

PROCEEDINGS OF THE 53rd ANNUAL MEETING OF THE



Entomological Society of Alberta

Held jointly with the Entomological Society of Canada

November 2-5, 2005
Canmore, Alberta

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Entomological Society of Alberta-Executive for 2005

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..... Derek Sikes (central)
..... Jennifer Otani (northern)
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..... Jan Volney
..... Mike Dolinski
Student representatives Tyler Cobb
..... Tonya Mousseau

President's Report

Thank you all for being here—I am always amazed at how popular our Annual General Meetings are, and I think it reflects well on our society. The overwhelming theme for the past year has been, of course, the Joint Annual Meeting with our colleagues from across Canada. When I accepted the nomination for society president, it had slipped my mind that this would be the case, and at first I was quite worried about the “big meeting.” Now that we are here, however, I must admit that it feels good, and I am proud of our accomplishments.

I have worked with a very fine group of people on the JAM plans. Felix Sperling and Dave Langor did a superb job of organizing the scientific program. Dan Johnson, Derek Sikes and Stephanie Erb worked long difficult hours on local arrangements. Greg Pohl took on the daunting task of registration, and Maya Evenden assumed the equally imposing duties of awards chair. Behind the scenes, John Spence, Mike Dolinski, and Jan Volney worked on fundraising for the JAM. Heather Proctor and Derrick Kanashiro took on the task of publicity, and Heather as Past President has been a continual source of support and good advice. Derrick and Derek are now looking after photography as well, and graduate student affairs have been well managed by Tonya Mousseau and Tyler Cobb. And through it all, conscientiously watching the balance sheets, Kim Rondeau has done a very fine job as treasurer.

As if that wasn't enough, we have also reaped the benefits of a dedicated executive for the Entomological Society of Alberta, and those concerns that are uniquely Albertan have not been forgotten. Without listing all of the people involved, I would like to say that we have a fine, functional, and financially sound society here, and something to be proud of. I hope that you will all, either now or in the future, find the time to contribute to the society, and to see for yourself how smooth the inner workings of this group really are.

On a personal note, my own involvement with the ESA began when I was in grade 3, as an entrant in the insect collections competition. I have been close to the society ever since, and although it is true that narrowing the geographic scope of your colleagues reduces the likelihood that you will encounter others with exactly the same entomological interests, it is also true that nothing beats old fashioned close-to-home human interaction. There is a bond among entomologists, and without analyzing this further, I have to say that it is clearly, to my mind, a good thing and a thing worth supporting.

John Acorn
ESA President
November, 2005

**Joint Annual Meeting of the Entomological Society of Alberta
and the Entomological Society of Canada**

November 2-5, 2005

Wednesday, November 2

- 08:30-16:30 ESC Governing Board Meeting
- 12:30-17:30 Field Trips
- 15:30-17:00 ESA Executive Board Meeting
- 18:30-19:45 Opening, Awards, Gold Medal Address
- 19:45-20:45 Students meet the Board Reception
- 19:45-23:00 Opening Reception

Thursday, November 3

- 08:00-09:10 Plenary Speaker -Michael Majerus: "The Peppered Moth: Decline of a Darwinian Disciple"
- 09:15-16:45 President's Prize Papers (concurrent sessions)
 - Pest Management (PP1)
 - Faunistics and Systematics (PP2)
 - Forest Entomology (PP3)
 - Parasitoids and Biocontrol (PP4)
 - Terrestrial, Riparian and Aquatic Ecology (PP5)
- 16:45-17:45 Entomological Society of Alberta Annual General Meeting
- 18:45-20:45 *Delia* Workshop
- 19:00-19:45 Demonstration: Constructing inexpensive databases for remote contributions: tools for biodiversity, systematics, and collaborative efforts
- 20:00-22:00 President's Reception

Friday, November 4

- 08:00-15:15 Concurrent Symposia and Contributed Papers:
 - Symposium A: Graduate Student Symposium (SA)
 - Symposium B: Maintaining Arthropods in Northern Forest Ecosystems (SB) - *Arnica*
[organized by the Biological Survey of Canada; sponsored by Univ. of Alberta]
 - Contributed papers: Agricultural Entomology (C1)
 - Symposium C: Biology and Diversity of Arachnids
 - Contributed Papers: Biological Control (C2)
 - Contributed Papers: Forest Biodiversity (C3)
[sponsored by Alberta Sustainable Resource Development]
 - Contributed Papers: Forest Entomology (C4)
- 12:00-13:15 The Canadian Entomologist Editorial Board Meeting
- 15:15-16:30 Poster Session (incl. President's Prize poster judging)
- 16:30-17:15 Heritage Lecture
David Larson: "The Prairies Then and Now: Personal Reflections on Entomologists and Entomology"
- 17:30-18:30 ESC Annual General Meeting
- 19:00-22:00 Banquet and Student Awards presentation
After dinner talk: Michael Majerus: "Ladybirds behaving badly"

Saturday, November 5

- 08:00-12:30 Concurrent Symposia and Contributed Papers:
Symposium D: Fire and Arthropods (SD) [organized by the Biological Survey of Canada]
Symposium E: Wheat Stem Sawfly (SE) [sponsored by SeCan Association]
Contributed papers: Arachnology (C5)
Contributed papers: Diversity and Systematics (C6)
Contributed Papers: Ecology and Management (C7)
- 12:00-13:30 ESC Board Meeting
- 13:00-17:30 Biological Survey of Canada Scientific Committee Meeting
- 13:00-18:00 Field Trips



Greetings from the ESC

Welcome to the 55th Annual Meeting of the Entomological Society of Canada, hosted this year by the Entomological Society of Alberta here in Canmore. From past joint meetings in Alberta I know that *Entomology: A celebration of life's little wonders* will be another fine meeting, and a real celebration. Thanks to the hard-working Committee that organized the meeting on our behalf, and to all of you who have come together to share your fascination of insects. Alberta entomology is known for its strength in systematics, biodiversity, ecology, forestry and agriculture, assuring a stimulating program. Of course Alberta hospitality is legendary. It's great to be back in the mountains again.

Bob Lamb

President,
Entomological Society of Canada

Welcome from the ESA

Welcome to Canmore, to Alberta, to the Rocky Mountains, and to the Joint Annual Meeting of the Entomological Society of Canada and the Entomological Society of Alberta. Our organizing committee has been working hard to provide you with a stimulating, enjoyable, and memorable event, and I'm sure you join me in thanking them for their hard work. We have tried to make this get-together as student-friendly as possible, and as exciting as we can muster as well, complete with field trips in search of cave arthropods and rock crawlers. On behalf of the Entomological Society of Alberta, we sincerely hope you enjoy your stay, make new friends, nurture new ideas, and reconnect with the vibrant entomological community in which we are all so fortunate to function. Have fun, take time to gaze at the mountains, or stroll beside the Bow River, and do let us know if there is anything we can do to help make your time here more enjoyable.

John Acorn

President,
Entomological Society of Alberta



Bob Lamb, ESC President; John Acorn, ESA President

Oral Presentation Abstracts

Occurrence of desert locust (*Schistocerca gregaria*) in Saudi Arabia.

Aziz Ajlan

Dept. Plant Protection, College of Agricultural & Food Sciences, King Faisal Univ., PO Box 55009, Hofuf, Al-Hasa 31982, Saudi Arabia

The desert locust, *Schistocerca gregaria*, is one big threat to crops in the Arab peninsula. The desert locust changes their behavior and physiology in response to changes in their population density by forming swarms that may contain billions of individuals migrate over hundreds and even thousands of kilometers. Saudi Arabia is one of the breeding regions. Infestations were heavy in 1986-88, 1992-95, and 1997-98.

An antimicrobial substance in the egg wax of the tick, *Amblyomma hebraeum* (Acari: Ixodidae), protects the eggs from soil microflora.

Claire Arrieta¹, Brenda Leskiw, Reuben Kaufman

Dept. Biological Sciences, Univ. Alberta, Edmonton, AB, T6G 2E9; ¹Current: Div. Gastroenterology, Dept. Medicine, Univ. Alberta, Edmonton, AB, T6G 2N8

Tick eggs inhibited the growth of Gram-negative, but not Gram-positive bacteria. Solvent-extracted egg wax, however, was effective only against Gram-positive bacteria. The active material was stable to heat and proteolytic enzymes. Gené's organ (the egg-waxing gland) grows substantially during the vitellogenetic period, but gained antimicrobial activity only when oviposition began. 20-Hydroxyecdysone, the vitellogenetic hormone in *A. hebraeum*, did not stimulate growth of Gené's organ or precocious secretion of antimicrobial activity.

Life history and ecology of the hairy chinch bug (*Blissus leucopterus hirtus*) within the cool climate of Newfoundland.

Robyn Auld¹, Murray Colbo¹, Peggy Dixon²

¹Memorial University of Newfoundland, St. John's, NL; ²AAFC Atlantic Cool Climate Crop Research Centre, St. John's, NL

The hairy chinch bug (*Blissus leucopterus hirtus*) is as a serious turfgrass and crop pest in central and eastern North America. Discussion will focus on life history and adaptive response to environmental parameters within the cool climate of Newfoundland. Results will be applied to current knowledge of hairy chinch bug ecology elsewhere in North America with the goal of developing of more environmentally responsible control measures.

Oribatid mite fauna of central British Columbia – impact of harvesting and soil compaction on abundance and diversity 10 years later.

Jeff Battigelli

Earthworks Research Group, 10 Naples Way, St. Albert, AB, T8N 7E8

Soil arthropods have been sampled as part of the Long-Term Soil Productivity Study in the Sub-Boreal Spruce Zone of central British Columbia. This presentation reports on samples collected 10 years after initial

treatment application. How has the abundance and diversity of the oribatid fauna on these sites responded in the intervening 10 years? Were my predictions correct?

Mesostigmatic mites in Australian wet forests: free-living predators can be habitat specific but why?

Frédéric Beaulieu, David E. Walter, Heather C. Proctor, Roger L. Kitching
Dept. Zoology & Entomology, Univ. Queensland, St Lucia, QLD, 4072, Australia [mail: F. Beaulieu, 7- 4945
Edouard Montpetit, Montreal, H3W 1R1, Canada]

Phytophagous mites are frequently host/habitat-specific, but is that true of predatory mites? We examined habitat-specificity of predatory mesostigmatic mites at different scales: forest types (rainforest vs. open) and habitats within forest (canopy vs. ground litter). Among 217 species, 36 were significantly associated with forest type and 17 showed clear affinity to canopy. Occurrence of canopy species in other patchy or open habitats suggests that patchiness and microclimate are two important determinants of species distribution.

Hyperdiversity in the tropics: the role of spatial and ecological turnover of species of predatory mesostigmatic mites in Australia.

Frédéric Beaulieu
Dept. Zoology & Entomology, Univ. Queensland, St Lucia, QLD, 4072, Australia [mail: F. Beaulieu, 7- 4945
Edouard Montpetit, Montreal, H3W 1R1, Canada]

I sampled mesostigmatic mites in various litter microhabitats of humid forests across eight localities in Eastern Australia. Species distributions across geographical space and microhabitats revealed remarkably high levels of turnover at both scales. Turnover was also apparent at genus level, and certain genera were represented mostly by habitat specialists and/or local endemics. Litter-associated Mesostigmata may have undergone radiation via fragmentation of rainforests and possibly also via evolution of habitat specificity.

Beyond Matador: diversity of Oribatida in Canadian grasslands.

Valerie M. Behan-Pelletier¹, Derrick Kanashiro², Jill M. Clapperton²
Agriculture and Agri-Food Canada, ¹K. W. Neatby Bldg., 960 Carling Ave., Ottawa, ON, Canada K1A 0C6;
² Lethbridge Research Centre, Lethbridge, AB

The Matador Project (1967-1972), the first study on Oribatida in Canadian grasslands, recorded 15 species. Subsequently, published data on grassland Oribatida includes representatives of only 50 species in 25 families. In contrast, our ongoing studies indicate that taxonomic diversity is high, and the fauna of major grassland types have distinct elements, sharing similarities at the genus and family levels. We examine the hypothesis that broad habitat preferences among Oribatida can be expressed at the family level.

Effects of seasonality and plant species on boreal rhizosphere invertebrate assemblages.

Danica Belter, Heather Proctor
Dept. Biological Sciences, Univ. Alberta, Edmonton, AB, T6G 2E9

Soil organisms are found predominantly near the root zone (rhizosphere) of plants. Exudates released in this zone provide food for microbes and, in turn, invertebrates. Because exudates often vary among plant species, it seems likely that microbial and invertebrate assemblages are also plant-specific. We examined rhizosphere microbes and invertebrates of four species of boreal plants, and found that effects of plant species and season differed among the taxa examined.

Spider-habitat associations in a disturbed coastal sand dune ecosystem in southwestern British Columbia.

Robert Bennett, Maxence Salomon

BC Ministry of Forests, 7380 Puckle Road, Saanichton BC, V8M 1W4

Pitfall trapping was used to establish a baseline inventory of ground-active spiders at a popular marine beach near Victoria BC. Species assemblages were compared between three dune habitat types: one “natural” (primarily endemic plant species) and two dominated by invasive vegetation (scotch broom, *Cytisus scoparius* or Douglas-fir, *Pseudotsuga menziesii*). We report the distribution, relative abundance, and life history traits of rare, endemic, and introduced spiders based on a two-year dataset.

Developing a directed approach for including spiders in Canada’s endangered species conservation efforts.

Robert Bennett

BC Ministry of Forests, 7380 Puckle Road, Saanichton BC V8M 1W4

Spiders have no visible presence in Canada’s growing federal endangered species conservation program. Successful inclusion of any taxon requires status reports including good distribution and abundance data. Except for a small minority of spider species these data are lacking and difficult to obtain. Realistic candidates for conservation consideration are Canada’s mygalomorphs and endemic pholcids. Spiders with strong associations with threatened or endangered habitats could be targeted for future directed surveys.

Assessment of IPM strategies to control wheat stem sawfly.

Brian Beres¹, H. Cárcamo¹, JR Byers¹, F. Clarke², R. DePauw²

¹Lethbridge Research Centre, Agriculture & Agri-Food Canada, Lethbridge, AB; ²Semi-Arid Prairie Research Centre, Agriculture & Agri-Food Canada, Swift Current, SK

Integrating resistant cultivars, seeding systems, and sustainable farming tools will reduce the business risk of growing wheat in regions prone to wheat stem sawfly attack. This paper reports on the research findings of our integrated pest management studies, which aim to quantify effects of alternative seeding systems on wheat stem sawfly population dynamics, and to determine the impact of such systems on the parasitoid *Bracon cephi*.

Ground-dwelling beetle and forest mosaic.

Colin Bergeron, John Spence, Jan Volney

Department of Renewable Resources, Univ. Alberta, Edmonton, AB, T6G 2E3

My research aims to relate the ground-beetle (Carabidae: Coleoptera) community to the spatial organisation of the forest created by natural disturbances. An analysis of 10 239 beetles collected on 84 km² of forested land demonstrate that certain dominant beetle species are strongly associated to tree species cover even if they are generalist predator. Furthermore, pockets of forest skipped by historical fire events support the highest concentration of uncommon beetle species.

Comparison of component communities associated with cynipid galls near James Bay and central Ontario.

M. J. T. Bodnar, J.D. Shorthouse
Dept. Biology, Laurentian Univ., Sudbury, ON, P3E 2C6

Populations of galls induced by the cynipid wasp *Diplolepis spinosa* on the stems of roses were sampled at five locations from Manitoulin Island in Lake Huron, northwards to the mouths of three rivers entering James Bay. Gall populations near James Bay are isolated and found only on riverbanks. Even so, James Bay galls housed assemblages of parasitoids similar to those of southern galls. How gall communities remain diverse at isolated northern sites will be discussed.

Influence of intra-plant variation in rates of parasitism on the foraging behavior and performance of a specialist herbivore.

Jeffrey W. Boone¹, Sandy Smith¹, Dan Quiring²,
¹Faculty of Forestry, 22 Robert St., Univ. Toronto, Toronto, ON, M5S 2K3, ²Faculty of Forestry, Univ. New Brunswick, Fredericton, NB

Herbivorous insects may employ different foraging strategies in response to the heterogeneous distribution of suitable food within host plants. For example, late instar yellow-headed spruce sawfly larvae disperse acropetally, from lower to upper crown levels, due to variation in foliar quality. However, the potential tradeoffs with respect to parasitism that may accompany this dispersal behavior have not been investigated. This is being tested in experiments currently underway that measure parasitism in pre- and post-dispersal larvae between crown levels.

Flower visiting in a little-known Fly family: Are acrocerids pollinators or opportunists?

Chris Borkent
2396 Estevan Ave, Victoria, BC, V8R 2S5

Species in the rare Diptera family Acroceridae have complex and interesting life histories that have proven difficult to study. Adults of many species have been collected on flowers and have morphological characteristics that suggest dependence on floral nectar, though their role in pollination has never been researched. I studied the floral behaviour and abundance of the genus *Eulonchus* to determine whether they prefer certain plant species, and are a significant part of the pollinator fauna.

Ground beetle (Coleoptera: Carabidae) responses to different weed management practices in corn in southern Alberta.

Stéphane Bourassa^{1,2}, J.R. Spence¹, H.A. Cárcamo², R.E. Blackshaw², K.D. Floate².
¹Dept. Renewable Resources, University of Alberta, Edmonton, AB ²Agriculture and Agri-Food Canada, Lethbridge Research Centre, Lethbridge, AB, T1J 4B1

Carabids are considered beneficial on farms because of their ability to prey on a wide variety of pests. In a long term study near Lethbridge, we used pitfall traps during the growing seasons of 2004 and 2005 to collect carabids from corn plots subjected to various weed control practices: conventional herbicide (Atrazine®), herbicide tolerant corn with Roundup® application and low tillage. Our results from the first year will include diversity and the activity/density of carabids in relation to the weed community.

Impact of knapweed biological control agents in southeastern British Columbia.

Rob Bouchier

Agriculture & Agri-Food Canada, Lethbridge Research Centre, Lethbridge, AB, T1J 4B1

Spotted knapweed has been the target of an aggressive operational biological control program dating back to the late 1960's. Population densities and species interactions of four spotted knapweed biocontrol agents were assessed at 16 recent biocontrol release sites, between 2001 and 2004. Knapweed densities have declined at almost all release sites, with the declines at least partially the result of the attack by the root feeding weevil *Cyphocleonus achates* and the root-feeding moth, *Agapeta zoegana*.

Reduced herbicide rates for improved integrated crop management (in progress).

Jim Broatch

Alberta Ag-Info Centre, Postal Bag 600, 4705-49 Street, Stettler, AB, T0C 2L0

Agronomic practices can affect the species composition and biology of herbivores and their natural enemies. I am investigating the phenology of *Delia* spp. in relation to their canola host plants, and testing the hypothesis that reducing herbicide application rates to alter weed densities affects the abundance of root maggots and their natural enemies. Current results indicate that the staphylinid beetle, *Aleochara bilineata* Gyllenhal, and carabid beetles are the species most responsible for regulating *Delia* populations in canola in Alberta.

A review of the factors influencing spider diversity: Why do we have so many eight-legged freaks?

Christopher M. Buddle, Tara E. Sackett

Dept. Natural Resource Sciences, McGill Univ., Macdonald Campus, 21,111 Lakeshore Rd., Ste Anne de Bellevue, QC H9X 3V9

Although much research has documented patterns of spider diversity in space and time, seldom is this arachnological literature placed within the context of ecological theories that attempt to explain patterns in species diversity. We review the key factors governing spider diversity, including the role of disturbance, productivity, competition, moisture, and habitat complexity. We attempt to generalize about the mechanisms underlying spider diversity, recognizing that the factors related to spider diversity vary with the scale of observation.

Deciphering a complex web: the structure and dynamics of spider assemblages in disturbance-driven boreal forests.

David P. Shorthouse¹, Christopher M. Buddle²

¹Dept. Biological Sciences, Univ. Alberta, Edmonton, AB, T6G 2H1; ²Dept. Natural Resource Sciences, McGill Univ., Macdonald Campus, 21,111 Lakeshore Rd., Ste Anne de Bellevue, QC H9X 3V9

We review how spider assemblages are structured and influenced by geography, forest composition, succession, wildfire, and forest harvesting. We address spatial and temporal patterns in spider diversity and composition in relation to these landscape features, and include species and guild-level responses. Data from boreal forests in Quebec and Alberta are used, with particular focus on large-scale forestry experiments from both provinces. We provide a critical assessment of what conservation measures are required to maintain spider assemblages in the ever-changing boreal zone of Canada.

Novel solid-stemmed wheat hybrid (durum-red spring) germplasm- a sawfly response.

Héctor Cárcamo¹, B. Beres¹, F. Clarke², R. DePauw², J.R. Byers¹
Agriculture and Agri-Food Canada, ¹Lethbridge Research Centre, Lethbridge, AB; ²Semi-Arid Prairie
Research Centre, Swift Current, SK

A recent cross of solid-stemmed durum wheat with hollow-stemmed red spring wheat may increase the stability of the pith expression required to improve management of this serious pest of wheat in the prairies. We report the effects of selected lines of this novel germplasm on sawfly mortality, fitness and sex ratios and compare it with conventional solid and hollowed-stemmed cultivars.

Phenology of lygus bugs (Miridae: Heteroptera) and their *Peristenus* nymphal parasitoids (Braconidae: Hymenoptera) in southern Alberta.

Héctor Cárcamo¹, Carolyn Herle¹, Henri Goulet², Jennifer Otani³
Agriculture and Agri-Food Canada: ¹Lethbridge, ²Ottawa, ³Beaverlodge

Although *Lygus* spp. are pests of alfalfa, canola and other crops, there is limited information on their ecology in non-cultivated habitats and their parasitoids in the short grass prairie. We will present results from an ongoing long term study to determine the *Lygus* species community and population structure in selected spring weeds, alfalfa and canola and an update on the levels of parasitism by *Peristenus* (spp. nova) in these habitats.

Linking lifespan and foraging behaviour in bumble bees: The case for wing wear.

Ralph Cartar
Dept. Biological Sciences, Univ. Calgary, 2500 University Dr. NW, Calgary, AB T2N 1N4

Foraging bumble bees can collect nectar and pollen from a variety of simultaneously flowering plant species. But their choice of flower species affects their wing use, which affects their wing wear. In this observational study, I show that rate of wing loss, and wing use, both affect lifespan of foraging bumble bees in SW Alberta. I discuss implications for flower choice by bees and presentation of floral rewards by plants.

Community composition affects the behavioral response of male gypsy moth to (-)-disparlure.

Monique Chatterton, Paul Schaefer, Regine Gries, Yasu Higashiura, Katrin Möller, Annett Engelmann, Erika Plettner, Gerhard Gries.
Dept. Biological Sciences, Simon Fraser Univ., Burnaby BC, V5A 1S6

(+)-Disparlure is a known sex pheromone component of gypsy moth (GM) and nun moth (NM), whereas (-)-disparlure (produced by NM) inhibits attraction of male GM. In field experiments with sympatric and allopatric populations of GM and NM, we demonstrate that allopatric unlike sympatric GM populations are not inhibited by (-)-disparlure. In laboratory studies, we demonstrate that allopatric male GM have retained sense cells and odour-binding protein for detection of (-)-disparlure.

Inheritance of alternate source of solidness.

Fran Clarke, R. Knox, R. DePauw, J. Clarke.
Agriculture and Agri-Food Canada, Semiarid Prairie Agricultural Research Centre, P.O. Box 1030, Swift
Current, SK, S9H 3X2

Solid stem cultivars prevent yield loss caused by the wheat stem sawfly (*Cephus cinctus* Norton). Current hexaploid solid stem wheat varieties derive from a single genetic source of solidness, S615. To reduce genetically vulnerability, we transferred durum solidness (Golden Ball) and a non-suppressor gene for solidness (*Aegilops squarrosa*) and a second source of solidness from *Agropyron elongatum* into hexaploid backgrounds. We are evaluating the inheritance of these sources of solidness.

Saproxylic beetles and woody debris decomposition in burned boreal forests: Linking biodiversity to ecosystem function.

Tyler P. Cobb¹, David W. Langor², John R. Spence¹, Barbara Kishchuk²

¹ Dept. Renewable Resources, Univ. Alberta, 442 Earth Sciences Building, Edmonton, AB, T6G 2E3; ² Northern Forestry Centre, Canadian Forest Service, 5320-122 Street NW, Edmonton, AB, T6H 3S5

Recent research in northern Europe and elsewhere suggests that the loss of woody debris from managed forests may have dire consequences for many saproxylic (deadwood-dependent) insects. This group is thought to be critical to decomposition processes in forest ecosystems, yet there is little direct evidence of this relationship. We conducted a mesocosm-scale experiment that demonstrates a clear link between *Monochamus scutellatus* (Coleoptera: Cerambycidae) and soil nutrient dynamics in burned forests.

Pyrophilous arthropods and post-fire salvage harvesting: the ecological implications of an economic reality.

Tyler P. Cobb¹, David W. Langor², John R. Spence¹, I.D. Phillips³

¹ Dept. Renewable Resources, Univ. Alberta, 442 Earth Sciences Bldg, Edmonton, AB T6G 2E3; ² Northern Forestry Centre, Canadian Forest Service, 5320-122 Street NW, Edmonton, AB T6H 3S5; ³ Dept. Biological Sciences, Univ. Alberta, Edmonton, AB 26G 2E3

For industrial forest companies, salvage logging following wildfire has become increasingly important for recuperating economic loss. However, few guidelines exist for managing this practice because little is known about its ecological consequences in early post-fire habitats. We investigated responses of >100 beetle species to wildfire and salvage logging to examine implications for biodiversity conservation and possible solutions for developing management guidelines that balance economic and ecological values of burned forests.

Courtship communication signals in *Glyptapanteles flavicoxis* (Hymenoptera: Braconidae), an endoparasitoid of gypsy moth, *Lymantria dispar* (Lepidoptera: Lymantriidae).

Adela Danci¹, S. Takacs¹, P.W. Schaefer², G. Gries¹

¹ Simon Fraser University, 8888 University Dr., Burnaby, BC V5A 1S6; ² USDA, Beneficial Insects Introduction Research Laboratory, Newark, DE 19713

Male *Glyptapanteles flavicoxis* wingfan when they approach pheromone-emitting conspecific females. Using state-of-the-art technology, we have recorded and analyzed the sound associated with wing-fanning males. In laboratory experiments with virgin female *G. flavicoxis* and played-back recordings from males, we have tested the hypothesis that wing-fanning sound has signal characteristics in the communication system of *G. flavicoxis*.

A method of determining European corn borer (*Ostrinia nubilalis*) infestation levels in potatoes.

Kathryn Dau-Schmidt^{1,2}, Christine Noronha¹, Donna Giberson²

¹Agriculture and Agri-food Canada, Crops and Livestock Research, 440 University Ave., Charlottetown, PE, C1A 4N6; ²Dept. Biology, Univ. Prince Edward Island, Charlottetown, PE, C1A 4P3

European corn borer (ECB) is an emerging potato pest in Atlantic Canada. The level of ECB infestation is difficult to determine because the larvae bore into the potato stems. Potato stems were collected and the number of ECB larvae, entry holes, and tunnels were counted. The results of this work showed that the number of larval holes per stem provided a good estimation of ECB larval infestation in potatoes.

***Sericoda* (Carabidae) beetles and *Antennoseius* (Ascidae) mites: the mystery continues.**

Andrea D. Déchéne¹, Tyler P. Cobb¹, Heather C. Proctor², John R. Spence¹

¹Dept. Renewable Resources, and ²Biological Sciences, Univ. Alberta, Edmonton, AB

The presence of *Sericoda* beetles in recently burned forest appears to be short-lived as they are primarily collected in the first 3 years following a fire. Competition with other ground beetle species is one of the hypotheses proposed to explain this pattern. Here, we investigated the occurrence of *Antennoseius* mites on two *Sericoda* beetle species and their potential for influencing the rapid decline of these beetles following wildfire.

Temperature changes on honey bees due to infestation by varroa mite.

S. Desai¹, A. Manickavasagan², D.S. Jayas², R. Currie¹

¹Dept. Entomology; ² Dept. Biosystems Engineering, Univ. Manitoba, Winnipeg, MB, R3T 2N2

The parasitic varroa mite is a major pest of bees, throughout the world. Knowledge about the thermobiologic behaviour of honey bees in relation to varroa mites is still fragmentary. Honey bees produce heat from the thorax as a defense mechanism to intruders. The objective of this study was to investigate the thermal behavior of bees in response to the presence of varroa mites on their bodies. Group stress response of bees while infested with varroa mites was measured by infrared thermal photography.

Unresolved roaches: phylogenetic analysis of Blattodea based on 16S and 28S.

Marie Djernaes

Dept. Biological Sciences, Univ. Alberta, Edmonton, AB, T6G 2E9

This study uses 16S and 28S to illuminate the phylogeny of Blattodea, including possible paraphyly with respect to Isoptera. A close relationship between Blattodea and Isoptera was supported, but the question of paraphyly was not resolved. The study does not support a close relationship between Nocticolidae and Polyphagidae/ Polyphaginae. A close relationship between *Cryptocercus* and Polyphagidae/ Polyphaginae is supported, while a sister group relationship between *Cryptocercus* and *Therea* is rejected.

Managing flea beetles in canola with seeding date, plant density, and seed treatment.

Lloyd M. Dosedall, F. C. Stevenson

Dept. Agricultural, Food & Nutritional Science, Univ. Alberta, Edmonton, AB, T6G 2P5

Field experiments were conducted in Alberta to determine the effect of fall versus spring seeding of canola on flea beetle damage. Interactions with seeding rate and seed treatment also were investigated. Seeding in fall enabled

plants to progress beyond the vulnerable cotyledon stage by the time that most flea beetle injury occurred. Seeding canola in fall, at rates higher than those currently recommended, are important components of an integrated management strategy for flea beetles, with the potential to substantially reduce insecticide use in this crop.

Does seeding canola in fall influence damage by root maggots (*Delia* spp.) (Diptera: Anthomyiidae)?

Lloyd M. Dosdall

Dept. Agricultural, Food and Nutritional Science, Univ. Alberta, Edmonton, AB, T6G 2P5

Field experiments were conducted to determine the effect of seeding canola in fall versus spring on root maggot infestations and crop damage. Interactions with seeding rate and seed treatment also were investigated. Seeding in fall was not consistently associated with increased damage from root maggots. Seed treatment effects were dependent on site and year, but increasing seeding rate resulted in less root maggot damage. Seeding canola in fall should not increase risk of crop damage from root maggot larvae.

Factors affecting flight behaviour of the large aspen tortrix, *Choristoneura conflictana* (Lepidoptera: Tortricidae).

Christine Elliott, Maya Evenden

Dept. Biological Sciences, Univ. Alberta, Edmonton, AB

Flight can be used as an estimate of insect dispersal capability for habitat/host location or mate-finding purposes. Flight characteristics were measured in the laboratory using computer-linked flight mills to record the flight behaviour of large aspen tortrix (*Choristoneura conflictana*) over 12 hours. This tortricid is being examined for differences in flight ability due to differences in sex, age, mating status and disease load. Sex and age differences will be discussed.

Effects of food limitation and density on carabid populations in forest floor enclosures.

Evan Esch, Joshua Jacobs, John Spence

Dept. Renewable Resources, Univ. Alberta, 442 Earth Sciences Bldg., Edmonton, Alberta, T6G 2E3

Carabid beetles are among the most common and diverse arthropods on the forest floor. Nonetheless, there have been few studies about density dependence and/or food limitation in carabid populations. We studied carabid assemblages in forest enclosures using food supplements and addition of beetles to vary food availability and density. Weight changes and population size were monitored among treatments to determine which factors control carabid beetle populations.

Sex pheromone components of the ash leaf coneroller, *Caloptilia fraxinella* (Lepidoptera: Gracillariidae), a new pest of ash in the prairies.

Maya Evenden¹, R. Gries², G. Gries²

¹Dept. Biological Sciences, Univ. Alberta; ²Dept. Biological Sciences, Simon Fraser Univ.

Two sex pheromone components were identified in gland extracts from female ash leaf conerollers using coupled gas chromatographic-electroantennographic detection. The biological activity of components was tested in field trapping and wind tunnel experiments. The ash leaf coneroller sex pheromone is a 100:10 ratio of (Z)11-Hexadecenal and (Z)11-Hexadecen-1-ol. Male moths were attracted to traps baited with pheromone at doses ranging from 1 to 300 µg with peak attraction to 100 µg.

Wheat-legume flour mixtures: baking and safe storage potential.

Paul G. Fields¹, D. Fenn¹, O.M. Lukow¹, G. Humphreys¹, J.I. Boye², W. Taylor³
Agriculture & Agri-Food Canada: ¹ Cereal Research Centre, Winnipeg, MB; ² Food Research and Development Centre, Saint-Hyacinthe, QC; ³ Saskatoon Research Centre, Saskatoon, SK

We examined the effect of three pulse proteins, soy, chickpea and pea, mixed with flours of various western wheat cultivars on the dough properties and end-product quality of bread, tortilla and noodles. Soy and pea composite flours reduced the feeding of rice weevil, but chickpea protein did not have this effect. All pulse proteins reduced the number of second generation red flour beetle adults. Composite flours have the potential to produce acceptable end-products that have some inherent protection from stored-grain insects.

Response of ground beetle assemblages (Carabidae) to cultivation of Bt corn during a 4-yr study.

Kevin D. Floate^{1,2}, H.A. Cárcamo¹, R. Blackshaw¹, B. Postman¹, S. Bourassa^{1,3}
¹ Lethbridge Research Centre, Agriculture & Agri-Food Canada, 5403 - 1st Avenue S., Lethbridge, AB, T1J 4B1; ²Univ. Lethbridge, AB; ³Univ. Alberta, Edmonton, AB

Ground beetles were monitored from 2000 to 2003 to assess their response to cultivation practices in plots of Bt corn vs plots of conventional corn grown with or without insecticide application. A significant treatment effect was detected only when data were combined across years, and only when all species were examined simultaneously with discriminant analyses. Differences were most apparent between treatments of Bt corn vs. corn grown with insecticide.

Temperature and moisture control of egg sacs by female fishing spiders, *Dolomedes triton* (Pisauridae).

Carol Frost, John Spence
Univ. Alberta, Dept. Renewable Resources, 442 Earth Sciences Bldg., Edmonton, AB, T6G 2E3
A female fishing spider invests a lot of time in her egg sac by carrying it for 16 days before hatch. The cost is that during this period she feeds at a reduced level, thus taking longer to produce a second sac than if she had abandoned the first one. I examined how a female increases reproductive output by behaviourally controlling temperature and moisture content of the egg sac.

A molecular approach to evaluating the ecological host range of European *Peristenus* spp. (Hymenoptera: Braconidae), parasitoids of *Lygus* spp. (Hemiptera: Miridae).

Tara D. Gariepy^{1,2,3}, Ulrich Kuhlmann², Cedric Gillott³, Martin Erlandson¹
¹ Agriculture and Agri-Food Canada, Saskatoon Research Centre, Saskatoon, SK, S7N 0X2; ² CABI Bioscience Switzerland, Rue des Grillons 1, CH-2800 Delémont, Switzerland; ³ Dept. Biology, Univ. Saskatchewan, 112 Science Place, Saskatoon, SK, S7N 5E2.

Molecular methods for detecting and identifying parasitoids within their hosts may expedite ecological studies prior to introducing exotic biological control agents. To determine the utility of molecular diagnostics in non-target risk assessment of European parasitoids of *Lygus* (Hemiptera: Miridae), a multiplex PCR assay for *Peristenus* (Hymenoptera: Braconidae) was applied to field-collected target and non-target mirids. Parasitism levels and parasitoid species composition based on rearing, dissection, and molecular analysis were compared.

Ovipositing female houseflies provide nutritional supplements for larval offspring.

Christine Geisreiter, Kevin Lam, Gerhard Gries
Dept. Biological Sciences, Simon Fraser University, Burnaby, BC, V5A 1S6.

In laboratory experiments, we show that female houseflies, *Musca domestica*, deposit, together with their eggs, a variety of bacteria. By rearing sterilized eggs on sterile larval-rearing media inoculated with various concentrations of these egg-associated bacteria, we found that significantly more offspring complete development when sufficient concentrations of these bacteria are present.

Flight performance of bumble bees with wing wear.

Claudia Haas, Ralph Cartar
Biological Sciences, Univ. Lethbridge, Lethbridge, AB

How does wing wear flight biomechanics in foraging bumble bees? We experimentally induced wing wear in worker bees, and measured their flights while foraging on fireweed flowers. Bumble bee flight performance was remarkably resilient in the face of induced wing wear. Travel times between widely space flowers were most affected by wing area. Biomechanics, especially velocity and acceleration, were most influenced by simultaneous high asymmetry and high wing area loss.

The spider's niche.

Kathleen Hancock, John Hancock
PO Box 2932, Pincher Creek, AB T0K 1W0

This presentation illustrates the diversity of niches utilized, in just one tree, by spiders. The importance of spiders as indicator species in monitoring the condition of a given habitat will be shown. Unlike most other invertebrates, spiders are not directly dependent on vegetation. Damaged habitats will show a decrease in niches. Spiders are often the first life form to recolonise a damaged habitat due to their ability to “balloon”. Diversity Index can be simplified by using the spider’s niche.

Went down to the cemetery looking for beetles.

Dustin J. Hartley, John R. Spence
Dept. Renewable Resources, Univ. Alberta, 442 Earth Sciences Bldg., Edmonton, AB, T6G 2E3

Carabid assemblages from grassland and graveyard habitats were sampled with pitfall traps along an urban-rural gradient in central Alberta. Beetles assemblages responded to differences in habitat quality, and structure of the surrounding landscape. The results demonstrate that ground beetle community is affected by urbanization and suggest that appropriate urban land management could limit the effect of human invasion on the native fauna.

Documenting fire characteristics: what is important in understanding fire and insect interactions?

Brad Hawkes
Natural Resources Canada, Canadian Forest Service Service, Pacific Forestry Centre, 506 W Burnside Road, Victoria, BC, V8Z 1M5

Recently, entomologists have been interested in understanding the relationships between insects and fire. Are the

fires being monitored and documented in a manner that facilitates an analysis of these relationships? What role do fire scientists have in a research team approach? This presentation will describe the current “state of art” in documenting fire severity and fire behavior as it might relate to insect population dynamics and early post burn vegetation succession.

Bioassay for observing wireworm movement in soil.

Wim van Herk, Robert S. Vernon

Agriculture & Agri-Food Canada, Pacific Agri-Food Research Center, 6947 #7 Highway, Agassiz, BC, V0M 1A0

What if you throw a party and no one shows up? Seed treatments for control of soil pests will have little effect if insects can detect and be repelled by the insecticides coated on the seeds. Here a bioassay is described to monitor wireworm orientation to treated seeds in soil. Wireworm orientation, feeding and post-feeding behaviours are discussed.

Soil fertility affects the preference and performance of a weed biocontrol insect.

Brian Van Hezewijk, Rose De Clerck-Floate

Lethbridge Research Centre, Agriculture & Agri-Food Canada, 5403 - 1st Avenue S., Lethbridge, AB, T1J 4B1

In a field experiment, nitrogen fertilization of hound’s tongue plants resulted in higher population growth rates of the weed biocontrol agent *Mogulones cruciger*. To understand this effect, the weevils’ preference for and performance on fertilized plants was measured in the laboratory. Weevils consumed more high-nitrogen leaves and laid 25% more eggs when fed high-nitrogen leaves. These results suggest weevils can assess host plant quality and respond numerically on fertile sites.

The response of ants (Hymenoptera: Formicidae) to seral change in the sub-boreal forests of British Columbia.

Robert J. Higgins, B.S. Lindgren, DA McColl

Univ. Northern British Columbia, 3333 University Way, Prince George, BC, V2N 4Z9

Despite the ubiquity of ants in the early seral stages of boreal and sub-boreal forests, little is known of their basic ecology or response to seral change. This study, possibly the first in Canada, conducted in the sub-boreal forests of central British Columbia, has examined the composition of the ant community in several seral stages. Distinct changes in community composition are evident suggesting species specific environmental preferences and possible inter-specific affects on species abundance.

Colonisation and association of freshwater invertebrates with three species of wood in a temperate stream.

Nancy Hofer, John S. Richardson

Univ. British Columbia, Dept. Forest Sciences, 3041 – 2424 Main Mall, Vancouver, BC, V6T 1Z4

Colonisation by stream invertebrates of three species of wood veneers, alder leaves and plastic mimics were compared. Leaves were significantly more colonised by invertebrates than were wood or plastic of similar surface areas. Detritivores showed this pattern the most; predators showed none. Contrasts showed that wood

was no more frequently colonised than plastic, suggesting that biofilm development on the surface or the substrate itself accounted for most of the colonists.

Review of the Harvestmen (Arachnida, Opiliones) of Canada.

Robert Holmberg
Centre for Science, Athabasca Univ., Athabasca, AB, T9S 3A3

Harvestmen are unique within the arachnids in that they possess a pair of defensive scent glands. Males have a true penis; females, a flexible ovipositor. Biological information, other than morphology used for taxonomy, is scant. However certain adaptations related to defence and avoidance of harsh environmental factors are known. Canada has about 50 species, nearly all of the suborder Palpatores. Many Canadian species are introduced or probably introduced from Europe.

Do drifting stream insects need to see the streambed to find it? The relative importance of visual and flow-related settlement cues for mayfly larvae.

Trent M. Hoover¹, John S. Richardson¹, Noboru Yonemitsu²

¹Dept. Forest Sciences, 2424 Main Mall, Univ. British Columbia, Vancouver, BC, V6T 1Z4; ² Dept. Civil Engineering, 2324 Main Mall, Univ. British Columbia, Vancouver, BC, V6T 1Z4

Stream insects can drift passively downstream, allowing them to disperse between patches of suitable habitat. The cues that enable drifting insects to orient to the bed were examined by recording the drift distances and associated behaviours of mayfly larvae released into the flow above beds of different roughness and colour. Swimming behaviours primarily controlled how far insects drifted, but bed colour and turbulence also played important roles.

Integrating *Delia radicum* & *Delia floralis* control in Sweden.

Richard Hopkins
Department of Entomology, Faculty of Natural Resources and Agriculture, Swedish University of Agricultural Sciences, Uppsala, Sweden

Studies at the Swedish University of Agricultural Sciences and Stockholm University aim to compare host-plant resistance to the two fly species *Delia radicum* and *D. floralis* in horticultural *Brassica* crops. Field studies will then be carried out to assess the influence of the arrangement of crops in the field on the oviposition patterns of *D. radicum*.

Breaking down the break-down: The rise and fall of beetle empires.

Joshua Jacobs¹, John Spence¹, David Langor²

¹Dept. Renewable Resources, Univ. Alberta, 442 Earth Sciences Bldg., Edmonton, AB, T6G 2E3; ² Northern Forestry Center, Canadian Forest Service, 5320 - 122 Street, Edmonton, AB, T6H 3S5

Coarse woody debris (CWD) provides habitat for many forest species. This study uses flight intercept traps to assess the succession of beetles that utilize standing white spruce CWD (snags) throughout the initial stages of decay. Our results indicate that there is a rapid succession of beetles in the first three years after death and many beetles require previous inhabitants to precondition the wood for their own colonization.

Patch foraging decisions of a parasitoid of concealed hosts.

Wade H. Jenner¹, B. Roitberg²

¹Carleton University, 1125 Colonel By Drive, Ottawa, ON, K1S 5B6; ²Simon Fraser University, 8888 University Drive, Burnaby, BC, V5A 1S6

Campoplex dubitator (Hymenoptera: Ichneumonidae) attacks the larvae of *Enarmonia formosana* (Lepidoptera: Tortricidae), which feed in the bark of several rosaceous trees. A single host patch may contain one to several larvae, but the parasitoid's exploitation of host resources is complicated by the presence of inaccessible larvae or abandoned, but still attractive, feeding sites. To maximise foraging efficiency, *C. dubitator* demonstrates flexible patch time allocation in response to variable patch quality.

Changes in distribution, abundance and phenology of Orthoptera in grassland, montane and alpine habitats during recent decades, with reference to influences of weather and vegetation.

Dan L. Johnson

Environmental Science / Department of Geography, University of Lethbridge, 4401 University Drive W., Lethbridge, AB, T1K 3M4

Approximately 100 species of Orthoptera are found in western Canada. Many of these are adapted to certain regimes of moisture, vegetation and growing season (heat). This presentation will cover changes between 1930 and 1980, and focus in detail on biogeography of rare and common Orthoptera during the last two decades, mainly in Alberta, but with additional observations in Manitoba, Saskatchewan and British Columbia.

A combined sex pheromone-based monitoring system for forest tent caterpillar (*Malacosoma disstria*) and large aspen tortrix (*Choristoneura conflictana*).

Brad C Jones, Maya L Evenden

Dept. Biological Sciences, Univ. Alberta, Edmonton, AB, T6G 2E9

The forest tent caterpillar, *Malacosoma disstria* Hübner, and large aspen tortrix, *Choristoneura conflictana* Walker are both important defoliators of trembling aspen in Canada. As the species do not share pheromone components but do exhibit overlapping adult flight periods, the opportunity exists for a combined sex pheromone-based monitoring tool to detect changes in population density. The goal is to relate male moth capture with relative densities of immature stages to develop a predictive model.

Does aggregation of codling moth larvae, *Cydia pomonella*, increase the risk of parasitism by the parasitoid, *Mastrus ridibundus*?

E. Jones¹, Zaid Jumean¹, T. Unruh², G. Gries¹

¹Simon Fraser University, Burnaby, BC, V5A 1S6, ²Yakima Agricultural Research Laboratory, Wapato, WA, USA 98951

We tested the hypothesis that (large) aggregations of codling moth larvae, *Cydia pomonella*, increase the risk of parasitism by the prepupal parasitoid *Mastrus ridibundus*. In wind-tunnel experiments, aggregated larvae on constructed tree trunks attracted more foraging female *M. ridibundus* than distributed larvae of the same density. However, large and small aggregations experienced similar rates of parasitism, suggesting that aggregations are not a trade-off between enhanced reproductive success of aggregation members and increased risk of parasitism.

Brachychthoniidae from western Canadian Grasslands; a new examination of the genus *Liochthonius*.

Derrick A. Kanashiro¹, M.J. Clapperton¹, and V. Behan-Pelletier².

Agriculture and Agri-Food Canada, ¹Lethbridge Research Centre, Lethbridge, AB; ²K. W. Neatby Bldg., 960 Carling Ave., Ottawa, ON, Canada K1A 0C6

Brachychthoniidae mites have been found to be the dominant mite family in Western Canadian grassland soils. To date approximately 28 Brachychthoniidae species have been identified and of those 15 appear to be new species. We will examine the genus *Liochthonius* and propose new taxonomic characters.

Mechanism of induced resistance to the pathogens in rice infested with white-backed planthopper, *Sogatella furcifera*.

Hiroo Kanno

Nagoya University of Arts, Shikatsu, Aichi 481-8503, Japan

It was recently confirmed that the rice plants previously been infested by the white-backed planthopper, *Sogatella furcifera*, strongly induce the systemic resistance to pathogens, such as the rice blast fungus, *Magnaporthe grisea*, and the rice leaf blast, *Xanthomonas campestris* pv. *oryzae*. The mechanism of such induced resistance that was investigated using molecular biological and biochemical analysis is introduced in the poster.

Using an insect pest to vector a biocontrol agent for plant pathogens.

J. P. Kapongo^{1,2}, J. Shipp², P.G. Kevan¹

¹Univ. Guelph, ON; ²Agriculture and Agri-Food Canada, Harrow, ON

Fungus gnats are typically considered a pest of greenhouse crops. However, laboratory trials found that adult and immature stages of this pest can vector spores of the antagonist fungus, *Clonostachys rosea*, for control of greenhouse plant pathogens. Spores of *C. rosea* were still viable after being vectored both externally and internally by *Bradysia* sp. and suppressed colonies of *Fusarium* and *Pythium* when plated on PDA Petri dishes.

Is bigger better?: Examining male competition in context.

Michael M. Kasumovic, Maydianne C.B. Andrade

Integrative Behaviour and Neuroscience Group, Univ. Toronto, Scarborough, ON, M1C 1A4

Studies examining correlates of male fitness associate male competitive success with larger size and/or weaponry. However, such studies ignore juvenile experience which can potentially overstate the importance of fixed, heritable traits to lifetime reproductive success. Using the Australian redback spider (*Latrodectus hasselti*), we show that when the developmental context is taken into consideration, phenotypes that are more closely matched to specific competitive challenges perform better than simply larger, better equipped males.

Rove beetles as a target group for biodiversity research on litter inhabiting fauna (Coleoptera: Staphylinidae).

Jan Klimaszewski

Natural Resources Canada, Canadian Forest Service, Laurentian Forestry Centre, 1055 du P.E.P.S., P.O. Box 3800, Sainte-Foy, QC, G1V 4C7.

Staphylinids are a major component of forest litter faunas, and are often a target group in biodiversity projects because they are: species rich; abundant; well represented in forest litter (30% of epigeic beetle species and 40-50% of beetle specimens); present in many macro- and microhabitats; functionally diverse; and good indicators of natural and human-induced forest disturbances. A review of the Canadian species, identification methods, and utilization in forestry studies is presented.

Fire severity, salvage logging and mixed-wood forest ground beetles (Carabidae).

Matti J. Koivula

Dept. Renewable Resources, 4-42 ESB, University of Alberta, Edmonton, AB, T6G 2E3

As one of the most important "natural" disturbances in boreal forests, fire creates spatially and temporally patchy resources for various organisms. Post-fire succession is often altered by salvage logging. I studied fire severity and post-fire logging at the House River fire area, Canada, during 2003-2004 by examining a total of 24 landscapes (625 ha each). I will present two-year results on ground beetles (Carabidae) of mixed-wood stands and the beetles' responses to the two aspects.

Examining the relationship between brood rearing in honey bees and populations of varroa mites in winter.

P.R. Kozak, R.W. Currie.

Dept. Entomology, Univ. Manitoba, Winnipeg, MB, R3T 2N2

The parasitic varroa mite is a major pest of honey bees worldwide. Colonies of overwintering honey bees were fumigated with formic acid to control varroa mites in an indoor wintering facility. Prior to fumigation brood was removed from half of the colonies to limit the amount of honey bee and mite reproduction. The goal was to examine the relationship between brood rearing by honey bees and increases in the populations of mites in winter.

Blood and tissue feeding parasitic mites on Albertan birds.

Wayne Knee, Heather Proctor

Dept. Biological Sciences, Univ. Alberta, Edmonton, AB, T6G 2E9

What species of blood and tissue feeding mites parasitize Albertan birds? We examined 282 birds representing 116 species, and found 37 species of parasitic mites. Novel host-mite species records were recorded. Potentially 4 new rhinonyssid species and 1 new knemidokoptid species were collected. Contributing to the knowledge of host associations of these mites may aid in better understanding of their evolution, ecology, and potential for disease transmission among hosts.

Indirect effects of soil fungi on the feeding performance of the sunflower beetle (*Zygogramma exclamationis*, Chrysomelidae), via changes to host sunflower plants (*Helianthus annuus*, Asteraceae).

Robert A. Laird, John F. Addicott

Dept. Biological Sciences, Univ. Calgary, Calgary, Alberta T2N 1N4

Mycorrhizal fungi form symbioses with the roots of most plant species, helping them forage for nutrients in exchange for photosynthates. Consequently, mycorrhizal and non-mycorrhizal plants potentially have different nutrient compositions, which can differentially affect insect herbivores. Through feeding experiments, we demonstrate that specialist sunflower beetle larvae have, (1) lower mortality, (2) faster

growth, and (3) a lower relative consumption rate when fed on mycorrhizal compared to non-mycorrhizal sunflowers.

Oviposition deterring signal found on housefly eggs.

Kevin Lam, Daron Babor, Bruce Duthie, Elisa-Marie Babor, Margo Moore, Gerhard Gries.
Dept. Biological Sciences, Simon Fraser University, Burnaby, BC, V5A 1S6

Female houseflies, *Musca domestica*, oviposit in aggregations on decaying organic matter, but avoid overcrowding and age disparity of eggs to prevent cannibalism among larval offspring. We have discovered a communication signal on the surface of housefly eggs that inhibits oviposition. If flies oviposit despite the deterrent signal, fewer offspring complete development. Through the signal, female houseflies inform each other about previous oviposition events. The signal also deterred oviposition on attractive chicken manure, and could be developed for housefly control in livestock production facilities.

Domestication of plants in the genus *Triticum*: consequences for the interaction between insect herbivores and wheat.

Robert J. Lamb, Samuel M. Migui, Ian L. Wise
Agriculture and Agri-Food Canada, Cereal Research Centre, 195 Dafoe Road, Winnipeg, MB, R3T 2M9

Wheat was domesticated by human selection of natural inter-specific hybrids, for traits that suited crop production.

The effects of domestication on herbivory was assessed for a wheat midge and three aphid species using wild, partially- and fully-domesticated species. The free-threshing trait essential for domestication increased suitability of wheat for wheat midge. Domestication had no effect on aphid-plant interactions, but tetraploid and hexaploid inter-specific hybrids are more susceptible than diploid wheats.

Maintaining saproxylic insects in managed forests.

David Langor, John Spence, James Hammond, Josh Jacobs, Tyler Cobb
Natural Resources Canada, Canadian Forest Service, 5320 –122 St., Edmonton, AB, T6H 3S5

Saproxylic insect assemblages are especially influenced by tree species, degree of decay, stand age and cause of tree death. Wildfire and harvesting have different effects on assemblages. Ongoing experiments will help identify optimal management prescriptions to minimize harvesting impacts on faunas. Development of a biologically meaningful classification system for dead wood will help identify habitats at risk due and improve strategies to better maintain saproxylic organisms in managed boreal forests.

Ant biodiversity in disturbed and undisturbed Guanacasta, Costa Rica lowland forest fragments.

Dave Larson
Univ. Alberta, Augustana Faculty, Camrose, AB, T4V 2R3

The results of ant biodiversity forest litter surveys conducted in four Guanacasta, Costa Rica forest fragments in the dry and the wet seasons will be presented. The effects of disturbance in forest fragments that occurred 50 yrs ago as well as season, edge effects and tramp species are examined.

Aggregation in the mountain pine beetle: does it pay to be first?

Tanya Latty, Mary Reid

Dept. of Biological Sciences, University of Calgary, Calgary, AB, T2N 1N4

The mountain pine beetle (*Dendroctonus ponderosae* Hopkins) relies on mass attack to overcome the defences of host trees. The first beetle to attack a tree is known as the pioneer and suffers higher mortality than individuals that join established aggregations. Field experiments were conducted to determine if the order in which individuals joined aggregations affected reproductive success and beetle survivorship. Preliminary results suggest that pioneers and early arrivers produce less offspring than late arriving beetles.

Canopy oribatid mite communities in ancient Western redcedar.

Zoë Lindo, N. N. Winchester

Univ. Victoria, Dept. Biology, P.O. Box 3020, Stn CSC, Victoria, BC, V8W 3N5

Ninety-four oribatid mite species, many undescribed, were recorded from canopy and forest floor habitats associated with Western redcedar on the southwest coast of Vancouver Island, British Columbia in September 2005. Nineteen of the 54 oribatid mite species observed from the canopy were unique to this system and not found on the forest floor. Additionally, the overall similarity of oribatid mite communities between the canopy and forest floor was low (35%).

Recent advances in the systematics of the family Clusiidae (Diptera).

Owen Lonsdale, Stephen Marshall

Dept. Environmental Biology, Univ. Guelph, Guelph, ON, N1G 2W7

The Clusiidae is a family of acalyptrate Diptera with 278 described species and at least 230 undescribed species in the New World alone, most of which belong to the diverse genus *Sobarocephala* Czerny (containing well over 200 species). Prior to recent studies at the University of Guelph, most New World Clusiidae were poorly known, and new discoveries have necessitated significant changes to clusiid higher classification, including the redefinition of subfamilies and erection of new genera.

Hybrid interactions between the spruce budworm, *Choristoneura fumiferana*, and the two year cycle budworm, *C. biennis* (Lepidoptera: Tortricidae).

Lisa Lumley, Felix Sperling

Dept. Biological Sciences, Univ. Alberta, Edmonton, AB, T6G 2E9

Geographical overlap of ranges and morphological similarities have made species identification within the spruce budworm complex difficult. We sampled two species within the complex, *Choristoneura fumiferana* and *C. biennis*, across Alberta and British Columbia in allopatric and sympatric regions. Mitochondrial DNA indicates that there are geographic areas in which the two species are hybridizing along the eastern slopes of the Rocky Mountains.

Wheat stem sawfly, *Cephus cinctus* Norton, and wheat interactions: an ecophysiological approach.

Tulio B. Macedo, Robert K. D. Peterson, David K. Weaver, Wendell L. Morrill

Land Resources and Environmental Science Dept., Montana State Univ., Bozeman, MT 59717.

Impact of wheat stem sawfly on photosynthetic capacity and primary metabolism of wheat was evaluated in three different environments: environmental growth chamber, greenhouse, and field. Wheat stem sawfly elicited different photosynthetic responses in different environments. Wheat gas exchange parameters were negatively impacted by insect feeding in growth chamber environment. Conversely, the same gas exchange responses were not observed under greenhouse and field conditions. This study demonstrates the role of environmental variables on plant responses to herbivores.

Stranger in a strange land: biology of a European birch leafminer in Alaska.

Chris MacQuarrie

University of Alberta, Dept. Renewable Resources, 442 Earth Sciences Bldg, Edmonton, AB, T6G 2H1

Understanding the biology of invasive species is useful in determining their environmental effects on native ecosystems. I investigated the phenology, development and mortality factors of *Profenusa thomsoni*, a European native, recently introduced to Anchorage, Alaska. Elsewhere in North America *P. thomsoni* is associated with 3-5 other birch leafmining species that are absent or rare in Alaska, presenting a unique opportunity to study this species in absence of competitors.

Behavioural evolution in the jumping spider genus *Habronattus*.

Wayne Maddison, Marshal Hedin

Depts. Zoology and Botany, Univ. British Columbia, Vancouver, BC, V6L 1Y5

Courtship ornamentation and behaviour of male *Habronattus* are complex and diverse, providing an opportunity to explore their evolution in a phylogenetic context. Courtship observations of more than 50 species suggest several patterns: coloured ornaments tend to be concentrated centrally; asymmetric motions have evolved many times; acoustic and visual events tend to be synchronized. These patterns may be due, in part, to constraints in females' sensory systems.

Ovicidal activities of *Annona squamosa* Linn. seed oil and two new compounds against two strains of *Tribolium castaneum* Herbst (Coleoptera: Tenebrionidae).

M. A. Malek

1187 Summerville Avenue, Ottawa, ON, K1Z 8G3

Ovicidal activities of Malathion, *Annona squamosa* Linn. seed oil and two new compounds were tested against eggs of FSS-2 and CTC-12 strains of *Tribolium castaneum* Herbst. The mortality of CTC-12 eggs showed little resistance to *A. squamosa* seed oil but it did not show resistance to the two new compounds. The LD₅₀ values for the mortality of eggs of FSS-2 and CTC-12 were 1.94, 2.42, 9689, 59428, 1.15, 2.51, 3.01 and 3.52 ppm respectively.

Protection of stored paddy (B.R.-3) by using plant extracts.

M. A. Malek, M. B. Parveen

1187 Summerville Avenue, Ottawa, ON, K1Z 8G3

The percentage of infestation of paddy by *Rhizopertha dominica* Fab. found to be 4.67±0.33; 5.33±0.88 and 5.67±0.67 which were significantly (P>0.001) reduced compared to the control (13.33±0.58) during 12 months storage. The percentage of paddy loss due to this insect infestation was 2.73±0.15; 4.00±0.29 and 5.13±0.03

by the treatment of 0.1gm (W/W) plant extracts. The percentage of germination of paddy was found to be 95.33 ± 0.33 ; 94.67 ± 0.88 ; 94.33 ± 0.67 and 86.67 ± 0.88 in control.

Effects of a variable food resource on the survival, growth rate and fitness of a riparian spider.

Laurie B. Marczak, John S. Richardson

3041-2424 Main Mall, Centre for Applied Conservation Research, Dept. Forest Sciences, Univ. British Columbia

Seasonal environments, where synchronized prey emergence results in large pulses of resource availability, impose limits on responses of consumers such as spiders. The ability to capitalise on short-lived resource peaks may lead to compensatory growth, which could be stage dependent. We used feeding trials and field observations to investigate growth rate plasticity, compensatory growth, and fitness effects of variable timing of resource pulses in the spider *Tetragnatha versicolor* (Araneae: Tetragnathidae).

Field evaluation of a gall mite, *Cecidophyes rouhollahi* Craemer (Acari: Eriophyidae), as a biological control agent for a cropland weed, false cleavers, *Galium spurium* L. (Rubiaceae).

Alec McClay

McClay Ecoscience, 15 Greenbriar Crescent, Sherwood Park, AB, Canada

Field plot studies were conducted on a European gall mite to evaluate its survival under field conditions, impact on false cleavers, dispersal, and effects of application timing. Mite treatments resulted in approximately 30% reductions in weed seed yield and biomass. Inoculation at the 2 leaf-whorl stage resulted in heavier galling and greater biomass reduction than at the 6 leaf-whorl stage. No evidence for overwinter survival of the mites was seen.

Pheromone mediated mating in *Aphidius ervi*.

Melanie McClure, Jeremy N. McNeil

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Mating in the aphid parasitoid, *Aphidius ervi*, is mediated by a female produced sex pheromone that is produced and/or released from the abdomen. Laboratory assays and field trapping showed that there was a significant decline in female attractiveness with age, and that pheromone production was significantly reduced following mating. In contrast there was no clear age-related pattern in the responsiveness of virgin males and mating did not modify male mating behaviour.

Onion maggot damage to onion varies with cultivar, plant spacing, and planting method.

Mary Ruth McDonald, Kevin Vander Kooi

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Onion maggot (*Delia antiqua* (Meigen)) damage to bulb onions was assessed on four cultivars grown at different spacings (17, 25, 34, 40 and 51 plants m⁻¹) on direct seeded and transplanted onions over three years. Cultivar had the greatest effect on damage; "Hoopla" was most susceptible. Effect of spacing and planting method varied from year to year. Where spacing had an effect, there was higher percent damage in denser spacings.

Phenotypic effects of infection with parthenogenesis-inducing *Wolbachia* on *Trichogramma sibericum* (Hymenoptera: Trichogrammatidae).

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Wolbachia infection causes parthenogenetic reproduction in *Trichogramma* wasps. Although associated reductions in egg production have also been observed, little is known about other phenotypic effects of infection. Here, we present data for egg load and wing size for a strain of *T. sibericum* infected with *Wolbachia* and for the same strain cured of infection. The results are discussed regarding the evolutionary ecology of *Wolbachia* and biological control using *Trichogramma*.

Impact of harvest operations on parasitism of the wheat stem sawfly, *Cephus cinctus* Norton (Hymenoptera: Cephidae).

Scott B. Meers

Alberta Agriculture Food and Rural Development, CDC Brooks, AB

Cephus cinctus, is a well recognized wheat pest in Alberta, Saskatchewan, North Dakota and Montana. Two species of parasitoids, *Bracon cephi* and *B. lissogaster*, effectively attack *C. cinctus* in wheat. The vast majority of overwintering cocoons (>80%) were consistently found in the bottom third of standing wheat stems when measured prior to harvest. Wheat stems cut at varying heights demonstrated that harvest practices impact overwinter survival of the parasitoids.

Integrated management of onion smut and onion maggot with reduced-risk seed treatments.

Z. Mona Moineddin¹, C. D. Scott-Dupree¹, C.R. Harris¹, B. J. Harris², J. H. Tolman³, A.G. Taylor⁴, M. R. McDonald⁵.

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Onion maggot (OM) (*Delia antiqua* Meigen) and onion smut (OS) (*Urocystis cepulae* Frost) are the most economically important pests of onions in Ontario. Our objective was to develop an efficacious, integrated approach to OS and OM control using reduced-risk fungicide/ insecticide seed treatment combinations. Several combinations were highly effective against OS and OM and represent >95% reduction in pesticide use as compared to current control programs.

What the buzz is all about: a taxonomic revision of the genus *Piezura* Rondani (Diptera: Fanniidae).

Amy Moores, Jade Savage

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Taxonomic errors have occurred within the genus *Piezura* Rondani, resulting in confusion relative to the status and species concepts of its members. To address these problems, all species have been redescribed under their proper name and species concepts and a new key of identification was written. The distribution range of most species has been modified and the female of *Piezura nearctica* Chillcott is described for the first time.

Post-diapause development duration of wheat stem sawflies and parasitoids from China and the US.

Wendell L. Morrill¹, Kim A. Hoelmer², Thomas G. Shanower³

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Post-diapause development periods of *Cephus cinctus* Norton from Montana and *Cephus fumipennis* Eversmann (Hymenoptera: Cephidae) from China were compared to determine if differences in seasonal phenology would preclude compatibility of host-specific parasitoids. An egg parasitoid, *Collyria* n spp. (Hymenoptera: Ichneumonidae) attacks sawflies in China, but is not known to occur in North America.

Long morphological branches in the genus *Nicrophorus* (Coleoptera: Silphidae).

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Phylogenetic analyses of the nepalensis group of species in the genus *Nicrophorus* have revealed a possible case of morphological-based long-branch attraction. Bayesian Inference using the MkV model was compared with Parsimony using data simulated in both the Felsenstein and Farris zones. Complicating this problem, morphological data strongly conflict with molecular data.

Damage to juvenile hemlock in Pacific coastal forests by the blackheaded budworm.

Vince G. Nealis

Natural Resources Canada, Canadian Forest Service, Pacific Forestry Centre, 506 W Burnside Rd, Victoria, BC, V8Z 1M5

An outbreak of western blackheaded budworm, *Acleris gloverana*, on the Queen Charlotte Islands, BC (1996-2001) defoliated 170 000 ha of western hemlock and was most intense in juvenile stands, especially those that had been previously spaced. Although overall mortality was relatively low, top-kill, dramatic reductions in radial increment, and slow recovery of damaged hemlock has created a significant disturbance to expected productivity. These losses are quantified and management alternatives discussed.

Carabid beetle diversity associated with agroforestry buffers and its potential impact on adjacent field crops.

Christine Noronha

Agriculture and Agri-Food Canada, Crops and Livestock Research Centre, 440 University Avenue, Charlottetown PE, C1A 4N6

The diversity of Carabid beetle species associated with a forest buffer and its impact on diversity within the adjacent crop field, was studied in 2004. Pitfall traps were used to collect beetles every two weeks from within the crop and forest buffer of three fields at Harrington farms on PEI. Forty-three species of the family Carabidae were identified; populations within the forest and at different distances within field will be discussed.

Wheat stem sawfly in Saskatchewan.

Owen Olfert¹, S. Hartley².

¹Agriculture and Agri-Food Canada, Saskatoon Research Centre, 107 Science Place, Saskatoon, SK, S7N 0X2; ²Saskatchewan Agriculture and Food, Regina, SK, S4S 0B1

The first sawfly surveys in over 50 years indicated that wheat stem sawfly (*Cephus cinctus*) is distributed throughout much of the wheat-growing area of Saskatchewan. Crop injury by this pest is usually more prevalent within field edges. However, in some extreme cases, entire fields have been affected with estimates of more than 50 per cent of the stems cut.

Epidemiology of Aster Yellows Disease in canola crops in Saskatchewan, 2001 – 2005.

Chrystel Olivier, Brian Galka, Owen O. Olfert.

Agriculture and Agri-Food Canada, Saskatoon Research Centre, 107 Science Place, Saskatoon, SK, S7N 0X2

Incidence of Aster Yellows disease and populations of leafhoppers were surveyed in canola and cereal crops from 2001 to 2005. PCR testing was used to estimate the % of phytoplasma-infected leafhoppers and plants. Phytoplasmas were detected in the predominant leafhopper vector, *Macrostelus quadrilineatus* and in 11 other species of leafhoppers. Phytoplasmas were detected in roots, stems and leaves of symptomatic and symptomless canola and cereal plants as well as in canola seeds.

Does bad taxonomy serve conservation purposes? The case of the *Cicurina cueva* complex (Araneae: Dictynidae) in the vicinity of Austin (Travis Co.) Texas.

Pierre Paquin, Marshal Hedin

Dept. Biology, San Diego State Univ., San Diego, CA, USA

Cicurina cueva is a species of concern known from only two caves in the vicinity of Austin (Texas). The mtDNA phylogenetic approach of Paquin & Hedin (2004) was used to assign names to juveniles collected in 70 caves of the region. Results suggest that *C. cueva*, *C. bandida* and *C. reyesi* represent the same biological entity and that spermathecal variation is important. Conservation policies should be based on sound taxonomy in order to insure their long-term efficacy.

***Cicurina* (Dictynidae): the genus from hell.**

Pierre Paquin

Dept. Biology, San Diego State Univ., San Diego, CA, USA

The troubled growth of the taxonomy and systematics of the genus is reviewed. In addition to its troglobitic radiation, *Cicurina* is also characterized by the rarity of many species, the rarity of males, a peculiar phenology that suggest cryophilic affinities, and extreme variation of female genitalia. The combined use of molecular data, morphology and geography provides insights for a revision of the genus and leads towards a comprehensive phylogeny.

The role of diversity in agricultural systems: effect of intercropping on cabbage maggot, *Delia radicum* (Diptera: Anthomyiidae) oviposition and cauliflower yield.

Carolyn Parsons^{1,2}, P. Dixon¹, M. Colbo²

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The role of increasing vegetational diversity in agricultural systems is of increasing importance in developing more sustainable forms of crop production. Increasing diversity within cropping systems enables growers to rely on basic ecological processes to help manage insect pests. This discussion will focus on diversification research in agricultural systems, specifically the effect of within field diversification on first generation *D. radicum* egg numbers and cauliflower yield.

Oviposition preference of wheat stem sawfly (Hymenoptera: Cephidae) and larval performance on wheat and downy brome grass (Cyperales: Poacea).

Joel Perez-Mendoza, David K. Weaver, Wendell L. Morrill

Land Resources and Environmental Science Dept., Montana State Univ., Bozeman, MT, USA 59717.

Oviposition preference and larval survivorship of sawflies were compared in downy brome grass and wheat in field conditions in Montana. Seven weekly randomly-selected samples for each plant species were collected at spots where both plants were growing together. About 67% of the grass and 31% of the wheat were infested with sawflies throughout the entire growing season. Larval survivorship was more than 2-fold higher in mature wheat than in grass.

***Cardinium*, a recently discovered bacterial symbiont that manipulates reproduction in insects.**

Steve Perlman

Dept. Biology, Univ. Victoria, Victoria, BC

Cardinium is a recently discovered bacterial symbiont which appears to rival *Wolbachia* as a master manipulator of reproduction. It is widespread in arthropods, and induces diverse phenotypes, including parthenogenesis and cytoplasmic incompatibility in *Encarsia* wasps (Hymenoptera: Aphelinidae). *Cardinium* is in the *Bacteroidetes* group and thus not related to *Wolbachia*, providing exciting opportunities for a comparative approach in understanding the ecology, evolution and mechanisms of reproductive parasitism.

Variable larval life history of the malaria mosquito *Anopheles gambiae*.

Conan Phelan, Bernard D. Roitberg

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Mosquitoes exhibit variable adult sizes and larval development times. However, large size is associated with increased fecundity and survival, and developmental time and energetic state may influence disease transmission. Using both modeling and experimental approaches we attempted to discover the developmental rules *Anopheles gambiae* uses under various food availabilities. Evidence suggests a growth strategy that manages the risk of starvation and complexities of insect physiology against the advantages of size.

Effects of the crayfish *Orconectes virilis* on the aquatic invertebrates of a recovering acidified lake: A reintroduction or an invasion?

Iain D. Phillips¹, R. D. Vinebrooke¹

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Re-introduction of extirpated species is one possible strategy to facilitate ecosystem recovery. Here we re-introduced an extirpated crayfish, *Orconectes virilis*, into a recovering acidified boreal lake to determine its effects on aquatic invertebrates. *O. virilis* altered the invertebrate community and significantly suppressed invertebrate biomass. Our findings suggest re-introduction of *O. virilis* must be controlled carefully as this omnivore can function as an invader, with negative effects on aquatic invertebrates.

Rove beetles (Coleoptera: Staphylinidae) in northern forests.

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We review the state of taxonomic and biological knowledge of rove beetles occurring in northern forests. Spatial and temporal distribution patterns, and the effects of anthropogenic and natural disturbance is examined, based primarily on large-scale experimental work carried out in western Canada. As well, the role of exotic introductions is discussed. We make recommendations for conservation of rove beetles in managed forests, and identify key gaps in our current knowledge.

Do feather mites choose hosts based on host body size?

Heather C. Proctor, Steve Kembel

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Host-specificity among symbionts ranges from monoxenous to polyxenous (many host species). Polyxenous ectosymbionts may select host species that have similar body shapes or sizes. We tested the hypothesis that hosts of polyxenous feather mites (*Proctophyllodes* spp.) are more similar in body size than expected. We found strong evidence that birds hosting the same mite were unusually similar in weight; phylogenetic controls reduced but did not eliminate all significant relationships.

Timing emergence of two-spotted spider mites, *Tetranychus urticae*.

David Raworth

Agriculture and Agri-Food Canada, P.O. Box 1000 – 6947 # 7 Highway, Agassiz, BC, V0M 1A0

Emergence of *T. urticae* from winter diapause on strawberry in southwestern British Columbia was studied from 1988 to 1995. *T. urticae*-infested leaves collected from fields in February were monitored at different temperatures to provide a temperature threshold for initial egg production. Fields were monitored for egg production. Timing of initial egg production was predicted as a function of temperature, and interpreted in terms of long-term warming trends.

Habitat-dependent movement in bark beetles.

Mary Reid

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The movement of insects searching for resources can be influenced by the type of habitat they are moving through. Possible reasons for habitat-dependent movement include the habitat's structural complexity and the density of resources contained within. Here I present data from mark-recapture studies of bark beetles (Scolytinae) that suggest that both structure and resources may be important in determining the range of dispersal in bark beetles.

The effects of temperature on fungal pathogenesis of the black vine weevil (*Otiorhynchus sulcatus*) by *Metarhizium anisopliae* isolates of differing cold tolerance.

Aaron Retzlaff

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The black vine weevil (*Otiorhynchus sulcatus*) has few viable chemical control options and so investigation of alternate controls including fungal pathogens is required. A commercial isolate of *Metarhizium anisopliae* can control the black vine weevil but may not be suited to cool climates. Research concerning whether the commercial isolate can be effective relative to a cold-tolerant isolate at temperatures reflecting the natural range for the black vine weevil will be presented.

Aquatic arthropods and large-scale land-use effects in temperate North America.

John Richardson

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Aquatic arthropods are affected by forest management resulting from changes in hydrology, sediment run-off, temperature modifications, and food-web effects. The suite of alterations depends on local topography, climate, and the particular management practices. Impacts on all trophic levels, especially in streams, can occur from forest harvesting. The primary tool for mitigating these impacts is the use of riparian buffers, the effectiveness of which is largely untested.

Forest landscape patterns and mountain pine beetle management.

Bill Riel, T.L. Shore, J. Hughes, A. Fall, M Eng.

Canadian Forest Service, Pacific Forestry Centre, 506 West Burnside Road, Victoria, BC, V8Z 1M5

A simulation has been developed to explore the effects of host abundance and spatial patterns on mountain pine beetle (*Dendroctonus ponderosae* Hopkins) outbreak behaviour. A pattern generation model was developed after analyzing 57 landscapes in British Columbia. This model was used to generate a wide range of landscape types on which varying levels and patterns of beetles were introduced and different management strategies evaluated through stochastic simulations.

Interaction of *Aleochara bilineata* and *A. bipustulata* for host locations.

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Aleochara bilineata (Gyll.) and *A. bipustulata* (L.) first instar larvae are important pupal ectoparasitoids of *Delia radicum* in many brassica crops in Europe. In North America, *A. bipustulata* does not occur, and if introduced into the Canadian prairies it may have an additive effect on the mortality of *D. radicum*. Field and laboratory experiments were used to determine if intra- and interspecific competition occurs between the adult or larval stage or female oviposition choice.

The effects of time and preservation techniques on DNA quality in insect specimens.

Amanda Roe, F.A.H. Sperling

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Insect molecular systematics has become increasingly prevalent and obtaining specimens with intact DNA is of great importance. A variety of methods exist for killing and preserving specimens, although optimal conditions are not always available, particularly in field conditions. The effects of time and preservation technique on DNA quality was examined. The results of this study will provide recommendations to researchers wishing to gather specimens for molecular studies.

Assessing dispersal of the knapweed biocontrol agent *Cyphocleonus achates* in response to density and time of release.

Kimberly J. Rondeau^{1,2} Rob Bouchier², Jens Roland¹

¹Dept. Biological Sciences, Univ. Alberta, Edmonton, AB; ² Agriculture and Agri-Food Canada, Lethbridge, AB

Cyphocleonus achates (Coleoptera: Curculionidae) has been demonstrated to reduce field densities of knapweed (*Centaurea diffusa*) but its dispersal abilities are limited and poorly understood. Individual mark-recapture methods were used in natural and experimental field plots to determine the factors influencing *C. achates* dispersal. Later releases and high densities have been found to increase dispersal rates and can be used to predict plant life stage preference of the beetles.

Beetles, fire and tallgrass prairie.

Rob Roughley

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Fire is one of the predominant kinds of disturbance in grasslands and it is often used by prairie managers. From 1997 to 2000 we studied ground beetle (Coleoptera: Carabidae) and vegetation species richness and abundance on the St. Charles Rifle Range near Winnipeg, Manitoba. The implications of using disturbance for prairie managers are extensive and recommendations are made for future studies as well as management techniques.

Analysis of the possible attraction of *Culex pipiens* to human hosts in a Niagara Region woodlot.

Curtis B. Russell, Fiona F. Hunter

Biology Dept., Brock Univ., 500 Glenridge Ave., St. Catharines, ON, L2S 3A1

Previous work has shown that *Cx. pipiens* will weaken in its host attraction to birds near the end of the season and be attracted to mammals. The purpose of this study is to determine if these mosquitoes will be attracted to humans at two different elevations in a Niagara Region woodlot. Human hosts were placed in tree stands at ~5 m and ground level over the course of the entire season.

Validity of using chronosequence studies to predict carabid beetle (Coleoptera: Carabidae) assemblage response to forest succession in managed and natural jack pine (*Pinus banksiana*) forests in southeastern Manitoba.

Kathleen Ryan¹, N. J. Holliday¹, A. R. Westwood²

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In this follow-up study we examined the influence of forest succession on carabid beetle assemblages. We assessed insect communities in the same sites and examined changes over the intervening period. We evaluated how well temporal changes were predicted by the previous age-class-based experimental design. Carabid assemblages followed clear trends associated with forest age; certain patterns differed between managed and natural forests. These temporal patterns were predicted by the previous study.

Pyrophily in boreal insects: Do wildfires really contribute at maintaining higher populations?

Michel Saint-Germain¹, Christopher M. Buddle¹, Pierre Drapeau²

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Several insect species respond to smoke and heat generated by forest fires and use recent burns to reproduce. These species are rarely captured in undisturbed forests and have been assumed to be fire-dependent. In this talk, we raise a few questions about boreal landscape dynamics and insect ecology that may suggest that fire dependency is not a viable strategy, and that pyrophilous species could probably do without fire.

Characteristic communities, hungry hunters, and unknown immatures: studying spider assemblages in apple orchards.

Tara Sackett¹, Chris Buddle¹, Charles Vincent²

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Spiders are predators of many pests in agroecosystems. In apple orchards I studied spider predation of *Choristoneura rosaceana* larvae (Tortricidae), the relationship between habitat structure and source populations of spiders to orchards, and whether current collection techniques, which exclude immature specimens, affect spider community analysis. Deciduous forests, more than herbaceous habitats, are the main source of spider immigration to orchards. Certain analyses are affected by the exclusion of immature specimens.

The dynamics of coexistence of three temperate species of web-building spiders in British Columbia.

Maxence Salomon¹, Samantha Vibert², Bernard D. Roitberg¹

¹Behavioural Ecology Research Group, and ²Centre for Environmental Biology, Simon Fraser University, Burnaby, BC

Web-building spiders are territorial animals that generally avoid living in close proximity to one another. We conducted a field experiment to investigate what conditions allow for the coexistence of native western black widow spiders and introduced European house spiders in coastal habitats of southern British Columbia. Here,

we present our results and discuss them in the context of habitat selection theory and the evolution of social behaviour.

Effects of Host Plant Nutrient Regime on Performance of the Diamondback moth, *Plutella xylostella*.

Rana M. Sarfraz¹, L. M. Dossall², B.A. Keddie¹

Univ. Alberta, Edmonton, AB: ¹Dept. Biological Sciences, T6G 2E9; ²Dept. Agricultural, Food and Nutritional Science, T6G 2P5

Five fertility regimes were investigated to determine their effects on several developmental parameters of the diamondback moth (DBM), *Plutella xylostella* (L.) (Lepidoptera: Plutellidae). We studied survival, developmental period, herbivory, weight of pupae and silk cocoons, adult longevity, fecundity, wing area, and oviposition preference. Possible correlation between DBM herbivory and plant response in the form of root growth were assessed at different fertilizer levels. The impact of soil fertility on the development of epicuticular leaf waxes was also determined.

Recovery of the arthropod fauna in an Antelope-brush community following destruction by fire.

G.G.E. Scudder

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The recovery of the arthropod fauna in the Haynes Lease Ecological Reserve near Osoyoos, BC following elimination by fire in July 1993 is considered. This paper reports on pan-trap research that documented the early aerial recolonization, and pit-fall trapping research that has investigated the origin and reinvasion by ground-dwelling arthropods in the 12 years since the fire. Changes in this fauna over time are discussed.

Classical biological control of the wheat stem sawfly: An update.

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Wheat stem sawfly (*Cephus cinctus* [Hymenoptera: Cephidae], one of only four grass-feeding cephids in the palearctic region, is a key pest of wheat in the U.S.A. and Canada. Previous biological control efforts utilized European parasitoids which failed to establish despite large releases over many years. The current project is evaluating *Collyria* sp.n. (Hymenoptera: Ichneumonidae) collected from *Cephus fumipennis* in China. Initial results indicate that *Collyria* sp.n. recognizes and locates *C. cinctus* oviposition sites, and successfully oviposits into *C. cinctus* eggs.

Make me a woman: an examination of developmental stage and sexual determination in mermithid-infected (Nematoda: Mermithidae) black flies (Diptera: Simuliidae).

Amy Sharp, Fiona F. Hunter

Biology Dept., Brock Univ., 500 Glenridge Ave., St. Catharines, ON, L2S 3A1

Feminization is observed in nematode-infected (Nematoda: Mermithidae) black flies (Diptera: Simuliidae). While studies have revealed mermithid infections in the larval, pupal and adult stages of simuliid development, it remains uncertain as to the exact developmental stage at which feminization occurs. To highlight such sexual alteration at the aforementioned developmental stages, nematode-infected black fly larvae, pupae and adults were sexed by examining gonad development and morphology. Chromosomal examination confirmed the morphological observations.

Modeling the eastern spread of the mountain pine beetle.

Terry L. Shore, Andrew Fall, Bill G. Riel

Canadian Forest Service, Pacific Forestry Centre, 506 West Burnside Road, Victoria, BC, V8Z 1M5

The mountain pine beetle has killed mature pine over 7 million ha of BC. Recently it has been found in several locations in western Alberta. We are developing a model to simulate the spread and impact of the beetle under various management and future climate scenarios. Of particular importance is the potential for the infestation to cross Alberta into the jack pine forests, which extend to eastern Canada.

Constructing inexpensive databases for remote contributions: tools for biodiversity, systematics, and collaborative efforts. [Demonstration]

David P. Shorthouse

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Generating species lists and publication-quality maps of specimen collection locales has traditionally been a very difficult task, especially if the goal is to produce lists and maps for entire biogeographical regions. The challenge requires access to voucher records from disparate sources, a deep knowledge of nomenclature, and the often insurmountable funds to plot these locales using geospatially-aware software. Technical challenges are no longer problems for institutions or individual collectors. There is also no budgetary reason why all of our Canadian biota from plants to vertebrates cannot be mapped using collection records across institutions. Thanks to the influx of open-source software, on-line databases that permit real-time species lists, layered distribution maps, and remote uploads of voucher records can be accomplished with nothing more than the cost of an old PC, an Internet connection, and a little patience. The tools and output that will be presented also need not be tied to a web server, but can be quickly installed and run under Windows XP if the goal is to generate maps using personal collection records at any resolution for use in peer-reviewed publications.

Muscles, glands and genitalia – the utilization of soft-part morphology in butterfly systematics.

Thomas J. Simonsen

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Histology has received limited interest in insect taxonomy and systematics and mainly been used in higher-level systematics. The reasons for this are: tradition, methodological and terminological difficulties, and equipment requirements. There are, however, several good reasons to include histological characters in lower-level systematic studies, despite the methodological difficulties. In this talk I illustrate the usefulness of histological characters based on my work on the phylogeny of Fritillary Butterflies (Lepidoptera: Nymphalidae).

Quantifying sawfly impacts on wheat yield.

Sharlene E. Sing¹, David K. Weaver² and Wendell L. Morrill²

¹US Forest Service, Rocky Mountain Research Station RM-4151, Bozeman, MT, USA; ²Land Resources and Environmental Sciences, Montana State Univ., Bozeman, MT, USA

Specialized herbivory is the primary biotic stressor influencing yield in dryland wheat. Although it continues to be a significant wheat pest in western North America, a definitive characterization of sawfly impact on wheat yield remains elusive. Yield loss due to sawfly infestation is assessed in terms of agronomic practices

(solid versus hollow stemmed varieties), behavioral factors influencing host selection and use, and ecological interactions such as interspecific competition.

Assessment of the attraction of endemic mountain pine beetles to lodgepole pine trees infested with *Pseudips mexicanus*.

Greg Smith, Allan Carroll, Staffan Lindgren

Canadian Forest Service, Pacific Forestry Centre, 506 West Burnside Rd., Victoria, BC, V8Z 1M5

The mountain pine beetle in its endemic state is often found cohabiting weak lodgepole pines with the bark beetle species *Pseudips mexicanus*. Trees infested by the early flying *P. mexicanus* may be more attractive to endemic mountain pine beetles than trees without. An experiment using funnel traps was conducted to assess this attraction and the results will be discussed in the context of mountain pine beetle population dynamics.

Ten years of root maggot research: postcards from the edge – of the canola field.

Juliana Soroka¹, Robert Elliott¹, Owen Olfert¹, Ross Weiss¹, Kevin Falk¹, Gerhard Rakow¹, Margaret Gruber¹, Gordon Thomas¹, Lloyd Dossdall², Ed Seidle³, Hugh Philip⁴

¹Agriculture and Agri-Food Canada, Saskatoon Research Centre, 107 Science Place, Saskatoon, SK, S7N 0X2;

²Dept. Agricultural, Food and Nutritional Science, Univ. Alberta, Edmonton, AB, T6G 2P5; ³Seidle Seed Farms, Medstead, SK, S0M 1W0; ⁴British Columbia Ministry of Agriculture, Food and Fisheries, Kelowna, BC, V1X 7G5.

Investigations on crucifer-feeding root maggots (*Delia* spp.) include prairie-wide surveys for maggot damage to canola, forecasting maggot damage, host plant resistance studies, correlations of damage and yield, and agronomic factors affecting maggot feeding levels. Ecological and climatological parameters strongly affect maggot injury to canola roots, while factors such as initial seed size do not.

Unthreatening forest arthropods: simultaneous management of ‘beeillions’ of small and heterogenous risks.

John Spence¹, David Langor², Jan Volney² and Joshua Jacobs¹

¹Dept. Renewable Resources, Univ. Alberta, Edmonton, AB, T6G 2H1; ²Canadian Forest Service, 5320 –122 St., Edmonton, AB, T6H 3S5

Arthropods are superior indicators of inadvertent and unwanted impacts of humans on forest ecosystems. Although most species are benign or functionally important with respect to human values, they are loved by few. Specialists in invertebrates must find strength in convincing science to set clear goals for conservation, to develop coarse filters for a full range of scales, and to promote realistic and practical approaches to biomonitoring, action thresholds and actual prescriptions.

Gerrid diets: specialists for a surface smorgasboard.

John Spence

Dept. Renewable Resources, Univ. Alberta, Edmonton, AB, T6G 2H1

Semi-aquatic bugs are often portrayed as surface-feeding scavengers exhibiting little choice among cadavers from which they suck their food. Analysis of c. 1500 prey items taken from two commonly co-occurring prairie waterstriders (*Gerris buenoi* and *Limnoporus dissortis*) suggests that food partitioning plays a role in their coexistence. The species and their various life-history stages use different sizes and taxa of prey consistent with specialized dependence on the surface food resource.

Structure and conservation of lepidopteran communities in managed forests of northeastern North America: a review.

Keith S. Summerville, Thomas O. Crist

Dept. Environmental Science & Policy, Drake Univ., Des Moines, Iowa, USA 50311

We review patterns of lepidopteran diversity in managed forests of northern North America. Lepidoptera respond predictably to timber harvest, with changes in community structure driven by the magnitude of floristic alteration. Fragmentation effects on moth communities may be characterized by species replacement. Shifts in composition towards herbaceous-feeding moths are more substantial than changes in richness. Lepidoptera that appear sensitive to logging are dietary specialists, dispersal limited, or dependent on commercially-valuable trees.

Pheromones of the brown spruce longhorn beetle, *Tetropium fuscum* (F.): preliminary results.

Jon Sweeney¹, Peter Silk^{1,2}, Jerzy Gutowski³, Jocelyn Millar⁴, Larry Hanks⁵

¹ Canadian Forest Service, PO Box 4000, Fredericton, NB, E3B 5P7; ² Silk Biochemical Services, 642 McLeod Hill Road, Fredericton, NB, E3A 6J4; ³ Forest Research Institute, Białowieża, Poland; ⁴ Dept. Entomology, Univ. California, Riverside, CA 92521; ⁵ Dept. Entomology, Univ. Illinois at Urbana-Champaign, Urbana, IL, USA 61801

Male *Tetropium fuscum* (F.) (Coleoptera: Cerambycidae) beetles were observed displaying what appeared to be calling behavior in the lab. Headspace samples above male *T. fuscum* revealed a 6-carbon ketol that elicited antennal response in both male and female *T. fuscum* in electroantennograms. In field trapping bioassays, the racemic 6-carbon ketol was not attractive but significantly increased catch when combined with host volatile lures, compared to the host volatiles alone.

Western conifer seed bug, *Leptoglossus occidentalis* Heidemann: characterization and attractiveness of male-produced sonic and vibrational signals.

S. Takács, Karl Hardin, R. Bennett, W. Strong, G. Gries

Dept. Biological Sciences, Simon Fraser Univ., Burnaby, BC, V5A 1S6

We tested the hypothesis that *Leptoglossus occidentalis* Heidemann (Hemiptera: Coreidae) use sonic and vibrational signals in addition to pheromonal signals for communication. Played-back male-produced sonic signals attracted males and females, but not nymphs, in arena bioassays. Male-produced vibrational signals transferred to a wooden dowel by piezoelectric loudspeakers attracted females, but not males.

A taxonomic study of *Anopheles* (Diptera: Culicidae) based on cytogenetic and morphological data.

Aynsley Thielman, F. F. Hunter

Dept. Biological Sciences, Brock Univ., St. Catharines, ON, L2S 3A1

Mosquito species of the genus *Anopheles* (Diptera: Culicidae) were collected from 4 main regions in Ontario. Fourth instar larvae and adult males and females were examined morphologically to investigate their phylogenetic relationships, to elucidate sibling or isomorphic species and to determine any new species records or distributions. Preliminary results will be presented.

Do molecular data support an ancient rapid radiation in *Nicrophorus* (Coleoptera: Silphidae)?

Chandra Venables, Derek Sikes
2713 4th ave. NW Calgary Alberta, T2N 0P9

Previous phylogenetic analyses of Burying beetles (*Silphidae:Nicrophorus*) show a polytomy in the mid-level of the clade with well supported basal and terminal branches. The polytomy may represent rapid radiation, or be an artifact of insufficient data. Maximum likelihood, MP and Bayesian analyses on a data set containing additional informative sites and increased number of species, did not completely resolve the polytomy. This suggests the hypothesis that the nicrophorines have undergone an ancient rapid radiation may be correct.

The myth of necrotic arachnidism: mythconceptions, mythidentifications and mythdiagnosis.

Rick Vetter
Dept. Entomology, Univ. California, Riverside, CA, USA 92521

Spiders are frequently blamed for causing many medical maladies due more to historical prejudice, hyperbolic word-of-mouth and medical misdiagnoses rather than solid evidence-based research. Re-examination of “facts” regarding medically-implicated spiders by a small group of clinicians and arachnologists has shown that many of these are myths instead. Many medical conditions of diverse origins manifest in necrotic lesions which are more probable etiologies of skin eruptions than are spider bites.

Managing the wheat stem sawfly, an adaptive pest: a tribute to the research of Wendell Morrill.

David Weaver
Land Resources and Environmental Science Dept., Montana State Univ., Bozeman, MT, USA 59717

The wheat stem sawfly is a major pest of dryland wheat production in the Northern Great Plains States and Prairie Provinces, causing an estimated \$100 million (U.S.). Over the past two decades, the research of Dr. Wendell Morrill, Montana State University, has identified key changes in the field biology of the sawfly, and focused on its biological control by endemic natural enemies. Recent research on inoculative redistribution of native parasitoids and conservation biological control will be highlighted in recognition of Dr. Morrill’s contributions.

Project IBISCA - Stratification and beta diversity of arthropods in a Panamanian rainforest.

Neville N. Winchester
Biology Dept., Univ. Victoria, P.O. Box 3020, Victoria, BC, V8W 3N5

Biodiversity of Soil and Canopy Arthropods (Project IBISCA), examines overall patterns of spatial and vertical distribution of arthropods using sixteen sampling protocols, across nine spatial replicates (20 X 20m plots) and 4 seasonal replicates (2003, 2004) in the San Lorenzo forest, Panama. Beta-diversity of oribatid mites and their vertical stratification are discussed by comparing ground, mid-canopy and upper canopy. Meta-data analysis of focal taxa and remote sensing data, canopy openness and vegetation characteristics are presented.

The potential for synergism between horticultural oils and sprayable pheromone formulations in the behavioural manipulation of the oblique-banded leafroller, *Choristoneura rosaceana* (Lepidoptera: Tortricidae).

Andreas Wins-Purdy¹, Maya Evenden, Gary Judd²

¹Dept. Biological Sciences, Univ. Alberta, Edmonton, AB, T6G 2E9; ²PARC Canada, 4200 Hwy 97, Summerland, BC, V0H 1Z0

The oblique-banded leafroller, *Choristoneura rosaceana* (Lepidoptera: Tortricidae) is a key orchard pest in western Canada. As part of an integrated pest management strategy, my research examines the novel approach of combining a light grade horticultural oil with a sprayable leafroller pheromone. This approach to controlling this pest is examined through both oviposition and male mate-finding bioassays, with the broader goal of developing a viable alternative to the traditional application of organophosphate insecticides against tortricid moths in apple agroecosystems.

Resistance to Hessian fly (Diptera: Cecidomyiidae) in a Canadian spring wheat.

Ian L. Wise¹, Robert J. Lamb¹, Jay W. Whistlecraft²

¹Cereal Research Centre, Agriculture and Agri-Food Canada, 195 Dafoe Road, Winnipeg, MB, R3T 2M9; ²Southern Crop Protection and Food Research Centre, Agriculture and Agri-Food Canada, 1391 Sandford Street, London, ON, N5V 4T3

The Canadian spring wheat cultivar ‘Superb’ is less susceptible to *Mayetiola destructor* (Say) than other spring wheat cultivars. Although females oviposit readily on seedlings of all cultivars, few larvae develop on ‘Superb’: seedling resistance is antibiosis against larvae. In the field, four weeks after the seedling stage, ‘Superb’ is less resistant. Nevertheless, the antibiosis and tolerance of ‘Superb’ reduces losses by 65% in comparison with susceptible cultivars.

Using core species assemblages and rare carabid taxa to evaluate forest change in Canada.

Timothy T. Work¹, John R. Spence², David Langor³, Matti Koivula², Jon Sweeney⁴

¹Département des Sciences Biologiques, Université du Québec à Montréal, C.P. 8888, Succursale Centre-ville, Montreal, QC, H3P 3P8 ; ²Dept. Renewable Resources, Univ. Alberta, Edmonton, AB, T6G 2H1; ³Canadian Forest Service, 5320-122 St., Edmonton, AB, T6H 3S5 ; ⁴Canadian Forest Service, PO Box 4000, Fredericton, NB, E3B 5P7

Carabids are used extensively for biomonitoring of natural and anthropogenic disturbances. With more large-scale biodiversity studies it is possible to evaluate generalized responses among subgroups of the Carabidae across a variety of disturbances and cover types. Here we evaluate the hypothesis that within the Carabidae there exists a core group of functionally equivalent species and a highly variable set of rarer species that represent ‘legacy’ elements unique to local conditions.

Poster Abstracts

Spring emergence of Canadian *Delia radicum* (L.) (Diptera: Anthomyiidae) and its natural enemies, an assessment for classical biological control.

L. Andreassen^{1,2}, U. Kuhlmann², J. Whistlecraft³, N.J. Holliday¹

¹Univ. Manitoba, Dept. Entomology, 214 Animal Science/Entomology Building, Winnipeg MB, R3T 2N2;

²CABI Bioscience Switzerland Centre, 1 Rue de Grillons, 2800 Delemont, Switzerland; ³Southern Crop Protection and Food Research Centre, Agriculture and Agri-Food Canada, 1391 Sandford Street, London ON, N5V 4T3

To evaluate the prospect of introducing the natural enemy *Aleochara bipustulata*, we assessed the thermal requirements for spring emergence of three different Canadian *D. radicum* populations, *A. bipustulata* from Sweden, and *Aleochara bilineata* from Winnipeg. The median thermal accumulation requirement for *D. radicum* from London was about 200 DDC (above 4°C) less than for *D. radicum* from Saskatoon and Winnipeg, and *A. bilineata*. No *A. bipustulata* emerged.

Dispersal capability of male forest tent caterpillars, *Malacasoma disstria* (Lepidoptera: Lasiocampidae), from two different populations and outbreak densities.

Aleks Argals, Maya Evenden

Dept. Biological Sciences, Univ. Alberta, Edmonton, AB, T6G 2E9

Two populations of forest tent caterpillar, *Malacasoma disstria*, were compared to examine the influence of density on flight capacity. Pupae were collected from two different populations in Alberta and male moths were flown on a flight mill to measure flight dispersal. Flight distance, duration and weight loss during flight will be presented for the two populations.

Pitfall trap depth in 3 forest habitats.

Colin Bergeron, John Spence

Dept. of Renewable Resources, Univ. Alberta, Edmonton, AB, T6G 2E3

Pitfall traps are commonly used to assess ground-dwelling arthropod biodiversity and are getting increasingly popular in biomonitoring programs. Although this method has a long history and has been carefully studied, certain aspects of pitfall trapping still need clarification. This poster compares catches from traps established at the surface of the soil (0 cm) to traps established at the mineral soil level (15-25 cm) in 3 different forest habitats.

Beetle diversity in burrowing owl pellets: impacts of agriculture on prey availability.

Pat Bouchard¹, R. G. Poulin², T. Wellicome³, G. Holroyd³

¹Agriculture and Agri-Food Canada; 960 Carling Avenue; Ottawa, ON, K1A 0C6; ²Department of Biological Sciences; University of Alberta; Edmonton, AB, T6G 2E9; ³Environment Canada, Canadian Wildlife Service, 4999-98 Avenue, Edmonton, AB, T6B 2X3.

Canadian populations of the Burrowing Owl (*Athene cunicularia*) have decreased significantly in the last thirty years. This species is now listed as “Endangered” under the Species at Risk Act. Agricultural practices have undoubtedly contributed largely to population decline. Regurgitated food pellets from over 200 burrowing owl nests in southern Alberta and Saskatchewan were collected in 2004. Nearly 30 000 beetles from those pellets were identified. Relationships between habitat diversity / land use and beetle diversity in burrowing owl pellets will be discussed.

Evaluation of egg parasitoids for biological control of bertha armyworm, *Mamestra configurata* Walker.

Lorraine Braun¹, Peter Mason

Agriculture and Agri-Food Canada, ¹Saskatoon Research Centre, 107 Science Place, Saskatoon, SK, S7N 0X2;
²Eastern Cereal and Oilseed Research Centre, K. W. Neatby Bldg., Ottawa, ON, K1A 0C6

Three *Trichogramma* species (one native and two commercially available) were assessed as potential inundative biological control agents against bertha armyworm, *Mamestra configurata* Walker. Parameters examined under laboratory conditions included: the number of eggs attacked and number of progeny produced; the range of egg ages attacked; the temperature range for optimum parasitism; the effectiveness of females in locating host eggs; and realized fecundity, daily egg production, and fertility of *Trichogramma* species.

Biology of *Lygus keltoni*- a pest of canola in Alberta.

Héctor Cárcamo¹, T. R. Larson¹, C. E. Herle¹, J. Otani².

Agriculture & Agri-Food Canada: ¹Lethbridge, AB; ²Beaverlodge, AB

Lygus keltoni was recently recognized as a species distinct from *L. shulli* and one of the dominant species that occasionally reaches pest status in canola in southern Alberta. We determined longevity and reproductive potential of adults provided with sprouted potatoes and romaine lettuce. Nymphal developmental time and proportion surviving to the adult stage was determined by rearing them individually and in groups on romaine lettuce.

Using PCR to identify a putative esterase in *Plutella xylostella* L.

Stephanie L. Chaisson, Donald T. Stewart, Sonia O. Gaul, Kathleen Glover

Agriculture and Agri-Food Canada, Atlantic Food and Horticulture Research Centre, 32 Main St., Kentville, NS, B4N 1J5

Degenerate primers designed from a *Myzus persicae* and an apparently homologous *Drosophila* esterase sequence were used in the polymerase chain reaction (PCR) to amplify DNA fragments and to direct sequence a 306 bp DNA fragment from *P. xylostella* DNA. The 306bp sequence matched other insect esterase sequences, including a partial esterase active site (oxyanion hole). The 306 bp sequence may provide a probe marker for *P. xylostella* resistance to pesticides.

Settlement patterns of mountain pine beetle (*Dendroctonus ponderosae*) in relation to lodgepole pine (*Pinus contorta*) characteristics in Banff National Park.

Mike Climie, Mary Reid

200 Lake Wapta Rise SE, Calgary, AB, T2J 2M9

I determined settlement patterns of mountain pine beetle (MPB) (*Dendroctonus ponderosae*) on *Pinus contorta* in Banff National Park, in relation to between- and within-tree factors. MPB prefer large DBH trees and low bole sections. MPB avoid high bark temperatures (south) and concentrate on cooler aspects (north, east). The lowest MPB density occurred on the west aspect. This suggests MPB settlement patterns may be related to some other factor in addition to bark temperature, such as degree of exposure.

Diversity of gall wasps (Hymenoptera: Cynipidae) on bur oak (*Quercus macrocarpa* Michx.) in Riding Mountain National Park, MB.

Scott C. Digweed
3761 – 20 Street, Edmonton, AB, T6T 1R8

Galls of 19 cynipid species were found on above-ground parts of bur oak (*Quercus macrocarpa* Michx.) in Riding Mountain National Park, MB during 2004. Most galls also hosted cynipoid and chalcidoid wasp guests or parasitoids. The park is near the northern limit of the natural range of bur oak, but gall wasp diversity was similar to that (23 species) recorded from bur oak further south.

Recent progress in Linyphiidae taxonomy.

Nadine Dupérré¹, Pierre Paquin¹, Don Buckle², Darrell Ubick³

¹Dept. Biology, San Diego State Univ., San Diego, CA, USA; ²620 Albert Avenue, Saskatoon, SK, S7N 1G7, Canada; ³Dept. Entomology, California Academy of Sciences, Golden Gate Park, San Francisco, CA, USA 94118

Systematics and taxonomy of the cavernicolous genus *Oaphantes*. Two new species from the West Coast are described. Molecular data suggests that the most troglobitic species is basal. A new troglobitic species of the genus *Oreonetides*. Recent collections in Appalachian caves lead to the discovery of an undescribed troglobite. Revision of the genus *Nanavia* in North America. The synonymy of the genus under *Leptorhoptrum* is erroneous, examination of museum specimens revealed the existence of a second *Nanavia* species.

Discovery of a native genetic variant of *Metarhizium anisopliae* var. *anisopliae* pathogenic to grasshoppers.

S. C. Entz¹, D. L. Johnson¹, and L. M. Kawchuk²

¹Univ. Lethbridge, 4401 University Drive, Lethbridge, AB, T1K 3M4; ²Agriculture and Agri-Food Canada, Research Centre, Box 3000, Lethbridge, AB, T1J 4B1

A genetic variant of the entomopathogenic fungus *Metarhizium anisopliae* var. *anisopliae* was isolated from an Alberta wheat field with a history of severe grasshopper infestations. PCR amplification of total genomic DNA from the isolate produced a product almost 300 bp larger than normal. Experimental infection of field-collected grasshoppers under laboratory conditions resulted in 100% mortality in 7 days. This is the first highly effective, indigenous non-chemical control of grasshoppers.

***Rhagoletis mendax* L. (Curran) control using vegetative field management in lowbush blueberry (*Vaccinium angustifolium*).**

Sonia O. Gaul, Leonard J. Eaton

Agriculture and Agri-Food Canada, Atlantic Food and Horticulture Research Centre, 32 Main St., Kentville, NS, B4N 1J5

Plots in eight commercial lowbush blueberry fields in Nova Scotia were monitored over 4 years to determine the influence of vegetative field management of *R. mendax*. The influence of duration of the vegetative management and distance of monitoring traps from the border between vegetative and fruiting fields on captures of adults was assessed. Captures decreased with years in vegetative management, and, within the fruiting field, with distance from the border.

Life history and demographic parameters of *Brevicoryne brassicae* L. (Homoptera: Aphididae) at three constant temperatures.

Ali Hosseini Gharalari

Agriculture and Agri-Foods Canada, Cereal Research Centre, 195 Dafoe Road, Winnipeg, MB, R3T 2M9

Reproductive and population parameters of cabbage aphid *Brevicoryne brassicae* were measured at 20, 25 and 30±1° C. Female longevity of *B. brassicae* ranged (minimum/ maximum) from 3 to 21, 20 to 20, and 0 to 4 at 20, 25 and 30±1 °C, respectively. Highest net reproductive rate (i.e. production of newborn females per generation) occurred at 20 °C. Highest intrinsic rate of population increase were at 25 °C. At 25 °C the mean generation time had the lowest value. Effects of temperature on cabbage aphid reproduction and life history patterns are discussed.

Foliage architecture and the oviposition preference of spruce budworm, *Choristoneura fumiferana*, for white spruce over balsam fir.

Gary Grant

Canadian Forest Service, Great Lakes Forestry Centre, 1219 Queen St. E., Sault Ste. Marie, ON, P6A 2E5

Spruce budworm have repeatedly shown a 2:1 oviposition preference for white spruce, *Picea glauca*, foliage over balsam fir, *Abies balsamea*, foliage under both laboratory and field conditions. A series of dual-choice, oviposition experiments using both real and artificial foliage was conducted to test the hypothesis that foliage architecture (specifically, the spatial arrangement of foliage needles) rather than other physical or chemical host cues account for this preference.

Some of Waterton Lakes National Park's spiders.

John Hancock

PO. Box 2932, Pincher Creek, AB T0K 1W0

Meet some of Waterton Lakes National Park interesting spiders. After six years of collecting Arachnids within the park some fascinating spiders have been revealed. An alpine jumping spider, ant mimics, funnelwebs, and some that are illegal immigrants from Europe. Plus some beautiful members of the families Pholcidae, Telemidae, Titanoecidae, Linyphiidae, Hahniidae, Theridiidae, Gnaphosidae, Clubionidae and Lycosidae that are seldom met with.

Habitat utilization of the pyrophilous beetle *Sericoda quadripunctata* (Carabidae) in burned white spruce stands.

Joshua Jacobs

Dept. Renewable Resources, Univ. Alberta, Edmonton, AB, T6G 2E3

The distribution of many species is limited to burned habitats. The specific reasons for pyrophilous habitat specialization and the roles they might play in the recovery of these disturbed areas are poorly known. *Sericoda quadripunctata* is rarely collected outside of areas burned within the last three years. Pitfall traps were deployed in 2 burns investigating the habitat utilization of this beetle at the EMEND research site in northwestern Alberta.

Life table study to identify control options for leek moth in Canada.

Wade H. Jenner^{1,2,3}, N. Cappuccino¹, P. Mason², U. Kuhlmann³

¹Carleton University, 1125 Colonel By Drive, Ottawa, ON, K1S 5B6; ² AAFC, Eastern Cereal and Oilseed Research Centre, 960 Carling Ave., Ottawa, ON, K1A 0C6; ³ CABI Bioscience Switzerland Centre, 1 Rue des Grillons, 2800, Delémont, Switzerland

Cultivated and wild species of *Allium* plants in central Europe were surveyed for natural enemies of the leek moth, *Acrolepiopsis assectella* (Lepidoptera: Acrolepiidae), which is an exotic pest of *Allium* crops in Ontario and Quebec. The selection of parasitoid candidates for classical biological control is discussed, accompanied by leek moth life table data from two subsequent years of study in Switzerland.

Rates of recovery of biodiversity of grasshoppers (Orthoptera: Acrididae, Tettigoniidae) and leafhoppers (Homoptera, Auchenorrhyncha: Cercopidae, Cicadellidae, Cicadidae) following intense wildfire in fescue foothills of Alberta.

Dan L. Johnson¹, K.G.A. Hamilton²

¹University of Lethbridge, 4401 University Drive, Lethbridge, AB, T1K 3M4; ²Agriculture and Agri-Food Canada, Eastern Cereal and Oilseed Research Centre, 960 Carling Ave., Ottawa, ON, K1A 0C6

Dry, windy conditions allowed a prairie fire near Granum, Alberta, to spread over 35 kilometres in under 6 hours, in December, 1997. Upland and coulees were burned by the intense heat, killing surface vegetation and overwintering insects. Samples over time following the burn were compared to pre-fire samples in the nearby fescue foothills. Reestablishment of grasshoppers and short-horned bugs varied, apparently according to dispersal ability and preferred food plants.

Dynamics of a Lepidoptera (moth) community in managed boreal forests of northwestern Alberta, Canada.

Esther Kamunya¹, J.R. Spence¹, W.J.A. Volney²

¹University of Alberta, Department of Renewable Resources, Edmonton, AB; ² Canadian Forest Service, Northern Forestry Centre, 5320-122 St., Edmonton, AB

The response of Lepidoptera (moths) to forest harvesting in the mixed wood boreal of North Western Alberta will be evaluated with respect to cover type and percentage green tree retention at the Ecosystem Management Emulating Natural Disturbance (EMEND) experimental site. Moths will be light trapped for a single night every 7-10 days and shrub vegetation searched for caterpillars. I predict treatment differences in diversity and species assemblages owing to differences in vegetation regeneration following harvesting.

Performance of traps used to monitor the plum curculio, *Conotrachelus nenuphar* (Herbst), is influenced by materials and abiotic factors.

Steve Lamothe¹, Gerald Chouinard², Daniel Cormier², Charles Vincent³.

¹Université du Québec à Montréal, Dép, des sciences biologiques, C.P. 8888, Succursale Centre Ville, Montréal, QC, H3C3P8; ² Institut de recherche et de développement en agroenvironnement, 3300 Sicotte, St-Hyacinthe, QC, J2S 7B8; ³ Centre de recherche et de développement en horticulture, Agriculture et Agro-alimentaire Canada, 430 boul Gouin, St-Jean-sur-Richelieu, QC, J3B 3E6

In order to improve the performance of pyramidal traps used to monitor plum curculio, models made of different materials (plastic, geotextile and screening) were assayed in various combinations of conditions, i.e.,

temperature, humidity, wind speed and luminosity. Trap captures of males and females were influenced by abiotic factors and by materials used to build the traps.

A coarse filter approach to conserving arthropod biodiversity in Canadian forests.

David Langor, James Hammond, Greg Pohl

Natural Resources Canada, Canadian Forest Service, 5320 –122 St., Edmonton, AB, T6H 3S5.

We assessed the utility of the Canadian Forest Ecosystem Classification (FEC) system as an ecological surrogate for epigaeic arthropod assemblage structure. Epigaeic assemblages were characterized in 15 ecosites in Upper Cordilleran forests. Partial congruence of ecosite classification with arthropod assemblage structure, especially at the extremes of soil nutrient and moisture gradients, suggests that the FEC may be used as a biodiversity conservation tool.

Changes in mate choice with age and mating history in *Tenebrio molitor*.

Tanya Latty, Mary Reid

Dept. of Biological Sciences, University of Calgary, Calgary, AB, T2N 1N4

A lab experiment was conducted to examine changes in female and male mate choice with age and mating history. Individuals were given a choice between high and low quality partners at ages 10, 20 and 30 days. Individuals were also exposed to one of three mating treatments: no mating, medium mating and high mating frequency. Preliminary results suggest that younger females spend greater amounts of time examining prospective mates and are choosier than older females.

Islands in the sky: Oribatid mite communities in suspended soils of Western redcedar as model systems of island biogeography and metacommunity dynamics.

Zoë Lindo

Dept. Biology, Univ. Victoria, P.O. Box 3020, Stn CSC, Victoria, BC, V8W 3N5

Suspended soils in ancient Western redcedar are unique in that they are natural model systems that lend themselves to testing resource limitations, island biogeography and metacommunity dynamics. These suspended soils are interconnected islands through which random movement disperses individuals; however, the source pool of resident arboreal fauna assemblages is unknown. Experiments on island biogeography and metacommunity dynamics test whether the forest floor is a colonizing source for canopy fauna assemblages.

Susceptibilities of green apple and spirea aphids to insecticides.

Tom Lowery, Michael Smirle, Bob Footitt, Cheryl Zurowski

Agriculture & Agri-Food Canada, Pacific Agri-Food Research Centre, Box 5000, Hwy 97, Summerland, BC, V0H 1Z0

The green apple, Aphis pomi, and spirea aphid, *A. spiraecola*, co-exist on apple throughout most of North America. These morphologically-similar species differ significantly in susceptibilities to insecticides. Exposure to insecticides applied to leaf disks showed that most clones of *A. spiraecola* were more tolerant to imidacloprid, pirimicarb, cyhalothrin-lambda, and pymetrozine than *A. pomi*, but susceptibility to dimethoate differed little. Implications for the management of ‘green apple aphids’ will be discussed.

Biological control of ambermarked birch leafminer in Alaska.

Chris MacQuarrie¹, D. Langor², E. Holsten³, S. Digweed², D. Williams²

Dept. Renewable Resources, 442 Earth Sciences Bldg, Edmonton, AB, T6G 2H1; Canadian Forest Service, 5320 - 122 St., Edmonton, AB, T6H 3S5; USDA Forest Service, 3301 "C" St., Ste. 202, Anchorage, AK, USA 99503

In 2003 we initiated a classical biological control program against an outbreak of *Profenusa thomsoni* in Alaska. *P. thomsoni* was introduced to the region in the early 1990s and rapidly expanded its range, defoliating 200,000+ acres of birch in 2005. Outbreaks of *P. thomsoni* occurred in Canada but were suppressed in the 1990's by the parasitoid *Lathrolestes luteolator*. By introducing *L. luteolator* to Alaska it is hoped the same level of control can be achieved.

The efficacy of three different insecticides to control European corn borer *Ostrinia nubilalis* (Lepidoptera: Pyralidae) in potatoes.

Christine Noronha

Agriculture and Agri-Food Canada, Crops and Livestock Research Centre, 440 University Avenue, Charlottetown PE, C1A 4N6

A study to determine the efficacy of three insecticides, Novaluron®, Avaunt® and Success®, to reduce European corn borer damage, was conducted at Harrington farms on PEI. Treatments consisted of two rates of Avaunt® and Novaluron® and one rate of Success® applied twice during the summer. The number of holes per plant was used to assess damage. Results show that all three insecticides significantly reduced ECB damage when compared to the untreated control.

Assessing the effectiveness of mountain pine beetle management strategies in Banff National Park.

Jane Park, Joanna Wilson

Parks Canada, Banff National Park, PO Box 900, Banff, AB, T1L 1K2

Mountain pine beetle populations are increasing in Banff National Park, causing concerns that they will expand eastward onto provincial lands. In response to these concerns, Parks Canada has divided the park into a 'monitoring zone' where prescribed fire is the only tool for beetle management, and a 'management zone' where more direct control measures are used. We are developing a model to assess the effectiveness of this management strategy for slowing the eastward spread of mountain pine beetle.

Aphid resistance in wild potatoes: preliminary results of field and laboratory trials.

Y. Pelletier¹, P. Dexter¹, R. Coffin², M. Bejan³, E. Lucas³, C. Vincent⁴, V. LeRoux⁵, P. Giordanengo⁵

¹ Agriculture and Agri-Food Canada, Potato Research Centre, P.O. Box 20280, 850 Lincoln Rd., Fredericton, NB E3B 4Z7; ² Cavendish Farms, P.O. Box 3500, Summerside, PE, C1N 5J5; ³ Dép. Sciences Biologiques, Groupe de Recherche en Écologie Animale et Comportementale, Univ. du Québec à Montréal, C.P. 8888, Succursale Centre Ville, Montréal, QC, H3C 3P8; ⁴ Centre de recherche et de développement en horticulture, Agriculture et Agroalimentaire Canada, 430 boul. Gouin, Saint-Jean-sur-Richelieu, QC, J3B 3E6; ⁵ Laboratoire de biologie animale, Univ. Picardie Jules Verne, 33 rue Saint Leu, 80039 Amiens Cedex 1, France

Our objective was to identify sources of resistance the Green Peach Aphid (*Myzus persicae*) and the Potato Aphid (*Macrosiphum euphorbiae*), within tuber-bearing *Solanum* species. To evaluate the aphid population development in a series of wild tuber-bearing *Solanum* species and accessions field plots were established on Prince Edward Island, in Quebec, and near Amiens, France. Colonization behaviour of *Myzus persicae* and

Macrosiphum euphorbiae was also studied in the laboratory at the Potato Research Centre of Agriculture and Agri-Food Canada.

Voraxin, the engorgement factor from ticks (Acari: Ixodidae): Cross-reactivity among various tick species.

Jessica Pollon, Morenike Olaosebikan, Reuben Kaufman
Dept. Biological Sciences, Univ. Alberta, Edmonton, AB, T6G 2E9

Virgin female *Amblyomma hebraeum* rarely exceed 10% of the engorged weight of mated females. Two peptides ('voraxin'), contained in the spermatophore, constitute the signal for full engorgement. We prepared homogenates of testis from fed male *A. hebraeum*, *A. americanum*, *Dermacentor andersoni*, *Rhipicephalus sanguineus*, *Ixodes ricinus* and *I. scapularis*. Extracts from each species were injected into virgin females of the other species in order to determine the cross-species specificity of voraxin.

Impact of woodborer damage vs. checking on fire-killed white spruce in northeast Alberta.

Sunil K. Ranasinghe, Tom Hutchison
Alberta Sustainable Resources Development, Public Lands and Forests Division, Forest Health Section, 8th Floor, 9920-108 Street, Edmonton, AB, T5K 2M4

We assessed woodborer damage and checking on mature white spruce that were affected by a spring wildfire over a two-year period. Experimental blocks representing three different fire intensities were set up. Sample trees from each block were felled and processed by following normal forest industry standards. We summarize the incidence of woodborer damage and checking on timber affected by different fire intensities and their impact on the final lumber product.

Mechanisms of resistance to Sunn Pest (*Eurygaster integriceps* Put.) in wheat cultivars.

M. Rezabeigi¹, G. Radjabi¹, G. Nouri Ghanbalani², G.A. Abdollahi¹
¹Plant Pests and Diseases Research Institute, Tehran, Iran; ²College of Agriculture, University of Mohaghege-Ardabili, Ardabil, Iran

Wheat cultivars showing resistance, semi-resistance and susceptibility to Sunn pest were examined under greenhouse and field conditions. The preference of adults and the number of newly emerged adults on each cultivar were used as indices of antixenosis. To examine antibiosis, indices such as weight gain of adults after feeding, the number of eggs, weight, dry weight and body fat percentage of newly emerged adults were studied. Lastly, indices including percent of grain damage and percentage weight reduction in damaged grains were examined to determine tolerance. A combination of antixenosis, antibiosis and tolerance were shown to influence the resistance. Correlations between the index of resistance and the indices of antixenosis, antibiosis and tolerance were significant.

Effect of the availability of preferred oviposition sites on reproductive performance of balsam fir sawfly, *Neodiprion abietis* (Harris), females.

Lucie Royer
Canadian Forest Service, PO Box 960, University Drive, Corner Brook, NL, A2H 6J3

Balsam fir sawfly (BFS) females lay their eggs preferentially into current year needles (C). However, other defoliators also exploit this same resource. How is reproductive performance of BFS females influenced by

this competition? In laboratory, realized fecundities of mated and virgin females decreased when C scarcity increased. Moreover, virgin females were more affected than mated females by a decreased availability of C. The ecological significance of results will be discussed.

Survival and fecundity of elm spanworm on different host tree species and the efficacy of a systemic insecticide as a control option.

Krista Ryall¹, H. Fry², P. Dixon³

¹Canadian Forest Service, PO Box 960, University Drive, Corner Brook, NL, A2H 6J3; ² Univ. New Brunswick, Fredericton, NB, E3B 6E1; ³ Agriculture and Agri-Food Canada, P.O. Box 39088, St. John's, NL, A1E 5Y7

Elm spanworm (ESW), *Ennomos subsignaria*, populations are at unprecedented outbreak levels in St. John's, Newfoundland. Feeding preferences of ESW were tested to determine: 1) whether larval development and adult fecundity differs among common urban tree species; and 2) ESW's ability to develop on native hardwoods, at risk if the outbreak spreads beyond the urban environment. To provide a control option, a systemic insecticide was tested against larvae in the field.

The Canadian Arachnologist On-line Spider Database.

David P. Shorthouse

Dept. Biological Sciences, Univ. Alberta, Edmonton, AB, T6G 2E9

On a shoe-string, this dynamic, interactive, and personally-funded initiative provides for all Nearctic spiders: 1) species descriptions, 2) real-time, publication-quality distribution maps, 3) all taxonomic literature since initial description, 4) species lists for all provinces and regions, 5) specimen lists, 6) synonym, current nomenclatural and common name searches, and 7) images of habitus, male and female external genitalia. Database management, outputs and potential applications are presented.

Effects of mixtures of kaolin (Surround®) and synthetic insecticides on larvae of the obliquebanded leafroller (Lepidoptera: Tortricidae).

Michael Smirle, Cheryl Zurowski, Tom Lowery

Agriculture & Agri-Food Canada, Pacific Agri-Food Research Centre, Summerland, BC, V0H 1Z0

Kaolin particle films have been used as protectants against insects and sunburn on pome fruits. Mixtures of kaolin with several insecticides were tested on obliquebanded leafroller larvae. Kaolin plus methoxyfenozide (Intrepid®) was more toxic to neonate larvae than methoxyfenozide alone. Mixtures of kaolin plus azinphosmethyl or indoxacarb (Avaunt®) were more toxic than the insecticides alone when tested on a resistant strain of leafrollers. Kaolin may have the potential to control resistant populations of leafrollers when mixed with other insecticides.

Voraxin, the engorgement factor from ticks (Acari: Ixodidae): production of recombinant peptides.

Alexandor Smith, Xiuyang Guo, Reuben Kaufman

Dept. Biological Sciences, Univ. Alberta, Edmonton, AB, T6G 2E9

Virgin female *Amblyomma hebraeum* rarely exceed 10% of the engorged weight of mated females. Two peptides (α - and β -voraxin), contained in the spermatophore, constitute the signal for full engorgement. In order to further explore the properties of voraxin and its biological effects, a source of pure material is

required. Here we compare the biological activity of recombinant voraxin produced from bacterial (*E. coli*, strain BL21(DH3)) and insect (*Sf21*ovary) cells.

Seasonal variation in damage potential to lodgepole pine seed orchards by *Leptoglossus occidentalis* (Hemiptera: Coreidae).

Ward Strong
BC Ministry of Forests, 3401 Reservoir Road, Vernon, BC, V1B 2C7

Seed feeding by *Leptoglossus occidentalis* Heidemann (Hemiptera: Coreidae) reduces seedset in British Columbia conifer seed orchards. We enclosed developing cones of Lodgepole pine in mesh bags, then introduced live adult females or nymphs for 10-day periods. Feeding in early May, late May-June, and July-August reduced seed yield to 8%, 18%, and 42% of protected cones, respectively. Seed orchard managers should reduce the action threshold from early May through June.

Emergence date reflects amount of fat in the Douglas-fir beetle (*Dendroctonus pseudotsugae*).

Wyatt Williams, Ian Robertson
Dept. Biology, Boise State Univ., 1910 University Dr., Boise, ID, USA 83725

Emergence day, mass, and body length were recorded for 63 newly-emerged female Douglas-fir beetles. Flight trials were then conducted to determine the effect of flight on fat levels. Flight duration (up to 4 h) had no significant effect on fat reserves. However, earlier emerging beetles had significantly higher fat reserves than later emerging beetles. Experiments are now being conducted to determine whether fat reserves influence host selection by female beetles.

Entomological Society of Alberta
Minutes of the Fall Executive Meeting

November 2, 2005
Radisson Hotel, Canmore, Alberta

Present: Danyk (Webmaster), Carcamo (ESC Regional Director), Kanashiro (Southern Director), Acorn (President), Evenden (Vice President), Undershultz (Secretary), Erb (editor of proceedings), Rondeau (Treasurer) and Otani (Northern Director)

1.0 Additions to Agenda

- 1.1 MOTION: To accept agenda as edited.
M/S Danyk/Carcamo
CARRIED

2.0 Approval of spring executive committee meeting minutes

- 2.1 MOTION: To accept spring exec meeting minutes.
M/S Otani/Evenden
CARRIED

3.0 Report from the Northern Director (Otani)

- 3.1 Director's Activities
No requests for Society participation in local events or activities.
- 3.2 Graduate Students - Thanks to those who provided information: Maya Evenden, Felix Sperling, and Kimberly Rondeau.

The degree being sought, a working title for their research project, their supervisor's name(s) and the student's contact information (optional) is listed below. Attending the University of Alberta:

- Armitage, G. B. Sc. (Completed Spring 2005). Reproductive biology of the ash leaf coneroller. Department of Biological Sciences. Supervised by Dr. Maya Evenden. Contact information: graham@ualberta.ca.
- Byer, Jay. Degree sought: M.Sc. (Year 3 of 4). Integrated management of lygus bugs in Faba bean. Department of Agricultural, Food and Nutritional Science. Supervised by Dr. Lloyd Dosdall. Contact information: manager.lara@telusplanet.net.
- Barkway, M.. M.Sc. (Year 2 of 2/3). Effects of logging on benthic macroinvertebrates in low gradient boreal streams. Department of Renewable Resources. Supervised by Dr. John Spence. Contact information: medgar@ualberta.ca.
- Belter, Danica. M.Sc. (Year 3 of 3). Microinvertebrates associated with rhizosphere zones of boreal plants. Department of Biological Sciences. Supervised by Dr. Heather Proctor. Contact information: dbelter@ualberta.ca.
- Bergeron, C. Ph.D. (Year 4 of 4/5). Fire history and historical effects on arthropods. Department of Renewable Resources. Co-supervised by Drs. John Spence and Jan Volney. Contact information: cb1@ualberta.ca.

- Boeckner, Matthew. Ph.D. (Year 3 of 5). Marine meiofaunal diversity. Department of Biological Sciences. Co-supervised by Dr. Heather Proctor and Dr. Rich Palmer. Contact information: boeckner@ualberta.ca.
- Bourassa, Stephan. M.Sc. (Year 2 of 2/3). Working title not available. Department of Renewable Resources. Co-supervised by Drs. John Spence and Hector Carcamo. Contact information: sb22@ualberta.ca.
- Broatch, Jim. Ph.D. (Year 3 of 5). The Importance of Reduced Herbicide Rates in Canola for Improved Integrated Crop Management. Department Agricultural, Food and Nutritional Science. Supervised by Dr. Lloyd Dosdall. Contact information: jim.broatch@gov.ab.ca.
- Bromilow, Sean. M.Sc. (Year 2 of 3). Genetic divergences of Peace River grassland butterflies. Department of Biological Sciences. Supervised by Dr. Felix Sperling. Contact information: bromilow@ualberta.ca.
- Cobb, Tyler. Ph. D. (Year 4 of 4). Impacts of salvage logging on insect communities. Department of Renewable Resources. Co-supervised by Drs. John Spence and David Langor. Contact information: tcobb@ualberta.ca.
- Crosina, Wendy. M.Sc. (Year 1 of 2/3). Title not available. Department of Renewable Resources. Co-supervised by Drs. John Spence and Luigi Morgantini. Contact information: wendy.crosina@ualberta.ca.
- Dechene, Andrea. B.Sc. (Completed Spring 2005). Natural history of Sericoda beetles and their mites. Department of Biological Sciences. Co-supervised by Drs. John Spence and Heather Proctor. Contact information: Not available.
- Djernaes, Marie. Ph.D. (Year 1). Marie is working on morphology and behaviour of primitive lepidopterans and has to come to us from Denmark. Marie is supervised by Dr. Felix Sperling. Contact information: Not available.
- Dyszy, Katarzyna. M.Sc. (Year 1 of 2/3). Title not available. Department of Renewable Resources. Co-supervised by Dr. John Spence and Dale Wrubleksi. Contact information: kdyszy@ualberta.ca.
- Elliott, Christina. M.Sc. (Year 1 of 2). Factors influencing flight of the large aspen tortrix. Department of Biological Sciences. Christina is supervised by Dr. Maya Evenden. Contact information: elliott@ualberta.ca.
- Frost, C. B.Sc. (Year 4 of 4). Factors regulating ballooning in pisaurid spiders. Department of Biological Sciences. Supervised by Dr. John Spence. Contact information: Not available.
- Glasgow, Maggie. M.Sc. (Completed August 2005). The effects of forest fragmentation on the generalist predators of the forest tent caterpillar, *Malacosoma disstria*. Department of Biological Sciences. Supervised by Dr. Jens Roland. Contact information: magglasgow@gmail.com.
- Hallstrom, Wayne. M.Sc. (Completed January 2005). Effect of invasion by Scotch broom (*Cytisus Scoparius*) and change in habitat quality on rare butterflies of Garry Oak meadows. Department of Biological Sciences. Supervised by Dr. Jens Roland. Contact information: waynehallstrom@yahoo.com.
- Hummel, Jeremy, M.Sc. (Year 2 of 3). The Importance of Canola-Barley Intercrops for Improved Integrated Crop Management. Department of Agricultural, Food and Nutritional Science. Supervised by Dr. Lloyd Dosdall. Contact information: hummelj@ualberta.ca.
- Jacobs, J. M.Sc. (Completed Spring 2005). Partial retention harvest, fire and saproxylic beetles. Department of Renewable Resources. Co-supervised by Drs. John Spence and David Langor. Contact information: Not available.

- Jones, B. M.Sc. Development of a combined pheromone-based monitoring system for the forest tent caterpillar and the large aspen tortrix. Department of Biological Sciences. Supervised by Dr. Maya Evenden. Contact information: bcjones@ualberta.ca.
- Kamunya, Esther. Ph.D. Title not available. Department of Renewable Resources. Supervised by Dr. John Spence. Contact information: Ekamunya@ualberta.ca.
- Korinus, Luisiana. Ph.D. (Year 5 of 5?). Agroforestry and spider biodiversity in Indonesia. Department of Biological Sciences. Supervised by Dr. John Spence. Contact information: lkorinus@ualberta.ca.
- Laffin, Rich. M.Sc. (Completed Spring 2005). The population structure of *Ceutorhynchus obstrictus* (Marsham), *Ceutorhynchus neglectus* (Blatchley), and molecular phylogenetic analysis of *Ceutorhynchus* (Coleoptera: Curculionidae). Co-supervised by Drs. Felix Sperling and Lloyd Dossdall. Department of Biological Sciences and Department Agricultural, Food and Nutritional Science. Contact information: rlaffin@ualberta.ca.
- Lopez, Mirey. B.Sc. (Completed Spring 2005). Impact of size and age on the reproductive biology of the large aspen tortrix. Department of Biological Sciences. Supervised by Dr. Maya Evenden. Contact information: mslopez@ualberta.ca.
- Lumley, Lisa. M.Sc. (Year 2 of 3). Genetic architecture of species differences between *Choristoneura spruce* budworm moths. Department of Biological Sciences. Supervised by Dr. Felix Sperling. Contact information: llumley@ualberta.ca.
- MacQuarrie, Chris. Ph.D. (Year 3 of 4). Biological control of birch leaf-mining sawflies. Department of Renewable Resources. Co-supervised by Drs. John Spence and David Langor. Contact information: Chris.MacQuarrie@ualberta.ca.
- Montes de Oca Torres, Enrique. Ph.D. (Completed Spring 2005?). Effects of altitude and patterns of land use on Mexican beetle assemblages. Department of Biological Sciences. Co-supervised by Drs. John Spence and George Ball. Contact information: enrique@ualberta.ca.
- Nazari, Vazrick. M.Sc., (Year 3 of 3). Phylogeography and systematics of swallowtail butterflies in the tribe Zerinthiini. Department of Biological Sciences. Supervised by Dr. Felix Sperling. Contact information: vnazari@ualberta.ca.
- Phillips, Iain. M.Sc. (Year 2 of 2/3). Patterns of habitat use in a colonizing crawfish. Department of Biological Sciences. Co-supervised by Drs. Rolf Vinebrooke and John Spence. Contact information: Not available.
- Roe, Amanda. Ph.D. (Year 5 of 5). Identification and evolution of *Dioryctria* cone borer moths. Department of Biological Sciences. Supervised by Dr. Felix Sperling. Contact information: aroe@ualberta.ca.
- Rondeau, Kimberly. M.Sc. (Start date September 2003). Factors influencing *Cyphocleonus achates* (Coleoptera: Curculionidae) dispersal and implications for biocontrol of diffuse knapweed (*Centaurea diffusa*) (Asteraceae). Department of Biological Sciences. Co-supervised by Drs. Jens Roland and Rob Bouchier. Contact information: kimberly.rondeau@ualberta.ca and www.ualberta.ca/~kjr2.
- Roth, David. M.Sc. (Completed August 2005). The effects of forest fragmentation on parasitoids of the forest tent caterpillar (*Malacosoma disstria*). Advisor: Jens Roland. University of Alberta, Department of Biological Sciences. Contact information: dzroth@gmail.com.
- Schmidt, Chris. Ph. D. (Year 3 of 5). Systematics of *Grammia arctiid* moths. Department of Biological Sciences. Supervised by Dr. Felix Sperling. Contact information: bjorn@ualberta.ca.
- Shorthouse, David. Ph.D. (Completed Spring 2005?). Partial retention harvests and spider assemblages. Department of Biological Sciences. Co-supervised by Dr. John Spence and Jan Volney. Contact information: dps1@ualberta.ca.

Simonsen, Thomas. Post Doc (Year 1). Thomas is working on the molecular phylogeny of cactus-feeding phycitine Pyralidae. Thomas is working with Dr. Felix Sperling and comes to us from Denmark. Contact information: Not available.

Wins-Purdy, Andreas. M.Sc. (Year 1 of 2). Effect of horticultural oil on the reproductive behaviour of the obliquebanded leafroller. Department of Biological Sciences. Supervised by Dr. Maya Evenden. Contact information: andreasw@ualberta.ca.

3.3 Changes in Professional Staff - New positions, study leave, sabbaticals, etc.

- Barry Cooke has taken an extended posting to CFS Edmonton from CFS, Ste. Foy, Quebec. Barry will be in Edmonton for the next two years.
- Dr. Jens Roland is on study leave from his position at the University of Alberta.
- Terry Thormin will be retiring from his position at the Royal Alberta Museum in March 2006.
- Dr. Bruce Heming will be retiring from his position at the University of Alberta in July 2006.

3.4 Events - July 7-12, 2005: David Langor (dlangor@nrca.gc.ca) coordinated the 2005 Biological Survey of Canada Bio-Blitz at Waterton Lakes National Park, Alberta, and 15 members of the Alberta Lepidopterists' Guild participated. Thanks to Greg Pohl for submitting.

3.5 News

- Alberta Lepidopterists' Guild - Thanks to Greg Pohl for submitting.
- The Guild is healthy and vibrant with about 45 members (many of whom are ESAB members as well).
- Several members of the Guild are involved with the compilation of an annotated checklist of Alberta Lepidoptera for a future publication.
- Small grants (up to \$2000) are available to Guild members pursuing Lepidoptera research in Alberta.
- For more information on the Alberta Lepidopterists' Guild, interested individuals can contact the president, Greg Pohl (gpohl@nrca.gc.ca).

3.6 Contact Information for Northern Director:

Beaverlodge Research Farm
Agriculture and Agri-Food Canada
P.O. Box 29
Beaverlodge AB T0H 0C0
tel. 780-354-5132 fax. 780-354-8171
e-mail: otanij@agr.gc.ca

4.0 Report from the Central Director

4.1 Sikes not present at meeting but subsequently provided the following information.

4.2 Rob Longair, busy but no report

4.3 Gordon Pritchard:

- Still writing up the results of a 10-year study of *Hetaerina Americana* (Odonata) in Hot Brook, S.D.
- Still writing up the results of a study of the effects of road-twinning on roadside insect communities in Banff N.P.
- Still planning further studies of the effects of road-twinning on the behavior and population dynamics of ants and opiliones.
- Still working on morphometrics of Zygoptera larvae in relation to growth rates and voltinism.

4.4 Mary Reid, busy but no report

4.5 Derek Sikes

- Systematics of subfamily Nicrophorinae (Silphidae)
- Collecting morphometric & DNA data to distinguish 2 possible cryptic species of *Nicrophorus* - a half-year undergraduate independent project on this is being conducted by Marcia Ricketts. - Project almost complete, Steve Vamosi will co-author as will MSc student Chandra Venables (who is finishing the DNA sequencing).
- Focus on new species in the SE Asian nepalensis group, ms submitted
- PhD student, Tonya Mousseau, started January '05 is focusing on the evolution & biogeography of this sp group
- Chandra Venables, MSc student, is working on resolving the basal radiation within the genus *Nicrophorus*
- Building web pages for Tree of Life website for the Silphidae.
- Will be moving to Alaska in June 2006 to take position as Assistant Professor of Entomology/Curator of Insects at the Univ. AK, Fairbanks. Will miss everyone!

4.6 Steve Vamosi

- Published a paper on the direct effects of larval competition on female fecundity, using bruchid beetles (Coleoptera: Bruchidae) as a model system (Vamosi SM. 2005. *Functional Ecology* 19: 859-864); my first peer-reviewed paper with an explicit entomological focus.
- Recently submitted a paper on sexual dimorphism in two bruchid species (Colgani & Vamosi, in review at *Entomol. Sci.*), and working on ms on the costs and benefits of contest vs. scramble larval competition strategies (Vamosi, den Hollander & Tuda, to be submitted to *Ecol. Lett.*).
- Masters student, Daynika Schade, set to begin her studies in January 2006 on host-parasitoid interactions, using bruchids & braconid wasps.
- Spent summer collecting dytiscids in ponds and lakes in southern Alberta, including Banff, Waterton Lakes, and Jasper NP.
- Undergraduate student, Cynthia Naydani, analyzing environmental correlates of dytiscid body size and species diversity.
- Doctoral student, Bianca Wohlfahrt, commenced her studies in September on predator-prey relationships between odonates and dytiscids.

4.7 Jack Zloty

- Moved to BC.

4.8 Ron Madge

- PhD under George Ball, Lebia.

- Retired, carrion beetle taxonomist & my collaborator - still visiting my lab about once or twice a month. Working on a ms with me revising a southeast Asian species group of *Nicrophorus* (ms submitted).
- Planning a paper looking at the basal radiation (deep splits) of the Nicrophorinae.
- Derek is hoping to get Ron on email so future collaborations will be easier.

5.0 Report from the Southern Director (Kanashiro)

5.1 Information not recorded.

6.0 Report from Regional Director to Ent Soc of Canada (Carcamo)

6.1 Strategic Review. In 2005 the Society conducted a strategic review of key aspects similar to the one conducted in 1996. At the Board meeting on 2 November 2005 (in progress at the time of writing this report) a number of motions in three areas were considered to summarize the recommendations from this review:

- Membership (11 motions). These deal with ways to retain and increase the number of members such as timely notices and invitation letters from the president. Membership fees will not increase because we are still in a healthy financial situation despite a deficit (see finance section below). A controversial topic was the issue of disclosing members' names from regional societies that do not belong to the national society to the national membership committee. Paypal or another method of web-based payment will be considered to pay fees. The ESC will consider ways of increasing its visibility at the annual meetings to attract more members. The issue of splitting the profits (50:50) was mentioned and may need to be emphasized more but there may be some resistance in regions where this is the only major fundraiser.
- Finance (6 motions). More detailed mid-term reports to update the executive and tracking institutional subscriptions were recommended. The Finance and Awards committees will assess the option of increasing the size of each award but reduce the overall number of awards. There was some discussion about making the bulletin entirely electronically but this was abandoned in recognition of our high quality Bulletin that needs to be mailed to those who ask for it.
- Technologies to collect, process, transfer information including moving towards electronic peer review of manuscripts. This is a major issue that will be tackled by an Ad Hoc committee, which is expected to become a permanent committee next year. ESC will look for technologically-savvy entomologists to lead this task. If you know of someone let us know.

6.2 Current Membership has actually increased thanks to the efforts of our president. As of September 16, 2005 we have 499 members, 24 more than same time last year; this are mostly new students.

Year	Regular	Student	Emeritus	Total
1997	404	79	70	553
1998	396	76	76	548
1999	382	72	72	526
2000	400	114	77	591
2001	386	98	82	566
2002	364	90	65	519

2003 (April 1)	303	47	66	416
2003 (October)	357	87	74	518
2004 (April 1)	307	53	73	433
2004 (September 28)	330	68	77	475
2005 (September 16)	338	86	75	499

6.3 Finances. The society reached a historical high “Balance end of the year of \$803 884” at the end of 2004. It has around \$477 000 in its General Fund, at least \$150,000 in building (Headquarter value) and \$177,000 in its Scholarship Fund. ESC hopes to increase this fund to about \$200, 000 and use the interests for fewer larger individual awards.

6.4 Other

- The Editor of Can Ent, Dr. Richard Ring has resigned as of the end of 2006 to allow replacement with an editor that will pave the way for electronic review and publication.
- Can Ent was ranked 31 of 64 among entomology journals as per an ISI 2003 citation record. There will be an article in the Bulletin about this in the near future.
- Mrs. Sandy Devine, the Office Manager at Headquarters has resigned as of the end of 2006.
- Dr. Paul Fields has resigned as Editor of the Bulletin as of the end of 2006. If you or anyone you know is interested in this position please contact your Regional Director.

7.0 Secretary’s Report (Undershultz)

7.1 Duties included:

- Kept copies of correspondence for archives.
- Distributed messages to members.
- Received newsletter for senior entomologists and associates

8.0 Treasurer’s Interim Financial Report (Rondeau)

8.1 Balances January 2005:

Term Deposit	\$15,000.00
Chequing	\$12,022.23

8.2 Credits:

Registration	\$28,050.00
Fundraising	\$2,000.00
Membership	\$668.00

8.3 Debits:

Invited Speaker	\$2,000.00
T-shirts & Bags	\$2,065.00
Award Contributions Carr Framing	\$54.00
Printing Costs (Proceedings/Program, etc)	\$3,640.00

8.4 Current Balance (Nov. 1, 2005):

Term Deposit	\$15,000.00
Chequing	\$34,789.78

- 8.5 MOTION: To roll over term investments in 2006
M/S Acorn/Undershultz
CARRIED
- 9.0 Webmaster's Report (Danyk)
- 9.1 The number of visits to the ESA website homepage appears to have leveled-off. Mean (\pm SE) number of hits during a 44-week period in 2005, ending October 30, was 68.0 ± 5.5 hits/week. Mean (\pm SE) number of hits in 2004 was 72.1 ± 4.1 hits/week. A total of 13250 visits to the homepage have been recorded since the addition of the counter in May 2000.
- 9.2 Since the 2004 ESA-ESS Joint Annual Meeting, website information content has remained about the same and has been updated as needed. Notable additions include: names of Charter members, photos and short histories of Honorary members, FS Carr Award recipient info, 2003 Proceedings, revised awards and membership applications, new by-laws and rules and regulation, a bulletin board, more internet links, and website history and info. Making available on-line more back issues of the Proceedings was not possible because of limited access to document scanners; this situation is no longer applicable and Troy anticipates completion of this project. Further website improvements include access to more on-line documents and a website search function.
- 9.3 In February 2005, confusion arose among people seeking information about the 2005 ESA-ESC Joint Annual Meeting (JAM). JAM info, available (at the time) on the ESA website, was being duplicated on a JAM local arrangements (LA) website (maintained by Dr. Dan Johnson). I understand the LA website was created because some people couldn't access JAM info on the ESA website, however no such concerns were ever brought to my attention. After Troy became aware of the LA website, he mentioned to certain JAM organizers that it made no sense to have duplicate websites, and asked them to select one website which would serve as the primary JAM website. JAM organizers selected the LA website for logistical reasons, and on March 1, all JAM info was deleted from the ESA website and replaced with a link to the LA website.
- 9.4 In July 2005, a redesigned ESA website was launched. Improvements included new graphics and photos, and information was grouped under major headings accessible from the homepage. Colours used on the website now conform more closely to those used in the coat of arms and flag crest for the province of Alberta. The ESA is grateful to the following people who provided new material (photos and/or text) seen on the website: John Acorn, Robert Bercha (webmaster of "Insects of Alberta"), Dr. Troy Danyk, Joe Gurba, Evan Gushul, Joe Shemanchuk and Dr. Derek Sikes. Troy regrets that for technical reasons he could not use additional photos sent to me by John Acorn and Elsa Cade.
- 9.5 The Department of Biological Sciences at the University of Alberta continues to provide us with excellent computing service by way of supplying space on their server for our website. Thanks the Department for hosting our website free of charge.
- 9.6 Troy looks forward to standing for election to the position of Webmaster at the 2005 General Meeting, and serving the Society in such a capacity for another year.

10.0 Executive committee nominations (Evenden)

10.1 Executive Committee status and nominations:

- Northern director – Otani (3rd of 3-year term).
- Central director - Kanashiro (2nd of 3-year term).
- Southern Director – Sikes heading to Alaska (Longair to be nominated).
- Webmaster – Danyk to be nominated for another term.
- Vice president – Jeff Battigelli to be nominated.
- Treasurer – will encourage Kim to stay, if not other will be nominated.
- Secretary – Undershultz (3rd of 3-year term).
- Regional director to ESC – Carcamo (2nd of 3-year term).

11.0 Awards (Evenden)

11.1 The following is the awards agenda for ESC/ESA meeting: Canmore AB, November 2nd 18:30-19:45

Opening

Awards:

- ESA Carr Award: Introduced by John Acorn, presented to Terry Thormin to be accepted by Robin Leech (he won't be there). We can then make the real presentation to Terry at the Strickland Dinner in March.
- ESC Criddle Award: presented to Gary Anweiler, to be introduced and by Greg Pohl and Felix Sperling and presented by Bob Lamb.
- Hewitt and Gold Medal award recipients introduced by Dan Quiring, presentation of awards by Bob Lamb.
- ESC C. Gordon Hewitt Award: presented to Dr. Dwayne Hegedus, to be accepted by Lorraine Braun.
- ESC Gold Medal: presented to Dr. Peter Kevan.
- Derek Sikes and Derrick Kanashiro to take pictures

Gold Medal Address

11.2 Agenda for November 4th 19:45-22:00 - Banquet

- ESA Student Awards: to be presented by Heather Proctor (Wayne Knee, Tonya Mouseau, Iain Phillips, Kim Rondeau, Chandra Venables).
- Undergraduate student award - applications received from Carol Frost and Aleks Agrals. Aleks selected as winner through executive committee vote (with extremely honorable mention to Carol Frost).
- ESC Student Awards: to be presented by Rose De Clerck-Floate
- Graduate Research Travel Scholarship—Owen Lonsdale
 - Owen will be present at the banquet

Student Conference Travel Awards:

- Kathryn Dau-Schmidt, University of PEI, Dept. Biology
- Maxence Salomon, Simon Fraser University, Biological Sciences
- Both recipients will be present in Canmore

Post Graduate Award (MSc)

- Andreas Wins-Purdy, University of Alberta, Dept. Biological Sciences

- Andreas will be present at the meeting
- Post Graduate Award (PhD)
- Zoë Lindo, University of Victoria, Dept. Biology
 - Zoë will be present at the meeting
- Keith Kevan Scholarship
- Amanda Roe, University of Alberta, Dept. Biological Sciences
 - Amanda will be present at the meeting
 - NOTE: this scholarship will be presented by Mrs. Keith Kevan
- NSERC Biocontrol Network Paper Presentation Award
- Network representative to present award (Dave Gillespie)
- ESC President's Prize Awards
- 5 oral presentation awards + 1 poster presentation award
 - Maya to present the President's Prize Awards
- Derek Sikes and Derrick Kanashiro to take pictures

- 11.3 Judging Information:
- PP1-Pest Management: Charles Vincent, Ward Strong, Julie Soroka + Dave Gillespie (Biocontrol Network Rep)
 - PP2-Faunistics and Systematics: Chris Buddle, Jan Klimaszewski, Chrystel Olivier
 - PP3-Forest Entomology: Shiyu Li, Jon Sweeney, Jens Roland
 - PP4-Parasitoids and Biocontrol: Alec McClay, Rob McGregor, Kevin Floate + Dave Gillespie (Biocontrol Network Rep)
 - PP5-Terrestrial, Riparian and Aquatic Ecology: Jade Savage, Dean Morewood, Dave Larson
- 12.0 Report on 2005 joint meeting between Ent Soc Alberta and Ent Soc Canada (Acorn)
- 12.1 All preparations complete. Everything set for a successful meeting.
- 12.2 Financially, we may break even and probably won't make a profit.
- 12.3 Speakers from 9 countries, and all provinces.
- 13.0 Business meeting agenda (Acorn)
- 13.1 Reviewed and approved by committee.
- 14.0 Vice President committee commitments (Evenden)
- 14.1 Currently the VP is listed in the Rules and Regs as the chair of 3 committees. Maya was wondering if these duties should be spread out.
- 14.2 Troy to redraft the Rules and Regs to address the above concern. To be tabled at next exec meeting.
- 15.0 4-H Club sponsorship
- 15.1 The 4H club approached Rob Longair to sponsor some sort of entomological program/event (not much detail about the purpose of sponsorship).

- 15.2 Exec committee expressed interest, although requests that Longair get more info prior to a formal approval.
- 16.0 Arachnology sponsorship
 - 16.1 Received a note from Rob Bennett (coordinator of arachnology symposium) requesting financial support for travel expenses for 2 speakers from California.
 - 16.2 Prior decision stands to assist only keynote speaker with travel expenses. All other speakers receive reduced registration rate.

MOTION: To adjourn meeting.
M/S Kanashiro/Undershultz
CARRIED

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

November 3, 2005
Radisson Hotel, Canmore, Alberta

Executive committee members present: Danyk (Webmaster), Carcamo (ESC Regional Director), Kanashiro (Southern Director), Acorn (President), Evenden (Vice President), Undershultz (Secretary), Erb (Editor of proceedings), Rondeau (Treasurer), Otani (Northern Director), Sikes (Central Director), and Proctor (Past President)

17.0 Additions to agenda and approval

17.1 Dan Johnson to speak about American Institute of Biological Sciences membership (item 10).

17.2 MOTION: To accept agenda as edited.
M/S Proctor/McQuarrie
CARRIED

18.0 President's Address (Acorn)
(see beginning of proceedings)

19.0 Approval of 2004 Annual General Meeting Minutes

19.1 MOTION: To approve 2004 meeting minutes.
M/S Carcamo/Evenden
CARRIED

20.0 Nominations for Office (Evenden)

20.1 The following are the three positions up for nomination this year, and nominees:

- Webmaster – Troy Danyk nominated
- Southern Director – Rob Longair nominated
- Vice President – Jeff Battigalli nominated

20.2 MOTION: To accept the nominations.
M/S Evenden/Kanashiro
CARRIED

21.0 Appointment of internal auditors for the treasurer's report

21.1 Proctor and Roe volunteered to be auditors

21.2 MOTION: To appoint Proctor and Roe as internal auditors.
M/S Ball/Carcamo
CARRIED

22.0 Treasurer's Interim 2005 Financial Report (Rondeau)

22.1 See attached report

- 22.2 MOTION: To accept the Treasurer's report.
M/S Acorn/Shemanchuk
DISCUSSION: Net balance does not include ESC grant, and some fundraising dollars yet to be received. Due to this, profit from the meeting will be approximately \$2000.
CARRIED
- 23.0 Webmaster's Report (Danyk)
- 23.1 See attached annual report of the webmaster.
- 23.2 Troy looks forward to standing for election to the position of Webmaster at the 2005 General Meeting, and serving the Society in such a capacity for another year.
- 23.3 MOTION: To accept the Webmaster's report.
M/S Leech/Sperling
CARRIED
- 24.0 Report from Regional Director to ESC (Carcamo)
- 24.1 See attached report.
- 24.2 MOTION: To accept the report of the Regional Director to the ESC
M/S Carcamo/Pohl
DISCUSSION: Johnson inquired if the student travel fund established in 2004 is still available. It was confirmed that the fund is still in place.
CARRIED
- 25.0 Student Awards (Proctor)
- 25.1 Travel awards and undergraduate prize will be presented at the banquet
- 26.0 ESA membership for the American Institute of Biological Sciences (Johnson)
- 26.1 The American Institute of Biological Sciences (AIBS) has opened up membership to smaller societies and biological sciences departments. The ESA could join and gain access to valuable information (databases on education, funding, and initiatives). More information on the Institute can be found at www.aibs.org.
- 26.2 Johnson noted he would be making a future motion for the ESA to join the AIBS, and if it was carried he would personally pay the first year's membership fee.
- 26.3 MOTION: For the ESA to become a single one-time member of the AIBS.
M/S Leech/Johnson
DISCUSSION: In response to Sperling's question on further clarification on the benefits of membership, Johnson noted that benefits include access to a public policy office, lists of funding sources, access to Bio1, and a subscription to Bioscience magazine. Ball expressed apprehension if may cost lots of money in the future. Johnson noted the cost of the membership is \$125/year.

AMENDED MOTION: To decline Johnson's generous offer to pay first year fee, and to have the Executive Committee take a close look and make the final approval for the ESA to become a single one-time member of the AIBS.

M/S McClay/Kanashiro

CARRIED

27.0 Resolutions Committee (Elliot, Jones, Argals, Wins-purdy, Bergeron)

27.1 Whereas the 2005 joint meeting of the ESA and ESC was both successful and memorable, and whereby the success of the meeting can be attributed to:

- The hard work and outstanding organization of the meeting chair: John Acorn
- The program committee: Felix Sperling and Dave Langor
- Local arrangements committee: Dan Johnson, Derek Sikes, Stephanie Erb, and student volunteers
- Registration committee: Heather Proctor and Derrick Kanashiro
- Awards committee: Maya Evenden
- Fundraising committee: John Spence, Jan Volney and Mike Dolinski
- Student representatives: Tyler Cobb and Tanya Mousseau
- Mike Majerus for his captivating plenary session
- The staff of the Radisson for their hospitality

28.0 Meeting adjourned

**Interim Financial Report
Entomological Society of Alberta
Annual General Meeting**

November 3, 2005

Balances January 2005:

Term Deposit	\$15,000.00
Chequing	\$12,022.23

Credits:

Registration Total		\$34,170.00
Total Registrations	266	
Students/Retired	111	
Regular Members	117	
Non Members	38	
Fundraising Total		\$2,000.00
Membership Total		\$668.00
Total Members		
Regular	88	
Student	34	
Library	20	
Subscrip. Library	4	
Honorary	7	
New Members in 2005		
Regular	12	
Student	11	

Debits:

Invited Speaker	\$2,000.00
T-shirts & Bags	\$2,065.00
Award Contributions Carr Framing	\$54.00
Printing Costs (Proceedings/Program, etc)	\$3,640.00

Current Balance (Nov. 1, 2005):

Term Deposit	\$15,000.00
Chequing	\$34,789.78

Annual Report of the Webmaster

The number of visits to the ESA website homepage appears to have leveled-off. Mean (\pm SE) number of hits during a 44-week period in 2005, ending October 30, was 68.0 ± 5.5 hits/week. Mean (\pm SE) number of hits in 2004 was 72.1 ± 4.1 hits/week. A total of 13250 visits to the homepage have been recorded since the addition of the counter in May 2000.

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The Department of Biological Sciences at the University of Alberta continues to provide us with excellent computing service by way of supplying space on their server for our website. I thank the Department for hosting our website free of charge.

I look forward to standing for election to the position of Webmaster at the 2005 General Meeting, and serving the Society in such a capacity for another year.

Dr. Troy Danyk
ESA Webmaster
October 30, 2005

ESC Director Report

Strategic Review. In 2005 the Society conducted a strategic review of key aspects similar to the one conducted in 1996. At the Board meeting on 2 November 2005 (in progress at the time of writing this report) a number of motions in three areas were considered to summarize the recommendations from this review:

- i) Membership (11 motions). These deal with ways to retain and increase the number of members such as timely notices and invitation letters from the president. Membership fees will not increase because we are still in a healthy financial situation despite a deficit (see finance section below). A controversial topic was the issue of disclosing members' names from regional societies that do not belong to the national society to the national membership committee. Paypal or another method of web-based payment will be consider to pay fees. The ESC will consider ways of increasing its visibility at the annual meetings to attract more members. The issue of splitting the profits (50:50) was mentioned and may need to be emphasized more but there may be some resistance in regions where this is the only major fundraiser.
- ii) Finance (6 motions). More detailed mid-term reports to update the executive and tracking institutional subscriptions were recommended. The Finance and Awards committees will assess the option of increasing the size of each award but reduce the overall number of awards. There was some discussion about making the bulletin entirely electronically but this was abandoned in recognition of our high quality Bulletin that needs to be mailed to those who ask for it.
- iii) Technologies to collect, process, transfer information including moving towards electronic peer review of manuscripts. This is a major issue that will be tackled by an Ad Hoc committee which is expected to become a permanent committee next year. ESC will look for technologically-savvy entomologists to lead this task. If you know of someone let us know.

Current Membership has actually increased thanks to the efforts of our president. As of September 16, 2005 we have 499 members, 24 more than same time last year; this are mostly new students

Year	Regular	Student	Emeritus	Total
1997	404	79	70	553
1998	396	76	76	548
1999	382	72	72	526
2000	400	114	77	591
2001	386	98	82	566
2002	364	90	65	519
2003 (April 1)	303	47	66	416
2003 (October)	357	87	74	518
2004 (April 1)	307	53	73	433
2004 (September 28)	330	68	77	475
2005 (September 16)	338	86	75	499

Finances. The society reached a historical high "Balance end of the year of \$803 884" at the end of 2004. It has around \$477 000 in its General Fund, at least \$150,000 in building (Headquarter value) and \$177,000 in its Scholarship Fund. ESC hopes to increase this fund to about \$200, 000 and use the interests for fewer larger individual awards.

Other

- The Editor of Can Ent, Dr. Richard Ring has resigned as of the end of 2006 to allow replacement with an editor that will pave the way for electronic review and publication.
- Can Ent was ranked 31 of 64 among entomology journals as per an ISI 2003 citation record. There will be an article in the Bulletin about this in the near future.
- Mrs. Sandy Devine, the Office Manager at Headquarters has resigned as of the end of 2006.
- Dr. Paul Fields has resigned as Editor of the Bulletin as of the end of 2006. If you or anyone you know is interested in this position please contact your Regional Director.
-

Respectfully submitted,
November 2nd, 2005

Héctor Cárcamo
ESA Director to the ESC

In early November in the soft alpenglow,
the entomologists gathered, to learn and to grow.
Kicked-off in style by the Deputy Mayor,
Gryllola -- Gryllobla -- what does he care?

Wednesday night found us up 'till two-o'clock,
desperately trying to finish out talk.
Thursday we learned of the great peppered moth,
reputation in tatters and credibility lost.

The talks that we heard filled our heads with the notion
that life's little wonders can cause such a commotion.
Arachnids, cerambycids, tortricids, you name it,
the pine beetle resisting our efforts to tame it.

Entomologie,
une célébration des pitites merveilles de la vie.
Trois semaines de traduction,
et deux heures de sommeil avant la présentation.

And after this sharing of entomo-delights,
did we disperse and fly quietly into the night?
No, we don't sleep, entomologists are hardy,
and if there's one thing I've learned, we know how to party.

Late into the night we caroused, and we laughed
(though this did not endear us to the Radisson staff).
But up in the morn' did we rise with the sun,
to glean all we could from the last day of fun.

So as we adjourn our meet' in Canmore.
We thank all the people who tackled this chore.
I'm sure you'll agree with us folks from the west
The 2005 JAM was a resounding success!

Andreas Wins-purdy
Christina Elliot
Brad Jones
Aleks Argals
Colin Bergeron

Resolutions Committee

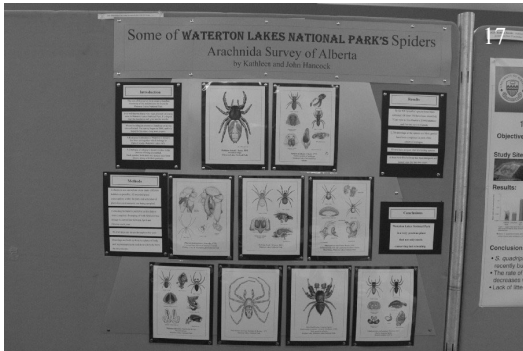




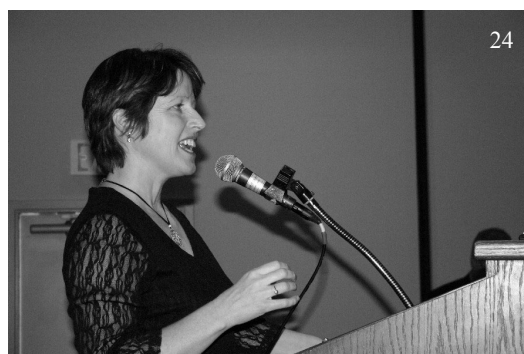
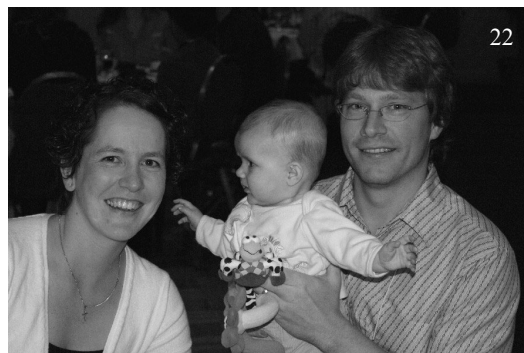
Awards: 1. Bob Lamb, ESC President and Gary Anweiler, Criddle Award winner 2. Peter Kevan, Gold Medal Award recipient, with family 3. John Acorn accepting Frederick S. Carr award for Terry Thormin 4. ESA student award winners: Aleks Argals, Chandra Venables, Iain Phillips, Tonya Mousseau, Wayne Knee, Kimberly Rondeau, Carol Frost 5. ESC student award winners: Maxence Salomon, Owen Lonsdale, Amanda Roe, Andreas Wins-Purdy, Zoë Lindo, Kathryn Dau-Schmidt 6. President's Prize winners: Tara Gariepy, Tyler Cobb, Tonya Mousseau,, Michael Kasamovic, Wim van Herk, Wade Jenner, Jeff Boone



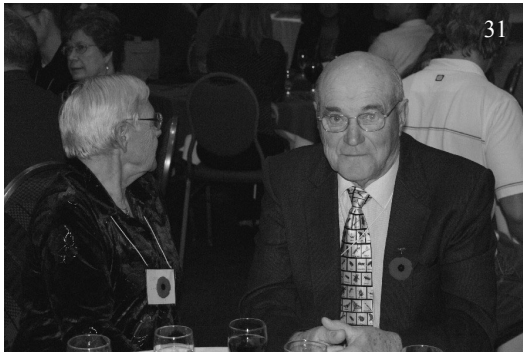
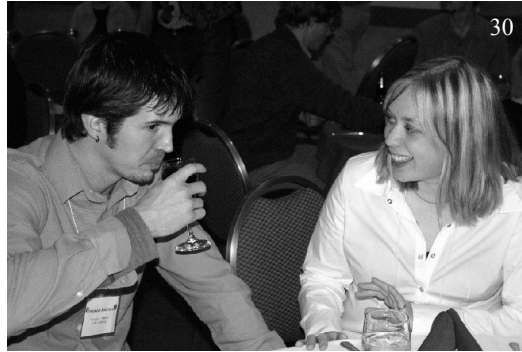
2005 attendees: 7. Barb Deneka and Gary Anweiler 8. Derek Sikes, Dave Walter, Maya Evenden, Heather Proctor 9. Heather Proctor and Dave Walter 10. George and Kay Ball 11. Enthusiastic registration desk volunteers 12. Marie Djernaes 13. Bruce Hemming 14. Amanda Roe



Scientific Session and special lectures: 15. David Larson, Heritage Lecture 16. Michael Majerus, Plenary speaker 17. Poster session-Kathleen and John Hancock 18. Greg Pohl speaks about rove beetles in northern forests 19. Timothy Work discusses carabids as biomonitors of disturbance 20. Rick Vetter informs us of “mythconceptions and mythidentifications”



Banquet: 21. Barry Cooke talks with Maya Evenden 22. Kelly, Sadie and Mike Undershultz
23. Dan Johnson and Vince Nealis 24. Rose DeClerck-Floate presenting ESC student awards
25. Michael Majerus and Heather Proctor 26. Banquet attendees being addressed by John
Acorn



Banquet: 27. Michael Majerus convinces us that ladybirds behave badly 28. Zöe Lindo, Jeff Battigalli, Frédéric Beaulieu, Mark St. John 29. Greg Pohl, Scott Digweed, Jason Edwards 30. Stéphane Bourassa and Kimberly Rondeau 31. Clara and Joe Shemanchuk 32. Colin Bergeron entertains the crowd 33. David Raworth, Pat Mackay, Bob Lamb, Charles Vincent 34. Paul Fields, Barry Lyons, photographers extraordinaire!



Group pictures: 35. John Spence lab 36. Students meet the Board reception 37. A full session

Photo credits: Photos courtesy of Derek Sikes (2, 3, 10, 17), John Acorn (9, 12, 35) and Derrick Kanashiro (remaining pictures)

Entomological Society of Alberta Membership

Last Name	First Name	Contact Information	Phone	E-mail
Honourary Members				
Ball	George	Dept. of Biological Sciences, Univ. Alberta	(780) 492-2084	gball@ualberta.ca
Carr	John	24 Dalrymple Green NW, Calgary AB	(403) 288-4634	
Gurba	Joe	9415-144 St, Edmonton AB	(780) 452-6752	
Gushul	Evan	1714-15 Ave South, Lethbridge AB	(403) 328-2426	
Larson	Ruby	410 20, 3 ST South, Lethbridge AB	(403) 327-2089	
Shemanchuk	Joseph	1050 Henderson Lake Blvd, Lethbridge AB	(403) 328-2171	
Regular Members				
Acom	John	132 Walsh Crescent, Edmonton AB		janature@compusmart.ab.ca
Ahmad	Zulfiqar	172 Castlegreen Close NE, Calgary AB	(403) 312-3102	zulfjee@hotmail.com
Ampong-Nyarko	Kwesi	Crop diversification Centre North	(780) 415-2316	kwesi.ampong-nyarko@gov.ab.ca
Anweiler	Gary	7212-103 Ave, Edmonton, AB	(780) 452-4245	gganweiler@sprint.ca
Ball	Kay	8108-138 St, Edmonton, AB	(780) 483-4951	keball@telusplanet.net
Barr	Bill	12316-93St, Edmonton, AB	(780) 474-6134	
Battigelli	Jeff	Earthworks Research Group	(780) 482-3744	jeff@earthworksresearch.com
Beres	Brian	AAFC Research Centre, Crop Sciences Section	(403) 317-2251	beresb@agr.gc.ca
Bird	Charley	Box 22, Erskine, AB	(403) 742-0626	
Blrse	Ian	11332-46 Ave, Edmonton AB	(780) 437-3195	
Bjornson	Susan	Pacific Agri-food Research Centre, AAFC	(604) 796-2221 x236	
Bourchier	Rob	AAFC Research Centre, Crop Sciences Section	(403) 317-2298	bourchier@agr.gc.ca
Braun	Lorraine	AAFC, Saskatoon Research Centre	(306) 956-7650	braun@agr.gc.ca
Brons	Gloria	Butterfly Wings n' Wishes	(780) 462-1839	gloria@butterflyab.com
Bryan	Nora	3307 12th ave SW, Calgary AB	(403) 246-7601	
Byers	Bob	AAFC Research Centre	(403) 327-4561	byers@agr.gc.ca
Byrtus	Gary	16531-114 St, Edmonton AB	(780) 427-9911	gbyrtus@env.gov.ab.ca
Cade	Elsa	109 Kings Bay S, Lethbridge AB	(403) 329-2201	ecade@telusplanet.net
Cade	William	University of Lethbridge	(403) 329-2201	Bill.Cade@uleth.ca
Calpas	James	Alberta Agriculture	(780) 422-4911	pestman@shaw.ca
Carcamo	Hector	AAFC Research Centre, Crop Sciences Section	(403) 317-2247	carcamoh@agr.gc.ca
Cartar	Ralph	Dept. of Biological Sciences, Univ. Lethbridge	(403) 329-2122	cartar@uleth.ca
Cerezke	Herb	11215-36A Ave, Edmonton AB	(780) 435-6007	cere@planet.eon.net
Christensen	Bruce	5702-43A ST, Vegereville, AB	(780) 632-2240	christe@digitalweb.net

Last Name	First Name	Contact Information	Phone	E-mail
Cohen	Michael	Dept. of Biological Sciences	(780) 492-0412	michael.cohen@ualberta.ca
Collister	Doug	3426 Lane Cres. SW, Calgary AB	(403) 246-2697	
Colwell	Doug	Lethbridge Research Centre	(403) 317-2254	colwell@agr.gc.ca
Cooke	Barry	#219, 1810 NW 23 Blvd., Gainesville FL	(352) 377-8302	
Crowe	Mike	University of Lethbridge	(403) 317-3430	mike.crowe@uleth.ca
Cryer	Karen	Department of Renewable Resources, Univ. Alberta	(780) 492-0463	kcryer@ualberta.ca
Cuny	Robert	Lakeland College	(780) 871-5766	Robert.Cuny@lakelandc.ab.ca
Dacks	Andrew	10835 - 80 Ave., Edmonton AB	(780) 438-0357	adacks@hotmail.com
Danyk	Troy	105 Fox Hollow Bay, Lethbridge AB	(403) 381-7634	tdanyk@hotmail.com
DeClerck-Floate	Rosemarie	AAFC Research Centre	(403) 317-2270	floate@agr.gc.ca
Dickinson	Tracy	AAFC Research Centre	(403) 327-4561 x399	dickinsont@agr.gc.ca
Digweed	Scott	Canadian Forest Service		scott_digweed@canada.com
Dolinski	Michael	Alberta Agriculture, Food & Rural Development	(780) 427-4873	mike.dolinski@gov.ab.ca
Dosdall	Lloyd	Pest Prevention and Management Unit, Alberta Agriculture	(780) 422-4911	lloyd.dosdall@gov.ab.ca
Edwards	Jason	Department of Natural Resources	(780) 989-5129	jasedwar@nr.can.gc.ca
Erb	Stephanie	AAFC Research Centre	(403) 317-3405	erbs@agr.gc.ca
Evans	George	Dept. of Biological Sciences, Univ. Alberta	(780) 492-3376	welvans@ualberta.ca
Evenden	Maya	Dept. Biological Sciences, Univ. Alberta	(780) 492-1873	mevenden@ualberta.ca
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