entomological Society of Ontario and the Entomological Society of Canada extend an invitation to members of the Entomological Society of Alberta to attend the 2013 Joint Annual Meeting in Guelph, Ontario, October 20th to 23rd. This year marks the 150th Anniversary of the national Society and offers an exciting and informative range of symposia, workshops and associated events. Further information on this event is available online at: <http://www.uoguelph.ca/debu/esc-eso2013/esc-eso.html>. The 2014 JAM will be held in Saskatchewan.

This year also marks the transition of the ESC to a new legal entity as mandated by recent changes to federal legislation (Canada Not-for-profit Corporations Act). Rather than a 'Governing Board of a Society', the ESC will be governed by a 'Board of Directors of a Corporation' whose members will be voted into office by the ESC membership. Every effort is being made to retain the general structure and function of the Society with representatives on the Board from regional societies. As part of this transitioning, new and simplified By-laws also are being drafted and are to be voted on by the ESC Board and members at the Guelph JAM. Further details will be announced as they become available.

The ESC also is pleased to announce that *The Canadian Entomologist* has adopted a hybrid open access model to increase publication options for its contributors. Under this model, authors can chose to pay a one-time publication charge to make their articles open access. Conversely, they retain the option of not paying any fees with their articles accessible to journal subscribers.

Respectfully submitted,

Kevin Floate

Regional Director to the Entomological Society of Canada

2013 Annual Report
Regional Director for the Entomological Society of Alberta
to the Entomological Society of Canada

The 61st Annual Meeting of the Entomological Society of Alberta will be held in Olds, Alberta, from Thursday October 10 to Saturday October 12, 2013. The meeting will celebrate

100 years since the arrival of E.H. Strickland in Alberta and the 100th Anniversary of Olds College (<http://100.oldscollege.ca/>). Dr. Strickland's obituary appears in *The Canadian Entomologist* (1963, 95: 291-296) and provides details of his remarkable career and contributions to entomology in Alberta, both as a federal researcher in Lethbridge and as an educator/researcher at the University of Alberta.

The Society has ca. 90 members. There are about 50 undergraduate, graduate and PhDs doing entomology-based research at the province's various universities and colleges. As in previous years, members hosted a number of insect events for the public with great success.

Kevin Floate,

Regional Director to the Entomological Society of Canada

Entomological Society of Alberta Webmaster's Report

Updates to the website this year have included posting the current Board listings, the 2010 Proceedings, and information on the Annual Meeting, and revising membership application form. PayPal buttons have been provided for payment of Annual Meeting registration fees and membership dues, and some broken links have been corrected.

On 27 July I met with Kevin Judge to discuss possibilities for updating and revamping the website. We both felt that there is quite a bit of outdated and redundant information on the site, and that navigation is not as simple as it could be. Some pages such as the history of the website and 50th anniversary memorabilia are probably of little current interest.

Although Troy Danyk did an excellent job on the original design of the website in 1998, from the webmaster's point of view, several features of the site make it quite cumbersome to maintain and update. Some pages contain quite complex layout and many redundant HTML tags (possibly a legacy of having been created in Word or some other application not primarily designed for web authoring), which makes editing difficult. Graphic elements like the changing colour buttons have to be created by hand each time new ones are required, quite a laborious process.

I suggest that it is probably easier to create a new, simplified website from scratch rather than trying to revise the current one. Desirable features of a new site would be a cleaner, more modern look and feel; updated and simplified content; removal of outdated material; simplified navigation; and updated photographs submitted by members. Using a suitable design template, or possibly a content management system such as WordPress, should make updating and maintaining the site easier. It would also be very useful to link the site to a membership database which could be used to record contact information, dues payment status, annual meeting registrations, etc.

A redesign like this is somewhat beyond my skill level and the time commitment that I am able to make, but should be quite a simple task for a professional or even a skilled amateur web designer. I suggest that the Society should use some of the profit from the 2012 JAM to contract out this job. I would be happy to entertain feedback from the Board and the ESA membership on what elements they would like to see in a redesigned website, and to work with the selected designer on the specifics of the site. It might be worth canvassing the membership at the Olds meeting to see if they can suggest candidates who could undertake this job.

As always I thank all those members who have provided information or pointed out changes that need to be made to the site, and I welcome these suggestions at any time.

Respectfully submitted
Alec McClay, Webmaster
October 4, 2013

Entomological Society of Alberta
Southern Director's Report
Spring Executive Meeting, 10 June 2013

Events:

Another very successful Insect Discovery Day took place at the Alberta Birds of Prey Centre in Coaldale on August 17th (see the Lethbridge Herald's article on p. 3). Although the centre does not keep record of the number of entries, we heard from people working there that the visitor's attendance of the center this day may have been unprecedented. As the two previous years, visitors were invited to catch insects from a pond and a meadow using nets. The volunteer entomologists helped them capture and identify these insects, as well as tell some facts about their life history. The kids were especially pleased with catching insects. There was a third station indoor with numerous live and framed insects to look at. Following the increasing success of the Insect Discovery Day since its start in 2011, we plan to run this event again next summer.

People:

- Diana Wilches (from Bogotá, Columbia), started a M. Sc. at the University of Lethbridge in September 2013, co-supervised by Rob Laird and Kevin Floate. Diana conducts her research at the Lethbridge AAFC research centre. Diana will be studying temperature tolerance (hot-cold) of the khapra beetle, *Trogoderma granarium* (Dermestidae) (a pest of food stored products), as well as the effects of temperature on bacterial symbionts of the beetle.
- Greg Holmes (From Lethbridge, AB), started a M. Sc. at the University of Lethbridge in September 2013, co-supervised by Rob Laird and Rose De Clerck-Floate. Greg will be working on determining the biology and impact of a gall wasp, *Aulacidea pilosellae* (Hymenoptera: Cynipidae) and rust pathogen, *Puccinia hieracii*, on invasive hawkweed species, *Pilosella* spp.

Noteworthy:

Héctor Cárcamo and Donna Giberson are pleased to report that Volume 3 of the series on "Arthropods of Canadian Grasslands (Biodiversity and Systematics)" is being finalized and will be published at the end of 2013 or early 2014. There will be 25 chapters published in two parts:

- Part I (non-insects and lower insect orders) will include a dedication to honor Strickland's arrival to Lethbridge and 100 years of professional entomology in Alberta, a preface by H. Cárcamo and D. Giberson, and the following chapters (order to be determined for both parts):

1. Introduction: Biogeography
2. Myriapoda: millipedes, centipedes and terrestrial isopods
3. Plant mites
4. Feather mites and lice
5. Spiders

6. Collembola
7. Odonata
8. Plecoptera
9. Orthoptera of British Columbia. and Yukon
10. Heteroptera
11. Aphids
12. Leafhoppers

- Part II (Holometabola):

13. Lepidoptera of the Prairies
14. Lepidoptera of the Peace River Region
15. Carabidae
16. Tenebrionidae
17. Elateridae
18. Weevils
19. Asilidae
20. Biting flies
21. Simuliidae
22. Bees
23. Ichneumonidae
24. Braconidae
25. Ants

Respectfully submitted,

Vincent Hervet, Southern Director

Kids go BUGGY over insects

ENTOMOLOGISTS
SHARE THEIR LOVE
OF CREEPY CRAWLIES
IN COALDALE

Conor Beagan
For The Herald

Almost every kid seems to have a fascination with bugs. Whether their passion is spiders or butterflies, entomologists were on hand in Coaldale yesterday to answer questions at the popular Alberta Birds of Prey Centre Insect Discovery Day event.

"The event is definitely getting more popular, and now we're getting more people coming from out of town specifically for this event. The entomologists are developing a fan club with the kids," said Colin Weir, co-founder of the Alberta Birds of Prey Centre.

Weir presented the idea for Insect Discovery Day three years ago after attending a banquet for the Entomological Society of Alberta.

"He said that they had a lot of insects at the Birds of Prey Centre and that it would be nice to reveal something about them and share that with the public," said Rose DeClerck-Floate of the Entomological Society of Alberta and the Entomological Society of Canada.

De Clerck-Floate is studying biological weed control. Since the early 1950s, scientists have been studying and testing insects that can potentially be used to control invasive plants.

At her post inside the Natural



Herald photos by David Fuller

Mersaydes Baines, 8, peers into a glass jar containing a dragonfly at the Birds of Prey centre in Coaldale as a part of their insect day event Saturday morning.

History Building, De Clerck-Floate provided information to curious kids about the various insects on display. For a more up close and personal experience, she offered a twig with a colourful two-inch long Hawk Moth caterpillar perched on the end. The caterpillars have a distinct "horn" caused by a backward curving spine.

The Hawk Moth was released in the 1960s to control Leafy Spurge, an invasive plant that displaces native vegetation through shading, usurping water and plant toxins.

"This weed arrived from Eurasia with settlers during the early 1900s and is now a huge problem on the Prairies. We've brought over a few species over the years, and these insects are really helping to control the weeds," said De Clerck-Floate.

What makes the Hawk Moth

special is the fact that it feeds solely in Leafy Spurge, making it ideal for weed control purposes.

Kids milled around the grounds of the centre all afternoon, participating in butterfly capture, aquatic displays and indoor displays.

"The kids just love holding and interacting with the insects. It doesn't matter if they're a boy or a girl, kids just have an innate curiosity," said De Clerck-Floate.

All of the entomologists at the centre volunteered their time to share their love of all things creepy and crawly, and to show that the fascination with insects isn't something that has to go away with adulthood.

"When I was a little girl I used to love capturing insects and learning about them. That's my full-time job now," said De Clerck-Floate.

Northern Director's Report to the Entomological Society of Alberta
Fall Executive Meeting: 10 October 2013

Newly Eclosed Students

Heather Bird, MSc (advised by Felix Sperling, U. of Alberta) – defended 11 September 2013.
Thesis title: "Phylogenomics of the *Choristoneura fumiferana* complex (Lepidoptera: Tortricidae)."

James Glasier, MSc (co-advised by John Acorn, U of Alberta, and Scott Neilsen, U. of Alberta) – defended Spring 2013.

Thesis title: "Community ecology of ants (Hymenoptera: Formicidae) in the central sand hills of Alberta, and a key to the ants of Alberta" (Note: James is now at the University of New South Wales, in Australia, doing his PhD on the effects of grazing on subterranean ants.)

Jessica Kwon, MSc (advised by Maya Evenden, U. of Alberta) – defended 2013.

Thesis title: "Development of a pheromone-based attract and kill formulation with visual cues to target the diurnally active apple clearwing moth, *Synanthedon myopaeformis* (Borkhausen), (Lepidoptera: Sesiidae)." (Note: Jessica is currently a technician in the Dept. of Biological Sciences, U. of Alberta.)

Jeffrey Newton, PhD (advised by Heather Proctor, U. of Alberta) – defended July 2013.

Thesis title: "Biodiversity of soil arthropods in a native grassland in Alberta, Canada: obscure associations and effects of simulated climate change."

Marla Schwarzfeld, PhD (advised by Felix Sperling, U. of Alberta) – defended 13 September 2013.

Thesis title: "Systematics and diversity of Ichneumonidae, with an emphasis on the taxonomically neglected genus *Ophion* Fabricius."

Nymphal Students

Zhuoyan Song, PhD candidate (advised by Heather Proctor, U. of Alberta) – started September 2013.

Thesis subject: not set yet, but will likely involve symbionts of freshwater arthropods

Amanda St. Onge, MSc candidate (advised by Maya Evenden, U. of Alberta) – started September 2013.

Thesis subject: development of semiochemical-based monitoring of the pea leaf weevil

Christiane Uherek, MSc candidate (co-advised by Heather Proctor, U. of Alberta, and Bill Tonn, U. of Alberta) – started September 2013.

Thesis subject: focused on freshwater arthropods associated with artificial streams in the NWT

Asha Wijerathna, MSc candidate (co-advised by Heather Proctor, U. of Alberta, and Maya Evenden, U. of Alberta) – started September 2013.

Thesis subject: dispersal capacity of the mountain pine beetle

Events

The annual National Moth Week survey was held at the Devonian Botanic Gardens on the evening of July 26. Shelley Ryan-Hovind of DBG reports that it was a great success, with roughly 50-60 members of the public attending (the event was combined with a meteor shower observation). See Appendix I for a checklist of moths identified during this event and on two other evenings at DBG this summer.

Reports

Michael Dolinski reports that northern Alberta had its first real economic infestations of orange wheat blossom midge (*Sitodiplosis mosellana*, Cecidomyiidae) in the Falher area, and suggests that this could be a good topic for graduate work and pheromone studies because of the uniqueness of the geographical location of this population.

Upcoming Events

Swaroop Kher, PhD candidate (co-advised by Lloyd Dosdall, U of Alberta and Hector Carcamo, Agriculture and Agri-Food Canada) will be defending his doctoral thesis on Friday November 1st.

Thesis title: "Sustainable management of the cereal leaf beetle, *Oulema melanopus* (Coleoptera: Chrysomelidae), a new invasive insect pest of cereal crops in western Canada"

Joelle Lemmen, PhD candidate (advised by Maya Evenden, U. of Alberta) will be defending her doctoral thesis on Friday November 15th.

Thesis title: "Plasticity in response to semiochemicals as part of a reproductive diapause syndrome in a long-lived moth, *Caloptilia fraxinella* (Lepidoptera: Gracillariidae)."

New Collaborations

Later in October, Doug Craig (Professor Emeritus) will be attending the JAM in Guelph to talk about Australian Gondwanan simuliids. Having, last year, published a monograph on New Zealand blackflies, the idea was to move onto those of Australia. With the size of the country more than daunting, not to mention the specific times needed for collecting, a collaborative effort is in the works. Kevin Moulton, Doug Currie and Doug Craig intend to invade Australia at this time next year and examine collections in the Australian National Insect Collection (ANIC) and make fresh collections of an enigmatic group currently placed in *Paracnephia* (aka *Cnephia* of earlier and other authors) - a very uneasy placement. Moulton has already done much molecular work on material and has ideas about the generic arrangement necessary to resolve relationships of the group. Currie has interest in the deeper phylogeny of these apparently Gondwanan simuliids and Craig is presently doing the morphological work on material already collected. At the JAM Craig and Currie will be discussing strategic moves for the invasion of Oz. This collaborative effort will be a number of years long. (contributed by D. Craig)

With a modicum of respect,
Kevin Judge
MacEwan U.

**Minutes of the Entomological Society of Alberta
61st Annual General Meeting**

Olds College, Olds, Alberta October 10, 2013

Minutes prepared by Ken Fry, ESA Secretary

Attendees:

John Acorn Ronald Batallas Robert Bercha Charles Bird Heather Bird Bryan Brunet Michael Dolinski Lloyd Dossall Giovanny Fagua Kevin Floate Ken Fry	Vincent Hervet Gerald Hilchie Jeremy Hummel Leanna Lachowsky David Larson Rob Longair Christianne McDonald Mark Oliver Tom Oliver Patrick Pekarski	Jason Peterson Mark Piitz Sunil Ranasinghe Dylan Sjoliz Amanda St. Onge Felix Sperling John Swann Chaminda Weeraddana Caroline Whitehouse Diana Wilches Tamara Zembal
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Meeting called to order at 4:32 by Felix Sperling (President)

Approval of agenda

MOVED to accept, Rob Longair; seconded, John Acorn: Carried

Approval of minutes from the 2012 AGM as amended

MOVED to accept, Rob Longair; seconded, Mark Oliver; Carried

Webmaster's Report (Ken Fry for Alec McClay)

See report in Fall Directors Board meeting provided elsewhere in Proceedings

Is there a process going forward?

Kevin Judge and Alec McClay to pursue issue this year

Nature Alberta no longer looks after hosting websites therefore many natural history associations are looking to develop new sites

Word Press is an option

Membership encouraged to contribute or notify of who might help us

MOVED to accept, Ken Fry; seconded, John Swann; Carried

Secretary's Report (Ken Fry)

see report in Fall Directors Board meeting provided elsewhere in Proceedings

discussed FaceBook membership policy - accept all, delete only with cause
membership polled and no support for a twitter feed being set up

MOVED to accept, Ken Fry; seconded, Dave Larson; Carried

Report from Regional Director to Entomological Society of Canada (Kevin Floate)

See report in Fall Directors Board meeting provided elsewhere in Proceedings

- reinforced issue of ESC regulations changing due to government regulatory change
- need to have regional director elected by ESC membership
- our role is to suggest a candidate for ESC to consider and vote on at the AGM of the ESC
- national membership would respect the wishes of the regional society and vote in the candidate
- Our task is to elect a new director to serve one year as normal and then assume the next two years under the new system
- Canadian Entomologist is now hybrid open access (pay a fee and paper is open access, pay no fee and paper is closed to only subscribers) to accommodate U.S. funders saying if funds from a public source, papers must be published in an open access journal.

MOVED to accept, Kevin Floate; seconded, Leanna Lachowski; Carried

Treasurer's Report (Caroline Whitehouse)

See report in Fall Directors Board meeting provided elsewhere in Proceedings

- Notified membership of filing of official audit with province and renewal of provincial certification as a non-profit

MOVED to accept, Caroline Whitehouse; seconded, Rob Longair; Carried

Nominations (Mike Dolinski): nominations were presented as follows:

President – Mike Dolinski
Past President – Felix Sperling
Vice President – John Swann
Treasurer – Caroline Whitehouse
Secretary – Ken Fry
Southern Director – Vincent Hervet
Central Director – Mark Oliver
Northern Director - Kevin Judge
Proceedings Editor – Amanda St. Onge
Webmaster – Alec McClay

MOVED that nominations cease, Mike Dolinski; seconded, Caroline Whitehouse; Carried.

Nominated slate Acclaimed.

Appointment of society financial auditors

- Bryan Brunet and Ronald Batallas accepted.

Resolutions: the following resolution was prepared and read by Christianna McDonald, Heather Bird;

Whereas the 2013 Annual Meeting of the Entomological Society of Alberta was a resounding success and exceedingly memorable, be it resolved that the success of the meeting can be attributed to the hard work and organisational ability of:

- the meeting chairs, Ken Fry and Felix Sperling
- the local arrangements committee, Ken Fry
- the scientific programme committee chair, Felix Sperling
- registration and finance committee, Caroline Whitehouse
- plenary presenter, John Acorn
- the after dinner speaker, Gordon Gilchrist
- and the staff of Olds College for their hospitality
- and the fine support of the college,

be it resolved that we shall provide a round of applause and the President will write a letter of thanks to the college.

Old Business

Archiving (Felix Sperling)

- U. of A. material is not included in the society archive
- Felix briefed the membership on the plans to have the societies material transferred to the Provincial Archive (if they will take it)

Finances

- Membership informed of intention to maintain a minimum balance of \$25,000 and draw down to \$7-8K between JAMs so that we stay solvent

New Business

Honorary members:

- Mike Dolinski to investigate if we have room and to solicit nominations.

2014 meeting:

- The Western Forum on Pest Management wants to hold the meeting in conjunction with the ESA.
- Lethbridge missed out this year due to Olds College
- Seek to have the meeting in Lethbridge and then in North in 2015

MOVED Kevin Floate, seconded by Vincent Hervet, that the 2014 meeting be in the South with or without the WFPM. Carried.

President's Address

- See earlier section in Proceedings

Thanks to the President

- membership thanked the President for his service.

Adjournment

MOVED to adjourn, Mark Oliver
- meeting adjourned at 5:55PM

Photos 61st Annual General Meeting 2013 (Olds)



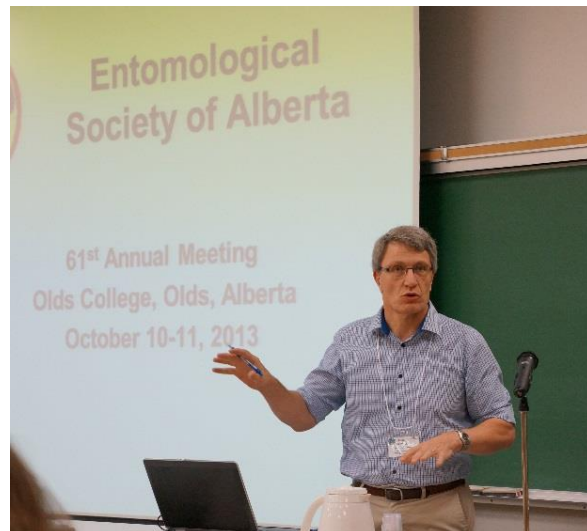
Ken Fry, Conference Co-Chair and ESA Secretary



Dot Negropontes, Dean of the School of Environment at Olds College brought a welcome on behalf of Olds College.



Dr. Charlie Bird



Felix Sperling, Conference co-chair and ESA president



Ronald Batallas, spoke about his work with redbacked cutworms



Vincent Hervet U of L, ESA Southern Region Director gives his presentation about biocontrol of cutworms



Heather Bird's presentation was about adaptive traits of jack pine budworm

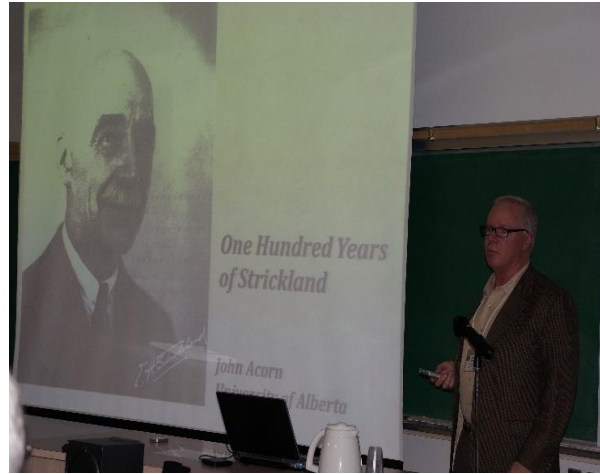


Mark

Piitz spoke about shapely bumble bees



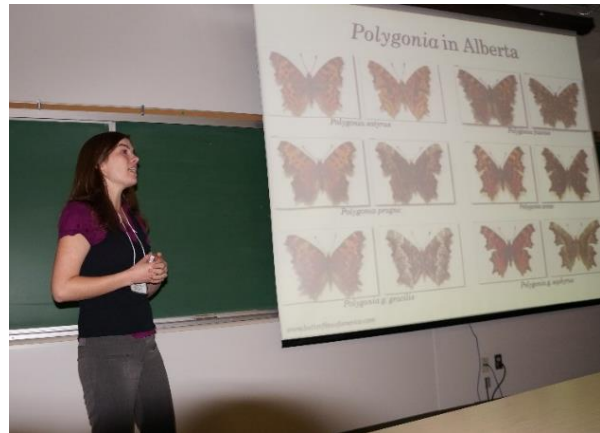
John Swann (U of C) presents his work with tropical Milichiidae (Diptera)



John Acorn gave the plenary presentation "One hundred years of Strickland"



Caroline Whitehouse, ESA Treasurer and Conference Registration and Finance Chair



Christianne McDonald U of A makes her presentation on molecular species delimitation and phylogeny of the genus *Polygonia*



Rob Longair (U of C)



John Swann, Kevin Floate



Lloyd Dosdall U of A, ESA Past President



Father and son team: Tom and Mark Oliver



John Acorn and Robert Bercha



Rob Longair (U of C) and Ken Fry (Olds College)



Congratulations to the lucky student award recipients:

Amanda St. Onge
Diana Wilches
Bryan Brunet
Dylan Sjolie
Patrick Piekarski
Leanna Lachowsky

Entomological Society of Alberta

2013 Membership

Last	First	Organization	Location
Honorary Members			
Ball	George	University of Alberta	Edmonton, AB
Byers	Bob	AAFC Research Centre	Lethbridge, AB
Gurba	Joe		
Gushul	Evan		
Shemanchuk	Joseph		
Regular Members			
Acorn	John		
Bahar	MD Habibullah	AAFC Saskatoon Research Centre	Saskatoon, SK
Ball	Kay		
Barkley	Shelley	Alberta Agriculture	
Barr	William	City of Edmonton	Edmonton, AB
Bercha	Robert		
Bird	Charley		
Bourassa	Stéphane	University of Alberta	Edmonton, AB
Bouchier	Rob	AAFC Research Centre	Lethbridge, AB
Brandao	Karina Silva	Sao Paulo University	
Brandao	Marcelo Mendez		
Brons	Gloria	Butterfly Wings n' Wishes	Edmonton, AB
Byrtus	Gary		
Cárcamo	Héctor	AAFC Research Centre	Lethbridge, AB
Cartar	Ralph	University of Calgary	Calgary, AB
Cheema	Jagdish		
Cooke	Barry		
Crowe	Michael	Lakeland College	Lloydminster, AB

Last	First	Organization	Location
Cuny	Robert	Lakeland College	Lloydminster, AB
Davies	Milton		Edmonton, Ab
DeClerck-Floate	Rosemarie	AAFC Research Centre	Lethbridge, AB
Dergousoff	Shaun	Agriculture and Agri-Food Canada	
Dosdall	Lloyd	University of Alberta	Edmonton, AB
Erb	Stephanie	AAFC Research Centre	Lethbridge, AB
Erbilgin	Nadir		
Evenden	Maya	University of Alberta	Edmonton, AB
Floate	Kevin	AAFC Research Centre	Lethbridge, AB
Fry	Ken	Olds College	Olds, AB
Heming	Bruce	University of Alberta	Edmonton, AB
Herle	Carolyn	AAFC Lethbridge	Lethbridge, AB
Hilchie	Gerald	University of Alberta	Edmonton, AB
Hindmarch	Trevor		
Holmberg	Robert	Centre for Science	Athabasca, AB
Honsameddin	Elkrwe		Edmonton
Hundsdoerfer	Anina	Alberta Sustainable Resource Development	Edmonton, AB
Johnson	Elaine	City of Red Deer	Red Deer, AB
Judge	Kevin	Grant MacEwan University	Edmonton, AB
Kanashiro	Derrick	AAFC Research Centre	Lethbridge, AB
Katzell	Susan	City of Red Deer	Red Deer, AB
Laird	Robert	University of Lethbridge	Lethbridge, AB
Larson	David	Augustana University College	Camrose, AB
Larson	Tracy	AAFC Research Centre	Lethbridge, AB
Leggett	Fran	AAFC Research Centre	Lethbridge, AB
Lehman	Ken	City of Red Deer	Red Deer, AB
Linowski	Ron	Medicine Hat College	Medicine Hat, AB
Longair	Robert	University of Calgary	Calgary, AB
Luong	Lien	University of Alberta	Edmonton, AB
Lvie	Tyler		
Mark	Michelle	University of Alberta	Edmonton, AB
Maximchuk	Mike	Alberta Sustainable Resource Development	Peace River, AB

Last	First	Organization	Location
McClay	Alec	McClay Ecoscience	Sherwood Park, AB
McKellar	Ryan	University of Alberta	Edmonton, AB
Milligan	Patricia		
Moir	Grant	City of Red Deer	Red Deer, AB
Mousseau	Tonya	Mount Royal University	Calgary, AB
Oliver	Mark		
Otani	Jennifer	AAFC	Beaverlodge, AB
Owen	Robin	University of Calgary	Calgary, AB
Oxbrough	Anne	University of Alberta	Edmonton, AB
Peterson	Jason		Burnaby, BC
Phillips	Iain	Saskatchewan Watershed Authority	Saskatoon, SK
Pohl	Greg	Canadian Forest Service, Northwest Region	Edmonton, AB
Pritchard	Gordon	University of Calgary	Calgary, AB
Proctor	Heather	University of Alberta	Edmonton, AB
Qamar	Muhammad	Alberta Health Services	
Rajput	Sunil	Alberta Innovates Technology Futures	Vegreville, AB
Ranasinghe	Sunil	Alberta Sustainable Resource Development	Edmonton, AB
Reid	Mary	University of Alberta	Calgary, AB
Rochon	Kateryn	Agriculture and Agri-Food Canada	Lethbridge, AB
Rondeau	Kimberly		
Sarafraz	Rana	University of British Columbia	Vancouver, BC
Sexsmith-West	Maureen		
Sharpe	Andrea		
Smith	Alexander	University of Alberta	Edmonton, AB
Spence	John	Department of Renewable Resources	Edmonton, AB
Sperling	Felix	University of Alberta	Edmonton, AB
Sperling	Janet	University of Alberta	Edmonton, AB
Stevenson	Margaret	City of Red Deer	Red Deer, AB
Sturtevant	Brian	USDA Forest Service	
Swann	John	University of Calgary	Calgary, AB
Tansey	James	University of Alberta	Edmonton, AB
Thysse	Adrian		

Last	First	Organization	Location
Van Hezewijk	Brian	Agriculture and Agri-Food Canada	Lethbridge, AB
Waelchli	Fred		
Walgama	Ravindra		
Walsh	Peter	Lakeland College	Vermilion, AB
Walter	Dave	University of Alberta	Edmonton, AB
Whitehouse	Caroline	University of Alberta	Edmonton, AB
Williams	Daryl		
Retired Members			
Dolinski	Michael		
Leech	Robin	Alberta Society of Professional Biologists	Edmonton, AB
Student Members			
Barnewall	Emily	University of Lethbridge, AAFC	Lethbridge, AB
Batista	Philip	University of Alberta	Edmonton, AB
Bird	Heather	University of Alberta	Edmonton, AB
Blair	Leah	Agriculture and Agri-food Canada	Lethbridge, AB
Blake	Adam	University of Alberta	Edmonton, AB
Brunet	Bryan	University of Alberta	Edmonton, AB
Byers	Kaylee	University of Alberta	Edmonton, AB
Cigan	Paul	University of Alberta	Edmonton, AB
Dombroskie	Jason	University of Alberta	Edmonton, AB
Dupont	Jaimee		
Dupuis	Julian Rowe		
Esch	Evan	University of Alberta	Edmonton, AB
Evans	Megan	University of Calgary	Calgary, AB
Farmer	Alexandria	University of Calgary	Calgary, AB
Fox	Jennette		
Glasier	James	University of Alberta	Edmonton, AB
Hervet	Vincent	University of Alberta	Edmonton, AB
Hummel	Jeremy	University of Alberta	Edmonton, AB
Jaeger	Christi	University of Alberta	Edmonton, AB
Kher	Swaroop	University of Alberta	Edmonton, AB
Klutsch	Jennifer	University of Alberta	Edmonton, AB

Last	First	Organization	Location
Kulkarni	Sharavari	University of Alberta	Edmonton, AB
Kwon	Jessica	University of Alberta	Edmonton, AB
Lachowsky	Leanna	University of Calgary	Calgary, AB
Lecourtois	Caroline		
Lee	Seung-Il	University of Alberta	Edmonton, AB
Lemmen	Joelle	University of Alberta	Edmonton, AB
Leo	Sarah	University of Alberta	
Li	Yanyan	Agriculture and Agri-food Canada	Lethbridge, AB
Lumley	Lisa	University of Alberta	Edmonton, AB
McDonald	Christianne	University of Alberta	Edmonton, AB
McLeod	Lauren	University of Alberta	Camrose, AB
Mori	Boyd	University of Alberta	Edmonton, AB
Mosdosy	Krisztina		Calgary, AB
Newton	Jeffrey	University of Alberta	Edmonton, AB
Oatway	W. Keenan	University of Alberta	Edmonton, AB
Odsen	Sonya		
Oliver	Tom		
Peralta Vazquez	Haydee	University of Alberta	Edmonton, AB
Pinzon	Jaime	University of Alberta	Edmonton, AB
Proshek	Benjamin	University of Alberta	Edmonton, AB
Ritter	Scott		
Schwarzfeld	Marla	University of Alberta	Edmonton, AB
St. Onge	Amanda	University of Alberta	
Subra	Ravi		
Subramaniam	Ravindran	University of Alberta	Edmonton, AB
Van Haga	Amanda	University of British Columbia	
Vandervalk	Lynae	University of Alberta	Edmonton, AB
Vankosky	Meghan	University of Windsor	Windsor, ON
Wist	Tyler	University of Alberta	Edmonton, AB
Wood	Charlene	University of Alberta	Edmonton, AB
Wu	Xiuhua		
Zink	Lindsay	University of Calgary	Calgary, AB

Libraries	Institution	Location
Archives, Entomological Society of Alberta		
Athabasca University College Library	Athabasca University College	Athabasca, AB
Augustana University College Library	Augustana University College	Camrose, AB
Cameron Library	University of Alberta	Edmonton, AB
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	Lakeland College	Vermilion, AB
Lethbridge Research Centre	Agriculture and Agri-Food Canada	Lethbridge, AB
Medicine Hat College Library	Medicine Hat College	Medicine Hat, AB
N.A.I.T. Library	Northern Institute of Technology	Edmonton, AB
National Library of Canada	National Library of Canada, Serials Records Section, Acquisitions and Bibliographical Services	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
Albert R. Mann Library	Albert R. Mann Library, Cornell University	Ithaca, NY
Colorado State University Libraries, Serials Department	Colorado State University Libraries	Fort Collins, CO
Universitaetsbibliothek	Senckenberg // Zeitschriftenabteilung/DFG	Frankfurt, Germany