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PROCEEDINGS OF THE 59TH ANNUAL MEETING OF THE

Entomological Society of Alberta

October 14th-16th 2011
Kananaskis, Alberta

Entomological Society of Alberta Board of Directors for 2011 3
Annual Meeting Committees 3
President's Address 4
Program of the 59th Annual Meeting of the Entomological Society of Alberta 5
Oral Presentations and Abstracts 8
Poster Presentations and Abstracts 18
Index to Authors 20
Minutes of the ESA Board of Directors Fall Meeting 22
Draft Minutes of the Entomological Society of Alberta 59th AGM 25
Regional Director's Report 28
Northern Director's Report 29
Central Director's Report 34
Southern Director's Report 36
Webmaster's Report 38
Secretary's Report 39
Treasurer's Report 41
Photos 44
List of Members 49

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President's Address
14 October 2011

I appreciate the opportunity to make a few remarks to you before I introduce our guest speaker. The President of a Society like ours often arrives intending to accomplish a lot and subsequently realizes they are happy to have kept things running at all. Even that wouldn't be accomplished without the substantial advice and help provided by other members of the Society, in this case, particularly Greg Pohl, our Past-President and Ken Fry, our Secretary – I shudder the imagine when he decides to step down. On more than a few occasions I rattled off quick emails and they were quick to respond.

The "Institutional memory" which resides with people like this allows us to continue to operate relatively smoothly. But we can't rely on it forever. One of the items we spent some time discussing in the Board meeting last night was how we ensure that historical information, both recent and less recent, can be appropriately cared for. Our Society really needs to think about how (whether?) we want to ensure the right records are kept safely, where we can access them if we need them. Tomorrow, during the business meeting, we will request that members consider how we can go about doing this. In recent years, Fran Leggett and now Kateryn Rochon have looked into possibilities for archiving some material – we need to think about this.

I would encourage you to plan ahead for next year's JAM with the Entomological Society of Canada in Edmonton; put aside 4-7 November (?) for that event. There will also be a celebration of the 90th anniversary of the establishment of the Department of Entomology (may it rest in peace – or perhaps not) at the University of Alberta and we hope to see many former students and faculty there to celebrate.

I would like to take just a few minutes to have you think about where we are meeting. This field station, originally a forestry research station, and briefly a Prisoner of War camp for German prisoners, hosts a large number of academic researchers, university students taking credit courses (including my Biodiversity field course) and hordes (swarms?) of kindergarten to Grade 12 students and their teachers. The Environmental education programmes are in their 24th year and involve short-term experiences in ecological education for elementary and high school students, summer workshops and a Summer Institute for teachers to maintain their education level, web sites, outreach programmes and university associated projects. In 2010/11, the station hosted 1,170 students, youth and educators – sounds impressive but, in fact, that was a 20% decrease in participant numbers from 2009/2010, part of a planned reduction in certain programmes.

The cost of running a facility like this is not small and university administrators are often quick to look at a place like this, which they rarely if ever see, as a source of savings – out of site, out of mind. Other sources of support disappear. For many of us, field stations are invaluable and are among the formative experiences we've had as biologists. I hope that the next time you hear someone suggesting that a place like this might be a low priority, you offer them a few choice words. Well, maybe be a little more diplomatic than that.

I will finish off with thanking the individuals who helped with the organizing of this meeting – Lindsay Zink handled the majority of keeping track of registration; Lindsay, Chandra Venables, Haydee Peralta and Megan Evans were involved in the planning and Megan produced the Proceedings from last year's meeting (and has agreed to do it again, I understand). Tonya Mousseau handled the abstract submissions and produced the programme. Oh, and Lindsay got the beer.

Program of the 59th Annual Meeting of the Entomological Society of Alberta

Friday, October 14, 2011

7:30 **Breakfast and Registration**

9:00 **Keynote Speaker Insect, vertebrate, and plant inclusions in Late Cretaceous Canadian amber, with an emphasis on Hymenoptera**
McKellar, R.C.

10:00 **COFFEE**

CONTRIBUTED PAPERS SESSION 1

10:30 **The phylogenetic position of the Jack Pine Budworm (*Choristoneura pinus*) within the *C. fumiferana* species complex**
Bird, H., and Sperling, F

10:45 **Symbionts of House Sparrows (*Passer domesticus*): Geographical Differences in Abundance and Diversity**
Byers, K., and Proctor, H.

11:00 **Are bees that feed on different flower types of different shape?**
Cartar, R.V., Tanner, D.A.

11:15 **Species delimitation and mitochondrial DNA: one marker is not enough**
Dupuis, J.R., Roe, A.D.R., and Sperling, F.A.H.

11:30 **Effects of grazing pressure on native bee diversity in the foothills rough fescue prairie**
Evans, M.M., Cartar, R.V., and Wonneck, M.

11:45 **LUNCH**

CONTRIBUTED PAPERS SESSION 2

1:00 **Changes in bumble bee distribution and abundance in response to clearcut logging in foothills forests; and consequences to native plant fitness**
Farmer, A.M., Cartar, R.V.

1:15 ***Tetrastichus julis* (Hymenoptera: Eulophidae) non-target effects study in Southwestern Canada**
Hervet, V.A., Dosdall, L.M., Cárcamo, H.A.

1:30 **Phylogeny of genera of the *Pedaliodes* complex (Lepidoptera: Satyrinae: Pronophilina) based on morphological analysis**
Higuera, M., Galindo, L., Fagua, G And Viloria, A.

1:45 **Taxonomy of Phaneta (Lepidoptera: Tortricidae): Testing a morphological perspective**
C. Jaeger, Dr. J. Dombroskie, Dr. F. Sperling

2:00 **Observations on the biology of *Tetrastichus julis* Walker (Hymenoptera: Eulophidae), the principal parasitoid of the cereal leaf beetle, *Oulema melanopus* L. (Coleoptera: Chrysomelidae)**
Kher, S., Dosdall, L.M., Cárcamo, H.A.

2:15 **Development of a pheromone-based attracticide to target the apple clearwing moth (*Synanthedon myopaeformis*) in British Columbia**
Kwon, J.J., Judd, G.J.R., and Evenden, M.L.

2:45 **COFFEE**

3:00 **Over-wintering mortality increases sex-ratio bias of a size-dimorphic bark beetle**
Lachowsky, L. E., Reid, M. L.

3:15 **Genetic structure of the ocean- skater *Halobates sericeus* suggests stability of Pacific Equatorial conditions since the late Pleistocen**
Leo**,** S.S.T., Cheng, L. and Sperling, F.A.H.

3:30 **Genetic diversity of *Dermacentor albipictus* (Acari:lxodidae) in North America**
Leo, S.S.T., Davis, C., Pybus, M.J., Samuel, W.M. and Sperling, F.A.H.

3:45 **Hunting the elusive "elephant" wasp**
Longair, R.W.

3:00 **Over-wintering mortality increases sex-ratio bias of a size-dimorphic bark beetle**
Lachowsky, L. E., Reid, M. L.

7:30 **BANQUET**

Saturday, October 15, 2011

CONTRIBUTED PAPERS SESSION 3

8:45 ***Nicrophorus kieticus* and its membership of the *nepalensis* species group (Coleoptera: Silphidae)**
Mousseau, T.

9:00 **Ants and subterranean Sternorrhyncha in a native grassland in east-central Alberta**
Newton, J.S., Glasier, J., Maw, H.E.L., Proctor, H.C., and Foottit, R.G.

9:15 **Significant expansion of the distribution of the bumble bee *Bombus moderatus* (Hymenoptera: Apidae) in Alberta over twenty years**
Owen, R., Otterstatter, M., Cartar, R., Farmer, A., Colla, S., and O'Toole, N.

9:30 **Undescribed mite species picks the best ride**
Peralta-Vazquez, G.H., Reid, M.

9:45 **Development of a semiochemical-based monitoring tool for the pea leaf weevil, *Sitona lineatus* L. (Coleoptera: Curculionidae).**
Whitehouse, C.M., Cárcamo, H.A., Herle, C., Meers, S., Barkley, S., Wanner, K.W., and Evenden, M.L.

10:00 **COFFEE**

CONTRIBUTED PAPERS SESSION 4

10:30 **Kairomonal luring: turning female *Caloptilia fraxinella* host location behaviour against them**
Wist, T.J., Gries, R., and Evenden, M.L.

10:45 **The effect of managed pollinator density on wild bee visitation of canola crops**
Zink, L., Cartar, R., and Wonneck M.

11:00 **ENTOMOLOGICAL SOCIETY OF ALBERTA ANNUAL GENERAL MEETING**

Oral Presentations and Abstracts
(Alphabetically by presenting author)

1. The phylogenetic position of the Jack Pine Budworm (*Choristoneura pinus*) within the *C. fumiferana* species complex.

Bird, H., and Sperling, F.
Department of Biological Sciences, University of Alberta, Edmonton, AB.

The spruce budworm species complex (*Choristoneura fumiferana* (Clemens)) is a group of very closely related Tortricid moth species that attack fresh buds of conifers across North America, causing severe defoliation in outbreak years. Due to hybridization and cryptic morphology, these moths are difficult to differentiate visually without geographic location, larval host tree, and pheromone attraction information. Lumley and Sperling have made excellent progress in delimiting these species by using the mitochondrial DNA marker COI and eight nuclear DNA microsatellite markers. To build on this work and delimit these species more clearly, I sequenced and analyzed the ITS2 region of the nuclear genome. Phylogenies from the mitochondrial marker data and nuclear marker data were compared and a conflict regarding the position of *C. pinus* was discovered. Research designed to decipher the cause of this conflict and discover the "true" phylogeny is underway using RAD sequencing, which will potentially characterize thousands of loci for each specimen via high throughput sequencing.

2. Symbionts of House Sparrows (*Passer domesticus*): Geographical differences in abundance and diversity

Byers, K., and Proctor, H.C.
Department of Biological Sciences, University of Alberta

The house sparrow (*Passer domesticus*) has a worldwide distribution, which in North America extends from Mexico to the NWT. House sparrows are host to a variety of symbionts that need not occupy the same distribution, resulting in numerous possible assemblages varying in both species diversity and abundance. To determine whether symbionts are less diverse towards the margin of the host's introduced range, we collected associated invertebrates from 58 house sparrows from Edmonton, Alberta, Canada and 13 from Onefour, 545 km south of Edmonton, by washing dead birds and examining filtrates. Our results revealed 12 mite species (Arachnida) from 11 families, one fly genus (Diptera), one louse species (Phthiraptera), one flea species (Siphonaptera) and one trematode genus (Platyhelminthes: Trematoda). While quill-dwelling mites were present in Edmonton sparrows, they were absent from Onefour birds. Overall, symbiont assemblages from Onefour were less diverse and had generally lower abundance than from Edmonton-caught birds. Moreover, numerous symbionts found in previous North American studies were absent from Alberta birds. In particular, in contrast to U.S. studies where the feather mite *Proctophyllodes troncatus* occurs on a high proportion of house sparrows, we found no *P. troncatus*, suggesting either an effect of climate or a 'missing-the-boat' founding event.

3. Are bees that feed on different flower types of different shape?

Cartar, R.V., Tanner, D.A.
Department of Biological Sciences, University of Calgary.

Students of functional morphology have long appreciated that morphology can be intricately shaped by the environment. For flight mechanics, this is particularly evident in studies of wing

shape in different species of vertebrates. This study considers intraspecific variation in wing shape of a social insect: the noble bumble bee. We digitized wing landmarks of individuals of a single bumble bee species (*Bombus terricola*) in northern Alberta, whose wing use behaviour was timed before their collection, and applied geometric morphometrics to them. We found that wing shape differed between individuals feeding on different plant species, and these differences appear to reflect amount of wing use (the most important trait), and difficulty of flower handling. We conclude that a forager's choice of flower depends in part upon the shape of their wings, a trait fixed at emergence. This implies a novel form of developmental determination of foraging behaviour.

4. Species delimitation and mitochondrial DNA: one marker is not enough

Dupuis, J.R.[1], Roe, A.D.R.[2], and Sperling, F.A.H.[1]
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Despite taxonomy's 250-year history, the past twenty years have seen remarkable advances in technology and techniques, as well as debate. DNA barcoding has generated a substantial proportion of this debate, with its proposition that a single mitochondrial sequence will consistently identify and delimit species, replacing more evidence-rich and time-intensive methods. Although mtDNA has since been the focus of voluminous discussion and case studies, little effort has been made to comprehensively evaluate its success in delimiting closely related species. We conducted the first comprehensive literature review to address the efficacy of molecular markers for delimiting such species over a broad taxonomic range. By considering only closely related species, we sought to avoid inflation of success rates due to the inclusion of deeply divergent taxa. We also address whether increased population-level or geographic sampling decreases delimitation success. We found that all marker groups, including mtDNA, had approximately equal success rates (~70%) in delimiting closely related species. We also found no relationship between increased sampling of intraspecific variability and delimitation success, but we could not exclude the possibility that this reflects a publication bias or artifacts of a review methodology. Ultimately, our results support a multi-locus integrative approach to species delimitation and taxonomy.

5. Effects of grazing pressure on native bee diversity in the foothills rough fescue prairie

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[2] Agriculture & Agri-Food Canada, Calgary, AB. wonneckm@agr.gc.ca

Grazing is a dominant land use in southern Alberta, with native grasses that provide high nutritional value for cattle. These pastures are also important habitat for native pollinators who rely on flowers for their pollen and nectar as food sources and on untilled soil for nesting. Grazing has the potential to drastically alter the plant communities in these pastures. This raises the question: what effect does cattle grazing pressure have on bee diversity? To help answer this question, pairs of pastures were selected with contrasting range condition in the foothills rough fescue natural subregion. Abundance and diversity of bees and flowers were evaluated in each site throughout the summers of 2009 and 2010. We hope to further our understanding of the factors that influence wild bees, an important group of pollinators of conservation concern.

6. Changes in bumble bee distribution and abundance in response to clearcut logging in foothills forests; and consequences to native plant fitness

Farmer, A.M., Cartar, R.V.
University of Calgary, AB

Bumble bees (Hymenoptera, Apidae; *Bombus)* provide an essential pollination service to native flowering plants found in the understory of boreal forests. This study examines how clearcut logging in the foothills forests affects the distribution and abundance of bumble bees and the reproductive fitness of the native plants they pollinate. Fifteen field sites (0.75 km radii circles) were established throughout the eastern slopes of Kananaskis with varying levels of clearcut logging in the landscape (ranging from 25% to greater than 60%). Bumble bees and floral resources were surveyed in clearcuts and adjacent forests along linear transects from late June through mid-August. Bee abundance was greater in clearcuts than forests and as logging intensity increased in the landscape bee abundance decreased in adjacent forests. Bee distribution was found to be independent of floral resources in forested habitats but at an ideal free distribution (IFD) in clearcuts when logging in the local landscape was near 40%. Significant deviations from IFD of bees relative to their floral resources were found below 33% and above 46% logging levels. Of particular conservation interest is the finding that there is decreased pollination service and decreased plant abundance within unlogged forests in heavily logged landscapes.

7. *Tetrastichus julis* (Hymenoptera: Eulophidae) non-target effects study in Southwestern Canada

Hervet, V. A.[1], Dosdall, L. M.[2], Cárcamo, H. A.[3]
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The cereal leaf beetle (*Oulema melanopus* L.) is an important pest of cereals reported from eastern North America in the 1960s. It has expanded its range to the Canadian Prairies in the last decade to include: Southern Alberta (2005), the Northwestern agricultural region of Manitoba (2009) and the Edmonton area (2011). *Tetrastichus julis* (Walker) (Eulophidae) was introduced in eastern USA in the early 1970s and has become an effective biocontrol agent that has followed the beetle or has been relocated throughout the beetle's range. The potential non-target impacts of *Tetrastichus julis* in North American ecosystems have not been considered to date. Therefore, we conducted a review to determine potential non-target chrysomelids that could be affected by *T. julis* in Canada and conducted laboratory trials with selected species. Our results thus far indicate that *T. julis* is unlikely to affect non-target species and remains one of the few successful examples of biocontrol of a field crop pest.

8. Phylogeny of genera of the *Pedaliodes* complex (Lepidoptera: Satyrinae: Pronophilina) based on morphological analysis

Higuera, M.[1,2], Galindo, L.[1,4], Fagua, G.[1] And Viloria, A. [3]
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[3] Instituto Venezolano de Investigaciones Científicas (IVIC)
[4] Centro de Investigaciones del café (Cenicafé)

The *Pedaliodes* complex Butler 1867 is a Neotropical group of butterflies with a high number of species distributed along a wide altitudinal range, making it an interesting taxon to study the effects of orography and prehistoric climate changes on speciation. We tried to elucidate the phylogenetic relationships inside the group. New characters were described, and some characters employed in systematic of *Pedaliodes* complex were redefined. We analyzed 17 genera and 45 species of the *Pedaliodes* complex. Three Erebiina species (genera *Diaphanos*, *Idioneurula*, and *Manerebia*), and one Pronophilina (*Lymanopoda*) specie were used as out group. The phylogenetic analyses (TNT) show just one obtained tree (555 steps, CI= 0.23, RI= 0.53). Major conclusions including that the complex *Pedaliodes* was a monophyletic group being the monotypic genus *Dangond*, the sister group of other genera of the *Pedaliodes* complex. Inside of remnant genera, *Steromapedaliodes* was the sister group of the rest of the complex. *Altopedaliodes*, *Corderopedaliodes*, and *Pedaliodes* were paraphyletic or polyphyletic. Out of the 17 genera covered in the present study, just *Panyapedaliodes*, *Pherepedaliodes*, *Praepronophila* and *Redonda* remained as natural groups. The *Neopedaliodes* species made a monophyletic group, but its branch was placed in middle of the terminal branch of *Pedaliodes* species.

9. Taxonomy of Phaneta (Lepidoptera:Tortricidae): Testing a morphological perspective

Jaeger, C., DrDombroskie, J., and Sperling, F.A.H.
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Species delimitation is one of the most important operations in systematics, conservation biology, and natural history. In cryptic species groups, it is difficult to define where species boundaries should be placed. *Phaneta* moths of Alberta have presented this challenge to entomologists for the last century, especially moths within the *P. tarandana* complex. Using a total evidence approach, we diagnosed two major groups within *Phaneta* to provide an effective means of distinguishing them. We examined wing maculation, wing fringe, head appendages, genitalia, locality, and flight time in 138 specimens. We focused on the characters that allowed tests of the prior taxonomic arrangement. A new character in *Phaneta*, scale morphology, revealed new evidence supporting the hypothesis that *P. tarandana* and *P. montanana* are two distinct species. In addition to morphological characters, we sequenced CO1 and ITS2 DNA to test the utility of scale morphology in separating species.

10. Observations on the biology of *Tetrastichus julis* Walker (Hymenoptera: Eulophidae), the principal parasitoid of the cereal leaf beetle, *Oulema melanopus* L. (Coleoptera: Chrysomelidae)

Kher, S.[1], Dosdall, L. M.[1], Cárcamo, H. A. [2]
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[2] Agriculture and Agri-Food Canada, Lethbridge, AB Canada

The cereal leaf beetle, *Oulema melanopus* (Coleoptera: Chrysomelidae), is an invasive pest of cereals including oat, wheat and barley in western Canada and was discovered in Alberta in 2005. Research to develop effective control measures for the control of *O. melanopus* has focused mainly on biological control strategies using the principal parasitoid of the pest, *Tetrastichus julis* Walker (Hymenoptera: Eulophidae). *T. julis* is a bivoltine, gregarious larval endoparasitoid of *O. melanopus* introduced to North America from Europe. The establishment of *T. julis* in the Nearctic region and its effectiveness as a parasitoid constitutes an important success story in biological control. Its success is due to its host specificity, host tracking capabilities and

exemplary synchronization with peak activity of *O. melanopus* in the field. Although much previous work focused on *T. julis* field parasitization dynamics, the biological parameters of the parasitoid have not been extensively studied. Here, we present preliminary results of studies conducted to understand the biology and developmental patterns of *T. julis* under laboratory conditions. Observations were recorded on developmental time, sex ratio, effective mating time, gregariousness, and adult longevity. *T. julis* preferences for specific larval stages for parasitization were investigated using choice and no-choice tests. Observations on parasitization behaviour were also recorded.

11. Development of a pheromone-based attracticide to target the apple clearwing moth (*Synanthedon myopaeformis*) in British Columbia

Kwon, J. J. [1], Judd, G. J. R.[2], and Evenden, M. L.[1]
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[2]Agriculture and Agri- Food Canada, Pacific Agri- Food Research Centre, Summerland, BC

The apple clearwing moth (ACM), *Synanthedon myopaeformis*, (Lepidoptera: Sesiidae) is a serious, introduced pest of apples in the Similkameen Valley in British Columbia. Larval feeding under pruning cuts and graft unions weakens trees and reduces apple yields resulting in serious economic loss. In an effort to manage this invasive pest, we attempt to develop a pheromone-based attracticide using a proprietary wax called SPLAT (Specialized Pheromone and Lure Application Technology). This will produce an optimized management system that can be incorporated into integrated pest management programs in apple orchards in British Columbia.

12. Over-wintering mortality increases sex-ratio bias of a size-dimorphic bark beetle

Lachowsky, L. E., Reid, M. L.
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Mountain pine beetles typically have female biased populations (2:1) and females are 37% larger than males. High rates of mortality occur as developing beetles over-winter and the relatively smaller males could be more susceptible to stresses. This is a proximate mechanism that could explain biased sex ratios. Higher mortality of the smallest individuals of both sexes has been shown in adults and was tested here in juveniles. We studied survival, sex ratio and body size of beetles from naturally attacked trees by applying three treatments: no-overwintering, overwintering below-snow and above-snow. Compared to beetles from logs that did not overwinter, survival was lower and the sex ratio was more female-biased in overwintering logs. We detected weak divergent patterns in body size due to overwintering mortality. Among females, body size was greatest when mortality was high, whereas among males body size was greatest when mortality was low. Body size effects were weak relative to the sex-biased mortality, suggesting that body size is not the only reason for male-biased mortality.

13. Genetic structure of the ocean-skater *Halobates sericeus* suggests stability of Pacific Equatorial conditions since the late Pleistocene

Leo, S. S. T.[1], Cheng, L.[2], and Sperling, F. A. H.[1]
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The oceanic water strider (or ocean-skater) *Halobates sericeus* Eschscholtz has disjunct distributions in the Pacific Ocean with a northern and a southern population widely separated by an equatorial zone. It is sensitive to sea surface conditions, and consequently its distribution and population structure can provide insight into environmental changes on the ocean surface on both recent and historical scales. We assessed the genetic diversity and population structure of *H. sericeus* in the Pacific Ocean using one mitochondrial (COI) and two nuclear (EF1 α, ITS-1) gene markers. These genetic markers indicated that the northern and southern populations are evolutionarily distinct with limited gene flow, and that these populations separated 20 to 50 thousand years ago. This implies that physical conditions or biotic interactions on the surface of the Pacific Ocean have provided significant barriers to gene flow since the late Pleistocene or earlier, creating biotic stability over large geographical and temporal scales in spite of a long history of global climate change.

14. Genetic diversity of *Dermacentor albipictus* (Acari: Ixodidae) in North America.

Leo, S. S. T.[1], Davis, C.[1], Pybus, M. J.[2], Samuel, W. M.[1], and Sperling, F. A. H.
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Dermacentor albipictus (Packard) is a single-host tick that can reach severe infestation levels on its ungulate hosts. Quick identification of ticks to species is essential for better management and control strategies. Unfortunately, traditional methods of identification based on morphology are often difficult and single-locus sequencing may not necessarily be accurate given the extensive genetic variation present in many ticks. Furthermore, the species boundary of *D. albipictus* is often under debate. In order to study the genetic diversity of *D. albipictus* and to compare the utility of several genetic markers for identifying this parasite, we sequenced regions of two mtDNA genes (COI and 16S rDNA), one nuclear gene (ITS-2) and amplified 14 microsatellite loci for three *Dermacentor* species collected across Canada and the United States of America. While all molecular markers successfully delimited the ticks to species, mtDNA and microsatellite makers revealed extensive genetic variation in *D. albipictus*. This variation is likely due to retained ancestral polymorphism and isolation by distance effects. We conclude that while *D. albipictus* consists only of a single species, the extensive amount of variation in this ectoparasite may provide additional information for establishing surveillance and control programs.

15. Hunting the elusive "elephant" wasp

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Synagris elephas is the largest species of a genus of large Afrotropical wasps (Vespidae: Eumeninae). It is known from a single specimen collected in the late 19th century. The collecting locality for the holotype, "Sierra Leone", is insufficiently specific to aid in relocating the wasp. Although most species in the genus were figured in a monograph (Maidl, 1914), this wasp was known only from a written description until recently, when the holotype was relocated at the Museum national d'Histoire naturelle in Paris and photographs made available. Attempts to determine the type locality are made more difficult by the imprecision of the original label and

the potential for errors by the collector. A search for possible localities involved researching other collections made by the same individual, and circulating requests among various groups (e.g. Peace Corps volunteers. conservation officers) to identify potential sites, without success. The value of information from local individuals is hampered by the presence of other common species which superficially appear similar. If *S.* elephas is as rare as it appears, any attempts to collect it must be carefully weighed.

16. Insect, vertebrate, and plant inclusions in Late Cretaceous Canadian amber, with an emphasis on Hymenoptera

McKellar, R.C.
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Canadian amber provides a glimpse of a Late Cretaceous (Campanian) ecosystem preserved in exquisite detail. This deposit contains one of the best-preserved assemblages of Hymenoptera in the Mesozoic. The study of hymenopteran inclusions has led to contributions within a broader range of taxa, and developments for amber research in general. To date, 30 families, 38 genera and 70 species of Hymenoptera have been identified in the assemblage: 36 of these species, six of the genera, and two of the families have only been recognized within the last few years. New taxa have also been documented within Neuroptera and Hemiptera, constituting important records for their respective families (Rhachiberothidae and Microphysidae). In addition to insect inclusions, the search for micro-hymenopterans has revealed the most abundant and diverse assemblage of feathers and putative protofeathers yet to be recovered from Mesozoic amber. Attempts to answer longstanding questions surrounding the source of Cedar Lake amber (a secondary deposit in Manitoba), and the palaeobotanical source for Canadian amber have also demonstrated the versatility of stable isotope analyses in the study of amber. Combining the study of inclusions with new lines of research provides a more comprehensive account of conditions in the amber-producing forest.

17. *Nicrophorus kieticus* and its membership of the *nepalensis* species group (Coleoptera: Silphidae)

Mousseau, T.
Mount Royal University; Calgary, Alberta

Although recent attention has been given to understanding the systematics of *Nicrophorus* (Coleoptera: Silphidae), a significant question has remained untested and unresolved, that is, whether or not *Nicrophorus kieticus* Mroczkowski, 1959 should be a member of the *nepalensis* species group. This is an interesting question because preliminary phylogenetic analyses of the genus *Nicrophorus*, based on morphology alone, resulted in *N. kieticus* being retrieved as the sister-species to the sympatrically distributed *N. reticulatus*, with the pair together being a sister-lineage to the rest of the species of the *nepalensis* group (which would either exclude *N. reticulatus* from the group, or include *N. kieticus*) (Sikes 2003). Although *N. reticulatus* is an unusual member of the *nepalensis* species group (different elytral microsculpture, greatly reduced elytral maculations, greatly reduced setae), it is considered a valid member of the group. This research tests the hypothesis that these two species exhibit long morphologic branching, and that molecular data will reveal many of the morphologic similarities between *N. reticulatus* and *N. kieticus* to be the result of convergence, resulting in *N. reticulatus*, but not *N. kieticus*, being placed within the *nepalensis* species group because of features uniquely shared with that cluster.

18. Ants and subterranean Sternorrhyncha in a native grassland in east-central Alberta

Newton, J. S.[1], Glasier, J.[2], Maw, H. E. L.[3], Proctor, H. C.[1], and Foottit, R. G. [3]
[1] Department of Biological Sciences, University of Alberta, Edmonton, Alberta, Canada T6G 2E9.
[2] Department of Renewable Resources, University of Alberta, Edmonton, Alberta, Canada T6G 2H1.
[3] Canadian National Collection of Insects, Arachnids and Nematodes, National Environmental Health Program, Agriculture and Agri-Food Canada, K.W. Neatby Building, 960 Carling Avenue, Ottawa, Ontario, Canada K1A 0C6.

Little is known about the associations of ants (Hymenoptera: Formicidae) with subterranean aphids and mealybugs (Hemiptera: Sternorrhyncha: Aphididae and Pseudococcidae), particularly in Canadian grasslands. Knowledge of host plants for these sternorrhynchans is equally rare. We carried out a plant-based survey of ants and belowground aphids and mealybugs in a native fescue grassland in east-central Alberta, Canada. We found 23 species of ants, 12 of which (species of *Lasius* F., *Myrmica* Latreille, *Tapinoma* Förster, and *Temnothorax* Mayr) were in association with subterranean sternorrhynchans. Twelve species of aphids and mealybugs were collected; 3 are new records for Canada and 2 are possibly undescribed. Most ant species associated with sternorrhynchans were found with more than one species of sternorrhynchan, sometimes in the same nest. Almost all sternorrhynchans were found on graminoid hosts (Poaceae and Cyperaceae); there was little observed plant-specificity beyond this. There were no significant correlations between presence of subterranean sternorrhynchans and percent cover of different plant types, soil moisture content, slope, aspect, or visible entrances to ant nests.
Future research should encompass a broader geographic area to ascertain whether these ant-sternorrhynchan associations are more widespread, and to determine effects on host plants.

19. Significant expansion of the distribution of the bumble bee *Bombus moderatus* (Hymenoptera: Apidae) in Alberta over twenty years.

Owen, R.[1], Otterstatter, M.[2], Cartar, R.[3], Farmer, A.[4], Colla, S.[5] and O'Toole, N.[6]
[1] Department of Chemical & Biological Sciences, Mount Royal University, Calgary, Alberta, Canada, T3E 6K6.
[2] A-51 Bayshore Drive, Ottawa, Ontario, Canada, K2B 6M7.
[3] Department of Biological Sciences, University of Calgary, Calgary, Alberta, Canada, T2N 1N4.
[4] Department of Chemical &, Biological Sciences, Mount Royal University, Calgary, Alberta, Canada, T3E 6K6; Department of Biological Sciences, University of Calgary, Calgary, Alberta, Canada, T2N 1N4.
[5] Biology Department, York University, 4700 Keele St., Toronto, Ontario, M3J 1P3.
[6] Mount Royal University Library, Mount Royal University, Calgary, Alberta, Canada, T3E 6K6.

The bumble bee *Bombus moderatus* occurs in the northern and western regions of North America and reaches its southern limit in Alberta. In 1915 the southernmost record was Banff; by 1987 it had appeared at Barrier Lake in Kananaskis Country, 40 km southeast of Banff, and by 2010 it had spread 80 km further east to become one of the more common bumble bee species in Calgary, where it had never been previously recorded. This represents a rate of spread over the last 20 years of about 4 km/yr. The simplest hypothesis that can account for this change is that it is just a continuation of the natural expansion of its range since the end of the last ice age. An alternative hypothesis is that it is filling the niche vacated as a result of the decline in another species, *B. occidentalis*.

20. Undescribed mite species picks the best ride

Peralta-Vazquez, G. H.[1], Reid, M. [1]
[1]Department of Biological Sciences, University of Calgary, Calgary Alberta T2N 1N4

Phoresy has been defined as a commensal temporary relationship in which an organism obtains an ecological benefit by migrating from a primary habitat while attached to a host. Phoretic associations are well represented in the invertebrate world especially in unpredictable and ephemeral habitats. If phoresy is an advantageous escape for the phoretic organism from patchy environments, we may expect them to discriminate among potential hosts. In the present study we addressed this question with pine engravers and three phoretic mite taxa. Of the three species studied, the most common phoretic mite is an undescribed fungivorous species. We found that larger and heavier beetles had more of these phoretic mites while body condition was not related to phoretic load. Our results suggest some advantage for mite fitness and as yet unknown effects for the bark beetle host.

21. Development of a semiochemical-based monitoring tool for the pea leaf weevil, *Sitona lineatus* L. (Coleoptera: Curculionidae).

Whitehouse, C.M.[1], Cárcamo, H.A.[2], Herle, C. [2], Meers, S. [3], Barkley, S. [3], Wanner, K.W. [4], and Evenden, M.L[1].
[1] Department of Biological Sciences, University of Alberta, Edmonton, AB;
[2] Agriculture and Agri-Food Canada, Lethbridge Research Centre, Lethbridge, AB;
[3] Agriculture and Rural Development, Crop Diversification Centre, Brooks, AB;
[4] Plant Sciences and Plant Pathology, Montana State University, Bozeman, MT

The pea leaf weevil is an invasive pest of pulse crops that has recently become established in southern Alberta and Saskatchewan. Although the weevil is polyphagous, the main hosts are field pea, *Pisum sativa*, and faba bean, *Vicia faba*. Increased production of these crops in the prairies has likely facilitated the weevil's range expansion. Males produce an aggregation pheromone, 4-methyl-3,5-heptanedione, that is attractive to both sexes and this response is enhanced when pheromone is combined with bean leaf volatiles. Synthetic aggregation pheromone has been used to monitor the pea leaf weevil in Europe. We tested the attractiveness of the aggregation pheromone and three bean volatiles alone and in combination. Trials were conducted in pea fields in southern Alberta in spring and fall 2011 to intercept weevils entering and leaving the fields, respectively. Traps baited with both the aggregation pheromone and bean volatiles caught a similar number of weevils as traps baited with the aggregation pheromone alone in both spring and fall flights. The number of weevils caught in traps baited with bean volatiles alone was similar to the number caught in control traps. Preliminary data suggest that there may be seasonal differences in the response of weevils to the semiochemicals tested.

22. Kairomonal luring: turning female *Caloptilia fraxinella* host location behaviour against them

Wist, T. J; [1] Gries, R.[2], and Evenden M. L.[1]
[1] Department of Biological Sciences, University of Alberta, Edmonton, AB, T6G 2E9, Canada,
[2] Department of Biological Sciences, Simon Fraser University, Burnaby, BC, Canada

Many herbivorous insects use kairomones released by their hosts to locate suitable plants for oviposition. The monophagous leafminer, *Caloptilia fraxinella* (Lepidoptera: Gracillaridae) uses a ratio of common plant volatiles to locate its host *Fraxinus* spp. (Oleacea) for oviposition. Two main *Fraxinus* hosts are used in Western Canada, Green, *F. pennsylvanica*, and Black ash, *F.*

nigra. Gas chromatography electoantennography (GC-EAD) analysis identified similar blends and ratios of plant volatiles from the two hosts that were antennaly active in female moths. Synthetic blends mimicking the ratio and amount of volatiles found in ash trees elicit host finding behaviour in wind tunnel experiments. The Edmonton population of *C. fraxinella* however, is behaviourally more responsive to green ash than black ash, perhaps due to the greater prevalence of green ash in the urban forest landscape. Field trapping experiments showed no significant differences but suggest that a synthetic blend of volatiles based on green ash is the path to follow to develop a successful attracticide formulation.

23. The effect of managed pollinator density on wild bee visitation of canola crops

Zink, L.[1], Cartar, R. V.[1], and Wonneck M.[2]
[1] University of Calgary, 2500 University Dr NW, Calgary AB
[2]Agriculture and Agri-Food Canada, Room 600, 138-4th ave SE, Calgary AB

Crop pollination services can be provided by both wild and managed bees, yet industrial agriculture increasingly emphasizes the latter. Canola seed production requires insect pollination for transfer of pollen between male and female lines during hybridization, and employs approximately 80,000 honey bee (*Apis mellifera*) hives and numerous leafcutter (*Megachile rotundata*) tents each summer in southern Alberta. At least 20 genera of wild bees have also been found to visit canola flowers in the region. This study aims to assess the effect of managed pollinators on wild bee visitation of canola crops. Bees were sampled in 32 canola fields throughout southern Alberta, including both commercial and seed production types, and encompassing a wide range of managed pollinator densities.

24. *Francisella* spp. in the ticks *Dermacentor andersoni* (Rocky Mountain wood tick) and *D. variabilis* (American dog tick) in western Canada

Dergousoff, S.[1], and Chilton, N.[2]
[1] Lethbridge Research Centre, Agriculture and Agri-Food Canada, Lethbridge, Alberta
[2] Department of Biology, University of Saskatchewan, Saskatoon, Saskatchewan

Dermacentor andersoni (Rocky Mountain wood tick) and *Dermacentor variabilis* (American dog tick) are vectors of *Francisella tularensis* in the United States, but their relative importance in the epidemiology of tularemia in Canada is unknown. The aim of this study was to determine the types, distribution, and prevalence of *Francisella* spp. in adult *D. andersoni* and *D. variabilis* from 12 localities near their northern distributional limits in western Canada. We detected *Francisella* DNA in 90% of the ticks using a genus-specific PCR. DNA sequencing and phylogenetic analyses revealed that none of the 1042 ticks were infected with *F. tularensis*; rather, all PCR-positive ticks contained "*Francisella*-like endosymbionts" (FLEs). Ten genetic types of FLEs were identified, five of which were found in *D. andersoni*, and six where found in *D. variabilis.* In general, each FLE type was specific for either tick species, even in localities where they both occurred in sympatry. However, the two most common FLE types were also found in very few individuals of the other tick species. The patterns of infection provide insight into potential modes of transmission of these tick-borne bacteria. The importance of these organisms with respect to their hosts is unknown and requires further investigation.

25. Dispersion and sampling of adult *Dermacentor andersoni* in rangeland in western North America.

Rochon, K.[1], Scoles, G. A.[2], and Lysyk, T. J.[1]
[1] Agriculture and Agri-Food Canada, Lethbridge Research Centre, Lethbridge, AB.
[2] USDA-ARS Animal Disease Research Unit, Pullman, WA.

A fixed precision sampling plan was developed for 30 off-host populations of adult Rocky Mountain wood tick, *Dermacentor andersoni* (Stiles) based on data collected by dragging at 13 locations in Alberta, Washington, and Oregon. Analysis of simulated quadrats ranging in size from 10 – 50 sq. m indicated that the most precise sample unit was the 10 sq. m. quadrat. Samples taken when abundance < 0.04 ticks per 10 sq. m were more likely to not depart significantly from statistical randomness than samples taken when abundance was greater. Data were grouped into ten abundance classes and assessed for fit to the Poisson and negative binomial distributions. Both the Taylor and Iwao mean-variance relationships were fit and used to predict sample sizes for a fixed level of precision. Sample sizes predicted using the Taylor model tended to underestimate actual sample sizes, while sample sizes estimated using the Iwao model tended to overestimate actual sample sizes. Using a negative binomial with common *k* provided estimates of required sample sizes closest to empirically calculated sample sizes.

26. Dispersal of Mountain Pine Beetle and Impacts of Management

Strohm, S., and Tyson, R.
University of British Columbia, Okanagan Campus, Kelowna, British Columbia, Canada

Efforts to control the Mountain Pine Beetle infestation in British Columbia and Alberta include large-scale landscape manipulations such as clearcutting, and cost-intensive techniques such as green attack tree removal. Unfortunately, it is unclear just how effective these techniques are in practice. I will present a spatially-explicit hybrid model for the Mountain Pine Beetle (MPB) dispersal and reproduction. The model is composed of reaction-diffusion-chemotaxis PDEs for the beetle flight period and discrete equations for the overwintering stage. I will discuss the impacts of management in the PDE model.

Index to Authors
(Bold page number indicates first author)

Barkley, S. 21
Bird, H. 1
Byers, J. 2
Cárcamo, H.A. 7, 10, 21
Cartar, R.V. **3**, 5, 6, 19, 23
Cheng, L. 13
Chilton, N. 24
Colla, S. 19
Davis, C 14
Dergousoff, S. 24
Dombroskie, J. 9
Dosdall, L.M. 7, 10
Dupuis, J.R. **4**
Evans, M.M. **5**
Evenden, M.L. 11, 21, 22
Fagua, G. 8
Farmer, A.M. **6**, 19
Foottit, R.G. 18
Galindo, L. 8
Glasier, J. 18
Gries. R. 22
Herle, C. 21
Hervet, V.A. **7**
Higuera, M. **8**
Jaeger, C. **9**
Judd, C. 11
Kher, S. **10**
Kwon, J.J. **11**
Lachowsky, L.E. **12**
Leo, S.S.T. **13, 14**
Longair, R.W **15**
Lysyk, T.J. 25
Maw, H.E.L. 18
McKellar, R.C. **16**
Meers, S. 21
Mousseau, T. **17**
Netwon, J.S. **18**
O'Toole, N. 19
Otterstatter, M. 19
Owen, R. **19**
Peralta-Vazquez, G.H. **20**
Proctor, H.C. 2, 18
Pybus, M.J. 14
Reid, M.L. 12, 20
Rochon, K. 25
Roe, A.D.R. 4
Samuel, W.M. 14

Scoles, G.A. 25
Sperling, F. 1, 4, 9, 13, 14
Strohm, S. 26
Tanner, D.A. 3
Tyson, R. 26
Viloria, A. 8
Wanner, K.W. 21
Whitehouse, C.M. **21**
Wist, T.J. **22**
Wonneck, M. 5, 23
Zink, L. **23**

Minutes of the Entomological Society of Alberta
Executive/Board of Directors Fall Meeting
Kananaskis October 13, 2011

Meeting called to order at 6:47PM

Chair: Rob Longair (President)

In Attendance: Greg Pohl (Past-President), Lloyd Dosdall (Vice-President), Mary Reid (Central Director), Ken Fry (Secretary), Kateryn Rochon (Southern Director), Adam Blake (Treasurer), Megan Evans (Proceedings Editor)

Regrets: Stephane Bourassa (Northern Director), Alec McClay (Webmaster), Kevin Floate (Regional Director to ESC)

1. Additions to Agenda and approval
   - Banquet Speaker Gift
   - Undergraduate Award

MOVED by Kateryn, Seconded by Blake that the agenda, as amended be approved; Carried

2. Approval of April 19, 2011 Executive Meeting Minutes

MOVED by Greg, Seconded by Megan that the minutes be approved; Carried

3. Report from the Treasurer (Adam Blake)
   - Membership renewal option on AGM Registration Form
     1. 2012 organising committee to attend to this detail
     2. Adam to investigate getting PayPal account for ESA for 2012 meeting to facilitate registration
   - See attached report

MOVED by Kateryn, Seconded by Mary that the Treasurer's report be accepted; Carried

4. Report from Secretary (Ken Fry)
   - Adam to investigate with bank who has signing authority and what addresses are on file
   - Kim has been filling in annual report to Province, Adam to continue
   - Ken to set up Google Docs folder to hold SOPs and other common documents for executive to access
   - Ken to upgrade Facebook group to new format and to post material to Facebook and to remind members of its existence
   - See attached report

MOVED by Ken, Seconded by Mary that the Secretary's report be accepted; Carried

5. Regional Director's Reports
    a) Report from Northern Director (Stephane Bourassa, Presented by Ken Fry)
        - See attached report

    b) Report from Central Director (Mary Reid)
        - See attached report

    c) Report from Southern Director (Kathryn Rochon)
        - See attached report

    d) Regional Director to the ESC (Kevin Floate)
        - No report

MOVED by Ken, seconded by Greg to accept the reports as submitted; Carried

6. Report from Webmaster (Alec McClay, Presented by Ken Fry)
    - Ken to ask Alec to update website content, using the discretion of the webmaster
    - See attached report

MOVED by Kateryn, Seconded by Adam to accept the Webmaster's report; Carried

7. Fall 2011 Annual General Meeting
    - Agenda set
    - 45 registered
    - Budget on track
    - Wireless available
    - Single cheque will be required to pay a single invoice from the field station

8. 2012 Meeting (Greg Pohl, Lloyd Dosdall)
    - Room for 8 symposia, 5 already filled
    - Maya Evenden making a presentation at the Halifax ESC meeting
    - Doug Craig organizing 90th anniversary event for Department of Entomology
    - November 4-7 with Alumni dinner at Faculty Club on the Saturday night before
    - See attached report

9. Archives (Kateryn Rochon)
    - Should consolidate disparate holdings to one place

- Ken offered to receive material from last 15 years for temporary storage at Olds College

- Need an archivist to process all material dating from the 1940s
- Solicitation will be made at AGM

10. Other business
    a) Undergraduate Award (Greg Pohl)
        - Two worthy applicants

MOVED by Lloyd, Seconded by Kateryn to allocate an additional $500.00 to fund a second undergraduate award for 2011; Carried.

    b) Banquet Speaker (Rob Longair)
        - In lieu of a gift, and considering the banquet speaker waived their fee, can a gift of a donation to a charity of the speakers choice be substituted

MOVED by Rob, Seconded by Greg that a $250.00 gift be presented to Kevin Strange, to be donated to an approved charity or organization of his choosing; Carried.

    c) Membership – Honorary Life Members
        - Have 6 currently, need to find out if there is room for any more.
    d) Checklists/keys to Alberta Insects (Rob Longair)
        - No progress as yet but still pursuing

11. Adjournment

MOVED by Mary, Adjourn the meeting at 8:48PM

Draft Minutes of the Entomological Society of Alberta
59th Annual General Meeting
Barrier Lake Field Station, Kananaskis, Alberta
October 15, 2011

Minutes prepared by Ken Fry, ESA Secretary

Attendees:

Charlie Bird
Heather Bird
Adam Blake
Kaylee Byers
Shaun Dergousoff
Lloyd Dosdall
Julian Dupuis
Brian Ellert
Megan Evans
Ken Fry
Vincent Hervet
Monica Higuera
Christi Jaeger
Jessica Kwon
Dave Larson
Leanna Lachowsky
Sarah Les
Rob Longair
Ryan McKellar
Krisztina Mosdossy
Tonya Mousseau
Sadia Munir
Jeffrey Newton
Heikki Nuorteva
Mark Oliver
Tom Oliver
Robin Owen
Greg Pohl
Mary Reid
David Robinson
Kateryn Rochon
Felix Sperling
Dan Stanton
Ravindran Subramanian
Guadalupe Haydee Peralta Vazquez
Caroline Whitehouse
Tyler Wist
Lindsay Zink

Meeting called to order at 11:28 AM

1. Approval of agenda

MOVED to accept, Dave Larson; seconded, Lloyd Dosdall: Carried

2. Approval of minutes from the 2010 AGM

MOVED to accept, Lloyd Dosdall; seconded, Mary Reid; Carried

3. Webmaster's Report (Ken Fry for Alec McClay)
   - See attached report
   - Solicited members to submit errors or omissions observed on website

MOVED to accept, Tyler Wist; seconded, Adam Blake; Carried

4. Secretary's Report (Ken Fry)
   - see attached report

MOVED to accept, Kateryn Rochon; seconded, Tonya Mousseau; Carried

5. Report from Regional Director to Entomological Society of Canada (Kevin Floate)
   - None delivered at meeting

6. Treasurer's Report (Adam Blake)
   - Oral report on 2010 fiscal year and informal report on current meeting
   - 89 members on the books with 39 in good standing
   - 6 honorary members
   - Proceedings to 20 libraries free and 3 libraries paying
   - 3 new regular and 6 new student members

MOVED to accept, Mark Oliver; seconded, Tyler Wist: Carried

7. Nominations (Rob Longair): nominations were presented as follows:
   a. President – Lloyd Dosdall
   b. Past President – Rob Longair
   c. Vice President – Felix Sperling
   d. Treasurer – Caroline Whitehouse
   e. Secretary – Ken Fry
   f. Southern Director – Vincent Hervet
   g. Central Director – Tonya Mousseau
   h. Northern Director - Stephane Bourassa
   i. Proceedings Editor – Megan Evans
   j. Webmaster – Alec McClay

MOVED that nominations cease, Greg Pohl; seconded, Ken Fry: Carried.

Nominated slate Acclaimed. Felix Sperling won by election conducted by secret ballot

MOVED that ballots be destroyed, Kateryn Rochon; seconded, Tyler Wist: Carried.

Ballots destroyed.

8. Appointment of society financial auditors
   - Jeffery Newton and Kaylee Byers accepted.

9. Resolutions: the following resolution was prepared and read by Julian Dupuis and Christie Jaeger:

We would like to thank everyone for attending as well as the providers of great food, drink, and merriment. The University of Calgary Biogeosciences Barrier Lake Research Station has provided an excellent venue for our meetings, mingling, and meals.

Additionally, we'd particularly like to thank the planning committee including Rob, Lindsay, Chandra, Megan, Haydee, Tonya, and Adam.

10. 2012 Meeting to be held in conjunction with ESC in Edmonton.
    a. Greg Pohl presented report on status of preparations

11. Business Arising

11.1. Archiving (Rob Longair)
- Three cabinets exist in Lethbridge that contain bulk of the Societies files
- Provincial archival expert willing to visit and lend advice
- Need direction on what to archive, where, and how
- Interim storage at available at Olds College for recent files
- Solicited Archivist from membership, no one appointed as yet
- Jeffrey Newton suggested hiring a student to scan all of the documents, have those documents put up on Google Docs for members to review and recommend what to keep and what to let go
- Tyler Wist suggested we turn it over to the Provincial Archives, Kateryn Rochon responded that there was no real interest from the Province but the issue has never been pressed
- Felix Sperling said Leslie Latta Guthrie at the Provincial Archives is approachable, but only some records would likely be accepted, leaving us with some material to deal with.
- Felix Sperling recommended we not only do Google Docs because of uncertainty of ownership of documents once uploaded
- Consensus that electronic copies should be made

12. New Business

12.1 Group Photograph
- Charlie Bird raised issue of formally having a group Photo

13. Adjournment

MOVED to adjourn, Tyler Wist
- Meeting adjourned at 12:23.

2011
Entomological Society of Alberta
Regional Director's Report
to the Entomological Society of Canada

The 2011 ESAB annual general meeting was held at the University of Calgary's Barrier Lake Field Station in Kananaskis, 13-15 October. Attendance was a bit smaller than in years past with 45 registrants.

Entomological pursuits remain a health endeavor in the province. The Society has ca. 90 members. There are about 50 undergraduate, graduate and PDFs doing entomology-based research at the province's various universities and colleges. A number of insect events for the public were hosted by ESAB members at various venues throughout the year.

The ESAB looks forward to hosting next year's JAM with the Entomological Society of Canada in Edmonton. Next year also marks the 90th anniversary of the establishment of the Department of Entomology, University of Alberta.

Kevin Floate,
Regional Director to the Entomological Society of Canada

2011
Northern Director's Report
Stephane Bourassa

Events:
On October 4th, Dr. Kenichi Ozaki from the Hokkaido Research Center and the Forestry and Forest Products Research Institute in Japan, gave a talk at the Northern Forestry Centre on the forest insect biodiversity in Japan.
On August 30th, Brian Beres form the University of Alberta and the Lethbridge Research Centre gave a talk on: Integrating the building blocks of agronomy into an integrated pest management system for wheat stem sawfly

Metamorphosis:
Karin Heming, a long-standing regular member died from a brain aneurysm on August 25, 2011.
Suzanne Abele, died in a tragic ATV accident while working at the EMEND project on August 18, 2011.

Students currently enrolled in Entomology at U of A:

Maya Evenden: 5 students, 1 PDF

Inka Lusebrink: PDF., Chemical ecology of the mountain pine beetle invasion. Co-supervised with Nadir Erbilgin.

Tyler Wist: PhD., Chemically-mediated tritrophic interactions among *Caloptilia fraxinella* its ash hosts (*Fraxinus*) and parasitoid *Apanteles polychrosidis.*

Joelle Lemmen: PhD. (rolled over from Master), Mechanisms of pheromone response plasticity in the long-lived moth *Caloptilia fraxinella* (Lepidoptera: Gracillariidae).

Boyd Mori: MSc., Development of a pheromone monitoring system for red clover casebearer (*Coleophora deauratella*).

Jessica Kwon: MSc., Development of a semiochemical-based attracticide to attract and kill two invasive pests of apple in British Columbia.

Graduated:

Marius Aurelian: MSc, semiochemical-based mass trapping of apple clearwing moth, *Synanthedon myopaeformis.*

Caroline Whitehouse: Reproductive biology and life history trade-offs in the fir coneworm, *Dioryctria abietivorella* (Grote) (Lepidoptera: Pyralidae). Now Research Technician for M. Evenden.

Jens Roland: 2 students

Kurt Illerbrun: PhD., Effect of herbivory by alpine *Parnassius* butterfly larvae on the spatial dynamics of its host plant, *Sedum lanceolatum* the lance-leaved stonecrop.

Jennifer Waller: MSc., Dynamics of the parasitoid community of the forest tent caterpillar at the front of a host population 'traveling wave'.

Graduated:

Amanda Doyle: MSc., Role of induced host-plant defense on population dynamics of *Parnassius smintheus* butterflies.

Amy Nixon: MSc., Forest structure and the role of Allee effects in preventing the spread of forest tent caterpillar outbreaks. Amy holds an NSERC PGS-M Scholarship and an Alberta Ingenuity Scholarship.

Heather Proctor: 4 students

Jeffrey Newton: PhD., Effects of climate change and grazing intensity on diversity and food-web structure of rangeland microarthropods.

Kaylee Byers: MSc., Sexual coevolution of feather mite genitalia.

Lindsey Wilson: MSc., Effects of iron treatment for eutrophication on freshwater invertebrates.

Bronwyn Willams: PhD., Population genetic to determine the points of origin of both the crayfish *Orconectes virilis* and its symbiotic branchiobdellidan worms.

Felix Sperling: 5 students

Julien Dupius: PhD. (rolled over from MSc.), Speciation and hybridization in swallowtail butterfly species complexes.

Marla Schwarzfeld: PhD., Diversity and taxonomy of parasitic ichneumon wasps in Alberta (Hymenoptera: Ichneumonidae), with special reference to *Ophion* species.

Bryan Brunet: PhD., Genomic architecture of species differences between spruce budworm of the *Chorisitoneura fumiferana* group in western Canada (Lepidoptera: Tortricidae).

Heather Bird: MSc., Genetic relationships between the species of the *Choristoneura* complex.

Sarah Leo: MSc., Population genetics of winter ticks (*Dermacentor albipictus*) in Alberta.

Andrew Keddie: 2 students

Jennifer Biliske: PhD., Investigating role of insulin signaling in *Wolbachia* - insect host interactions.

Philip Batista: PhD., Investigating the association of *Wolbachia* with cabbage seedpod weevil and its parasitoids.

Graduated:

Lesley Brennan: 5th year PhD., Investigating the expression of proteins in a mosquito cell line naturally infected with *Wolbachia*.

Lloyd Dosdall: 6 students

James Tansey: PDF., Determining the mechanisms of resistance in some genotypes of root maggot-resistant canola.

Dan Stanton: The genetics and mechanism of resistance to root maggots in resistant canola germplasm.

Swaroop Kher: The biology and control of the cereal leaf beetle.

Sharavari Kulkarni: The role of seed-feeding carabid beetles in canola agroecoystems.

Sadia Munir: The biology of natural enemies of the diamondback moth.

Lynae Vandervalk: Integrated management of Varroa mite parasites of honeybees.

Graduated:

Ali Sultani: Assessments of new transgenic canola genotypes for susceptibility to attack by flea beetles (Phyllotreta spp.).

John Spence: 5 students, 1 PDF

Colin Bergeron: PhD., Boreal forest ecology and biodiversity of carabid beetles in relation with forest history revealed by dendrochronology.

Esther Kamunya: PhD., Insect ecology, biological diversity and conservation of moth in relation to partial harvest in the boreal forest (Lepidoptera).

Seung-Il Lee: PhD., Saproxylic beetle conservation in relation to partial harvest and retention patch size.

Charlene Wood: MSc., Investigation of saproxylic beetle habitat associations from dead trembling aspen (*Populus tremuloides*) snags (standing deadwood) and logs (fallen deadwood).

Evan Esch: MSc., Investigation of the life history traits of the mountain pine beetle, *Dendroctonus ponderosae* (MPB), in whitebark pines, *Pinus albicaulis*.

Anne Oxbraugh: PDF., Investigation of the litter-dwelling invertebrate community, encompassing a range of functional groups (predators, herbivores, detritivores), in mixed forests in Canada and Ireland.

Graduated:

Jaime Pinzon: PhD., Composition and structure of epgeaic spider assemblages in mixed wood forest cover-types after variable retention harvests.

John Acorn: 1 student

James Glassier: MSc, 2nd year. Ecology of ants in jackpine sandhill ecosystems. Co-supervised with Scott Neilsen. Has ACA Biodiversity Grant.

Nadir Erbilgin: 8 students

Janet Ariss: MSc., Effects of interactions between bacteria and fungi on mountain pine beetle (*Dendroctonus ponderosae*) reproduction in three host tree species.

Devin Goodsman: PhD., Reducing mountain pine beetle (*Dendroctonus ponderosae*) impact by managing stand vigor to increase tree defenses and resistance.

Jenny Lazebnik: MSc., Importance of plant volatiles for the induction of resistance to mountain pine beetle (*Dendroctonus ponderosae*) in neighbouring trees.

Ahmed Najar: MSc., Role of plant growth and biomass intolerance and resistance of aspen to forest tent caterpillar (*Malacosoma disstria*) in western Canada.
Ashley-Anne Wick: MSc., Conservation of the metalmark butterfly (*Apodemia mormo).*

Jessica Klutsh: MSc., Dynamic of the interaction between Mountain Pine Beetle and Jackpine.

Crisia Tabacaru: PhD., Reproductive success of mountain pine beetle (*Dendroctonus ponderosea*) in burned and unburned stands to determine whether beetles preferentially locate and breed in fire-injured trees.

Paul Cigan: MSc., Conifer seedling regeneration in mountain pine beetle-killed forests: The role of ectomycorrizal fungi.

Jocelyn Hall

Monica Higuera: MSc., Pollination ecology and pollination genetics in *Cleome serrulata* and *Polanisia dodecandra*.

Respectfully submitted,
Stephane Bourassa

2011
Central Director's Report
Mary Reid

Lethbridge, 14 October 2010

University of Calgary

The 2011 ESAB annual general meeting, held at University of Calgary's Barrier Lake Field Station in Kananaskis, 13-15 October, was organized by Rob Longair, Lindsay Zink, Chandra Venables, Megan Evans, Tonya Mousseau, and Haydee Peralta.

Insect Biodiversity Field Course did not run for first time in 13 years. Changes in the funding formula resulted in considerable uncertainty with the result that there were not enough students to run the course. We plan to run it again in 2012.

Art installation ("Resonating Bodies") involving bees/wasps and recording vibrations of trap-nesting species in Canadian Wilds exhibit at Calgary Zoo. Similar to one set up at Metro Zoo in Toronto. See:
http://resonatingbodies.wordpress.com/

Copies of the "Wechiau Community Hippo Sanctuary Guidebook", produced by the Calgary Zoo and including a chapter on insects, were transported to Ghana for sale by students in the University of Calgary Ghana Biology programme led by Rob Longair.

Rob Longair, Mary Reid, Ralf Cartar participated in the Bug Jamboree at Ellis Bird Farm, 6 August 2011 with numerous others (Ken Fry (see below), Charley Bird, etc.).

Graduate students: In September 2011, two new graduate students (Lisa Hensel, Paul Simpson) in pollination biology have started with Lawrence Harder, and one Mathias Kaiser is beginning a project on mountain pine beetle acoustics in Mary Reid's lab.

Invertebrate Collections (report from John Swann, Manager)

- We have continued to upgrade the curation of our bulk collecting residues so that students and researchers can now have access to them and the material is now in closed cabinetry, out of the light.
- I have continued with the faunal survey of Fish Creek Provincial Park and have had several interesting discoveries from that work including species new to science (being worked up by other entomologists for publication).
- I successfully ran the entomology portion of the bioblitz at the Barrier Lake Field station this summer and that material is currently being prepared for specialists.
- Graduate students are continuing to use the collections including a 'new' MSc student in anthropology looking at insects as a supplemental food source for capuchin monkeys in Costa Rica.
- Again numerous pinned collection donations are coming in including a variety of orders, not just Lepidoptera, and donations of bulk collected samples from all over Canada (mostly BC, AB, and ON)

- Still sending out about 12-18 loans per year; will probably be 18 this year.
- Have between 15-20 volunteers, mostly undergraduate students working in the collection, helping with specimen preparation and general curation upgrades.
- We are growing by about 6-7% per year in terms of new material in the pinned collection, and another 5-6% via improved curation of the pinned material (ie. can't get all the worms back in the can once opened and properly identified.)
- Still would love to have people come by/ send their requests for loans.

Olds College (report from Ken Fry)

Olds College has reformed its curriculum in the Landscape Management, Arboriculture, Turf, and Production Horticulture programs from a combined first year course on biology of insects and diseases and a combined second year course on insect and disease management to separate one year courses on insects and diseases. The result is the turf program students will receive their entomology course in first year and no longer be required to make an insect collection, while Landscape Management, Arboriculture, and Production Horticulture students will be offered entomology in second year and will still have to make an insect collection.

Olds College once again collaborated with StopDED to service the elm bark beetle traps and invasive alien species monitoring traps. Five students were trained in aspects of servicing these traps. Residues from the traps were added to the Olds College insect collection.

Ken Fry participated in the annual Bug Jamboree at the Ellis Bird Farm August 6, spoke about insects in the urban landscape on Alberta at Noon on CBC radio in June, July and August, and delivered instruction to 10-12 year olds on insect ecology, including a thoroughly enjoyable romp about the property chasing down insects, at the Aspen Ranch Summer Science Camp Series in July and August.

Respectfully submitted,
Mary Reid
Central Director

2011
Southern Director's Report
Kateryn Rochon

Lethbridge, 14 October 2010

Events and Outreach:

- The ESA put on an "Insect discovery day" at the Alberta Bird of Prey Centre on August 20, 2011. Below is an article in the Lethbridge Herald. There was also an interview by Global TV where the ESA got full mention.

Bugged by summer? Here's a chance to understand insects

Jamie Woodford
LETHBRIDGE HERALD
jwoodford@lethbridgeherald.com

"It's the bug days of summer" making August the perfect time of year to showcase the area's backyard bugs, said Rose DeClerk-Floate from the Entomology Society of Alberta.

This Saturday, DeClerk-Floate and several of her fellow entomologists will host Close Encounters of the Bug Kind Insect Discovery Day at the Alberta Birds of Prey Centre in Coaldale.

"It's a way to explore the plethora of insects that are right under our noses, especially this time of year," she said.

"There's dragonflies flying around and damselflies and other insects in the water, and there's also terrestrial insects — a lot of butterflies flying around."

Herald photo by David Rossiter

Entomologist Rose DeClerk-Floate and PhD research student Swaroop Kher look over Spurge Hawk-moth caterpillars at the research centre Tuesday. The hawk moth is used as an agent of biological pest control against the noxious weed known as leafy spurge.

Members of the entomology society will be on hand to impart their knowledge of creepy crawlies, elegant flyers and other insects found on the property.

Participants can learn how to gently capture, observe and release butterflies, and view bugs under a microscope.

In addition to learning about native bugs, entomologists will also be bringing bugs from their own collections, including a colony of Madagascar hissing cockroaches.

Those planning to attend can also bring along their own bugs for identification.

"We can show them what these things look like under a microscope as well," she said. "It'll be a fun day."

The event takes place from 10:30 a.m. to 3 p.m.

For more information call 403-345-4262.

- Exhibit of watercolour paintings by artist Linda Carney at the Bowman Arts Centre in Lethbridge. Most of the paintings depict different species of moths and butterflies. Linda Carney lives in Medicine Hat.

People:

- Robert Laird, University of Lethbridge: 3 students
  - Kevin Kwok, M.Sc. student, working on *Helianthus-Zygogramma* interactions.
  - Vince Hervet, M. Sc. student, working on canola-cutworm-parasitoid tri-trophic interactions.
  - Sue Bury, M. Sc. Student, working on non-transitive interactions, most likely in orthopterans.

- Hector Carcamo, AAFC Lethbridge Research Centre: 1 student
  - Swaroop Kher, Ph. D. student, working on cereal leaf beetle (co-supervised with Lloyd Dosdall).

- Tim Lysyk, AAFC Lethbridge Research Centre: 2 PDFs
  - Sampath Walgama, working on *Culicoides* and mosquitoes.
  - Shaun Dergousoff, working on Rocky Mountain wood ticks.

News:

- Haley Catton, PhD student with Rose DeClerck-Floate, won second place in the graduate student speaking competition at the "International Symposium on the Biological Control of Weeds", held in Hawaii, Sept 12-16, 2011. She presented a portion of her research involving a houndstongue biocontrol weevil in a presentation titled "Temporary spillover? Patch-level nontarget attack by the biocontrol weevil Mogulones crucifer".

Noteworthy:

- *Arthropods of Canadian Grasslands – Volume 2: Inhabitants of a Changing Landscape*, edited by Kevin Floate, is now available. (ISBN13: 9780968932155, http://www.volumesdirect.com/detail.aspx?ID=4764)

- "Field Notes Collective" is a group of arts professionals and scientists working in the Southern Alberta area who are bound by a shared set of social, environmental and cultural concerns. The mandate of the Collective is to foster dialogue and action through the staging of cross-disciplinary events, engaging with matters of local and regional interest. ESA members Mark Geottel and Rose DeClerck-Floate are part of the Collective.

  The product of Mark's association with local artist Troy Nickle is presented in a first edition publication entitled *Time and Change: Field Notes from the Coulees*.

  The product of Rose's association with visual and media artist Mary Kavanagh (Chair of the Department of Art at the University of Lethbridge) are on display at the Helen Schuler Nature Centre, Old Man River Valley, in Lethbridge.

Respectfully submitted,
Kateryn Rochon, Southern Director

2011
Webmaster's Report
Alec McClay

Web pages have been posted and updated as necessary, including the proceedings of the 2009 annual meeting, the executive listing for 2011, the membership application form, the first and second announcements and call for papers for the AGM in Kananaskis, positions available at UC Davis and at Université de Montréal, and the student travel and undergraduate awards forms. The instructions for these forms now indicate that they are to be sent to the Secretary rather than to the Chair of the Awards Committee. This will reduce the need for frequent updates to these forms and the pages that link to them. The membership information and honorary membership were updated to reflect changes in Society policies. Following a discussion of privacy issues by the Board, the membership list page was taken off line. The new members page, which had not been updated for several years, was also discontinued. The search function has been fixed so that it searches the new site rather than trying to search the old one at ualberta.ca. We were offered a free hosting upgrade from Blacksun, with increased disk space and bandwidth, more email addresses (we currently are not using any), improved statistics, site management tools, etc. I have accepted this offer and the site has now been migrated to the new server. This should not affect site users. There were some issues with a lack of instruction from Blacksun on how to access the new server for site management and to download server statistics; however, these now appear to have been resolved.

From January to October 2011, the site averaged 52 visits and 141 page views per day. The ten most popular pages were the main page, 2007 and 2009 Proceedings, list of members (currently blank!), 1988 proceedings, current board members, publications page, 2008 Proceedings, 2011 AGM page, and the Carr Award recipients. These counts appear to include visits from Google and other indexers and spiders so the actual number of human visits is probably considerably lower.

I appreciate the help of Board members who from time to time have pointed out information on the site that needs to be updated. As always, please let me know if there are any questions or concerns about the site.

Respectfully submitted

Alec McClay
Webmaster

2011
Secretary's Report
Ken Fry

Barrier Lake Station, Kananaskis, Alberta

Report for the Period October 17, 2010 – October 13, 2011

I received/tracked twelve (12) items in my capacity as ESA Secretary:

1. Web site update – names/addresses
2. Insect identification enquires
3. Joint Annual Meeting preparations
4. Request for Incorporation Registration for JAM banking needs
5. Notification of the passing of Doug Eidt
6. Notification of the passing of Joe Nelson
7. Notification of the passing of Karin Heming
8. Documentation advertising Insect Discovery Day
9. Proposed ESAB/ESC 2012 Logo
10. ESC Public Encouragement Grants Program
11. Prairie Plantwatch Program
12. Secretary as contact for bank account

I retained discussions and correspondence conducted via email, including a total in excess of one hundred seventy six (176) messages on the Gmail account and three hundred forty three (343) on my work account.

As Secretary I issued twenty-five (25) notices to the membership:

1. Lapsed Member Contact .....Oct 11 2011
2. COSEWIC Call for Nominations.....Oct 4 2011
3. 2011 AGM Second Announcement .....Sep 27 2011
4. Student Awards reminder .....Sep 22 2011
5. 2011 AGM First Announcement .....Sep 19 2011
6. Packing Guidelines for International Shipments .....Aug 23 2011
7. Wild Species of Canada Report .....Aug 23 2011
8. Executive Director for Nature Alberta Posting.....Aug 08 2011
9. Doug Eidt Notice of Passing.....Jul 14 2011
10. GPRC Apiculture Employment Opportunity.....Jun 09 2011
11. ESC Director Questions.....Jun 02 2011
12. ICE Symposia Request .....May 16 2011
13. Pest identification Request.....Mar 30 2011
14. WFPM Announcement .....Mar 30 2011
15. Employment Opportunity .....Mar 22 2011
16. Strickland Announcement.....Feb 16 2011

17. Ruby Larson Obituary.....Feb 15 2011
18. ESC Nominations Request.....Feb 14 2011
19. Land Transfer Information.....Feb 4 2011
20. CFIA Questionnaire.....Jan 25 2011
21. COSEWIC Committee Solicitation .....Jan 25 2011
22. Archives Notice .....Nov 16 2010
23. Award Notification .....Oct 22 2010
24. Biodiversity Report.....Oct 21 2010
25. Grazing Lands Background .....Oct 18 2010

Letters/items retained

1. NAPPO Regional Phytosanitary Proceedures
2. Coast Edmonton Plaza Hotel Contract Estimate
3. ALG Potato Farm Letter and drafts
4. ESC Letter soliciting nominations for ESC awards
5. Nature Canada to Premier of Alberta
6. Nature Alberta to Premier of Alberta
7. Coast Edmonton Plaza Hotel Proposal
8. First Data Account Information Update
9. JAM 29 Mar 2011 Minutes
10. JAM 25 Feb 2011 Minutes
11. JAM Rough Schedule
12. Coast Countersigned Contract

2011
Treasurer's Report
Adam Blake

October 14-15, 2011

Memberships:

Total Memberships (on the books / in good standing)

Regular	89 / 39
Student	45 / 24
Honourary	6
Free Library	20
Subscription Library	3

New Members in 2011 (included in above totals)

Regular	3
Student	6

Opening Balance January 2010

Assets

Cash (bank account)	$6,823.16	
Term deposits	$15,000.00	
Common shares (Credit Union shares)	$577.30	
Total Assets		$22,400.46

Liabilities & Equity

Total Liabilities	$0.00
Equity	$22,400.46
Liabilities plus Equity	$22,400.46

Lethbridge, AB -- ESA Annual Meeting 2010

Costs	$3,238.62	The Coast Lethbridge Hotel
	$ 140.00	Payment to Joint Societies Registrations (WFPM)
	$2,000.00	Student Travel Awards
	$ 31.45	Speaker Gift

Total Meeting Costs - $5410.07

Revenues

Registration Revenues + $5800.00

Total		+ $389.93
Other Transactions		
Credits:		
Investment Interest	$ 207.50	
Membership renewals	$1,090.00	
Debits:		
Web Hosting	$ 608.33	
Proceedings	$ 551.15	
Deposit for 2010 Meeting	$ 600.00	
Deposit for 2012 Meeting	$2,500.00	
MC/VISA Transaction Charges	$ 20.35	

Closing Balance December 31, 2010:

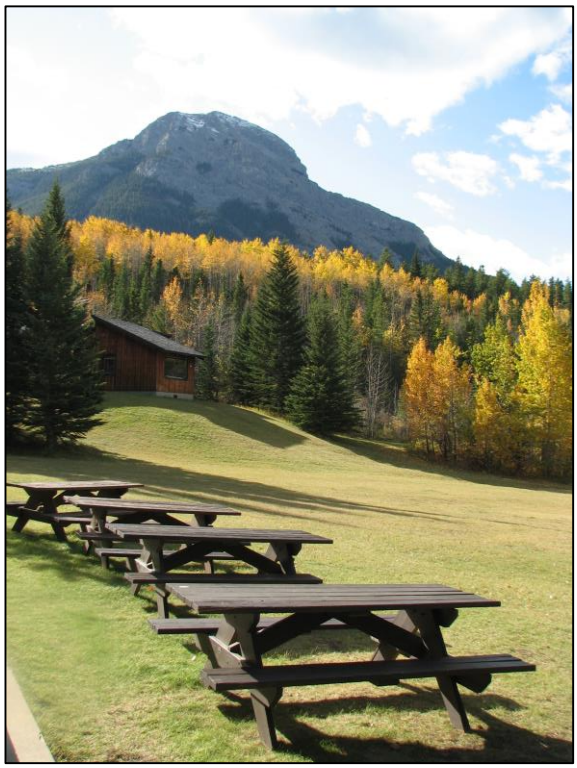
Assets		
Cash (bank account)	$4,753.33	
Term deposits	$15,000.00	
Common shares (Credit Union shares)	$603.07	
Total Assets		$20,356.40
Liabilities & Equity		
Total Liabilities		$0.00
Equity		$20,356.40
Liabilities plus Equity		$20,356.40

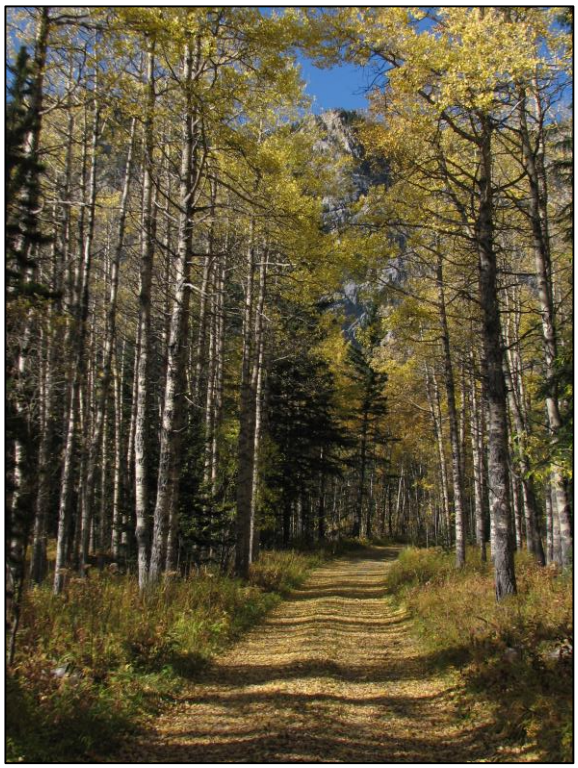
2011 Transactions Thus far		
Credits:		
Investment Interest	$ 202.50	
Membership Renewals	$ 239.46	
ESAB share of the remaining balance of the 2010 joint meeting account	$ 340.32	
Debits:		
Miscellaneous Expenses	$ 73.02	

Closing Balance October 12, 2011:

Assets		
Cash (bank account)	$5549.09	
Term deposits	$15,000.00	
Common shares (Credit Union shares)	$603.07	
Total Assets		$21,052.16
Liabilities & Equity		
Total Liabilities		$0.00
Equity		21,052.16
Liabilities plus Equity		$21,052.16

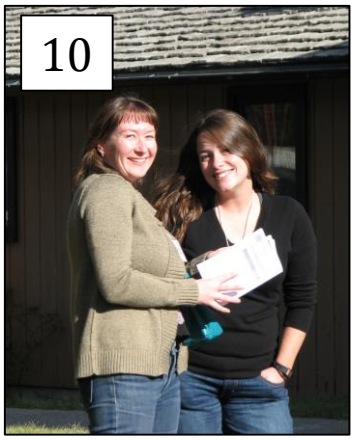
Photos

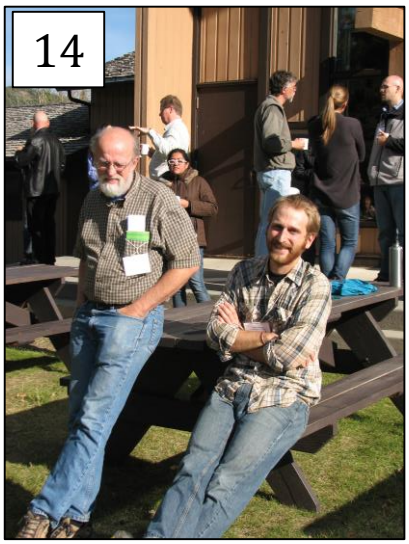




The Venue, Barrier Lake Station, Biogeoscience Institute, Kananaskis, AB

Presenters 1. Lindsay Zink. 2. Ryan McKellar. 3. Tyler Wist. 4. Leanna Lachowsky. 5. Felix Sperling. 6. Caroline Whitehouse. 7. Jessica Kwon. 8. Lloyd Dosdall.





10. Tonya Mousseau, Megan Evans. 11. Vincent Hervet, Caroline Whitehouse. 12. Heather Bird, Christi Jaeger. 13. Tom Oliver, Christi Jaeger, Heather Bird, Jessica Kwon, Sarah Leo, Monica Higuera and Felix Sperling. 14. Gerald Hilchie and Julian Rowe Dupuis

16. Greg Pohl, Barb Deneka. 17. Christi Jaeger. 18. Rob Longair, meeting room. 19. Heather Bird and Charlie Bird. 20. Gordon Pritchard, Robin Owen.

21. Undergraduate Awards Presented to Christi Jaeger and Brian Ellert with Greg Pohl. 22. Travel Award Recipients Heather Bird, Jeffery Newton, Kaylee Byers, Jessica Kwon and Monica Higuera with Greg Pohl. 23. Banquet Speaker Kevin Strange. 24. Presidential Address Rob Longair. 25. John Acorn. 26. Bumble Bees!

Entomological Society of Alberta
List of Members

Last	First	Organization/Address	City
Honorary Members			
Byers	Bob	AAFC Research Centre	Lethbridge, AB
Ball	George	Dept. of Biological Sciences	Edmonton, AB
Larson	Ruby		
Gushul	Evan		
Gurba	Joe		
Shemanchuk	Joseph		
Regular Members			
Acorn	John		
Adamson	Judy	City of Red Deer	Red Deer, AB
Ball	Kay		
Barr	William	City of Edmonton	
Battigelli	Jeff	Paragon Soil & Environmental Consulting Inc.	Edmonton, AB
Bird	Charley		
Bourassa	Stéphane	University of Alberta	
Bourchier	Rob	AAFC Research Centre, Crop Sciences Section	Lethbridge, AB
Brons	Gloria	Butterfly Wings n' Wishes	Edmonton, AB
Bryan	Nora		
Byrtus	Gary		
Cárcamo	Héctor	AAFC Research Centre, Crop Sciences Section	Lethbridge, AB
Cartar	Ralph	Dept. of Biological Sciences, University of Calgary	Calgary, AB
Cheema	Jagdish		
Clarkson	Christopher		
Cobb	Tyler	Dept. of Biological Sciences	Edmonton, AB
Craft	Trevor	City of Red Deer	
Crowe	Michael	Lakeland College	
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	
Digweed	Scott		
Dosdall	Lloyd	Department of Agricultural, Food, and Nutritional Science, University of Alberta	Edmonton, AB
Erb	Stephanie	AAFC Research Centre	Lethbridge, AB
Evenden	Maya	Dept. Biological Sciences, U of A	Edmonton, AB
Feddes-Calpas	Janet		
Floate	Kevin	AAFC Research Centre	Lethbridge, AB
Fry	Ken	Olds College	Olds, AB
Goettel	Mark	AAFC Research Centre	Lethbridge, AB
Gooding	Ronald	Dept. of Biological Sciences	Edmonton, AB
Griffiths	Graham		Athabasca, AB
Harris	Peter		
Heming	Karin		
Heming	Bruce	Dept. of Biological Sciences	Edmonton, AB
Herle	Carolyn	AAFC Lethbridge	Lethbridge, AB
Hilchie	Gerald	Dept. of Biological Sciences	Edmonton, AB
Hindmarch	Trevor		
Holmberg	Robert	Centre for Science	Athabasca, AB
Honsameddin	Elkrwe Mohammad		Edmonton
Hossain	Babul		
Hundsdoerfer	Anina	Alberta Sustainable Resource Development	Edmonton, AB
Ivie	Tyler	Bayer Crop Science Inc.	Calgary, AB
Johnson	Elaine	City of Red Deer	
Jones	Jim		
Judge	Kevin	University of Lethbridge	Lethbridge, AB
Kanashiro	Derrick	AAFC Research Centre	Lethbridge, AB
Katzell	Susan	City of Red Deer	
Kaufman	Reuben	Dept. of Biological Sciences	Edmonton, AB
Keddie	Andrew	Dept. of Biological Sciences	Edmonton, AB
Laird	Robert	University of Lethbridge	Lethbridge, AB
Langor	David	Department of Natural Resources, Canadian Forest Service, Northwest Region	Edmonton, 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	Dept. of Biological Sciences	Calgary, AB
Lvie	Tyler		
Mark	Michelle	University of Alberta	
Maximchuk	Mike	Alberta Sustainable Resource Development	Peace River, AB
McClay	Alec	McClay Ecoscience	Sherwood Park, AB
McKellar	Ryan	Department of Earth and Atmospheric Science	Edmonton, AB
Milligan	Patricia		
Moir	Grant	City of Red Deer	
Mousseau	Tonya	Mount Royal University	
Oliver	Mark		
Otani	Jennifer	AAFC	Beaverlodge, AB
Owen	Robin	Department of Biological Sciences	Calgary, AB
Oxbrough	Anne	University of Alberta	Edmonton, AB
Peterson	Jason	4023 Hamilton Hall, 8888 University Drive	Burnaby, BC
Phillips	Iain	Saskatchewan Watershed Authority	Saskatoon, SK
Pohl	Greg	Department of Natural Resources, Canadian Forest Service, Northwest Region	Edmonton, AB
Pritchard	Gordon	Dept. of Biological Sciences	Calgary, AB
Proctor	Heather	Dept. of Biological Sciences	Edmonton, AB
Rajput	Sunil	Alberta Innovates Technology Futures	Vegreville, AB
Ranasinghe	Sunil	Alberta Sustainable Resource Development	Edmonton, AB
Reid	Mary	Dept. of Biological Sciences	Calgary, AB
Rice	Adrianne	Northern Forestry Centre, Canadian Forest Service, Natural Resources Canada	Edmonton, AB
Rochon	Kateryn	Agriculture and Agri-Food Canada	Lethbridge, AB
Rondeau	Kimberly		
Saunders	Chris	City of Edmonton	
Sexsmith-West	``	Grant's Plants Tree Service	Lethbridge, AB
Sharpe	Andrea		
Spence	John	Department of Renewable Resources	Edmonton, AB
Sperling	Felix	Dept. of Biological Sciences	Edmonton, AB
Sperling	Janet		
Stevenson	Margaret	City of Red Deer	
Tansey	James	University of Alberta	Edmonton, AB
Thysse	Adrian		
Van Hezewijk	Brian	Agriculture and Agri-Food Canada	Lethbridge, AB

Veenstra	Kevin	City of St. Albert	
Waelchli	Fred		
Walgama	Ravindra		
Walsh	Peter	Lakeland College	Vermilion, AB
Walter	Dave	U of A	
Wheeler	Jenny	City of Edmonton	

Student Members

Barnewall	Emily	University of Lethbridge, AAFC	Lethbridge, AB
Batista	Philip	Dept. of Biological Sciences	Edmonton, AB
Biliske	Jennifer	Department of Biological Sciences	Edmonton, AB
Bird	Heather	University of Alberta	
Blair	Leah	AAFC	Lethbridge, AB
Blake	Adam	Dept. of Agricultural, Food and Nutritional Science, University of Alberta	Edmonton, AB
Brunet	Bryan	Dept. of Biological Sciences	Edmonton, AB
Byers	Kaylee	Department of Biological Sciences	
Dombroskie	Jason	Dept. of Biological Sciences	Edmonton, AB
Dupuis	Julian Rowe		
Esch	Evan	University of Alberta	
Evans	Megan	University of Calgary	
Farmer	Alexandria	University of Calgary	
Foster	Danusha	University of Calgary	Calgary, AB
Fox	Jennette		
Gaberel	Michelle	Augustana University College	Camrose, AB
Glasier	James	University of Alberta	Edmonton, AB
Hervet	Vincent	University of Lethbridge, Department of Biological Sciences	
Hummel	Jeremy	University of Alberta	Edmonton, AB
Jaeger	Christi	University of Alberta, Northern Forestry Centre	
Kher	Swaroop	University of Alberta	Edmonton, AB
Kwon	Jessica	University of Alberta	
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	

Lumley	Lisa	University of Alberta	Edmonton, AB
Miluch	Christine		
Mori	Boyd	University of Alberta	
Mosdossy	Krisztina		Calgary, AB
Newton	Jeffrey	University of Alberta	Edmonton, AB
Oatway	W. Keenan	University of Alberta	
Odsen	Sonya		
Oliver	Tom		
Pengelly	Christian	University of Calgary	Calgary, AB
Peralta Vazquez	Haydee	Department of Biological Sciences	
Pinzon	Jaime	Dept. of Renewable Resources	Edmonton, AB
Proshek	Benjamin	Dept. of Biological Sciences	Edmonton, AB
Schwarzfeld	Marla	Dept. of Biological Sciences	Edmonton, AB
Subra	Ravi		
Subramaniam	Ravindran	University of Alberta	
Van Haga	Amanda	Dept. of Biological Sciences	Edmonton, AB
Vankosky	Meghan	University of Alberta	
Waller	Jennifer	University of Alberta	
Whitehouse	Caroline	University of Alberta	Edmonton, AB
Wist	Tyler	University of Alberta, Biological Sciences Department	Edmonton, AB
Wood	Charlene	University of Alberta	
Wu	Xiuhua		
Zink	Lindsay	University of Calgary	

Free Library Subscriptions

Archives, Entomological Society of Alberta	Agriculture and Agri-Food Canada, Lethbridge Research Station
Athabasca University College Library	Athabasca University College
Augustana University College Library	Augustana University College
Cameron Library, 5th floor, Periodicals, University of Alberta	Cameron Library, 5th floor, Periodicals, University of Alberta
Concordia University College Library	Concordia University College
Glenbow Alberta Institute	Glenbow Alberta Institute
Grande Prairie Regional College Library	Grande Prairie Regional College
Lakeland College Library	Lakeland College
Lethbridge Research Centre	Agriculture and Agri-Food Canada, Lethbridge Research Station
Medicine Hat College Library	Medicine Hat College

N.A.I.T. Library	N.A.I.T.
National Library of Canada	National Library of Canada, Serials Records Section, Acquisitions and Bibliographical Services
Northern Forestry Centre Library	Canadian Forest Service, Northern Forestry Centre
Olds College Library	Olds College
Provincial Museum and Archives	Provincial Museum and Archives
Red Deer College Library	Red Deer College
S.A.I.T. Library	S.A.I.T.
Strickland Library	University of Alberta
University of Calgary Library	University of Calgary
University of Lethbridge Library	University of Lethbridge

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The Entomological Society of Alberta

The Entomological Society of Alberta 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 of Alberta 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 Labratories in Lethbridge (now an Agriculture and Agri-Food Canada Research Station), the Suffield Research Station, the Forest Zoology Laboratory in Calgary, and students and staff from the University of Alberta.

The objective of the Entomological Society of Alberta (ESAB) 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). Contact the Treasurer via the society website:

http://www.entsocalberta.ca/esa.htm